

 <b>ATMIYA UNIVERSITY</b>	<b>NAAC–Cycle– 1</b> <b>AISHE:U-0967</b>	
	<b>Criterion 1</b>	<b>CA</b>
	<b>KI 1.3</b>	<b>M 1.3.2</b>

<b>1.3.2</b>	<i>Number of certificate/ value added / Diploma Programme offered by the institutions and online courses of MOOCS / SWAYAM / e_Pathshala/ NPTEL and other recognized platforms where the students of the institution have enrolled and successfully completed during last five years</i>
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**Course modules and outcomes of Certificate/Value added programme offered by the institution**

**Additional information**

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**Registrar**  
**Atmiya University**  
**Rajkot**



- Certificate/value added programme offered by the institution of 40 hrs duration

S. N.	Offering Department	Course Title	Course code	Page no.
1.	Chemistry	Formulation of Detergents & Toiletries	23UGCH050	10
2.		Electroplating: Sustainable Techniques and waste Mitigation	23UGCH051	12
3.	CS & IT	E-learning tools	23UGCS050	14
4.		DTP Photoshop	23UGCS051	17
5.	Microbiology	Culture handling and preservation techniques	23UGMB050	19
6.	Biotechnology	Food Adulteration	23UGBT050	22
7.		Wealth from Waste	23UGBT051	25
8.	Industrial Chemistry	Polymer Chemistry	23UGIC050	28
9.	Mathematics	Vedic mathematics	23UGMT050	30
10.	Physics	Circuit Designing and Fabrication	23UGPY050	32
11.	English	English for Competitive Exams	23UGEN050	34
12.	Civil Engineering	Computer Aided Drawings	23UGCI050	36
13.	Electrical Engineering	Energy Management	23UGEE050	38
14.	Computer Engineering	Internet Technology	23UGCE050	40
15.		CISCO: Fundamentals of Networking	23UGCE051	43
16.	Mechanical Engineering	Computer Assisted Drafting	23UGME051	45
17.	Information Technology Engineering	Computer Maintenance & Troubleshooting	23UGIT050	47

18.	Management	Entrepreneurship	23UGMG050	50
19.	Pharmacy	Cosmetic Preparations	23UGPH050	52
20.	Commerce	Financial Literacy & Taxation	23UGCO050	54
21.	UHV Cell	Prosperity through self-reliance (स्वावलंबन से समृद्धि)	23UGID050	57
22.	Department of Electronics and Communication	Introduction to Robotics	23UGID050	59
23.	Pharmacy	Pharmaceutical Prerequisite	23UGPH051	62
24.	Mechanical Engineering	Personality Development	23UGID050	65
25.	Chemistry	Surface Coating Techniques	21AEVA001	69
26.		Formulation of Detergents & Toiletries	21AEVA002	72
27.		Soil & Water Analysis	21AEVA003	74
28.		Ice-cream & Desserts	21AEVA004	76
29.	CS & IT	E-learning tools	21AEVA005	79
30.		DTP Photoshop	21AEVA006	82
31.	Microbiology	Mushroom Cultivation	21AEVA007	84
32.		Bakery and Confectionary	21AEVA008	86
33.	Biotechnology	Food Adulteration	21AEVA009	89
34.		Wealth from Waste	21AEVA010	92
35.	Industrial Chemistry	Polymer Chemistry	21AEVA011	95
36.	Mathematics	Vedic mathematics	21AEVA012	99
37.	Physics	Circuit Designing and Fabrication	21AEVA013	99
38.	English	English for Competitive Exams	21AEVA014	101

39.	Civil Engineering	Computer Aided Drawings	21AEVA015	103
40.	Electrical Engineering	Energy Management	21AEVA016	105
41.	Computer Engineering	Internet Technology	21AEVA017	107
42.		CISCO: Fundamentals of Networking	21AEVA018	110
43.	Mechanical Engineering	Material Science and Measurement for day to day life	21AEVA019	112
44.	Information Technology Engineering	Computer Maintenance & Troubleshooting	21AEVA020	115
45.	Management	Entrepreneurship	21AEVA021	118
46.	Pharmacy	Cosmetic Preparations	21AEVA022	120
47.	Commerce	Financial Literacy & Taxation	21AEVA023	122
48.	UHV Cell	Prosperity through self-reliance (स्वावलंबन से समृद्धि)	21AEVA024	125
49.	Chemistry	Surface Coating Techniques	18AEVA001	127
50.	Chemistry	Formulation of Detergents & Toiletries	18AEVA002	128
51.	Chemistry	Soil & Water Analysis	18AEVA003	129
52.	Computer Science & Information Tech.	E-learning tools	18AEVA004	130
53.	Computer Science & Information Tech.	Desktop Data Publishing	18AEVA005	133
54.	Microbiology	Mushroom Cultivation	18AEVA006	135
55.	Biotechnology	Food Adulteration	18AEVA007	137
56.	Biotechnology	Wealth from Waste	18AEVA008	139
57.	Ind. Chem.	Mechanical Operations	18AEVA009	140

58.	Mathematics	Vedic mathematics	18AEVA010	142
59.	Mathematics	Graphing and Plotting techniques	18AEVA011	144
60.	Physics	Instrument Calibration and Maintenance	18AEVA012	146
61.	Physics	Repair & Maintenance of House hold Appliances	18AEVA013	148
62.	English	English for Competitive Exams	18AEVA014	150
63.	Civil Engineering	Computer Aided Drawings	18AEVA015	151
64.	Electrical Engineering	Energy Management	18AEVA016	152
65.	E & C Engineering	Introduction to Robotics	18AEVA017	154
66.	Information Technology Engineering	Computer Maintenance & Troubleshooting	18AEVA018	155
67.	Computer Engineering	Internet Technology	18AEVA019	157
68.	YOGA department	Pranayama & Meditation	18AEVA020	159
69.	Mechanical Engineering	Productivity Improvement Techniques	18AEVA021	162
70.	Management	Entrepreneurship	18AEVA022	165
71.	Pharmacy	Cosmetic Preparations	18AEVA023	167
72.	Commerce	Commercial Wisdom and Consumerism	18AEVA024	169
73.	Commerce	Financial Literacy & Taxation	18AEVA025	171
74.	English	Communication skill - I	18AECS01	174
75.	English	Communication skill - II	18AECS02	178
76.	English	Soft skill - I	18AECS01	182
77.	English	Soft skill - II	18AECS02	186

- **Certificate/value added programme offered by the institution of 80-200 hrs duration**

S.N.	Offering Department	Name of Co-curricular Course	Course Code	Page no.
1.	Computer Application	E-Marketing	21AECO001	190
2.		Web Designing	21AECO002	196
3.		Front End Web Development with React JS	21AECO003	200
4.	Computer Science	iOS App Development using Swift	21AECO004	206
5.		Software Implementation Process	21AECO005	213
6.		Responsive Web Design with Bootstrap	21AECO006	218
7.	Microbiology	Industrial Quality Management	21AECO007	222
8.	Biotechnology	Plant Tissue Culture	21AECO008	227
9.		Bioinformatics	21AECO009	232
10.		Competitive Exams for Life Science	21AECO010	237
11.	Chemistry	Quantitative Aptitude & Logical Reasoning for Government & Bank Competitive Exams	21AECO011	242
12.	Industrial Chemistry	Treatment of Environmental Waste	21AECO012	246
13.		Quality Assurance in Industry	21AECO013	251
14.	Physics	Bio Chemical Instrument Calibration And Maintenance	21AECO014	256
15.	Mathematics	Statistics Using R Programming	21AECO015	260
16.	Pharmacy	Herbal Medicine	21AECO016	264
17.	Civil Engineering	Interior Designing	21AECO017	269
18.	Computer Engineering	Animation & Multimedia	21AECO018	273
19.	Electrical Engineering	Renewable Energy Sources	21AECO019	278
20.		CCTV Video Footage Auditing and Investigation - Fundamental	21AECO020	283

21.	Information Technology	Advance Concepts with Google workspace	21AECO021	288
22.	Mechanical Engineering	3D Printing Technology	21AECO022	294
23.	Electronics & Communication Engineering	IoT based decentralized solar power system	21AECO023	298
24.	English	The Art of Speech Writing and Public Speaking	21AECO024	303
25.	Physical Education	Yogic Science	21AECO025	307
26.		Sports	21AECO026	313
27.	NCC	National Cadet Corps (NCC)	21AECO027	319
28.	NSS	National Service Scheme (NSS)	21AECO028	344
29.	UHV Cell	Concepts in Coexistence for Holistic Human Living	21AECO029	355
30.	IKS Cell	Study of Ancient Indian Painting & Crafts	21AECO030	361
31.	Management	Interpersonal Relationship Dynamics for Managerial Effectiveness	21AECO031	366
32.		Service Marketing	21AECO032	373
33.		Quantitative Research Management Techniques	21AECO033	379
34.	Commerce	Managerial economics theory and application	21AECO034	386
35.		Operations of stock exchange	21AECO035	390
36.		Indian financial system	21AECO036	395
37.	Physical Education	Laws of Cricket	21AECO037	398
38.	Civil Engineering	Environmental Assessment & Management	18AECO001	400
39.	Computer Engineering	Animation & Multimedia	18AECO002	405
40.	Electrical Engineering	Renewable Energy Sources	18AECO003	409
41.	Information Technology	Career life after Placement	18AECO004	414
42.	Mechanical Engineering	3D Printing Technology	18AECO005	417

43.	Electronics & Communication Engineering	Decentralized Solar Power System	18AECO006	421
44.	Pharmacy	Herbal Medicine	18AECO007	427
45.	Business Administration	Entrepreneurship Development	18AECO008	431
46.	Department of Commerce	Tally PRO	18AECO009	435
47.	Biotechnology	Plant Tissue Culture	18AECO010	439
48.		Bioinformatics	18AECO011	444
49.		Preparation for Competitive Exams for Academic Vertical Mobility in Life Science	18AECO012	449
50.	Microbiology	Biofertilizers	18AECO013	454
51.	Chemistry	Quantitative Aptitude & Logical Reasoning for Government & Bank Exams	18AECO014	458
52.	Industrial Chemistry	Treatment of Environmental Waste	18AECO015	461
53.	Mathematics	Quantitative Aptitude & Logical Reasoning for Industrial Placement	18AECO016	464
54.	Computer Science	E-Marketing	18AECO017	468
55.		Web Designing	18AECO018	472
56.	English	General Awareness	18AECO019	475
57.	Computer Science	Network Administration	18AECO020	477
58.		Basic Python Programming	18AECO021	481
59.		Tech. Implementer and Trouble shooter	18AECO022	486
60.	Physics	Instrument Calibration And Maintenance	18AECO023	490
61.	Physical Education	Yogic Science	18AECO024	495
62.	Chemistry	National Cadet Corps (NCC)	18AECO025	499
63.	Industrial Chemistry	Quality Assurance in Industry	18AECO026	506



64.	Physical Education	Sports	18AECO027	507
65.	Mechanical Engineering	National Service Scheme (NSS)	18AECO028	512

Course Code	Course Title	Course Credit and Hours
<b>23UGCH050</b>	<b>Formulation of Detergents &amp; Toiletries</b>	<b>2 Credit - 4 hrs / wk</b>

**Objective of the course:**

1. Student should be able to understand the basic concept of surface active agents.
2. Understand the basic theory and role of additives in the formulation of cleansing agents and their role in day to day life of humans
3. Students will be able to develop the raw materials and formulation of the soap.
4. Students will be able to develop the raw materials and formulation of the detergents.
5. Student should be able to understand the basic concept of toiletries and their formulation with vast applications.

**Target Skills (Course outcomes):**

1. Skill development to perform the formulation of soap, detergent and other cleansing agent.
2. Skill development to assess the quality of soap and detergent.

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other) :**

- The Value added course based on formulation of Detergents & Toiletries belongs to area of Home care, Personal care and industrial hygiene are offered by various government and non-government institutes. Students will be able to do their own business by improving their skills.
- **Reference:**
  1. <http://www.ihpcia.org/>
  2. <http://www.dcmsme.gov.in/All%20Associations/Product%20Base%20Associations/Soap%20&%20Toiletries%20Associations.html>

**Course Description:**

The course enables the students to understand the information about surface active agents. To enable the students to understand the importance of additives in the formulation of soaps and detergents. The course provides the complete formulation process of soap, detergents and toiletries both in solid as well as liquid phase  
The course aims to address SDG-1: No Poverty.

Course Content	Hours
<b>Module-I: Surface active agents</b>	8 hrs
<ul style="list-style-type: none"> <li>• Introduction,</li> <li>• Classification and role of surface active agents - emulsifiers, foaming agents,</li> <li>• Antifoaming agents, concept of HLB - Hydrophile Lipophile Balance.</li> </ul>	
<b>Module-II : Additive agents</b>	8 hrs
<ul style="list-style-type: none"> <li>• Chemistry, composition, characteristics, role and applications of oil paints, water paints (emulsion paints), varnishes, lacquers and wax polishes.</li> </ul>	
<b>Module-III : Soaps</b>	8 hrs
<ul style="list-style-type: none"> <li>• Introduction, composition, characteristics, role and applications of soaps,</li> </ul>	

formulation process of soaps - both liquid and solid.	
<b>Module-IV : Detergents</b>	8 hrs
<ul style="list-style-type: none"> <li>• Introduction, composition, characteristics, role and applications of soaps, formulation process of detergents - both liquid and solid.</li> </ul>	
<b>Module-V : Toiletries</b>	8 hrs
<ul style="list-style-type: none"> <li>• Introduction, composition, characteristics, role and applications of toiletries like liquid dish-wash and domestic toilet cleaners. Formulation process of liquid dish-wash and domestic toilet cleaners.</li> </ul>	

**Suggested laboratory experiments / other activities:**

1. Preparation of liquid hand-wash: Gel type - transparent.
2. Preparation of liquid hand-wash: Cream type - opaque.
3. Preparation of liquid dish-wash.
4. Preparation of domestic glass cleaner.
5. Preparation of domestic toilet cleaner.
6. Preparation of liquid detergent.
7. Preparation of tiles cleaner
8. Preparation of rust remover
9. Preparation of drainage cleaner
10. Preparation of shower gel & shampoo.

**Pedagogic tools:**

1. Chalk and Talk
1. PPT and Videos.
2. Assignment
3. Group discussion

**Reference Books:**

1. Surfactants and interfacial phenomena - Milton J. Rosen
2. Chemical formulation an overview of surfactant – based preparation used in everyday life – Tony Hargreave, Royal Society of Chemistry, 2003, ISBN: 0854046356
3. Cosmetic and Toiletry Formulations - Vol. 2, Ernest W. Flick, Noyes Publication

**Suggested reading / E-resources**

1. <https://www.sciencedirect.com/topics/earth-and-planetary-sciences/synthetic-detergent>
2. <https://www.shaalaa.com/question-bank-solutions/give-two-differences-between-the-soap-and-synthetic-detergent-cleansing-age>

**Suggested MOOCs:**

1. <https://swayam.gov.in/explorer?searchText=chemistry>

Course Code	Course Title	Course Credit and Hours
<b>23UGCH051</b>	<b>Electroplating: Sustainable Techniques and Mitigation</b>	<b>2 Credit – 2hrs / wk</b>

**Objective of the course:**

1. Give an overview of various cleaning process for surface chemistry.
2. Train the student to formulate various electrolytes and to determine quality of electrolyte.
3. Be familiar with the different types of organic surface coating and inorganic surface coating
4. Discuss Formulation; Application; Properties of various additives like Solvent, Brightener and Emulsifiers.

**Target Skills (Course outcomes) :**

1. Decide the surface preparation methods suitable for different substrate materials
2. Understand the basic concept of electroplating & interpret testing & evaluation.-explain importance of electroplating & its applications
3. Student should ability to understand the fundamental principles of Paint and Coating Formulation via classification and film formation mechanisms.
4. Student should able to understand formulations of Electrolyte based on different processes.
5. Ability to handle various machineries and equipment used in laboratory as well as commercial scale.
6. Basic understanding of designing Solvent, Brightener and Emulsifiers for formulation of various electrolytes
7. Ability to understand testing methods for various electrolytes

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other) :**

- This course based on surface coating to area of surface finishing. Various types of courses from surface finishing sector are offering by Paints and Coatings Skill Council of India (ASCI-SSC).

**References:**

Link Regional needs of the course: <https://nsdcindia.org/sector-skill-councils>

**Course Description:**

The course provides basic information about theory and application of surface chemistry. To enable the students to understand the importance of Techniques of Surface Preparation for different substrata. The course introduces for highlights on different paint application techniques and its efficiency. The course introduces various Classifications of coatings, Mechanisms of film formation in surface coatings. The course emphasizes on Principles of Inorganic surface coating - Non-electric coatings, role of additive like Brightener, Solvent and Emulsifiers technology in electroplating techniques.

Course Content	Hours
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<b>Module-I: Electroplating of Base metal</b>	10 hrs
<ul style="list-style-type: none"> <li>• Basic process of electroplating</li> <li>• Theory and application of following electroplating techniques <ul style="list-style-type: none"> <li>➤ Copper plating</li> <li>➤ Nickel plating</li> <li>➤ Chromium plating</li> <li>➤ Cadmium plating</li> <li>➤ Zinc plating</li> </ul> </li> </ul>	
<b>Module-II : Electroplating of Precious metals</b>	10 hrs
<ul style="list-style-type: none"> <li>➤ Silver plating</li> <li>➤ Gold plating</li> <li>➤ Rhodium plating</li> <li>➤ Ruthenium plating</li> </ul>	
<b>Module-III : Process Control and Mitigation</b>	10 hrs
<ul style="list-style-type: none"> <li>• Analysis and recovery of metal for following plating solution <ul style="list-style-type: none"> <li>➤ Cadmium plating solution</li> <li>➤ Chromium plating solution</li> <li>➤ Copper plating solution</li> <li>➤ Gold plating solution</li> <li>➤ Nickel plating solution</li> <li>➤ Silver plating solution</li> <li>➤ Rhodium plating solution</li> </ul> </li> </ul>	

**Pedagogic tools:**

4. Chalk and Talk
5. PPT and Videos.
6. Assignment
7. Group discussion
8. Seminar

**Reference Books:**

1. Coatings materials and surface coatings - Arthur A. Tracton (Editor), CRC Press, Tailor & Fransis Group.
2. Engineering chemistry - R. Gopalan, D. Venkappayya, S. Nagarajan.
3. Chemistry in engineering and technology volume -1 & 2 – J.C. Kuriacose & J. Rajaram
4. Engineering chemistry – Jain & Jain Industrial hygiene and chemical safety – M. K. Fulekar.
5. The Canning Handbook Surface Finishing Technology by Tromans B
6. Electroplating engineering handbook by Lawrence J. Durney

Course Code	Course Title	Course Credit and Hours
<b>23UGCS050</b>	<b>E-learning Tools</b>	<b>2 Credit - 4 hrs / wk</b>

**Objective of the course:**

1. Understand the concept of internet
2. Understand the use of Google tools & Technology
3. Create a document , presentation with formatting by using online tools
4. Understand the working of internet ,DNS
5. Create an effective presentation and diagram using online and offline tools
6. Create Simple website

**Target Skills (Course outcomes) :**

1. Students will be able to use E-Learning Tools for their academics.
2. Students will be able to use many open source tools provided by google
3. Students will be able to develop static website
4. Students will be able to create google blog
5. Students will be able to know basic foundation of how freelancing can be done
6. Students will be able to use many open source animated presentation tools and software etc.

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other) :**

- The Value added course based on E-Learning tools and technology is designed based on the course offered by google for the students to enhance their search experience and improve work productivity by using many automated open source tools

**Reference:**

<https://learndigital.withgoogle.com/digitalgarage>

**Course Description:**

The course is an introduction to E-Learning Tools and Technique. This course aims to provide Many open source technology which allows the students to enhance their digital search skill more advance. This course is designed to build your confidence and help you thrive the digital literacy by discover tools to make Improve your interview skills, academics succeed, Prepare for the career you want

Course Content	Hours
<b>Module-I: Introduction of Internet</b>	4 hrs
<ul style="list-style-type: none"> <li>• Introduction of Network               <ul style="list-style-type: none"> <li>○ Computer Networks &amp; Type of Computer Network</li> <li>○ Remote Desktop Login</li> <li>○ What is Internet? &amp; Use of Internet?</li> </ul> </li> <li>• Applications of Internet               <ul style="list-style-type: none"> <li>○ World wide web(web page, web site, web client, URL web server)</li> <li>○ DNS and Web Hosting</li> </ul> </li> </ul>	

<ul style="list-style-type: none"> <li>○ Email and how email transfer works, Social media and E-commerce</li> <li>○ Data transfer over Internet</li> <li>● How to stay safe on internet?</li> <li>● How to download and upload?</li> <li>● IP addressing</li> </ul>	
<b>Module-II : Google Tools &amp; Technology</b>	8 hrs
<ul style="list-style-type: none"> <li>● Internet search and Content <ul style="list-style-type: none"> <li>○ Google Trends</li> <li>○ Google alerts(news and search e-mail alerts)</li> <li>○ Google Earth (3-D satellite Imagery),</li> <li>○ Google Image Search</li> <li>○ Google Labs (online services research and development)</li> <li>○ Google Local, Google Play Store (Marketplace for digital content)</li> <li>○ Google (Google gravity , Google Water , Google Sphere etc...)</li> </ul> </li> <li>● Tools and application <ul style="list-style-type: none"> <li>○ Google sites (To create your personal Homepage) , Google profile</li> <li>○ Blogger</li> <li>○ Gmail, Google Drive (Docs , Forms etc), Google Chrome(web browser)</li> <li>○ Google Language tools</li> <li>○ Google Code</li> <li>○ Google Calendar , Google Reader , Google Voice</li> <li>○ Google Checkout (Google wallet)</li> <li>○ Google Class room</li> </ul> </li> </ul>	
<b>Module-III : Office Made Easy and Other Utility tools &amp; technique</b>	10 hrs
<ul style="list-style-type: none"> <li>● Word processing tool in detail</li> <li>● Spreadsheet</li> <li>● Presentation tool <ul style="list-style-type: none"> <li>○ Online/Offline presentation tool to make effective presentation(powtoon etc)</li> <li>○ Diagrammatic Tools (Online and offline)</li> </ul> </li> <li>● Different File Conversion Tools</li> </ul>	
<b>Module-IV : Learning Management SystemTools</b>	10 hrs
<ul style="list-style-type: none"> <li>● Moodle</li> <li>● Coursera, edx, Udemy, Lynda, Udacity, Codeschool, Microsoft Virtual Academy etc</li> <li>● Overview of Freelancing (Fiverr etc)</li> </ul>	
<b>Module-V : Other E-Learning Resources and Tools</b>	8 hrs
<ul style="list-style-type: none"> <li>● Online Certification sites</li> <li>● Online tools <ul style="list-style-type: none"> <li>● CourseLab</li> <li>● exelearning.org , lamsfoundation.org</li> <li>● NPTEL</li> </ul> </li> </ul>	

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| <ul style="list-style-type: none"><li>• MIT Open Course Ware</li><li>• Learners TV</li></ul> |  |
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**Suggested laboratory experiments / other activities:**

1. Internet access with network setup
2. Google Searching Technique and Applications
3. Make creative presentation
4. Use of Learning Management tools
5. Join different learning resource and get certification

**Pedagogic tools:**

1. Computer Application
2. Chalk and Talk
3. PPT & Videos
4. Assignment
5. Group Discussion

**Reference Books:**

1. R.K. Taxali , Pc Software For Windows Made Simple, McGRAW HILL
2. 1. Vincent Hargreaves , The Complete Book of the Freshwater Aquarium, Thunder Bay Press, CA, 2<sup>nd</sup> edition, 2007.
3. John E.Bardach, John H. Ryther and William O.Mc.Larney Aquaculture. New York : WileyInterscience.

**Suggested reading / E-resources**

1. <http://www.google.com>
2. [www.courselab.com](http://www.courselab.com)
3. [nptel.ac.in](http://nptel.ac.in)
4. <https://ocw.mit.edu>,<https://www.edx.org>
5. <https://www.coursera.org>, <https://www.udemy.com>, <https://www.lynda.com/>
6. [www.learnerstv.com](http://www.learnerstv.com)

**Suggested MOOCs:**

1. <http://www.google.com>
2. [www.courselab.com](http://www.courselab.com)
3. [nptel.ac.in](http://nptel.ac.in)
4. <https://ocw.mit.edu>,<https://www.edx.org>
5. <https://www.coursera.org>, <https://www.udemy.com>, <https://www.lynda.com/>
6. [www.learnerstv.com](http://www.learnerstv.com)



Course Code	Course Title	Course Credit and Hours
23UGCS051	DTP Photoshop	2 Credit - 4 hrs / wk

**Objective of the course:**

- Identify and learn the image manipulation.
- Identify the categories of Adobe Photoshop tools.
- Manipulate layers through ordering, positioning, scaling, rotation, and adjustments.
- Learn the basics so that you can complete fundamental tasks.
- Learn how to make use of more advanced features that will make your Photographs pieces of art.

**Target Skills (Course outcomes) :**

- Skill development to perform basic editing
- Skill development to image manipulation.
- Working with layers through ordering, positioning, scaling, rotation, and adjustments.
- Prepare images for Web and print output with appropriate sizing and resolution.

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other) :**

- DTP (desktop publishing) operators use specialist computer software to make sure that printed materials (such as books, newspapers, magazines and brochures) are well designed, attractive and easy to read by NSDC and skill India.

**Reference:**

[https://eskillindia.org/Course/course\\_detail/117206920200221051647](https://eskillindia.org/Course/course_detail/117206920200221051647)

**Course Description:** This course covers the beginning skills of image production and manipulation, using the industry-standard Adobe Photoshop to work with digital images for both Web and print use.

Course Content	Hours
<b>Module-I:</b> Introduction	4 hrs
<ul style="list-style-type: none"> <li>• About Photoshop &amp; Interface</li> <li>• Understanding Canvas &amp; Layer</li> </ul>	
<b>Module-II :</b> Tools	8 hrs
<ul style="list-style-type: none"> <li>• Understanding tools</li> <li>• Different Selection</li> </ul>	
<b>Module-III :</b> Image Processing	10 hrs
<ul style="list-style-type: none"> <li>• Photo editing (Background, Retouch, Color correction)</li> <li>• Filters</li> </ul>	
<b>Module-IV :</b> Creation	10 hrs
<ul style="list-style-type: none"> <li>• Create Object</li> <li>• Logo, Passport size photo, Different Cards, Kankotri, Wedding Album</li> </ul>	

<b>Module-V : Advertising</b>	8 hrs
<ul style="list-style-type: none"> <li>• Story &amp; Post</li> <li>• Banner, Broacher, Visiting Cards,</li> </ul>	

**Suggested laboratory experiments / other activities:**

1. Photo Retouch
2. Color correction
3. Create object

**Pedagogic tools:**

1. Computer Application
2. Chalk and Talk
3. Videos
4. Assignment

**Reference Books:**

1. Adobe Photoshop CS6 on Demand (2012), *Pearson Education*, Perspection Inc., Steve Johnson. (ISBN: 9780132966498, 0132966492)
2. Photoshop CC Bible (2013), *Wiley*, Lisa DaNae Dayley, Brad Dayley, (ISBN: 9781118643778, 1118643771)

**Suggested reading / E-resources**

1. <http://kfrserver.natur.cuni.cz/obecne/soubory/PhotoShop6/UserGuide.pdf>

**Suggested MOOCs:**

Course Code	Course Title	Course Credit and Hours
<b>23UGMB050</b>	<b>Culture Handling and Preservation Techniques</b>	<b>2 Credit - 4 hrs / wk</b>

**Objectives of the course:**

The aim of the course is

1. To equip students with a comprehensive understanding of the underlying principles and intricate techniques involved in the delicate art of microbial culture handling and preservation.
2. To delve into various types of microbial cultures, we aim to impart knowledge on different methods for their preservation.
3. To provide hands-on laboratory sessions to enable students to gain practical experience in essential processes such as streak plating, sub culturing, cryopreservation, and lyophilization.
4. To empower students with the necessary skills to apply their expertise in diverse fields that rely on effective microbial culture manipulation and conservation.

**Target Skills (Course outcomes):**

Upon completion of this course, the learner will be able to

CO1 -Explain various isolation techniques for microorganisms- Bloom Level-K2

CO2 -Demonstrate an appropriate media for cultivation of microorganisms- Bloom – Level – K2

CO3- Compare different bacterial preservation techniques- Bloom Level- K2

CO4- Plan and experiment with microorganisms- Bloom Level –K3

CO5- Choose an appropriate method for culture handling and preservation- Bloom Level- K1

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other):**

- The Value-added course based on Culture Handling and Preservation Techniques belongs to the area of Applied and basic microbiology. Various types of skill based courses in this area are acknowledged by Govt and Private sectors , industries, laboratory, research institutes as one of the prime target skill like FishfaBiogenics, Metoda, CSIR-MTCC, Govt of India etc.
- **Reference:**
  - <https://www.imtech.res.in/>

- [https://www.ugc.gov.in/pdfnews/0727661\\_MICROBIOLOGY-UG.pdf](https://www.ugc.gov.in/pdfnews/0727661_MICROBIOLOGY-UG.pdf)

**Course Description:**

The course is designed to provide a basic understanding of the principles and techniques involved in the handling and preservation of microbial cultures. Students will learn the various methods of microbial culture handling and importance of viability and purity of microbial cultures. The course will consist of lectures, laboratory practical and assignment. In the laboratory sessions, students will practice the techniques of microbial culture handling and preservation, including streak plating, subculturing, cryopreservation, and lyophilization. Students will also learn how to record results application.

<b>Course Content</b>	<b>Hours</b>
<b>Module-I: Basic methods in Microbiology</b>	15hrs
<ul style="list-style-type: none"> <li>• Pure culture techniques- isolation- streak, spread, pour plate method</li> <li>• Cultivation of microbes on different media</li> <li>• Enumeration of bacteria</li> <li>• Culture preservation method: Glycerol stock, oil layer, water, soil</li> <li>• Advanced culture preservation: Lyophilization, cryopreservation</li> </ul>	
<b>Module-II: List of Practical's</b>	30 hrs
<ul style="list-style-type: none"> <li>• Media preparation and sterilization: Solid and liquid media</li> <li>• Enumeration of bacteria by Direct Microscopic Count</li> <li>• Enumeration of bacteria by Total Viable Count</li> <li>• Preservation techniques: Slant preparation, butt preparation, oil layer, Glycerol stock, Lyophilizer (Demonstration)</li> <li>• Preservation techniques: Slant preparation, butt preparation,</li> <li>• Preservation techniques: oil layer, Glycerol stock, Lyophilizer (Demonstration)</li> <li>• Motility: Hanging drop, Soft agar tube</li> <li>• Isolation of bacteria by streak, spread, pour plate method</li> <li>• Isolation of mold by streak, spread, pour plate method</li> </ul>	

**Pedagogic tools:**

1. Chalk and Talk
2. PPT and Videos.
3. Assignment

#### 4. Group discussion

#### **Reference Books:**

1. Pelczar, M.J., Chan, E.C.S., Kreig, N.R. (2001). Microbiology, 5<sup>th</sup> Edition. New Delhi: Tata McGraw Hill Publishing Company Ltd.
2. Dubey, R.C., Maheshwari, D.K. (2005). Practical Microbiology. New Delhi: S. Chand & Company Limited.
3. Aneja, K.R. (2003). Experiential Microbiology, plant Pathology and Biotechnology, New Age International Publishers.
4. Sharma, K. (2005). Manual of Microbiology – Tools and Techniques. New Delhi: Ane books.
5. Patel. R.J., Patel. K.R. (2009). Experimental Microbiology, Vol-I, Ahmedabad: Aditya Publications.
6. Benson, H.J. (2002). Microbiological Applications – Laboratory Manual in General Microbiology – 8<sup>th</sup> edition: McGraw Hill Company.

#### **Suggested reading / E-resources**

1. Bacterial Isolation - Microbiology Resource Centre - Truckee Meadows Community College (tmcc.edu)
2. Lecture notes, lecture 1 - Micro Chapter The microbial world The microbes - StuDocu

#### **Suggested MOOCs:**

1. General Microbiology - Course (swayam2.ac.in)
2. <https://www.mooc-list.com/university-entity/british-society-antimicrobial-chemotherapy-bsac>

Course Code	Course Title	Course Credit and Hours
<b>23UGBT050</b>	<b>Food Adulteration</b>	<b>2 Credit - 4 hrs / wk</b>

**Objective of the course:**

1. To understand the adulteration in common foods adulterants and their impact on health.
2. To comprehend certain skills of detecting adulteration of common foods.
3. To impart knowledge on the basic laws of food adulteration and consumer protection.

**Target Skills (Course outcomes) :**

1. Skill development to identify the adulterants in common food items.
2. Skill development to perform detection tests for common foods items.

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other) :**

- The Value added course based on food adulteration and analysis belongs to area of food science. Various types of courses from the food science (food adulteration) sector are offered by Food Processing Sector Skill Council under the label of Food Industry Capacity & Skill Initiative (FICSI).

**Reference:**

The link for FICSI courses – <https://fpsc.ficsi.in>

**Course Description:**

The course is an introduction to various types of food adulteration and its analysis for common foods. It focuses primarily on physical, chemical and microbiological tests for the detection of adulterants in milk and milk products, spices, condiments, fats, salt sugar jaggery and honey. The course also aims to educate on the future education and career prospects on food security; emphasizes on basic laws of food adulteration and consumer protection. It addresses SDG 3 ‘Good health and wellbeing’ focuses on health, while SDG 2 ‘Zero Hunger’ encompasses eradication of nutrition and SDG 6 ‘Clean water and sanitation’ is a pre-requisite for health.

Course Content	Hours
<b>Module-I: Introduction to Adulteration and Career Prospects</b>	8 hrs
<ul style="list-style-type: none"> <li>• Definition and Types of Adulteration</li> <li>• Causes and Effects of Food Adulteration.</li> <li>• Current trends in Food Adulteration in India and abroad.</li> <li>• Future education in the field of food security.</li> <li>• Career Prospects in testing for food adulteration.</li> </ul>	

<b>Module-II : Detection of Adulteration in milk and milk products</b>	8 hrs
<ul style="list-style-type: none"> <li>• Adulteration of formalin and starch powder in milk.</li> <li>• Adulteration of water in milk.</li> <li>• Adulteration of glucose, sugar and salt in milk.</li> <li>• Adulteration of benzoic acid, salicylic acid and soap in milk.</li> <li>• Adulteration in paneer and sweets.</li> </ul>	
<b>Module-III : Detection of Adulteration in spices, jaggery and honey.</b>	8 hrs
<ul style="list-style-type: none"> <li>• Adulteration of lead salts, brick powder and coal tar in red chilli powder.</li> <li>• Adulteration of yellow lead salts, chalk powder and metanyl yellow dye.</li> <li>• Adulteration of starch powder and chalk powder in asafoetida.</li> <li>• Adulteration of papaya seeds in black pepper and poppy seeds in mustard.</li> <li>• Adulteration of washing soda &amp; metanyl yellow dye in jaggery and physical tests to check purity of honey.</li> </ul>	
<b>Module-IV : Detection of Adulteration in Fats, salt, sugar and condiments</b>	8 hrs
<ul style="list-style-type: none"> <li>• Adulteration of dyes, argemone oil, and castor oil in edible oils.</li> <li>• Adulteration of vanaspati or margarine, paraffin wax and hydrocarbon in ghee and butter.</li> <li>• Adulteration in salt.</li> <li>• Adulteration in sugar.</li> <li>• Adulteration in ketchup and mayonnaise.</li> </ul>	
<b>Module-V : Legislative aspects of Food adulteration</b>	8 hrs
<ul style="list-style-type: none"> <li>• Overview of Food Safety and Standards Act 2006 (FSSA) –Food Safety and Standards Authority of India–Rules and Regulations.</li> <li>• Role of voluntary agencies such as, Agmark, I.S.I.</li> <li>• Quality control laboratories and Private testing laboratories</li> <li>• Consumer’s problems rights and responsibilities.</li> <li>• Other International regulatory bodies</li> </ul>	

**Suggested laboratory experiments / other activities:**

1. Collection of information on adulteration of 10 common foods from local market.
2. Demonstration of Adulteration detection methods for a minimum of 5 common foods (one method each- other than the ones in syllabus).

**Pedagogic tools:**

1. Chalk and Talk
2. Presentation
3. Videos
4. Assignment

### **Reference Books:**

1. Rees, J. (2020). Food Adulteration and Food Fraud. Reaktion Books.
2. Shrivastava, A. (Ed.). (2018). Adulteration Analysis of Some Foods and Drugs (Vol. 1). Bentham Science Publishers.

### **Suggested reading / E-resources:**

1. [https://old.fssai.gov.in/Portals/0/Pdf/Draft\\_Manuals/Beverages and confectionary.pdf](https://old.fssai.gov.in/Portals/0/Pdf/Draft_Manuals/Beverages_and_confectionary.pdf)
2. <https://www.fssai.gov.in/>
3. <https://fssai.gov.in/dart/>
4. <https://indianlegalsolution.com/laws-on-food-adulteration/>

### **Suggested MOOCs:**

1. Food Safety and Quality Control - [https://onlinecourses.swayam2.ac.in/cec20\\_ag06/preview](https://onlinecourses.swayam2.ac.in/cec20_ag06/preview)



Course Code	Course Title	Course Credit and Hours
<b>23UGBT051</b>	<b>Wealth from Waste</b>	<b>2 Credit - 4 hrs / wk</b>

**Objective of the course:**

1. To develop Sustainable Orderliness, Enhanced Ecological Balance, Beauty, Productivity and Dignity in the society and nature.
2. To develop the ability to critically think and creatively use the unused natural resources.
3. To sensitize the students regarding environmental concerns and social responsibility
4. To explore market opportunities for the recovered and recycling materials among the students
5. To provide platform for business model through experiential learning.

**Target Skills (Course outcomes) :**

**The students will be able to develop**

1. Critical Thinking
2. Creativity
3. Collaboration & Team Work
4. Communication & Presentation
5. Recognize, Build & Appraise the trash as recourse for eco friendly Sustainable Solution.

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other) :**

Our ATMIYA University is working with the mission of nurturing the creative thinkers and leaders through transformative learning and core value like Co-existential thinking and Green - thinking. To fulfill the same, this course has been proposed since 2016. This course was designed to nurture our core value of “harmony with nature” and Sustainable development. The various discarded resources of the campus generated everyday are used as raw material to prepare variety of useful creative products.

**Reference:**

**Course Description:**

The course is skill based where students will learn to identify different unused natural resources and convert them into creative and useful products. The course also provides knowledge of marketing like product packaging, labelling, branding, costing etc.. The course addresses SDG- 8,9,11,12 and 13: Decent Work and Economic Growth, Industry, Innovation and Infrastructure, Sustainable Cities and Communities, Responsible Production & Consumption and Climate Action.

Course Content	Hours
<b>Module-I: Waste Material: Collection and Treatment</b>	6 hrs
<ul style="list-style-type: none"> <li>• Survey of available/generated waste</li> <li>• Collection of waste materials: Bio waste, Cloth waste, E-waste and Plastic waste</li> <li>• Processing of waste material: Dying with natural color, painting, designing etc...</li> <li>• Hardening of material: drying/ironing</li> </ul>	

<b>Module-II : Product Preparation using waste materials</b>	10 hrs
<ul style="list-style-type: none"> <li>• Procedure of flower preparation from different waste</li> <li>• Procedure for the preparation of different decorative items from collected waste</li> <li>• Procedure for the preparation of different household items from collected waste</li> </ul>	
<b>Module-III : Use of products for different purposes</b>	13 hrs
<ul style="list-style-type: none"> <li>• <b>Products from Bio waste :</b> Different flower arrangements including small and large handy bouquet, table bouquet, Photo frames, Flower vase, Wall Hangings; Garlands and Ornaments</li> <li>• <b>Products from Cloth waste:</b> Carpets, Doormat, Purses, Bags, Hangings, Decorative items etc..</li> <li>• <b>Products from E-waste:</b> Containers, Stationary items, Home decorative items and household items</li> <li>• <b>Products from Plastic waste:</b> Containers for terrace gardening, Containers to hold different items, Home decorative items and household items</li> </ul>	
<b>Module-IV : Marketing</b>	8 hrs
<ul style="list-style-type: none"> <li>• Need analysis, pricing and basic marketing strategies</li> <li>• Preparation and designing of price list; Methods of advertisement</li> <li>• Packaging of products; Exhibition cum sale</li> <li>• Survey for the need of Product and its supply to the market</li> </ul>	
<b>Module-V : Project: Innovative Creation through Reuse and Recycling of Waste</b>	3 hrs

**Suggested laboratory experiments / other activities:**

1. Improving the Self life of the product
2. Marketing through pamphlet designing
3. Exhibition cum sale

**Pedagogic tools:**

1. Videos
2. Oral Discussion
3. Live Demonstrations
4. Hands on training
5. Assignment

**Reference Books:**

1. Susan Wasinger, Eco Craft: Recycle, Recraft, Restyle, Lark Books, 4 Division of Sterling Publishing co., 2009
2. Maria Noble, How to make 100 Paper Flowers, Creative Publishing International, 2013

**Suggested reading / E-resources**

1. <https://books.google.co.in/books?id=RzJ59JWEBs0C&printsec=frontcover&dq=eco+craft&hl=en&sa=X&ved=0ahUKEwjxufe76q7aAhXMrI8KHcuEAFwQ6AEIKDAA#v=onepage&q=eco%20craft&f=false>
2. <https://books.google.co.in/books?id=3Uv0AAwAAQBAJ&printsec=frontcover&dq=DIY+craft+for+flowers&hl=en&sa=X&ved=0ahUKEwi4pf2Q6a7aAhVCqo8KHRPeAH8Q6wEIOzAD#v=onepage&q&f=false>

### **Suggested MOOCs:**

1. <https://www.classcentral.com/course/from-waste-to-value-20611>
2. <https://www.classcentral.com/course/edx-solid-waste-management-18989>
3. <http://www.basel.int/Implementation/TechnicalAssistance/MOOC/tabid/4966/Default.aspx>

Course Code	Course Title	Course Credit and Hours
<b>23UGIC050</b>	<b>Polymer Chemistry</b>	<b>2 Credit - 4 hrs / wk</b>

**Objective of the course:**

1. Determine different polymers, their properties and access them according to their industrial applications.
2. Study different polymerization techniques & their mechanisms.
3. Know Industrial polymer processing & their engineering aspects.

**Target Skills (Course outcomes):**

1. Skill development to prepare various polymers.
2. Skill development to identify the polymers.

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other) :**

- The Value added course based on Polymer in Chemscience belongs to area of Polymer industry. Various types of courses from polymer are offering by NSDC.

**Reference:**

[https://nsdcindia.org/sites/default/files/FG\\_Machine-Operator-Assistant-Plastics-Processing-RSCQ4801%28CPCQ0103%29-29-04-2021.pdf](https://nsdcindia.org/sites/default/files/FG_Machine-Operator-Assistant-Plastics-Processing-RSCQ4801%28CPCQ0103%29-29-04-2021.pdf)

**Course Description:**

The course is an introduction to polymer science, focusing primarily on the basic principles of polymerization techniques and the properties of polymer. Emphasis is on polymer processing to synthesize the various polymers. The course aims to address SDG-12: Responsible Consumption and Production.

Course Content	Hours
<b>Module-I :</b> Introduction to polymer	4 hrs
<ul style="list-style-type: none"> <li>• Polymer, Oligomer, Macromolecules,</li> <li>• Classification of polymer, Sources of polymer, Monomers, Functionality concept, Concept of Cross linking.</li> <li>• Polymer science mapped with SDG-Goals, Responsible Consumption and Production.</li> </ul>	
<b>Module-II :</b> Properties of Polymer	4 hrs
<ul style="list-style-type: none"> <li>• Physical properties, Chemical properties, Mechanical properties</li> </ul>	
<b>Module-III :</b> Biodegradable – Sustainable polymer	4 hrs
<ul style="list-style-type: none"> <li>• PLA</li> <li>• PGA</li> <li>• PHBV</li> <li>• Cellulose based polymer</li> </ul>	
<b>Module-IV :</b> Conventional polymer	4 hrs

<ul style="list-style-type: none"> <li>• Phenol – formaldehyde resins.</li> <li>• Poly olefins – Poly ethylene, HDPE, LDPE, LLDE, Polypropylene</li> <li>• Kevlar &amp; Aramid</li> <li>• Polyamides – Nylon-6, Nylone-66</li> </ul>	
<b>Module-V : Polymer Processing</b>	4 hrs
<ul style="list-style-type: none"> <li>• Polymer processing introduction</li> <li>• Compounding</li> <li>• Molding</li> <li>• Casting</li> <li>• Rolling</li> <li>• Extrusion</li> </ul>	

**Suggested laboratory experiments / other activities:**

**(20 hrs)**

1. Prepare Phenol Formaldehyde polymer.
2. Prepare cellulose acetate from cellulose.
3. Prepare melamine formaldehyde copolymer.
4. Prepare glyptal resin from phallic anhydride.
5. Prepare urea formaldehyde copolymer.
6. To characterize fundamental properties of polymer.

**Pedagogic tools:**

1. Chalk and Talk
2. PPT and Videos.
3. Assignment

**Reference Books:**

1. A. Ravve, (2012, 3<sup>rd</sup> Edition) Principles of Polymer Chemistry, New York: Springer (ISBN: 978146142211).
2. Joel R. Fried (2014, 3<sup>rd</sup> Edition) Polymer Science and Technology, NJ: Prentice Hall (ISBN: 978013703955).
3. V R Gowariker, N V Viswanathan, Jayadev Sreedhar, (1986, 1<sup>st</sup> Edition) Polymer Science, Delhi: New Age International (ISBN: 085226307430)

**Suggested reading / E-resources**

1. Shreve's Chemical Process Industries, Austin, G.T, McGraw Hill publication, New Delhi 5<sup>th</sup> edition

**Suggested MOOCs:**

1. <https://swayam.gov.in/explorer?searchText=polymer>

Course Code	Course Title	Course Credit and Hours
23UGMT050	Vedic Mathematics	2 Credit - 4 hrs / wk

**Objective of the course:**

1. To promote the Indian Mathematics.
2. To enhance computation skills in students.
3. Improve clarity on mathematical concepts.
4. Developing a logical thinking and analytical thinking through Vedic Mathematics.
5. Helping students discover their competence to deal with numbers and mathematics
6. Edifying students with speedy, simple and precise techniques to derive solutions

**Target Skills (Course outcomes) :**

3. Understand and appreciate the history of ancient mathematics methods.
4. Understand the sixteen sutras of vedic mathematics
5. Utilize the sutras in order to solve related problems of short calculation.
6. Solve some of the algebraic problems using the vedic sutras.
7. Reduces the burden of memorizing difficult concepts
8. Increases the concentration of a student and his determination to learn and develop the skills

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other) :**

- The Value added course based on Vedic Mathematics belongs to area of ancient Indian mathematics are offering by NSDC-National Skill Development Corporation.
- **Reference:**  
The link of NSDC – <https://iiva.in/vedic-maths-course/online/>

**Course Description:**

This course is a collection of techniques/sutras to solve mathematical problem sets in a fast and easy way. These tricks introduce wonderful applications of Arithmetical computation, theory of numbers, mathematical and algebraic operations, higher-level mathematics, calculus, and coordinate geometry, etc. It is one of the most refined and efficient mathematical systems possible. Vedic math is a system of learning maths for faster calculations with time-saving methods to get answers quickly developing the mental ability of learners. Maths as the subject requires a complete understanding of the concepts and daily practice. It is a subject in which one can score full marks if practices on a continuous basis.

Course Content	Hours
<b>Module-I: Sutras 1 to 3</b>	8 hrs
<ul style="list-style-type: none"> <li>• EkadhikinaPurvena -By one more than the previous one (Cor: Anurupyena)</li> <li>• NikhilamNavatashcaramamDashatah -All from 9 and the last from 10 (Cor: SisyateSesamjnah)</li> <li>• Urdhva-Tiryagbyham-Vertically and crosswise (Cor: Adyamadyenantyamantya)</li> </ul>	

<b>Module-II : Sutras 4 to 6</b>	8 hrs
<ul style="list-style-type: none"> <li>• Paraavartya Yojayet-Transpose and adjust (Cor: Kevalaih Saptakam Gunyat)</li> <li>• Shunyam Saamyasamuccaye-When the sum is the same, that sum is zero. (Cor: Vestanam)</li> <li>• (Anurupye) Shunyamanyat-If one is in ratio, the other is zero (Cor: Yavadunam Tavadunam)</li> </ul>	
<b>Module-III : Sutras 7 to 9</b>	8 hrs
<ul style="list-style-type: none"> <li>• Sankalana-vyavakalanabhyam-By addition and by subtraction (Cor: Yavadunam Tavadunikritya Varga Yojayet)</li> <li>• Puranapurana byham-By the completion or non-completion (Cor: Antyayordashake)</li> </ul>	
<b>Module-IV : Sutras 10 to 12</b>	8 hrs
<ul style="list-style-type: none"> <li>• Chalana-Kalanabyham-Differences and Similarities (Cor: Antyayoreva)</li> <li>• Yaavadunam-Whatever the extent of its deficiency (Cor: Samuccayagunitah)</li> <li>• Vyashtisamanstih-Part and Whole (Cor: Lopanasthapanabhyam)</li> </ul>	
<b>Module-V : Sutras 13 to 16</b>	8 hrs
<ul style="list-style-type: none"> <li>• Shesanyankena Charamena-The remainders by the last digit (Cor: Vilokanam)</li> <li>• Sopaantyadvayamantyam-The ultimate and twice the penultimate (Cor: Gunitasamuccayah Samuccayagunitah)</li> <li>• Ekanyunena Purvena-By one less than the previous one (Cor: Dhvajanka)</li> <li>• Gunitasamuchyah-The product of the sum is equal to the sum of the product (Cor: Dwandwa Yoga)</li> <li>• Gunakasamuchyah-The factors of the sum is equal to the sum of the factors.</li> </ul>	

**Suggested laboratory experiments / other activities:**

1. Activities regarding mentally calculation.

**Pedagogic tools:**

1. Chalk and Talk
2. PPT and Videos.
3. Assignment
4. Group discussion

**Reference Books:**

1. Swami B. K. T., Agrawala V. S.,(2013), *Vedic Mathematics*, Motilal Banarsidass Publishers Pvt Ltd.
2. Dhaval Bathia., (2021 Second edition), *Vedic Mathematics Made Easy*, Jaico Publishing House.

**Suggested reading / E-resources**

1. <https://vedicmathsindia.org/>
2. <https://nptel.ac.in/courses/111/101/111101080/>

Course Code	Course Title	Course Credit and Hours
<b>23UGPY050</b>	<b>Circuit Designing and Fabrication</b>	<b>2 Credit - 4 hrs / wk</b>

**Objective of the course:**

1. To create awareness about basic electronics and its applications.
2. Train the student to understand circuit designing.
3. Students can explore different aspect of Printed Circuit Board Design and fabrication.
4. Students can learn various types of PCBs.

**Target Skills (Course outcomes) :**

1. Skill development to design and fabricate their own PCB.
2. Skill development to make Project and can also work in PCB Designing and Fabrication area.

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other) :**

- Electronics Sector Skills Council of India: ESSCI

**Reference:**

The link of ESSC – <https://www.essc-india.org/>

**Course Description:**

The course is an introduction to basic electronics, focusing primarily on the basic principles to understand the different type of circuits, their application and fabrication. Emphasis is on various types of PCBs and fabrication of electronic components on PCBs. The course also provides an introduction to the Solid state electronics.

Course Content	Hours
<b>Module-I: DESIGNING AND FABRICATION OF RECTIFIERS</b>	10
<ul style="list-style-type: none"> <li>• Introduction to rectifiers</li> <li>• Types of rectifiers</li> <li>• Half wave rectifiers, Full wave rectifiers bridge rectifiers</li> <li>• Designing of different circuits for rectifier fabrication</li> <li>• Tracing of different rectifier circuits</li> </ul>	
<b>Module-II : DESIGNING AND FABRICATION OF AMPLIFIERS</b>	10
<ul style="list-style-type: none"> <li>• Introduction to amplifiers</li> <li>• Types of amplifiers</li> <li>• Single stage transistor amplifier, Multistage transistor amplifier</li> <li>• Transistor power amplifier</li> <li>• Designing of different amplifying circuits</li> <li>• Fabrication and tracing of different amplifying circuits</li> </ul>	
<b>Module-III : DESIGNING AND FABRICATION OF FILTERS</b>	10
<ul style="list-style-type: none"> <li>• Introduction to filters</li> <li>• Types of filters</li> <li>• RL filters, RC filters, LCR filters, Pie filters</li> </ul>	



<ul style="list-style-type: none"> <li>• Designing of different filters circuits</li> <li>• Fabrication and tracing of different fitters circuits</li> </ul>	
<b>Module-IV : DESINGING AND FABRICATION OF VOLTAGE REGULATORS</b>	10
<ul style="list-style-type: none"> <li>• Introduction to voltage regulators</li> <li>• Types of voltage regulators</li> <li>• Zener diode voltage regulator, Transistor series voltage regulator</li> <li>• Transistor shunt voltage regulator</li> <li>• Designing of different voltage regulator circuits</li> <li>• Fabrication and tracing of different voltage regulator circuits</li> </ul>	

**Suggested laboratory experiments / other activities:**

1. Fabrication of Full Wave Rectifier Circuit
2. To study CE amplifier circuit
3. Fabrication of Voltage Regulator Circuit using Zener Diode

**Pedagogic tools:**

1. Chalk and Talk
2. PPT and Videos.
3. Assignment
4. Group discussion

**Reference Books:**

1. V K Mehta, Principles of Electronics, S Chand Publication.
2. John D Ryder, Electronic fundamentals and applications, Prentice Hall publication.
3. B L Theraja, Basic Electronics, S Chand publication.

**Suggested reading / E-resources**

1. <https://www.electronics-tutorials.ws>
2. <https://www.makerspaces.com/basic-electronics/>

**Suggested MOOCs:**

1. <https://swayam.gov.in/explorer?searchText=Physics>

Course Code	Course Title	Course Credit and Hours
<b>23UGEN050</b>	<b>English for Competitive Exams</b>	<b>2 Credit - 4 hrs / wk</b>

**Objective of the course:**

1. Familiarize with English as an integral part of various competitive exams.
2. Improve their English language and grammar

**Target Skills (Course outcomes):**

1. Language Skill Development
2. Analytical Skill Development

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other) :**

- The Value added course based on English for Competitive Exams. Various courses based on Grammar and competitive exams are being offered online and offline by various persons/institutes charging huge sum of money. So students preparing for competitive exams will have benefit learning the course in form of Value Added Course.

**Course Description:**

The course is an introduction to basic grammar, sentence pattern, language work, reading comprehension and common errors. Emphasis is on grammatical level as well as syntactical level. The course provides an overall introduction to the nature of English in competitive exams.

Course Content	Hours
<b>Module-I: Basic English Grammar</b>	8 hrs
<ul style="list-style-type: none"> <li>• Articles</li> <li>• Prepositions</li> <li>• Direct &amp; Indirect Narration</li> <li>• Voices</li> </ul>	
<b>Module-II :Common Errors</b>	8 hrs
<ul style="list-style-type: none"> <li>• Spelling Errors</li> <li>• Spotting Errors</li> </ul>	
<b>Module-III :Sentence Structure</b>	8 hrs
<ul style="list-style-type: none"> <li>• Sentence Completion</li> <li>• Sentence Improvement</li> <li>• Reordering word and sentences</li> </ul>	
<b>Module-IV :Language Work</b>	8 hrs

<ul style="list-style-type: none"> <li>• Synonyms &amp; Antonyms</li> <li>• One-Word Substitution</li> <li>• Idioms &amp; Phrases</li> </ul>	
<b>Module-V :Reading Comprehension Practice</b>	8 hrs
<ul style="list-style-type: none"> <li>• Dissecting Unseen Passages</li> <li>• Finding answer to the questions from passages</li> </ul>	

**Suggested laboratory experiments / other activities:**

1. Quiz
2. Group Discussion

**Pedagogic tools:**

1. Chalk and Talk
2. PPT and Videos.
3. Assignment

**Reference Books:**

1. English grammar & Comprehension- Ramesh Publishing House, New Delhi.
2. Kiran's Common Errors in English- KiranPrakashan, Delhi.
3. Handbook of Superfast English- KiranPrakashan, Delhi.
4. Lucent's General English- Lucent Publication, Patna.

**Suggested reading / E-resources**

1. High School English Grammar and Composition by Wren and Martin

**Suggested MOOCs:**

Course Code	Course Title	Course Credit and Hours
<b>23UGCI050</b>	<b>Computer Aided Drawings</b>	<b>2 Credit - 4 hrs / wk</b>

**Objective of the course:**

1. To create awareness about Computer based drawing.
2. Train the student to develop various geometric drawings using Autocad

**Target Skills (Course outcomes) :**

1. Recognize the general terminology related to Autocad software
2. To understand application of basic CAD command & to develop 2D drawings of various Geometric Figures using AutoCAD.

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other) :**

- This Value added course based on Graphical and Geometric design which helps in representation of different types of drawing. As technology upgrading day by day it is necessary in industrial as well as corporate life.

**Reference:**

- A Hand Book On AutoCAD Tools Practice, Author: SSR Krishna, AzharWahab Publisher: Notion Press Media Pvt
- AutoCAD 2018 Training Guide, Author: SagarLinkan, Publisher: BPB Publications.

**Course Description:**

Computer-aided design is the use of computers (or workstations) to aid in the creation, modification, analysis, or optimization of a design. CAD software is used to increase the productivity of the designer, improve the quality of design, improve communications through documentation, and to create a database for manufacturing.

Course Content	Hours
<b>Module-I: Introduction to AutoCAD</b>	6hrs
<ul style="list-style-type: none"> <li>• File menu of AutoCAD, Basic 2D commands like Line, Circle, Ellipse, Multi Line ,Construction Line, Polyline, Point, Donut, Ellipse, Polygon, Rectangle, Arc, etc..</li> </ul>	
<b>Module-II : Editing of AutoCAD Drawing</b>	8 hrs
<ul style="list-style-type: none"> <li>• Modify Properties of Drawing Entity, Copy, Move, Rotate, Mirror , Offset , Array, Scale, Stretch, Lengthen, Trim, Extend , Break, Chamfer , Fillet, Block, W-Block, Insert and Explode , Area and Volume with Civil Engineering Application</li> </ul>	
<b>Module-III : Advanced 2DCommands : Section -1</b>	10hrs
<ul style="list-style-type: none"> <li>• Application of LAYER command in Civil Engineering Layer command with its all sub commands, Line type, Color , Dimension</li> </ul>	
<b>Module-IV : Advanced 2DCommands : Section -2</b>	10hrs
<ul style="list-style-type: none"> <li>• Command – aligned, arc length, radius, Diameter, Centre, Leader, Baseline and Continuous Dimensioning, tolerance, override and Dimension updates Text and BTEXT commands with Text Style Hatch command</li> </ul>	

<b>Module-V : Plot of 2D</b>	6hrs
<ul style="list-style-type: none"> <li>• PLOT and its Sub Command for Plotting Drawing on A1, A2 and A3 Size Paper using Printer and / or Plotter</li> </ul>	

**Suggested laboratory experiments / other activities:**

1. NA

**Pedagogic tools:**

1. PPT and Videos.
2. Assignment

**Reference Books:**

1. Ahluwalia, V. K. (2011, Fourth edition) *Organic Reaction Mechanism*. New Delhi: Narosa (ISBN: 978-81-8487-115-9).
2. Morrison & Boyd (2009, Sixth edition) *Organic Chemistry*. New Jersey: Pearson Education (ISBN: 978-81-7758-169-0).
3. McMurry, John E. (2011, Eight edition) *Organic Chemistry*. Boston: Cengage Learning (ISBN: 0840054440).

**Suggested reading / E-resources**

1. NPTL Web Series : <https://nptel.ac.in/courses/112102101/>
2. NPTL Web Series : <https://nptel.ac.in/courses/107103084/>

**Suggested MOOCs:**

1. <https://swayam.gov.in/explorer?searchText=chemistry>

Course Code	Course Title	Course Credit and Hours
<b>23UGEE050</b>	<b>Energy Management</b>	<b>2 Credit - 4 hrs / wk</b>

**Objective of the course:**

1. To conserve natural resources.
2. Train the student to protect the climate.
3. Train the student to save the cost.

**Target Skills (Course outcomes):**

1. Skill development to produce the electrical energy with the help of prototype.
2. Skill development to conserve the electrical energy.

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other) :**

- The Value added course based on energy management belongs to area of energy auditing. Various types of courses from energy auditing sector are being offered by Bureau of Energy Efficiency.

**Reference:**

<https://beeindia.gov.in/>

**Course Description:**

The course is an introduction to energy management, focusing primarily on incredible expertise within the energy management, implementation, and financing of the energy projects, along with a different kind of policy analysis. The course aims to address SDG-7: Renewable energy.

Course Content	Hours
<b>Module-I:</b> Electrical Energy Introduction	3hrs
<ul style="list-style-type: none"> <li>• Importance of electricity in modern industrial society</li> <li>• Scenario with / without electricity</li> <li>• Advantage &amp; Disadvantage of Electricity</li> </ul>	
<b>Module-II :</b> Energy Production	10hrs
<ul style="list-style-type: none"> <li>• Electrical Energy Production by Conventional Energy Sources</li> <li>• Electrical Energy Production by Non-Conventional Energy Sources</li> </ul>	
<b>Module-III :</b> Energy Consumption	10hrs
<ul style="list-style-type: none"> <li>• Domestic &amp; Industrial Energy Consumption</li> </ul>	
<b>Module-IV :</b> Electrical Energy Saving & Energy conservation	9hrs
<ul style="list-style-type: none"> <li>• Generation</li> <li>• Solar Design</li> </ul>	
<b>Module-V :</b> Energy Scenario Domestic	4hrs
<ul style="list-style-type: none"> <li>• Energy generation</li> <li>• Energy transmission</li> </ul>	

<b>Module-VI : Energy Scenario International</b>	
<ul style="list-style-type: none"> <li>• Energy generation</li> <li>• Energy transmission</li> </ul>	

**Pedagogic tools:**

1. Chalk and Talk
2. PPT and Videos.
3. Assignment
4. Group discussion

**Reference Books:**

1. Energy Conversion & Management: Dr. Akshay Pujara, Dr. Ravi Khant, Book India Publication
2. Generation of electrical energy: B.R. Gupta, S. Chand Publication
3. Energy for a sustainable world: Jose Goldenberg, Thomas Johansson, Oxford University Press.

**Suggested reading / E-resources**

1. <http://aipnpc.org/Guidebooks.aspx>
2. <https://www.aipnpc.org/>
3. [http://www.refreshercourse.in/Module/RC\\_Material.pdf](http://www.refreshercourse.in/Module/RC_Material.pdf)

**Suggested MOOCs:**

1. <https://nptel.ac.in/courses/108105058/>
2. <https://nptel.ac.in/courses/108105058/2>
3. <https://nptel.ac.in/courses/108105058/3>
4. <https://nptel.ac.in/courses/108105058/4>
5. <https://nptel.ac.in/courses/108105058/5>
6. <https://nptel.ac.in/courses/105102175/>
7. <https://nptel.ac.in/courses/105102175/2>
8. <https://nptel.ac.in/courses/105102175/3>
9. <https://nptel.ac.in/courses/105102175/4>
10. <https://nptel.ac.in/courses/105102175/5>

Course Code	Course Title	Course Credit and Hours
<b>23UGCE050</b>	<b>Internet Technology</b>	<b>2 Credit - 4 hrs / wk</b>

**Objective of the course:**

1. To provide foundation knowledge of Web designing.
2. To develop the basic Web page designing skills in students
3. To improve their proficiency in applying the basic knowledge to build effective web sites.

**Target Skills (Course outcomes) :**

1. Understand basic concept of web designing
2. Design a static web page using different HTML tags
3. Create a web page using different CSS Features with Different Layout as per need of Application
4. Create a webpage using Javascript

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other) :**

- The Value added course based on Internet technology belongs to area of Web Designing.

**Reference:**

The link -

[https://courses.edx.org/assets/courseware/v1/220c987e9ebd826db434eb646110bce6/asset-v1:Microsoft+DEV211.1x+1T2017+type@asset+block@introduction\\_HTML\\_\\_JavaScript\\_updatedsyllabus.pdf](https://courses.edx.org/assets/courseware/v1/220c987e9ebd826db434eb646110bce6/asset-v1:Microsoft+DEV211.1x+1T2017+type@asset+block@introduction_HTML__JavaScript_updatedsyllabus.pdf)

**Course Description:**

The target audience for this training course is individuals who are interested in learning about the core skills necessary for web development. Course will be start from the ground up by learning how to implement modern web pages with HTML and CSS. Using Javascript, students will be able to build a fully functional web application that utilizes Ajax to expose server-side functionality and data to the end user.

<b>Course Content</b>	<b>Hours</b>
<b>Module-I: Internet Fundaments</b>	8 hrs
<ul style="list-style-type: none"> <li>• Internet</li> <li>• World wide web(WWW)</li> <li>• Web protocols</li> </ul>	
<b>Module-II : HTML</b>	8 hrs
<ul style="list-style-type: none"> <li>• HTML Strucutre</li> <li>• HTML Elements</li> <li>• HTML Attributes</li> <li>• HTML Headings</li> <li>• HTML Paragraphs</li> <li>• HTML Formatting</li> <li>• HTML Fonts</li> <li>• HTML Styles</li> <li>• HTML Links</li> <li>• HTML Images</li> <li>• HTML Tables</li> </ul>	
<b>Module-III : CSS</b>	8 hrs



<ul style="list-style-type: none"> <li>• CSS Structure</li> <li>• Different CSS properties</li> <li>• CSS Introduction</li> <li>• CSS Syntax</li> <li>• CSS Id &amp; Class</li> <li>• CSS Styling</li> <li>• Styling Backgrounds</li> <li>• Styling Text</li> <li>• Styling Fonts</li> <li>• Styling Links</li> <li>• Styling Lists</li> <li>• Styling Tables</li> </ul>	
<b>Module-IV : Javascript</b>	8 hrs
<ul style="list-style-type: none"> <li>• Basics of javascript language</li> <li>• Dynamic Webpage</li> <li>• Basics of OOP</li> </ul>	
<b>Module-V : Bootstrap</b>	8 hrs
<ul style="list-style-type: none"> <li>• Overview of Bootstrap 4</li> <li>• Grid System</li> <li>• Typography</li> <li>• Tables</li> <li>• Button groups</li> <li>• Alerts</li> <li>• Badges/Labels</li> <li>• Dropdowns</li> </ul>	

**Suggested laboratory experiments / other activities:**

1. Create a Case Study on Different Design Issues of Websites.
2. Create a Sitemap Using Online tool.
3. Create HTML Page with title and Set Icon of Web Page.
4. Demonstrate the use of Lists and Heading in HTML Page.
5. Create a Section Based HTML Page with CSS.
6. Create a Section Based HTML Page with CSS.
7. Create a Form Using Bootstrap Buttons and Form.
8. Design a Web Page with Bootstrap Carousel and tooltip.
9. Demonstrate a Web Page for different alerts using Bootstrap
10. Create a page using Javascript.

**Pedagogic tools:**

1. Chalk and Talk
2. PPT and Videos.
3. Assignment
4. Group discussion

**Reference Books:**

1. “Web Technologies Black Book”, by Dreamtech Press 3
2. “HTML 5 Black Book”, by Dreamtech Press
3. “Bootstrap 4 By Example”, Packt Publishing
4. “Developing Web Applications”, Ralph Moseley and M. T. Savaliya, Wiley-India

**Suggested reading / E-resources**

1. www.w3.org

2. [www.w3schools.com](http://www.w3schools.com)
3. [www.tutorialspoint.com](http://www.tutorialspoint.com)

**Suggested MOOCs:**

1. [https://onlinecourses.swayam2.ac.in/aic20\\_sp11/preview](https://onlinecourses.swayam2.ac.in/aic20_sp11/preview)

Course Code	Course Title	Course Credit and Hours
23UGCE051	<b>CISCO: Fundamentals of Networking</b>	<b>2 Credit - 4 hrs / wk</b>

**Objective of the course:**

1. To create awareness about modern network such as protocols and topologies.
2. Train the student to select proper hardware devices for n.
3. Train the student to understand transmission media.
4. Understanding for network addressing.

**Target Skills (Course outcomes) :**

1. Analyze network terminology.
2. Working of network devices and IP addressing.

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other) :**

- The Value added course based on computer network fundamentals. In which we describe various protocols, models in networks and also Illustrate use of Subnets, Ipv4 and Ipv6 in computer networks.

**Reference:**

[https://www.cisco.com/c/dam/en\\_us/training-events/le31/le46/cln/marketing/exam-topics/200-301-CCNA.pdf](https://www.cisco.com/c/dam/en_us/training-events/le31/le46/cln/marketing/exam-topics/200-301-CCNA.pdf)

**Course Description:**

The course content prepared with the aim to develop different types of skills so that students are able to acquire subsequent competency: Use Software and hardware technology to establish, Commission (make operational) and maintain computer networks.

Course Content	Hours
<b>Module-I:</b> Basics of computer network	8 hrs
<ul style="list-style-type: none"> <li>• History of networks</li> <li>• Usage of Computer Networks</li> <li>• Network Topology</li> <li>• Categories of network</li> </ul>	
<b>Module-II :</b> OSI and TCP/IP Model	8 hrs
<ul style="list-style-type: none"> <li>• OSI model &amp; function of each Layer</li> <li>• TCP/ IP model</li> <li>• Connection oriented v/s Connectionless approach</li> <li>• Comparison of OSI &amp; TCP/IP Models</li> </ul>	
<b>Module-III :</b> Transmission Media	8 hrs
<ul style="list-style-type: none"> <li>• Types of Transmission Media</li> <li>• Guided Media: Twisted Pair, Coaxial Cable, Fiber</li> <li>• Unguided Media : Electromagnetic spectrum, Radio Transmission,</li> </ul>	

Microwave Transmission, Infrared Transmission, Satellite Communication	
<b>Module-IV : Network Devices</b>	8 hrs
<ul style="list-style-type: none"> <li>• Repeater</li> <li>• Switch</li> <li>• Hub</li> <li>• Routers</li> </ul>	
<b>Module-V : IP Addressing</b>	8 hrs
<ul style="list-style-type: none"> <li>• IP Protocol – IP v4, IP v6.</li> <li>• Addressing Schemes</li> <li>• Subnetting</li> </ul>	

**Suggested laboratory experiments / other activities:**

1. Install & Test Network Interface Card.
2. Prepare and Test Straight UTP Cable.
3. Prepare and Test Cross UTP Cable.
4. Develop a small Network. (Hands on Training).

**Pedagogic tools:**

1. PPT and Videos.
2. Assignment
3. Group discussion

**Reference Books:**

1. Computer Networks Andrew S Tannebaum, & David J Wetherall, Pearson, 2012
2. Information Technology Today S. Jaiswal Galgotia Publications
3. Computer Networks Bhushan Trivedi Oxford University Press, 2013
4. Data Communication & Networking, Forouzen Tata McGraw Hill

**Suggested reading / E-resources**

1. <http://nptel.iitm.ac.in/courses.php?disciplineId=106>
2. <http://www.edrawsoft.com>
3. Network Simulator Tool: GNS3 v0.8.5, NetSimK

**Suggested MOOCs:**

1. <https://nptel.ac.in/courses/106/105/106105081/>

Course Code	Course Title	Course Credit and Hours
<b>23UGME051</b>	<b>Computer Assisted Drafting</b>	<b>2 Credit - 4 hrs / wk</b>

**Objective of the course:**

1. Demonstrate basic concepts of the AutoCAD software.
2. Apply basic concepts to develop construction (drawing) technique for 2D drawing.
3. Understand and demonstrate dimensioning concepts and techniques using advanced tool.
4. Become familiar with 3D drawing concepts and techniques
5. Ability to manipulate drawings through editing and plotting techniques

**Target Skills (Course outcomes) :**

1. Create the different wireframe primitives using parametric representations.
2. Create surface primitives using parametric modeling.
3. Create the different solid primitives using the different representation schemes.
4. Apply geometric transformations on the created wireframe, surface and solid models.

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other) :**

- The Value added course based on computer Assisted drafting belongs to area of 2D and 3D technical drawing drafting. This course is a regional need because Rajkot being an industrial hub, skill of technical drawing drafting open up wide opproninity. This type of course is also available in NSQF level 4.

**Reference:**

<https://www.nsdcindia.org/designer-%E2%80%93-cad>

**Course Description:**

This course is designed for the new beginners who require comprehensive training in drawing drafting using AutoCAD. It incorporates the features, commands, and techniques for creating, editing, and printing drawings with AutoCAD. Hands-on exercises throughout the course explore how to create 2D and 3D conceptual drawings.

Course Content	Hours
<b>Module-I: Introduction to AutoCAD</b>	8 hrs
<ul style="list-style-type: none"> <li>• File menu of AutoCAD with New, Open, Save, Save as and Close</li> <li>• Basic 2D commands like Line, Circle, Ellipse, Multi Line ,Construction Line, Polyline, Point, Donut, Ellipse, Polygon, Rectangle, Arc</li> <li>• Erase, Snap, Redraw, Regenerate , Zoom, Pan</li> </ul>	
<b>Module-II : Editing of AutoCAD Drawing</b>	8 hrs
<ul style="list-style-type: none"> <li>• Modify Properties of Drawing Entity</li> <li>• Copy, Move, Rotate, Mirror , Offset</li> <li>• Array, Scale, Stretch, Lengthen, Trim</li> <li>• Extend , Break, Chamfer , Fillet</li> </ul>	

<ul style="list-style-type: none"> <li>• Insert and Explode</li> <li>• Application</li> </ul>	
<b>Module-III : Advanced 2D Commands</b>	8 hrs
<ul style="list-style-type: none"> <li>• Application of LAYER command in Civil Engineering</li> <li>• Layer command with its all sub commands, Line type, Color</li> <li>• Dimension command – line, aligned, arc length, radius, Diameter, Centre, Leader, Baseline and Continuous Dimensioning, tolerance, override and Dimension updates Text and DTEXT commands with Text Style Hatch command</li> </ul>	
<b>Module-IV : Introduction of 3D in AutoCAD</b>	8 hrs
<ul style="list-style-type: none"> <li>• Units, Elevation, Thickness, UCS and UCS Icon</li> <li>• Viewports , Extrude , 3D Solids – Sphere, Box, Cylinder, Cone, Wedge, Interference</li> <li>• 3D Surface – Revolved, Tabulated and Ruled Surfaces</li> <li>• Hide, Render and Shade of 3D drawings</li> <li>• Adjust Floating Viewports</li> <li>• Overriding layer Properties in Layout Viewports</li> <li>• Drawing on Layouts</li> </ul>	
<b>Module-V : Plot of 2D &amp; 3D Drawings</b>	8 hrs
<ul style="list-style-type: none"> <li>• PLAN , ELEVATION and 3D Views of Residential and Commercial Building</li> <li>• PLOT and its Sub Command for Plotting Drawing on A1, A2 and A3 Size Paper using Printer and / or Plotter</li> </ul>	

**Suggested laboratory experiments / other activities:**

- Interfacing with AutoCAD software
- Creating a drawing using 2D and 3D commands.
- Manipulate the drawing using editing commands.

**Pedagogic tools:**

- Chalk and Talk
- PPT and Videos.
- Assignment

**Reference Books:**

- Omura, G. (2011). Mastering AutoCAD 2010 and AutoCAD LT 2010. John Wiley & Sons.
- Yarwood, A. (2011). Introduction to AutoCAD 2012. Routledge.

**Suggested reading / E-resources**

- <https://nptel.ac.in/courses/112102101>
- <https://nptel.ac.in/courses/112104031>
- [https://onlinecourses.nptel.ac.in/noc20\\_me79/preview](https://onlinecourses.nptel.ac.in/noc20_me79/preview)
- <https://archive.nptel.ac.in/courses/112/102/112102101/>

Course Code	Course Title	Course Credit and Hours
<b>23UGIT050</b>	<b>Computer Maintenance &amp; Troubleshooting</b>	<b>2 Credit - 4 hrs / wk</b>

**Objective of the course:**

1. This course is focused on developing skills in installation and configuration of Operating systems, loading and configuring various device drivers, diagnosing the faults and troubleshoots the computer at software level as well as component level.
2. This course will be helpful for students to get employment in the computer maintenance industry as well as self employment.

**Target Skills (Course outcomes) :**

1. Skill development to perform computer hardware and software troubleshooting
2. Skill development to identify the fault in computer hardware.

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other) :**

- The Value added course based on computer maintenance and troubleshooting is offered by ITI.

**Reference:** The link of ITI :- <https://targetstudy.com/iti/trade/75-mechanic-computer-hardware/>

**Course Description:**

This course is focused on developing skills in installation and configuration of Operating systems, loading and configuring various device drivers, diagnosing the faults and troubleshoots the computer at software level as well as component level. The course aims to address SDG-4: Quality Education

Course Content	Hours
<b>Module-I: Core Components of Computer</b>	6 hrs
<ul style="list-style-type: none"> <li>• Features and Functionalities of CPU</li> <li>• Basics of Motherboard</li> <li>• Bus Slots and Cards</li> <li>• System Controllers</li> <li>• BIOS Features</li> <li>• Chipsets</li> <li>• Types of memory modules</li> </ul>	
<b>Module-II : Disk Drives and Controllers</b>	8 hrs
<ul style="list-style-type: none"> <li>• Basics of Disk Drives</li> <li>• Hard Disk Interfaces, Geometry and Performance Characteristics.</li> <li>• Hard Disk Controller</li> <li>• DVD Drive and Performance Criteria</li> <li>• Basics of Blu-Ray Disk</li> </ul>	
<b>Module-III : Input Devices</b>	8 hrs
<ul style="list-style-type: none"> <li>• Basic Input Devices</li> <li>• Types of keyboards and interfaces</li> </ul>	

<ul style="list-style-type: none"> <li>• Types of Mouse and specifications.</li> <li>• Types of Scanners and its applications</li> <li>• Latest input devices with applications</li> </ul>	
<b>Module-IV : Output Devices</b>	10 hrs
<ul style="list-style-type: none"> <li>• Display Technologies : Conventional and Digital</li> <li>• Printers and its types</li> <li>• Graphics Card</li> <li>• Plotter and Projectors</li> <li>• Audio-Visual Devices</li> </ul>	
<b>Module-V : Troubleshooting &amp; Maintenance</b>	6 hrs
<ul style="list-style-type: none"> <li>• Basics of POST and BOOTING</li> <li>• Troubleshooting Problems and Diagnosis</li> </ul>	

### Suggested laboratory experiments / other activities:

Sr.	Experiments
1	Identify basic components of a personal computer.
2	Prepare a list of various computer peripherals.
3	Identify common ports, associated cables, and their connections.
4	Identify major components including motherboards, memory, drives, peripheral cards and devices, BIOS, and Windows operating system.
5	Observe, search and write the specifications of CD/DVD drive, HDD, motherboard, RAM chips, Power supply, Microprocessor chip, Add on cards.
6	Observe the power supply (SMPS) and measure their voltage levels of a given SMPS.
7	Observe various secondary storage systems- Hard Disk, Flash drives, CD/DVD drive. Open drives and draw the internal structure of them.
8	Hard Disk formatting and Operating System installations.
9	Operate and learn various I/O Devices.
10	Observe the interfacing, installation and working of various devices such as scanner, projector, web cam etc. Connect all these devices with the given PC, install & test them.
11	Identify BIOS settings.
12	Identify the problem in the given PC, using the given troubleshooting sequence, fix the issue, record the given problem.
13	Recognize common symptoms associated with diagnosing and troubleshooting PCs and utilize Windows built-in diagnostic tools, log and boot up events.

### Pedagogic tools:

1. Chalk and Talk
2. PPT and Videos.
3. Assignment
4. Group discussion

### Reference Books:



1. “Computer Installation and Servicing”, D Balasubramanian, Tata McGraw Hill.
2. “The complete PC Upgrade & Maintenance Guide”, Mark Minasi, BPB Publications.
3. “IBM PC and clones”, Govind Rajalu, Tata McGraw Hill.

**Suggested reading / E-resources**

1. Software: Microsoft windows operating system from XP/vista/7/8/10.
2. <http://www.gcflearnfree.org/computerbasics/15/print>
3. <http://www.more.net/sites/default/files/training/BTTmain.pdf>
4. <http://www.computerhope.com/issues/ch000248.htm>
5. <http://www.youtube.com/watch?v=Wk0m6TIO8X4>
6. <http://computer.howstuffworks.com/computer-hardware-channel.htm>

**Suggested MOOCs:**

1. [https://onlinecourses.nptel.ac.in/noc22\\_cs19/preview](https://onlinecourses.nptel.ac.in/noc22_cs19/preview)

Course Code	Course Title	Course Credit and Hours
<b>23UGMG050</b>	<b>Entrepreneurship</b>	<b>2 Credit - 4 hrs / wk</b>

**Objective of the course:**

1. To make the students familiar to the concept entrepreneurship
2. To develop in them the quality for innovative entrepreneur.
3. The ability to identify entrepreneurial opportunities that exist, those that represent untapped markets and underserved markets, and those that can be created by applying existing technologies to new fields and new markets

**Target Skills (Course outcomes) :**

1. Skill development to identify entrepreneurial opportunities.
2. Skill development to create enterprise.

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other) :**

- The Value added course based on Entrepreneurship course is offered by The National Programme on Technology Enhanced Learning (NPTEL).

**Reference:** <https://nptel.ac.in/course.html>

**Course Description:**

1. The course is an introduction to entrepreneurship and help students to identify entrepreneurial opportunities. Also it helps to students to identify entrepreneurship skills required by the students.
2. The ability to identify entrepreneurial opportunities that exist, those that represent untapped markets and underserved markets, and those that can be created by applying existing technologies to new fields and new markets. The course aims to address SDG-8: Decent Work and Economic Growth.

Course Content	Hours
<b>Module-I: Way to Entrepreneurship</b>	8 hrs
<ul style="list-style-type: none"> <li>• Concept of Entrepreneur and Entrepreneurship</li> <li>• Who are Entrepreneurs? (Characteristics &amp; Motivation)</li> <li>• Why for Entrepreneurship? (Importance)</li> <li>• Entrepreneurial Barriers</li> <li>• Family Business &amp; Entrepreneurship</li> </ul>	
<b>Module-II : Ease of Doing Business</b>	8 hrs
<ul style="list-style-type: none"> <li>• Types of Business Venture</li> <li>• Different forms of Organization &amp; Registration</li> <li>• Sources of Finance</li> <li>• Government Policy – Tax, Clearance Policy</li> <li>• Types of Funding</li> <li>• Debt vs. Equity</li> </ul>	
<b>Module-III : An Entrepreneur's Toolkit</b>	8 hrs
<ul style="list-style-type: none"> <li>• Unleashing Creativity &amp; Innovation</li> <li>• Recognizing and Shaping Opportunities</li> <li>• Business Model Canvas (Concepts) <ul style="list-style-type: none"> <li>○ <i>Step 01 - Customer Segments</i></li> </ul> </li> </ul>	

<ul style="list-style-type: none"> <li>○ Step 02 - Customer Relationships</li> <li>○ Step 03 - Market Channels</li> <li>○ Step 04 - Business Value Propositions</li> <li>○ Step 05 - Key Activities</li> <li>○ Step 06 - Key Resources</li> <li>○ Step 07 - Key Partners</li> <li>○ Step 08 - Cost Structure</li> <li>○ Step 09 - Revenue Streams</li> </ul>	
<b>Module-IV : Entrepreneurship Policies and Opportunities</b>	8 hrs
<ul style="list-style-type: none"> <li>● Pitching Opportunities</li> <li>● Startup Policy</li> <li>● Make in India,</li> <li>● Role of Venture Capitalist in Business Organization</li> <li>● Introduction to Intellectual Property - Trademark, Copyright and Patents</li> <li>● Ethics &amp; Values in Business</li> </ul>	
<b>Module-V : Trends and Cases for Entrepreneurship</b>	8 hrs
<ul style="list-style-type: none"> <li>● Women Entrepreneurship</li> <li>● Social Entrepreneurship</li> <li>● Rural Entrepreneurship</li> <li>● At least two cases on Entrepreneurship</li> </ul>	

**Suggested laboratory experiments / other activities:**

1. Discussion of practical examples and cases of entrepreneurs.

**Pedagogic tools:**

1. Chalk and Talk
2. PPT and Videos.
3. Assignment
4. Group discussion

**Reference Books:**

1. Vasant Desai, *Dynamics of Entrepreneurial Development And Management*, Himalaya Publishing House, Fourth Edition
2. Hisrich&Manimala, *Entrepreneurship*, McGraw Hill Education, Ninth Edition
3. Neeta Baporikar, *Entrepreneurship Development & Project Management*, Himalaya Publishing House, First Edition

**Suggested reading / E-resources**

1. <https://ndl.iitkgp.ac.in/>

**Suggested MOOCs:**

1. <https://nptel.ac.in/courses/110/106/110106141/>

Course Code	Course Title	Course Credit and Hours
<b>23UGPH050</b>	<b>Cosmetic Preparations</b>	<b>2 Credit - 4 hrs / wk</b>

**Objective of the course:**

1. To create understanding of the basic science employed in cosmetics.
2. This course is aimed at learning the principles underlying cosmetic technology and approach to cosmetic research and development.
3. To develop awareness about Good manufacturing practices and quality assurance in cosmetic technology.
4. Students will be able to have a better outlook on cosmetic formulations and their usage.

**Target Skills (Course outcomes) :**

1. Skill development to develop formulation of cosmetics.
2. Skill development to identify the skin and hair problems and how to overcome through cosmetic preparations.
3. Learn about the selection of suitable excipients for cosmetics products.

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other) :**

- The Value added course based on cosmetic belongs to area of Cosmetic Technology. Various types of courses from cosmetics sector are offering by Faculty of Healthcare Administration, Institute of Good Manufacturing Practices India (IGMPI).

**Reference:**

The link of IGMPI – <https://www.igmpiindia.org/Executive-Diploma-in-Cosmetic-Technology.html>

**Course Description:**

The course, Cosmetic preparations, is an interdisciplinary applied science program providing students with the opportunities to develop professional skills and fundamental concepts driving cosmetic science. It is focuses on the needs of the cosmetic industry and its consumers, in addition to providing students with the critical and evaluative skills to become professional skilled manufacturer. The course aims to address to SDG 3 (good health and well being) and SDG 4 (quality education).

Course Content	Hours
<b>Module-I:</b> Fundamentals of cosmetic science	3 hrs
<ul style="list-style-type: none"> <li>• Introduction, Objectives, Applications of cosmetics</li> <li>• Classification of cosmetics</li> <li>• Basic terminologies.</li> </ul>	
<b>Module-II :</b> Cosmetics for Skin	8 hrs
<ul style="list-style-type: none"> <li>• Basics and selection of ingredients for skin care products</li> <li>• Fundamentals of Sunscreen, moisturizers, cold cream, vanishing cream, bathing shop, etc.</li> </ul>	

<b>Module-III : Cosmetics for Hair</b>	8 hrs
<ul style="list-style-type: none"> <li>• Basics and selection of ingredients for hair care products</li> <li>• Shampoo and conditioners</li> </ul>	
<b>Module-IV : Cosmetics for Oral care</b>	8 hrs
<ul style="list-style-type: none"> <li>• Basics and selection of ingredients for oral care preparations</li> <li>• Dentifrice-powders, gels, paste, etc.</li> </ul>	
<b>Module-V : Manicure and other preparations</b>	8 hrs
<ul style="list-style-type: none"> <li>• Basics, Selection of Ingredients, Nail polish, Nail polish remover, Lipsticks, Eye lashes, Baby care products, Hygienic products, etc.</li> </ul>	

**Suggested laboratory experiments / other activities:**

**Pedagogic tools:**

1. Chalk and Talk
2. PPT and Videos
3. Assignment

**Reference Books:**

1. Hilda Butler. (2000, Tenth Edition) *Poucher's Perfumes, Cosmetics and Soaps*. Kluwer Academic Publishers (ISBN 978-90-481-4034-3).
2. Sharma P.P. (2014, Fifth Edition) *Cosmetics – Formulation, Manufacturing and Quality Control*. Vandana Publications Pvt. Ltd., Delhi (ISBN: 978-8190595704).
3. André O. Barel, Marc Paye, Howard I. Maibach (2009, Third Edition) *Handbook of Cosmetic Science and Technology*. Informa Healthcare USA, Inc. (ISBN: 978-1-4200-6963-1).
4. E.A.Rawlins, (1997, Eighth Edition) *Bentley's text book on pharmaceuticals*. Elsevier Health Sciences (ISBN: 9788131232668).

**Suggested reading / E-resources**

1. Drugs and Cosmetic act/rules by Govt. of India Publication.

**Suggested MOOCs:**

1. <https://www.udemy.com/course/certificate-course-in-basic-cosmetology/>
2. <https://www.udemy.com/course/easy-cosmetics/>
3. <https://mademoiselle-organic-academy.teachable.com/p/free-introduction-to-diy-skincare>

Course Code	Course Title	Course Credit and Hours
<b>23UGCO050</b>	<b>Financial Literacy &amp; Taxation</b>	<b>2 Credit - 4 hrs / wk</b>

**Objective of the course:**

1. To make the students familiar with Banking system in India and how to use different banking services.
2. To provide basic knowledge about Types of investment opportunities both risk free and having moderate risk features.
3. To make the students aware about different types of insurance and how to get benefit out of it and to familiarize them with basics of Indian tax system.

**Target Skills (Course outcomes) :**

1. Skill development to familiar with Banking system in India
2. Skill development to aware about different types of insurance and basics of Indian tax system.

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other) :**

- The Value added course based on banking system in India, insurance and investment options belongs to area of financial literacy & taxation. Various types of courses from financial literacy & taxation related are offering by BFSI Sector Skill Council of India.

**Reference:** The link of BFSI – <http://www.bfsissc.com/basics-of-banking-insurance.html>

**Course Description:**

The course is making the students' familiar with Banking system in India and how to use different banking services. Emphasis on various investment options. The course is learning about different types of insurance and how to get benefit out of it and to familiarize them with basics of Indian tax system.

Course Content	Hours
<b>Module-I: Basics of Banking</b>	7 hrs
<ul style="list-style-type: none"> <li>• Introduction of Banking System</li> <li>• Types of Bank Accounts</li> <li>• Negotiable Instruments (cheque and draft)</li> <li>• Dealing with basic banking documents</li> <li>• Information about E-banking services like NEFT, RTGS, Net Banking, Debit Card, Credit Card, ECS</li> <li>• Overdraft, loans, C.C., etc.</li> </ul>	
<b>Module-II : Basics of Investments – 1 (Risk free way)</b>	5 hrs
<ul style="list-style-type: none"> <li>• Concept of Savings and Investment</li> <li>• Investment Alternatives like <ul style="list-style-type: none"> <li>- Fixed Deposits and PPF</li> <li>- National Saving Certificates</li> <li>- Secured Debentures &amp; Bonds</li> </ul> </li> </ul>	

<ul style="list-style-type: none"> <li>- Post office Saving Schemes</li> <li>- National Pension Schemes etc.</li> </ul>	
<b>Module-III : Basics of Investments – 2 (Moderate risk factor)</b>	15 hrs
<ul style="list-style-type: none"> <li>• Introduction to Capital Market: Primary Market &amp; Secondary Market</li> <li>• Equity Shares: <ul style="list-style-type: none"> <li>- Features</li> <li>- How to apply for an IPO</li> <li>- Demat Account and Trading Account</li> <li>- NSDL and CDSL</li> <li>- Trading in stock market: Screen Based Trading</li> </ul> </li> <li>• Mutual Funds: <ul style="list-style-type: none"> <li>- Concept and Features</li> <li>- Types of Mutual funds</li> <li>- Open ended and close ended scheme</li> <li>- How to invest in MFs</li> </ul> </li> <li>• Concept of Derivatives <ul style="list-style-type: none"> <li>- Basics of Futures &amp; Options</li> <li>- Investing in Derivatives</li> <li>- Risk- return ratio</li> </ul> </li> <li>• Portfolio Management Services</li> </ul>	
<b>Module-IV : Basics of Insurance</b>	6 hrs
<ul style="list-style-type: none"> <li>• Concept of Life Insurance</li> <li>• Concept of General Insurance</li> <li>• Benefits of Insurance</li> <li>• Different investment avenues of LIPs</li> <li>• Types of General Insurance and its utilities</li> </ul>	
<b>Module-V : Basics of Taxation</b>	7 hrs
<ul style="list-style-type: none"> <li>• Concepts of Taxation</li> <li>• Types of Tax: Direct &amp; Indirect Taxes</li> <li>• Income tax slabs</li> <li>• Briefing about Goods and Service Tax (GST)</li> </ul>	

**Suggested laboratory experiments / other activities:**

1. Not applicable

**Pedagogic tools:**

1. Chalk and Talk
2. PPT and Videos.
3. Assignment
4. Group discussion

**Suggested reading / E-resources**

1. Financial Literacy for people newly inducted into the Financial System\_RBI
2. Financial & Tax Literacy Drive Vitiya Gyan - ICAI ka Abhiyan

**Suggested MOOCs:**

1. <https://youtu.be/w0WiOmjksE>

2. T. N. Manoharan, G. R. (Latest Edition). *Student's Handbook on Taxation*. Mumbai: Snow White Publications Pvt. Ltd.
3. Kevin S, "*Security Analysis & Portfolio Management*", PHI Learning Pvt. Ltd.
4. Pandian P, (Second Edition), "*Security Analysis & Portfolio Management*", Vikas Publishing House.
5. Chandra P., "*Investment Analysis & Portfolio Management*", Tata McGraw Hill.
6. Dayal, H. (2017). *Fundamentals of Insurance* . Notion Press.
7. Praharaj, P. (2015). *Your Everyday Guide to Personal Finance and Insurance*. TV 18 broadcasting limited.



Course Code	Course Title	Course Credit and Hours
23UGID050	Prosperity through self-reliance(स्वावलंबन से समृद्धि)	2 Credit - 4 hrs / wk

**Objective of the course:**

1. Developing the mindset for physical work(श्रम).
2. Understanding the usefulness of the body.
3. To understand the concept of Prosperity.

**Target Skills (Course outcomes):**

1. Herbal Cosmetic Products like soap, wheat biscuit, hair oil,
2. Useful items from Waste material

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other) :**

The Value-added course is based on co-existential philosophy of Shree A. Nagrajji. It focuses on developing mindset for self-reliance and make sustainable and ecofriendly daily need products.

**Course Description:**

The course is an introduce self-reliance in human thought co-existential philosophy of Shree A. Nagrajji. The aim of this course is to develop mindset and confidence to produce daily needs products without using harmful chemicals. It also promotes the organic products and empowered students to build mind set for the same. The course also describes the right utilization of the resources.

Course Content	Hours
<b>Module-I: Self-reliance (स्वावलंबन) in current world</b>	3hrs
<ul style="list-style-type: none"> <li>• Introduction</li> <li>• What is Self-reliance (स्वावलंबन)?</li> <li>• Why स्वावलंबन?</li> <li>• What is conventional consumerism and production?</li> <li>• Difference between consumerism and स्वावलंबन</li> </ul>	
<b>Module-II :Developing mindset for स्वावलंबन through education</b>	3hrs
<ul style="list-style-type: none"> <li>• Objective of education</li> <li>• Education for स्वावलंबन</li> <li>• Identifying our daily needs</li> <li>• Mindset for स्वावलंबन</li> <li>• Difference of mindset in स्वावलंबन and consumerism</li> </ul>	
<b>Module-III :Health (स्वास्थ्य) and Temperance (संयम)</b>	3hrs

<ul style="list-style-type: none"> <li>• What isस्वास्थ्यand संयम</li> <li>• Criteria to make any product keeping in mind स्वावलंबन</li> <li>• स्वावलंबन in FMCG(Fast-Moving Consumer Goods) items to complete our daily needs</li> <li>• Herbal Cosmetic Product</li> </ul>	
<b>Module-IV :Relation centric production</b>	3hrs
<ul style="list-style-type: none"> <li>• Importance of relation</li> <li>• Relation centric production and not production centric relation</li> <li>• Organic and Healthy food making</li> <li>• स्वावलंबन Case study-1:MCVK (ManavChetanaVikas Kendra) - Indore, M.P.</li> </ul>	
<b>Module-V : Marketing for Relation</b>	3hrs
<ul style="list-style-type: none"> <li>• Marketing for relation</li> <li>• 7 types of relations is exist</li> <li>• Herbal Cosmetic Product</li> <li>• स्वावलंबन Case study-2:Samrudhi kendra, Rajkot</li> <li>• A way towards स्वावलंबन.</li> </ul>	

**Suggested laboratory experiments / other activities:**

1. Preparation of Soap
2. Preparation of Wheat Biscuits
3. Preparation of Hair Oil
4. Useful items from Waste material

**Pedagogic tools:**

1. Chalk and Talk
2. PPT and Videos.
3. Assignment
4. Case Study

**Reference Books:**

1. ManavVyavharDarshan, A. Nagraj
2. ManavAbhyasDarshan, A. Nagraj
3. AavartanshilArthshastra, A, Nagraj

**Suggested reading / E-resources**

1. <https://www.youtube.com/channel/UC5NkBmitVXqg-2v1rJKNKzA/playlists>

**Suggested MOOCs:**

1. [https://www.youtube.com/watch?v=CZsqUk\\_ynbo&list=PL2oQmUmGIvR\\_i2Qe2-P-4duGHzBTW9SNs](https://www.youtube.com/watch?v=CZsqUk_ynbo&list=PL2oQmUmGIvR_i2Qe2-P-4duGHzBTW9SNs)

Course Code	Course Title	Course Credit and Hours
<b>23UGID050</b>	<b>Introduction to Robotics</b>	<b>2 Credit - 4 hrs / wk</b>

**Objective of the course:**

1. To provide an introduction to Robotics and Automation
2. To provide information on interfacing
3. To provide the details of operations for a variety of sensory devices that are used on robot
4. The meaning of sensing, classification of sensor, that measure position, velocity & acceleration of robot joint.
5. To perform gain knowledge on programming of robots.

**Target Skills (Course outcomes) :**

**The students will be able to develop**

1. To identify different sensors used for Robotics.
2. To construct a simple Robot.
3. To study programming of Robot using AVR family micro controller.
4. To design different systems according to requirement using a Robot.

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other) :**

Our ATMIYA University is working with the mission of nurturing the creative thinkers and leaders through transformative learning. To fulfill the same, this course has been proposed since 2016. This course was designed to Understand robot configuration, structures, basic components, workspace and generations of robots. Get knowledge and analysis skills and to Learn about various sensors, actuators, robot programming. Understand the present & future applications of a robot.

**Reference:**

**Course Description:**

Robotics is a branch of mechanical engineering, electrical engineering, electronic engineering and computer science. It deals with the design, construction, operation, and application of robots, as well as computer systems for their control, sensory feedback and information processing. This course aims to provide the details of operations for a variety of sensory devices that are used on robot. This course is designed to gain knowledge about various peripherals and their interface with the AVR controllers. Students will learn to control various peripherals through the programming.

Course Content	Hours
<b>Module-I: Sensors, Actuators and Microcontrollers used in Robots</b>	7 hrs

<ul style="list-style-type: none"> <li>• Sensors, types of sensors, IR Sensor, Photodiode,</li> <li>• Proximity Sensors, Ultra Sonic sensors,</li> <li>• Wide range ultra sonic sensors,</li> <li>• DC motors, DC motor rotation using PWM. Introduction to Microcontrollers</li> </ul>	
<b>Module-II : Construction of Robot and Programming</b>	8 hrs
<ul style="list-style-type: none"> <li>• Introduction to DC motor driver ICs,</li> <li>• Constructing a Robot using L2938 and AtMega8. Programming</li> <li>• AtMega8 for moving Robot in forward and reverse direction</li> </ul>	
<b>Module-III : Interfacing of Buzzer, LED Bargraph and LCD</b>	7 hrs
<ul style="list-style-type: none"> <li>• Interfacing of Buzzer, Buzzer programming</li> <li>• Interfacing of LED bargraph, Programming LED bargraph</li> <li>• Introduction to 16x2 LCD, LCD interfacing</li> <li>• Programming of LCD for displaying various things</li> </ul>	
<b>Module-IV : Simple motion and Position control of Robot</b>	8 hrs
<ul style="list-style-type: none"> <li>• DC motor programming using PWM,</li> <li>• Different motions of Robots</li> <li>• Introduction to position encodes</li> <li>• Position encoder programming using external interrupts</li> </ul>	
<b>Module-V : ADC interfacing and White Line following Robot</b>	10 hrs
<ul style="list-style-type: none"> <li>• ADC interfacing with microcontroller</li> <li>• Displaying parameters of ADC on LCD</li> <li>• Working of white line sensors, White Line sensor programming</li> </ul>	

#### **Suggested laboratory experiments / other activities:**

1. Learning about various sensors of the robot
2. Learning about programming tool AVR studio and ATMEL studio
3. Learning about interfacing of robot with the computer.
4. Programming of various modules of robot.

#### **Pedagogic tools:**

5. Videos
6. Oral Discussion
7. Live Demonstrations
8. Hands on training
9. Assignment

#### **Reference Books:**

1. The AVR Microcontroller and Embedded System by Muhammad Ali Mazidi
2. Make: AVR Programming: Learning to Write Software for Hardware by Elliot Williams
3. Embedded C Programming and the Atmel AVR, 2nd Edition by Richard H. Barnett & Sarah Cox

#### **Suggested reading / E-resources**

1. <https://www.ee.iitb.ac.in/~ccgroup/docs/cclab/2/3.pdf>
2. <https://www.ee.iitb.ac.in/~ccgroup/docs/cclab/2/4.pdf>

3. <https://www.youtube.com/watch?v=gAH5ES1kZV4>
4. <http://www.nex-robotics.com/products/spark-v-robot/spark-v.html>

**Suggested MOOCs:**

3. <https://www.udemy.com/course/avr-microcontroller-complete-course-from-scratch-atmega16/>
4. <https://www.skillshare.com/en/classes/Start-Learning-Embedded-Systems-with-AVR-Atmega32-Controller/1774285377>

Course Code	Course Title	Course Credit and Hours
<b>23UGPH051</b>	<b>Pharmaceutical Prerequisite</b>	<b>2 Credit - 4 hrs / wk</b>

**Objective of the course:**

- To create understanding of the basic technology employed in pharmaceutical industries.
- This course is aimed at learning the principles underlying pharmaceutical requirement and approach to pharmaceutical research and development.
- To develop awareness about current Good Laboratory Practices in pharmaceutical industries.
- Students will be able to have a better outlook on pharmaceutical technology and their usage.

**Target Skills (Course outcomes) :**

- Skill development to work in laboratory.
- Understand the pharmaceutical needs to function effectively in the areas of pharmaceutical operation.
- Skill development to measure the flow rate of fluids.

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other) :**

- The Value added course based on pharmaceutical requirements belongs to area of health care and life science. Various types of courses from health care sector are offering by Healthcare Sector Skill Council and Life Sciences Sector Skill Development Council.

**Reference:**

- <https://www.healthcare-ssc.in/certified-candidates-list.aspx>
- <https://www.lssdc.in/>

**Course Description:**

The course, Pharmaceutical Prerequisite is an interdisciplinary advanced science course providing the students with the opportunities to develop fundamental skills and concepts driving the field of Pharmaceutical Technology. It also provides students with the basic concepts of material handling and stoichiometry, which are some of the important and critical skills required to become professional experts in the same. The course also focuses on the foundation part required for the optimum output, which is GLP (Good Laboratory Practices). The course aims to address to SDG 4 (quality education), SDG 8 (Decent work and Economic Growth) and SDG 9 (Industry, Innovation and Infrastructure).

Course Content	Hours
<b>Module-I:</b> Fundamentals of Pharmaceutical Technology	8 hrs
<ul style="list-style-type: none"> <li>Introduction, Objectives,</li> <li>Basic terminologies.</li> </ul>	
<b>Module-II:</b> Stoichiometry	8 hrs
<ul style="list-style-type: none"> <li>General principles, material balance-tie substances, chemical reactions and molal units</li> <li>Rate process, steady, unsteady and equilibrium state, laws of combining weights, applications of gas laws, energy balance, fuels and combustion, etc.</li> </ul>	
<b>Module-III:</b> Liquid/Gas flow measurement techniques	8 hrs

<ul style="list-style-type: none"> <li>• Types of manometers</li> <li>• Reynolds number and its significance, Bernoulli's theorem and its applications</li> <li>• Energy losses, Orifice meter, Venturimeter, Pitot tube and Rotometer.</li> </ul>	
<b>Module-IV: Good laboratory practice</b>	8 hrs
<ul style="list-style-type: none"> <li>• Fundamental of GLP</li> <li>• Resources, Characterization, Rules, Results</li> <li>• Quality Assurance</li> </ul>	
<b>Module-V: Crystallization techniques</b>	8 hrs
<ul style="list-style-type: none"> <li>• Objectives, crystal lattice, types of crystal, crystal form, size and habit, formation of crystals, factors affecting crystallization process and crystal growth.</li> <li>• Study of various types of crystallizers.</li> <li>• Methods for prevention of caking of crystals.</li> </ul>	

### **Suggested laboratory experiments / other activities:**

1. To demonstrate unit systems and conversion of units.
2. To demonstrate stoichiometry and tie substances in chemical reactions.
3. To measure pressure of gas and other fluids using different manometers (U-tube manometer, inclined manometer etc.)
4. Study of various flow meters (orifice meter, venturi meter, rotameter) and ejector pump.
5. Experiment on Reynolds number.
6. Study the effect of various factors (rate of cooling, rate of agitation, seeding, solvent, etc.) on crystallization of different salts.
7. Demonstration of corrosion resistance of various materials.
8. Practical related to topics in pharmaceutical engineering theory should be carried out.
9. Introduction to engineering drawing – Demonstration of orthographic and isometric projections, preparation of sheets based on orthographic projections.
10. Preparation of different pharmaceutical solutions.
11. Perform inter conversion of solution having different concentration terms.

### **Pedagogic tools:**

1. Chalk and Talk
2. PPTs and Videos
3. Assignment

### **Reference Books:**

1. Max S. Peters (1954) *Elementary Chemical Engineering*. McGraw Hill Book Company, New York, 1954.
2. Good Laboratory Practice, [https://proto.ufsc.br/files/2012/03/glp\\_trainee\\_green.pdf](https://proto.ufsc.br/files/2012/03/glp_trainee_green.pdf)
3. Stocklosam J. (1991) *Pharmaceutical calculations*, Lea & Febiger, Philadelphia.
4. C.V.S Subrahmanyam, V. Kusum Devi, Sarasija Suresh, J. Thimma Setty, (2002) *Pharmaceutical engineering principles and practices*, Vallabh Prakashan.

**Suggested reading / E-resources**

1. <https://apps.who.int/iris/handle/10665/66894>
2. <https://www.fda.gov/regulatory-information/search-fda-guidance-documents/good-laboratory-practice-regulations-management-briefings-post-conference-report-aug-1979>

**Suggested MOOCs:**

1. <https://www.udemy.com/course/good-laboratory-practices/>
2. <https://www.udemy.com/course/introduction-to-mass-balance/>
3. <https://www.igmpiindia.org/Certified-Good-Laboratory-Practice-Professional-CGLPP.html>



Course Code	Course Title	Course Credit and Hours
<b>23UGID050</b>	<b>Personality Development (Activity based)</b>	<b>2 Credit - 4 hrs / wk</b>

**Objective of the course:**

- Share and experience various communication styles
- Insights into the personality dynamics of interpersonal and inter-group relations;
- Develop communication skills particularly focusing on effective articulation and listening;
- Acquire skills for managing and resolving conflicts at work through effective communication skills
- Develop positive attitudes towards work, superiors, peers and subordinate;
- Sharpen behavioural skills and insights for supervision, coordination and motivation to the subordinates to enhance their effectiveness;
- Appreciate changing labour market and employment relations scenario in the context of globalization, privatization and liberalization;

**Target Skills (Course outcomes) :**

5. Effective way of communication
6. Interpersonal skill development
7. Building self confidence
8. Improve problem solving ability
9. Develop contributory personality
10. Learn personality traits through biography
11. Develop importance of skills through management games

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other) :**

- The Value added course based on current requirement of LPG market, VUCA world and post-covid market requirement. It develops self confidence and decision making skills in market and industries.
- (Introduction to Personality Development, How to Problem Solving & Interpersonal Relationship Skills, etc.)

**Reference:**

<https://courses.iid.org.in/course/personality-development>

**Course Description:**

This course is an introduction to communication skill, Basics of personality, Sports and yoga for personality development, Self development activities and Volenteership.

Course Content	Hours
<b>Module-I: Personality Development</b>	6 hrs

<ul style="list-style-type: none"> <li>• Need, scope and application of personality development in society</li> <li>• personality Types</li> <li>• Personality dynamics</li> <li>• Personality evaluation</li> <li>• Role of human being in society</li> <li>• Self analysis</li> <li>• Inner and outer personality</li> <li>• SWOT &amp; Johari window</li> <li>• Learning traits from biography</li> </ul>	
<b>Module-II : Sports , Yoga and personality development (Any Five activities)</b>	8 hrs
<ul style="list-style-type: none"> <li>• Indore games</li> <li>• Outdoor games</li> <li>• Outbound activities</li> <li>• Vipassana</li> <li>• Yoga for health and wellness</li> <li>• Team building and team spirit</li> </ul>	
<b>Module-III : Communication skill (Any Five activities)</b>	6 hrs
<ul style="list-style-type: none"> <li>• Publishing e-news letter</li> <li>• Story writing/ telling</li> <li>• Photography</li> <li>• Calligraphy</li> <li>• Preparation of gratitude journals</li> <li>• Painting</li> <li>• Standup comedy</li> <li>• Survey</li> <li>• Mime</li> <li>• Street play</li> <li>• Drama and theater</li> <li>• Design and analysis of advertisement</li> <li>• Collaborative writing</li> <li>• Email drafting</li> <li>• Blog writing</li> <li>• Podcast</li> <li>• Video resume preparation</li> <li>• Think-Pair-Share</li> <li>• Mind mapping</li> <li>• Interview a family or friend</li> </ul>	
<b>Module-IV : Self development activities (Any Five activities)</b>	8 hrs
<ul style="list-style-type: none"> <li>• Research your family history</li> <li>• Prepare YouTube channel</li> <li>• Design self development plan</li> <li>• Slide show with everyday photos</li> <li>• Personal finance</li> <li>• Design a reels</li> <li>• Have a winners mind set</li> <li>• Self talk</li> <li>• Best from waste</li> <li>• Innovative crafting</li> <li>• Digital learning</li> <li>• Learnathon</li> </ul>	
<b>Module-V : Volunteering-Developing contributory personality (3 activities)</b>	8 hrs

Visits and report preparation of <ul style="list-style-type: none"> <li>• Old age home</li> <li>• Schools</li> <li>• Hospitals</li> <li>• NGOs.</li> <li>• Gaushala</li> <li>• Historical sites</li> <li>• Organic farms</li> <li>• Terrace garden</li> <li>• Day care center</li> <li>• Counseling and mentoring center</li> </ul>	
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**Suggested laboratory experiments / other activities:**

- Sports and Yoga
- Leadership stories
- Experiential learning
- Volunteering

**Pedagogic tools:**

- Chalk and Talk
- PPT and Videos.
- Assignment
- Game
- Exercise
- Lecture
- Questionnaire
- Distribute Article
- Video Clip
- Watching a Movie:
- Group Activity
- Questionnaire on Listening and Speaking
- Experience sharing
- Group discussion
- Picture Exercise
- Case studies and discussions
- Multi media
- Survey
- Visit & interaction
- Action oriented task
- Design

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**Reference Books:**

- Carnegie, D. (2022). *How to win friends and influence people*. DigiCat.
- Caspi, A., Roberts, B. W., & Shiner, R. L. (2005). Personality development: Stability and change. *Annu. Rev. Psychol.*, 56, 453-484.
- Khera, S. (2018). *You Can Win: A Step-by-Step Tool for Top Achievers*. Bloomsbury Publishing

**Suggested reading / E-resources:**

- <https://nptel.ac.in/courses/109104107>
- [https://onlinecourses.nptel.ac.in/noc21\\_hs76/preview](https://onlinecourses.nptel.ac.in/noc21_hs76/preview)
- <https://archive.nptel.ac.in/noc/courses/noc20/SEM2/noc20-hs43/>

### Evaluation norms for Value added course - 100% CIA

- Only remarks will be given at the end of the course
- A separate certificate on completion of each course will be issued by the CoE

### 100 % CIA components

Sr. No.	Component	Content	Duration	Marks	Sub Total
1.	Attendance	Min. 80 %	For full 40 Hrs	10	10
2	Practical	At least 75 % of practical performance attendance		50	50
3	Assignment	1 or 2	-	20	20
4	Test	Full course	1hr.	20	20
<b>Grant Total</b>					<b>100</b>

- All above are compulsory components
- In event of non-completion of course, the student has to re-do the course or opt for another one.

### Remarks:

Range of Marks	Remarks
40 - 100	Completed
39 - and below	Not Completed

Course Code	Course Title	Course Credit and Hours
21AEVA001	Surface Coating Techniques	1 Credit - 4 hrs / wk

**Objective of the course:**

5. Give an overview of various cleaning process for surface chemistry.
6. Train the student to formulate various electrolytes and to determine quality of electrolyte.
7. Be familiar with the different types of organic surface coating and inorganic surface coating
8. Discuss Formulation; Application; Properties of various additives like Solvent, Brighter and Emulsifiers.

**Target Skills (Course outcomes) :**

1. Decide the surface preparation methods suitable for different substrate materials
2. Understand the basic concept of electroplating & interpret testing & evaluation.-explain importance of electroplating & its applications
3. Student should ability to understand the fundamental principles of Paint and Coating Formulation via classification and film formation mechanisms.
4. Student should able to understand formulations of Electrolyte based on different processes.
5. Ability to handle various machineries and equipment used in laboratory as well as commercial scale.
6. Basic understanding of designing Solvent, Brighter and Emulsifiers for formulation of various electrolytes
7. Ability to understand testing methods for various electrolytes

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other) :**

- The Value added course based on surface coating to area of surface finishing. Various types of courses from surface finishing sector are offering by Paints and Coatings Skill Council of India (ASCI-SSC).

**Reference:**

<https://nsdcindia.org/sector-skill-councils>

**Course Description:**

The course provides basic information about theory and application of surface chemistry. To enable the students to understand the importance of Techniques of Surface Preparation for different substrata. The course introduces for highlights on different paint application techniques and its efficiency. The course introduces various Classifications of coatings, Mechanisms of film formation in surface coatings. The course emphasizes on Principles of Inorganic surface coating - Non-electric coatings, role of additive like Brighter, Solvent and Emulsifiers technology in electroplating techniques.

<b>Course Content</b>	<b>Hours</b>
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<b>Module-I: Surface coating</b>	8 hrs
<ul style="list-style-type: none"> <li>• Introduction</li> <li>• Objectives &amp; applications of coating (on metal &amp; non-metals)</li> <li>• Classification of surface coatings (inorganic &amp; organic)</li> <li>• Preliminary treatment of surfaces.</li> </ul>	
<b>Module-II : Organic surface coating:</b>	8 hrs
<ul style="list-style-type: none"> <li>• Chemistry, composition, characteristics, role and applications of <ul style="list-style-type: none"> <li>✓ Oil paint</li> <li>✓ Water paint (emulsion paint)</li> <li>✓ Varnishes</li> <li>✓ lacquers</li> <li>✓ Wax polishes.</li> </ul> </li> </ul>	
<b>Module-III : Inorganic surface coating - Electroplating:</b>	8 hrs
<ul style="list-style-type: none"> <li>• Theory and application of following electroplating techniques <ul style="list-style-type: none"> <li>✓ Copper</li> <li>✓ Zinc</li> <li>✓ Chrome</li> <li>✓ Nickel</li> <li>✓ Silver</li> </ul> </li> </ul>	
<b>Module-IV : Inorganic surface coating - Non-electric coatings:</b>	8 hrs
<ul style="list-style-type: none"> <li>• Theory, characteristics, special applications, and working techniques of <ul style="list-style-type: none"> <li>✓ Hot dipping</li> <li>✓ metal spraying</li> <li>✓ Vacuum metalizing</li> <li>✓ Vitreous coating.</li> <li>✓ Anodizing</li> </ul> </li> </ul>	
<b>Module-V : Additive Agents for Surface Coatings:</b>	8 hrs
<ul style="list-style-type: none"> <li>• Introduction, role and classification of additives in surface coating processes</li> <li>• Role and application of following additives <ul style="list-style-type: none"> <li>✓ Brighter</li> <li>✓ Solvents</li> <li>✓ Emulsifiers.</li> </ul> </li> </ul>	

**Suggested laboratory experiments / other activities:**

1. To prepare electrolyte and bath for Copper Electroplating.
2. To prepare electrolyte and bath for Zinc Electroplating.
3. To prepare electrolyte and bath for Chrome Electroplating.
4. To prepare electrolyte and bath for Nickel Electroplating.
5. To perform electroplating of Copper metal on given standard sample.
6. To perform electroplating of Zinc metal on given standard sample.
7. To perform electroplating of Nickel metal on given standard object.
8. Demonstrative Practical: To perform electroplating of Chrome metal on given sample.
9. To perform analysis of electrolyte for Copper Electroplating.
10. To perform analysis of electrolyte for Zinc Electroplating.
11. To perform analysis of electrolyte for Chrome Electroplating.
12. To perform analysis of electrolyte for Nickel electroplating.

**Pedagogic tools:**

1. PPT and Videos.
2. Assignment
3. Group discussion

**Reference Books:**

7. Coatings materials and surface coatings - Arthur A. Tracton (Editor), CRC Press, Tailor & Fransis Group.
8. Engineering chemistry - R. Gopalan, D. Venkappayya, S. Nagarajan.
9. Chemistry in engineering and technology volume -1 & 2 – J.C. Kuriacose & J. Rajaram
10. Engineering chemistry – Jain & Jain Industrial hygiene and chemical safety – M. K. Fulekar.

**Suggested reading / E-resources**

1. [https://www.youtube.com/watch?v=TuP9de\\_SK1A](https://www.youtube.com/watch?v=TuP9de_SK1A)
2. <https://www.youtube.com/watch?v=7u54Hx9n3LY>

**Suggested MOOCs:**

1. [https://onlinecourses.nptel.ac.in/noc20\\_me68/preview](https://onlinecourses.nptel.ac.in/noc20_me68/preview)

Course Code	Course Title	Course Credit and Hours
21AEVA002	<b>Formulation of Detergents &amp; Toiletries</b>	<b>1 Credit - 4 hrs / wk</b>

**Objective of the course:**

1. Student should be able to understand the basic concept of surface active agents.
2. Understand the basic theory and role of additives in the formulation of cleansing agents and their role in day to day life of humans
3. Students will be able to develop the raw materials and formulation of the soap.
4. Students will be able to develop the raw materials and formulation of the detergents.
5. Student should be able to understand the basic concept of toiletries and their formulation with vast applications.

**Target Skills (Course outcomes):**

1. Skill development to perform the formulation of soap, detergent and other cleansing agent.
2. Skill development to assess the quality of soap and detergent.

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other) :**

- The Value added course based on formulation of Detergents & Toiletries belongs to area of Home care, Personal care and industrial hygiene are offered by various government and non-government institutes. Students will be able to do their own business by improving their skills.
- **Reference:**
  1. <http://www.ihpcia.org/>
  2. <http://www.dcmsme.gov.in/All%20Associations/Product%20Base%20Associations/Soap%20&%20Toiletries%20Associations.html>

**Course Description:**

The course enables the students to understand the information about surface active agents. To enable the students to understand the importance of additives in the formulation of soaps and detergents. The course provides the complete formulation process of soap, detergents and toiletries both in solid as well as liquid phase

The course aims to address SDG-1: No Poverty.

Course Content	Hours
<b>Module-I: Surface active agents</b>	8 hrs
<ul style="list-style-type: none"> <li>• Introduction,</li> <li>• Classification and role of surface active agents - emulsifiers, foaming agents,</li> <li>• Antifoaming agents, concept of HLB - Hydrophile Lipophile Balance.</li> </ul>	
<b>Module-II : Additive agents</b>	8 hrs
<ul style="list-style-type: none"> <li>• Chemistry, composition, characteristics, role and applications of oil paints, water paints (emulsion paints), varnishes, lacquers and wax polishes.</li> </ul>	



<b>Module-III : Soaps</b>	8 hrs
<ul style="list-style-type: none"> <li>• Introduction, composition, characteristics, role and applications of soaps, formulation process of soaps - both liquid and solid.</li> </ul>	
<b>Module-IV : Detergents</b>	8 hrs
<ul style="list-style-type: none"> <li>• Introduction, composition, characteristics, role and applications of soaps, formulation process of detergents - both liquid and solid.</li> </ul>	
<b>Module-V : Toiletries</b>	8 hrs
<ul style="list-style-type: none"> <li>• Introduction, composition, characteristics, role and applications of toiletries like liquid dish-wash and domestic toilet cleaners. Formulation process of liquid dish-wash and domestic toilet cleaners.</li> </ul>	

**Suggested laboratory experiments / other activities:**

11. Preparation of liquid hand-wash: Gel type - transparent.
12. Preparation of liquid hand-wash: Cream type - opaque.
13. Preparation of liquid dish-wash.
14. Preparation of domestic glass cleaner.
15. Preparation of domestic toilet cleaner.
16. Preparation of liquid detergent.
17. Preparation of tiles cleaner
18. Preparation of rust remover
19. Preparation of drainage cleaner
20. Preparation of shower gel & shampoo.

**Pedagogic tools:**

1. Chalk and Talk
4. PPT and Videos.
5. Assignment
6. Group discussion

**Reference Books:**

1. Surfactants and interfacial phenomena - Milton J. Rosen
2. Chemical formulation an overview of surfactant – based preparation used in everyday life – Tony Hargreave, Royal Society of Chemistry, 2003, ISBN: 0854046356
3. Cosmetic and Toiletry Formulations - Vol. 2, Ernest W. Flick, Noyes Publication

**Suggested reading / E-resources**

1. <https://www.sciencedirect.com/topics/earth-and-planetary-sciences/synthetic-detergent>
2. <https://www.shaalaa.com/question-bank-solutions/give-two-differences-between-the-soap-and-synthetic-detergent-cleansing-age>

**Suggested MOOCs:**

1. <https://swayam.gov.in/explorer?searchText=chemistry>

Course Code	Course Title	Course Credit and Hours
<b>21AEVA003</b>	<b>Soil and water analysis</b>	<b>1 Credit - 4 hrs / wk</b>

**Objective of the course:**

1. To assess the fertility status and to furnish soil test-based fertilizer recommendation to farmers for obtaining optimum yields.
2. To identify the soil problems if any.
3. To reclaim the problematic soils.
4. To implement soil test results for soil fertility management as per the requirement of crop.
5. To enhance their skills about water analysis.
6. To identify the elements, present in drinking water sample.
7. To determine physical parameters of Water.

**Target Skills (Course outcomes):**

1. Theoretical knowledge and practical demonstrations on various aspects of soil and water testing were provided to the trainees for the purpose of developing skill and self-entrepreneurship for economic upliftment.
2. To skill development to identify the health of soil.
3. Recognize the common physical, chemical and biological unit operations encountered in treatment processes.
4. Understanding the various types of soil samples carried out by soil Analysis.

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other) :**

- The Value added course based on soil and water analysis belongs to area of agriculture. Various types of courses from agriculture and farming sector are offering by Agriculture skill council of India (ASCI-SSC).

**Reference:**

The link of ASCI – <https://asci-india.com/nos-panel/uploadPDF/QP-Soil%20&%20Water%20Testing%20Lab%20Analyst6a50a7b24d6ea183fa410369f6cadb57.pdf>

**Course Description:**

The course is an introduction to the nature and properties of soils. Hands-on experience with current techniques for examining the types, numbers, activity and roles of soil and water with specific application to the carbon, nitrogen and sulfur cycle; soil and water quality. organic chemistry, focusing primarily on the basic principles to understand the fertility and reactivity of soil. The course also provides understanding of important soil, physical and chemical properties of water quality.

Course Content	Hours
<b>Module-I: Water Analysis – Physical examination</b>	8 hrs
pH, temperature, total dissolved solid, suspended solid, acidity, alkalinity, colour, taste, smell, turbidity, hardness of water.	
<b>Module-II: Water Analysis – Nonmetallic inorganic constitutes</b>	8hrs

chloride, sulphate, Sulphide, fluoride, phosphate, Sulphur, nitrate, nitrite, carbon dioxide, ammonia, cyanide.	
<b>Module-III : Water Analysis – Mineral and Toxic Ions</b>	8hrs
Mineral ions: calcium, magnesium, iron, sodium, silver, zinc, manganese. Toxic ions: lead, mercury, arsenic, beryllium, cadmium, chromium, copper, selenium.	
<b>Module-IV : Soil Analysis-Physical Test</b>	8hrs
Soil Texture, Water Holding Capacity, Bulk Density, Hydraulic Conductivity.	
<b>Module-V : Soil Analysis- Chemical Test</b>	8hrs
pH, Electrical Conductivity (EC), Organic Carbon ,Free Lime, macronutrients N, P, K, micronutrients Cu, Zn, Mg etc.	

**Suggested laboratory experiments / other activities:**

**Soil analysis-Determination of:**

1. Water holding capacity
2. Bulk density
3. Soil Reaction (pH)
4. Electrical Conductivity (EC)
5. Calcium Carbonate (CaCO<sub>3</sub>) Free Lime
6. Nitrogen, Phosphorous, Potassium

**Water analysis-Determination of:**

1. pH
2. Electrical Conductivity (EC)
3. Carbonates & Bicarbonates
4. Calcium & Magnesium - EDTA Titrimetric Method
5. Chloride
6. Sulphate on Spectrophotometer

**Pedagogic tools:**

1. Chalk and Talk
2. PPT and Videos.
3. Assignment
4. Group discussion

**Reference Books:**

1. Instrumental Analysis, H H Willard, CBS Publishing Co.
2. Handbook of Water Analysis, Third Edition, Leo M.L. Nollet, Leen S. P. De Gelder, CRC Press, ISBN 9781439889640

Course Code	Course Title	Course Credit and Hours
<b>21AEVA004</b>	<b>Ice Cream &amp; Desserts</b>	<b>1 Credit - 4 hrs / wk</b>

**Objective of the course:**

1. To train the students in the field of bakery and confectionary hub.
2. Identify key tools and ingredients for making frozen treats, including ice cream makers, thick shakes, falooda and coffees.
3. Understand how faster freezing results in smoother ice creams.
4. Apply the techniques needed to prepare various kind of toppings involves in ice creams and coffees.
5. Prepare various flavored ice creams, thick shakes, falooda and coffees.

**Target Skills (Course outcomes) :**

1. Student are able to help people create an individual career plan and develop a ways to reach the goal of long term which includes a person can either start their own venture.
2. Student are able to start their own chocolate and ice cream units, as professional in cookery shows, baking classes and many more.

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other) :**

- The Value added course based on Ice Cream & Desserts belongs to area of frozen foods related to the day to day life of common people. Different types of courses from Ice Cream & Desserts are offering by National Skill Development Corporation (NSDC-Skill India).

**Reference:**

<https://nsdcindia.org/ice-cream-processing-technician>

**Course Description:**

Dessert is a course that concludes a meal. The course consists of sweet foods, such as confections term dessert can apply to many confections, such as biscuits, cakes, cookies, custards, gelatines, ice creams, pastries, pies, puddings, sweet soups, tarts and fruit salad. Fruit is also commonly found in dessert courses because of its naturally occurring sweetness. Some cultures sweeten foods that are more commonly savoury to create desserts. This definition includes a wide range of courses from fruits or dried nuts to multi-ingredient cakes and pies. Many cultures have different variations of dessert. In modern times the variations of desserts have usually been passed down or come from geographical regions. This is one cause for the variation of desserts. These are some major categories in which desserts can be placed. The course aims to address SDG-1: No Poverty.

Course Content	Hours
<b>Module-I:</b> Composition of Ice Cream	6 hrs
<ul style="list-style-type: none"> <li>• Basics of Ice Cream-Common faults in ice cream making, corrective measures, Storages and packaging</li> <li>• Definition of ice cream as per PFA</li> </ul>	

<ul style="list-style-type: none"> <li>• Classification of ice cream: Ice cream, Candies, Kulfi etc.</li> <li>• Knowledge of basic ingredient of ice-cream</li> <li>• Ice cream base preparation</li> </ul>	
<b>Module-II : Ice- Cream making-1</b>	9 hrs
<ul style="list-style-type: none"> <li>• Chocolate chips-Ingredients: Chocolate base, Malai, Choco Chips, Decorative</li> <li>• Cookies and cream-Ingredients: White base, Malai, Choco Chips, Oreo biscuit crush, Decorative</li> <li>• Rajbhog-Ingredients: White base, Malai, Dry -fruits, Flavouring agent, Colouring agent</li> <li>• Butterscotch-Ingredients: White base, Malai, Dry -fruits, Flavouring agent, Cameral, Colouring agent</li> <li>• Traffic jam-Ingredients: White base, Malai, Dry -fruits, Flavouring agent, Jellies, Colouring agent, Choco Chips</li> </ul>	
<b>Module-III : Ice- Cream making-2</b>	9 hrs
<ul style="list-style-type: none"> <li>• Vanilla-Ingredients: White base, Malai, Dry -fruits, Flavouring agent, Jellies, Colouring agent, Choco Chips</li> <li>• Pan Ice cream-Ingredients: White base, Malai, Dry -fruits, Flavouring agent, Jellies, Colouring agent, Nagarvel Pan</li> <li>• Mava Badam-Ingredients: White base, Malai, Dry -fruits, Flavouring agent, Colouring agent</li> <li>• Kulfi-Ingredients: White base, Malai, Dry-fruits, Flavouring agent, Colouring agent</li> <li>• Rose Pettles-Ingredients: White base, Malai, Dry-fruits, Flavouring agent, Colouring agent , Rose syrup</li> </ul>	
<b>Module-IV : Types of Thick Shakes &amp; Falooda</b>	8 hrs
<ul style="list-style-type: none"> <li>• Concept of Falooda &amp; Thick Shakes with its nutritional values</li> <li>• Chocolate Falooda-Ingredients: Milk, Ice cream, Dry fruits, Falooda sev, Chia Seed, Chocolate Syrup, Choco chips</li> <li>• Dry Fruit Falooda-Ingredients: Milk, Ice cream, Dry fruits, Falooda sev, Chia Seed</li> <li>• Traditional Falooda-Ingredients: Milk, Ice cream, Dry fruits, Falooda sev, Chia Seed, Rose syrup</li> <li>• Thick Chocolate Shake-Ingredients: Milk, Ice cream, Dry fruits, Falooda sev, Chia Seed, Chocolate Syrup, Choco chips</li> <li>• Cookies &amp; Cream Thick Shake-Milk, Ice cream, Dry fruits, Falooda sev, Chia Seed, Chocolate Syrup, Choco chips</li> <li>• Strawberry Thick Shake-Milk, Ice cream, Dry fruits, Falooda sev, Chia Seed, Strawberry syrup</li> </ul>	
<b>Module-V : Types of Coffees</b>	8 hrs
<ul style="list-style-type: none"> <li>• CAFFÈ Mocca- Ingredients: Milk , Ice cream, Dry fruits, Falooda sev, Chia Seed , Chocolate Syrup, Choco chips, Coffee powder</li> <li>• Dalgona Coffee-Ingredients: Milk, Ice cream, Dry fruits, Falooda sev, Chia Seed, Chocolate Syrup, Choco chips, Coffee powder</li> <li>• Banana Milk Coffee-Ingredients: Milk, Ice cream, Dry fruits, Falooda sev, Chia Seed, Chocolate Syrup, Choco chips, Coffee powder, Banana</li> <li>• Chocolate Iced Mocha Coffee-Ingredients: Milk, Ice cream, Dry fruits,</li> </ul>	

**Suggested laboratory experiments / other activities:****Pedagogic tools:**

1. Chalk and Talk
2. PPT and Videos
3. Assignment
4. Group discussion
5. Live demonstration

**Reference Books:**

1. Yogambal, A. (2012). Textbook of Bakery and Confectionery (Paperback). 2<sup>nd</sup> Edition. Prentice Hall India Learning Private Limited. India. Pp1-244. ISBN-10: 8120346033
2. Dubey, S.C. 2002. Basic Baking. The Society of Indian Bakers, New Delhi.
3. Srilakshmi, B. Food Science. 6<sup>th</sup> Edition. New Age International Publishers (2017). ISBN-10: 9386418886
4. Talbot, G. (2009). *Technology of coated and filled chocolate, confectionary and bakery: Science and technology of enrobed and filled chocolate, confectionary and bakery products*. Woodhead Publishing Limited, UK. CRC Press ISBN 978-1-4398-0136-9.

**Suggested reading / E-resources**

1. [epgp.inflibnet.ac.in > epgpdata > uploads > epgp\\_content](http://epgp.inflibnet.ac.in/epgpdata/uploads/epgp_content)
2. [epgp.inflibnet.ac.in > food\\_microbiology > 105\\_et\\_m25](http://epgp.inflibnet.ac.in/food_microbiology/105_et_m25)
3. <https://ndl.iitkgp.ac.in/>
4. [www.asmallbite.com](http://www.asmallbite.com)
5. [www.aromaessence.co](http://www.aromaessence.co); [cookpad.com/in/search/gelatin%20cake](http://cookpad.com/in/search/gelatin%20cake)
6. [https://cookpad.com/in/recipes/351169-healthy-veggie-cake?via=search&search\\_term=gelatin%20cake](https://cookpad.com/in/recipes/351169-healthy-veggie-cake?via=search&search_term=gelatin%20cake)
7. [mindovermunch@t.kajabimail.net](mailto:mindovermunch@t.kajabimail.net)

Course Code	Course Title	Course Credit and Hours
<b>21AEVA005</b>	<b>E-learning Tools</b>	<b>1 Credit - 4 hrs / wk</b>

**Objective of the course:**

7. Understand the concept of internet
8. Understand the use of Google tools & Technology
9. Create a document , presentation with formatting by using online tools
10. Understand the working of internet ,DNS
11. Create an effective presentation and diagram using online and offline tools
12. Create Simple website

**Target Skills (Course outcomes) :**

7. Students will be able to use E-Learning Tools for their academics.
8. Students will be able to use many open source tools provided by google
9. Students will be able to develop static website
10. Students will be able to create google blog
11. Students will be able to know basic foundation of how freelancing can be done
12. Students will be able to use many open source animated presentation tools and software etc.

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other) :**

- The Value added course based on E-Learning tools and technology is designed based on the course offered by google for the students to enhance their search experience and improve work productivity by using many automated open source tools

**Reference:**

<https://learndigital.withgoogle.com/digitalgarage>

**Course Description:**

The course is an introduction to E-Learning Tools and Technique. This course aims to provide Many open source technology which allows the students to enhance their digital search skill more advance. This course is designed to build your confidence and help you thrive the digital literacy by discover tools to make Improve your interview skills, academics succeed, Prepare for the career you want

Course Content	Hours
<b>Module-I: Introduction of Internet</b>	4 hrs
<ul style="list-style-type: none"> <li>• Introduction of Network               <ul style="list-style-type: none"> <li>○ Computer Networks &amp; Type of Computer Network</li> <li>○ Remote Desktop Login</li> <li>○ What is Internet? &amp; Use of Internet?</li> </ul> </li> <li>• Applications of Internet               <ul style="list-style-type: none"> <li>○ World wide web(web page, web site, web client, URL web server)</li> <li>○ DNS and Web Hosting</li> <li>○ Email and how email transfer works, Social media and E-</li> </ul> </li> </ul>	

<ul style="list-style-type: none"> <li>○ Data transfer over Internet</li> <li>● How to stay safe on internet?</li> <li>● How to download and upload?</li> <li>● IP addressing</li> </ul>	
<b>Module-II : Google Tools &amp; Technology</b>	8 hrs
<ul style="list-style-type: none"> <li>● Internet search and Content <ul style="list-style-type: none"> <li>○ Google Trends</li> <li>○ Google alerts(news and search e-mail alerts)</li> <li>○ Google Earth (3-D satellite Imagery),</li> <li>○ Google Image Search</li> <li>○ Google Labs (online services research and development)</li> <li>○ Google Local, Google Play Store (Marketplace for digital content)</li> <li>○ Google (Google gravity , Google Water , Google Sphere etc...)</li> </ul> </li> <li>● Tools and application <ul style="list-style-type: none"> <li>○ Google sites (To create your personal Homepage) , Google profile</li> <li>○ Blogger</li> <li>○ Gmail, Google Drive (Docs , Forms etc), Google Chrome(web browser)</li> <li>○ Google Language tools</li> <li>○ Google Code</li> <li>○ Google Calendar , Google Reader , Google Voice</li> <li>○ Google Checkout (Google wallet)</li> <li>○ Google Class room</li> </ul> </li> </ul>	
<b>Module-III : Office Made Easy and Other Utility tools &amp; technique</b>	10 hrs
<ul style="list-style-type: none"> <li>● Word processing tool in detail</li> <li>● Spreadsheet</li> <li>● Presentation tool <ul style="list-style-type: none"> <li>○ Online/Offline presentation tool to make effective presentation(powtoon etc)</li> <li>○ Diagrammatic Tools (Online and offline)</li> </ul> </li> <li>● Different File Conversion Tools</li> </ul>	
<b>Module-IV : Learning Management SystemTools</b>	10 hrs
<ul style="list-style-type: none"> <li>● Moodle</li> <li>● Coursera, edx, Udemy, Lynda, Udacity, Codeschool, Microsoft Virtual Academy etc</li> <li>● Overview of Freelancing (Fiverr etc)</li> </ul>	
<b>Module-V : Other E-Learning Resources and Tools</b>	8 hrs
<ul style="list-style-type: none"> <li>● Online Certification sites</li> <li>● Online tools <ul style="list-style-type: none"> <li>● CourseLab</li> <li>● exelearning.org , lamsfoundation.org</li> <li>● NPTEL</li> <li>● MIT Open Course Ware</li> </ul> </li> </ul>	



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|---|--|
| <ul style="list-style-type: none"><li>• Learners TV</li></ul> |  |
|---|--|

**Suggested laboratory experiments / other activities:**

1. Internet access with network setup
2. Google Searching Technique and Applications
3. Make creative presentation
4. Use of Learning Management tools
5. Join different learning resource and get certification

**Pedagogic tools:**

6. Computer Application
7. Chalk and Talk
8. PPT & Videos
9. Assignment
10. Group Discussion

**Reference Books:**

4. R.K. Taxali , Pc Software For Windows Made Simple, McGRAW HILL
5. 1. Vincent Hargreaves , The Complete Book of the Freshwater Aquarium, Thunder Bay Press, CA, 2<sup>nd</sup> edition, 2007.
6. John E.Bardach, John H. Ryther and William O.Mc.Larney Aquaculture. New York : WileyInterscience.

**Suggested reading / E-resources**

7. <http://www.google.com>
8. [www.courselab.com](http://www.courselab.com)
9. [nptel.ac.in](http://nptel.ac.in)
10. <https://ocw.mit.edu>,<https://www.edx.org>
11. <https://www.coursera.org>, <https://www.udemy.com>, <https://www.lynda.com/>
12. [www.learnerstv.com](http://www.learnerstv.com)

**Suggested MOOCs:**

7. <http://www.google.com>
8. [www.courselab.com](http://www.courselab.com)
9. [nptel.ac.in](http://nptel.ac.in)
10. <https://ocw.mit.edu>,<https://www.edx.org>
11. <https://www.coursera.org>, <https://www.udemy.com>, <https://www.lynda.com/>
12. [www.learnerstv.com](http://www.learnerstv.com)

Course Code	Course Title	Course Credit and Hours
<b>21AEVA006</b>	<b>DTP Photoshop</b>	<b>1 Credit - 4 hrs / wk</b>

**Objective of the course:**

- Identify and learn the image manipulation.
- Identify the categories of Adobe Photoshop tools.
- Manipulate layers through ordering, positioning, scaling, rotation, and adjustments.
- Learn the basics so that you can complete fundamental tasks.
- Learn how to make use of more advanced features that will make your Photographs pieces of art.

**Target Skills (Course outcomes) :**

- Skill development to perform basic editing
- Skill development to image manipulation.
- Working with layers through ordering, positioning, scaling, rotation, and adjustments.
- Prepare images for Web and print output with appropriate sizing and resolution.

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other) :**

- DTP (desktop publishing) operators use specialist computer software to make sure that printed materials (such as books, newspapers, magazines and brochures) are well designed, attractive and easy to read by NSDC and skill India.

**Reference:**

[https://eskillindia.org/Course/course\\_detail/117206920200221051647](https://eskillindia.org/Course/course_detail/117206920200221051647)

**Course Description:** This course covers the beginning skills of image production and manipulation, using the industry-standard Adobe Photoshop to work with digital images for both Web and print use.

Course Content	Hours
<b>Module-I:</b> Introduction	4 hrs
<ul style="list-style-type: none"> <li>• About Photoshop &amp; Interface</li> <li>• Understanding Canvas &amp; Layer</li> </ul>	
<b>Module-II :</b> Tools	8 hrs
<ul style="list-style-type: none"> <li>• Understanding tools</li> <li>• Different Selection</li> </ul>	
<b>Module-III :</b> Image Processing	10 hrs
<ul style="list-style-type: none"> <li>• Photo editing (Background, Retouch, Color correction)</li> <li>• Filters</li> </ul>	
<b>Module-IV :</b> Creation	10 hrs
<ul style="list-style-type: none"> <li>• Create Object</li> <li>• Logo, Passport size photo, Different Cards, Kankotri, Wedding Album</li> </ul>	
<b>Module-V :</b> Advertising	8 hrs

- |  |  |
|--|--|
| <ul style="list-style-type: none"><li>• Story &amp; Post</li><li>• Banner, Broacher, Visiting Cards,</li></ul> |  |
|--|--|

**Suggested laboratory experiments / other activities:**

1. Photo Retouch
2. Color correction
3. Create object

**Pedagogic tools:**

5. Computer Application
6. Chalk and Talk
7. Videos
8. Assignment

**Reference Books:**

3. Adobe Photoshop CS6 on Demand (2012), *Pearson Education*, Perspection Inc., Steve Johnson. (ISBN: 9780132966498, 0132966492)
4. Photoshop CC Bible (2013), *Wiley*, Lisa DaNae Dayley, Brad Dayley, (ISBN: 9781118643778, 1118643771)

**Suggested reading / E-resources**

2. <http://kfrserver.natur.cuni.cz/obecne/soubory/PhotoShop6/UserGuide.pdf>

**Suggested MOOCs:**

Course Code	Course Title	Course Credit and Hours
<b>21AEVA007</b>	<b>Mushroom Cultivation</b>	<b>1Credit - 4 hrs / wk</b>

**Objectives of the course:**

5. To enable the students in identifying the edible and poisonous mushrooms.
6. To provide hands-on training for mushroom cultivation and its harvesting, pests and diseases control and post harvesting management.
7. To provide the students awareness about the marketing trends of Mushrooms.
8. To help the students to learn a means of self-employment and income generation.

**Target Skills (Course outcomes):**

1. Students can gain a better understanding of nutritional aspects and commercial use of mushrooms for human consumption.
2. Students can have a very good understanding of mushroom cultivation, disease management mushrooms, mushroom harvesting and various avenues for using it into an entrepreneurship development.

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other):**

- The Value-added course based on mushroom cultivation belongs to the area of Agriculture microbiology. Various types of courses such as mushroom cultivation and trading are offering by Indian Council of Agriculture Research (ICAR).

**Reference:**

- <https://www.iihr.res.in/cultivation-technology-oyster-mushroom>
- [https://www.ugc.ac.in/pdfnews/9208077\\_MICROBIOLOGY.pdf](https://www.ugc.ac.in/pdfnews/9208077_MICROBIOLOGY.pdf)

**Course Description:**

The course is an introduction to mushroom cultivation, focusing primarily on the basic differences in edible and poisonous mushrooms, mushroom production on small and large scale and trading of mushrooms. It also emphasis on various problems and their solutions during mushroom farming.

The course aims to address SDG-1: No poverty and SDG-3: Ensure healthy lives and promote well-being for all at all ages.

Course Content	Hours
<b>Module-I: Introduction</b>	4hrs
<ul style="list-style-type: none"> <li>• Introduction: Morphology, Classification and identification of edible &amp; non-edible/poisonous mushroom.</li> <li>• Nutritional and Medicinal value of mushroom,</li> <li>• Scope of mushroom cultivation.</li> <li>• Common Indian mushrooms.</li> </ul>	
<b>Module-II: Basics of Mushroom Cultivation</b>	4hrs
<ul style="list-style-type: none"> <li>• Structure and life cycle of Oyster Mushroom</li> <li>• Sterilization, disinfections and pasteurization of different substrates</li> <li>• Isolation, growth media preparation</li> <li>• Spawns production and their maintenance</li> </ul>	
<b>Module-III: Techniques of Cultivation</b>	4hrs

<ul style="list-style-type: none"> <li>• Structure and construction of mushroom house,</li> <li>• Layout of Traditional and Greenhouse method.</li> <li>• Multiplication of spawn, Composting, bed and polythene bag preparation,</li> <li>• Spawning - casing – cropping</li> </ul>	
<b>Module-IV: Post cultivation management</b>	4hrs
<ul style="list-style-type: none"> <li>• Cultivation management: Insect pests, fungal competitors and other important diseases.</li> <li>• Pest management-chemical control</li> <li>• Harvest and Post-harvest technology: Freezing, dry freezing, drying, canning</li> <li>• Short term and long-term storage of Oyster mushroom</li> </ul>	
<b>Module-V: Economics of Mushroom cultivation</b>	4hrs
<ul style="list-style-type: none"> <li>• Economics of Oyster Mushroom Cultivation in Poly-house.</li> <li>• Economics of Oyster Mushroom Cultivation in Mud House.</li> <li>• Economic return from mushroom production on different categories of farms.</li> <li>• Foreign exchange from Mushroom cultivating countries and international trade.</li> </ul>	

**Suggested laboratory experiments / other activities: (20 hours)**

1. Identification of edible and poisonous mushrooms
2. Cultivation of oyster mushrooms at small scale

**Pedagogic tools:**

1. Chalk and Talk
2. PPT and Videos.
3. Assignment
4. Group discussion

**Reference Books:**

1. Pathak, V.N., Yadav, N. and Gaur, M. (2010) Mushroom Production and Processing Technology, Agrobios (India) Publication (ISBN: 978-8177540062).
2. Singh, Reetiand Singh, V. C. (2011) Modern Mushroom Cultivation, Agrobios(India) Publication (ISBN: 978-8177542356).

**Suggested reading / E-resources**

1. [https://www.youtube.com/watch?v=qbGwQ9QNdf0&list=PLu5EbRHXkq\\_fU9g1Rzp0yQtd91ULFZJgc](https://www.youtube.com/watch?v=qbGwQ9QNdf0&list=PLu5EbRHXkq_fU9g1Rzp0yQtd91ULFZJgc)
2. [https://agricoop.nic.in/sites/default/files/ICAR\\_8.pdf](https://agricoop.nic.in/sites/default/files/ICAR_8.pdf)

**Suggested MOOCs:**

1. [https://onlinecourses.swayam2.ac.in/nos20\\_ge07/preview](https://onlinecourses.swayam2.ac.in/nos20_ge07/preview)

Course Code	Course Title	Course Credit and Hours
21AEVA008	Bakery and Confectionary	1Credit - 4 hrs / wk

**Objective of the course:**

- 1.To skill the learners for making myriad recipes like breads, cookies, chocolates, mousse, and biscuits.
2. Train the student to for improvisation in recipes with low capital investment and healthy nutritious raw materials available regionally keeping in mind the health benefits.
3. To train the learners skilled enough to develop self-entrepreneurship ideas, enlightening on baking science, microbiology a little biochemistry behind the baking science
3. Train the student to nurture the quality of team work and leadership ability.
- 4.Train the students to develop awareness creation on baking safety and risk assessments or troubleshoot management.

**Target Skills (Course outcomes):**

1. Skill development of entrepreneurship.  
Skill development to correlate microbiology and bakery science maintaining health and hygiene as well as nutrition detailing.

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other) :**

- The Value added course based on Bakery and Confectionary belongs to area of Food Microbiology. Various types of courses from Food Microbiology and Hotel Management related and allied areas are practiced by National Skill Development Corporation (NSDC) and many other school of programme under Govt and Private sectors. Regionally this course is very helpful due to the demand of food lovers in bakery and confectionary products. Small entrepreneurs are good in number in this region for this business.

**Reference:**

The link of NSDC

[https://nsdcindia.org/sites/default/files/MC\\_FICQ5002\\_Craft%20Baker\\_V1.0\\_09.10.2018.pdf](https://nsdcindia.org/sites/default/files/MC_FICQ5002_Craft%20Baker_V1.0_09.10.2018.pdf)

The link of dgt

[https://dgt.gov.in/sites/default/files/CTS\\_Baker\\_and\\_Confectioner\\_CTS\\_2017.pdf](https://dgt.gov.in/sites/default/files/CTS_Baker_and_Confectioner_CTS_2017.pdf).

The link of NIOS

<https://nios.ac.in/departmentsunits/vocational-education/stand-alone-courses/bakery-and-confectionery.aspx>

News article link on bakery

<https://www.bakeryandsnacks.com/Article/2020/11/27/Survey-reveals-what-bakers-expect-to-be-the-lead-sellers-in-2021>

The link of industry hubs of bakery and confectionary in Rajkot

<https://www.tradeindia.com/industry-hubs/gujarat/rajkot.html>

**Course Description:**

Confectionery and Bakery is a blend of both art and science. It can also be regarded as an associative part of Hotel Management programmes opted as career choice too. The opportunity of expressing one's creativity in culinary skills and associative arts of plating/garnishing can best be explored besides a self entrepreneur skill development. The

course is designed in such a way that it not only provides a scope to explore the budding chef / baker of one's own culinary art /skill in myriad sectors like as baker, chef , head cook, food processing workers in Hotels & Restaurants , Institutional Food Service Providers , or can start their own large baked goods manufacturers, as professional in cookery shows , baking classes and many more. but also a self awareness of science specially microbiology, health & hygiene aspects, awareness on risk assessments of baking in parallel. The course also helps to nurtures communication skills, detailing of orientations, basic math skills, physical stamina and strength.

<b>Course Content</b>	<b>Hours</b>
<b>Module-I: Basics of Cake Making</b>	6hrs
<ul style="list-style-type: none"> <li>• Basics of Bakery Science -Common bakery faults, corrective measures, Storages and packaging</li> <li>• Balancing cake formula, Swiss rolls -requirements, roll making, ribbon stages.</li> <li>• Lemon Yogurt cake-pre-processing stages, batter preparation, lemon juice preparation, lemon sugar mix addition, finishing stage.</li> <li>• Veggie cake -Veggie choices, preheating stage, garnishing.</li> <li>• Fruit cake-choice of ingredients, sweetening agent, baking stage, packaging.</li> </ul>	
<b>Module-II : Biscuits &amp; Cookies</b>	8 hrs
<ul style="list-style-type: none"> <li>• Basic Concept of Maillard reaction and Caramelization</li> <li>• Nan-Khatai -Core ingredients and flavouring agent choice, dough making, baking, serving choices.</li> <li>• Nut biscuits -Ingredients choice, dough preparation, rolling and garnishing.</li> <li>• Macarone (biscuit)- batter preparation, dough making, filling, baking process, finishing</li> <li>• Granola bars (introduction to healthy aspects , mix ins: core ingredient, sweetening agents, choice of dry fruits, granule sugar formation softening criteria, cost cutting formula, maxing &amp; baking, serving</li> </ul>	
<b>Module-III : Types of Mousse</b>	8 hrs
<ul style="list-style-type: none"> <li>• Concept of Nutritional Evaluation</li> <li>• Chocolate Mousse (Basics of ingredients, procedure , piping and storage)</li> <li>• Carrot Mousse -Savory mousse a concept; carrot mix preparation, flavouring, molding and filling-</li> <li>• Fruit Mousse -Ingredients, preparation and calorie evaluation</li> <li>• Triple coloured mousse - Ingredients, preparation and calorie evaluation</li> </ul>	
<b>Module-IV : Types of Chocolates</b>	8 hrs
<ul style="list-style-type: none"> <li>• Nutritional labelling &amp; food safety management system –ISO groups, HACCP (GMP,GHP), Agmarks</li> <li>• Nutritional facts for white and dark chocolate &amp; health benefits</li> <li>• Milk Chocolate -Difference between dark and milk chocolate, blending, mixing, conching (explanation of term) &amp; packaging.</li> <li>• Orange Chocolate-Health importance &amp; nutrition facts, extract preparation, shaping, finishing</li> <li>• Bountee -nutrition facts,choiceof sweetening criteria in , tempering, shaping, storage.</li> </ul>	
<b>Module-V : Bread</b>	10hrs
<ul style="list-style-type: none"> <li>• Elemental knowledge of Baker's yeast and its role in fermentation of dough</li> <li>• Types of microbial spoilage and its remedies</li> <li>• Whole Wheat Bread -concept of dry yeast, mixture preparation, dough</li> </ul>	

making & holding period, pre baking and post baking process. <ul style="list-style-type: none"> <li>• Soya Bread- bread preparation, dough making, fermenting, finishing and storage</li> <li>• Chatni pin wheel bread -Essential ingredients,mixing, kneading, dough quality, baking and storage</li> </ul>	
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### Suggested laboratory experiments / other activities:

The complete course is laboratory based with small introduction and basic overview of each module as theory.

### Pedagogic tools:

1. Chalk and Talk
2. PPT and Videos.
3. Assignment
4. Group discussion
5. Field trip

### Reference Books:

1. Yogambal, A. (2012).Textbook of Bakery and Confectionery (Paperback). 2<sup>nd</sup> Edition. Prentice Hall India Learning Private Limited. India. Pp1-244. ISBN-10: 8120346033
2. Dubey,S.C.2002.Basic Baking. The Society of Indian Bakers, New Delhi.
3. Srilakshmi.B.Food Science.6<sup>th</sup>Edition. New Age International Publishers (2017).ISBN-10: 9386418886
4. Talbot, G.(2009). *Technology of coated and filled chocolate, confectionary and bakery: Science and technology of enrobed and filled chocolate , confectionary and bakery products*. Woodhead Publishing Limited , UK.CRC Press ISBN 978-1-4398-0136-9.
5. Barndt, R.L.(1993). Fat and Calorie .- Modified Bakery Products , Springer , US.
6. Samuel , A.M. (1992). Cookies and Cracker Technology, Van Nostrand Reinhold.

### Suggested reading / E-resources

- [epgp.inflibnet.ac.in](http://epgp.inflibnet.ac.in) > [epgpdata](#) > [uploads](#) > [epgp\\_content](#)
- [epgp.inflibnet.ac.in](http://epgp.inflibnet.ac.in) > [food\\_microbiology](#) > [105\\_et\\_m25](#)
- <https://ndl.iitkgp.ac.in/>
- [www.asmallbite.com](http://www.asmallbite.com)
- [www.aromaessence.co](http://www.aromaessence.co); [cookpad.com/in/search/gelatin%20cake](http://cookpad.com/in/search/gelatin%20cake)
- [https://cookpad.com/in/recipes/351169-healthy-veggie-cake?via=search&search\\_term=gelatin%20cake](https://cookpad.com/in/recipes/351169-healthy-veggie-cake?via=search&search_term=gelatin%20cake)
- [mindovermunch@t.kajabimail.net](mailto:mindovermunch@t.kajabimail.net)
- <https://www.verywellfit.com/the-best-cookies-for-weight-loss-3495635>
- [http://www.eiilmuniversity.co.in/downloads/Bakery\\_&\\_confectionery.pdf](http://www.eiilmuniversity.co.in/downloads/Bakery_&_confectionery.pdf)

### Suggested MOOCs:

1. <https://nios.ac.in/online-course-material/vocational-courses/bakery.aspx>
2. [https://onlinecourses.nptel.ac.in/noc20\\_ag02/preview](https://onlinecourses.nptel.ac.in/noc20_ag02/preview)
3. <https://www.udemy.com/course/the-pastry-arts-online-pastry-training-centre-part-1/>



Course Code	Course Title	Course Credit and Hours
<b>21AEVA009</b>	<b>Food Adulteration</b>	<b>1 Credit - 4 hrs / wk</b>

**Objective of the course:**

4. To understand the adulteration in common foods adulterants and their impact on health.
5. To comprehend certain skills of detecting adulteration of common foods.
6. To impart knowledge on the basic laws of food adulteration and consumer protection.

**Target Skills (Course outcomes) :**

3. Skill development to identify the adulterants in common food items.
4. Skill development to perform detection tests for common foods items.

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other) :**

- The Value added course based on food adulteration and analysis belongs to area of food science. Various types of courses from the food science (food adulteration) sector are offered by Food Processing Sector Skill Council under the label of Food Industry Capacity & Skill Initiative (FICSI).

**Reference:**

The link for FICSI courses – <https://fpsc.ficsi.in>

**Course Description:**

The course is an introduction to various types of food adulteration and its analysis for common foods. It focuses primarily on physical, chemical and microbiological tests for the detection of adulterants in milk and milk products, spices, condiments, fats, salt sugar jaggery and honey. The course also aims to educate on the future education and career prospects on food security; emphasizes on basic laws of food adulteration and consumer protection. It addresses SDG 3 ‘Good health and wellbeing’ focuses on health, while SDG 2 ‘Zero Hunger’ encompasses eradication of nutrition and SDG 6 ‘Clean water and sanitation’ is a pre-requisite for health.

Course Content	Hours
<b>Module-I: Introduction to Adulteration and Career Prospects</b>	8 hrs

<ul style="list-style-type: none"> <li>• Definition and Types of Adulteration</li> <li>• Causes and Effects of Food Adulteration.</li> <li>• Current trends in Food Adulteration in India and abroad.</li> <li>• Future education in the field of food security.</li> <li>• Career Prospects in testing for food adulteration.</li> </ul>	
<b>Module-II : Detection of Adulteration in milk and milk products</b>	8 hrs
<ul style="list-style-type: none"> <li>• Adulteration of formalin and starch powder in milk.</li> <li>• Adulteration of water in milk.</li> <li>• Adulteration of glucose, sugar and salt in milk.</li> <li>• Adulteration of benzoic acid, salicylic acid and soap in milk.</li> <li>• Adulteration in paneer and sweets.</li> </ul>	
<b>Module-III : Detection of Adulteration in spices, jaggery and honey.</b>	8 hrs
<ul style="list-style-type: none"> <li>• Adulteration of lead salts, brick powder and coal tar in red chilli powder.</li> <li>• Adulteration of yellow lead salts, chalk powder and metanyl yellow dye.</li> <li>• Adulteration of starch powder and chalk powder in asafoetida.</li> <li>• Adulteration of papaya seeds in black pepper and poppy seeds in mustard.</li> <li>• Adulteration of washing soda &amp; metanyl yellow dye in jaggery and physical tests to check purity of honey.</li> </ul>	
<b>Module-IV : Detection of Adulteration in Fats, salt, sugar and condiments</b>	8 hrs
<ul style="list-style-type: none"> <li>• Adulteration of dyes, argemone oil, and castor oil in edible oils.</li> <li>• Adulteration of vanaspati or margarine, paraffin wax and hydrocarbon in ghee and butter.</li> <li>• Adulteration in salt.</li> <li>• Adulteration in sugar.</li> <li>• Adulteration in ketchup and mayonnaise.</li> </ul>	
<b>Module-V : Legislative aspects of Food adulteration</b>	8 hrs
<ul style="list-style-type: none"> <li>• Overview of Food Safety and Standards Act 2006 (FSSA) –Food Safety and Standards Authority of India–Rules and Regulations.</li> <li>• Role of voluntary agencies such as, Agmark, I.S.I.</li> <li>• Quality control laboratories and Private testing laboratories</li> <li>• Consumer’s problems rights and responsibilities.</li> <li>• Other International regulatory bodies</li> </ul>	

**Suggested laboratory experiments / other activities:**

1. Collection of information on adulteration of 10 common foods from local market.
2. Demonstration of Adulteration detection methods for a minimum of 5 common foods (one method each- other than the ones in syllabus).

**Pedagogic tools:**

1. Chalk and Talk
2. Presentation
3. Videos
4. Assignment

**Reference Books:**

1. Rees, J. (2020). Food Adulteration and Food Fraud. Reaktion Books.
2. Shrivastava, A. (Ed.). (2018). Adulteration Analysis of Some Foods and Drugs (Vol. 1). Bentham Science Publishers.

**Suggested reading / E-resources:**

1. [https://old.fssai.gov.in/Portals/0/Pdf/Draft\\_Manuals/Beverages and confectionary.pdf](https://old.fssai.gov.in/Portals/0/Pdf/Draft_Manuals/Beverages_and_confectionary.pdf)
2. <https://indianlegalsolution.com/laws-on-food-adulteration/>

**Suggested MOOCs:**

1. Food Safety and Quality Control -  
[https://onlinecourses.swayam2.ac.in/cec20\\_ag06/preview](https://onlinecourses.swayam2.ac.in/cec20_ag06/preview)

Course Code	Course Title	Course Credit and Hours
<b>21AEVA010</b>	<b>Wealth from Waste</b>	<b>1 Credit - 4 hrs / wk</b>

**Objective of the course:**

1. To develop Sustainable Orderliness, Enhanced Ecological Balance, Beauty, Productivity and Dignity in the society and nature.
2. To develop the ability to critically think and creatively use the unused natural resources.
3. To sensitize the students regarding environmental concerns and social responsibility
4. To explore market opportunities for the recovered and recycling materials among the students
5. To provide platform for business model through experiential learning.

**Target Skills (Course outcomes) :**

**The students will be able to develop**

1. Critical Thinking
2. Creativity
3. Collaboration & Team Work
4. Communication & Presentation
5. Recognize, Build & Appraise the trash as recourse for eco friendly Sustainable Solution.

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other) :**

Our ATMIYA University is working with the mission of nurturing the creative thinkers and leaders through transformative learning and core value like Co-existential thinking and Green - thinking. To fulfill the same, this course has been proposed since 2016. This course was designed to nurture our core value of “harmony with nature” and Sustainable development. The various discarded resources of the campus generated everyday are used as raw material to prepare variety of useful creative products.

**Reference:**

**Course Description:**

The course is skill based where students will learn to identify different unused natural resources and convert them into creative and useful products. The course also provides knowledge of marketing like product packaging, labelling, branding, costing etc.. The course addresses SDG-8,9,11,12 and 13: Decent Work and Economic Growth, Industry, Innovation and Infrastructure, Sustainable Cities and Communities, Responsible Production & Consumption and Climate Action.

Course Content	Hours
<b>Module-I: Waste Material: Collection and Treatment</b>	6 hrs
<ul style="list-style-type: none"> <li>• Survey of available/generated waste</li> <li>• Collection of waste materials: Bio waste, Cloth waste, E-waste and Plastic waste</li> <li>• Processing of waste material: Dying with natural color, painting, designing etc...</li> <li>• Hardening of material: drying/ironing</li> </ul>	

<b>Module-II : Product Preparation using waste materials</b>	10 hrs
<ul style="list-style-type: none"> <li>• Procedure of flower preparation from different waste</li> <li>• Procedure for the preparation of different decorative items from collected waste</li> <li>• Procedure for the preparation of different household items from collected waste</li> </ul>	
<b>Module-III : Use of products for different purposes</b>	13 hrs
<ul style="list-style-type: none"> <li>• <b>Products from Bio waste :</b> Different flower arrangements including small and large handy bouquet, table bouquet, Photo frames, Flower vase, Wall Hangings; Garlands and Ornaments</li> <li>• <b>Products from Cloth waste:</b> Carpets, Doormat, Purses, Bags, Hangings, Decorative items etc..</li> <li>• <b>Products from E-waste:</b> Containers, Stationary items, Home decorative items and household items</li> <li>• <b>Products from Plastic waste:</b> Containers for terrace gardening, Containers to hold different items, Home decorative items and household items</li> </ul>	
<b>Module-IV : Marketing</b>	8 hrs
<ul style="list-style-type: none"> <li>• Need analysis, pricing and basic marketing strategies</li> <li>• Preparation and designing of price list; Methods of advertisement</li> <li>• Packaging of products; Exhibition cum sale</li> <li>• Survey for the need of Product and its supply to the market</li> </ul>	
<b>Module-V : Project: Innovative Creation through Reuse and Recycling of Waste</b>	3 hrs

**Suggested laboratory experiments / other activities:**

1. Improving the Self life of the product
2. Marketing through pamphlet designing
3. Exhibition cum sale

**Pedagogic tools:**

1. Videos
2. Oral Discussion
3. Live Demonstrations
4. Hands on training
5. Assignment

**Reference Books:**

1. Susan Wasinger, Eco Craft: Recycle, Recraft, Restyle, Lark Books, 4 Division of Sterling Publishing co., 2009
2. Maria Noble, How to make 100 Paper Flowers, Creative Publishing International, 2013

**Suggested reading / E-resources**

1. <https://books.google.co.in/books?id=RzJ59JWEBs0C&printsec=frontcover&dq=eco+craft&hl=en&sa=X&ved=0ahUKEwjxufe76q7aAhXMrI8KHcuEAFwQ6AEIKDAA#v=onepage&q=eco%20craft&f=false>
2. <https://books.google.co.in/books?id=3Uv0AAwAAQBAJ&printsec=frontcover&dq=DIY+craft+for+flowers&hl=en&sa=X&ved=0ahUKEwi4pf2Q6a7aAhVCqo8KHRPeAH8Q6wEIOzAD#v=onepage&q&f=false>

### **Suggested MOOCs:**

1. <https://www.classcentral.com/course/from-waste-to-value-20611>
2. <https://www.classcentral.com/course/edx-solid-waste-management-18989>
3. <http://www.basel.int/Implementation/TechnicalAssistance/MOOC/tabid/4966/Default.aspx>

Course Code	Course Title	Course Credit and Hours
21AEVA011	Polymer Chemistry	1 Credit - 4 hrs / wk

**Objective of the course:**

1. Determine different polymers, their properties and access them according to their industrial applications.
2. Study different polymerization techniques & their mechanisms.
3. Know Industrial polymer processing & their engineering aspects.

**Target Skills (Course outcomes):**

1. Skill development to prepare various polymers.
2. Skill development to identify the polymers.

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other) :**

- The Value added course based on Polymer in Chemscience belongs to area of Polymer industry. Various types of courses from polymer are offering by NSDC.

**Reference:**

[https://nsdcindia.org/sites/default/files/FG\\_Machine-Operator-Assistant-Plastics-Processing-RSCQ4801%28CPCQ0103%29-29-04-2021.pdf](https://nsdcindia.org/sites/default/files/FG_Machine-Operator-Assistant-Plastics-Processing-RSCQ4801%28CPCQ0103%29-29-04-2021.pdf)

**Course Description:**

The course is an introduction to polymer science, focusing primarily on the basic principles of polymerization techniques and the properties of polymer. Emphasis is on polymer processing to synthesize the various polymers. The course aims to address SDG-12: Responsible Consumption and Production.

Course Content	Hours
<b>Module-I :</b> Introduction to polymer	4 hrs
<ul style="list-style-type: none"> <li>• Polymer, Oligomer, Macromolecules,</li> <li>• Classification of polymer, Sources of polymer, Monomers, Functionality concept, Concept of Cross linking.</li> <li>• Polymer science mapped with SDG-Goals, Responsible Consumption and Production.</li> </ul>	
<b>Module-II :</b> Properties of Polymer	4 hrs
<ul style="list-style-type: none"> <li>• Physical properties, Chemical properties, Mechanical properties</li> </ul>	
<b>Module-III :</b> Biodegradable – Sustainable polymer	4 hrs
<ul style="list-style-type: none"> <li>• PLA</li> <li>• PGA</li> <li>• PHBV</li> <li>• Cellulose based polymer</li> </ul>	
<b>Module-IV :</b> Conventional polymer	4 hrs

<ul style="list-style-type: none"> <li>• Phenol – formaldehyde resins.</li> <li>• Poly olefins – Poly ethylene, HDPE, LDPE, LLDE, Polypropylene</li> <li>• Kevlar &amp; Aramid</li> <li>• Polyamides – Nylon-6, Nylone-66</li> </ul>	
<b>Module-V : Polymer Processing</b>	4 hrs
<ul style="list-style-type: none"> <li>• Polymer processing introduction</li> <li>• Compounding</li> <li>• Molding</li> <li>• Casting</li> <li>• Rolling</li> <li>• Extrusion</li> </ul>	

**Suggested laboratory experiments / other activities:**

**(20 hrs)**

1. Prepare Phenol Formaldehyde polymer.
2. Prepare cellulose acetate from cellulose.
3. Prepare melamine formaldehyde copolymer.
4. Prepare glyptal resin from phallic anhydride.
5. Prepare urea formaldehyde copolymer.
6. To characterize fundamental properties of polymer.

**Pedagogic tools:**

1. Chalk and Talk
2. PPT and Videos.
3. Assignment

**Reference Books:**

1. A. Ravve, (2012, 3<sup>rd</sup> Edition) Principles of Polymer Chemistry, New York: Springer (ISBN: 978146142211).
2. Joel R. Fried (2014, 3<sup>rd</sup> Edition) Polymer Science and Technology, NJ: Prentice Hall (ISBN: 978013703955).
3. V R Gowariker, N V Viswanathan, Jayadev Sreedhar, (1986, 1<sup>st</sup> Edition) Polymer Science, Delhi: New Age International (ISBN: 085226307430)

**Suggested reading / E-resources**

1. Shreve's Chemical Process Industries, Austin, G.T, McGraw Hill publication, New Delhi 5<sup>th</sup> edition

**Suggested MOOCs:**

1. <https://swayam.gov.in/explorer?searchText=polymer>

Course Code	Course Title	Course Credit and Hours
<b>21AEVA012</b>	Vedic Mathematics	<b>1 Credit - 4 hrs / wk</b>

**Objective of the course:**

1. To promote the Indian Mathematics.
2. To enhance computation skills in students.
3. Improve clarity on mathematical concepts.
4. Developing a logical thinking and analytical thinking through Vedic Mathematics.



5. Helping students discover their competence to deal with numbers and mathematics
6. Edifying students with speedy, simple and precise techniques to derive solutions

**Target Skills (Course outcomes) :**

1. Understand and appreciate the history of ancient mathematics methods.
2. Understand the sixteen sutras of vedic mathematics
3. Utilize the sutras in order to solve related problems of short calculation.
4. Solve some of the algebraic problems using the vedic sutras.
5. Reduces the burden of memorizing difficult concepts
6. Increases the concentration of a student and his determination to learn and develop the skills

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other) :**

- The Value added course based on Vedic Mathematics belongs to area of ancient Indian mathematics are offering by NSDC-National Skill Development Corporation.

• **Reference:**

The link of NSDC – <https://iiva.in/vedic-maths-course/online/>

**Course Description:**

This course is a collection of techniques/sutras to solve mathematical problem sets in a fast and easy way. These tricks introduce wonderful applications of Arithmetical computation, theory of numbers, mathematical and algebraic operations, higher-level mathematics, calculus, and coordinate geometry, etc. It is one of the most refined and efficient mathematical systems possible. Vedic math is a system of learning maths for faster calculations with time-saving methods to get answers quickly developing the mental ability of learners. Maths as the subject requires a complete understanding of the concepts and daily practice. It is a subject in which one can score full marks if practices on a continuous basis.

<b>Course Content</b>	<b>Hours</b>
<b>Module-I: Sutras 1 to 3</b>	8 hrs
<ul style="list-style-type: none"> <li>• EkadhikinaPurvena -By one more than the previous one (Cor: Anurupyena)</li> <li>• NikhilamNavatashcaramamDashatah -All from 9 and the last from 10 (Cor: SisyateSesamjnah)</li> <li>• Urdhva-Tiryagbyham-Vertically and crosswise (Cor: Adyamadyenantyamantya)</li> </ul>	
<b>Module-II : Sutras 4 to 6</b>	8 hrs
<ul style="list-style-type: none"> <li>• ParaavartyaYojayet-Transpose and adjust (Cor: KevalaihSaptakamGunnyat)</li> <li>• ShunyamSaamyasamuccaye-When the sum is the same, that sum is zero. (Cor: Vestanam)</li> <li>• (Anurupye) Shunyamanyat-If one is in ratio, the other is zero (Cor: YavadunamTavadunam)</li> </ul>	
<b>Module-III : Sutras 7 to 9</b>	8 hrs

<ul style="list-style-type: none"> <li>• Sankalana-vyavakalanabhyam-By addition and by subtraction (Cor: YavadunamTavadunikrityaVargaYojayet)</li> <li>• Puranapurabyham-By the completion or non-completion (Cor: Antyayordashake)</li> </ul>	
<b>Module-IV : Sutras 10 to12</b>	8 hrs
<ul style="list-style-type: none"> <li>• Chalana-Kalanabyham-Differences and Similarities (Cor: Antyayoreva)</li> <li>• Yaavadunam-Whatever the extent of its deficiency (Cor: Samuccayagunitah)</li> <li>• Vyashtisamanstih-Part and Whole (Cor: Lopanasthapanabhyam)</li> </ul>	
<b>Module-V : Sutras 13 to16</b>	8 hrs
<ul style="list-style-type: none"> <li>• ShesanyankenaCharamena-The remainders by the last digit (Cor: Vilokanam)</li> <li>• Sopaantyadvayamantyam-The ultimate and twice the penultimate (Cor: GunitasamuccayahSamuccayagunitah)</li> <li>• EkanyunenaPurvena-By one less than the previous one (Cor: Dhvajanka)</li> <li>• Gunitasamuchyah-The product of the sum is equal to the sum of the product (Cor: Dwandwa Yoga)</li> <li>• Gunakasamuchyah-The factors of the sum is equal to the sum of the factors.</li> </ul>	

**Suggested laboratory experiments / other activities:**

1. Activities regarding mentally calculation.

**Pedagogic tools:**

1. Chalk and Talk
2. PPT and Videos.
3. Assignment
4. Group discussion

**Reference Books:**

3. Swami B. K. T., Agrawala V. S.,(2013), *Vedic Mathematics*, Motilal Banarsidass Publishers Pvt Ltd.
4. Dhaval Bathia., (2021 Second edition), *Vedic Mathematics Made Easy*,Jaico Publishing House.

**Suggested reading / E-resources**

1. <https://vedicmathsindia.org/>
2. <https://nptel.ac.in/courses/111/101/111101080/>

**Suggested MOOCs:**

1. [https://onlinecourses.swayam2.ac.in/ugc19\\_hs52/preview](https://onlinecourses.swayam2.ac.in/ugc19_hs52/preview)

Course Code	Course Title	Course Credit and Hours
21AEVA013	Circuit Designing and Fabrication	1 Credit - 4 hrs / wk

**Objective of the course:**

1. To create awareness about basic electronics and its applications.
2. Train the student to understand circuit designing.
3. Students can explore different aspect of Printed Circuit Board Design and fabrication.
4. Students can learn various types of PCBs.

**Target Skills (Course outcomes) :**

3. Skill development to design and fabricate their own PCB.
4. Skill development to make Project and can also work in PCB Designing and Fabrication area.

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other) :**

- Electronics Sector Skills Council of India: ESSCI

**Reference:**

The link of ESSC – <https://www.essc-india.org/>

**Course Description:**

The course is an introduction to basic electronics, focusing primarily on the basic principles to understand the different type of circuits, their application and fabrication. Emphasis is on various types of PCBS and fabrication of electronic components on PCBS. The course also provides an introduction to the Solid state electronics.

Course Content	Hours
<b>Module-I: DESIGNING AND FABRICATION OF RECTIFIERS</b>	10
<ul style="list-style-type: none"> <li>• Introduction to rectifiers</li> <li>• Types of rectifiers</li> <li>• Half wave rectifiers, Full wave rectifiers bridge rectifiers</li> <li>• Designing of different circuits for rectifier fabrication</li> <li>• Tracing of different rectifier circuits</li> </ul>	
<b>Module-II : DESIGNING AND FABRICATION OF AMPLIFIERS</b>	10
<ul style="list-style-type: none"> <li>• Introduction to amplifiers</li> <li>• Types of amplifiers</li> <li>• Single stage transistor amplifier, Multistage transistor amplifier</li> <li>• Transistor power amplifier</li> <li>• Designing of different amplifying circuits</li> <li>• Fabrication and tracing of different amplifying circuits</li> </ul>	
<b>Module-III : DESIGNING AND FABRICATION OF FILTERS</b>	10

<ul style="list-style-type: none"> <li>• Introduction to filters</li> <li>• Types of filters</li> <li>• RL filters, RC filters, LCR filters, Pie filters</li> <li>• Designing of different filters circuits</li> <li>• Fabrication and tracing of different filters circuits</li> </ul>	
<b>Module-IV : DESIGNING AND FABRICATION OF VOLTAGE REGULATORS</b>	10
<ul style="list-style-type: none"> <li>• Introduction to voltage regulators</li> <li>• Types of voltage regulators</li> <li>• Zener diode voltage regulator, Transistor series voltage regulator</li> <li>• Transistor shunt voltage regulator</li> <li>• Designing of different voltage regulator circuits</li> <li>• Fabrication and tracing of different voltage regulator circuits</li> </ul>	

**Suggested laboratory experiments / other activities:**

1. Fabrication of Full Wave Rectifier Circuit
2. To study CE amplifier circuit
3. Fabrication of Voltage Regulator Circuit using Zener Diode

**Pedagogic tools:**

1. Chalk and Talk
2. PPT and Videos.
3. Assignment
4. Group discussion

**Reference Books:**

1. V K Mehta, Principles of Electronics, S Chand Publication.
2. John D Ryder, Electronic fundamentals and applications, Prentice Hall publication.
3. B L Theraja, Basic Electronics, S Chand publication.

**Suggested reading / E-resources**

1. <https://www.electronics-tutorials.ws>
2. <https://www.makerspaces.com/basic-electronics/>

**Suggested MOOCs:**

1. <https://swayam.gov.in/explorer?searchText=Physics>

Course Code	Course Title	Course Credit and Hours
<b>21AEVA014</b>	<b>English for Competitive Exams</b>	<b>1Credit - 4 hrs / wk</b>

**Objective of the course:**

1. Familiarize with English as an integral part of various competitive exams.
2. Improve their English language and grammar

**Target Skills (Course outcomes):**

3. Language Skill Development
4. Analytical Skill Development

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other) :**

- The Value added course based on English for Competitive Exams. Various courses based on Grammar and competitive exams are being offered online and offline by various persons/institutes charging huge sum of money. So students preparing for competitive exams will have benefit learning the course in form of Value Added Course.

**Course Description:**

The course is an introduction to basic grammar, sentence pattern, language work, reading comprehension and common errors. Emphasis is on grammatical level as well as syntactical level. The course provides an overall introduction to the nature of English in competitive exams.

<b>Course Content</b>	<b>Hours</b>
<b>Module-I: Basic English Grammar</b>	8 hrs
<ul style="list-style-type: none"> <li>● Articles</li> <li>● Prepositions</li> <li>● Direct &amp; Indirect Narration</li> <li>● Voices</li> </ul>	
<b>Module-II :Common Errors</b>	8 hrs
<ul style="list-style-type: none"> <li>● Spelling Errors</li> <li>● Spotting Errors</li> </ul>	
<b>Module-III :Sentence Structure</b>	8 hrs
<ul style="list-style-type: none"> <li>● Sentence Completion</li> <li>● Sentence Improvement</li> <li>● Reordering word and sentences</li> </ul>	
<b>Module-IV :Language Work</b>	8 hrs
<ul style="list-style-type: none"> <li>● Synonyms &amp; Antonyms</li> <li>● One-Word Substitution</li> <li>● Idioms &amp; Phrases</li> </ul>	

<b>Module-V :Reading Comprehension Practice</b>	8 hrs
<ul style="list-style-type: none"> <li>• Dissecting Unseen Passages</li> <li>• Finding answer to the questions from passages</li> </ul>	

**Suggested laboratory experiments / other activities:**

1. Quiz
2. Group Discussion

**Pedagogic tools:**

1. Chalk and Talk
2. PPT and Videos.
3. Assignment

**Reference Books:**

1. English grammar & Comprehension- Ramesh Publishing House, New Delhi.
2. Kiran's Common Errors in English- KiranPrakashan, Delhi.
3. Handbook of Superfast English- KiranPrakashan, Delhi.
4. Lucent's General English- Lucent Publication, Patna.

**Suggested reading / E-resources**

2. High School English Grammar and Composition by Wren and Martin

**Suggested MOOCs:**

Course Code	Course Title	Course Credit and Hours
21AEVA015	Computer Aided Drawings	1Credit - 4 hrs / wk

**Objective of the course:**

1. To create awareness about Computer based drawing.
2. Train the student to develop various geometric drawings using Autocad

**Target Skills (Course outcomes) :**

1. Recognize the general terminology related to Autocad software
2. To understand application of basic CAD command & to develop 2D drawings of various Geometric Figures using AutoCAD.

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other) :**

- This Value added course based on Graphical and Geometric design which helps in representation of different types of drawing. As technology upgrading day by day it is necessary in industrial as well as corporate life.

**Reference:**

- A Hand Book On AutoCAD Tools Practice, Author: SSR Krishna, AzharWahab Publisher: Notion Press Media Pvt
- AutoCAD 2018 Training Guide, Author: SagarLinkan, Publisher: BPB Publications.

**Course Description:**

Computer-aided design is the use of computers (or workstations) to aid in the creation, modification, analysis, or optimization of a design. CAD software is used to increase the productivity of the designer, improve the quality of design, improve communications through documentation, and to create a database for manufacturing.

Course Content	Hours
<b>Module-I: Introduction to AutoCAD</b>	6hrs
<ul style="list-style-type: none"> <li>• File menu of AutoCAD, Basic 2D commands like Line, Circle, Ellipse, Multi Line ,Construction Line, Polyline, Point, Donut, Ellipse, Polygon, Rectangle, Arc, etc..</li> </ul>	
<b>Module-II : Editing of AutoCAD Drawing</b>	8 hrs
<ul style="list-style-type: none"> <li>• Modify Properties of Drawing Entity, Copy, Move, Rotate, Mirror , Offset , Array, Scale, Stretch, Lengthen, Trim, Extend , Break, Chamfer , Fillet, Block, W-Block, Insert and Explode , Area and Volume with Civil Engineering Application</li> </ul>	
<b>Module-III : Advanced 2DCommands : Section -1</b>	10hrs
<ul style="list-style-type: none"> <li>• Application of LAYER command in Civil Engineering Layer command with its all sub commands, Line type, Color , Dimension</li> </ul>	
<b>Module-IV : Advanced 2DCommands : Section -2</b>	10hrs
<ul style="list-style-type: none"> <li>• Command – aligned, arc length, radius, Diameter, Centre, Leader, Baseline and Continuous Dimensioning, tolerance, override and Dimension updates Text and BTEXT commands with Text Style Hatch command</li> </ul>	

<b>Module-V : Plot of 2D</b>	6hrs
<ul style="list-style-type: none"> <li>• PLOT and its Sub Command for Plotting Drawing on A1, A2 and A3 Size Paper using Printer and / or Plotter</li> </ul>	

**Suggested laboratory experiments / other activities:**

1. NA

**Pedagogic tools:**

1. PPT and Videos.
2. Assignment

**Reference Books:**

1. Ahluwalia, V. K. (2011, Fourth edition) *Organic Reaction Mechanism*. New Delhi: Narosa (ISBN: 978-81-8487-115-9).
2. Morrison & Boyd (2009, Sixth edition) *Organic Chemistry*. New Jersey: Pearson Education (ISBN: 978-81-7758-169-0).
3. McMurry, John E. (2011, Eight edition) *Organic Chemistry*. Boston: Cengage Learning (ISBN: 0840054440).

**Suggested reading / E-resources**

1. NPTL Web Series : <https://nptel.ac.in/courses/112102101/>
2. NPTL Web Series : <https://nptel.ac.in/courses/107103084/>

**Suggested MOOCs:**

1. <https://swayam.gov.in/explorer?searchText=chemistry>



Course Code	Course Title	Course Credit and Hours
<b>21AEVA016</b>	<b>Energy Management</b>	<b>1 Credit - 4 hrs / wk</b>

**Objective of the course:**

1. To conserve natural resources.
2. Train the student to protect the climate.
3. Train the student to save the cost.

**Target Skills (Course outcomes):**

1. Skill development to produce the electrical energy with the help of prototype.
2. Skill development to conserve the electrical energy.

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other) :**

- The Value added course based on energy management belongs to area of energy auditing. Various types of courses from energy auditing sector are being offered by Bureau of Energy Efficiency.

**Reference:**

<https://beeindia.gov.in/>

**Course Description:**

The course is an introduction to energy management, focusing primarily on incredible expertise within the energy management, implementation, and financing of the energy projects, along with a different kind of policy analysis. The course aims to address SDG-7: Renewable energy.

<b>Course Content</b>	<b>Hours</b>
<b>Module-I:</b> Electrical Energy Introduction	3hrs
<ul style="list-style-type: none"> <li>• Importance of electricity in modern industrial society</li> <li>• Scenario with / without electricity</li> <li>• Advantage &amp; Disadvantage of Electricity</li> </ul>	
<b>Module-II :</b> Energy Production	10hrs
<ul style="list-style-type: none"> <li>• Electrical Energy Production by Conventional Energy Sources</li> <li>• Electrical Energy Production by Non-Conventional Energy Sources</li> </ul>	
<b>Module-III :</b> Energy Consumption	10hrs
<ul style="list-style-type: none"> <li>• Domestic &amp; Industrial Energy Consumption</li> </ul>	
<b>Module-IV :</b> Electrical Energy Saving & Energy conservation	9hrs
<ul style="list-style-type: none"> <li>• Generation</li> <li>• Solar Design</li> </ul>	

<b>Module-V : Energy Scenario Domestic</b>	4hrs
<ul style="list-style-type: none"> <li>• Energy generation</li> <li>• Energy transmission</li> </ul>	
<b>Module-VI : Energy Scenario International</b>	
<ul style="list-style-type: none"> <li>• Energy generation</li> <li>• Energy transmission</li> </ul>	

**Pedagogic tools:**

1. Chalk and Talk
2. PPT and Videos.
3. Assignment
4. Group discussion

**Reference Books:**

1. Energy Conversion & Management: Dr. Akshay Pujara, Dr. Ravi Khant, Book India Publication
2. Generation of electrical energy: B.R. Gupta, S. Chand Publication
3. Energy for a sustainable world: Jose Goldenberg, Thomas Johansson, Oxford University Press.

**Suggested reading / E-resources**

1. <http://aipnpc.org/Guidebooks.aspx>
2. <https://www.aipnpc.org/>
3. [http://www.refreshercourse.in/Module/RC\\_Material.pdf](http://www.refreshercourse.in/Module/RC_Material.pdf)

**Suggested MOOCs:**

1. <https://nptel.ac.in/courses/108105058/>
2. <https://nptel.ac.in/courses/108105058/2>
3. <https://nptel.ac.in/courses/108105058/3>
4. <https://nptel.ac.in/courses/108105058/4>
5. <https://nptel.ac.in/courses/108105058/5>

Course Code	Course Title	Course Credit and Hours
21AEVA017	Internet Technology	1 Credit - 4 hrs / wk

**Objective of the course:**

1. To provide foundation knowledge of Web designing.
2. To develop the basic Web page designing skills in students
3. To improve their proficiency in applying the basic knowledge to build effective web sites.

**Target Skills (Course outcomes) :**

1. Understand basic concept of web designing
2. Design a static web page using different HTML tags
3. Create a web page using different CSS Features with Different Layout as per need of Application
4. Create a webpage using Javascript

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other) :**

- The Value added course based on Internet technology belongs to area of Web Designing.

**Reference:**

The link -

[https://courses.edx.org/assets/courseware/v1/220c987e9ebd826db434eb646110bce6/asset-v1:Microsoft+DEV211.1x+1T2017+type@asset+block@introduction\\_HTML\\_\\_JavaScript\\_updatedsyllabus.pdf](https://courses.edx.org/assets/courseware/v1/220c987e9ebd826db434eb646110bce6/asset-v1:Microsoft+DEV211.1x+1T2017+type@asset+block@introduction_HTML__JavaScript_updatedsyllabus.pdf)

**Course Description:**

The target audience for this training course is individuals who are interested in learning about the core skills necessary for web development. Course will be start from the ground up by learning how to implement modern web pages with HTML and CSS. Using Javascript, students will be able to build a fully functional web application that utilizes Ajax to expose server-side functionality and data to the end user.

Course Content	Hours
<b>Module-I:</b> Internet Fundamentals	8 hrs
<ul style="list-style-type: none"> <li>• Internet</li> <li>• World wide web(WWW)</li> <li>• Web protocols</li> </ul>	
<b>Module-II :</b> HTML	8 hrs
<ul style="list-style-type: none"> <li>• HTML Strucutre</li> <li>• HTML Elements</li> <li>• HTML Attributes</li> <li>• HTML Headings</li> <li>• HTML Paragraphs</li> <li>• HTML Formatting</li> <li>• HTML Fonts</li> <li>• HTML Styles</li> <li>• HTML Links</li> <li>• HTML Images</li> <li>• HTML Tables</li> </ul>	

<b>Module-III : CSS</b>	8 hrs
<ul style="list-style-type: none"> <li>• CSS Structure</li> <li>• Different CSS properties</li> <li>• CSS Introduction</li> <li>• CSS Syntax</li> <li>• CSS Id &amp; Class</li> <li>• CSS Styling</li> <li>• Styling Backgrounds</li> <li>• Styling Text</li> <li>• Styling Fonts</li> <li>• Styling Links</li> <li>• Styling Lists</li> <li>• Styling Tables</li> </ul>	
<b>Module-IV : Javascript</b>	8 hrs
<ul style="list-style-type: none"> <li>• Basics of javascript language</li> <li>• Dynamic Webpage</li> <li>• Basics of OOP</li> </ul>	
<b>Module-V : Bootstrap</b>	8 hrs
<ul style="list-style-type: none"> <li>• Overview of Bootstrap 4</li> <li>• Grid System</li> <li>• Typography</li> <li>• Tables</li> <li>• Button groups</li> <li>• Alerts</li> <li>• Badges/Labels</li> <li>• Dropdowns</li> </ul>	

**Suggested laboratory experiments / other activities:**

Create a Case Study on Different Design Issues of Websites.

2. Create a Sitemap Using Online tool.
3. Create HTML Page with title and Set Icon of Web Page.
4. Demonstrate the use of Lists and Heading in HTML Page.
5. Create a Section Based HTML Page with CSS.
6. Create a Section Based HTML Page with CSS.
7. Create a Form Using Bootstrap Buttons and Form.
8. Design a Web Page with Bootstrap Carousel and tooltip.
9. Demonstrate a Web Page for different alerts using Bootstrap
10. Create a page using Javascript.

**Pedagogic tools:**

1. Chalk and Talk
5. PPT and Videos.
6. Assignment
7. Group discussion

**Reference Books:**

1. “Web Technologies Black Book”, by Dreamtech Press 3
2. “HTML 5 Black Book”, by Dreamtech Press
3. “Bootstrap 4 By Example”, Packt Publishing
4. “Developing Web Applications”, Ralph Moseley and M. T. Savaliya, Wiley-India

**Suggested reading / E-resources**

1. [www.w3.org](http://www.w3.org)
2. [www.w3schools.com](http://www.w3schools.com)
3. [www.tutorialspoint.com](http://www.tutorialspoint.com)

**Suggested MOOCs:**

1. [https://onlinecourses.swayam2.ac.in/aic20\\_sp11/preview](https://onlinecourses.swayam2.ac.in/aic20_sp11/preview)

Course Code	Course Title	Course Credit and Hours
21AEVA018	CISCO: Fundamentals of Networking	1 Credit - 4 hrs / wk

**Objective of the course:**

1. To create awareness about modern network such as protocols and topologies.
2. Train the student to select proper hardware devices for n.
3. Train the student to understand transmission media.
4. Understanding for network addressing.

**Target Skills (Course outcomes) :**

1. Analyze network terminology.
2. Working of network devices and IP addressing.

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other) :**

- The Value added course based on computer network fundamentals. In which we describe various protocols, models in networks and also illustrate use of Subnets, Ipv4 and Ipv6 in computer networks.

**Reference:**

[https://www.cisco.com/c/dam/en\\_us/training-events/le31/le46/cln/marketing/exam-topics/200-301-CCNA.pdf](https://www.cisco.com/c/dam/en_us/training-events/le31/le46/cln/marketing/exam-topics/200-301-CCNA.pdf)

**Course Description:**

The course content prepared with the aim to develop different types of skills so that students are able to acquire subsequent competency: Use Software and hardware technology to establish, Commission (make operational) and maintain computer networks.

Course Content	Hours
<b>Module-I:</b> Basics of computer network	8 hrs
<ul style="list-style-type: none"> <li>• History of networks</li> <li>• Usage of Computer Networks</li> <li>• Network Topology</li> <li>• Categories of network</li> </ul>	
<b>Module-II :</b> OSI and TCP/IP Model	8 hrs
<ul style="list-style-type: none"> <li>• OSI model &amp; function of each Layer</li> <li>• TCP/ IP model</li> <li>• Connection oriented v/s Connectionless approach</li> <li>• Comparison of OSI &amp; TCP/IP Models</li> </ul>	
<b>Module-III :</b> Transmission Media	8 hrs

<ul style="list-style-type: none"> <li>• Types of Transmission Media</li> <li>• Guided Media: Twisted Pair, Coaxial Cable, Fiber</li> <li>• Unguided Media : Electromagnetic spectrum, Radio Transmission, Microwave Transmission, Infrared Transmission, Satellite Communication</li> </ul>	
<b>Module-IV : Network Devices</b>	8 hrs
<ul style="list-style-type: none"> <li>• Repeater</li> <li>• Switch</li> <li>• Hub</li> <li>• Routers</li> </ul>	
<b>Module-V : IP Addressing</b>	8 hrs
<ul style="list-style-type: none"> <li>• IP Protocol – IP v4, IP v6.</li> <li>• Addressing Schemes</li> <li>• Subnetting</li> </ul>	

**Suggested laboratory experiments / other activities:**

1. Install & Test Network Interface Card.
2. Prepare and Test Straight UTP Cable.
3. Prepare and Test Cross UTP Cable.
4. Develop a small Network. (Hands on Training).

**Pedagogic tools:**

1. PPT and Videos.
2. Assignment
3. Group discussion

**Reference Books:**

1. Computer Networks Andrew S Tannebaum, & David J Wetherall, Pearson, 2012
2. Information Technology Today S. Jaiswal Galgotia Publications
3. Computer Networks Bhushan Trivedi Oxford University Press, 2013
4. Data Communication & Networking, Forouzen Tata McGraw Hill

**Suggested reading / E-resources**

1. <http://nptel.iitm.ac.in/courses.php?disciplineId=106>
2. <http://www.edrawsoft.com>
3. Network Simulator Tool: GNS3 v0.8.5, NetSimK

**Suggested MOOCs:**

1. <https://nptel.ac.in/courses/106/105/106105081/>
2. <http://www.nptelvideos.in/2012/11/computer-networks.html>

Course Code	Course Title	Course Credit and Hours
<b>21AEVA019</b>	<b>Material Science and Measurement for day to day life</b>	<b>1 Credit - 4 hrs / wk</b>

**Objective of the course:**

1. Understand the concepts of various measurement systems & standards with regards to realistic applications.
2. Develop knowledge of basics of Measurements, Metrology and measuring devices.
3. Apply the principle of metrology and measurements in industries.
4. Suggest the different heat treatment processes as per the industrial requirement.
5. Application of ferrous and non ferrous for quality product.

**Target Skills (Course outcomes) :**

12. Apply the basic concept of material science in their day to day life.
13. Differentiate the ferrous and non-ferrous metals and alloys and their applications
14. Apply basic concepts of Measurement
15. Identify the uses of Linear and angular Measuring Instruments

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other) :**

- The Value added course based on material science and measurement belongs to area of material science and measurement. It comes under the Indian Iron and Steel skill sector council.

**Reference:** <https://nsdcindia.org/sector-skill-councils>

**Course Description:**

This course is an introduction to different material and different instruments used for measurement in day to day life. This course will provide an introduction to different strength, properties and characteristics associated with different material.

Course Content	Hours
<b>Module-I: Introduction of Material Science</b>	6 hrs
<ul style="list-style-type: none"> <li>• Need, Importance and scope of material science in mechanical engineering. Classification of Engineering Materials, Engineering requirements of materials, Criterion for selection of materials for engineering applications, Properties of Engineering Materials.</li> <li>• Introduction to Unit cells, Metallic crystal structures like macro, micro, their correlated properties</li> </ul>	
<b>Module-II :Ferrous and non ferrous metals &amp; its application</b>	8 hrs
<p><b>Ferrous Materials</b></p> <ul style="list-style-type: none"> <li>• Alloy Steel: Purpose of alloying; General effect of alloying elements on mechanical Property.</li> <li>• Types: Chromium, Manganese, Molybdenum and Manganese steels. Tool</li> </ul>	



<p>Steels: Classification, properties, applications, White Cast Iron, Grey Cast Iron, Malleable Cast Iron, S. G. Iron, Alloy Cast Iron. Indian standard code and ASME code for designation of metals.</p> <p><b>Non Ferrous Materials</b></p> <ul style="list-style-type: none"> <li>Alloys of copper, aluminum., white metals and bearing alloys</li> </ul>	
<b>Module-III : Metal Treatment</b>	6 hrs
<ul style="list-style-type: none"> <li>Annealing, tempering, normalizing and spheroidising,</li> <li>Case hardening, carburizing, nitriding, cyaniding, carbo-nitriding, flame and induction hardening, vacuum and plasma hardening</li> </ul>	
<b>Module-IV : Introduction To Mechanical Measurement</b>	8 hrs
<ul style="list-style-type: none"> <li>Introduction to Mechanical Measurement</li> <li>Need of mechanical measurement, Basic definitions.</li> <li>Measurement method</li> </ul>	
<b>Module-V : Linear And Angular Measurement</b>	8 hrs
<ul style="list-style-type: none"> <li>Linear Measurement using Vernier calliper and micrometer.</li> <li>Slip gauges, Checking of slip gauges for surface quality,</li> <li>Angular Measurement using Vernier bevel protector, Sine bar and Auto collimator</li> </ul>	

**Suggested laboratory experiments / other activities:**

- Classification of different material and their properties
- Testing of different material
- Classification of measuring instruments with specification
- Measurement of different components using various measuring instruments.

**Pedagogic tools:**

- Chalk and Talk
- PPT and Videos.
- Assignment

**Reference Books:**

- Khanna, O. P. (2009). Material science and metallurgy. DhanpatRai Pub (P) Ltd.Industrial Engineering and Management, Khana, Dhanpat Rai.
- Er. R K Rajput(2018) ,Mechanical Measurements and Instrumentations, Kataria Publication

**Suggested reading / E-resources**

- NPTEL web Series <https://nptel.ac.in/courses/113106032/>
- NPTEL web Series <https://nptel.ac.in/courses/112108150/2>
- NPTEL web Series <https://nptel.ac.in/courses/112108150/7>
- NTEL web Series <https://nptel.ac.in/courses/112106139/>
- NPTEL web Series <https://nptel.ac.in/courses/112106179/>
- NPTEL web Series <https://nptel.ac.in/courses/112106179/4>
- NPTEL web Series <https://nptel.ac.in/courses/112106179/9>

Course Code	Course Title	Course Credit and Hours
<b>21AEVA020</b>	<b>Computer Maintenance &amp; Troubleshooting</b>	<b>1 Credit - 4 hrs / wk</b>

**Objective of the course:**

3. This course is focused on developing skills in installation and configuration of Operating systems, loading and configuring various device drivers, diagnosing the faults and troubleshoots the computer at software level as well as component level.
4. This course will be helpful for students to get employment in the computer maintenance industry as well as self employment.

**Target Skills (Course outcomes) :**

3. Skill development to perform computer hardware and software troubleshooting
4. Skill development to identify the fault in computer hardware.

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other) :**

- The Value added course based on computer maintenance and troubleshooting is offered by ITI.

**Reference:** The link of ITI :- <https://targetstudy.com/iti/trade/75-mechanic-computer-hardware/>

**Course Description:**

This course is focused on developing skills in installation and configuration of Operating systems, loading and configuring various device drivers, diagnosing the faults and troubleshoots the computer at software level as well as component level. The course aims to address SDG-4: Quality Education

Course Content	Hours
<b>Module-I: Core Components of Computer</b>	6 hrs
<ul style="list-style-type: none"> <li>• Features and Functionalities of CPU</li> <li>• Basics of Motherboard</li> <li>• Bus Slots and Cards</li> <li>• System Controllers</li> <li>• BIOS Features</li> <li>• Chipsets</li> <li>• Types of memory modules</li> </ul>	
<b>Module-II : Disk Drives and Controllers</b>	8 hrs
<ul style="list-style-type: none"> <li>• Basics of Disk Drives</li> <li>• Hard Disk Interfaces, Geometry and Performance Characteristics.</li> <li>• Hard Disk Controller</li> <li>• DVD Drive and Performance Criteria</li> <li>• Basics of Blu-Ray Disk</li> </ul>	
<b>Module-III : Input Devices</b>	8 hrs
<ul style="list-style-type: none"> <li>• Basic Input Devices</li> <li>• Types of keyboards and interfaces</li> </ul>	

<ul style="list-style-type: none"> <li>• Types of Mouse and specifications.</li> <li>• Types of Scanners and its applications</li> <li>• Latest input devices with applications</li> </ul>	
<b>Module-IV : Output Devices</b>	10 hrs
<ul style="list-style-type: none"> <li>• Display Technologies : Conventional and Digital</li> <li>• Printers and its types</li> <li>• Graphics Card</li> <li>• Plotter and Projectors</li> <li>• Audio-Visual Devices</li> </ul>	
<b>Module-V : Troubleshooting &amp; Maintenance</b>	6 hrs
<ul style="list-style-type: none"> <li>• Basics of POST and BOOTING</li> <li>• Troubleshooting Problems and Diagnosis</li> </ul>	

**Suggested laboratory experiments / other activities:**

Sr.	Experiments
1	Identify basic components of a personal computer.
2	Prepare a list of various computer peripherals.
3	Identify common ports, associated cables, and their connections.
4	Identify major components including motherboards, memory, drives, peripheral cards and devices, BIOS, and Windows operating system.
5	Observe, search and write the specifications of CD/DVD drive, HDD, motherboard, RAM chips, Power supply, Microprocessor chip, Add on cards.
6	Observe the power supply (SMPS) and measure their voltage levels of a given SMPS.
7	Observe various secondary storage systems- Hard Disk, Flash drives, CD/DVD drive. Open drives and draw the internal structure of them.
8	Hard Disk formatting and Operating System installations.
9	Operate and learn various I/O Devices.
10	Observe the interfacing, installation and working of various devices such as scanner, projector, web cam etc. Connect all these devices with the given PC, install & test them.
11	Identify BIOS settings.
12	Identify the problem in the given PC, using the given troubleshooting sequence, fix the issue, record the given problem.
13	Recognize common symptoms associated with diagnosing and troubleshooting PCs and utilize Windows built-in diagnostic tools, log and boot up events.

**Pedagogic tools:**

1. Chalk and Talk
2. PPT and Videos.
3. Assignment
4. Group discussion

**Reference Books:**

1. “Computer Installation and Servicing”, D Balasubramanian, Tata McGraw Hill.
2. “The complete PC Upgrade & Maintenance Guide”, Mark Minasi, BPB Publications.
3. “IBM PC and clones”, Govind Rajalu, Tata McGraw Hill.

**Suggested reading / E-resources**

1. Software: Microsoft windows operating system from XP/vista/7/8/10.
2. <http://www.gcflernfree.org/computerbasics/15/print>
3. <http://www.more.net/sites/default/files/training/BTTmain.pdf>
4. <http://www.computerhope.com/issues/ch000248.htm>
5. <http://www.youtube.com/watch?v=Wk0m6TIO8X4>
6. <http://computer.howstuffworks.com/computer-hardware-channel.htm>

**Suggested MOOCs:**

1. [https://onlinecourses.nptel.ac.in/noc22\\_cs19/preview](https://onlinecourses.nptel.ac.in/noc22_cs19/preview)

Course Code	Course Title	Course Credit and Hours
<b>21AEVA021</b>	<b>Entrepreneurship</b>	<b>1 Credit - 4 hrs / wk</b>

**Objective of the course:**

4. To make the students familiar to the concept entrepreneurship
5. To develop in them the quality for innovative entrepreneur.
6. The ability to identify entrepreneurial opportunities that exist, those that represent untapped markets and underserved markets, and those that can be created by applying existing technologies to new fields and new markets

**Target Skills (Course outcomes) :**

3. Skill development to identify entrepreneurial opportunities.
4. Skill development to create enterprise.

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other) :**

- The Value added course based on Entrepreneurship course is offered by The National Programme on Technology Enhanced Learning (NPTEL).

**Reference:** <https://nptel.ac.in/course.html>

**Course Description:**

3. The course is an introduction to entrepreneurship and help students to identify entrepreneurial opportunities. Also it helps to students to identify entrepreneurship skills required by the students.
4. The ability to identify entrepreneurial opportunities that exist, those that represent untapped markets and underserved markets, and those that can be created by applying existing technologies to new fields and new markets. The course aims to address SDG-8: Decent Work and Economic Growth.

Course Content	Hours
<b>Module-I: Way to Entrepreneurship</b>	8 hrs
<ul style="list-style-type: none"> <li>• Concept of Entrepreneur and Entrepreneurship</li> <li>• Who are Entrepreneurs? (Characteristics &amp; Motivation)</li> <li>• Why for Entrepreneurship? (Importance)</li> <li>• Entrepreneurial Barriers</li> <li>• Family Business &amp; Entrepreneurship</li> </ul>	
<b>Module-II : Ease of Doing Business</b>	8 hrs
<ul style="list-style-type: none"> <li>• Types of Business Venture</li> <li>• Different forms of Organization &amp; Registration</li> <li>• Sources of Finance</li> <li>• Government Policy – Tax, Clearance Policy</li> <li>• Types of Funding</li> <li>• Debt vs. Equity</li> </ul>	
<b>Module-III : An Entrepreneur's Toolkit</b>	8 hrs

<ul style="list-style-type: none"> <li>• Unleashing Creativity &amp; Innovation</li> <li>• Recognizing and Shaping Opportunities</li> <li>• Business Model Canvas (Concepts) <ul style="list-style-type: none"> <li>○ <i>Step 01 - Customer Segments</i></li> <li>○ <i>Step 02 - Customer Relationships</i></li> <li>○ <i>Step 03 - Market Channels</i></li> <li>○ <i>Step 04 - Business Value Propositions</i></li> <li>○ <i>Step 05 - Key Activities</i></li> <li>○ <i>Step 06 - Key Resources</i></li> <li>○ <i>Step 07 - Key Partners</i></li> <li>○ <i>Step 08 - Cost Structure</i></li> <li>○ <i>Step 09 - Revenue Streams</i></li> </ul> </li> </ul>	
<b>Module-IV : Entrepreneurship Policies and Opportunities</b>	8 hrs
<ul style="list-style-type: none"> <li>• Pitching Opportunities</li> <li>• Startup Policy</li> <li>• Make in India,</li> <li>• Role of Venture Capitalist in Business Organization</li> <li>• Introduction to Intellectual Property - Trademark, Copyright and Patents</li> <li>• Ethics &amp; Values in Business</li> </ul>	
<b>Module-V : Trends and Cases for Entrepreneurship</b>	8 hrs
<ul style="list-style-type: none"> <li>• Women Entrepreneurship</li> <li>• Social Entrepreneurship</li> <li>• Rural Entrepreneurship</li> <li>• At least two cases on Entrepreneurship</li> </ul>	

**Suggested laboratory experiments / other activities:**

1. Discussion of practical examples and cases of entrepreneurs.

**Pedagogic tools:**

1. Chalk and Talk
5. PPT and Videos.
6. Assignment
7. Group discussion

**Reference Books:**

4. Vasant Desai, *Dynamics of Entrepreneurial Development And Management*, Himalaya Publishing House, Fourth Edition
5. Hisrich&Manimala, *Entrepreneurship*, McGraw Hill Education, Ninth Edition
6. Neeta Baporikar, *Entrepreneurship Development & Project Management*, Himalaya Publishing House, First Edition

**Suggested reading / E-resources**

2. <https://ndl.iitkgp.ac.in/>

**Suggested MOOCs:**

2. <https://nptel.ac.in/courses/110/106/110106141/>

Course Code	Course Title	Course Credit and Hours
21AEVA022	Cosmetic Preparations	1 Credit - 4 hrs / wk

**Objective of the course:**

9. To create understanding of the basic science employed in cosmetics.
10. This course is aimed at learning the principles underlying cosmetic technology and approach to cosmetic research and development.
11. To develop awareness about Good manufacturing practices and quality assurance in cosmetic technology.
12. Students will be able to have a better outlook on cosmetic formulations and their usage.

**Target Skills (Course outcomes) :**

4. Skill development to develop formulation of cosmetics.
5. Skill development to identify the skin and hair problems and how to overcome through cosmetic preparations.
6. Learn about the selection of suitable excipients for cosmetics products.

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other) :**

- The Value added course based on cosmetic belongs to area of Cosmetic Technology. Various types of courses from cosmetics sector are offering by Faculty of Healthcare Administration, Institute of Good Manufacturing Practices India (IGMPI).

**Reference:**

The link of IGMP – <https://www.igmpiindia.org/Executive-Diploma-in-Cosmetic-Technology.html>

**Course Description:**

The course, Cosmetic preparations, is an interdisciplinary applied science program providing students with the opportunities to develop professional skills and fundamental concepts driving cosmetic science. It is focuses on the needs of the cosmetic industry and its consumers, in addition to providing students with the critical and evaluative skills to become professional skilled manufacturer. The course aims to address to SDG 3 (good health and well being) and SDG 4 (quality education).

Course Content	Hours
<b>Module-I:</b> Fundamentals of cosmetic science	3 hrs
<ul style="list-style-type: none"> <li>• Introduction, Objectives, Applications of cosmetics</li> <li>• Classification of cosmetics</li> <li>• Basic terminologies.</li> </ul>	
<b>Module-II :</b> Cosmetics for Skin	8 hrs
<ul style="list-style-type: none"> <li>• Basics and selection of ingredients for skin care products</li> <li>• Fundamentals of Sunscreen, moisturizers, cold cream, vanishing cream, bathing shop, etc.</li> </ul>	



<b>Module-III : Cosmetics for Hair</b>	8 hrs
<ul style="list-style-type: none"> <li>• Basics and selection of ingredients for hair care products</li> <li>• Shampoo and conditioners</li> </ul>	
<b>Module-IV : Cosmetics for Oral care</b>	8 hrs
<ul style="list-style-type: none"> <li>• Basics and selection of ingredients for oral care preparations</li> <li>• Dentifrice-powders, gels, paste, etc.</li> </ul>	
<b>Module-V : Manicure and other preparations</b>	8 hrs
<ul style="list-style-type: none"> <li>• Basics, Selection of Ingredients, Nail polish, Nail polish remover, Lipsticks, Eye lashes, Baby care products, Hygienic products, etc.</li> </ul>	

**Suggested laboratory experiments / other activities:**

**Pedagogic tools:**

1. Chalk and Talk
2. PPT and Videos
3. Assignment

**Reference Books:**

1. Hilda Butler. (2000, Tenth Edition) *Poucher's Perfumes, Cosmetics and Soaps*. Kluwer Academic Publishers (ISBN 978-90-481-4034-3).
2. Sharma P.P. (2014, Fifth Edition) *Cosmetics – Formulation, Manufacturing and Quality Control*. Vandana Publications Pvt. Ltd., Delhi (ISBN: 978-8190595704).
3. André O. Barel, Marc Paye, Howard I. Maibach (2009, Third Edition) *Handbook of Cosmetic Science and Technology*. Informa Healthcare USA, Inc. (ISBN: 978-1-4200-6963-1).
4. E.A.Rawlins, (1997, Eighth Edition) *Bentley's text book on pharmaceuticals*. Elsevier Health Sciences (ISBN: 9788131232668).

**Suggested reading / E-resources**

1. Drugs and Cosmetic act/rules by Govt. of India Publication.

**Suggested MOOCs:**

1. <https://www.udemy.com/course/certificate-course-in-basic-cosmetology/>
2. <https://www.udemy.com/course/easy-cosmetics/>
3. <https://mademoiselle-organic-academy.teachable.com/p/free-introduction-to-diy-skincare>

Course Code	Course Title	Course Credit and Hours
21AEVA023	Financial Literacy & Taxation	1 Credit - 4 hrs / wk

**Objective of the course:**

1. To make the students familiar with Banking system in India and how to use different banking services.
2. To provide basic knowledge about Types of investment opportunities both risk free and having moderate risk features.
3. To make the students aware about different types of insurance and how to get benefit out of it and to familiarize them with basics of Indian tax system.

**Target Skills (Course outcomes) :**

3. Skill development to familiar with Banking system in India
4. Skill development to aware about different types of insurance and basics of Indian tax system.

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other) :**

- The Value added course based on banking system in India, insurance and investment options belongs to area of financial literacy & taxation. Various types of courses from financial literacy & taxation related are offering by BFSI Sector Skill Council of India.

**Reference:** The link of BFSI – <http://www.bfsissc.com/basics-of-banking-insurance.html>

**Course Description:**

The course is making the students' familiar with Banking system in India and how to use different banking services. Emphasis on various investment options. The course is learning about different types of insurance and how to get benefit out of it and to familiarize them with basics of Indian tax system.

Course Content	Hours
<b>Module-I: Basics of Banking</b>	7 hrs
<ul style="list-style-type: none"> <li>• Introduction of Banking System</li> <li>• Types of Bank Accounts</li> <li>• Negotiable Instruments (cheque and draft)</li> <li>• Dealing with basic banking documents</li> <li>• Information about E-banking services like NEFT, RTGS, Net Banking, Debit Card, Credit Card, ECS</li> <li>• Overdraft, loans, C.C., etc.</li> </ul>	
<b>Module-II : Basics of Investments – 1 (Risk free way)</b>	5 hrs
<ul style="list-style-type: none"> <li>• Concept of Savings and Investment</li> <li>• Investment Alternatives like <ul style="list-style-type: none"> <li>- Fixed Deposits and PPF</li> <li>- National Saving Certificates</li> <li>- Secured Debentures &amp; Bonds</li> </ul> </li> </ul>	

<ul style="list-style-type: none"> <li>- Post office Saving Schemes</li> <li>- National Pension Schemes etc.</li> </ul>	
<b>Module-III : Basics of Investments – 2 (Moderate risk factor)</b>	15 hrs
<ul style="list-style-type: none"> <li>• Introduction to Capital Market: Primary Market &amp; Secondary Market</li> <li>• Equity Shares: <ul style="list-style-type: none"> <li>- Features</li> <li>- How to apply for an IPO</li> <li>- Demat Account and Trading Account</li> <li>- NSDL and CDSL</li> <li>- Trading in stock market: Screen Based Trading</li> </ul> </li> <li>• Mutual Funds: <ul style="list-style-type: none"> <li>- Concept and Features</li> <li>- Types of Mutual funds</li> <li>- Open ended and close ended scheme</li> <li>- How to invest in MFs</li> </ul> </li> <li>• Concept of Derivatives <ul style="list-style-type: none"> <li>- Basics of Futures &amp; Options</li> <li>- Investing in Derivatives</li> <li>- Risk- return ratio</li> </ul> </li> <li>• Portfolio Management Services</li> </ul>	
<b>Module-IV : Basics of Insurance</b>	6 hrs
<ul style="list-style-type: none"> <li>• Concept of Life Insurance</li> <li>• Concept of General Insurance</li> <li>• Benefits of Insurance</li> <li>• Different investment avenues of LIPs</li> <li>• Types of General Insurance and its utilities</li> </ul>	
<b>Module-V : Basics of Taxation</b>	7 hrs
<ul style="list-style-type: none"> <li>• Concepts of Taxation</li> <li>• Types of Tax: Direct &amp; Indirect Taxes</li> <li>• Income tax slabs</li> <li>• Briefing about Goods and Service Tax (GST)</li> </ul>	

**Suggested laboratory experiments / other activities:**

1. Not applicable

**Pedagogic tools:**

1. Chalk and Talk
2. PPT and Videos.
3. Assignment
4. Group discussion

**Suggested reading / E-resources**

1. Financial Literacy for people newly inducted into the Financial System\_RBI
2. Financial & Tax Literacy Drive Vitiya Gyan - ICAI ka Abhiyan

**Suggested MOOCs:**

1. <https://youtu.be/w0WiOmjksE>

2. T. N. Manoharan, G. R. (Latest Edition). *Student's Handbook on Taxation*. Mumbai: Snow White Publications Pvt. Ltd.
3. Kevin S, "*Security Analysis & Portfolio Management*", PHI Learning Pvt. Ltd.
4. Pandian P, (Second Edition), "*Security Analysis & Portfolio Management*", Vikas Publishing House.
5. Chandra P., "*Investment Analysis & Portfolio Management*", Tata McGraw Hill.
6. Dayal, H. (2017). *Fundamentals of Insurance* . Notion Press.
7. Praharaj, P. (2015). *Your Everyday Guide to Personal Finance and Insurance*. TV 18 broadcasting limited.

Course Code	Course Title	Course Credit and Hours
21AEVA024	Prosperity through self-reliance(स्वावलंबन से समृद्धि)	1Credit - 4 hrs / wk

**Objective of the course:**

1. Developing the mindset for physical work(श्रम).
2. Understanding the usefulness of the body.
3. To understand the concept of Prosperity.

**Target Skills (Course outcomes):**

1. Herbal Cosmetic Products like soap, wheat biscuit, hair oil,
2. Useful items from Waste material

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other) :**

The Value-added course is based on co-existential philosophy of Shree A. Nagrajji. It focuses on developing mindset for self-reliance and make sustainable and ecofriendly daily need products.

**Course Description:**

The course is an introduce self-reliance in human thought co-existential philosophy of Shree A. Nagrajji. The aim of this course is to develop mindset and confidence to produce daily needs products without using harmful chemicals. It also promotes the organic products and empowered students to build mind set for the same. The course also describes the right utilization of the resources.

Course Content	Hours
<b>Module-I: Self-reliance (स्वावलंबन) in current world</b>	3hrs
<ul style="list-style-type: none"> <li>• Introduction</li> <li>• What is Self-reliance (स्वावलंबन)?</li> <li>• Why स्वावलंबन?</li> <li>• What is conventional consumerism and production?</li> <li>• Difference between consumerism and स्वावलंबन</li> </ul>	
<b>Module-II :Developing mindset for स्वावलंबन through education</b>	3hrs
<ul style="list-style-type: none"> <li>• Objective of education</li> <li>• Education for स्वावलंबन</li> <li>• Identifying our daily needs</li> <li>• Mindset for स्वावलंबन</li> <li>• Difference of mindset in स्वावलंबन and consumerism</li> </ul>	
<b>Module-III :Health (स्वास्थ्य) and Temperance (संयम)</b>	3hrs

<ul style="list-style-type: none"> <li>• What isस्वास्थ्यand संयम</li> <li>• Criteria to make any product keeping in mind स्वावलंबन</li> <li>• स्वावलंबन in FMCG(Fast-Moving Consumer Goods) items to complete our daily needs</li> <li>• Herbal Cosmetic Product</li> </ul>	
<b>Module-IV :Relation centric production</b>	3hrs
<ul style="list-style-type: none"> <li>• Importance of relation</li> <li>• Relation centric production and not production centric relation</li> <li>• Organic and Healthy food making</li> <li>• स्वावलंबन Case study-1:MCVK (ManavChetanaVikas Kendra) - Indore, M.P.</li> </ul>	
<b>Module-V : Marketing for Relation</b>	3hrs
<ul style="list-style-type: none"> <li>• Marketing for relation</li> <li>• 7 types of relations is exist</li> <li>• Herbal Cosmetic Product</li> <li>• स्वावलंबन Case study-2:Samrudhi kendra, Rajkot</li> <li>• A way towards स्वावलंबन.</li> </ul>	

**Suggested laboratory experiments / other activities:**

1. Preparation of Soap
2. Preparation of Wheat Biscuits
3. Preparation of Hair Oil
4. Useful items from Waste material

**Pedagogic tools:**

1. Chalk and Talk
2. PPT and Videos.
3. Assignment
4. Case Study

**Reference Books:**

1. ManavVyavharDarshan, A. Nagraj
2. ManavAbhyasDarshan, A. Nagraj
3. AavartanshilArthshastra, A, Nagraj

<b>18AEVA001</b>	<b>Surface Coating Techniques</b>	<b>40 Hrs</b>	<b>1 Credit</b>
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**Unit 1: Surface coating (03 Hrs)**

Introduction, objectives & applications of coating (on metal & non-metals), classification of surface coatings (inorganic & organic), preliminary treatment of surfaces.

**Unit 2: Organic surface coating (03 Hrs)**

Chemistry, composition, characteristics, role and applications of oil paints, water paints (emulsion paints), varnishes, lacquers and wax polishes.

**Unit 3: Inorganic surface coating - Electroplating: (03Hrs)**

Theory and electroplating techniques of copper, zinc, and chrome.

**Unit 4: Inorganic surface coating - Non-electric coatings: (03 Hrs)**

Theory, characteristics, special applications, and working techniques of hot dipping, metal spraying, vacuum metalizing, vitreous coating.

**Unit 5: Additive Agents for Surface Coatings: (03 Hrs)**

Introduction, role and classification of additives in surface coating processes.  
Additives - brightener, solvents, emulsifiers.

**List of Proposed Practicals: (25 Hrs)**

13. To prepare electrolyte and bath for Copper Electroplating.
14. To prepare electrolyte and bath for Zinc Electroplating.
15. To prepare electrolyte and bath for Chrome Electroplating.
16. To perform electroplating of Copper metal on given standard sample.
17. To perform electroplating of Zinc metal on given standard sample.
18. Demonstrative Practical: To perform electroplating of Chrome metal on given sample.
19. To perform analysis of electrolyte for Copper Electroplating.
20. To perform analysis of electrolyte for Zinc Electroplating.
21. To perform analysis of electrolyte for Chrome Electroplating.

**Reference Books:**

11. Coatings materials and surface coatings - Arthur A. Tracton (Editor), CRC Press, Taylor & Francis Group.
12. Engineering chemistry - R. Gopalan, D. Venkappayya, S. Nagarajan.
13. Chemistry in engineering and technology volume -1 & 2 – J.C. Kuriacose & J. Rajaram
14. Engineering chemistry – Jain & Jain
15. Industrial hygiene and chemical safety – M. K. Fulekar.

<b>18AEVA002</b>	<b>Formulation of Detergents &amp; Toiletries</b>	<b>40 Hrs.</b>	<b>1 Credit</b>
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**Unit.1 Surface active agents: (03 Hrs)**

Introduction, classification, and role of surface active agents - emulsifiers, foaming agents, antifoaming agents, concept of HLB - HydrophileLipophile Balance.

**Unit.2 Additive agents: (03 Hrs)**

Introduction, types of additives, role of additives, selection of additives. Additives: colour, fragrance, preservatives, stabilizers, glycerine.

**Unit.3 Soaps: (03 Hrs)**

Introduction, composition, characteristics, role and applications of soaps, formulation process of soaps - both liquid and solid.

**Unit.4 Detergents: (03 Hrs)**

Introduction, composition, characteristics, role and applications of soaps, formulation process of detergents - both liquid and solid.

**Unit.5 Toiletries: (03 Hrs)**

Introduction, composition, characteristics, role and applications of toiletries like liquid dish-wash and domestic toilet cleaners. Formulation process of liquid dish-wash and domestic toilet cleaners.

**List of Proposed Practical: (25 Hrs.)**

21. Preparation of liquid hand-wash: Gel type - transparent.
22. Preparation of liquid hand-wash: Cream type - opaque.
23. Preparation of liquid dish-wash.
24. Preparation of domestic glass cleaner.
25. Preparation of domestic toilet cleaner.
26. Preparation of liquid detergent.
27. Preparation of tiles cleaner
28. Preparation of rust remover
29. Preparation of drainage cleaner
30. Preparation of shower gel & shampoo.

**Books Recommended:**

1. Surfactants and interfacial phenomena - Milton J. Rosen
2. Chemical formulation an overview of surfactant – based preparation used in everyday life – Tony Hargreave, Royal Society of Chemistry, 2003, ISBN: 0854046356
3. Cosmetic and Toiletry Formulations - Vol. 2, Ernest W. Flick, Noyes Publication



<b>18AEVA003</b>	<b>Soil &amp; Water Analysis</b>	<b>40 Hrs.</b>	<b>1 Credit</b>
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**Unit.1 Water Analysis – Physical examination: (03 Hrs)**

pH, temperature, total dissolved solid, suspended solid, acidity, alkalinity, colour, taste, smell, turbidity, hardness of water.

**Unit.2 Water Analysis – Nonmetallic inorganic constitutives (03 Hrs)**

chloride, sulphate, sulphide, fluoride, phosphate, sulphur, nitrate, nitrite, carbon dioxide, ammonia, cyanide.

**Unit.3 Water Analysis – Mineral and Toxic Ions (03 Hrs)**

Mineral ions: calcium, magnesium, iron, sodium, silver, zinc, manganese. Toxic ions: lead, mercury, arsenic, beryllium, cadmium, chromium, copper, selenium.

**Unit.4 Soil Analysis- Physical Test: (03 Hrs)**

Soil Texture, Water Holding Capacity, Bulk Density, Hydraulic Conductivity

**Unit.5 Soil Analysis- Chemical Test (03 Hrs)**

pH, Electrical Conductivity (EC), Organic Carbon, Free Lime, macronutrients N, P, K, micronutrients Cu, Zn, Mg etc.

**List of Proposed Practical: (25 Hrs)**

**Soil analysis-Determination of:**

7. Water holding capacity
8. Bulk density
9. Soil Reaction (pH)
10. Electrical Conductivity (EC)
11. Calcium Carbonate (CaCO<sub>3</sub>) Free Lime
12. Nitrogen, Phosphorous, Potassium

**Soil analysis-Determination of:**

7. pH
8. Electrical Conductivity (EC)
9. Carbonates & Bicarbonates
10. Calcium & Magnesium - EDTA Titrimetric Method
11. Chloride
12. Sulphate on Spectrophotometer

**Reference Books:**

1. Instrumental Analysis, H H Willard, CBS Publishing Co.
2. Handbook of Water Analysis, Third Edition, Leo M.L. Nollet, Leen S. P. De Gelder, CRC Press, ISBN 9781439889640.

<b>18AEVA004</b>	<b>E-learning tools</b>	<b>40 hrs</b>	<b>1 Credit</b>
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**Objectives:**

**To enable students to**

1. Understand the concept of internet
2. Understand the use of Google tools & Technology
3. Create a document , presentation with formatting by using online tools
4. Understand the working of internet ,DNS
5. Create an effective presentation and diagram using online and offline tools
6. Create Simple website

**Unit 1: Introduction of Internet (08 Hrs)**

- Introduction of Network
  - Computer Networks & Type of Computer Network
  - Remote Desktop Login
  - What is Internet? & Use of Internet?
- Applications of Internet
  - World wide web(web page, web site, web client, URL web server)
  - DNS and Web Hosting
  - Email and how email transfer works, Social media and E-commerce
  - Data transfer over Internet
- How to stay safe on internet?
- How to download and upload?
- IP addressing

**Unit 2: Google Tools & Technology (08 hrs)**

- Internet search and Content
  - Google Trends
  - Google alerts(news and search e-mail alerts)
  - Google Earth (3-D satellite Imagery),
  - Google Image Search
  - Google Labs (online services research and development)
  - Google Local, Google Play Store (Marketplace for digital content)
  - Google (Google gravity , Google Water , Google Sphere etc...)
- Tools and application
  - Google sites (To create your personal Homepage) , Google profile
  - Blogger
  - Gmail, Google Drive (Docs , Forms etc), Google Chrome(web browser)
  - Google Language tools
  - Google Code

- Google Calendar , Google Reader , Google Voice
- Google Checkout (Google wallet)
- Google Class room

**Unit 3: Office Made Easy and Other Utility tools & technique (08 hrs)**

- Word processing tool in detail
- Spreadsheet
- Presentation tool
- Online/Offline presentation tool to make effective presentation(powtoonetc)
- Diagrammatic Tools (Online and offline)
- Different File Conversion Tools

**Unit 4: Learning Management SystemTools (08 hrs)**

- Moodle
- Coursera, edx, Udemy, Lynda, Udacity, Codeschool, Microsoft Virtual Academy etc
- Overview of Freelancing (Fiverretc)

**Unit 5: Other E-Learning Resources and Tools (08 hrs)**

- Online Certification sites
- Online tools
- CourseLab
- exelearning.org ,lamsfoundation.org
- NPTEL
- MIT Open Course Ware
- Learners TV

**Reference Books**

1. *R.K. Taxali , Pc Software For Windows Made Simple*, McGRAW HILL

**Web References**

1. <http://www.google.com>
2. [www.courselab.com](http://www.courselab.com)
3. [nptel.ac.in](http://nptel.ac.in)
4. <https://ocw.mit.edu>,<https://www.edx.org>
5. <https://www.coursera.org>, <https://www.udemy.com>, <https://www.lynda.com/>
6. [www.learnerstv.com](http://www.learnerstv.com)

**Text Books :**

1. Ahilan. B, Felix. N and Santhanam.R., 2008. Text book of Aquariculture.Daya Publishing House, New Delhi.
2. Jhingran V.G. fish and fisheries of India. Hindustan publication Corpn.( India) Delhi.
3. M.Srinivaswa Reedy and K.R.S. SambasivaRao. Text book of Aquaculture.Discovery publication House, New Delhi – 110002.

**References :**

1. Vincent Hargreaves , The Complete Book of the Freshwater Aquarium, Thunder Bay Press, CA,

2<sup>nd</sup> edition, 2007.

2. John E. Bardach, John H. Ryther and William O. Mc.Larney Aquaculture. New York : Wiley- Interscience.

18AEVA005	<b>Desktop Data Publishing</b>	<b>40 hrs</b>	<b>1 Credit</b>
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**Objectives:**

To enable the students to

1. Create composite images that demonstrate advanced selection and layering techniques
2. Use basic selection tools and edge refinement to isolate and edit parts of an image
3. Manipulate layers through ordering, positioning, scaling, rotation, and adjustments
4. Prepare images for Web and print output with appropriate sizing and resolution
5. Apply painted masks, selection-based masks, gradient masks, and blend modes to create sophisticated image effects
6. Set and modify typography using the full range of type tools, the Character panel, and the Paragraph panel.
7. Apply special effects to typography using masks, paths, and layer styles.

**Unit -1 Introduction to Photoshop**

**(08 hrs)**

- About Adobe Photoshop
- Graphics Basics
- Exploring Menus & Panels
- Customizing Workspaces
- Different file formats
- Work area Using Rulers and Guides
- Introduction to Colour
- Image Manipulation & Painting tools

**Unit -2 Working with Layers, Image Post Production (Image Processing) (08 hrs)**

- **Working with Layers**
  - Color Management, Levels & Curves, Using Retouching tools, Spot Healing Brush, Clone Stamp, Pattern Stamp, Red Eye, Eraser, Blur, Sharpen, Smudge, Dodge, Burn, Sponge Blurring and Sharpening Images, Color Replacement Tool, The Free Transform command
- **Image Post Production (Image Processing)**
  - Getting started with Photoshop Filters
  - Liquify Command
  - Exploring filters
  - Blur, Distort, Noise, Pixelate
  - Render, Sharpen, Stylize, Smart Filters, Lens Correction

**Unit – 3 Scripting**

**(08 hrs)**

- Action
  - Using the Action palette, Droplet
  - Recording, Playing, Editing Action

- Adobe ImageReady
- The Image Ready Interface
- Image Maps
- Image Slicing

#### **Unit – 4 CorelDraw Basics and Interface**

**(08 hrs)**

- Exploring the CorelDraw Screen
- File Management
- Moving Around and Viewing Drawings
- Customizing Options
- Setting File Backups
- Objects- Creation and Manipulation, Drawing and Shaping Objects

#### **Unit – 5 Working With Special Effects**

**(08 hrs)**

- Drawing with the Artistic Media Tool
- Shaping an Object with an Envelope
- Working with Text
- Working with Paragraph
- Special Text Effects
- Using Symbols and Clipart
- Working with Bitmaps
- Advanced Features
- Special Page Layouts

#### **Reference Books**

1. *Andrew Faulkner, Conrad Chavez, Adobe Photoshop Classroom in a Book*, Adobe
2. *M.C. Sharma, Corel Draw: Graphics Suite*, BPB Publication

<b>18AEVA006</b>	<b>Mushroom Cultivation</b>	<b>40 Hrs.</b>	<b>1 Credit</b>
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**Course Objectives:**

The Course is designed to-

9. Enable the students to identify the edible and poisonous mushrooms.
10. Provide hands-on training for the preparation of bed for mushroom cultivation and it's harvesting, pests and diseases control and post harvesting management.
11. Provide the students awareness about the marketing trends of Mushrooms.

**Unit1: Introduction**

**(10 Hours)**

- Introduction: General History, edible mushrooms, mushrooms with medicinal importance and poisonous mushrooms.
- Common Indian mushrooms.
- Nutritional value, medicinal value and advantages.
- Systematic position, morphology, distribution, structure and lifecycle of *Pleurotus*.

**Unit2: Basics of Mushroom Cultivation**

**(10 Hours)**

- Fundamentals of cultivation system-small village unit & larger commercial unit.
- Mushroom farm layout: location of building plot, design off arm, bulk chamber, composting platform, equipments & facilities, pasteurization room & growing rooms.
- Cultivation: Oyster mushroom– substrate, polythene bag method, field cultivation.
- Oyster mushroom spawn making.

**Unit3: Post Cultivation process**

**(10 Hours)**

- Maintenance of mushroom.
- Diseases-Common pests, disease prevention and control measures.
- Processing of mushroom: Sun drying, Canning, Pickling, and Freeze drying.
- Storage-short term and long-term.

**Unit4: Economics of Mushroom Cultivation**

**(10 Hours)**

- Economics of Oyster Mushroom Cultivation in Poly-house.
- Economics of Oyster Mushroom Cultivation in Mud House.
- Economic return from mushroom production on different categories of farms.
- Foreign exchange from Mushroom cultivating countries and international trade.

**Practical**

3. Identification of Edible and poisonous mushrooms
4. Microscopic observations of mushrooms
5. Cultivation of mushrooms at small scale

**Text Books**

1. Harander Singh(1991). Mushrooms – The Art of Cultivation-Sterling Publishers.
2. Kaul T. N. (1997). Introduction to Mushroom Science (Systematics). Oxford & IBH Publishing Co. Pvt. Ltd. New Delhi & Calcutta, India.
3. Vijaya Khader (1998). Mushrooms for Livelihood. Kalyani Publishers, Ludhiana, India.



<b>18AEVA007</b>	<b>Food Adulteration</b>	<b>40 Hrs</b>	<b>1 Credit</b>
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**Objective:**

**To enable students to**

1. Be aware of adulteration of selected food products through various testing procedures
2. Understand the effects of adulterants in food
3. Create awareness of food adulteration to consumers.

**Theory:**

1. Introduction- definition, Types of adulteration and detection methods
2. Prevention of Food Adulteration Act.(PFA)
3. Types of Adulterants in spices
4. Types of Adulterants in milk and milk products
5. Types of Adulterants in flour, sugars, oils and food grains
6. Effect of Adulterants on Community Health

**List of Practicals:**

- 1. To detect the presence of adulterants in sugar**
  1. Adulteration of chalk powder, washing soda in sugar
  2. Adulteration of various insoluble substances in sugar
- 2. To detect the presence of adulterants in samples of chilli powder**
  1. Adulteration of red lead salts in chilli powder
  2. Adulteration of brick powder in red chilli powder
  3. Adulteration of Oil soluble coal tar colour in red chilli powder.
- 3. To detect the presence of adulterants in samples of turmeric powder.**
  1. Adulteration of yellow lead salts to turmeric powder
  2. Adulteration of Chalk or yellow soap stone powder to turmeric powder
  3. Adulteration of Starch of maize, wheat, tapioca, rice to turmeric powder
- 4. To detect the presence of adulterants in samples of Asafoetida(Hing).**
  1. Adulteration of Soap stone or other earthy matter in asafoetida
  2. Adulteration of chalk powder in asafoetida.
- 5. To detect the presence of adulterants in samples of Coriander powder.**
  1. Adulteration of Dung powder in Coriander powder.
  2. Adulteration of Common salt in Coriander powder.
- 6. To detect the presence of adulterants in samples of Milk.**

1. Adulteration of starch powder in milk.
2. Adulteration of formalin in milk.
3. Adulteration of water in milk.

**7. To detect the presence of adulterants in samples of Milk.**

1. Adulteration of paraffin wax and hydrocarbon in vegetable ghee
2. Adulteration of argemone oil in edible oils
3. Adulteration of dyes in fat

**8. To detect the presence of kesari dal in red gram dal.**

**9. To detect the presence of poppy seeds/argemone seeds in mustard.**

**Reference Books:**

1. Wiley, Harvey Washington Foods and Their Adulteration Rarebooksclub.com
2. Schlink, Frederick John Eat, Drink, and Be Wary: The Problems of Diet and Food Adulteration Literary Licensing, LLC
3. Bruce, E. M. (1917). Detection of the common food adulterants. D. Van Nostrand Company.
4. Hassall, A. H. (1876). Food: its Adulterations, and the Methods for their Detection. Longmans Green.

<b>18AEVA008</b>	<b>WEALTH FROM WASTE</b>	<b>40 Hrs.</b>	<b>1 Credit</b>
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**Objectives:**

1. To create sustainable orderliness, enhanced ecological balance, beauty, productivity, dignity in the society/nature
2. To explore market opportunities for the recovered and recycling materials
3. To experience developing of a business model

**Unit 1: Waste Material: Collection and Treatment (06 hrs)**

- Survey of available/generated waste
- Collection of waste materials: Husk leaves of corn, used ear of wheat, maize& other cereals
- Dyeing of waste material with natural colors
- Hardening of material: drying and ironing

**Unit 2: Use of treated waste material: Flower preparation (10 hrs)**

- Procedure of flower preparation
- Use of different materials
- Shapes and types of flowers

**Unit 3: Flower arrangement for different purposes (10 hrs)**

- Procedure for preparation of different flower
- Types and uses of different flower arrangements
- Small and large handy bouquet, table bouquet
- Photo frames, Flower vase, Wall Hangings
- Garlands and Ornaments

**Unit 4: Marketing (08hrs)**

- Need analysis, pricing and basic marketing strategies
- Preparation and designing of price list
- Methods of advertisement
- Packaging of products
- Exhibition cum sale
- Survey for the need of Product and its supply to the market

**Unit 5: Project: Innovative Creation through Reuse and Recycling of Waste (06hrs)**

<b>18AEVA009</b>	<b>Mechanical Operations</b>	<b>40 Hrs</b>	<b>1 Credit</b>
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**Objective:**

**To enable students to**

3. Understand properties of solid.
4. Carry out solid-solid separation.
5. Calculate power consumption in mechanical operations.

**Unit 1: Particle Technology (05 Hrs)**

Introduction to particle technology, solid processing operations, solid/liquid separation, Properties of solid, Characterisation of particle: particle shape, particle size, size distribution, mean particle size.

**Unit 2: Fundamentals of Size Reduction (06 Hrs)**

Objectives of size reduction, size reduction methods, Factors affecting size reduction process, Energy and power consumption in size reduction, Crushing efficiency, Laws of comminution, Size reduction equipment's and selection criteria for size reduction equipment,.

**Unit 3: Size Reduction Equipments (11 Hrs)**

Principle, Construction, Working, Advantages and Disadvantages of:

- Jaw Crusher
- Gyratory Crusher
- Roll Crusher
- Ball Mill
- Hammer Mill

**Unit 4: Screen Analysis (08 Hrs)**

Introduction to screens, Ideal screen, Actual Screen, Screen analysis, Construction and working of: Trommels, Vibrating Screens, Sieve Shaker.

**Unit 5: Method of Separation of Solid on Specific Principles (10 Hrs)**

Construction and working of:

- Gravity Settling Tank
- The Rake Classifier
- Riffled Tables
- Jigging and Hydraulic Jigging
- Magnetic Separators

**Text Books:**

1. Gavhane K. A. (2009), "*Unit Operations-I*", NiraliPrakashan, ISBN 978-81-90639-66-8.
2. Swain AK- Patra H- Roy GK (2011), "*Mechanical Operations*", Tata McGraw Hill Education Private Limited, ISBN(13):978-0-07-070022-2.

**Reference Books:**

3. Kiran D Patil (2009), "*Mechanical Operations: Fundamental Principles and Applications*", NiraliPrakashan, ISBN:978-93-80064-09-0.
4. McCabe, Smith and Harriot (2014), "*Unit Operations of Chemical Engineering*", McGraw Hill Education Publication, ISBN 0071247106, 9780071247108.

<b>18AEVA010</b>	<b>VEDIC MATHEMATICS</b>	<b>40 Hrs.</b>	<b>1 Credit</b>
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Upon completion of the course students will be able to

1. Understand and appreciate the history of ancient mathematics methods
2. Understand the sixteen sutras of vedic mathematics
3. Utilize the sutras in order to solve related problems of short calculation.
4. Solve some of the algebraic problems using the vedic sutras.

**Unit – 1: Sutras 1 to 3 (8Hrs)**

- EkadhikinaPurvena -By one more than the previous one (Cor: Anurupyena)
- NikhilamNavatashcaramamDashatah -All from 9 and the last from 10 (Cor: SisyateSesamjnah)
- Urdhva-Tiryagbyham-Vertically and crosswise (Cor: Adyamadyenantyamantyena)

**Unit – 2: Sutras 4 to 6 (8Hrs)**

- ParaavartyaYojayet-Transpose and adjust (Cor: KevalaihSaptakamGunyat)
- ShunyamSaamyasamuccaye-When the sum is the same, that sum is zero. (Cor: Vestanam)
- (Anurupye) Shunyamanyat-If one is in ratio, the other is zero (Cor: YavadunamTavadunam)

**Unit – 3: Sutras 7 to 9 (8Hrs)**

- Sankalana-vyavakalanabhyam-By addition and by subtraction (Cor:YavadunamTavadunikrityaVargaYojayet)
- Puranapurabyham-By the completion or non-completion (Cor: Antyayordashake)

**Unit – 3: Sutras 10 to12 (8Hrs)**

- Chalana-Kalanabyham-Differences and Similarities (Cor: Antyayoreva)
- Yaavadunam-Whatever the extent of its deficiency (Cor: Samuccayagunitah)
- Vyashtisamanstih-Part and Whole (Cor: Lopanasthanabhyam)

**Unit – 5: Sutras 13 to16 (8Hrs)**

- ShesanyankenaCharamena-The remainders by the last digit (Cor: Vilokanam)

- Sopaantyadvayamantyam-The ultimate and twice the penultimate (Cor: GunitasamuccayahSamuccayagunitah)
- EkanyunenaPurvena-By one less than the previous one (Cor: Dhvajanka)
- Gunitasamuchyah-The product of the sum is equal to the sum of the product (Cor: Dwandwa Yoga)
- Gunakasamuchyah-The factors of the sum is equal to the sum of the factors.

**TEXT BOOKS: -**

5. Swami Bharati Krishna Tirtha, Vasudeva SharanaAgrawala, V. S. Agrawala,MotilalBanarsidass Publishers Pvt Ltd., 1992
6. Dhaval Bathia, Vedic Mathematics Made Easy, Jaico Publishing House,Jun 2005.

**REFERENCE BOOKS:-**

1. Vandana Singhal, Vedic Mathematics for all ages: A beginner's Guide, Motilal Banarsidass Publishers Pvt Ltd Jan 2008.

<b>18AEVA011</b>	<b>GRAPHING AND PLOTTING TECHNIQUES</b>	<b>40 Hrs.</b>	<b>1 Credit</b>
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**Objectives:-**

Upon completion of the course students will be able to

1. Identify the relevant population, sample, study units (subjects) and variables.
2. Identify data that follow a normal curve and find chances and percentages using a normal curve.
3. Produce and interpret numerical summary statistics using mean, median, mode, range, standard deviation and variance.
4. Perform and interpret testing of hypothesis including chi-squared test and other ANOVA test for independence.

**Unit-1 Types of data and functions**

**(8Hrs)**

- Basic plotting and charting concepts
- Functions including  $\log$ ,  $e^x$ ,  $2^x$ ,  $a^x$ ,  $\sin$ ,  $\cos$ ,  $\tan$  and hyperbolic functions
- Plotting of these functions
- Plotting experimental data

**Unit-2 Plotting Data with Microsoft Excel**

**(7Hrs)**

- Defining a Data Series
- Pie Chart
- Column Chart
- Line Chart
- Bar Chart
- Area Chart
- Scatter Chart
- Other Chart Types

**Unit- 3 Plotting using SCILAB.**

**(8Hrs)**

- Scilab basics



- Matrices and vectors using Scilab
- Linspace command, colon operator
- Plot command and its parameters
- Polarplot command and its parameters.
- Formatting plots.

#### **Unit-4 Plotting using GeoGebra**

**(7Hrs)**

- Basics of GeoGebra
- Plotting curves like circle, conics, lines, polygons etc using tool bar.
- Plotting using menu-bar of GeoGebra
- Formatting the figures in GeoGebra

#### **Unit-5 Interpretation of data and its plots.**

**(6Hrs)**

- Observing the given data and plotting using any of the above methods
- Points to be observed as Interpretation of data from the given plot.
- Problems based on Interpretation.
- Identification of Relationship between variable like linear, quadratic, exponential, logarithmic and other.

#### **TEXT BOOKS: -**

7. Judith Hohenwarter and Markus Hohenwarter, Introduction to GeoGebra
8. Michael Baudin, Introduction to Scilab
9. Vook , Microsoft Excel Charts and Graphs: The How-To Guide

<b>18AEVA012</b>	<b>CIRCUIT DESIGNING AND FABRICATION</b>	<b>40 Hrs</b>	<b>01 Credits</b>
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**UNIT 1 : DESIGNING AND FABRICATION OF RECTIFIERS 10 HRS**

- Introduction to rectifiers
- Types of rectifiers
- Half wave rectifiers, Full wave rectifiers bridge rectifiers
- Designing of different circuits for rectifier fabrication
- Tracing of different rectifier circuits

**UNIT 2 : DESIGNING AND FABRICATION OF AMPLIFIERS 10 HRS**

- Introduction to amplifiers
- Types of amplifiers
- Single stage transistor amplifier, Multistage transistor amplifier
- Transistor power amplifier
- Designing of different amplifying circuits
- Fabrication and tracing of different amplifying circuits

**UNIT 3 : DESIGNING AND FABRICATION OF FILTERS 10 HRS**

- Introduction to filters
- Types of filters
- RL filters, RC filters, LCR filters, Pie filters
- Designing of different filters circuits
- Fabrication and tracing of different filters circuits

**UNIT 4 : DESIGNING AND FABRICATION OF VOLTAGE REGULATORS 10 HRS**

- Introduction to voltage regulators
- Types of voltage regulators

- Zener diode voltage regulator, Transistor series voltage regulator
- Transistor shunt voltage regulator
- Designing of different voltage regulator circuits
- Fabrication and tracing of different voltage regulator circuits

**Reference Books:**

4. V K Mehta, Principles of Electronics, S Chand Publication.
5. John D Ryder, Electronic fundamentals and applications, Prentice Hall publication.
6. B L Theraja, Basic Electronics, S Chand publication.

<b>18AEVA013</b>	<b>REPAIR &amp; MAINTENANCE OF HOUSE HOLD APPLIANCES</b>	<b>40 Hrs</b>	<b>01 Credits</b>
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**UNIT 1 : SAFTY PRACTICE AND MEASUREMNTS 10 HRS**

- Safety practicen - Lifting and handling loads, Heavy Equipments
- Fire extinguishers, Types of fire extinguishers
- General safety of tools and equipments, Electrical safety
- Purpose of Earthing, Types of Earthing
- Need of fuse, Types of fuses
- Basic electric shock guards, Roberts, MCBS

**UNIT 2 : ELECTRIC MATERIALS, CABLES AND MEASUREMENTS 10 HRS**

- Introduction to Electric Conductors
- Types of conductors, Insulators
- Measurements of electrical conductivity
- Measurement of line voltage, current, Electric power
- Direct current and testing the polarity,
- Alternating current and identifying phase, Neutral and earth terminals
- Types of electric cables, Crimping cable ends

**UNIT 3 : DOMESTIC ELECTRICAL CONNECTIONS AND ELECTRIC MOTOERS WINDING 10 HRS**

- Simple house wiring circuit
- Connecting number of lamps, Fans in series & parallel
- Different types of motors
- Preparation of winding table
- Connection diagram, Winding diagram for given Motor
- Testing the motor after rewinding

**UNIT 4 : INSTALLATION, SERVICING AND REPARING OF ELECRICAL HOME APPLIANCE 10 HRS)**

- Understand home appliances like heater, Iron, Ceiling fan, Washing machine etc.
- Dismantle and reassemble Ceiling fan, Table fan, Water heater, Washing machines
- General repair of heating Iron, Ceiling fan, Table fan, Washing machine etc.
- Maintenance of electrical appliances
- Regular services and faults finding in different electrical appliances
- Practice one installation of common electrical accessories such as switch, holder, Plug on board

**Reference Books:**

1. KB Bhatia, Study of Electrical Appliances and Devices, Khanna Publishers.
2. K Nath, Electrical Appliances Repairer & Maintenance, Hind Pocket Books.
3. Garshon J Wheeler, How to repair Electrical appliances, D.B. Taraporewala and Sons Co.Pvt. Ltd.
4. M L Anwani and I M Anwani, Electric Motor Winding and repair, Dhanapat Rai and Sons.

<b>18AEVA014</b>	<b>English for competitive Exams</b>	<b>40 hrs</b>	<b>1 Credit</b>
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**Objectives:**

**o enable students to:**

1. Familiarize with English as an integral part of various competitive exams.
2. Improve their English language and grammar.

**Unit 1: Basic English Grammar (08 Hrs)**

- Articles
- Prepositions
- Direct & Indirect Narration
- Voices

**Unit 2: Common Errors (08 Hrs)**

- Spelling Errors
- Spotting Errors

**Unit 3: Sentence Structure (08 Hrs)**

- Sentence Completion
- Sentence Improvement
- Reordering word and sentences

**Unit 4: Language Work (08 Hrs)**

- Synonyms & Antonyms
- One-Word Substitution
- Idioms & Phrases

**Unit 5: Reading Comprehension Practice (08 Hrs)**

- Dissecting Unseen Passages
- Finding answer to the questions from passages

**Reference books:**

1. English grammar & Comprehension- Ramesh Publishing House, New Delhi.
2. Kiran's Common Errors in English- Kiran Prakashan, Delhi.
3. Handbook of Superfast English- Kiran Prakashan, Delhi.

<b>18AEVA015</b>	<b>Computer Aided Drawings</b>	<b>40 hrs</b>	<b>1 Credit</b>
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**Objectives:**

1. Apply their knowledge and conduct programmatically approach to solve a problem using C language.
2. Understand how to draw the flowchart and write an algorithm for any problem.
3. Analyze a different conditional and looping statement.
4. Design C programs using function and array.
5. Implement C programs using pointers and structure.

<b>Unit-1</b>	<b>Introduction to AutoCAD</b>	<b>6 Hrs.</b>
	<ul style="list-style-type: none"> <li>• File menu of AutoCAD, Basic 2D commands like Line, Circle, Ellipse, Multi Line ,Construction Line, Polyline, Point, Donut, Ellipse, Polygon, Rectangle, Arc, etc..</li> </ul>	
<b>Unit-2</b>	<b>Editing of AutoCAD Drawing</b>	<b>8 Hrs.</b>
	<ul style="list-style-type: none"> <li>• Modify Properties of Drawing Entity, Copy, Move, Rotate, Mirror , Offset , Array, Scale, Stretch, Lengthen, Trim, Extend , Break, Chamfer , Fillet, Block, W-Block, Insert and Explode , Area and Volume with Civil Engineering Application</li> </ul>	
<b>Unit-3</b>	<b>Advanced 2DCommands : Section -1</b>	<b>10 Hrs.</b>
	<ul style="list-style-type: none"> <li>• Application of LAYER command in Civil Engineering Layer command with its all sub commands, Line type, Color , Dimension</li> </ul>	
<b>Unit-4</b>	<b>Advanced 2DCommands : Section -2</b>	<b>10 Hrs.</b>
	<ul style="list-style-type: none"> <li>• Command – aligned, arc length, radius, Diameter, Centre, Leader, Baseline and Continuous Dimensioning, tolerance, override and Dimension updates Text and BTEXT commands with Text Style Hatch command</li> </ul>	
<b>Unit-5</b>	<b>Plot of 2D</b>	<b>6 Hrs.</b>
	<ul style="list-style-type: none"> <li>• PLOT and its Sub Command for Plotting Drawing on A1, A2 and A3 Size Paper using Printer and / or Plotter</li> </ul>	

**Reference Books:**

1. Precision 2D drafting & documentation software includes AutoCAD web and mobile apps.
2. AutoCAD 2013 and AutoCAD LT 2013

**Online Learning Resource:**

1. NPTEL Web Series : <https://nptel.ac.in/courses/112102101/>

<b>18AEVA016</b>	<b>ENERGY MANAGEMENT</b>	<b>40 Hrs</b>	<b>1 Credit</b>
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### **Course Objectives**

Energy management includes planning and operation of energy production and energy consumption units. Objectives are resource conservation, climate protection and cost savings, while the users have permanent access to the energy they need.

<b>Unit 1</b>	<b>Electrical Energy Introduction and production</b>	<b>7 Hrs</b>
	Importance of electricity in modern industrial society, Scenario with / without electricity, Advantage & Disadvantage of Electricity	
	<b>Energy Production</b>	
	<b>(a) Electrical Energy Production by Conventional Energy Sources</b>	
	(i) Overview to Electricity Generation by Coal energy	
	(ii) Brief Knowledge about Electrical Energy Generation by Oil (Diesel, Petrol & other)	
	(iii) Introduction to Energy generation by Natural Gas	
	Other modes of energy generation via conventional energy sources	
<b>Unit 2</b>	<b>Electrical Energy Production by Non-Conventional Energy Sources</b>	<b>6 Hrs</b>
	(i) Overview to Electricity Generation by Wind Energy	
	(ii) Brief Knowledge about Electrical Energy Generation by Solar energy	
	(iii) Introduction to Energy generation by Hydro Energy	
	Basic of Energy generation by Geo- Thermal, Bio Gas & Bio- fuel energy sources	
<b>Unit 3</b>	<b>Energy Consumption: Domestic &amp; Industrial Energy Consumption</b>	<b>10 Hrs</b>
	(i) Equipment That consumes Electricity	
	(ii) Purpose for the Use of Electricity for domestic	
	(iii) Industrial uses of Electricity and their purposes	
	(iv) Difference between domestic and Industrial electricity	
	(v) Bifurcation of equipment which uses electricity	
	(vi) Classification of equipment which uses electricity	
	(vii) Type of supply: AC & DC and details	
<b>Unit 4</b>	<b>Electrical Energy Saving &amp; Energy conservation</b>	<b>9 Hrs</b>



- (i) Cogeneration
- (ii) Efficient energy use
- (iii) Green building
- (iv) Heat pump
- (v) Low-carbon power
- (vi) Micro-generation
- (vii) Passive solar building design

**Unit 5 Energy Scenario Domestic 4 Hrs**

- (i) Current Energy Generation in India
- (ii) Current energy generation of Gujarat
- (iii) Different power plants available in Gujarat
- (iv) Different type of plants, their resources & production
- (v) Govt. Power Plant & Private generation (captive Power Production)
- (vi) Efficiency and brief comparison of Different power plant
- (vii) Brief Knowledge about different transmission system exist in India

**Unit 6 Energy Scenario International 4 Hrs**

- (i) Energy Generation in different countries
- (ii) Different Size power plants available
- (iii) Different type of plants, their resources & production
- (iv) Govt. Power Plant & Private generation (captive Power Production)
- (v) Efficiency and brief comparison of Different power plant
- (vi) Brief Knowledge about different transmission system exist in other country

**Reference Books**

1. Energy for a sustainable world: Jose Goldenberg, Thomas Johansson, oxford university press.
2. Generation of electrical energy: B.R.Gupta, S. Chand Publication
3. Generation of electrical energy: C.L.Wadhwa, New age India Publication
4. Energy Conversion & Management: Dr.AkshayPujara, Dr. Ravi Khant, Book India Publication

**Online Learning Resources**

1. <https://nptel.ac.in/courses/108105058/>
2. <https://nptel.ac.in/courses/108105058/2>
3. <https://nptel.ac.in/courses/108105058/3>

<b>18AEVA017</b>	<b>INTRODUCTION TO ROBOTICS</b>	<b>40 Hrs</b>	<b>1 Credit</b>
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**Objectives:**

After learning this course, the students should be able

1. To identify different sensors used for Robotics.
2. To construct a simple Robot.
3. To study programming of Robot using AVR family micro controller.
4. To design different systems according to requirement using a Robot.

**Syllabus:**

<b>Unit 1</b>	<b>Sensors, Actuators and Microcontrollers used in Robots</b>	<b>07 Hrs</b>
	Sensors, types of sensors, IR Sensor, Photodiode, Proximity Sensors, Ultra Sonic sensors, Wide range ultra sonic sensors, DC motors, DC motor rotation using PWM. Introduction to Microcontrollers	
<b>Unit 2</b>	<b>Construction of Robot and Programming</b>	<b>08 Hrs</b>
	Introduction to DC motor driver ICs, Constructing a Robot using L2938 and AtMega8. Programming AtMega8 for moving Robot in forward and reverse direction	
<b>Unit 3</b>	<b>Interfacing of Buzzer, LED Bargraph and LCD</b>	<b>07 Hrs</b>
	Interfacing of Buzzer, Buzzer programming, Interfacing of LED bargraph, Programming LED bargraph, Introduction to 16x2 LCD, LCD interfacing, Programming of LCD for displaying various things	
<b>Unit 4</b>	<b>Simple motion and Position control of Robot</b>	<b>08 Hrs</b>
	DC motor programming using PWM, Different motions of Robots, Introduction to position encodes, Position encoder programming using external interrupts.	
<b>Unit 5</b>	<b>ADC interfacing and White Line following Robot</b>	<b>10 Hrs</b>
	ADC interfacing with microcontroller, Displaying parameters of ADC on LCD, Working of white line sensors, White Line sensor programming	

<b>18AEVA018</b>	<b>COMPUTER MAINTENANCE &amp; TROUBLESHOOTING</b>	<b>40 Hrs</b>	<b>1 Credit</b>
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**Objectives:**

5. This course is focused on developing skills in installation and configuration of Operating systems, loading and configuring various device drivers, diagnosing the faults and troubleshoots the computer at software level as well as component level.
6. This course will be helpful for students to get employment in the computer maintenance industry as well as self employment.

**Unit-1 Core Components of Computer 06 Hrs.**

- Features and Functionalities of CPU
- Basics of Motherboard
- Bus Slots and Cards
- System Controllers
- BIOS Features
- Chipsets
- Types of memory modules

**Unit-2 Disk Drives and Controllers 08 Hrs.**

- Basics of Disk Drives
- Hard Disk Interfaces, Geometry and Performance Characteristics.
- Hard Disk Controller
- DVD Drive and Performance Criteria
- Basics of Blu-Ray Disk

**Unit-3 Input Devices 10 Hrs.**

- Basic Input Devices
- Types of keyboards and interfaces
- Types of Mouse and specifications.
- Types of Scanners and its applications
- Latest input devices with applications

**Unit-4 Output Devices 10 Hrs.**

- Display Technologies : Conventional and Digital
- Printers and its types
- Graphics Card
- Plotter and Projectors
- Audio-Visual Devices

**Unit-5 Troubleshooting & Maintenance 06 Hrs.**

- Basics of POST and BOOTING
- Troubleshooting Problems and Diagnosis

## List of Experiments:

Sr.	Experiments
1	Identify basic components of a personal computer.
2	Prepare a list of various computer peripherals.
3	Identify common ports, associated cables, and their connections.
4	Identify major components including motherboards, memory, drives, peripheral cards and devices, BIOS, and Windows operating system.
5	Observe, search and write the specifications of CD/DVD drive, HDD, motherboard, RAM chips, Power supply, Microprocessor chip, Add on cards.
6	Observe the power supply (SMPS) and measure their voltage levels of a given SMPS.
7	Observe various secondary storage systems- Hard Disk, Flash drives, CD/ DVD drive. Open drives and draw the internal structure of them.
8	Hard Disk formatting and Operating System installations.
9	Operate and learn various I/O Devices.
10	Observe the interfacing, installation and working of various devices such as scanner, projector, web cam etc. Connect all these devices with the given PC, install & test them.
11	Identify BIOS settings.
12	Identify the problem in the given PC, using the given troubleshooting sequence, fix the issue, record the given problem.
13	Recognize common symptoms associated with diagnosing and troubleshooting PCs and utilize Windows built-in diagnostic tools, log and boot up events.

### Text Books:

4. "Computer Installation and Servicing", D Balasubramanian, Tata McGraw Hill.
5. "The complete PC Upgrade & Maintenance Guide", Mark Minasi, BPB Publications.

### Reference Books:

1. "IBM PC and clones", Govind Rajalu, Tata McGraw Hill.

### Online Learning Resources

1. Software: Microsoft windows operating system from XP/vista/7/8/10.
2. <http://www.gcflearnfree.org/computerbasics/15/print>
3. <http://www.more.net/sites/default/files/training/BTTmain.pdf>
4. <http://www.computerhope.com/issues/ch000248.htm>

<b>18AEVA019</b>	<b>INTERNET TECHNOLOGY</b>	<b>40 Hrs</b>	<b>1 Credit</b>
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**Objectives:**

1. Learn how to design a web site
2. Recognize the elements of HTML
3. Style web page using CSS
4. Create dynamic web page using JavaScript

<b>Unit-1</b>	<b>Internet Fundamentals</b>	<b>4 Hrs.</b>
	<ul style="list-style-type: none"> <li>• What is Internet?</li> <li>• History of Internet</li> <li>• What is WWW?</li> <li>• Protocols</li> <li>• Web Browser</li> <li>• Web Server</li> <li>• Web Development Tools</li> </ul>	
<b>Unit-2</b>	<b>HTML</b>	<b>12 Hrs.</b>
	<ul style="list-style-type: none"> <li>• What is HTML?</li> <li>• HTML Document Structure</li> <li>• Comment, Line Breaks, Spacing</li> <li>• Heading Elements</li> <li>• Formatting Elements</li> <li>• List Elements</li> <li>• Hyperlink Elements</li> <li>• Table Elements</li> <li>• Image Elements</li> <li>• iframe Element</li> <li>• Form Elements</li> <li>• Multimedia Elements</li> </ul>	
<b>Unit-3</b>	<b>CSS</b>	<b>12 Hrs.</b>
	<ul style="list-style-type: none"> <li>• Need for CSS</li> <li>• Structure of CSS</li> <li>• Class and ID Selector</li> <li>• Font Properties</li> <li>• Text Properties</li> <li>• Background color and its properties</li> <li>• Background image and its properties</li> <li>• Border and Box</li> <li>• Margin and Padding</li> </ul>	
<b>Unit-4</b>	<b>JavaScript</b>	<b>12 Hrs.</b>
	<ul style="list-style-type: none"> <li>• What is JavaScript?</li> </ul>	

- Static and Dynamic Webpage
- Structure of JavaScript, Variable
- Functions and its scope
- Alerts and Prompts
- Events
- Array
- Basics of OOP in JavaScript

### **Text Books:**

1. Ralph Moseley, M. T. Savaliya. (2013). *Developing Web Applications*. New Delhi, Wiley-India.

### **Reference Books:**

1. Kogent Learning Solutions Inc. (2013). *Web Technologies Black Book*. New Delhi, Dreamtech Press.
2. DT Editorial Services. (2016). *HTML 5 Black Book*. New Delhi, Dreamtech Press.
3. Silvio Moreto. (2016). *Bootstrap 4 by Example*. California, Packt Publishing.
4. Sue Jenkins. (2013). *Web Design All-in-One for Dummies*. New Delhi, Wiley-India.

### **Online Learning Resources:**

1. Browsers like IE, Mozilla, FireFox, Chrome: <https://www.google.com/chrome/>
2. Text Editor- Notepad++ : <https://notepad-plus-plus.org/>
3. Text Editor- Sublime : <https://www.sublimetext.com/>
4. Balsamiq Rapid, effective and fun wireframing software: <https://balsamiq.com/>
5. World Wide Web Consortium (W3C) : <https://www.w3.org>
6. W3Schools Online Web Tutorials : <https://www.w3schools.com>

<b>18AEVA020</b>	<b>Pranayama &amp; Meditation</b>	<b>40 Hours</b>	<b>01 Credits</b>
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### Objectives

1. Students work within their own comfort level and pace.
2. To impart the basic, classical and scientific knowledge about Pranayama and practices leading to Meditation.
3. To make the people aware of the Pranayama and Meditation for wellness in their daily life.
4. To develop healthy lifestyle of an individual through the practice of Pranayama and Meditation
5. To promote positive health and spiritual evolution of individuals by the practice of Pranayama and Meditation
6. To make aware of the utility of Pranayama and Meditation in disease prevention and health promotion.
7. Increase relaxation of body and soul.

### Unit 1: Fundamental principles of Pranayama

**7 hrs**

- General introduction to Yoga and Yogic practices.
- Introduction to Pranayama: Etymology, definition, aim and objectives of Pranayama
- Concept of breathing, Vayu, prana, upaprana.
- Classification and types of Pranayama
- What is health
- Stress and Illness

### Unit: 2

**13 hrs**

#### 2.1 Applications of Pranayama (with practical)

- Health benefits of Pranayama.
- Pranayama for Stress management.
- Pranayama for health.
- Pranayama for concentration
- Relevance of Pranayama practices in modern day

#### 2.2 Pranayama & Kriya

- Introductory breathing practices: abdominal, thoracic, clavicular, Yogic deep breathing, 3SRB Refining Exercises Overview
- Kriyas relevant for Pranayama: Kapalbhati, Agnisara, Neti
- Concept of Purak, Rechak and Kumbhak

### **2.3 Pranayama (Techniques, Benefits, limitation,)**

- Anulom-Vilom Pranayama
- Nadishodhana pranayama
- Chandrabhedhi & Suryabhedhi pranayama
- Ujjayi pranayama
- Shitali and Shitkari pranayama
- Bhramari pranayama
- Bhastrika pranayama
- 3 SRB pranayama

### **Unit 3: Fundamental principles of Meditation**

**4 hrs**

- Introduction to Meditation: Etymology, definition, aim and objectives of Pranayama
- Indications and contra-indications Meditation.
- Pre-requisites of meditation practices and their importance.
- Preparatory practices for meditation (Food, climate, season etc.)

### **Unit: 4 Holistic Health**

**4 hrs**

- Definition & Importance of Health According to WHO; Dimensions of Health: Physical, Mental, Social and Spiritual;
- Concept of Health and Disease in Indian Systems of Medicine i.e. Ayurveda, Naturopathy
- Yogic Concept of Health and Disease: Concept of Adhi and Vyadhi; Meaning and definitions, Holistic Human Personality

### **Unit: 5**

**12 hrs**

#### **5.1 Applications of Meditation (with practical)**

- Health benefits of Meditation.
- Meditation for Stress management.
- Meditation for good Health
- Meditation for concentration
- Relevance of Meditation practices in modern day.

#### **5.2 Meditation and devotional music (Techniques, Benefits, limitation)**

- Practice of meditation
- Cyclic meditation
- Devotional music
- “Om” Meditation

#### **Text Books:**



1. Yoga written by Dr. H R Nagendra & Dr. R Nagarathna published by swami Vivekananda yoga research foundation, July 2016, Bangalore.ISBN:978-81-87313-16-8
2. New Perspectives in Stress Management written by Dr. H R Nagendra & Dr. R Nagarathna published by swami Vivekananda yoga research foundation, Bangalore.ISBN:978-81-87313-01-4
3. Pranayama–The Art and Science written by Dr. R Nagarathna published by Swami Vivekananda Yoga Prakashana Bangalore, published year 2011, 3 rd Ed.
4. Yoga and Health written by Adhyatm Ananda 1ST ED Published by GGRK, AHMEDABAD
5. Refining Exercises by Sri S.N. Tavaria Published by Sri Ram Yoga Mandir Trust.

<b>18AEVA021</b>	<b>Productivity Improvement Techniques</b>	<b>40 Hours</b>	<b>01 Credits</b>
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**Objectives:**

1. Understand tools used for productivity Improvement Techniques
2. Understand how to make difference in their future organization.
3. Understand techniques to consume less time to complete allotted tasks.
4. Practice productivity improvement techniques in organization to get benefits in terms of cost reduction and increase profitability.

**Unit-1 Productivity Introduction 06 Hrs.**

- Define productivity
- Process of productivity
- Process of measuring productivity
- Relationship between the elements of productivity and production
- Significance of enhancing productivity
- Factors of Productivity Improvement
- Some Techniques for Measurement of Productivity Improvement
- Productivity Improvement Indices
- Productivity Calculation Exercise

**Unit-2 Work Study and Method Study 08 Hrs.**

- Meaning and objectives of Work Measurement
- Basic procedure of Work Measurement
- Techniques of Work Measurement and their Relationship with Productivity Improvement
- Work Measurement Exercise
- Definition, Concept of method study
- Objectives and Procedure of method study
- Process chart symbols
- Recording techniques
- Method Study Exercise

**Unit-3 Lean Manufacturing 8 Hrs.**

- Principles of Lean Manufacturing
- Basic elements of lean manufacturing
- Introduction to LM Tools

- Steps for lean manufacturing implementation
- Enablers and Barriers of Lean implementation
- Case studies of implementation of lean manufacturing
- Identification of Lean waste

**Unit-4 Productivity Improvements Techniques 10 Hrs.**

- 5S
- Andon
- Gemba (The Real Place)
- Jidoka (Autonomation)
- Just-In-Time (JIT)
- Kaizen (Continuous Improvement)
- Kanban (Pull System)
- KPIs (Key Performance Indicators)
- Muda (Waste)
- Overall Equipment Effectiveness (OEE)
- PDCA (Plan, Do, Check, Act)
- Poka-Yoke (Error Proofing)
- Single-Minute Exchange of Dies (SMED)
- Standardized Work
- Total Productive Maintenance (TPM)
- Value Stream Mapping
- Visual Factory
- 6S application Exercise

**Unit-5 Quality management 08 Hrs.**

- Definition, experts views on quality
- Dimensions of quality
- Cost of quality
- Statistical process control
- Total Quality Management (TQM)
- Root Cause Analysis
- Failure Mode & Effect Analysis
- Six Sigma
- ISO 9000 and other ISO series
- OHSAS
- Zero Defect Zero Effect Program (ZED)
- Case study Preparation on Six Sigma

**Reference Books:**

1. Total Quality Management, K.C.Arora, Katsons.
2. Industrial Engineering and Management, Khana, Dhanpat Rai.
3. Simplified Lean Manufacture N. Gopalkrishnan, PHI Learning Private Limited. New Delhi.
4. Introduction to Work study, ILO, Oxford.

<b>18AEVA022</b>	<b>Entrepreneurship</b>	<b>40 Hours</b>	<b>01 Credits</b>
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**Objectives:**

7. To make the students familiar to the concept entrepreneurship
8. To develop in them the quality for innovative entrepreneur.
9. The ability to identify entrepreneurial opportunities that exist, those that represent untapped markets and underserved markets, and those that can be created by applying existing technologies to new fields and new markets

**Unit 1 Way to Entrepreneurship**

**8 hrs**

- Concept of Entrepreneur and Entrepreneurship
- Who are Entrepreneurs? (Characteristics& Motivation)
- Why for Entrepreneurship? (Importance)
- Entrepreneurial Barriers
- Family Business & Entrepreneurship

**Unit 2 Ease of Doing Business**

**8 hrs**

- Types of Business Venture
- Different forms of Organization & Registration
- Sources of Finance
- Government Policy – Tax, Clearance Policy
- Types of Funding
- Debt vs. Equity

**Unit 3 An Entrepreneur’s Toolkit**

**8 hrs**

- Unleashing Creativity & Innovation
- Recognizing and Shaping Opportunities
- Business Model Canvas (Concepts)
  - *Step 01 - Customer Segments*
  - *Step 02 - Customer Relationships*
  - *Step 03 - Market Channels*
  - *Step 04 - Business Value Propositions*
  - *Step 05 - Key Activities*
  - *Step 06 - Key Resources*
  - *Step 07 - Key Partners*
  - *Step 08 - Cost Structure*

*Step 09 - Revenue Streams*

**Unit 4 Entrepreneurship Policies and Opportunities 8 hrs**

- Pitching Opportunities
- Startup Policy
- Make in India,
- Role of Venture Capitalist in Business Organization
- Introduction to Intellectual Property - Trademark, Copyright and Patents
- Ethics & Values in Business

**Unit 5 Trends and Cases for Entrepreneurship 8 hrs**

- Women Entrepreneurship
- Social Entrepreneurship
- Rural Entrepreneurship
- At least two cases on Entrepreneurship

**Reference Books:**

7. Vasant Desai, *Dynamics of Entrepreneurial Development And Management*, Himalaya Publishing House, Fourth Edition
8. Hisrich&Manimala, *Entrepreneurship*, McGraw Hill Education, Ninth Edition
9. Neeta Baporikar, *Entrepreneurship Development & Project Management*, Himalaya Publishing House, First Edition

<b>18AEVA023</b>	<b>Cosmetic Preparations</b>	<b>40 Hrs</b>	<b>1 Credit</b>
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**Unit 1: Fundamentals of cosmetic science (03 Hrs)**

Introduction, Objectives, Applications of cosmetics, Classification of cosmetics, basic terminologies.

**Unit 2: Cosmetics for Skin (03 Hrs)**

Basics, Selection of Ingredients, Fundamentals of Sunscreen, moisturizers, cold cream, vanishing cream, bathing soap, etc.

**Unit 3: Cosmetics for Hair (03 Hrs)**

Basics, Selection of Ingredients, Shampoo and conditioners.

**Unit 4: Cosmetics for Oral care (03 Hrs)**

Basics, Selection of Ingredients, Dentifrice-powders, gels, paste, etc.

**Unit 5: Manicure and other preparations (03 Hrs)**

Basics, Selection of Ingredients, Nail polish, Nail polish remover, Lipsticks, Eye lashes, Baby care products, Hygienic products, etc.

**List of Proposed Practicals: (25 Hrs)**

1. Preparation of Sunscreen and Moisturizers.
2. Preparation of cold cream and vanishing cream.
3. Preparation of soap.
4. Preparation of Shampoo.
5. Preparation of conditioners.
6. Preparation of tooth powder.
7. Preparation of tooth paste.
8. Preparation of antiseptic mouth gargles.
9. Preparation of Nail Polish and Nail polish remover.
10. Preparation of lipsticks.
11. Preparation of baby care products.
12. Preparation of hygienic products.

**Reference books:**

1. Poucher's Perfumes, Cosmetics and Soaps, Hilda Butler, 10th Edition, Kluwer Academic Publishers.
2. Cosmetics – Formulation, Manufacturing and Quality Control, P.P. Sharma, 4th edition, Vandana Publications Pvt. Ltd., Delhi.
3. Handbook of Cosmetic Science and Technology, 3rd Edition, André O. Barel, Marc Paye, Howard I. Maibach, Marianne Mahieu Informa Healthcare USA, Inc.
4. Theory and practice of industrial pharmacy by Leon Lachmann.
5. E.A.Rawlins, Bentley's text book on pharmaceuticals, 8th edition, 1997.
6. Drugs and Cosmetic act/rules by Govt. of India Publication.



<b>18AEVA024</b>	<b>COMMERCIAL WISDOM AND CONSUMERISM</b>	<b>40 hrs</b>	<b>01 Credit</b>
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**Objectives:**

1. To develop an understanding of basic system of law in India and formulation of contracts
2. To make them aware about Basic Negotiable Instruments and to impart skill for encouragement of online banking transactions
3. To make them aware about basics of Indian Tax System and about Consumer Rights

**Unit 1 Introduction to Basic System of Law in India 03 hrs**

- Meaning of Law and Sources of Law
- Process of framing any Act
- Types of Government
- Types of Courts

**Unit 2 Contract formulation process 10 hrs**

- Meaning of Agreement and Contract
- Essential Elements of Contract
- Offer and Acceptance
- Capacity of Parties
- Free Consent
- Lawful Consideration and Objects

**Unit 3 Basics of Negotiable Instruments 07 hrs**

- Meaning and Characteristics of Cheque, Promissory Note and Bills of Exchange and point of differences
- Types of Cheque, how to fill basic banking instruments
- Information about NEFT, RTGS, Net Banking, Debit Card, Credit Card, ECS

**Unit 4 Basics of Taxation 15 hrs**

- Preamble of Taxation
- Person, Assessee, Previous Year, Assessment Year
- Rates of Tax for different assesses
- Tax Calculation for Individuals (with/without agricultural income)
- PAN Card (How to apply for the same)
- Types of return

- Due date for filing of ROIs
- Advance Payment of Tax

**Unit 5 Introduction to Consumer Protection Act**

**05 hrs**

- Definition of Consumer
- Objects of Consumer Protection Act
- Consumer Protection Machineries

**Reference Books:**

1. Agrawal, V. K. (2016). *Law of Consumer Protection*. New Delhi: Bharat Law House Pvt. Ltd.
2. T. N. Manoharan, G. R. (Latest Edition). *Student's Handbook on Taxation*. Mumbai: Snow White Publications Pvt. Ltd.
3. Tulsian, P. C. (Latest Edition). *Business Law*. New Delhi: Tata McGraw-Hill Education.

<b>18AEVA025</b>	<b>Financial Literacy &amp; Taxation</b>	<b>40 hrs</b>	<b>01 Credit</b>
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**Objectives:**

1. To make the students familiar with Banking system in India and how to use different banking services
2. To provide basic knowledge about Types of investment opportunities both risk free and having moderate risk features
3. To make the students aware about different types of insurance and how to get benefit out of it and to familiarize them with basics of Indian tax system

**Unit 1 Basics of Banking 7 hrs**

- Introduction of Banking System
- Types of Bank Accounts
- Negotiable Instruments (cheque and draft)
- Dealing with basic banking documents
- Information about E-banking services like NEFT, RTGS, Net Banking, Debit Card, Credit Card, ECS
- Overdraft, loans, C.C., etc.

**Unit 2 Basics of Investments – 1 (Risk free way) 5 hrs**

- Concept of Savings and Investment
- Investment Alternatives like
  - Fixed Deposits and PPF
  - National Saving Certificates
  - Secured Debentures & Bonds
  - Post office Saving Schemes
  - National Pension Schemes etc.

**Unit 3 Basics of Investments – 2 (Moderate risk factor) 15 hrs**

- Introduction to Capital Market: Primary Market & Secondary Market
- Equity Shares:
  - Features
  - How to apply for an IPO
  - Demat Account and Trading Account
  - NSDL and CDSL
  - Trading in stock market: Screen Based Trading
- Mutual Funds:
  - Concept and Features
  - Types of Mutual funds
  - Open ended and close ended scheme
  - How to invest in MFs

- Concept of Derivatives
    - Basics of Futures & Options
    - Investing in Derivatives
    - Risk- return ratio
  - Portfolio Management Services
- Unit 4 Basics of Insurance 6 hrs**
- Concept of Life Insurance
  - Concept of General Insurance
  - Benefits of Insurance
  - Different investment avenues of LIPs
  - Types of General Insurance and its utilities
- Unit 5 Basics of Taxation 7 hrs**
- Concepts of Taxation
  - Types of Tax: Direct & Indirect Taxes
  - Income tax slabs
  - Briefing about Goods and Service Tax (GST)

**Reference Books:**

1. T. N. Manoharan, G. R. (Latest Edition). *Student's Handbook on Taxation*. Mumbai: Snow White Publications Pvt. Ltd.
2. Kevin S, “*Security Analysis & Portfolio Management*”, PHI Learning Pvt. Ltd.
3. Pandian P, (Second Edition), “*Security Analysis & Portfolio Management*”, Vikas Publishing House.
4. Chandra P., “*Investment Analysis & Portfolio Management*”, Tata McGraw Hill.
5. Dayal, H. (2017). *Fundamentals of Insurance* . Notion Press.
6. Praharaj, P. (2015). *Your Everyday Guide to Personal Finance and Insurance*. TV 18 broadcasting limited.

### Evaluation norms for Value added course - 100% CIA

- Only remarks will be given at the end of the course
- A separate certificate on completion of each course will be issued by the CoE

### 100 % CIA components

Sr. No.	Component	Content	Duration	Marks	Sub Total
1.	Attendance	Min. 80 %	For full 40 Hrs	10	10
2	Practical	At least 75 % of practical performance attendance		50	50
3	Assignment	1 or 2	-	20	20
4	Test	Full course	1hr.	20	20
<b>Grant Total</b>					<b>100</b>

- All above are compulsory components
- In event of non-completion of course, the student has to re-do the course or opt for another one.

### Remarks:

Range of Marks	Remarks
90 - 100	Excellent
75 - 89	Very Good
60- 74	Good
40 - 59	Fair
39 - and below	Not Completed

<b>18AECS01</b>	<b>Communication Skill-I</b>	<b>40 Hrs</b>	<b>2 Credit</b>
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### **Unit 1: Listening Skills**

**(8 Hours)**

**Subtopics:** Introduction to listening, active listening, types of listening, barriers to effective listening, feedback in listening.

**Activities:**

1. Listen to a podcast and summarize the key ideas and tone to improve focused listening (2 hrs).
2. Analyze famous speeches to understand delivery style, tone, and message to enhance critical listening (2 hrs).
3. Fill in the blanks from song lyrics and discuss their meanings in context to practice selective listening (1 hr).
4. Practice critical listening by identifying specific details from audio clips to develop comprehension skills (1 hr).
5. Engage in a paired listening activity and provide constructive feedback to improve active listening and response (2 hrs).

### **Unit 2: Speaking Skills**

**(8 Hours)**

**Subtopics:** Self-introduction, conversation skills, role-plays, debates, public speaking.

**Activities:**

1. Prepare and deliver self-introductions with feedback on clarity and expression to build confidence in speaking (1 hr).
2. Simulate real-life conversations such as workplace or customer service scenarios to practice fluency and interaction (2 hrs).
3. Participate in debates on current topics to enhance logical reasoning and persuasive speaking (2 hrs).
4. Narrate short stories to improve clarity, tone, and audience engagement in speaking (1 hr).
5. Deliver a short speech on a chosen topic to practice stage presence and public speaking skills (2 hrs).

### **Unit 3: Vocabulary Building**

**(8 Hours)**

**Subtopics:** Word formation, synonyms and antonyms, idioms and phrases, collocations, contextual usage.

#### **Activities:**

1. Engage in word games like bingo and crosswords to improve word recall and vocabulary retention (2 hrs).
2. Build meaningful sentences using newly learned words to enhance contextual vocabulary usage (1 hr).
3. Practice using idioms and phrases in sentences or conversations to develop natural language flow (1 hr).
4. Match words to situations and practice contextual usage to expand vocabulary understanding (2 hrs).
5. Compete in word-building challenges in teams to promote collaborative learning and creativity (2 hrs).

### **Unit 4: Basic Structure of English Language**

**(8 Hours)**

**Subtopics:** Parts of speech, sentence structures, tenses, subject-verb agreement, punctuation.

#### **Activities:**

1. Solve grammar worksheets on sentence structure and parts of speech to reinforce language basics (2 hrs).
2. Convert sentences between different tenses to practice and understand their proper usage (2 hrs).
3. Identify and correct grammatical errors in paragraphs to improve accuracy in writing (2 hrs).
4. Rewrite passages with proper punctuation to enhance readability and correctness (1 hr).
5. Create paragraphs using specific grammar rules to develop sentence construction skills (1 hr).

### **Unit 5: Body Language and Communication**

**(8 Hours)**

**Subtopics:** Importance of body language, posture, gestures, cultural variations, non-verbal cues.

#### **Activities:**

1. Practice maintaining positive body language in role plays to build self-awareness and confidence (2 hrs).
2. Use gestures to convey emotions in activities designed to understand non-verbal communication (1 hr).
3. Watch videos to analyze body language and interpret non-verbal cues effectively (2 hrs).
4. Discuss and practice culturally appropriate gestures to enhance cross-cultural communication skills (2 hrs).
5. Observe and correct personal body language through mirror exercises to improve presentation and poise (1 hr).

### Reference Books

1. Carnegie, Dale. *How to Win Friends and Influence People*. Simon & Schuster, 1936.
2. Covey, Stephen R. *The 7 Habits of Highly Effective People: Powerful Lessons in Personal Change*. Free Press, 1989.
3. Goleman, Daniel. *Emotional Intelligence: Why It Can Matter More Than IQ*. Bantam Books, 1995.
4. Lucas, Stephen E. *The Art of Public Speaking*. McGraw-Hill Education, 2019.
5. Thill, John V., and Courtland L. Bovée. *Excellence in Business Communication*. Pearson, 2019.

### YouTube Channels

1. The School of Life. “*Lessons on Emotional Intelligence and Interpersonal Skills.*” YouTube, <https://www.youtube.com/user/schooloflifechannel>.
2. TED-Ed. “*Short, Educational Talks on Communication and Soft Skills.*” YouTube, <https://www.youtube.com/user/TEDEducation>.
3. Brian Tracy. “*Communication Skills and Personal Development Tips.*” YouTube, <https://www.youtube.com/user/BrianTracySpeaker>.
4. Skillopedia. “*English and Soft Skills Development for Professionals.*” YouTube, <https://www.youtube.com/c/SkillopediaVideos>.
5. Communication Coach Alex Lyon. “*Practical Tips for Communication and Leadership.*” YouTube, <https://www.youtube.com/c/communicationcoach>.



## Other Reference Materials

1. LinkedIn Learning. “*Soft Skills for Professionals.*” LinkedIn, <https://www.linkedin.com/learning>.
2. Harvard Business Review. “*Articles on Leadership, Communication, and Emotional Intelligence.*” Harvard Business Publishing, <https://hbr.org/>.
3. Toastmasters International. “*Public Speaking and Leadership Development Resources.*” Toastmasters, <https://www.toastmasters.org/>.
4. Grammarly Blog. “*Tips for Writing, Communication, and Grammar.*” Grammarly, <https://www.grammarly.com/blog>.
5. Coursera. “*Communication Skills for Workplace Success.*” Coursera, <https://www.coursera.org/>.

<b>18AECS02</b>	<b>Communication Skill - II</b>	<b>40 Hrs</b>	<b>1 Credit</b>
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**Unit 1: Ethics and Morality in Communication**

**(8 Hours)**

**Subtopics:** Ethical communication, conflict resolution, diversity, honesty, professional integrity.

**Activities:**

1. Analyze and discuss ethical dilemmas in case studies to develop decision-making skills in communication (2 hrs).
2. Practice resolving conflicts ethically using role-play scenarios to build empathy and understanding (2 hrs).
3. Share perspectives on diversity in group discussions to promote inclusivity in communication (2 hrs).
4. Write reflection journals on personal values in communication to develop self-awareness and integrity (1 hr).
5. Debate the importance of ethics in workplace scenarios to enhance critical thinking on moral issues (1 hr).

**Unit 2: 21st Century Communication**

**(8 Hours)**

**Subtopics:** Digital tools, email etiquette, online meetings, social media, multicultural communication.

**Activities:**

1. Draft formal and informal emails to practice clarity and professionalism in digital communication (2 hrs).
2. Simulate online meetings to practice etiquette and collaboration in virtual environments (2 hrs).
3. Analyze professional social media posts to understand proper online communication practices (1 hr).
4. Solve case studies on cross-cultural communication to develop sensitivity in global interactions (2 hrs).
5. Brainstorm trends in digital communication to enhance awareness of modern tools and platforms (1 hr).

### **Unit 3: Writing Skills**

**(8 Hours)**

**Subtopics:** Formal messages, letters, resumes, reports, and minutes of meetings.

**Activities:**

1. Create resumes and receive constructive feedback to improve presentation and clarity in job applications (2 hrs).
2. Practice writing formal and informal letters to enhance written communication skills (2 hrs).
3. Draft short reports on given scenarios to build clarity and structure in professional writing (2 hrs).
4. Write minutes for a simulated meeting to practice summarization and documentation (1 hr).
5. Review and edit peers' documents to develop critical analysis and proofreading skills (1 hr).

### **Unit 4: Communication Games (8 Hours)**

**Subtopics:** Icebreakers, storytelling, role-plays, problem-solving, word association.

**Activities:**

1. Engage in icebreaker games like “Two Truths and a Lie” to build rapport and ease group communication (2 hrs).
2. Create storytelling chains in group activities to foster creativity and active listening (1 hr).
3. Simulate workplace communication challenges through role-plays to practice problem-solving (2 hrs).
4. Solve puzzles collaboratively to enhance team-based communication skills (2 hrs).
5. Play word association games to improve spontaneity and vocabulary (1 hr).

### **Unit 5: Presentation Skills (8 Hours)**

**Subtopics:** Structuring presentations, designing visuals, public speaking, handling Q&A, feedback.

**Activities:**

1. Plan and draft a structured presentation to organize ideas effectively (2 hrs).

2. Design visual aids using tools like PowerPoint to enhance the impact of presentations (1 hr).
3. Deliver presentations with peer feedback to build confidence and refine delivery (2 hrs).
4. Handle audience questions confidently in a mock Q&A session to improve on-the-spot thinking (1 hr).
5. Receive and implement constructive feedback to refine presentation skills further (2 hrs).

### Reference Books

1. Carnegie, Dale. *How to Win Friends and Influence People*. Simon & Schuster, 1936.
2. Covey, Stephen R. *The 7 Habits of Highly Effective People: Powerful Lessons in Personal Change*. Free Press, 1989.
3. Goleman, Daniel. *Emotional Intelligence: Why It Can Matter More Than IQ*. Bantam Books, 1995.
4. Lucas, Stephen E. *The Art of Public Speaking*. McGraw-Hill Education, 2019.
5. Thill, John V., and Courtland L. Bovée. *Excellence in Business Communication*. Pearson, 2019.

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1. The School of Life. “*Lessons on Emotional Intelligence and Interpersonal Skills.*” YouTube, <https://www.youtube.com/user/schooloflifechannel>.
2. TED-Ed. “*Short, Educational Talks on Communication and Soft Skills.*” YouTube, <https://www.youtube.com/user/TEDEducation>.
3. Brian Tracy. “*Communication Skills and Personal Development Tips.*” YouTube, <https://www.youtube.com/user/BrianTracySpeaker>.
4. Skillopedia. “*English and Soft Skills Development for Professionals.*” YouTube, <https://www.youtube.com/c/SkillopediaVideos>.
5. Communication Coach Alex Lyon. “*Practical Tips for Communication and Leadership.*” YouTube, <https://www.youtube.com/c/communicationcoach>.

### Other Reference Materials

1. LinkedIn Learning. *“Soft Skills for Professionals.”* LinkedIn, <https://www.linkedin.com/learning>.
2. Harvard Business Review. *“Articles on Leadership, Communication, and Emotional Intelligence.”* Harvard Business Publishing, <https://hbr.org/>.
3. Toastmasters International. *“Public Speaking and Leadership Development Resources.”* Toastmasters, <https://www.toastmasters.org/>.
4. Grammarly Blog. *“Tips for Writing, Communication, and Grammar.”* Grammarly, <https://www.grammarly.com/blog>.
5. Coursera. *“Communication Skills for Workplace Success.”* Coursera, <https://www.coursera.org/>.

<b>18AESS01</b>	<b>Soft Skill - I</b>	<b>40 Hrs</b>	<b>1 Credit</b>
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### **Unit 1: Emotional Intelligence**

**(8 Hours)**

**Subtopics:** Understanding emotional intelligence, managing emotions, empathy, emotional resilience, conflict resolution through EQ.

**Activities:**

1. Analyze personal emotional triggers through reflective journaling to understand and manage emotions better (2 hrs).
2. Role-play scenarios to practice empathy and perspective-taking in challenging situations (2 hrs).
3. Solve case studies on workplace conflicts to apply EQ principles in real-world contexts (1 hr).
4. Participate in group discussions about the impact of emotions on decision-making to improve self-awareness (2 hrs).
5. Practice mindfulness exercises to build emotional resilience and focus (1 hr).

### **Unit 2: Leadership Skills**

**(8 Hours)**

**Subtopics:** Leadership styles, decision-making, motivating teams, delegation, vision setting.

**Activities:**

1. Participate in a leadership style assessment to identify personal leadership strengths and weaknesses (2 hrs).
2. Solve team-based problem scenarios to practice decision-making and delegation (2 hrs).
3. Conduct group activities to motivate and inspire team members using positive reinforcement techniques (1 hr).
4. Create a vision statement for a hypothetical project to align team goals and direction (2 hrs).
5. Watch and analyze leadership speeches to identify effective leadership traits (1 hr).

### **Unit 3: Time Management**

**(8 Hours)**

**Subtopics:** Prioritization techniques, avoiding procrastination, effective scheduling, SMART goals, work-life balance.

**Activities:**

1. Create a weekly schedule using the Eisenhower Matrix to prioritize tasks effectively (2 hrs).
2. Reflect on personal time-wasting habits and develop strategies to overcome procrastination (2 hrs).
3. Participate in goal-setting exercises using the SMART framework to set achievable objectives (2 hrs).
4. Role-play a workplace scenario where time management is critical to project success (1 hr).
5. Discuss strategies for balancing work and personal commitments in group discussions (1 hr).

#### **Unit 4: Teamwork and Collaboration**

**(8 Hours)**

**Subtopics:** Team roles, effective communication, trust building, managing diversity, team problem-solving.

##### **Activities:**

1. Participate in a team-building activity like a collaborative puzzle-solving exercise to enhance coordination (2 hrs).
2. Conduct a group discussion on the importance of diversity and inclusion in teams (2 hrs).
3. Role-play a team conflict scenario to practice resolution and trust-building techniques (2 hrs).
4. Engage in an activity to identify and leverage individual team members' strengths (1 hr).
5. Solve a group case study to practice collaborative decision-making and problem-solving (1 hr).

#### **Unit 5: Adaptability and Flexibility**

**(8 Hours)**

**Subtopics:** Embracing change, growth mindset, managing uncertainty, overcoming resistance, adapting to technology.

##### **Activities:**

1. Analyze case studies on successful change management to understand adaptability in action (2 hrs).

2. Participate in a role-play scenario where quick adaptation to a new situation is required (2 hrs).
3. Reflect on a personal experience of change and discuss lessons learned in a group activity (1 hr).
4. Brainstorm strategies to overcome resistance to change in workplace settings (2 hrs).
5. Complete a hands-on activity involving new technology or software to practice adaptability (1 hr).

### Reference Books

1. Goleman, Daniel. *Emotional Intelligence: Why It Can Matter More Than IQ*. Bantam Books, 1995.
2. Covey, Stephen R. *The 7 Habits of Highly Effective People: Powerful Lessons in Personal Change*. Free Press, 1989.
3. Carnegie, Dale. *How to Win Friends and Influence People*. Simon & Schuster, 1936.
4. Maxwell, John C. *Developing the Leader Within You 2.0*. HarperCollins Leadership, 2018.
5. Whitmore, John. *Coaching for Performance: GROWing Human Potential and Purpose*. Nicholas Brealey Publishing, 2017.

### YouTube Channels

1. The School of Life. “Videos on emotional intelligence, empathy, and self-awareness.” YouTube, <https://www.youtube.com/user/schooloflifechannel>.
2. Brian Tracy. “Tips on productivity, leadership, and self-development.” YouTube, <https://www.youtube.com/user/BrianTracySpeaker>.
3. TED-Ed. “Short lessons on soft skills like communication and adaptability.” YouTube, <https://www.youtube.com/user/TEDEducation>.
4. Skillopedia. “Practical soft skills training for workplace success.” YouTube, <https://www.youtube.com/c/SkillopediaVideos>.
5. Communication Coach Alex Lyon. “Expert advice on leadership and interpersonal communication.” YouTube, <https://www.youtube.com/c/communicationcoach>.



## Other Reference Materials

1. LinkedIn Learning. *“Soft Skills Training Programs for Professionals.”* LinkedIn, <https://www.linkedin.com/learning>.
2. Harvard Business Review. *“Articles on Emotional Intelligence, Leadership, and Teamwork.”* Harvard Business Publishing, <https://hbr.org/>.
3. Toastmasters International. *“Resources for Public Speaking and Leadership Skills.”* Toastmasters, <https://www.toastmasters.org/>.
4. Mind Tools. *“Soft Skills Development Guides and Resources.”* MindTools, <https://www.mindtools.com>.
5. Coursera. *“Soft Skills Development Courses by Global Institutions.”* Coursera, <https://www.coursera.org/>.

<b>18AESS02</b>	<b>Soft Skill - II</b>	<b>40 Hrs</b>	<b>3 Credit</b>
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**Unit 1: Critical Thinking and Problem-Solving (8 Hours)**

**Subtopics:** Analyzing problems, creative thinking, decision-making strategies, evaluating solutions, learning from mistakes.

**Activities:**

1. Solve a real-world problem through group brainstorming and analysis sessions (2 hrs).
2. Participate in a lateral thinking exercise to practice creative approaches to problem-solving (2 hrs).
3. Complete a decision-making matrix activity to evaluate multiple solutions to a scenario (2 hrs).
4. Reflect on a past mistake and identify lessons learned through guided journaling (1 hr).
5. Conduct a mock evaluation of proposed solutions to a workplace issue in a team setting (1 hr).

**Unit 2: Communication Skills (8 Hours)**

**Subtopics:** Verbal and non-verbal communication, active listening, giving and receiving feedback, persuasion, negotiation.

**Activities:**

1. Practice active listening through peer conversation exercises and provide feedback on responses (2 hrs).
2. Role-play a workplace negotiation scenario to practice persuasive communication techniques (2 hrs).
3. Conduct a group discussion on the importance of non-verbal cues in effective communication (1 hr).
4. Create and deliver a persuasive pitch to a small group to practice articulation and clarity (2 hrs).
5. Engage in feedback exercises to practice giving constructive and respectful feedback (1 hr).

### **Unit 3: Professionalism and Work Ethics**

**(8 Hours)**

**Subtopics:** Workplace etiquette, integrity, punctuality, respect for diversity, handling criticism.

**Activities:**

1. Role-play a scenario involving workplace etiquette to practice professional behavior (2 hrs).
2. Participate in a group activity discussing the importance of integrity in building trust (2 hrs).
3. Create a personal action plan to improve punctuality and accountability (1 hr).
4. Analyze case studies on respecting diversity in professional environments (2 hrs).
5. Practice handling constructive criticism in a mock feedback session (1 hr).

### **Unit 4: Creativity and Innovation (8 Hours)**

**Subtopics:** Creative thinking, idea generation, overcoming creative blocks, implementing innovative solutions, fostering creativity.

**Activities:**

1. Brainstorm solutions to a hypothetical problem using creative thinking techniques (2 hrs).
2. Participate in an idea generation activity like mind mapping to explore potential solutions (2 hrs).
3. Discuss common creative blocks and share strategies to overcome them in a group session (1 hr).
4. Conduct a role-play where innovative thinking is needed to resolve a workplace issue (2 hrs).
5. Reflect on the role of creativity in professional success through guided journaling (1 hr).

### **Unit 5: Stress Management**

**(8 Hours)**

**Subtopics:** Identifying stress triggers, mindfulness techniques, coping mechanisms, relaxation strategies, maintaining well-being.

**Activities:**

1. Identify personal stress triggers and create a stress management plan in a guided workshop (2 hrs).

2. Practice mindfulness exercises like guided meditation to develop focus and relaxation (2 hrs).
3. Participate in a group discussion on healthy coping mechanisms for stress management (1 hr).
4. Conduct a relaxation technique session involving breathing exercises or yoga (2 hrs).
5. Reflect on mental well-being and self-care strategies through journaling (1 hr).

### Reference Books

1. Goleman, Daniel. *Emotional Intelligence: Why It Can Matter More Than IQ*. Bantam Books, 1995.
2. Covey, Stephen R. *The 7 Habits of Highly Effective People: Powerful Lessons in Personal Change*. Free Press, 1989.
3. Carnegie, Dale. *How to Win Friends and Influence People*. Simon & Schuster, 1936.
4. Maxwell, John C. *Developing the Leader Within You 2.0*. HarperCollins Leadership, 2018.
5. Whitmore, John. *Coaching for Performance: GROWing Human Potential and Purpose*. Nicholas Brealey Publishing, 2017.

### YouTube Channels

1. The School of Life. “Videos on emotional intelligence, empathy, and self-awareness.” YouTube, <https://www.youtube.com/user/schooloflifechannel>.
2. Brian Tracy. “Tips on productivity, leadership, and self-development.” YouTube, <https://www.youtube.com/user/BrianTracySpeaker>.
3. TED-Ed. “Short lessons on soft skills like communication and adaptability.” YouTube, <https://www.youtube.com/user/TEDEducation>.
4. Skillopedia. “Practical soft skills training for workplace success.” YouTube, <https://www.youtube.com/c/SkillopediaVideos>.
5. Communication Coach Alex Lyon. “Expert advice on leadership and interpersonal communication.” YouTube, <https://www.youtube.com/c/communicationcoach>.

### Other Reference Materials

1. LinkedIn Learning. *“Soft Skills Training Programs for Professionals.”* LinkedIn, <https://www.linkedin.com/learning>.
2. Harvard Business Review. *“Articles on Emotional Intelligence, Leadership, and Teamwork.”* Harvard Business Publishing, <https://hbr.org/>.
3. Toastmasters International. *“Resources for Public Speaking and Leadership Skills.”* Toastmasters, <https://www.toastmasters.org/>.
4. Mind Tools. *“Soft Skills Development Guides and Resources.”* MindTools, <https://www.mindtools.com>.
5. Coursera. *“Soft Skills Development Courses by Global Institutions.”* Coursera, <https://www.coursera.org/>.

Course Code	Course Title	Course Credit and Hours
<b>21AECO001</b>	<b>E-Marketing</b>	<b>2 Credit - 4 hrs / wk</b>

**Objective of the course:**

1. To work with a general model of online marketing and place online marketing tools, instruments and theories into a broader theoretical model/framework
2. To understand what the importance is of online marketing and social media to contemporary marketing
3. To learn how to use the internet as a research method and learn and practice on how to publish information on the internet themselves.
4. To learn how to advertise in websites
5. To understand how to generate revenue from advertisement

**Target Skills (Course outcomes) :**

1. Skill development to develop blog themselves.
2. Skill development to identify opportunities of e-marketing in any business and earn revenue.
3. Using blog or website registering and earning by Google AdSense.
4. Efficiently use of social media for business promotion or digital marketing.

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other) :**

- The Co-curricular course based on e-marketing belongs to area of advance technology in e-commerce and digital marketing.
- E-marketing in any business (online or offline) is an essential component for growth. Social media like YouTube, Instagram, and Blogs are available for e-marketing. Simply people are using WhatsApp for sharing their ads. Revenue generation using blog and paid advertisement are also becoming effective factor for growth.

**Reference:**

Link from NSDC qualification register (<https://www.nqr.gov.in/>)

1. <https://www.nqr.gov.in/sites/default/files/NSQF-Digital%20Marketing%20Social%20Media%20Manager.pdf>
2. [https://www.nqr.gov.in/sites/default/files/NSQF\\_Digital\\_Marketing\\_Manager\\_MES\\_Q0706\\_L6\\_V1\\_1\\_0.pdf](https://www.nqr.gov.in/sites/default/files/NSQF_Digital_Marketing_Manager_MES_Q0706_L6_V1_1_0.pdf)

**Course Description:**

- This course contains Overview of marketing and e-marketing. Importance of e-marketing in any business. Its techniques and various application methods using blog and social media. Importance of Search engine Optimization. Webmaster and analytics tools. Google Ads and AdSense using any blog or website. The course aims to address SDG 9: Industry, Innovation and Infrastructure.

<b>Course Content</b>	<b>Hours</b>
<b>Module-I: Overview of E-Marketing</b>	16 hrs
<ul style="list-style-type: none"><li>● Introduction, Objectives, Definition of e-marketing, features of e-marketing</li><li>● Scope and Benefits of e-marketing</li><li>● Problems in e-marketing</li><li>● E-marketing techniques</li><li>● Digital marketing and Internet Marketing</li></ul>	
<b>Module-II : Building Websites using Wordpress &amp; Social Media Marketing</b>	16 hrs
<ul style="list-style-type: none"><li>● Building websites for e-marketing</li><li>● Introduction &amp; Installation of Wordpress</li><li>● Working with content</li><li>● Creating basic theme</li><li>● Creating Widgets and Plugins</li><li>● Introduction to Social Media</li><li>● Social Networking Platforms</li><li>● Blogging</li><li>● Microblogging using twitter</li><li>● Facebook Marketing</li><li>● Youtube Marketing</li></ul>	
<b>Module-III : Search Engine Optimization</b>	16 hrs

<ul style="list-style-type: none"> <li>● What is SEO</li> <li>● what is search_marketing</li> <li>● white hat SEO,what is black SEO</li> <li>● Browser Addon</li> <li>● SEO project management</li> <li>● Determining Top Competitors</li> <li>● Benchmarking Current Indexing Status</li> <li>● Benchmarking Current Rankings</li> <li>● Benchmarking Current Traffic Sources and Volume</li> <li>● Conduct SEO/Website SWOT Analysis</li> <li>● The Theory Behind Keyword Research</li> <li>● Traditional Approaches: Domain Expertise</li> <li>● Site Content Analysis</li> <li>● Keyword Research Tools</li> <li>● Google Tag Manager in detail with tagging</li> </ul>	
<p><b>Module-IV : Analytics Using Webmaster Tools</b></p>	<p>16 hrs</p>
<ul style="list-style-type: none"> <li>● Webmaster Tools(Google, Bing)</li> <li>● Google Adsense <ul style="list-style-type: none"> <li>○ Understanding Google Adsense,</li> <li>○ Configuring your First Add,</li> <li>○ Using Advance Add Placement Strategy,</li> <li>○ Allowing and Blocking Ads, Using Performance Report,</li> <li>○ Advanced Administration(Accessing Messages,</li> <li>○ Reviewing Payment Setting)</li> </ul> </li> </ul>	
<p><b>Module-V : Other E-marketing Techniques</b></p>	<p>16 hrs</p>
<ul style="list-style-type: none"> <li>● E-mail marketing</li> <li>● Google Site (site.google)</li> <li>● Google Adword</li> <li>● Introduction,</li> <li>● Exploring where ads show up</li> <li>● Understanding the structure</li> <li>● Creating an account,</li> <li>● Choosing between billing options, Starting Your First Campaign,</li> <li>● Customizing Your Campaign Settings</li> <li>● Creating Your First Ad Group ,Optimizing Your Ads,Working Offline with AdWords Editor</li> </ul>	



**Suggested laboratory experiments / other activities:**

1. WordPress blog using wordpress.com.
  - a. Include page, plugin, theme, widgets, menu, etc.
2. WordPress blog using wordpress.org.
  - a. Download xampp software and install.
  - b. Download WordPress package and configure with xampp
  - c. Include page, plugin, theme, widgets, menu, etc.
3. Setup Google Analytics and AdSense for website or blog.
4. Perform e-marketing using Facebook.
5. Perform e-marketing using YouTube
6. Use SEO tools / Web Master Tools for site content analysis.
7. Use Google AdWords for paid advertisement.
8. Create google site and blog.
9. Perform e-mail marketing for summer sale in your business.
10. Install browser Add-on for SEO.

**Pedagogic tools:**

1. Chalk and Talk
2. PPT and Videos.
3. Hands-on activities
4. Assignment
5. Group discussion

**Reference Books:**

1. Lorrie Thomas, 2011, The McGraw-Hill 36-Hour Course: Online Marketing, McGraw-Hill Education
2. Stephanie Leary, 2010, Beginning WordPress 3, Apress
3. Dan Zarrella, 2009, The Social Media Marketing Book, O'Reilly Media
4. Eric Enge, Stephan Spencer, Rand Fishkin, Jessie C Stricchiola, 2009, The Art of SEO : Mastering Search Engine Optimization, O'Reilly Media
5. Jerri L. Ledford, 2009, SEO: Search Engine Optimization Bible [2nd Edition], Wiley India

**Suggested reading / E-resources**

1. <https://www.mbaskool.com/business-concepts/marketing-and-strategy-terms/1679-e-marketing.html>
2. <https://www.wishpond.com>

**Suggested MOOCs:**

1. <https://www.edx.org/micromasters/curtinx-marketing-in-a-digital-world>
2. <https://www.coursera.org/learn/marketing-digital>

**Methods of Assessment & Tools:**

(Though the credit has to be awarded at the end of the course i.e. two semesters, it is recommended to consolidated assessment in two stages one at end of each semester. Components used for assessment can be different as per the nature of the course)

S.N.	Component	Content	Duration	Marks	Sub Total
1	Attendance	-	-	10	10
2	Assignments	-	-	10	10
3	Practical Skill Assessment (Continuous Assessment during the semester)	-	-	40 (20 Marks for Each Semester)	40
4	Course Mid Examination	-	-	20	20
5	Course End Examination	-	-	20	20
<b>Total</b>				<b>100</b>	<b>100</b>

**At the end of the course no marks are given, only remarks are given as follows:**

**REMARKS:**

Range of Marks	Remarks
90-100	Excellent
75-89	Very Good
60-74	Good

40-59	Fair
< 40	Not Completed

Course Code	Course Title	Course Credit and Hours
<b>21AECO002</b>	<b>Web Designing</b>	<b>2 Credit - 4 hrs / wk</b>

**Objective of the course:**

1. Understand the principles of effective, dynamic and interactive web page designing.
2. Understand the graphic design principles that relate to web design and learn how to implement these theories into practice.
3. Develop skills of analyzing the usability of a web site.
4. Learn the language of the web: HTML and CSS.
5. Practice of JavaScript to enhance HTML documents dynamically.

**Target Skills (Course outcomes) :**

1. Skill development to design static web pages.
2. Runs the page he/she has designed using HTML codes.
3. HTML is taught along with CSS, and a few other JS or CSS frameworks, as well as other web content technologies.
4. HTML Training also includes a number of additional fantastic modules and chapters in the course curriculum that are helpful in acquiring web technology skills such as HTML elements, HTML Integration with JavaScript, and several more HTML features.
5. This is a Bundle Course that combines several entire, in-depth HTML Learning Courses into one.
6. This Bundle precisely satisfies the industry's requirements and increases your chances of being employed as an HTML Learning expert.

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other) :**

- The Co curricular course based on Web Designing belongs to area of advance technology in developing web sites. This course will help students to get job as per their skill. Various technical companies located in this region are required person having web designing skill. So the demand of this course is gradually increasing day by day.

**Reference:**

1. <https://eskillindia.org/Course/courses>
2. [https://onlinecourses.swayam2.ac.in/aic20\\_sp11/preview](https://onlinecourses.swayam2.ac.in/aic20_sp11/preview)
3. <https://nsdcindia.org/skillessence-web-designing>
4. <https://www.nielit.gov.in/aurangabad/content/certified-course-web-designing>

**Course Description:**

- This course is designed to start you on a path toward future studies in web development and design, no matter how little experience or technical knowledge you currently have. Web-Designing is a course of creation that requires only some basic computer skills. This course will allow students to discover themselves in field of information technology. This course is an excellent option for anyone who ever wanted to develop their skills in web designing. The course aims to address SDG 9: Industry, Innovation and Infrastructure.

<b>Course Content</b>	<b>Hours</b>
<b>Module-I: Introduction</b>	16 hrs
<ol style="list-style-type: none"> <li>1. Introduction to Internet</li> <li>2. What is HTML, Block Structure of HTML</li> <li>3. Basic tags :Texts formatting, Line breaks, Link, Color, Image, List creation, Table</li> </ol>	
<b>Module-II : Introduction of Frame &amp; Form</b>	16 hrs
<ol style="list-style-type: none"> <li>1. Use of Frame Tags</li> <li>2. HTML multimedia:HTML Plug-in, HTML Audio, HTML Video</li> <li>3. HTML FORM: Controls of Forms</li> <li>4. Introduction to HTML 5</li> </ol>	
<b>Module-III : Introduction of CSS</b>	16 hrs
<ol style="list-style-type: none"> <li>1. Use of CSS, Types of CSS, Creating class and id.</li> <li>2. CSS Properties: Background, Text, Font, Table, Border, Margin, Padding, Align, Image property.</li> <li>3. Page layouts: Use of DIV and SPAN tag. Introduction to DHTML</li> </ol>	
<b>Module-IV : Introduction to Javascript</b>	16 hrs
<ol style="list-style-type: none"> <li>1. Use of scripting language, difference between client side script and server side script,</li> <li>2. Javascript syntax, variables, Operators</li> <li>3. Control structures: Control statements, Looping statements, Sequential statements, Use of Dialog boxes, User defined functions, Built-in objects and properties: Number, Date, Math, String, Array. Browser Objects: History, Window, Location, Built-in functions</li> </ol>	
<b>Module-V : Use of Events</b>	16 hrs
<ol style="list-style-type: none"> <li>1. Mouse events, Keyboard events, Timer events, other events</li> <li>2. Javascript DOM: Methods and Properties.</li> <li>3. Error handling: throw and try catch block</li> </ol>	

**Suggested laboratory experiments / other activities:**

NA

**Pedagogic tools:**

1. Chalk and Talk
2. PPT and Videos.
3. Hands-on activities
4. Assignment

**Reference Books:**

1. Ivan Bayross, 2009, Web Enabled Commercial Application Development Using HTML, JavaScript, DHTML and PHP (English) [Fourth Edition], Published by BPB Publications, New Delhi. (UNIT 1 to 5)
2. Lemay Laura, Mastering Html, CSS & Javascript Web Publishing, Published by BPB Publications,(UNIT 1 to 5) ISBN: 9788183335157
3. Kogent Learning Solutions, 2015, Web Technologies HTML, Javascript, PHP, Java, JSP, ASP.NET, XML and AJAX Black Book, Dreamtech Press, New Delhi
- 4.

**Suggested reading / E-resources**

1. <https://www.w3schools.com/html/>

**Suggested MOOCs:**

1. <https://www.udemy.com/courses/search/?src=ukw&q=HTML>

**Methods of Assessment & Tools:**

(Though the credit has to be awarded at the end of the course i.e. two semesters, it is recommended to consolidated assessment in two stages one at end of each semester. Components used for assessment can be different as per the nature of the course)

S.N.	Component	Content	Duration	Marks	Sub Total
1	Attendance	-	-	10	10
2	Assignments	-	-	10	10

3	<b>Practical Skill Assessment</b> (Continuous Assessment during the semester)	-	-	<b>40</b> (20 Marks for Each Semester)	<b>40</b>
4	<b>Course Mid Examination</b>	-	-	<b>20</b>	<b>20</b>
5	<b>Course End Examination</b>	-	-	<b>20</b>	<b>20</b>
<b>Total</b>				<b>100</b>	<b>100</b>

**At the end of the course no marks are given, only remarks are given as follows:**

**REMARKS:**

<b>Range of Marks</b>	<b>Remarks</b>
90-100	Excellent
75-89	Very Good
60-74	Good
40-59	Fair
< 40	Not Completed

Course Code	Course Title	Course Credit and Hours
<b>21AECO003</b>	<b>Front-End Web Development with React JS</b>	<b>2 Credit - 4 hrs / wk</b>

**Objective of the course:**

1. Understand advanced JavaScript ES6 with different concepts
2. Describe React JS application structure and importance of it.
3. Demonstrate functional front-end web application using React JS.
4. Organizing a various React JS features including components and forms
5. Build powerful, fast, user-friendly and reactive web apps

**Target Skills (Course outcomes) :**

1. Skill development to design creative and interactive web application
2. Skill development to build complex user interfaces having a unidirectional data flow, with React JS
3. Skill development using React JS is the best practices and how to use them to build state-of-the-art apps

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other) :**

- React is a view library to develop single page applications in JavaScript. It is the most popular library backed by Face book. With React library, you can develop dynamic frontend applications which come with great features like component architecture, data binding, declarative views and universal apps.
- Creating dynamic web applications requires a lot of complex coding. React JS makes this super easy by enabling HTML quotes and tags to render particular subcomponents.
- This course will enable you to build user-friendly React JS applications using React router, data flow and usage with React, Bootstrap and CSS, and React middleware. Skills you will learn Components of React JS React JS nesting components React JS props React state React router React middleware

**Reference:**

- [https://eskillindia.org/Course/course\\_detail/reactjs-beginner-english](https://eskillindia.org/Course/course_detail/reactjs-beginner-english)
- <https://nsdcindia.org/skillessence-web-designing>



**Course Description:**

Introduction to the React JS JavaScript library for JS developers, starting from the very basics such as React components and JSX, props, state and more. Later on, we will cover more advanced concepts such as Component composition, passing data between components, styling, unit testing and more useful utilities. React JS works as the "view" in Model View Controller (MVC) programming and reduces boilerplate language through declarative code. It also features a virtual DOM (document-object-model), and the program takes care of child component changes through re-rendering. The course aims to address SDG 9: Industry, Innovation and Infrastructure.

<b>Course Content</b>	<b>Hours</b>
<b>Module-I: Concepts of Advanced JavaScript - ES6</b>	16 hrs
<ul style="list-style-type: none"><li>● History of JavaScript</li><li>● What is ES6</li><li>● Block scope, let &amp; const</li><li>● Template literals</li><li>● Arrow functions</li><li>● Spread and Rest operators</li><li>● Destructuring</li><li>● Classes - Inheritance, Static properties and methods</li><li>● Modules</li><li>● Promises</li><li>● Async/Await</li><li>● Array Iteration functions like map(), filter() and reduce(), Keys(), From()</li></ul>	
<b>Module-II : Introduction to React</b>	16 hrs

<ul style="list-style-type: none"> <li>● What is React?</li> <li>● Why React?</li> <li>● React Features</li> <li>● React version history</li> <li>● Work flow of React JS</li> <li>● Scope of React JS</li> <li>● Node setup</li> <li>● How to use NPM?</li> <li>● How to create package.json and purpose of it?</li> <li>● Just React - Hello World</li> <li>● Using create-react-app</li> <li>● Anatomy of react project</li> <li>● Running the app <ul style="list-style-type: none"> <li>○ start ReactJs using codes and box</li> </ul> </li> <li>● Class component vs function component <ul style="list-style-type: none"> <li>○ Debugging first react app</li> </ul> </li> </ul>	
<b>Module-III : ReactJs Component, Life Cycle and React Hooks</b>	16 hrs
<ul style="list-style-type: none"> <li>● Create a React component with JSX template.</li> <li>● How to create Nested Components?</li> <li>● What is React JS render?</li> <li>● React Fragments</li> <li>● React Props overview.</li> <li>● Introduction of Props validation with data types.</li> <li>● Flow of States, Initialize states and update states</li> <li>● React Hooks <ul style="list-style-type: none"> <li>○ Use State()</li> <li>○ Use Effect()</li> <li>○ Use Ref()</li> <li>○ Use Reducer()</li> </ul> </li> </ul>	
<b>Module-IV : Routing, ReactJs Forms and UI</b>	16 hrs

<ul style="list-style-type: none"> <li>● How to configure React Router?</li> <li>● Single Page Application Overview.</li> <li>● React-Router &amp; History</li> <li>● Lists of Form components.</li> <li>● Setup Controlled and Uncontrolled form components.</li> <li>● Control Input elements.</li> <li>● How to set default values on all formats of Input elements.</li> <li>● React JS Form validations.</li> <li>● How to write Styles?</li> <li>● React Bootstrap</li> </ul>	
<b>Module-V : React Events, API and Application</b>	16 hrs
<ul style="list-style-type: none"> <li>● OnClick, onBlur, onKeyUp, onChange and other useful primary events in ReactJS.</li> <li>● How to Sharing events between the components?</li> <li>● Working with API's</li> <li>● Axios for API</li> <li>● Fetch for API</li> <li>● Performing CRUD Operations in ReactJS</li> </ul>	

**Suggested laboratory experiments / other activities:**

1. ES6 each topic conceptual practice programs given below
  - Declare variable and assign value, define function that returns text, return number of characters in a string, function to return characters of a string in Upper/lowercase, function to replace character in string, calculate hypoteneuse, function to add amounts with surcharge, function to get first element of an array, etc.
  - Write functions to find out sum, max, min of an array, select even numbers, etc.
  - Create web to calculate age, write a constructor (planet) and ten objects that store information, write web form with radio button input, etc.
  - Get necessary values as input and find area of circle, square, cylinder, cube.
  - Math functions, Map reduce, arrays, objects: write math expression.
2. Create new ReactJs application and display your bio in detail with image
3. Implement ReactJs Component, Life Cycle and Routing
4. Design Custom webpage using bootstrap
5. Build Registration Form with validation with Event Handling
6. Create an interactive application which contains basic form fields and different DOM object events to get result in display page
7. Fetch data using API and pass the data using API in such webpage
8. Apply basic CRUD operation for such resource

**Pedagogic tools:**

1. Chalk and Talk
2. PPT and Videos.
3. Hands-on activities
4. Assignment
5. Open source code learning
6. Module based coding
7. Task based Learning Activities
8. Improve an observation to make real time web application
9. Group discussion

**Reference Books:**

1. React.js Essentials by Artemij Fedosejev - Packt Publishing
2. Learn React Hooks: Build and refactor modern React.js applications using Hooks Kindle Edition by Daniel Bugl
3. React 16 Essentials - Second Edition by Artemij Fedosejev, Adam Boduch
4. Learning React: Functional Web Development with React and Redux by Alex Banks, Eve Porcello Publisher O'Reilly Media; 1st edition (2017)

**Suggested reading / E-resources**

1. <https://reactjs.net/>
2. <https://www.educba.com/uses-of-react-js/>
3. [https://www.tutorialspoint.com/reactjs/reactjs\\_overview.htm](https://www.tutorialspoint.com/reactjs/reactjs_overview.htm)
4. <https://www.w3schools.com/REACT/DEFAULT.ASP>
5. <https://www.udemy.com/course/react-js-basics-to-advanced>

**Suggested MOOCs:**

1. <https://www.coursera.org/specializations/full-stack-react>
2. <https://www.simplilearn.com/tutorials/reactjs-tutorial/what-is-reactjs>

**Methods of Assessment & Tools:**

(Though the credit has to be awarded at the end of the course i.e. two semesters, it is recommended to consolidated assessment in two stages one at end of each semester. Components used for assessment can be different as per the nature of the course)

<b>S.N.</b>	<b>Component</b>	<b>Content</b>	<b>Duration</b>	<b>Marks</b>	<b>Sub Total</b>
1	<b>Attendance</b>	-	-	<b>10</b>	<b>10</b>
2	<b>Assignments</b>	-	-	<b>10</b>	<b>10</b>
3	<b>Practical Skill Assessment</b> (Continuous Assessment during the semester)	-	-	<b>40</b> (20 Marks for Each Semester)	<b>40</b>
4	<b>Course Mid Examination</b>	-	-	<b>20</b>	<b>20</b>
5	<b>Course End Examination</b>	-	-	<b>20</b>	<b>20</b>
<b>Total</b>				<b>100</b>	<b>100</b>

**At the end of the course no marks are given, only remarks are given as follows:**

**REMARKS:**

<b>Range of Marks</b>	<b>Remarks</b>
90-100	Excellent
75-89	Very Good
60-74	Good
40-59	Fair
< 40	Not Completed

Course Code	Course Title	Course Credit and Hours
<b>21AECO004</b>	<b>iOS App Development using Swift</b>	<b>2 Credit - 4 hrs / wk</b>

**Objective of the course:**

1. Understand Swift and iOS with different concepts.
2. Describe mobile application and importance of it.
3. Demonstrate functional iOS mobile application using swift.
4. Organizing a various features including controls and auto layout.
5. Build powerful, fast, user-friendly and reactive mobile apps.

**Target Skills (Course outcomes) :**

1. Demonstrate various terminology related to swift and iOS.
2. Use basic iOS Programming concepts on real life applications.
3. Design and deploy native iOS application.
4. Examine various functionality into properly design concepts.
5. Comprehensive Hands-on with swift and iOS applications.

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other) :**

- The first of a series of three modules explores developing applications for iOS based devices such as iPhone, iPod Touch and iPad. Course will provide an overview of iOS development from use of current iOS SDK, to design of applications and industry business practices. Prior programming experience in either C or an Object-Oriented Programming language is required for this course. This is a self-paced module. The module starts by generally introducing the user to iOS and Xcode, along with Cocoa Touch and design patterns. The second of a series of three modules starts by going through views and automatic layouts, then touches and gestures. Next, the module goes through storyboards and segues, what they are, and how they work. The module ends by going through iPad and universal apps and how code can be shared between apps on different devices. The third of a series of three modules starts by going through iOS human interface guidelines. Next, the module goes through additional frameworks that can be used, and how they can be added to a project. Later, the module goes through various ways that users can handle data, and ends by going through the steps required in order to distribute apps.

**Reference:**

- [https://eskillindia.org/Course/course\\_detail/it-mobile-development-english](https://eskillindia.org/Course/course_detail/it-mobile-development-english)

**Course Description:**

- Introduction to iOS app development with Swift, expands your programming skills and applies them to authentic app development projects. The topics covered in this course include Xcode basics, Core iOS and Cocoa Touch frameworks, simple user interface creation, MVC Architecture and much more. With a focus on using Apple's components to access sensors like camera, microphone and GPS, by the end of this course you will be able to create a basic App according to specified parameters and guidelines. The course aims to address SDG 9: Industry, Innovation and Infrastructure.

<b>Course Content</b>	<b>Hours</b>
<b>Module-I : Introduction to iOS application and Environment</b>	16 hrs

<ul style="list-style-type: none"> <li>● iOS Architecture and SDK Framework</li> <li>● iOS SDK version compatibility</li> <li>● iOS Application life cycle</li> <li>● Model view Controller</li> <li>● Xcode - Tour of IDE</li> <li>● Templates</li> <li>● Project and Workspace</li> <li>● Simulator</li> <li>● Asset management</li> <li>● Swift Playground</li> <li>● Create first Simple Application</li> </ul>	
<p><b>Module-II : Introduction to Swift</b></p>	<p>16 hrs</p>
<ul style="list-style-type: none"> <li>● Introduction to Swift</li> <li>● Objective C v/s Swift</li> <li>● Advantage of Swift</li> <li>● Swift Playground</li> <li>● Variable, Data types, Optional, Constants, Literals, Operators</li> <li>● Decision making, iterative statements</li> <li>● Functions, arrays, Dictionary, sets</li> <li>● Tuples, Enumerations, Structure</li> <li>● OOPs concepts.</li> </ul>	
<p><b>Module-III : User Interface and Application Development</b></p>	<p>16 hrs</p>
<ul style="list-style-type: none"> <li>● Single View Application</li> <li>● Storyboard</li> <li>● File owner, First Responder</li> <li>● Action, Outlet</li> <li>● Application life cycle, View lifecycle.</li> <li>● App Delegate</li> <li>● UI View Controller</li> <li>● Methods of App Delegate</li> <li>● Methods of UIViewController</li> <li>● Alert box, Actionsheet</li> <li>● Controls (Button, Label, TextField, TabBar, ImageView, UIPickerView, Switch,Slider, Stepper, WebView)</li> <li>● Gestures</li> <li>● Deployment of Application</li> <li>● Simple application of Calculator.</li> </ul>	



<b>Module-IV : Master Detail View</b>	16 hrs
<ul style="list-style-type: none"> <li>● Navigation controller</li> <li>● Story board Segue</li> <li>● Adding Scenes, Segues, Transitions</li> <li>● Auto layout</li> <li>● Data Source, Delegates</li> <li>● UITableView Controller Styles, Data source method, Delegate methods, binding data from static array and dictionary.</li> <li>● Customize TableView - Custom cells</li> <li>● CollectionView</li> <li>● Customize CollectionView – Delegates and Data Sources</li> <li>● Map integrations</li> <li>● YouTube integration</li> <li>● Simple application to play live news channel.</li> </ul>	
<b>Module-V : Working With Data</b>	16 hrs
<ul style="list-style-type: none"> <li>● Overview of core data</li> <li>● SQLite3</li> <li>● XML Parsing</li> <li>● JSON Parsing</li> <li>● Login with Facebook</li> <li>● Login with Google</li> </ul>	

**Suggested laboratory experiments / other activities:**

9. Write a program to calculate simple interest using swift.
10. Write a program that perform square and cube of entered number.
11. Develop Swift program to match of two given Strings.
12. Rewrite a swift program to calculate total amount based on following criteria : Enter Bill no, Quantity, price and find total amount in which 10.2% service tax should on amount find total payable amount.
13. Write program to accept percentage of N students and give grade as follows:
  - If percentage  $\geq 80$  then grade is A,
  - If percentage  $\geq 70$  then grade is B,
  - If percentage  $\geq 60$  then grade is C,
  - If percentage  $\geq 40$  then grade is D.
14. Create an iOS application that should demonstrate the use of Alert box based on following criteria (Take on UIButton by clicking on button alert message should be displayed).
15. Create an iOS application using UIButton and UILabel in which take a three UIButtons as Red, Green, Blue and change UILabel text color according to button text.
16. Develop an iOS application using UIButton and UILabel in which take a two UIButtons as hide and show and change UILabel visibility according to button text.
17. Develop an iOS application to calculate net salary.
  - DA – 10% of basic salary,
  - TA – 5% of basic salary,
  - PF- 10% of basic salary,
  - HRA – 3% of basic salary,
  - Net Salary = basic salary + DA + TA – PF – HRA.
18. Create an iOS application to calculate paid salary.
  - Enter basic salary and gender.
  - If basic salary  $< 5000$  and gender = 'Male' then no bonus should pay.
  - If Basic Salary  $\geq 5000$  &  $\leq 10000$  and gender M than bonus=7% of basic salary.
  - If Basic Salary  $\geq 10000$  and gender M than bonus=10% of basic salary.
  - Otherwise, bonus=9.5% of basic salary print Basic salary and net salary.
  - Net salary=bonus+ basic salary.
  - Now check pay salary is  $>1,00,000$  than tax=10% of net salary.
19. Invent an iOS application to create your own browser.
20. Develop an iOS application to display array in UITableView.
21. Create aniOS application to take pictures and select images from your phone.
22. Develop an iOS application to create collection view of grocery list.
23. Design an iOS application to create splash and login screen also check specific mechanism to

**Pedagogic tools:**

10. Chalk and Talk
11. PPT and Videos.
12. Hands-on activities
13. Assignment
14. Module based coding
15. Task based Learning Activities
16. Improve an observation to make real time mobile application
17. Online LMS support
18. Group discussion

**Reference Books:**

5. iOS 15 application development for beginners : Learn swift programming and build iPhone apps - Arpit Kulshetra
6. iOS 15 Programming Fundamentals with Swift – Matt Nuebarg
7. Learn iOS application development – Rudra s Misra

**Suggested reading / E-resources**

6. <https://developer.apple.com/>
7. <https://developer.apple.com/documentation/uikit/>
8. <https://developer.apple.com/documentation/swift>
9. <https://www.appcoda.com/>
10. <https://www.weheartswift.com/>
11. <https://www.raywenderlich.com/ios>

**Suggested MOOCs:**

3. <https://www.coursera.org/specializations/swift-5-ios-app-developer>
4. <https://www.coursera.org/specializations/app-development>
5. <https://www.udemy.com/course/ios-13-app-development-bootcamp/>

**Methods of Assessment & Tools:**

(Though the credit has to be awarded at the end of the course i.e. two semesters, it is recommended to consolidated assessment in two stages one at end of each semester. Components used for assessment can be different as per the nature of the course)

<b>S.N.</b>	<b>Component</b>	<b>Content</b>	<b>Duration</b>	<b>Marks</b>	<b>Sub Total</b>
1	<b>Attendance</b>	-	-	<b>10</b>	<b>10</b>
2	<b>Assignments</b>	-	-	<b>10</b>	<b>10</b>
3	<b>Practical Skill Assessment</b> (Continuous Assessment during the semester)	-	-	<b>40</b> (20 Marks for Each Semester)	<b>40</b>
4	<b>Course Mid Examination</b>	-	-	<b>20</b>	<b>20</b>
5	<b>Course End Examination</b>	-	-	<b>20</b>	<b>20</b>
<b>Total</b>				<b>100</b>	<b>100</b>

**At the end of the course no marks are given, only remarks are given as follows:**

**REMARKS:**

<b>Range of Marks</b>	<b>Remarks</b>
90-100	Excellent
75-89	Very Good
60-74	Good
40-59	Fair
< 40	Not Completed

Course Code	Course Title	Course Credit and Hours
<b>21AECO005</b>	<b>Software Implementation Process</b>	<b>2 Credit - 4 hrs / wk</b>

**Objective of the course:**

1. Understand the application testing.
2. Understand the Testing In Terms Of Bugs & Requirement.
3. Applying Test cases & test report.
4. Understand the Configuration And Implementation.

**Target Skills (Course outcomes) :**

1. Student will get training for troubleshoot and will be able to troubleshoot technical issues
2. They will be able to creating an application real-time project

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other) :**

- The Co-Curricular course based on Technical Implementation & Troubleshooting belongs to Software Testing and training (implementing) software systems into business.
- In any business the knowledge of Software implementation is must to successfully implement Enterprise Resource Planning Software (ERP) system. Today's rapid technology changing era its very important to understand client needs in a proper format with documentation as well as testing of the software applications at various stages.

**Reference:**

1. [https://qedgetech.com/enroll/softwaretesting/?lead=adwords&network=g&device=c&devicemodel=&keyword=qa%20online%20training&matchtype=p&adposition=&campaignid=13338639565&adgroupid=125788301249&feeditemid=&targetid=kwd-32587669422&placement=&target=&gclid=Cj0KCQjw06OTBhC\\_ARIsAAU1yOU4qexSljnKPhJU8OMKB73ZLOkT6AL4M-pK0GQ3Ox9q2pgGDThyUu4aAuXUEALw\\_wcB](https://qedgetech.com/enroll/softwaretesting/?lead=adwords&network=g&device=c&devicemodel=&keyword=qa%20online%20training&matchtype=p&adposition=&campaignid=13338639565&adgroupid=125788301249&feeditemid=&targetid=kwd-32587669422&placement=&target=&gclid=Cj0KCQjw06OTBhC_ARIsAAU1yOU4qexSljnKPhJU8OMKB73ZLOkT6AL4M-pK0GQ3Ox9q2pgGDThyUu4aAuXUEALw_wcB)
2. [https://nsdcindia.org/sites/default/files/ELEQ3608\\_Functional\\_Testing\\_Technician\\_v1\\_27\\_05\\_2020.pdf](https://nsdcindia.org/sites/default/files/ELEQ3608_Functional_Testing_Technician_v1_27_05_2020.pdf)
3. [https://nielit.gov.in/chennai/chennai/sites/default/files/Chennai/Certified%20Embedded%20Software%20Engineer%20March\\_22\\_prospectus\\_0.pdf](https://nielit.gov.in/chennai/chennai/sites/default/files/Chennai/Certified%20Embedded%20Software%20Engineer%20March_22_prospectus_0.pdf)

**Course Description:**

- Technical Implementer & Troubleshooter will cover the various aspects of Software Development Life Cycle, especially testing & implementations of the Enterprise Resource Planning Software & Applications with the real time exposure to the course contents. Students will get benefited by learning various tools & techniques, methods of testing. Along with the technical aspects this course also aims to help student provide with other most important aspects of Requirement gathering, Business Coordination. The course aims to address SDG 9: Industry, Innovation and Infrastructure.

Course Content	Hours
<b>Module-I: Application Understanding, Testing, Testing In Terms of Bug &amp; Requirement</b>	16 hrs
<ul style="list-style-type: none"> <li>● <b>Introduction</b> <ul style="list-style-type: none"> <li>○ Brief about Application</li> </ul> </li> <li>● <b>Detail About Application</b> <ul style="list-style-type: none"> <li>○ Domain Knowledge</li> <li>○ Functional Scope of Application</li> <li>○ System Requirement of Application</li> </ul> </li> <li>● <b>Testing in Terms of Bug</b> <ul style="list-style-type: none"> <li>○ Introduction</li> <li>○ Defect/Bug Life cycle in Application Testing</li> <li>○ Bug Testing Tools</li> <li>○ Bug Testing Methods</li> <li>○ Negative data Testing</li> </ul> </li> <li>● <b>Testing in Terms of Requirement</b> <ul style="list-style-type: none"> <li>○ Introduction</li> <li>○ Requirement Analysis</li> <li>○ Data testing in terms of Requirement</li> </ul> </li> <li>● Testing with Positive required data</li> </ul>	
<b>Module-II : Test Cases &amp; Test Report</b>	16 hrs

<ul style="list-style-type: none"> <li>● <b>Introduction</b> <ul style="list-style-type: none"> <li>○ Brief about the Unit</li> </ul> </li> <li>● <b>Different type of Test Cases</b> <ul style="list-style-type: none"> <li>○ Functionality Test Case</li> <li>○ Integration Test Case</li> <li>○ Performance Test Case</li> <li>○ Database Test Case</li> <li>○ Security Test Case</li> <li>○ User Acceptance Test Case</li> </ul> </li> <li>● <b>Different Testing Types</b> <ul style="list-style-type: none"> <li>○ Unit testing</li> <li>○ Integration testing</li> <li>○ System testing</li> <li>○ Smoke testing</li> <li>○ Interface testing</li> <li>○ Regression testing</li> <li>○ Beta/Acceptance testing</li> </ul> </li> <li>● <b>Test Report</b> <ul style="list-style-type: none"> <li>○ Analysis of Test Result</li> <li>○ Formation of Test Report Document</li> </ul> </li> <li>● Document Testing in terms of Report Layout, Title of Report, Logo, Header Footer Formation, Page Numbering Formation etc.</li> </ul>	
<b>Module-III : Configuration and Implementation</b>	16 hrs
<ul style="list-style-type: none"> <li>● <b>Introduction</b> <ul style="list-style-type: none"> <li>○ Brief about Configuration of Admin</li> </ul> </li> <li>● <b>Implementation</b> <ul style="list-style-type: none"> <li>○ Apply Configuration to System</li> <li>○ Report update and system changes</li> <li>○ Coordination between tech team and client</li> <li>○ Understanding of client needs</li> <li>○ Data migration</li> </ul> </li> </ul>	
<b>Module-IV : Training &amp; Troubleshoot</b>	16 hrs

<ul style="list-style-type: none"> <li>● <b>Introduction</b> <ul style="list-style-type: none"> <li>○ Brief about Configuration of Admin</li> </ul> </li> <li>● <b>Roles &amp; Responsibilities</b> <ul style="list-style-type: none"> <li>○ User Training</li> <li>○ Start an internal user group &amp; Plan</li> <li>○ Leverage existing resources</li> <li>○ Technical &amp; Application Support</li> <li>○ Capture the Knowledge</li> <li>○ Project Management</li> <li>○ Gap Finding</li> <li>○ Logical Update and Troubleshoot</li> </ul> </li> </ul>	
<b>Module-V : Project</b>	16 hrs
<ul style="list-style-type: none"> <li>● <b>Mini Project of Industry</b></li> </ul>	

**Suggested laboratory experiments / other activities:**

1. Clone website
2. Prepare documents from the given websites
3. Compare & Analyze various software applications
4. Final mini project report

**Pedagogic tools:**

- 1.
1. Chalk and Talk
2. PPT and Videos.
3. Hands-on activities
4. Assignment
5. Group discussion

**Reference Books:**

1. Bret Pettichord, CemKaner, and James Marcus Bach (2001), *Lessons Learned in Software Testing* Foundations of Software Testing: ISTQB Certification | Book by Dorothy Graham
2. Boris Beizer (1983), *Software Testing Techniques*
3. CemKaner, Hung Q Nguyen, and Jack Falk, 1988, *Testing Computer Software*

**Suggested reading / E-resources**

1. <https://youtu.be/sO8eGL6SFsA>
2. <https://youtu.be/mjuc5SjtiKI>
3. <https://www.udemy.com/course/software-testing-masterclass-from-novice-to-expert/>

**Suggested MOOCs:**



3. [https://onlinecourses.nptel.ac.in/noc22\\_cs12/preview](https://onlinecourses.nptel.ac.in/noc22_cs12/preview)
4. <https://www.mooc-list.com/course/serverless-data-processing-dataflow-operations-coursera>

**Methods of Assessment & Tools:**

(Though the credit has to be awarded at the end of the course i.e. two semesters, it is recommended to consolidated assessment in two stages one at end of each semester. Components used for assessment can be different as per the nature of the course)

S.N.	Component	Content	Duration	Marks	Sub Total
1	<b>Attendance</b>	-	-	<b>10</b>	<b>10</b>
2	<b>Assignments</b>	-	-	<b>10</b>	<b>10</b>
3	<b>Practical Skill Assessment</b> (Continuous Assessment during the semester)	-	-	<b>40</b> (20 Marks for Each Semester)	<b>40</b>
4	<b>Course Mid Examination</b>	-	-	<b>20</b>	<b>20</b>
5	<b>Course End Examination</b>	-	-	<b>20</b>	<b>20</b>
<b>Total</b>				<b>100</b>	<b>100</b>

**At the end of the course no marks are given, only remarks are given as follows:**

**REMARKS:**

Range of Marks	Remarks
90-100	Excellent
75-89	Very Good
60-74	Good
40-59	Fair
< 40	Not Completed

Course Code	Course Title	Course Credit and Hours
<b>21AECO006</b>	<b>Responsive Web Design with Bootstrap</b>	<b>2 Credit - 4 hrs / wk</b>

**Objective of the course:**

1. To understand the web design framework and its benefits
2. To understand responsive web design for different devices
3. To create responsive web pages with custom design from scratch
4. To apply different form validation using inbuilt library of bootstrap
5. To create an application with knowledge of bootstrap snippets/plugin in bootstrap

**Target Skills (Course outcomes) :**

1. Skill development to design creative web pages from scratch
2. Skill development to create responsive website / web application with adaptive screen resolutions

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other) :**

- Web Developer in the IT-ITeS Industry is also known as a Web Designer. The individuals are responsible for designing and maintaining web-based applications that include static and dynamic content. This includes the design, layout and coding of a website.
- Individuals at this job are responsible for designing and maintaining web-based applications that include static and dynamic content. This includes the design, layout and coding of a website. They may work independently or along with application/functional developers as part of the overall solution that includes a web based component.

**Reference:**

1. [https://nsdcindia.org/sites/default/files/MC%20SSC%20Q0503%20Web%20Developer%20v2.0%2021052020\\_0.pdf](https://nsdcindia.org/sites/default/files/MC%20SSC%20Q0503%20Web%20Developer%20v2.0%2021052020_0.pdf)
2. The link of e skill India – [https://eskillindia.org/Course/course\\_detail/css-essential-trng-eng](https://eskillindia.org/Course/course_detail/css-essential-trng-eng)

**Course Description:**

- This course is aimed at training candidates for the job role of “Web Designer and Developer”, in the “Information Technology” industry. It aims at building the following key competencies in learners by the end of the course: · Design websites · Develop websites. Bootstrap 5 is the newest version of Bootstrap, which is the most popular HTML, CSS, and JavaScript framework for creating responsive, mobile-first websites. Bootstrap 5 is completely free to download and use. The course aims to address SDG 9: Industry, Innovation and Infrastructure.

<b>Course Content</b>	<b>Hours</b>
<b>Module-I:</b> Introduction & Fundamentals	16 hrs
<ul style="list-style-type: none"><li>● Introduction to Advance Bootstrap 5</li><li>● History of Bootstrap</li><li>● Differentiate with Bootstrap 3 and Bootstrap 4</li><li>● Advantages of Bootstrap 5</li><li>● How to Downloading and Installation</li></ul>	
<b>Module-II :</b> Container and Grids	16 hrs
<ul style="list-style-type: none"><li>● Bootstrap Container</li><li>● Working with Grids Bootstrap 5</li><li>● Example of Creating Grids Bootstrap 5</li><li>● Responsive Utilities – Device friendly</li><li>● Grid System</li><li>● Container &amp; Container Fluid</li><li>● Container Rows Columns</li><li>● More on Container Rows Columns</li><li>● Container Rows Columns Rules</li><li>● Introduction to Nesting</li><li>● Nesting Example</li><li>● Pulling Pushing and Offsetting</li></ul>	
<b>Module-III :</b> Typography, Images and Tables	16 hrs

<ul style="list-style-type: none"> <li>● Responsive Images</li> <li>● Image Retina</li> <li>● Text Alignment, Centering and Floating</li> <li>● Typography</li> <li>● Working with Icons Fonts</li> <li>● Creating Tables in Bootstrap</li> <li>● Adding Background Color to Table Elements</li> <li>● Alerts Boxes in Bootstrap</li> <li>● Working on Navbar</li> <li>● Working with Pagination</li> <li>● Bootstrap Badges</li> <li>● Bootstrap Progressbar</li> <li>● Bootstrap Dropdown</li> <li>● Bootstrap Collapse</li> <li>● Working with Carousel</li> <li>● Tooltip and Popover</li> </ul>	
<b>Module-IV : Creating Forms and Validation</b>	16 hrs
<ul style="list-style-type: none"> <li>● Bootstrap-Vertical-Form</li> <li>● Bootstrap-Inline-Horizontal-Form</li> <li>● Form Fill</li> <li>● Bootstrap Form-Input</li> <li>● Bootstrap Check Boxes</li> <li>● Bootstrap Buttons</li> <li>● Bootstrap Label</li> <li>● Radio Button</li> <li>● Bootstrap Form-Example</li> <li>● Bootstrap Form-Control-State</li> <li>● Bootstrap List, List-Group</li> <li>● Bootstrap Modal</li> <li>● Bootstrap Pagination</li> <li>● Bootstrap Panel-Accordion</li> <li>● Bootstrap Tool-Tip</li> <li>● Working With Form Validation in Bootstrap</li> </ul>	
<b>Module-V : Customizing the layout and Snippets</b>	16 hrs

<ul style="list-style-type: none"> <li>● Building the Layouts</li> <li>● Introduction to Tabs</li> <li>● Tabs Nav Family</li> <li>● Adding Tab Contents</li> <li>● Sections and Styling Sections</li> <li>● Contents Buttons and Indicators</li> <li>● Implement Cards</li> <li>● Design Webpage like Custom Web Template</li> <li>● Beautifying and Designing the Header &amp; Footer</li> <li>● Implement Bootstrap Snippets like Bootstrap Chat, Bootstrap DataTables, Bootstrap Profile Page</li> </ul>	
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**Methods of Assessment & Tools:**

(Though the credit has to be awarded at the end of the course i.e. two semesters, it is recommended to consolidated assessment in two stages one at end of each semester. Components used for assessment can be different as per the nature of the course)

S.N.	Component	Content	Duration	Marks	Sub Total
1	<b>Attendance</b>	-	-	<b>10</b>	10
2	<b>Assignments</b>	-	-	<b>10</b>	10
3	<b>Practical Skill Assessment</b> (Continuous Assessment during the semester)	-	-	<b>40</b> (20 Marks for Each Semester)	40
4	<b>Course Mid Examination</b>	-	-	<b>20</b>	20
5	<b>Course End Examination</b>	-	-	<b>20</b>	20
<b>Total</b>				<b>100</b>	<b>100</b>

**At the end of the course no marks are given, only remarks are given as follows:**

**REMARKS:**

Range of Marks	Remarks
90-100	Excellent
75-89	Very Good
60-74	Good
40-59	Fair
< 40	Not Completed

Course Code	Course Title	Course Credit and Hours
<b>21AECO007</b>	Industrial Quality Management	<b>2 Credit - 4 hrs / wk</b>

**Objective of the course:**

1. To make students aware about importance of documentation and record keeping for quality management.
2. To make students aware about importance of logs and records
3. To train the students to prepare and fill the forms and records.
4. To train the student about various quality standards use in Industries and testing laboratories.

**Target Skills (Course outcomes) :**

1. Students will understand importance of documentation and record for quality management
2. Students shall be able to perform documentation and maintenance of records
3. Students will be aware about different types of documentation for raw materials, packaging materials, finished products, production sample, and market.
4. Students shall be able to develop formats for documentation of sample and production control sample, equipment calibration and regulatory requirements for performing lab activities.

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other) :**

- The Co curricular course is based on Document and maintains records for quality management in a organization.
- The course shall develop skills for regulatory requirement (documents and records) in students and help them to be industry ready.
- The course shall be useful for students wants to place in the industrial sectors such as Pharmaceuticals, Food and dairy, agricultural and entrepreneur.

**Reference:**

Link from NSDC Complete documentation and record keeping related to performing food lab activities

- [https://nsdcindia.org/sites/default/files/FICQ7601\\_Assistant\\_Lab\\_Technician\\_V1\\_19\\_09\\_2018.pdf](https://nsdcindia.org/sites/default/files/FICQ7601_Assistant_Lab_Technician_V1_19_09_2018.pdf)  
(FIC/N7604)

**Course Description:**

- The course is designed to develop knowledge and skills about regulatory requirements and documentation of various industrial sectors such as pharmaceuticals, food –dairy, agricultural and environment. By opting this course students are get familiarized with regulatory authorities, various standards and necessary documentation. It is intended develop basic knowledge of regulatory affairs and analysis skills in students. The course aims to address SDG 8 – Decent Work and Economic Growth, SDG 9 - Industry, Innovation and Infrastructure SDG 12 – Responsible consumption and production.

<b>Course Content</b>	<b>Hours</b>
<b>Module-I: Introduction of standards and regulatory framework</b>	08 hrs

<ul style="list-style-type: none"> <li>• Types of national standards: BIS, NABL, FSSAI</li> <li>• Types of international standards: ISO, EPA, HACCP</li> <li>• Introduction to Total Quality Management (TQM)</li> <li>• Introduction to SOPs for IQ, OQ, PQ</li> <li>• Types of forms for IQ, OQ, PQ</li> </ul>	
<b>Module-II : Basics of Quality management in Pharmaceutical sector</b>	08 hrs
<ul style="list-style-type: none"> <li>• Regulatory agencies in Pharmaceutical industry: FDA</li> <li>• Introduction to Pharmacopeia: Indian and US</li> <li>• Introduction to ISO 15089:2012</li> <li>• Types of analytical standards</li> <li>• Quality checks in drugs</li> </ul>	
<b>Module-III : Basics of Quality management in Food and Dairy sector</b>	08 hrs
<ul style="list-style-type: none"> <li>• Regulatory agencies in Food and Dairy industry: FSSAI, FDA</li> <li>• Introduction to HACCP</li> <li>• Introduction to ISO 17025:2017</li> <li>• Concept and types of adulteration</li> <li>• Quality checks in food and dairy industry</li> </ul>	
<b>Module-IV : Basics of Quality management in Environment sector</b>	08 hrs
<ul style="list-style-type: none"> <li>• Regulatory agencies in Environment sector: CPCB</li> <li>• Introduction to ISO 14001</li> <li>• Introduction to IS 10500</li> <li>• Introduction to IS 5182</li> <li>• Introduction to IS 2720</li> </ul>	
<b>Module-V : Basics of Quality management in Agriculture sector</b>	08 hrs
<ul style="list-style-type: none"> <li>• Regulatory agencies in Agriculture industry: ICAR, WHO</li> <li>• Introduction to HACCP</li> <li>• Concept of adulteration</li> <li>• Types of adulterants</li> <li>• Quality checks in food and dairy industry</li> </ul>	

**Pedagogic tools:**

1. Chalk and Talk
2. PPT and Videos.
3. Hands-on activities
4. Assignment



## 5. Group discussion

### Reference Books:

1. FSSAI Manual: <https://fssai.gov.in/cms/manuals-of-methods-of-analysis-for-various-food-products.php>
2. APHA Manual: [https://beta-static.fishersci.com/content/dam/fishersci/en\\_US/documents/programs/scientific/technical-documents/white-papers/apha-water-testing-standard-methods-introduction-white-paper.pdf](https://beta-static.fishersci.com/content/dam/fishersci/en_US/documents/programs/scientific/technical-documents/white-papers/apha-water-testing-standard-methods-introduction-white-paper.pdf)
3. Indian Pharmacopoeia 2018
4. CPCB Guidelines for the Measurement of Ambient Air Pollutants, <https://cpcb.nic.in/openpdffile.php?id=UmVwb3J0RmlsZXMvMjdfMTQ1ODExMDQyNI9OZXdJdGVtXzE5NI9OQUFRTVNFVm9sdW1lLUkucGRm>
5. CPCB: Guide Manual of Water and Waste Water Analysis, <https://cpcb.nic.in/openpdffile.php?id=UmVwb3J0RmlsZXMvMjA0XzE1MjQ2NTA4OTNfbWVkaWFwaG90bzEyODI3LnBkZg=>

### Suggested reading / E-resources

1. [https://biosci-intl.com/best\\_practices\\_faq.htm](https://biosci-intl.com/best_practices_faq.htm)
2. <https://www.polluconlab.com/microbiological-training.html>
3. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7149531/>

### Suggested MOOCs:

1. NPTEL: Water Quality Standards and Physiology of Water: <https://www.youtube.com/watch?v=OIGlIOZllyI>
2. <https://www.coursera.org/lecture/six-sigma-improve-control/document-management-6GNSg>
3. <https://www.complianceonline.com/resources/quality-control-laboratory-compliance-documentation-and-record-keeping-explained.html>

### Methods of Assessment & Tools:

S. N.	Component	Content	Duration	Marks	Sub Total
1	Attendance	--	--	10	10
2	Assignments	--	--	10	10
3	Practical Skill Assessment (Continuous Assessment during the semester)	--	2 Hour	20 (For Each Semester)	40

4	<b>Course Mid Examination</b>	Any two Modules	1 Hour	<b>20</b>	<b>20</b>
5	<b>Course End Examination</b>	All 5 Modules	1 Hour	<b>20</b>	<b>20</b>
<b>Total</b>				<b>100</b>	<b>100</b>

**At the end of the course no marks are given, only remarks are given as follows:**

<b>Range of Marks</b>	<b>Remarks</b>
90-100	Excellent
75-89	Very Good
60-74	Good
40-59	Fair
< 40	Not Completed

Course Code	Course Title	Course Credit and Hours
<b>21AECO008</b>	<b>Plant Tissue Culture</b>	<b>2 Credit - 4 hrs / wk</b>

**Objective of the course:**

The objective of the programme is to introduce career and market-oriented, skill enhancing add-on courses that have utility for job, self-employment and empowerment of the students.

After completion of this course, student will be able to:

- Understand the principle and application of plant tissue culture
- Define and describe components of plant tissue culture medium and methodology of preparation of medium
- Independently establish in vitro culture of plant

**Targeted Skills (Course outcomes):**

1. Plant tissue culture medium preparation
2. Independently establish the in vitro cultures of economically important plants
3. Organize and maintain Plant Tissue Culture Laboratory

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other):**

This co-curricular course on PTC will educate the students about basics and various techniques in plant tissue culture and development of job oriented skill of student to work in commercial plant tissue culture laboratories as well as give a basic training for the students who are planning to initiate their own start-up company for plant tissue culture.

**References**

- <https://nptel.ac.in/courses/102103016>

**Course Description:**

The course will focus on theoretical and practical aspects of Plant Cell Culture, like design and layout of the laboratory, aseptic technique used in plant cell culture, cloning and selection of specific cell types, contamination, methods for measuring viability and cytotoxicity, cell culture environment conditions for plant cells. The course will demystify intriguing routes of transgenic research where cell culture is a very potent tool. The course aims to address SDG 9: Industry, Innovation & Infrastructure.

<b>Course Content</b>	<b>Hours</b>
<b>Module-I: Basic of plant tissue culture</b>	6 hrs
<ul style="list-style-type: none"><li>● History, Scope and Applications of Plant Tissue Culture</li><li>● Concept of cellular totipotency and differentiation</li><li>● Laboratory Planning and Designing</li><li>● Plant tissue culture media: component and preparation</li></ul>	
<b>Module-II: Establishment of cultures</b>	6 hrs
<ul style="list-style-type: none"><li>● Explant: types, collection and preparation</li><li>● Sterilization and aseptic inoculation of explants on suitable medium</li><li>● Different stages of plant tissue culture</li><li>● Micropropagation pathways</li></ul>	
<b>Module-III :Variability in Tissue Culture</b>	6 hrs
<ul style="list-style-type: none"><li>● Somaclonal variations: Origin and causes of variation</li><li>● Molecular mechanism of variation</li><li>● Scope of somaclonal variation in interspecific crosses</li><li>● Methods to detect the variations</li></ul>	
<b>Module-IV :Hardening of tissue culture derived plantlets</b>	6 hrs

<ul style="list-style-type: none"> <li>● Basics and introduction to hardening and acclimatization</li> <li>● Factors affecting hardening and acclimatization of tissue culture grown plants</li> <li>● Primary and secondary hardening units; operation and managements</li> <li>● Hardening and acclimatization – success and bottlenecks</li> </ul>	
<b>Module-V :Commercialization of tissue culture</b>	6 hrs
<ul style="list-style-type: none"> <li>● SWOT analysis of tissue culture industries</li> <li>● Scaling-up production and automation in plant propagation</li> <li>● Global market of plant tissue culture</li> <li>● Commercial opportunities in plant tissue culture with special reference to plant tissue culture industries in India</li> </ul>	

**Suggested laboratory experiments / other activities: (60 Hrs)**

1. Plant tissue culture: laboratory organization and facilities requirements
2. To study principles, methodology and handling of equipments used in plant tissue culture
3. Preparations of stock solutions for tissue culture medium preparation
4. Preparation of Plant tissue culture media (MS medium)
5. To study explant characteristics, preparation of explant and aseptic inoculation of explant
6. In vitro culture of suitable explant for induction of callus
7. In vitro establishment of shoot culture using mature node explant
8. In vitro establishment of shoot culture using mature internodes explant
9. In vitro establishment of shoot culture leaf explant
10. Root induction in *in vitro* raised shoots
11. To study the hardening and acclimatization of tissue culture raised plantlets
12. Study of growth characteristics of callus
13. Establishment of cell suspension culture from callus

**Pedagogic tools:**

1. Chalk and Talk
2. PPT and Videos.
3. Hands-on activities
4. Assignment
5. Group discussion

#### **Reference Books:**

1. Chawla, H.S. (2002). Introduction to Plant Biotechnology. Oxford & IBH Publishers.
2. Narayanaswamy, S. (1994). Plant cell and tissue culture. Tata McGraw-Hill Education.
3. Bhojwani, S. S., & Razdan, M. K. (1986). Plant tissue culture: Theory and practice (Vol. 5). Elsevier.
4. Gamborg, O. L., & Phillips, G. (Eds.). (2013). Plant cell, tissue and organ culture: fundamental methods. Springer Science & Business Media.
5. George, E. F., Hall, M. A., & De Klerk, G. J. (Eds.). (2007). Plant propagation by tissue culture: volume 1. The background (Vol. 1). Springer Science & Business Media.
6. Smith, R. (2012). Plant tissue culture: Techniques and Experiments. Elsevier Science.
7. Joshi, N. and Purohit, S. D. (2010). A Practical Manual of Plant Biotechnology. Apex Publishing House

#### **Suggested reading / E-resources**

- <https://global.oup.com/academic/product/animal-cell-culture->
- <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3476009/>
- [https://www.intechopen.com/books/recent-advances-in-plant-in-vitro-culture/plant tissue-culture-current-status-and-opportunities](https://www.intechopen.com/books/recent-advances-in-plant-in-vitro-culture/plant-tissue-culture-current-status-and-opportunities)
- <https://nptel.ac.in/courses/102103016/>
- 

#### **Suggested MOOCs:**

- <https://www.mooc-list.com/course/cell-culture-basics-canvasnet>

#### **Methods of Assessment & Tools:**

(Though the credit has to be awarded at the end of the course i.e. two semesters, it is recommended to consolidated assessment in two stages one at end of each semester. Components used for assessment can be different as per the nature of the course)

<b>S.N.</b>	<b>Component</b>	<b>Content</b>	<b>Duration</b>	<b>Marks</b>	<b>Sub Total</b>
1	<b>Attendance</b>	--	--	<b>10</b>	
2	<b>Assignments</b>	--	--	<b>10</b>	
3	<b>Practical Skill Assessment</b> (Continuous Assessment during the semester)			<b>40</b> (20 Marks for Each Semester)	
4	<b>Course Mid Examination</b>			<b>20</b>	
5	<b>Course End Examination</b>			<b>20</b>	
<b>Total</b>				<b>100</b>	<b>100</b>

At the end of the course no marks are given, only remarks are given as follows:

**REMARKS:**

<b>Range of Marks</b>	<b>Remarks</b>
90-100	Excellent
75-89	Very Good
60-74	Good
40-59	Fair
< 40	Not Completed

Course Code	Course Title	Course Credit and Hours
<b>21AECO009</b>	Bioinformatics	<b>2 Credit -4 hrs / wk</b>

**Objective of the course:**

1. Understand the principle and applications of Bioinformatics
2. Analyze the nucleotide and protein sequences
3. Analyze the phylogenetic relationship among genic and protein sequences

**Target Skills (Course outcomes):**

1. Skill development for sequence analysis.
2. Develop the programming skill to solve biological problems.

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other):**

- The objective of the programme is to introduce career and market-oriented, skill enhancing add-on courses that have utility for job, self-employment and empowerment of the students.

**Reference:**

- Link [https://nsdcindia.org/sites/default/files/MC\\_LFSQ3905\\_Bioinformatics%20Scientist\\_v1\\_5May2021.pdf](https://nsdcindia.org/sites/default/files/MC_LFSQ3905_Bioinformatics%20Scientist_v1_5May2021.pdf) from NSDC
- The link of NPTEL- NOC: Bioinformatics: Algorithms and Applications, IIT Madras, <https://nptel.ac.in/courses/102106065>

**Course Description:**

Bioinformatics is a field of science that uses computational tools and techniques to analyze and interpret vast amounts of biological data. This course is designed to nurture the skills and knowledge required for aspiring students to develop algorithms and tools in bioinformatics. The course aims to address SDG 9: Industry, Innovation & Infrastructure.



<b>Course Content</b>	<b>Hours</b>
<b>Module-I: History, Scope and Importance</b>	9 hrs
<ul style="list-style-type: none"> <li>● Important contributions</li> <li>● Aims and scope of Bioinformatics</li> <li>● Applications of Bioinformatics-challenges and opportunities</li> <li>● Various file formats for biological sequences</li> </ul>	
<b>Module-II : Biological Databases</b>	9 hrs
<ul style="list-style-type: none"> <li>● Introduction and types of Biological databases</li> <li>● Bibliographic databases</li> <li>● Primary sequence databases- nucleic acid and protein</li> <li>● Secondary databases</li> </ul>	
<b>Module-III : Sequence Alignment Methods</b>	9 hrs
<ul style="list-style-type: none"> <li>● Basics of Sequence alignment</li> <li>● Pairwise sequence alignment methods: Dot Plot</li> <li>● Needleman Wunsch and Smith Waterman Algorithm</li> <li>● Multiple sequence alignment methods-Tools and application</li> </ul>	
<b>Module-IV : Sequence Similarity Searches-1</b>	9 hrs
<ul style="list-style-type: none"> <li>● Sequence-based database searches</li> <li>● BLAST- various versions and algorithm</li> <li>● FASTA- various versions and algorithms,</li> <li>● Interpretation of result of sequence similarity search tools</li> </ul>	
<b>Module-V : Predictive Methods Using DNA and Protein Sequences</b>	9hrs
<ul style="list-style-type: none"> <li>● Elements and Concepts of Phylogenetic analysis</li> <li>● Methods of Construction of phylogenetic trees</li> <li>● Character and distance-based algorithm</li> <li>● Reliability of trees. Bootstrap, jackknife tests</li> </ul>	

**Suggested laboratory experiments / other activities: ( 45 hrs)**

1. Review the quality of the data and view sequence traces
2. Assembling the sequences and correcting mistakes in the base calls
3. Vector Contamination tool: Vec Screen,
4. Data submission Tools: WebIn, Sequin, Bankit, Sakura.
5. To build query for retrieving scientific records from Pubmed database
6. Retrieving sequence records with NCBI's Entrez Nucleotides and EMBL
7. Getting the gene sequences by exploring and querying the nucleic acid databases.
8. Getting the protein sequences by exploring and querying the protein databases.
9. Sequence File format conversions
10. 3-D Structure Databases: PDB
11. To perform Sequence analysis by using EMBOSS: SMITH & WATERMAN
12. To find the similarity between sequences using FASTA
13. To find the similarity between sequences using BLAST
14. To align more than two sequences and find out the similarity between those sequences: Clustal Omega, Tcofee, MUSCLE
15. Identification of conserved regions in the MSA
16. To study the phylogenetic relationships of nucleotide and protein sequence(s) by using PHYLIP Package.
17. 3-D Protein structure visualization and measurement of bond length, bond angle & Torsion angles using RasMol.

**Pedagogic tools:**

1. Chalk and Talk
2. PPT and Videos.
3. Hands-on activities
4. Assignment
5. Group discussion

**Reference Books:**

1. Rastogi, S. C., Mendiratta, N., & Rastogi, P. (2003). Bioinformatics: Concepts, skills & applications. New Delhi: CBS & Distributor
2. Baxevanis, A.D., & Ouellette, B.F. (2001). Bioinformatics: A practical guide to the analysis of genes and proteins. New York: John Wiley & sons
3. David W.M (2004) "Bioinformatics sequence and genome Analysis", Cold spring harbor laboratory press.
4. Ignacimuthu, S. (2005). Basic bioinformatics. Harrow, Middlesex, U.K.: Alpha Science International.
5. Agostino, M. J. (2013). Practical bioinformatics. New York: Garland Science.
6. Ye, S. Q. (2008). Bioinformatics a practical approach. Boca Raton: Chapman & Hall/CRC.

#### Suggested reading / E-resources

<https://www.ncbi.nlm.nih.gov/books/NBK143764/>

#### Suggested MOOCs:

1. <https://nptel.ac.in/courses/102106065>
2. <https://www.coursera.org/specializations/bioinformatics>

#### Methods of Assessment& Tools:

S.N.	Component	Content	Duration	Marks	Sub Total
1	Attendance	--	--	10	
2	Assignments	--	--	10	
3	Practical Skill Assessment (Continuous Assessment during the semester)			40 (20 Marks for Each Semester)	
4	Course Mid Examination			20	
5	Course End Examination			20	
<b>Total</b>				<b>100</b>	<b>100</b>

**At the end of the course no marks are given, only remarks are given as follows:**

**REMARKS:**

<b>Range of Marks</b>	<b>Remarks</b>
90-100	Excellent
75-89	Very Good
60-74	Good
40-59	Fair
< 40	Not Completed

Course Code	Course Title	Course Credit and Hours
<b>21AECO010</b>	<b>Competitive Exams for Life Science</b>	<b>2 Credit - 4 hrs / wk</b>

**Objective of the course:**

1. Able to identify solutions to problems encountered in context of competitive exam.
2. Explain and apply appropriate analytical concepts to competitive exams in Life Sciences.
3. Able to recognize the component of various subjects and its weightage.
4. Build up the conceptual and logical reasoning in Science.

**Target Skills (Course outcomes) :**

1. Skill development to enhance the competency and concepts.
2. Skill development to crack various national level competitive exams in Life Science.

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other):**

- Course enables students to acquired requisite competency level for various entrance examinations.
- Improving human resource and fulfill the regional need by helping student to placed in institution of national reputes.

**Reference:**

<https://btm.gujarat.gov.in/network-biotech-capacity-building.htm>

**Course Description:**

The course provides support to students while they prepare for various competitive tests in Life science. This will make it easier for students to prepare for further higher education and, as a result, expand their professional options. In the beginning of the course provide information about contents of general Biology which is fundamental for any exam in life science and next three modules about applied Biology and end of the course contented with right mix of physics and chemistry. Entire contents selected are very important in context of entrance examination. Course is perfect blend and in right proportion from different subject, so that they can plan their preparation methodically. The course aims to address SDG 4: Quality education.

Course Content	Hours
<b>Module-I: General Biology</b>	20 hrs

<ul style="list-style-type: none"> <li>● Cell organelles and their function, internal transport systems of plants and animal.</li> <li>● Cellular reproduction and regulation</li> <li>● Cytoskeleton, Signaling, Cancer Biology.</li> <li>● populations and communities, genesis and diversity of organisms, evolution;</li> <li>● Animal hormones, Plant hormones, Plant and animal diseases.</li> </ul>	
<b>Module-II : Basics of Biochemistry</b>	20 hrs
<ul style="list-style-type: none"> <li>● Vitamins &amp; Enzyme mechanisms and kinetics</li> <li>● Carbohydrates structure and function catabolism &amp; anabolism</li> <li>● Protein structure, amino acid metabolism</li> <li>● Fatty acid catabolism, oxidation of fatty acid.</li> <li>● Fatty acid anabolism, Cholesterol &amp; its derivatives</li> </ul>	
<b>Module-III : Classical and Molecular genetics</b>	20 hrs
<ul style="list-style-type: none"> <li>● Problems on Mendelian principles &amp; penetrance and expressivity</li> <li>● linkage and crossing over, sex linkage</li> <li>● Mutagen and mode of action, Genome organization, population genetics.</li> <li>● Replication, Transcription &amp; Translation</li> <li>● Gene regulation in prokaryotes &amp; eukaryotes</li> </ul>	
<b>Module-IV : Microbiology, Immunology, Applied Biology</b>	20 hrs
<ul style="list-style-type: none"> <li>● General characteristics of Algae, Fungi, Bacteria, Viruses.</li> <li>● Antibiotics &amp; mode of action, bacterial genetics, archaeobacteria</li> <li>● Type of immunity, cell &amp; organ of immune system, Antigen and Antibody.</li> <li>● MHC, compliment system, cytokine, hypersensitivity, Autoimmunity, HIV &amp; other immunodeficiency.</li> <li>● Genetic engineering Tissue culture and its application, Animal Cell culture</li> </ul>	
<b>Module-V : Physical and Chemical Science</b>	20 hrs

<ul style="list-style-type: none"><li>● Motion, Work, Energy and Power, Thermodynamics, Gravitation, simple harmonic motion, Circular motion, Projectile Motion, Work, energy &amp; power, Friction</li><li>● Optics &amp; Dual Nature of Matter and Radiations, Electrostatics &amp; Current electricity</li><li>● Magnetic Effects of Current, Semiconductor Devices &amp; logic gates</li><li>● Bonding, Periodic properties, Coordination compounds, Chemical equilibrium &amp; kinetics, Acid-base concepts., Mechanism of organic reactions, Periodic properties</li><li>● Chemistry of Functional Groups, Important Aromatic hydrocarbons</li></ul>	
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**Suggested laboratory experiments / other activities: NA**

**Pedagogic tools:**

1. Chalk and Talk
6. Power point presentation
7. Assignment
8. Group discussion

**Reference Books:**

- 1 Hopkins, W.G. and Huner, A. (2008). Introduction to Plant Physiology. 4th edition, John Wiley and Sons. U. S.A.
- 2 Gyton C. and Hall J.E. (2011) Textbook of Medical Physiology, 11<sup>th</sup> edition, Elsevier, USA.
- 3 Nelson, D. L., Lehninger, A. L., & Cox, M. M. (2008). *Lehninger principles of biochemistry*. Macmillan.
- 4 Odum, E.P. (2005). Fundamentals of ecology. 5<sup>th</sup> edition Cengage Learning India Pvt. Ltd., New Delhi.
- 5 Stryer, B. (1981). *Biochemistry*. San Francisco. WH Freeman and Co.
- 6 Nelson & Cox (2013) Lenhinger. Principles of Biochemistry, 6th Edition, W. H. Freeman, USA
- 7 Voet & Voet (2011) Fundamentals of Biochemistry, 4<sup>th</sup> Edition, John Wiley & Sons, USA
- 8 Raghavan, V. (2000) Developmental Biology of Flowering plants, Springer, Netherlands
- 9 Cooper, G. M., & Hausman, R. E. (2000) The cell, Sunderland: Sinauer Associates.
- 10 Agarwal, R.S. (2013) Quantitative Aptitude for Competitive Examinations, 20th edition, S Chand.
- 11 Watson, J. D., Baker, T. A., Bell, S. B., Gann, A., Levine, M., & Losick, R. (2008). *Molecular biology of the gene*. 6<sup>th</sup> edn. New York: Pearson Education.
- 12 Brown, T. A. (2006). *Genomes*. Garland science
- 13 Wilson, K., & Walker, J. (2010). *Principles and Techniques of Biochemistry and Molecular Biology* (7<sup>th</sup> Edition). Cambridge University Press.
- 14 Abbas, A. K., Lichtman, A. H., & Pillai, S. (2014). Basic immunology: functions and disorders of the immune system. Elsevier Health Sciences.
- 15 Morrison R.T. (2010), Organic Chemistry, 7<sup>th</sup> edition, Pearson Education, USA.
- 16 Lee J.D. (2008) Concise Inorganic Chemistry, Oxford; Fifth edition
- 17 Verma H.C. (2015) Concepts of Physics, vol-1 & 2, Bharati Bhawan, India
- 18 Halliday, D., Resnick, R., Walker, J. (1960) Fundamental of Physics, John Wiley & Sons, Inc.

### **Suggested reading / E-resources-NA**

### **Suggested MOOCs: NA**

### **Methods of Assessment & Tools:**

(Though the credit has to be awarded at the end of the course i.e. two semesters, it is recommended to consolidated assessment in two stages one at end of each semester. Components used for assessment can be different as per the nature of the course)



S.N.	Component	Content	Duration	Marks	Sub Total
1	Attendance	--	--	10	
2	Assignments	--	--	10	
3	Practical Skill Assessment (Continuous Assessment during the semester)			40 (20 Marks for Each Semester)	
4	Course Mid Examination			20	
5	Course End Examination			20	
<b>Total</b>				<b>100</b>	<b>100</b>

At the end of the course no marks are given, only remarks are given as follows:

**REMARKS:**

Range of Marks	Remarks
90-100	Excellent
75-89	Very Good
60-74	Good
40-59	Fair
< 40	Not Completed

Course Code	Course Title	Course Credit and Hours
21AECO011	<b>Quantitative Aptitude &amp; Logical Reasoning for Government &amp; Bank Competitive Exams</b>	<b>2 Credit – 6hrs / wk</b>

**Objective of the course:**

1. Create awareness among the youth of Saurashtra particularly from the deprived sections, about aims and objectives, procedures and relative advantages of various competitive examinations.
2. Inculcate in them the culture of serving the community and the nation.
3. Plan and conduct coaching and training programmes for successful participation in competitive examination.

**Target Skills (Course outcomes) :**

1. To solve reasoning problems for competitive exams.
2. To solve common mathematical problems for competitive exams.

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other) :**

- The Quantitative aptitude & logical reasoning for government and bank exam is to focus on successful participation of students in competitive exams.

**References:**

Link Regional needs of the course: <https://gpsc.gujarat.gov.in/>

**Course Description:**

- This course will require general logical skills to solve common problems that will help them to build confidence to face and clear any competitive exam.
- SDG 4: Quality education

<b>Course Content</b>	<b>Hours</b>
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<b>Module-I: General Fundamentals of Mathematics for Competitive Exams</b>	15hrs
<ul style="list-style-type: none"> <li>Number system and its applications, whole number system and introduction to vedic mathematic techniques and basics of mathematics.</li> </ul>	
<b>Module-II : Arithmetic</b>	65hrs
<ul style="list-style-type: none"> <li>Introduction, simplification, Income-expenditure, number and value of coins, HCF &amp; LCM, Average, work and wages, installments, surds and exponent, boat and streams, pipes and cistern, 2D and 3D concepts and applications, linear motion, circular motion, concepts of negative remainder and positive remainder, fundamentals related to arithmetic and applications in day today life.</li> </ul>	
<b>Module-III : Algebra</b>	20 hrs
<ul style="list-style-type: none"> <li>Permutation &amp; Combination, Coordinate Geometry, Liner equation, Quadratic equation, Factorization, Polynomial equations and its solutions, factorization of various equations.</li> </ul>	
<b>Module-IV : Trigonometry &amp; Geometry</b>	25hrs
<ul style="list-style-type: none"> <li><b>Trigonometry:</b> Trigonometric Ratio and Identities, Trigonometric Functions &amp; their Properties, Height and Distance,</li> <li><b>Geometry:</b> Angels &amp; sides related properties, Theorems of Geometry, Properties of triangles, Similarity &amp; Congruence related Postulates</li> </ul>	
<b>Module-V : Reasoning</b>	35hrs
<ul style="list-style-type: none"> <li><b>Verbal Reasoning :</b> Data Interpretation, Data sufficiency, Data Analysis and Miscellaneous</li> <li><b>Non - Verbal Reasoning:</b> Miscellaneous questions related to non-verbal reasoning</li> <li><b>Practical:</b> Practice Session &amp;Wkly Multiple objective test of 25 marks</li> </ul>	

**Pedagogic tools:**

<ol style="list-style-type: none"> <li>1. Chalk and Talk</li> <li>2. PPT and Videos.</li> <li>3. Assignment</li> </ol>
<b>Reference Books:</b>
<ol style="list-style-type: none"> <li>1. Quantitative aptitude by Agrawal R. S. , Publishers: S. Chand &amp; Co., New Delhi</li> <li>2. Objective Arrithmetic by Rajesh Verma, Publishers: Arihant Publications (India) Ltd. , New Delhi</li> <li>3. QuickwerMaths by M. Tyra, Publishers: BSC Publishing Co. Pvt. Ltd., Delhi</li> <li>4. Analytical Reasoning by M K Pandey, Publishers: BSC Publishing Co. Pvt. Ltd., Delhi</li> <li>5. Reasoning by Agrawal R. S ,Publishers:Kiran Publication, New delhi.</li> <li>6. Reasoning, Verbal, Non verbal&amp; Analytical by B S Sijwali&amp;InduSijwali Publishers: Arihant Publications (India) Ltd. , New Delhi</li> </ol>

#### Methods of Assessment & Tools:

S.N.	Component	Content	Duration	Marks	Sub Total
1	<b>Attendance</b>	--	--	<b>10</b>	<b>10</b>
2	<b>Assignments</b>	--	--	<b>10</b>	<b>10</b>
3	<b>Practical Skill Assessment*</b> (Continuous Assessment during the semester)	<b>Module 1 and 2</b>	<b>1 Hr</b>	<b>20</b>	<b>40</b>
		<b>Module 3,4 and 5</b>	<b>1 Hr</b>	<b>20</b>	
4	<b>Course Mid Examination</b>	<b>Module 1 and 2</b>	<b>1 Hr</b>	<b>20</b>	<b>20</b>
5	<b>Course End Examination</b>	<b>Module 3,4 and 5</b>	<b>1 Hr</b>	<b>20</b>	<b>20</b>
<b>Total</b>				<b>100</b>	<b>100</b>

\* MCQ test based on State/National level competitive Exams for Government Organizations.

**At the end of the course no marks are given, only remarks are given as follows:**

#### REMARKS:

Range of Marks	Remarks
90-100	Excellent

75-89	Very Good
60-74	Good
40-59	Fair
< 40	Not Completed

Course Code	Course Title	Course Credit and Hours
<b>21AECO012</b>	Treatment of Environmental Waste	<b>2 Credits - 4 hrs / wk</b>

**Objective of the course:**

1. Gain insight into the design and recycling of municipal solid waste.
2. Understand the student to various treatments for recycling of gas and wastewater for reuse and disposal.
3. Understand the design and operation of Plastic waste-to-energy facility.
4. Develop a basic knowledge about the E-waste recycling process.

**Target Skills (Course outcomes) :**

1. Skill development to demonstrate paper recycling units.
2. Skill development to identify the environmental problems and solve with possible ways.

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other) :**

- Waste Management is basically all those activities, which are required to manage waste from its beginning to the final disposal. Waste Management majorly includes things like the collection, transport, treatment, and the ultimate disposal of waste with a high level of monitoring and regulation. The prospects of Waste Management in our country have reached its highest level today and the field is considered to be a great career option.
- If we want clean water and sanitation (**SDG 6**), we need to be looking at waste. It's a key vector of disease, and provides abundant breeding grounds for mosquitoes. Women in particular can benefit hugely from improved waste management, through independent earning opportunities (**SDG 5**) and protecting their families from sickness caused by open dumping and burning.

**Reference:**

<https://wasteaid.org/waste-sustainable-development-goals/>

**Course Description:**

- This course describes Solid Waste Management, Waste water Treatment, Gas Treatment, E-waste and Plastic Waste aspects. The topics will include: generation rates and waste composition; Integrated waste management issues, collection, recovery, reuse, recycling, energy-from waste, biological treatment of the organic waste fraction - direct land application, composting, and anaerobic digestion. The environmental impact of waste management and its relationship on the big picture sustainable development will be discussed.

<b>Course Content</b>	<b>Hours</b>
<b>Module-I: Municipal Solid Waste Treatment</b>	20 hrs
<ul style="list-style-type: none"> <li>● Definition of solid waste,</li> <li>● Waste generation,</li> <li>● Sources and types of solid waste</li> <li>● Sampling and characterization,</li> <li>● Determination of composition of MSW, storage and handling of solid waste.</li> <li>● Unit operations for separation and processing, Materials Recovery facilities,</li> <li>● Energy recovery – Incinerators</li> </ul>	
<b>Module-II : Waste Water Treatment</b>	20 hrs
<ul style="list-style-type: none"> <li>● Sources and types of waste water.</li> <li>● Physical, chemical and biological treatment of waste water:</li> <li>● Primary treatment- sedimentation, primary clarifier, final clarifier, flocculation.</li> <li>● Secondary treatment- Trickling filter, activated sludge process, biological tower, combined filtration and aeration process.</li> <li>● Tertiary treatment - Chemical precipitation, Membrane filtration, Reverse osmosis, Ion exchange, Electro-dialysis and Effluent disinfections,</li> <li>● Design aspects of effluent treatment plant (ETP),</li> <li>● Concept, operation and maintenance of common effluent treatment plant (CETP).</li> <li>● Reuse of treated water in industries, agriculture, oil refineries, thermal power stations and domestic uses.</li> </ul>	
<b>Module-III : Gas Treatment</b>	10 hrs
<ul style="list-style-type: none"> <li>● Various sources of waste gases,</li> <li>● Recovery of important gases CO<sub>2</sub>, SO<sub>2</sub>, NO etc.</li> <li>● Recycling process: Electrostatic precipitation, bag filters, wet/dry grid arrestors.</li> <li>● Absorption in liquids by Scrubbers, adsorption on solids.</li> <li>● Combustion: flaring, thermal incineration, catalytic oxidation</li> </ul>	

<b>Module-IV : Electronic Waste (E-Waste) Treatment</b>	10 hrs
<ul style="list-style-type: none"> <li>● Sources of generation, categories, segregation, constituents of E-wastes,</li> <li>● Collection and transport, recycling of e-waste and its environmental consequences,</li> <li>● E-Waste (Handling and Management) Rules 2011.</li> </ul>	
<b>Module-V : Plastic Waste Treatment</b>	20 hrs
<ul style="list-style-type: none"> <li>● Introduction to Plastic Waste,</li> <li>● Sources, Separation processes: Primary recycling, secondary recycling, and tertiary recycling.</li> <li>● Use of waste plastic as filler,</li> <li>● Recycling of Various Plastics: HDPE, Acrylics, PET, PVC, Engg. Plastics, Medical Plastics.</li> </ul>	

**Suggested laboratory experiments / other activities:**

1. Group Discussion
2. Quiz

**Pedagogic tools:**

1. Chalk and Talk
2. PPT and Videos.
3. Assignment

**Reference Books:**



1. Hammer, M. J. and Hammer M. J. Jr., (2002), *Water and Wastewater Technology-IV*. India: Prentice Hall of India.
2. Leidner, J., (2004), *Plastic waste: Recovery of Economic Value*. USA: Marcel Dekker Inc.
3. Rao, M. N., (1993). *Air pollution*. New York: Mcgraw Hill.
4. Kreith, F. and Tchobanoglous, G.(2002),*Handbook of Solid Waste Management*. New York: McGraw Hill Professional
5. Rao, M. N and Datta, A. K. (2012),*Wastewater Treatment*. New Delhi: IBH Publishing Company.

#### Suggested reading / E-resources

1. <https://www.classcentral.com/course/swayam-solid-and-hazardous-waste-management-14299>

#### Suggested MOOCs:

1. <https://nptel.ac.in/courses/105106056>

#### Methods of Assessment & Tools:

(Though the credit has to be awarded at the end of the course i.e. two semesters, it is recommended to consolidated assessment in two stages one at end of each semester. Components used for assessment can be different as per the nature of the course)

S.N.	Component	Content	Duration	Marks	Sub Total
1	Attendance	--	--	10	
2	Assignments	--	--	10	
3	Practical Skill Assessment (Continuous Assessment during the semester)			40 (20 Marks for Each Semester)	
4	Course Mid Examination			20	
5	Course End Examination			20	

<b>Total</b>	<b>100</b>	<b>100</b>
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**At the end of the course, no marks are given, only remarks are given as follows:**

**REMARKS:**

<b>Range of Marks</b>	<b>Remarks</b>
90-100	Excellent
75-89	Very Good
60-74	Good
40-59	Fair
< 40	Not Completed

Course Code	Course Title	Course Credit and Hours
<b>21AECO013</b>	<b>Quality Assurance in Industry</b>	<b>2 Credits - 4 hrs / wk</b>

**Objective of the course:**

- Understand Good Regulatory Practices in the Healthcare and related Industries.
- Prepare for the readiness and conduct of audits and inspections.
- Develop and implement the check lists and SOPs for various Good Regulatory Practices

**Target Skills (Course outcomes) :**

1. Skill development to provide knowledge of tools, methods, and concepts of quality assurance.
2. Skill to develop new standards for production and design, with improvements as needed, and create testing protocols for implementation across all service lines

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other) :**

- QA/QC is the combination of quality assurance, the process or set of processes used to measure and assure the quality of a product, and quality control, the process of ensuring products and services meet consumer expectations.
- Quality assurance is the process oriented and focuses on defect prevention, while quality control is product oriented and focuses on defect identification.

Quality assurance is a wide ranging concept and covering all matters that individually or collectively influence the quality of product and it follows **SDG 3** regarding good health and Well-being.

**Reference:**

<https://sdgs.un.org/goals>

**Course Description:**

- Quality assurance (QA) is a way of preventing mistakes and defects in manufactured products and avoiding problems when delivering products or services to customers; which ISO 9000 defines as "part of quality management focused on providing confidence that quality requirements will be fulfilled". This defect prevention in quality assurance differs subtly from defect detection and rejection in quality control.
- Quality assurance comprises administrative and procedural activities implemented in a quality system so that requirements and goals for a product, service or activity will be fulfilled. It is the systematic measurement, comparison with a standard, monitoring of processes and an associated feedback loop that confers error prevention. This can be contrasted with quality control, which is focused on process output.

<b>Course Content</b>	<b>Hours</b>
<b>Module-I: Introduction To Good Manufacturing Practices</b>	15 hrs
<ul style="list-style-type: none"><li>● Introduction to Current Good Manufacturing Practices</li><li>● Principles of GMP (Directive 91/356/EEC),Article 6 to Article 14</li><li>● WHO cGMP guidelines GAMP-5</li><li>● Medical device, IVDs Global Harmonization Task Force(GHTF) Guidance docs</li></ul>	
<b>Module-II : Fundamental Of Good Laboratory Practices</b>	15 hrs
<ul style="list-style-type: none"><li>● Good Laboratory Practices: Introduction, USFDA GLP Regulations</li><li>● Controlling the GLP inspection process</li><li>● Documentation, Audit, goals of Laboratory Quality Audit, Audit tools</li><li>● Future of GLP regulations</li></ul>	
<b>Module-III : Good Automated Laboratory Practices</b>	15 hrs
<ul style="list-style-type: none"><li>● Good Automated Laboratory Practices: Introduction to GALP</li><li>● Principles of GALP, GALP Requirements, SOPs of GALP</li><li>● Training Documentation</li><li>● Software Evaluation checklist, relevant ISO and QCI Standards</li></ul>	
<b>Module-IV : Good Distribution Practices</b>	15 hrs

<ul style="list-style-type: none"> <li>● Good Distribution Practices: Introduction to GDP</li> <li>● Principles, Personnel, Documentation, Premises and Equipment</li> <li>● Deliveries to Customers, Returns, Self-Inspection</li> <li>● Provision of information, Stability testing principles</li> <li>● WHO GDP, USP GDP (Supply chain integrity)</li> <li>● CDSCO guidance and ISO standards.</li> </ul>	
<b>Module-V : Concepts Of Quality Management</b>	20 hrs
<ul style="list-style-type: none"> <li>● Quality management systems: Concept of Quality,</li> <li>● Total Quality Management, Quality by design, Six Sigma concepts,</li> <li>● Types of Qualification, Validation master plan (VMP)</li> <li>● Validation of utilities [Compressed air, steam, water systems]</li> <li>● Heat Ventilation and Air conditioning (HVAC) and Cleaning Validation.</li> <li>● The International Conference on Harmonization (ICH) process, ICH guidelines to establish quality, safety and efficacy of drug substances and products, ISO 13485 and other relevant CDSCO regulatory guidance documents.</li> </ul>	

**Suggested laboratory experiments / other activities:**

1. Group Discussion
2. Quiz

**Pedagogic tools:**

1. Chalk and Talk
4. PPT and Videos
5. Assignment

**Reference Books:**

1. Vikash Kumar Chaudhari, Vijay Yadav, Praveen Kumar Verma<sup>1</sup>, Amit Kumar Singh Review On Good Manufacturing Practice (Gmp) For Medicinal Products
2. John Sharp.,(2004),*Good Pharmaceutical Manufacturing Practice: Rationale and Compliance*, U.S.CRC Press
3. Donald C.Singer,(2005),*Laboratory Auditing for Quality and Regulatory compliance*,CRC Press

#### Suggested reading / E-resources

1. <https://www.onlinegmptraining.com/product/good-laboratory-practice-glp>
2. <https://www.cfpie.com/insights-blog/understanding-pharmaceutical-guidelines-glp-vs-gmp>

#### Suggested MOOCs:

1. <https://alison.com/course/an-introduction-to-good-lab-practices>
2. <https://alison.com/course/food-safety-good-manufacturing-practices-gmp-in-the-food-industry>

#### Methods of Assessment & Tools:

(Though the credit has to be awarded at the end of the course i.e. two semesters, it is recommended to consolidated assessment in two stages one at end of each semester. Components used for assessment can be different as per the nature of the course)

S.N.	Component	Content	Duration	Marks	Sub Total
1	<b>Attendance</b>	--	--	<b>10</b>	
2	<b>Assignments</b>	--	--	<b>10</b>	
3	<b>Practical Skill Assessment</b> (Continuous Assessment during the semester)			<b>40</b> (20 Marks for Each Semester)	
4	<b>Course Mid Examination</b>			<b>20</b>	
5	<b>Course End Examination</b>			<b>20</b>	

<b>Total</b>	<b>100</b>	<b>100</b>
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**At the end of the course, no marks are given, only remarks are given as follows:**

**REMARKS:**

<b>Range of Marks</b>	<b>Remarks</b>
90-100	Excellent
75-89	Very Good
60-74	Good
40-59	Fair
< 40	Not Completed

Course Code	Course Title	Course Credit and Hours
<b>21AECO014</b>	<b>Bio Chemical Instrument Calibration And Maintenance</b>	<b>2 Credit - 4 hrs / wk</b>

**Objective of the course:**

1. To familiarize the students with different instruments like spectrophotometer, Audio Frequency oscillators, PH meter, PCR machine, Incubator. Conductivity meter, Polari meter etc.
2. To understand importance of calibration for measuring instruments.
3. To develop understanding among the students for the functioning and applications of the various instruments.

**Target Skills (Course outcomes) :**

1. Students will understand importance of Instrument Calibration.
2. Students shall be able to perform documentation and maintenance of instruments
3. Students will be aware about different types of instruments and their applications.

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other) :**

- Instrument Calibration and Maintenance.
- The course shall develop instrument handling skills) in students and help them to be industry ready.
- The course shall be useful for students wants to place in the industrial sectors such as Pharmaceutics, Food and dairy, agriculture and soil measurement and entrepreneur.

**Reference:**

Link from NSDC Complete documentation and record keeping related to performing food lab activities

- [https://nsdcindia.org/sites/default/files/CSC\\_Q0802\\_Technician\\_Instrumentation\\_1\\_02.07.2018.pdf](https://nsdcindia.org/sites/default/files/CSC_Q0802_Technician_Instrumentation_1_02.07.2018.pdf)



**Course Description:**

- The course is designed to develop knowledge and skills about Instrument Calibration And Maintenance. By opting this course students are get familiarized with various sophisticated instruments and their applications in the various sectors. The course aims to address SDG 9: Industry, Innovation and Infrastructure.

<b>Course Content</b>	<b>Hours</b>
<b>Module-I: SPECTROPHOTOMETER</b>	16 hrs
<ul style="list-style-type: none"><li>● Introduction to spectrophotometer and types of spectrophotometer</li><li>● Calibration requirements, Types of Calibration</li><li>● Maintenance</li><li>● Spectrophotometer applications, Structure identification</li><li>● To study rate of reaction, Determination of dissociation constant</li></ul>	
<b>Module-II : FI-IR</b>	16hrs
<ul style="list-style-type: none"><li>● Introduction to IR spectrum</li><li>● Infrared Spectroscopy</li><li>● Instrumentation</li><li>● Principle and working</li><li>● Analysis of spectrum and data interpretation</li><li>● Applications</li></ul>	
<b>Module-III : INCUBATOR</b>	16 hrs
<ul style="list-style-type: none"><li>● Introduction, Principle and working, Calibration methods</li><li>● Quality control and maintenance</li><li>● Applications, Growth and storage of bacterial cultures, Biochemical and haematological studies</li><li>● Pharmaceutical work and food analysis, Genetic engineering</li><li>● To create new organism, To make insulin and other essential biological proteins, to improve nutritional content of fruits.</li></ul>	
<b>Module-IV : PCR MACHINE</b>	16 hrs
<ul style="list-style-type: none"><li>● Introduction, Construction and working</li><li>● Calibration methods, maintenance</li><li>● Sample Acquisition and Preparation</li><li>● Applications of PCR machine genetic testing, Prenatal testing Forensic applications, to understand genetic fingerprinting</li></ul>	

<b>Module-V : PH METER</b>	16 hrs
<ul style="list-style-type: none"> <li>● Introduction, construction and working</li> <li>● Calibration and maintenance</li> <li>● Types of PH meter</li> <li>● Application of PH meter, Chemical laboratory work</li> <li>● Soil measurement in agriculture, measurement of water quality for water supply system</li> </ul>	

<b>Suggested laboratory experiments / other activities:</b>	40 hrs
<ul style="list-style-type: none"> <li>● Calibration of PH meter</li> <li>● Maintenance and calibration of polari meter</li> <li>● Maintenance and calibration of Microscopes</li> <li>● Maintenance of Air oven</li> <li>● Maintenance and calibration of Ultrasonic non-destructive tester</li> </ul>	

**Pedagogic tools:**

1. Chalk and Talk
2. PPT and Videos.
3. Hands-on activities
4. Assignment
5. Group discussion

**Reference Books:**

1. J Michael Hollas, Modern Spectroscopy, Wiley publication.
2. John H Moore, Building Scientific instruments, Cambridge university press.
3. Degen, PCR applications manuals 3<sup>rd</sup> edition.
4. Stephen A Busin, A to Z of Quantitative PCR , Intl Univ line

**Suggested reading / E-resources**

1. <https://resources.beamex.com/calibration-essentials-e-book>
2. <https://www.isa.org/training-and-certification/isa-training/instructor-led/course-descriptions/ti25>
3. <https://www.dsslearning.com/calibration-test-equipment-6-part-series/CTE099/>

**Suggested MOOCs:**

1. <https://www.dsslearning.com/calibration-test-equipment-6-part-series/CTE099>
2. <https://www.classcentral.com/course/udemy-introduction-to-process-control-and-instrum-60320>

**Methods of Assessment & Tools:**

(Though the credit has to be awarded at the end of the course i.e. two semesters, it is recommended to consolidated assessment in two stages one at end of each semester. Components used for assessment can be different as per the nature of the course)

<b>S. N.</b>	<b>Component</b>	<b>Content</b>	<b>Duration</b>	<b>Marks</b>	<b>Sub Total</b>
1	<b>Attendance</b>	--	--	<b>10</b>	<b>10</b>
2	<b>Assignments</b>	--	--	<b>10</b>	<b>10</b>
3	<b>Practical Skill Assessment</b> (Continuous Assessment during the semester)	--	2 Hour	<b>20</b> (For Each Semester)	<b>40</b>
4	<b>Course Mid Examination</b>	Any two Modules	1 Hour	<b>20</b>	<b>20</b>
5	<b>Course End Examination</b>	All 5 Modules	1 Hour	<b>20</b>	<b>20</b>
<b>Total</b>				<b>100</b>	<b>100</b>

**At the end of the course no marks are given, only remarks are given as follows:**

<b>Range of Marks</b>	<b>Remarks</b>
90-100	Excellent
75-89	Very Good
60-74	Good
40-59	Fair
< 40	Not Completed

Course Code	Course Title	Course Credit and Hours
<b>21AECO015</b>	<b>Statistics Using R Programming</b>	<b>2 Credit - 4 hrs / wk</b>

**Objective of the course:**

1. Use R for analytical programming.
2. Implement data structure in R.
3. To compute and interpret various measures of central tendency and dispersion.
4. Data visualization in R.

**Target Skills (Course outcomes) :**

1. Describe key terminologies, concepts and techniques employed in Statistical Analysis.
2. Define Calculate, central tendency and variation in data to solve a wide variety of problems.

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other) :**

Any data analysis is incomplete without statistics. After getting the data, any statistical analysis starts with descriptive statistics which aims to extract the information hidden inside the data. The tools of descriptive statistics are based on mathematical and statistical functions which are to be evaluated using the software. The statistical software are paid as well as free. Most of the statistical software are paid software. Popular free statistical software is R. What are the basic tools of descriptive statistics and how to use the R software for descriptive statistical analysis is the objective of the course to be taught.

**Reference:**

- <https://nielit.gov.in/calicut/calicut/content/online-course-data-analytics-using-r>

**Course Description:**

- The following modules comprises of R programming basics and application of several Statistical Techniques using it. The modules aim to provide exposure in terms of Statistical Analysis, Graphical plot, Central tendency and variation in data using R programming language.
- This course is aimed to address SDG-9: Industry, Innovative and Infrastructure.

<b>Course Content</b>	<b>Hours</b>
<b>Module-I: Introduction to R Software and Calculations with R Software</b>	16 hrs
<ul style="list-style-type: none"> <li>● Installation and use of software</li> <li>● Data editing</li> <li>● Use of R as a calculator</li> <li>● Calculations with Data Vectors</li> <li>● Built-in Commands and Missing Data Handling</li> <li>● Operations with Matrices</li> </ul>	
<b>Module-II : Introduction to Descriptive Statistics, Frequency Distribution</b>	16 hrs
<ul style="list-style-type: none"> <li>● Objectives, Steps and Basic Definitions</li> <li>● Variables and Types of Data</li> <li>● Absolute Frequency, Relative Frequency and Frequency Distribution</li> <li>● Frequency Distribution and Cumulative Distribution Function</li> </ul>	
<b>Module-III : Graphics and Plots</b>	16 hrs
<ul style="list-style-type: none"> <li>● Bar Diagrams</li> <li>● Subdivided Bar Plots and Pie Diagrams</li> <li>● 3D Pie Diagram and Histogram</li> <li>● Kernel Density and Stem - Leaf Plots</li> </ul>	
<b>Module-IV : Central Tendency of Data</b>	16 hrs
<ul style="list-style-type: none"> <li>● Arithmetic Mean</li> <li>● Median</li> <li>● Quartiles</li> <li>● Mode, Geometric Mean and Harmonic Mean</li> </ul>	
<b>Module-V : Variation in Data</b>	16 hrs
<ul style="list-style-type: none"> <li>● Range, Inter quartile Range and Quartile Deviation</li> <li>● Absolute Deviation and Absolute Mean Deviation</li> <li>● Mean Squared Error, Variance and Standard Deviation</li> <li>● Coefficient of Variation and Box plots</li> </ul>	

**Suggested laboratory experiments / other activities:**

1. Installation of R Software.
2. Calculations using R.
3. Graphical Plotting using R.
4. Computation of measures of central tendency and variation using R.

**Pedagogic tools:**

1. Chalk and Talk
2. PPT and Videos
3. Assignment
4. Group discussion

**Reference Books:**

1. F.Z. Alain, N.I. Elena and H.W.G.M. Erik,(2009), A Beginner's Guide to R, Springer
2. L.M. Pierre, D. Rémy and L. Benoit,(2013), The R Software-Fundamentals of Programming and Statistical Analysis ,Springer
3. S.C. Gupta and V. K. Kapoor,(2014), Fundamentals of Mathematical Statistics (12<sup>th</sup> Edition), Sultan

**Suggested reading / E-resources**

1. <https://www.coursera.org/projects/getting-started-with-r>
2. <https://www.udemy.com/course/statistics-using-r/>
3. <https://www.datacamp.com/courses/introduction-to-statistics-in-r>

**Suggested MOOCs:**

1. <https://nptel.ac.in/courses/111104120>
2. <https://nptel.ac.in/courses/111104100>

**Methods of Assessment & Tools:**

(Though the credit has to be awarded at the end of the course i.e. two semesters, it is recommended to consolidated assessment in two stages one at end of each semester. Components used for assessment can be different as per the nature of the course)

<b>S.N.</b>	<b>Component</b>	<b>Content</b>	<b>Duration</b>	<b>Marks</b>	<b>Sub Total</b>
1	<b>Attendance</b>	--	--	<b>10</b>	10
2	<b>Assignments</b>	--	--	<b>10</b>	10
3	<b>Practical Skill Assessment</b> (Continuous Assessment during the semester)	--	--	<b>40</b> (20 Marks for Each Semester)	40
4	<b>Course Mid Examination</b>	2 Modules	--	<b>20</b>	20
5	<b>Course End Examination</b>	5 Modules	--	<b>20</b>	20
<b>Total</b>				<b>100</b>	<b>100</b>

**At the end of the course no marks are given, only remarks are given as follows:**

**REMARKS:**

<b>Range of Marks</b>	<b>Remarks</b>
90-100	Excellent
75-89	Very Good
60-74	Good
40-59	Fair
< 40	Not Completed

Course Code	Course Title	Course Credit and Hours
<b>21AECO016</b>	Herbal Medicine	<b>2 Credit - 4 hrs / wk</b>

**Objective of the course:**

1. Understand raw material as source of herbal drugs.
2. Know use of plants in treatment of diseases.
3. Identify the medicinally active constituents in plants.
4. Know the evaluation parameters of herbal drugs.
5. Understand the traditional medicinal system.
6. Know the role of herbal drugs in cosmetics.
7. Know about herbal drugs as biopesticides.

**Target Skills (Course outcomes) :**

1. Skill development to identify herbal drugs.
2. Skill development to evaluate herbal medicine.
3. Skill development to formulate herbal products.



**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other) :**

- Herbal medicine course mapping with National Skill Development Corporation (NSDC):
  - QP Name: Ayurveda Ahara & Poshana Sahayak
    - QP Code: HSS/Q3901
    - QP Version: 1.0
    - NSQF Level: 4
    - Model Curriculum Version: 1.0
    - Module 2: Introduction to Basic principles of Ayurveda and their significance
    - Module 5: Importance of Ahara in Health and Disorders
  - QP Name: Ayurveda Dietician
    - QP Code: HSS/Q3902
    - QP Version: 1.0
    - NSQF Level: 5
    - Model Curriculum Version: 1.0
    - Module 2: Introduction to Basic principles of Ayurveda and their significance
    - Module 6: Importance of Ahara in Health and Disorders
    - Module 9: Ayurvedic Diet for lifestyle disorders
    - Module 10: Kitchen spices and their therapeutic uses

**Reference:**

[https://nsdcindia.org/sites/default/files/MC\\_HSSQ3901\\_Ayurveda%20Ahara%20and%20Poshana%20Sahayak\\_V1.0\\_27.08.2020.pdf](https://nsdcindia.org/sites/default/files/MC_HSSQ3901_Ayurveda%20Ahara%20and%20Poshana%20Sahayak_V1.0_27.08.2020.pdf)

[https://nsdcindia.org/sites/default/files/MC\\_HSSQ3902\\_Ayurveda%20Dietician\\_V1.0\\_27.08.2020.pdf](https://nsdcindia.org/sites/default/files/MC_HSSQ3902_Ayurveda%20Dietician_V1.0_27.08.2020.pdf)

**Course Description:**

- The Herbal Medicine course provides basic learning regarding use of various herbs as alternative medicine. The course includes overview, classification, adulteration, methods for evaluation of herbal drugs. This course also provides basic knowledge of active constituents present in medicinal plants. The course contains study of herbal drugs used in various disease and disorders such as malaria, diabetes, obesity, heart disease, gastrointestinal disorders, etc. This course also emphasis on providing skill to formulate some hair care and skin care cosmetics products. This course increasing the understanding regarding various Indian traditional systems of medicinal such as Ayurved, Siddha & Unani medicines. This course aim to address SDG goal-3 (Good Health and Well-being) and SDG goal-4 (Quality Education).

<b>Course Content</b>	<b>Hours</b>
<b>Module-I: Herbs as raw materials</b>	20 hrs
<ul style="list-style-type: none"> <li>● Definition of herbs and herbal medicine</li> <li>● Herbal medicinal product</li> <li>● Selection, identification and authentication of herbal materials</li> <li>● Classification of drugs: Alphabetical, Morphological, Taxonomical, Chemical and Pharmacological</li> <li>● Drug adulteration</li> <li>● Drug evaluation and WHO guidelines for the assessment of herbal drugs</li> <li>● Biodynamic Agriculture: Organic farming, Biopesticides</li> </ul>	
<b>Module-II : Introduction to active constituents of drugs</b>	12 hrs
<ul style="list-style-type: none"> <li>● Properties, classification and chemical tests of carbohydrates, lipids, alkaloids, glycosides, volatile oil, tannin, resin.</li> </ul>	
<b>Module-III : Plant drugs and extraction methods</b>	24 hrs
<ul style="list-style-type: none"> <li>● Biological sources, geographical sources, macroscopic study, chemical constituents, therapeutic efficacy of following categories of drugs. <ul style="list-style-type: none"> <li>○ Laxatives: Isapgula, Senna</li> <li>○ Carminatives &amp; G.I. regulators: Fennel, Dill, Ajawan, Linseed, Ginger, Black pepper, Asafoetida</li> <li>○ Drugs use in heart diseases: Garlic</li> <li>○ Brain tonic: Shankhapusphi, Brahmi</li> <li>○ Immunomodulator: Galo, Tulsi, Ashwagandha</li> <li>○ Antitussives: Vasaka, Liquorice</li> <li>○ Antiobesity: Guggul, Saragavo</li> <li>○ Antidiabetics: Karela, Methi</li> <li>○ Diuretics: Gokhru</li> <li>○ Antimalarials: Cinchona</li> </ul> </li> <li>● Methods of plant drug extraction.</li> </ul>	
<b>Module-IV : Herbal Cosmetics</b>	10 hrs
<ul style="list-style-type: none"> <li>● Herbal raw materials used in skin care products</li> <li>● Herbal raw materials used in hair care products</li> <li>● Herbal raw materials used in oral hygiene products</li> </ul>	
<b>Module-V : Indian Systems of Medicine</b>	14 hrs
<ul style="list-style-type: none"> <li>● Introduction of Ayurvedic, Siddha, Unani and Homeopathy system of medicine.</li> <li>● Preparation and standardization of Ayurvedic formulations</li> </ul>	

**Suggested laboratory experiments / other activities:**

1. Determination of swelling index.
2. Determination of moisture content in crude drug.
3. Determination of extractive values of crude drug.
4. Determination of Ash value of crude drug.
5. Determination of foaming index of crude drug.
6. Isolation and identification of starch from Potato.
7. Study of Chemical tests for identification of active constituents.
8. Study of Morphology of crude drugs.
9. Preparation of plant extracts
10. Preparation of herbal medicated formulations such as churna, syrup, infusion, decoction
11. Preparation of herbal cosmetic formulations such as, shampoo, oil

**Pedagogic tools:**

1. Chalk and Talk
9. PPT and Videos.
10. Assignment
11. Group discussion

**Reference Books:**

1. Shah Biren and Seth, A. K. (2010). Pharmacognosy and Phytochemistry, India: Elsevier, a division of Reed Elsevier India Pvt. Ltd.
2. Kokate, C. K., Purohit, A. P. and Gokhale S. B. (2014). Pharmacognosy. Pune, India: Nirali Prakashan.
3. Rangari, V.D. (2003). Pharmacognosy & Phytochemistry. Nashik, India: Career Publications.

**Suggested reading / E-resources**

1. Government of India, Ministry of Health and Family Welfare, Department of Ayurveda, Yoga & Naturopathy, Unani, Siddha and Homoeopathy, New Delhi, (2007). The Ayurvedic Pharmacopoeia of India. Part - II (Formulations). Vol.-I. First Edition.
2. [https://www.nhp.gov.in/introduction-and-importance-of-medicinal-plants-and-herbs\\_mtl](https://www.nhp.gov.in/introduction-and-importance-of-medicinal-plants-and-herbs_mtl)
3. <https://main.ayush.gov.in/ayush-systems/ayurveda/>

**Suggested MOOCs:**

1. <https://www.coursera.org/learn/herbalmedicine>
2. <https://www.udemy.com/course/herbalism-for-everyone-accredited-herbalism-diploma/>
3. <https://www.udemy.com/course/home-remedies-for-colds-and-flu/>

**Methods of Assessment & Tools:**

S.N.	Component	Content	Duration	Marks	Sub Total
1	Attendance	--	--	10	10
2	Assignments	--	--	10	10
3	<b>Practical Skill Assessment</b> (Continuous Assessment during the semester)	Practical exam conducted with experiment and viva at the end of each Semester	2 hrs	40 (20 Marks for Each Semester)	40
4	<b>Course Mid Examination</b>	Theory exam conducted including MCQs and Short questions at the end of first semester	1 hrs	20	20
5	<b>Course End Examination</b>	Theory exam conducted including MCQs and Short questions at the end of second semester	1 hrs	20	20
<b>Total</b>				<b>100</b>	<b>100</b>

**At the end of the course no marks are given, only remarks are given as follows:**

**REMARKS:**

Range of Marks	Remarks
90-100	Excellent
75-89	Very Good
60-74	Good
40-59	Fair
< 40	Not Completed

Course Code	Course Title	Course Credit and Hours
21AECO017	Interior Design	2 Credit - 4 hrs / wk

**Objective of the course:**

1. To improve design skill of student
2. To enhance creative mindset of student in real aspect.

**Target Skills (Course outcomes) :**

1. To impart an understanding of design process and provide knowledge of the principles of design and design elements.
2. To improve practical knowledge of design and visualization.

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other) :**

- The level of the NSQF is associated with a set of descriptors made up of five outcome statements, which describe in general terms, the minimum knowledge, skills and attributes that a learner needs to acquire in order to be certified for that level. Each level of the NSQF is described by a statement of learning outcomes in five domains, known as level descriptors.
- These five domains are: a. Process b. Professional Knowledge c. Professional Skill d. Core Skill e. Responsibility The broad learning outcome of Interior Design & Decoration trade under CTS mostly matches with the Level descriptor at Level- 4.
- Also trying to develop sustainable cities and communities for accomplishing sustainable goal 11
- <https://www.sikana.tv/en/diy/masonry>

**Reference:**

- As per notification issued by Govt. of India dated- 27.12.2013 on National Skill Qualification Framework total 10 (Ten) Levels are defined.

**Course Description:**

- This course is deal with art and creativity of various materialistic things that we approach in our routine life.

<b>Course Content</b>	<b>Hours</b>
<b>Module-I: Introduction</b>	8 hrs
<ul style="list-style-type: none"> <li>● General understanding of Interior Design and integration.</li> <li>● Role of Interior Designer.</li> <li>● The changing role of Interior Designer, his relation with other consultants, contractors and client, technical knowledge and other skills required as inputs.</li> </ul>	
<b>Module-II :Development of art</b>	14 hrs
<ul style="list-style-type: none"> <li>● History of art forms: pre historic times to present times changing nature of art through time in terms of content form and material.</li> <li>● study of traditional and contemporary art forms – painting, sculpture, architecture, decorative arts, Study of famous people who pioneered innovations in their own fields and their influence on design and other fields</li> </ul>	
<b>Module-III : Design drawing and graphics</b>	14 hrs
<ul style="list-style-type: none"> <li>● Introduction – Fundamentals of drawing</li> <li>● Introduction to drawing equipment, familiarization, use and handling.</li> <li>● Architectural symbols – representation of building elements, openings, materials, accessories etc., abbreviations used in architectural presentation.</li> </ul>	
<b>Module-IV : Forms of design</b>	18 hrs
<ul style="list-style-type: none"> <li>● Interiors sketching, perspectives, lighting &amp; composition, material expressions, elevations &amp; plans etc. using different media.</li> <li>● Drawing from photographs.</li> <li>● Study of points, lines and planes leading to simple and complex solid geometrical forms.</li> </ul>	
<b>Module-V : Interior design materials and applications</b>	16 hrs
<ul style="list-style-type: none"> <li>● Masonry – mud, bricks, building tiles i.e. roof, floor and wall tiles, stones, clay, lime, sand, mortars, cement and aggregates, concrete, gypsum-based plaster etc.</li> <li>● Wood – Plywood, block boards, particle board, medium density fiber etc. – their properties, Paints– Protective coating paints, types of paints – water paints, distempers, cement-based paints, emulsion paints, anti-corrosive paints etc.</li> </ul>	

**Suggested laboratory experiments / other activities:**

1. Perspective and projection drawing
2. 2D Design practice in AutoCAD
3. Case studies, market surveys, visual presentations

**Pedagogic tools:**

1. Chalk and Talk
2. PPT and Videos.
3. Hands-on activities
4. Assignment
5. Group discussion

**Reference Books:**

- Ching, Francis D.K. Architecture Form, space, and Order, 2nd ed. Van Nostrand Reinhold, New York, 1996.
- Hanks, A. David. Decorative Designs of Frank Lloyd Wright, Dover Publications, Inc. New York, 1999.

**Suggested reading / E-resources**

- <https://nptel.ac.in/courses/124/107/124107006/>

**Suggested MOOCs:**

- <https://nptel.ac.in/courses/124/107/124107006/>

**Methods of Assessment & Tools:**

(Though the credit has to be awarded at the end of the course i.e. two semesters, it is recommended to consolidated assessment in two stages one at end of each semester. Components used for assessment can be different as per the nature of the course)

S.N.	Component	Content	Duration	Marks	Sub Total
1	<b>Attendance</b>	--	--	<b>10</b>	10
2	<b>Assignments</b>	--	--	<b>10</b>	10
3	<b>Practical Skill Assessment</b> (Continuous Assessment during the semester)	--	--	<b>40</b> (20 Marks for Each Semester)	40
4	<b>Course Mid Examination</b>	2 Modules	--	<b>20</b>	20
5	<b>Course End Examination</b>	5 Modules	--	<b>20</b>	20
<b>Total</b>				<b>100</b>	<b>100</b>

**At the end of the course no marks are given, only remarks are given as follows:**

**REMARKS:**

Range of Marks	Remarks
90-100	Excellent
75-89	Very Good
60-74	Good
40-59	Fair
< 40	Not Completed



Course Code	Course Title	Course Credit and Hours
<b>21AECO018</b>	Animation& Multimedia	<b>2 Credit - 4 hrs / wk</b>

**Objective of the course:**

1. Prepared for the profession of multimedia
2. Apply Knowledge of basic storyboarding to prepare for a movie
3. Apply concept of unity 3D and using their imagination skill they can build game
4. Understand what to learn about the job roles and skills most essential to game production

**Target Skills (Course outcomes) :**

4. Skill development to demonstrate of animation
5. Define what Multimedia is and how that works, understand multimedia components using various tools and techniques.
6. Define and apply design principles and theories to animation production, Evaluate and apply the 12 principles of animation based on the requirements of the storyline
7. Hands on practice on unity 3D software
8. Learn and skill develop regarding various features of unity 3D

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other) :**

- The Co curricular course based on Animation and multimedia to explore various character understanding, layout design, game development.
- Through which better understanding AR, VR, MR technology.

**Reference:**

<https://unity.com/learn>

<https://nsdcindia.org/nos-listing/29>

<https://nsdcindia.org/nos-data-export-excel/29>

[https://www.nielit.gov.in/sites/default/files/headquarter/education/pdf/160512\\_Audio%20and%20Video%20Editing.pdf](https://www.nielit.gov.in/sites/default/files/headquarter/education/pdf/160512_Audio%20and%20Video%20Editing.pdf)

**Course Description:**

- To learn the basics and Fundamentals of Multimedia.
- To introduce Multimedia components and Tools.
- To understand how Multimedia can be incorporated.
- To provide a comprehensive introduction to fundamentals of art
- To understand the basic techniques about figure drawing, cartooning, composition of a scene or background and designs.
- To provide a comprehensive introduction to different techniques related to art for animation
- To understand basic terminology, progress, issues, and trends.
- To study the various application of art in creating animation projects
- Developing the basic skills necessary for the student to produce digital character-based animation, titles for film and video.
- Learning and experiencing the arts of storytelling, animation and cinematography while making 2D animation movies, motion graphics, and GIF stickers.
- Understanding principles that translate sequential images into action to make animation Believable
- This course is an excellent option for anyone who ever wanted to prototype an invention, create a work of art, customize a product No prior technical knowledge needed.
- The course aims to address SDG 9: Industry, Innovation and Infrastructure

<b>Course Content</b>	<b>Hours</b>
<b>Module-I: MULTIMEDIA SYSTEMS</b>	16 hrs
<ul style="list-style-type: none"> <li>● Multi Media Fundamentals: Multimedia, Multimedia Objects, Multimedia in business and work</li> <li>● Multimedia Tools</li> <li>● Graphics /Image: image file formats and how and where it is used, Principles of animation, 2D and 3D animation, Motion capture, character animation, modeling, special effects, Virtual Reality - Artificial intelligence.</li> </ul>	
<b>Module-II :ART FOR ANIMATION</b>	16hrs
<ul style="list-style-type: none"> <li>● Art of objects:: Study of light and shade, outline drawing of still life objects</li> <li>● Animation: Developing figure with detail body, Character design, Completing character designs for a given concept story</li> </ul>	
<b>Module-III :INTERACTIVE ANIMATION TECHNIQUES</b>	16hrs
<ul style="list-style-type: none"> <li>● Introduction to animation: History of animation: Types of animation: case study Understanding and learning the Principles of animation through the view of different animation films: case study</li> <li>● Difference between Animation and multimedia</li> <li>● Animation and multimedia as business, Application of animation as business job role</li> </ul>	
<b>Module-IV :Multimedia &amp; Animation Tools</b>	16hrs
<ul style="list-style-type: none"> <li>● Introduction to various multimedia tools with</li> <li>● windows movie maker using Image</li> <li>● Basic fundamentals of Frame</li> <li>● WMM create a movie using video</li> <li>● Create movie using Openshot</li> <li>● Create Story animation using Scratch story game design</li> </ul>	
<b>Module-V : Introduction to Unity 3d with User Interface</b>	16 hrs
<ul style="list-style-type: none"> <li>● Welcome to Unity ! Exploring Unity User Interface</li> <li>● Representation of 2D and 3D objects on game scene</li> <li>● Game Scene with rapid game prototyping</li> <li>● Game Physics</li> </ul>	

**Suggested laboratory experiments / other activities:**

1. Case study on various tools
2. Case study on Image and video in every aspect
3. Make presentation of animation and multimedia concept
4. Create story design through various tools such as scratch
5. Create Object / character or game layout through unity 3D
6. Create small game using Unity 3D

**Pedagogic tools:**

1. Chalk and Talk
2. PPT and Videos.
3. Hands-on activities
4. Assignment
5. Group discussion

**Reference Books:**

1. Ranjan Parekh, Principles of Multimedia, 2nd Edition, McGraw Hill Education, 2013
2. Tay Vaughan, Multimedia: Making it Work (with CD), 9th Edition, McGraw Hill Education
3. Wells, P. The Fundamentals of Animation. AVA Publishing
4. Walt Stanchfield, "Gesture Drawing for Animation", 2015, 1st edition, Andrews McMeel
5. Don Bluth, "Art Of Animation Drawing", First Edition, DH Press, 2014
6. Frank Thomas and Odie Johnson, The Illusion of Life: Disney Animation, Disney Editions; Rev Sub edition, 2014

**Suggested reading / E-resources**

1. <https://unity.com/learn>

**Suggested MOOCs:**

1. <https://www.coursera.org/specializations/game-design-and-development>
2. <https://www.udemy.com/topic/unity/free/>

**Methods of Assessment& Tools:**

(Though the credit has to be awarded at the end of the course i.e. two semesters, it is recommended to consolidated assessment in two stages one at end of each semester. Components used for assessment can be different as per the nature of the course)

S.N.	Component	Content	Duration	Marks	Sub Total
1	<b>Attendance</b>	--	--	<b>10</b>	10
2	<b>Assignments</b>	--	--	<b>10</b>	10
3	<b>Practical Skill Assessment / Unit Test</b> (Continuous Assessment during the semester)			<b>40</b> (20 Marks for Each Semester)	40
4	<b>Course Mid Examination</b>			<b>20</b>	20
5	<b>Course End Examination</b>			<b>20</b>	20
<b>Total</b>				<b>100</b>	<b>100</b>

**At the end of the course no marks are given, only remarks are given as follows:**

**REMARKS:**

Range of Marks	Remarks
90-100	Excellent
75-89	Very Good
60-74	Good
40-59	Fair
< 40	Not Completed

Course Code	Course Title	Course Credit and Hours
<b>21AECO019</b>	Renewable Energy Sources	<b>2 Credit - 4 hrs / wk</b>

**Objective of the course:**

1. Fundamental knowledge of renewable energy source
2. Performance analysis of Solar cell/module/Array modeling
3. Design module and its output analysis
4. Identify various components of Wind Energy Conversion system

**Target Skills (Course outcomes) :**

1. Understand of renewable and non-renewable sources of energy
2. Gain knowledge about working principle of various solar energy systems
3. Understand the application of wind energy and wind energy conversion system.
4. Develop capability to do basic design of bio gas plant.
5. Understand the applications of different renewable energy sources like ocean thermal, hydro, geothermal energy etc.

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other) :**

- The Co curricular course based on Renewable Energy Sources belongs to area of identifying advance economic development, improve energy security, improve access to energy, and mitigate climate change. Sustainable development is possible by use of sustainable energy and by ensuring access to affordable, reliable, sustainable, and modern energy.

**Reference:**

Link from NSDC qualification pack on occupational standards for green jobs :  
[https://nsdcindia.org/sites/default/files/QP-SGJ-Q0101\\_Solar-PV-Installer\\_Suryamitra\\_v1-9-4-2017.pdf](https://nsdcindia.org/sites/default/files/QP-SGJ-Q0101_Solar-PV-Installer_Suryamitra_v1-9-4-2017.pdf)

**Course Description:**

- Focuses on the practical application of renewable energy technologies. Topics include energy and resource conservation and project siting, economics, financing, renewable energy and tax credits, technical and engineering aspects, regulatory issues, energy storage, monitoring and verification. Students study the advantages, limitations and potential of various energy sources. Wind, solar, small-scale hydro, ground-source heat pumps, combined heat and power, biofuels, fuel cells, and other technologies are examined. Students will learn the strategies and cost/benefit analyses employed by energy analysts to meet demand with clean energy production. Students will also complete their own study and proposal for a renewable energy project. The course aims to address SDG 7: Affordable and Clean Energy.

<b>Course Content</b>	<b>Hours</b>
<b>Module-I: Introduction to Renewable Energy Sources</b>	16 hrs
<ul style="list-style-type: none"><li>● Review of energy sources</li><li>● Present energy consumption/utilization pattern – sector wise in India</li><li>● Environmental impact of fossil fuels</li><li>● Growth of renewable energy sector and its planning in India</li><li>● Impact of renewable energy on economy</li><li>● Renewable Energy for sustainable development</li><li>● Need for use of renewable energy source</li></ul>	
<b>Module-II : Power Generation from Solar PV system</b>	16 hrs
<ul style="list-style-type: none"><li>● Operating principle</li><li>● Photovoltaic cell concepts</li><li>● Types of solar cells, fabrication of SPV cells</li><li>● Cell, module, array (Series and parallel connections)</li><li>● SPV system components and their characteristics, applications</li><li>● Block diagram of general SPV system</li></ul>	
<b>Module-III : Configuration of Solar PV Systems</b>	16 hrs
<ul style="list-style-type: none"><li>● Grid Tie System (On Grid)</li><li>● Stand Alone System (Off Grid)</li></ul>	
<b>Module-IV : Power Generation from Wind energy</b>	16 hrs

<ul style="list-style-type: none"> <li>● Basic principle of wind energy generation</li> <li>● Power extracted from wind</li> <li>● Force on blades &amp; turbines</li> <li>● Wind energy conversion system</li> <li>● Site selection for wind mill</li> <li>● Applications of wind energy</li> </ul>	
<b>Module-V : Classification of Turbines &amp; Construction of Wind mill</b>	16 hrs
<ul style="list-style-type: none"> <li>● Classifications of WECS</li> <li>● Schemes of electric power generation from wind.</li> <li>● Block Diagram &amp; construction of each block for wind mill.</li> <li>● Types of wind turbines &amp; wind generators.</li> <li>● Comparison/ advantages and disadvantages of WECS.</li> </ul>	

**Suggested laboratory experiments / other activities:**

1. Identification of various electrical terminologies.
2. Study of different measuring instruments of SPV.
3. To observe power generation from Solar PV panel with different configuration.
4. To understand working of different power converters.
5. Design & development of 1-Phase Bridge inverter circuit.
6. To study various parameters of Battery.
7. Design & development of Battery chargers.
8. To calculate payback analysis (Real time data) of SPV system.
9. To analyze& apply various SPV Govt. Schemes.
10. Design & develop the basic solar charge controller circuit.
11. To understand & design Solar MPPT System.
12. Design & development of Standalone SPV System.
13. To understand various standards of Grid Integration System.
14. Design & development of Grid Connected SPV System.
15. Evaluate the cut-in speed of wind turbine experimentally.
16. Demonstrate the power analysis at turbine output (for high wind speeds).
17. Evaluate the coefficient of performance of wind turbine.
18. Expert talk on installation of rooftop solar system
19. Visit of Solar Power Plant. Analysis of various aspects of SPV Systems.
20. Visit of Wind farm. Analysis of various aspects of wind farm.

**Pedagogic tools:**



1. Chalk and Talk
2. PPT and Videos.
3. Hands-on activities
4. Assignment
5. Group discussion

**Reference Books:**

1. C.S. Solanki, "Solar Photovoltaics: Fundamentals, Technologies and Applications", PHI Learning Pvt. Ltd, 2nd Edition, 2011
2. H. Abu Rab, M. Malinowski, Kamal Al-Haddad, "Power Electronics for Renewable Energy Systems, Transportation and Industrial Applications", Wiley- IEEE Press, 2014
3. Renewable Energy Technologies, Solanki, Chetan S., PHI Learning, 2011
4. Wind Power Technology, Earnest, Joshua, PHI Learning, New Delhi, 2013

**Suggested reading / E-resources**

1. [http://rael.berkeley.edu/old\\_drupal/sites/default/files/old-site-files/2001/Herzog-Lipman-Kammen-RenewableEnergy-2001.pdf](http://rael.berkeley.edu/old_drupal/sites/default/files/old-site-files/2001/Herzog-Lipman-Kammen-RenewableEnergy-2001.pdf)

**Suggested MOOCs:**

1. <https://www.mooc-list.com/course/photovoltaic-systems-coursera>

**Methods of Assessment & Tools:**

(Though the credit has to be awarded at the end of the course i.e. two semesters, it is recommended to consolidated assessment in two stages one at end of each semester. Components used for assessment can be different as per the nature of the course)

S.N.	Component	Content	Duration	Marks	Sub Total
1	<b>Attendance</b>	--	--	<b>10</b>	10
2	<b>Assignments</b>	--	--	<b>10</b>	10
3	<b>Practical Skill Assessment / Unit Test</b> (Continuous Assessment during the semester)			<b>40</b> (20 Marks for Each Semester)	40
4	<b>Course Mid Examination</b>			<b>20</b>	20
5	<b>Course End Examination</b>			<b>20</b>	20
<b>Total</b>				<b>100</b>	<b>100</b>

**At the end of the course no marks are given, only remarks are given as follows:**

**REMARKS:**

<b>Range of Marks</b>	<b>Remarks</b>
90-100	Excellent
75-89	Very Good
60-74	Good
40-59	Fair
< 40	Not Completed

Course Code	Course Title	Course Credit and Hours
<b>21AECO020</b>	CCTV Video Footage Auditing and Investigation - Fundamental	<b>2 Credit - 4 hrs / wk</b>

**Objective of the course:**

1. Audit hours of CCTV footage in minutes
2. Hugely reduce data size and create a very cost-effective disaster recovery mechanism
3. Report incidents/findings in PowerPoint, that are almost automatically created

**Target Skills (Course outcomes) :**

1. CCTV video footage auditing and investigation using 'COM-SUR', the world's only CCTV video footage auditing software
2. New skills to start a business of CCTV video footage auditing and investigation services
3. New skills to gain employment of a 'CCTV video footage AUDITOR'
4. How to audit hours of CCTV video footage in minutes in order to gain actionable insights from surveillance video
5. How to create audit/incident reports almost automatically in PowerPoint
6. How to reduce data size hugely, and to create a cost-effective disaster recovery backup

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other) :**

- The Co-curricular course based on 'cctv video footage auditing and investigation – fundamental' belongs to area of providing skill training and /or upgrading the knowledge level of the trainees to take up the job of an "CCTV Supervisor" in the Management and Entrepreneurship Sector.

**Reference:**

Link from NSDC qualification pack on occupational standards for green jobs :  
[https://nsdcindia.org/sites/default/files/FG\\_CCTV\\_Supervisor\\_31\\_10\\_2021.pdf](https://nsdcindia.org/sites/default/files/FG_CCTV_Supervisor_31_10_2021.pdf)

**Course Description:**

- The Fundamental module is useful to anyone looking to acquiring new skills to gain jobs of 'CCTV video footage auditors', and business opportunities of CCTV video footage auditing services. For example, a facility management services organization, or a security company can get its staff to take this module and have them eventually certified as 'CCTV video footage auditors'.
- This module is also useful for home users, as well as for anyone else (it is always great to acquire new skills) who wishes to make use of the software for/at any non-commercial use/location The course aims to address SDG 17: Partnerships for the goals.

<b>Course Content</b>	<b>Hours</b>
<b>Module-I: Introduction to COM-SUR HOME version</b>	16 hrs
<ul style="list-style-type: none"><li>● Overview</li><li>● Top benefits</li><li>● Augmented intelligence</li><li>● Philosophy of home version</li><li>● Recommended System Requirements</li><li>● Installing COM-SUR HOME</li><li>● Recommended Computer Settings</li><li>● Some Additional Settings</li></ul>	
<b>Module-II : Operational steps</b>	16 hrs
<ul style="list-style-type: none"><li>● To start COM-SUR HOME</li><li>● Auto-Pilot</li><li>● Capturing A 'Window'</li><li>● Auto-Pilot and Capturing A 'Window' – Very Important Note!</li><li>● Cropping a Desired Area</li><li>● The 'Results' Dialog Box</li><li>● More Options in the 'Results' Dialog Box</li></ul>	
<b>Module-III : Various Ways of Auditing (Reviewing)</b>	16 hrs

<ul style="list-style-type: none"> <li>● Play or Rewind</li> <li>● Manual Audit (Review/Analysis)</li> <li>● Auditing (Reviewing/Analyzing) in Full Screen Mode</li> <li>● Miscellaneous Options in the 'Results' Dialog Box</li> <li>● Searching for Screenshots</li> <li>● Auditing (Reviewing/Analyzing) External Images with A Single Image/Set of Images</li> <li>● Auditing (Reviewing/Analyzing) External Images with Images From a Folder</li> <li>● Auditing (Reviewing/Analyzing) External Images with Images From a Compressed (Zipped) Folder</li> </ul>	
<b>Module-IV : Bookmarking Frequently used URLs and customizing</b>	16 hrs
<ul style="list-style-type: none"> <li>● General Tab</li> <li>● Screenshots Tab</li> <li>● Delete/De-Link Tab</li> <li>● Miscellaneous Tab</li> <li>● Maintenance Tab</li> </ul>	
<b>Module-V : Troubleshooting</b>	16 hrs
<ul style="list-style-type: none"> <li>● Various solutions to the problems faced during operating the software</li> </ul>	

<b>Suggested laboratory experiments / other activities:</b>
<ol style="list-style-type: none"> <li>1. Installing COM-SUR HOME</li> <li>2. Recommended Computer Settings</li> <li>3. Capturing A 'Window'</li> <li>4. Cropping a Desired Area</li> <li>5. Auditing (Reviewing)</li> <li>6. Bookmarking and Accessing Frequently used URLs</li> <li>7. Customizing COM-SUR HOME</li> <li>8. Troubleshooting</li> </ol>
<b>Pedagogic tools:</b>

<ol style="list-style-type: none"> <li>1. Chalk and Talk</li> <li>2. PPT and Videos.</li> <li>3. Hands-on activities</li> <li>4. Assignment</li> <li>5. Group discussion</li> </ol>
<b>Reference Books:</b>
<ol style="list-style-type: none"> <li>1. CCTV – From Light to Pixels by Vlado Damjanovski</li> <li>2. CCTV Surveillance: Video Practices and Technology by Herman Kruegle</li> <li>3. Smart Video Security Handbook: A Practical Guide for Catching Intruders Before They Act by John Romanowich, Danny Chin, and Thomas Lento</li> </ol>

#### **Suggested reading / E-resources**

1. <https://www.udemy.com/course/cctv-video-footage-auditing-and-investigation-fundamental/>

#### **Suggested MOOCs:**

1. <https://www.mooc-list.com/course/photovoltaic-systems-coursera>

#### **Methods of Assessment& Tools:**

(Though the credit has to be awarded at the end of the course i.e. two semesters, it is recommended to consolidated assessment in two stages one at end of each semester. Components used for assessment can be different as per the nature of the course)

<b>S.N.</b>	<b>Component</b>	<b>Content</b>	<b>Duration</b>	<b>Marks</b>	<b>Sub Total</b>
1	<b>Attendance</b>	--	--	<b>10</b>	10
2	<b>Assignments</b>	--	--	<b>10</b>	10
3	<b>Practical Skill Assessment / Unit Test</b> (Continuous Assessment during the semester)			<b>40</b> (20 Marks for Each Semester)	40
4	<b>Course Mid Examination</b>			<b>20</b>	20
5	<b>Course End Examination</b>			<b>20</b>	20
<b>Total</b>				<b>100</b>	<b>100</b>

**At the end of the course no marks are given, only remarks are given as follows:**

**REMARKS:**

<b>Range of Marks</b>	<b>Remarks</b>
90-100	Excellent
75-89	Very Good
60-74	Good
40-59	Fair
< 40	Not Completed

Course Code	Course Title	Course Credit and Hours
<b>21AECO021</b>	Advance Concepts with Google workspace	<b>2 Credit - 4 hrs / wk</b>

**Objective of the course:**

1. To create awareness about Google utilities.
2. To acquire knowledge in various basic goggle skills like docs, spreadsheet, blog, google website creation

**Target Skills (Course outcomes) :**

1. Skill development to all the basic Google utilities
2. Skill development to all the Google Input tools like Docs, slides, sites, spreadsheet, blogs.

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other) :**

- The Co curricular course based on various Google applications/utilities like Docs, Spreadsheet, slides, and creation of blogs, create websites; one can apply this knowledge in employment and for day to day working.

**Reference:**

[https://workspace.google.com/intl/en\\_in/training/](https://workspace.google.com/intl/en_in/training/)

**Course Description:**

- This course is based on understanding how to use Google utility tools and analytics & App monetization. It can help each use with basic office skills and some ad & marketing skills. In this course we basically learn how products like Gmail, Docs, Drive, and Meet, Blogs, Google website creation will help your team reimaging the way they work and how deeply they collaborate. The course aims to address SDG 9: Industry Innovation and Infrastructure.



Course Content	Hours
<b>Module-I:</b> Introduction to Google basics	9 hrs
<ul style="list-style-type: none"> <li> <p>● <b>Gmail</b> Learn about Gmail, Google’s cloud based email service that allows you to access your messages from any computer or device with just a web browser. Explore common actions that can be applied to a Gmail message, and how to organize your mail using Gmail labels.</p> </li> <li> <p>● <b>Google Calendar</b> Expand your knowledge on how to create additional calendars, share your calendars with others, access other calendars in your organization, and more.</p> </li> <li> <p>● <b>Google Tasks</b> How to use Google Tasks ,Add or edit a task, Add a list Organize your tasks, Delete a task or list Export your data from Google Tasks, Use keyboard shortcuts for Google Tasks</p> </li> <li> <p>● <b>Google Dashboards</b> Google Dashboard lets users of the Internet view and manage personal data collected about them by Google. With an account, Google Dashboard allows users to have a summary view of their Google+, Google location history, Google web history, Google Play apps, YouTube and more.</p> </li> <li> <p>● <b>Google Admin Console</b> Introduction to Google admin console</p> </li> </ul>	
<b>Module-II :</b> Google workspace	12 hrs

<ul style="list-style-type: none"> <li>● <b>Google Drive</b> In this course, you will learn how to navigate your Google Drive as well as explore the sharing options available to fully leverage the collaboration capabilities of Google Workspace.</li> <li>● <b>Google Docs</b> Practice skills such as creating, editing, sharing, and customizing documents. Discover the capabilities of working in real time with others to share, edit, and iterate your documents.</li> <li>● <b>Google Blogs</b> Create blogs with different templates and flexible layout, use of background image for this.</li> <li>● <b>Google form</b> Google Forms are online surveys used to collect data and provide the opportunity for quick data analysis. In this module, we're going to explore how Google Forms and Google Sheets work together by connecting collected form data to a spreadsheet, or by creating a form from an existing spreadsheet.</li> </ul>	
<b>Module-III</b> : Introduction to with Google spreadsheet	24 hrs
<ul style="list-style-type: none"> <li>● <b>Google Sheets</b> In this course, learn the foundations of creating and formatting spreadsheets and better using your data. Explore how Google Sheets makes it easy to collaborate with your team, clients, and others wherever they are.</li> <li>● <b>Google Sheets Advanced formatting</b> Learn more about customized themes, conditional formatting, and advanced formulas and functions. Finish by exploring data visualization options in Google Sheets, as well as how to use Google Forms to conduct quick data analysis</li> </ul>	
<b>Module-IV:</b> Google meet, slides & sites.	15 hrs

<ul style="list-style-type: none"> <li>● <b>Google Meet and Google Chat</b> Explore Google’s video conference and chat software included with Google Workspace. By the end of the course, you will be able to create and manage video conference meetings, set up chat rooms, and more.</li> <li>● <b>Google Slides</b> Explore the foundations of the tool as well as how to enhance your slides by adding tables, images, charts. Check out the many features of Google Slides that make team collaboration easy.</li> <li>● <b>Google Sites</b> What is Google Sites, Accessing Google Sites, Creating a Google Site, Adding content, Adding pages, Customizing the design, Sharing a Google Site, Publishing a Google Site</li> </ul>	
<b>Module-V: Analysis and Monetization with Google</b>	20 hrs
<ul style="list-style-type: none"> <li>● <b>Google Analytics</b> It is used to track website activity such as session duration, pages per session and the bounce rate of individuals using the site, along with the information on the source of the traffic. It can be integrated with Google Ads, with which users can create and review online campaigns by tracking landing page quality and conversions (goals).</li> <li>● <b>Google Ad sense</b> Google uses its technology to serve advertisements based on website content, the user's geographical location, and other factors. Those wanting to advertise with Google's targeted advertisement system may enroll through Google Ads. Ad Sense has become one of the most popular programs specializing in creating and placing banner and responsive ads on websites and blogs.</li> </ul>	

**Suggested laboratory experiments / other activities:**

1. Some Spreadsheet exercises.
2. Exercise based on Google website, Google form creation.
3. Make presentation based on Google slides

**Pedagogic tools:**

1. Chalk and Talk

12. PPT and Videos.
13. Hands-on activities
14. Assignment
15. Group discussion

**Reference Books:**

6. Going Google: Powerful Tools for 21st Century Learning
7. Use Google forms for evaluation: Google forms and quizzes as effective educational tools  
Olivier Rebiere
8. Google Tools Meets Middle School Michael J. Graham, Jason Borgen

**Suggested reading / E-resources**

4. [https://workspace.google.com/intl/en\\_in/training/](https://workspace.google.com/intl/en_in/training/)
5. <https://www.google.com/inputtools/>

**Suggested MOOCs:**

4. <https://www.udemy.com/course/30-google-tools-you-need-to-know-about-now/>
5. <https://www.udemy.com/course/learn-google-suite-from-scratch/>

**Methods of Assessment & Tools:**

(Though the credit has to be awarded at the end of the course i.e. two semesters, it is recommended to consolidated assessment in two stages one at end of each semester. Components used for assessment can be different as per the nature of the course)

S.N.	Component	Content	Duration	Marks	Sub Total
1	<b>Attendance</b>	--	--	<b>10</b>	
2	<b>Assignments</b>	--	--	<b>10</b>	
3	<b>Practical Skill Assessment</b> (Continuous Assessment during the semester)			<b>40</b> (20 Marks for Each Semester)	
4	<b>Course Mid Examination</b>			<b>20</b>	

5	<b>Course End Examination</b>			<b>20</b>	
<b>Total</b>				<b>100</b>	<b>100</b>

**At the end of the course no marks are given, only remarks are given as follows:**

**REMARKS:**

<b>Range of Marks</b>	<b>Remarks</b>
90-100	Excellent
75-89	Very Good
60-74	Good
40-59	Fair
< 40	Not Completed

Course Code	Course Title	Course Credit and Hours
<b>21AECO022</b>	<b>3D Printing Technology</b>	<b>2 Credit - 4 hrs / wk</b>

**Objective of the course:**

1. To create awareness about 3D Printing Technology
2. To aware students about application area of 3D Printing in their own domain area.
3. Train the student to correlate 3D Printing technology with their own domain area.
4. Train the student to demonstrate 3D Printing process.

**Target Skills (Course outcomes) :**

1. Skill development to demonstrate 3D Printing Process
2. Skill development to identify the general procedure to create component in 3D Printing

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other) :**

- The Co curricular course based on 3D printing belongs to area of advance technology in prototype making.
- 3D Printing/Additive Manufacturing is an Emerging technology; Where the Manufacturing a product is much faster than all conventional manufacturing technologies. Many manufacturing Industries use various 3D Printing technologies in various applications such as in Automobile, Aerospace, Defense and in Bio- medical applications etc. by Ministry of Electronics & Information Technology

**Reference:**

Link from NSDC qualification pack on Installer - Additive Manufacturing (3D Printing)

[https://nsdcindia.org/sites/default/files/IASQ5602\\_%20Installer-Additive-Manufacturing-%283D-Printing%29\\_v1\\_12\\_06\\_2020.pdf](https://nsdcindia.org/sites/default/files/IASQ5602_%20Installer-Additive-Manufacturing-%283D-Printing%29_v1_12_06_2020.pdf)

The link of NIELIT – <https://nielit.gov.in/chennai/content/3d-printingadditive-manufacturing-lab-0>

**Course Description:**

- 3D Printing is a method of creation that requires only some basic computer skills. This class will allow students to discover for themselves the potential and limitations of 3D printing through a build intensive design project. This course is an excellent option for anyone who ever wanted to prototype an invention, create a work of art, customize a product No prior technical knowledge needed. The course aims to address SDG 9: Industry, Innovation and Infrastructure.

<b>Course Content</b>	<b>Hours</b>
<b>Module-I: CAD, CAM and Prototyping</b>	16 hrs
<ul style="list-style-type: none"> <li>● Introduction to computer Aided Design (CAD), Computer Aided Manufacturing (CAM).</li> <li>● Introduction to prototyping and its importance.</li> <li>● Traditional Prototyping Vs. Rapid Prototyping (RP).</li> </ul>	
<b>Module-II : CAD/CAM and RPT Tooling</b>	16 hrs
<ul style="list-style-type: none"> <li>● Introduction to Feature based modeling and component preparing by using software. (Hands on training on 3D modeling software)</li> <li>● Fundamental of Manual Part programming</li> <li>● Different G and M codes for CNC and VMC machine.</li> <li>● Conventional Tooling Vs. Rapid Tooling,</li> <li>● Classification of Rapid Tooling, Direct and Indirect Tooling Methods, Soft and Hard Tooling methods.</li> </ul>	
<b>Module-III : Introduction to 3D Printer - Parts and Construction</b>	16 hrs
<ul style="list-style-type: none"> <li>● Process Physics, Tooling, Process Analysis, Material and technological aspects,</li> <li>● Applications, limitations and comparison of various rapid manufacturing processes</li> <li>● Introduction to Stepper motor, nozzle, cooling fan, thermocouple, extruder, display unit, working table, electronic circuit and frame.</li> </ul>	
<b>Module-IV : Introduction to prototyping software</b>	16 hrs
<ul style="list-style-type: none"> <li>● File exchange formats, G-code generation,</li> <li>● Machine settings, Inserting 3D model, viewpoint, Material setting, Print setup, infill pattern, skirt, Brim, support structures and support and print pattern.</li> </ul>	
<b>Module-V : 3D Printer : Performance Analysis</b>	16 hrs
<ul style="list-style-type: none"> <li>● Introduction to input parameters and its importance,</li> <li>● Process parameters and effect of output parameters and its effect.</li> <li>● Hands on training on 3D printer of the modelled part.</li> </ul>	

**Suggested laboratory experiments / other activities:**

Demonstration on Presentation

**Pedagogic tools:**

1. Chalk and Talk<sup>3</sup>
2. PPT and Videos.
3. Hands-on activities
4. Assignment
5. Group discussion

**Reference Books:**

1. CAD/CAM and Automation by Farazdak Haideri, Nirali Prakashan.
2. Additive Manufacturing Technologies: 3D Printing, Rapid Prototyping, and Direct Digital Manufacturing by Brent Stucker, David W. Rosen, and Ian Gibson
3. Rapid Prototyping: Theory and practice by Kamrani A K, Nasr E A

**Suggested reading / E-resources**

1. [https://www.cet.edu.in/noticefiles/258\\_Lecture%20Notes%20on%20RP-ilovepdf-compressed.pdf](https://www.cet.edu.in/noticefiles/258_Lecture%20Notes%20on%20RP-ilovepdf-compressed.pdf)

**Suggested MOOCs:**

1. [https://onlinecourses.nptel.ac.in/noc20\\_me50/preview](https://onlinecourses.nptel.ac.in/noc20_me50/preview)
2. [https://www.researchgate.net/publication/226038981\\_Rapid\\_prototyping\\_technology\\_Applications\\_and\\_benefits\\_for\\_rapid\\_product\\_development](https://www.researchgate.net/publication/226038981_Rapid_prototyping_technology_Applications_and_benefits_for_rapid_product_development)
3. [https://www.ksrce.ac.in/admin/file\\_manager/source/RPT%20NOTES-converted.pdf](https://www.ksrce.ac.in/admin/file_manager/source/RPT%20NOTES-converted.pdf)
4. [http://www3.hamk.fi/metnet/Documents/RAPID%20PROTOTYPING\\_COTTBUS\\_2010.pdf](http://www3.hamk.fi/metnet/Documents/RAPID%20PROTOTYPING_COTTBUS_2010.pdf)
5. [https://www.vssut.ac.in/lecture\\_notes/lecture1517967201.pdf](https://www.vssut.ac.in/lecture_notes/lecture1517967201.pdf)

**Methods of Assessment & Tools:**

(Though the credit has to be awarded at the end of the course i.e. two semesters, it is recommended to consolidated assessment in two stages one at end of each semester. Components used for assessment can be different as per the nature of the course)

S.N.	Component	Content	Duration	Marks	Sub Total
1	Attendance	--	--	10	
2	Assignments	--	--	10	



3	<b>Practical Skill Assessment</b> (Continuous Assessment during the semester)			<b>40</b> (20 Marks for Each Semester)	
4	<b>Course Mid Examination</b>			<b>20</b>	
5	<b>Course End Examination</b>			<b>20</b>	
<b>Total</b>				<b>100</b>	<b>100</b>

**At the end of the course no marks are given, only remarks are given as follows:**

**REMARKS:**

<b>Range of Marks</b>	<b>Remarks</b>
90-100	Excellent
75-89	Very Good
60-74	Good
40-59	Fair
< 40	Not Completed

Course Code	Course Title	Course Credit and Hours
<b>21AECO023</b>	<b>IoT based Decentralized Solar Power System</b>	<b>2 Credit - 4 hrs / wk</b>

**Objective of the course:**

1. Generation of power where we need(A Solar-DC initiative)
2. Sustainable development
3. Energy efficient alternatives
4. Dependency on grid power can be reduced
5. Self sustainability in power generation
6. Very much needed in remote areas

**Target Skills (Course outcomes) :**

1. Skill development to Generate basic power by self with knowledge of IoT.
2. Skill development to identify the basic need of solar power and its advantages compare to grid power.

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other) :**

- The Co curricular course based on DC Solar Power belongs to area of renewable technology or we can say alternative of power solution.
- This course is a trending in world level, like recently due to situation of our planet we have to find some alternative for power requirements so it is the one of the alternative towards solution. Here I attaché some link of trending course like this.

**Reference:**

Link from NSDC Power loom Operator - Solar power drive attachment

<https://nsdcindia.org/sites/default/files/SPL-MC-Power-loom-operator-19-02-2018.pdf>

The link of NIELIT

<https://www.nielit.gov.in/calicut/content/solar-power-system>

<https://www.nielit.gov.in/calicut/content/online-course-solar-power-installation>

**Course Description:**

- This Decentralized Solar Power System course is designed keeping in mind the basic power needs of common man so, it connects with all students of society. This course motivates students about general awareness about renewable energy. Proposed system design and development task is simple so students from any discipline can enroll the course. The course aims to address SDG 7: Affordable and clean Energy, SDG 11: Sustainable cities and communities.

<b>Course Content</b>	<b>Hours</b>
<b>Module-I: Basics of Electricity</b>	16 hrs
<ul style="list-style-type: none"> <li>● Basics of Voltage, Current, Electrical Power, DC and AC Power</li> <li>● Measurement of Electrical Quantities</li> <li>● Estimating the energy requirement and daily energy consumption of a house</li> </ul>	
<b>Module-II : Solar Cells and Solar PV modules</b>	16 hrs

<ul style="list-style-type: none"> <li>● What it is and how it generates electricity</li> <li>● Parameters of the Solar Cells</li> <li>● Factors affecting the Solar Power Generation</li> <li>● Solar PV module and measuring the module parameters</li> </ul>	
<b>Module-III : Solar PV module array and Solar PV System Design</b>	16 hrs
<ul style="list-style-type: none"> <li>● Observing and measuring parameters of 10 Watt, 20 Watt, 40 Watt Solar Panels</li> <li>● Connection of modules in series, connection of modules in parallel</li> <li>● Concepts of various types of solar PV system</li> <li>● Detailed understanding of standalone solar PV system with DC load, charge controller circuit and battery</li> </ul>	
<b>Module-IV : Basics of Batteries</b>	16 hrs
<ul style="list-style-type: none"> <li>● Rechargeable batteries and know how it works</li> <li>● Commonly available rechargeable batteries</li> <li>● Understanding the parameters of batteries like battery terminal voltage, charge storage capacity, Depth of discharge etc.</li> <li>● Series connection of batteries and parallel connection of batteries</li> </ul>	
<b>Module-V : Concepts of power conversion and charge controller</b>	16 hrs
<ul style="list-style-type: none"> <li>● Concepts of DC to AC conversion(Inverter)</li> <li>● Basic of Internet of Things</li> <li>● Various types of charge controllers (Liner, PWM, MPPT and IoT based Controller)</li> <li>● Study of simple Linear Charge Controller using MOSFET and develop the circuit for battery low voltage indication and cut off circuit using operational amplifier LM 339</li> </ul>	

**Suggested laboratory experiments / other activities:**

1. Understanding the basic terms about electricity. These terms are current, Voltage, Power, Energy, AC power, DC power and learn the use of multi meter to measure the electrical quantities.
2. Estimate of electrical energy consumed by appliances with the study the various parameters of solar PV module.
3. Develop I-V curve of Solar PV module with measuring current and voltage of PV module at various operating point. Calculate the power at each point and show maximum power point.
4. Study the effect of change in angle of light falling on PV module and Connect the two solar panels in series-parallel and measure current and voltage of PV module at various operating point.
5. Connect the typical 12V DC LED bulb directly with solar panel and observe the effect with different position of solar PV module.
6. Develop regulated DC voltage from unregulated DC voltage of solar PV module.
7. Study the various parameters of battery and basic electronic components which are necessary in developing solar PV based system.
8. Develop the basic solar charge controller circuit and circuit to cut off battery from load at low voltage.
9. Demonstration of Standalone Solar PV system for DC/AC loads.
10. Demonstration of IoT based system.

**Pedagogic tools:**

1. PPT and Videos.
2. Hands-on activities
3. Assignment
4. Group discussion
5. Chalk and Talk

**Reference Books:**

1. Solar Photovoltaic Technology and Systems, Chetan Singh Solanki, PHI

**Suggested reading / E-resources**

1. <https://www.nielit.gov.in/calicut/content/online-course-solar-power-installation>
2. <https://www.nielit.gov.in/calicut/content/solar-power-system>
3. <https://www.coursera.org/learn/converter-circuits#about>
4. <https://www.coursera.org/learn/solar-energy-system-design>

**Suggested MOOCs:**

1. [https://onlinecourses.nptel.ac.in/noc22\\_me98/preview](https://onlinecourses.nptel.ac.in/noc22_me98/preview)
2. [https://onlinecourses.nptel.ac.in/noc22\\_ge28/preview](https://onlinecourses.nptel.ac.in/noc22_ge28/preview)
3. [https://onlinecourses.nptel.ac.in/noc22\\_ph25/preview](https://onlinecourses.nptel.ac.in/noc22_ph25/preview)

**Methods of Assessment & Tools:**

(Though the credit has to be awarded at the end of the course i.e. two semesters, it is recommended to consolidated assessment in two stages one at end of each semester. Components used for assessment can be different as per the nature of the course)

S.N.	Component	Content	Duration	Marks	Sub Total
1	Attendance	--	--	10	
2	Assignments	--	--	10	
3	Practical Skill Assessment (Continuous Assessment during the semester)			40 (20 Marks for Each Semester)	
4	Course Mid Examination			20	
5	Course End Examination			20	
<b>Total</b>				<b>100</b>	<b>100</b>

**At the end of the course no marks are given, only remarks are given as follows:**

**REMARKS:**

Range of Marks	Remarks
90-100	Excellent
75-89	Very Good
60-74	Good
40-59	Fair
< 40	Not Completed

Course Code	Course Title	Course Credit and Hours
<b>21AECO024</b>	<b>The Art of Speech Writing and Public Speaking</b>	<b>2 Credit - 4 hrs / wk</b>

**Objective of the course:**

1. To prepare the stakeholders to be able to understand the essential principles of the art and craft of speechwriting.
2. To provide the latest information and data with regards to speech writing and public speaking.
3. To enable the stakeholders to be updated about the importance of public speaking and application of strategies to become a more confident speaker.
4. To give the stakeholders a detailed understanding of developing an audience centered public speaking model.

**Target Skills (Course outcomes):**

1. Skill development in the art of Speech Writing.
2. Skill development in the art of Public Speaking

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other):**

- The Co-curricular course based on Public Speaking and Speech Writing is applicable for all the sectors of various domains.
- Communicative skill, in general, is an integral part of any job profile; especially Effective Speech Writing will be an integral asset which can be used predominantly in a professional setup.

**Reference:**

Link from NSDC India

<https://skillsip.nsdcindia.org/sites/default/files/kps-document/Frameworks%20for%20Social%20Emotional%20Learning%20at%20the%20Workplace.pdf>

**Course Description:**

- This course helps the stakeholders to develop and hone their writing and editing skills with specific exercises on hooking your audience and make the content memorable and engaging.
- Finally, it examines how to deliver a speech with confidence and conviction, which can be an important learning asset for any stakeholder belonging to any domain.

<b>Course Content</b>	<b>Hours</b>
<b>Module-I: The Art of Speechwriting</b>	16hrs.
<ul style="list-style-type: none"><li>● Importance of Speeches</li><li>● Understanding the Three Golden Principles of Speechwriting</li><li>● Identifying the Importance of Messaging and Structuring your Content</li><li>● Exploring the narrative art of Storytelling</li></ul>	
<b>Module-II: Organizing and Outlining Your Speech</b>	16hrs.
<ul style="list-style-type: none"><li>● Strategies to organize the main ideas of your speech</li><li>● Understanding the method to organize the supporting material for the central idea</li><li>● Learning the Concept of Signposting</li><li>● Develop a Preparation outline of the speech along with proper introduction and conclusion</li></ul>	
<b>Module-III: Learning Speech Delivery</b>	16hrs.
<ul style="list-style-type: none"><li>● Understanding and Remembering your Speech</li><li>● Managing Stage Fear and Building Self Confidence</li><li>● Learning the usage of Visual and Verbal Channels for an Elevated Impact</li><li>● Applying improvised technique based on audience response</li></ul>	
<b>Module-IV: Speaking to Inform</b>	16hrs.
<ul style="list-style-type: none"><li>● Exploring the five different types of Informative Speeches</li><li>● Understanding the Communication and Ethics Conundrum</li><li>● Identify and use required strategies for organizing informative speeches</li><li>● Understanding Communication and Diversity</li><li>● Identify and use appropriate strategies for making informative speeches more interesting and memorable.</li></ul>	



<b>Module-V: The Art of Persuasive Speaking</b>	16 hrs.
<ul style="list-style-type: none"> <li>● What is Persuasive Speaking?</li> <li>● Understanding the Psychology of Persuasion</li> <li>● Developing an Audience Centered Persuasive Speech</li> <li>● Learning how to support your Persuasive message with Credibility, Logic and Emotion</li> <li>● Understanding the process of adapting ideas to people and the people to the ideas</li> </ul>	

**Suggested laboratory experiments / other activities:**

1. Developing and writing speeches to be delivered in different situations
2. Designing content based on audience response
3. Jumbled sentence, crossword puzzles worksheets

**Pedagogic tools:**

1. Chalk and Talk
2. PPT and Videos.
3. Hands-on activities
4. Assignment
5. Group discussion

**Reference Books:**

1. Roy, Jennifer Rozines, and Johannah Haney. *Sharpen Your Debate And Speech Writing Skills*. Enslow Publishers, Inc., 2012.
2. Cornbleet, Sandra, and Ronald Carter. *Language Of Speech And Writing*. Routledge, 2015.
3. Beebe, Steven A et al. *Communication*. 6th ed., Pearson, 2019.
4. Lucas, Stephen, and Paul Stob. *The Art Of Public Speaking*.
5. Jacobs, Rachel. *Public Speaking*. Barcharts, Inc., 2014.

**Suggested reading / E-resources**

1. 2022, <https://pac.org/content/speechwriting-101-writing-effective-speech>.
2. *Edis.Ifes.Ufl.Edu*, 2022, <https://edis.ifes.ufl.edu/pdf/WC/WC11600.pdf>.
3. "What Is Public Speaking? [Definition, Importance, Tips Etc!] - Art Of Presentations". *Art Of Presentations*, 2022, <https://artofpresentations.com/what-is-public-speaking/>.

**Suggested MOOCs:**

1. <https://www.classcentral.com/course/public-speaking-889>
2. <https://www.my-mooc.com/en/mooc/introduction-to-public-speaking/>

**Methods of Assessment& Tools:**

S.N.	Component	Content	Duration	Marks	Sub Total
1	<b>Attendance</b>	Minimum 90%	Entire Course	<b>10</b>	10
2	<b>Assignment</b>	Topics from the syllabus	1 Week for submission	<b>10</b>	10
3	<b>Practical Skill Assessment</b> (Continuous Assessment during the semester)	Activity in each semester	1 week	<b>40</b> (20 Marks for Each Semester)	40
4	<b>Course Mid Examination</b>	From two Modules	1 hr.	<b>20</b>	20
5	<b>Course End Examination</b>	From all modules	1 hr.	<b>20</b>	20
<b>Total</b>				<b>100</b>	<b>100</b>

**At the end of the course no marks are given, only remarks are given as follows:**

**REMARKS:**

Range of Marks	Remarks
90-100	Excellent
75-89	Very Good
60-74	Good
40-59	Fair
< 40	Not Completed

Course Code	Course Title	Course Credit and Hours
<b>21AECO025</b>	<b>Yogic Science</b>	<b>2 Credit - 4 hrs / wk</b>

**Objective of the course:**

1. To learn the rules, fundamentals, skills & strategies of yoga.
2. To learn how to correctly execute required skills and techniques as well as to use the equipment/facilities safely.
3. To understand how kinesiology relates to a healthy individual lifestyle.

**Target Skills (Course outcomes) :**

1. Students work within their own comfort level and pace.
2. Teach various asanas (postures).
3. Learn breathing techniques.
4. Improve strength, flexibility and the sense of well-being.
5. Increase relaxation of body and soul.

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other) :**

- This course can prepare the students physically and mentally for the integration of their physical, mental and spiritual faculties so that the students can become healthier, saner and more integrated members of the society and of the nation.
- Yoga education helps in self-discipline and self-control, leading to immense amount of awareness, concentration and higher level of consciousness.

**Reference:**

Link of model curriculum of various government bodies:

1. [https://nsdcindia.org/sites/default/files/MC\\_BWSQ2203\\_Yoga\\_Trainer\\_16.07.2018.pdf](https://nsdcindia.org/sites/default/files/MC_BWSQ2203_Yoga_Trainer_16.07.2018.pdf)
2. [https://www.bwssc.in/pdf/Model-Curriculum/Model\\_Curriculum\\_Yoga\\_Instructor\\_\(B&W\)\\_V2.0.pdf](https://www.bwssc.in/pdf/Model-Curriculum/Model_Curriculum_Yoga_Instructor_(B&W)_V2.0.pdf)
3. <https://main.ayush.gov.in/yoga-as-a-career/>

**Course Description:**

The purpose of this course is to learn the specific skills and/or the techniques of the activity. By actively participating in an activity class, the student may gain health benefits such as improved body composition, increased flexibility, increased muscular endurance and increased muscular strength. Participating in activity classes leads to a healthier lifestyle. This aims to address SDG 3: Good Health and Well Being.

<b>Course Content</b>	<b>Hours</b>
<b>Module-I: Foundations of Yoga: History, Evolution of Yoga and Schools of Yoga</b>	6 hrs
<ul style="list-style-type: none"> <li>● Origin of Yoga, History and Development of Yoga; Etymology and Definitions, Misconceptions, Aim and Objectives of Yoga, True Nature and Principles of Yoga.</li> <li>● Introduction to Schools (Streams) of Yoga: Yoga Schools with Vedanta Tradition (Jnana, Bhakti, Karma and Dhyana), Yoga Schools with Samkhya-Yoga Tradition (Yoga of Patanjali)</li> </ul>	
<b>Module-II : Yoga and Health</b>	12 hrs
<ul style="list-style-type: none"> <li>● Definition &amp; Importance of Health According to WHO; Dimensions of Health: Physical, Mental, Social and Spiritual;</li> <li>● Concept of Health and Disease in Indian Systems of Medicine i.e. Ayurveda, Naturopathy</li> <li>● Yogic Concept of Health and Disease: Concept of Adhi and Vyadhi; Meaning and definitions,</li> <li>● Concepts of Trigunas, Pancha-mahabhutas, Pancha-prana and their role in Health and Healing; Concept of Pancha-koshas &amp; Shat-chakra and their role in Health and Healing;</li> <li>● Mental and Emotional ill Health: Styana, Samshaya, Pramada, Avirati, Bhranti-darsana, Alabdha-bhumikatva, Anavasthitatva, Duhkha and Daurmanasya.</li> <li>● Yogic Diet-General Introduction of Ahara; Concept of Mitahara; Classification in Yogic diet according to traditional Yoga texts; Concepts of Diet Pathya and Apathya according to Gheranda Samhita, Hatha Pradeepika and Bhagavad Gita; Importance of Yogic Diet in Yog Sadhana and its role in healthy living.</li> <li>● Yogic Principles of Healthy Living: Ahara, Vihara, Achara and Vichara; Role of Yogic Positive Attitudes (Maitri, Karuna, Mudita and Upeksha) for Healthy Living, Concept of Bhavas and Bhavanas with its relevance in Health and well-being.</li> <li>● Shatkarmas Dhauti (Kunjal), Vastra dhauti, Danda dhauti, Laghoo and Poorna sankhaprakshalana, Neti (Sutra and Jala), Kapalbhati, Agnisara, Nauli and trataka.</li> </ul>	
<b>Module-III : Applications of Yoga</b>	12 hrs

<ul style="list-style-type: none"> <li>● Yoga in Education: Salient features of Yoga Education, Factors of Yoga Education; Teacher, Student and Teaching, Guru-shishya parampara and its importance in Yoga Education; Value Education, its meaning and definitions, types of values, value-oriented education and modes of living, role of value oriented education; contribution of Yoga towards development of values; Salient features of ideal Yoga teacher, role of Yoga teacher in value-oriented education, role of Yoga in development of human society; Yogic Concepts for the Development of Four Fold Consciousness - Civic Sense, Patriotic Urge, Service Zeal and Spiritual Growth;</li> <li>● Yoga for Stress Management: Introduction to Stress, Concept of Stress; Solutions through Mandukya karika - Relaxation and stimulation combined as the core for stress management; Practice of Stimulation and relaxation; Yoga and Stress Management; Concepts and Techniques of Stress Management in Ashtanga Yoga of Patanjali and Bhagavad Gita, specific practices for stress management, breath awareness, shavasana, Yoganidra, pranayama and meditation, impact of yogic lifestyle on stress management.</li> <li>● Yoga for Personality Development - Yogic attitudes for personality development, Ashtanga Yoga and personality development, personality development with special emphasis on Panchakosa. Memory and Concentration; Short-term, long-term memory, stages of memory foundation and maintenance; Yoga modules to improve memory; Barriers to concentration; creativity eastern concept, silence and creativity; yogic approach to creativity; yogic practices for creativity development; Facets of intelligence; concept of intelligence according to Yoga; Yoga practices for IQ development; Practices for Anger Management.</li> </ul>	
<b>Module-IV : Practical Yoga</b>	38 hrs

<ul style="list-style-type: none"> <li>● Yogic Practices – Asana, Kriya, Mudra, Bandha, Dhyana, Surya Namaskara (Techniques, Salient Features, Benefits &amp; limitation)</li> <li>● Yogic Sukshma Vyayama</li> <li>● Suryanamaskar- Suryanamaskar must be practiced traditionally and the variation in Suryanamaskar may be taken into consideration based on the convenience of patients for therapy.</li> <li>● Asnas (yogic postures)</li> <li>● Standing Postures Ardhakati chukrasin, Hastapadasana, Ardchakrasana, Trikonasana, Parivritta trikonasana, Parsvakanasana,</li> <li>● Sitting postures Paschimottanasana, Suptavajrasana, Ardhamatsyendrasana, Vakrasana, Marichasana, Badhakanasana, Merudandasana, Akarna dhanurasana, Gumukhasana,</li> <li>● Prone postures Bhujangasana, Salabhasana, Sarvangasana, Matsyasana, Shavasana, Setubandhasana,</li> <li>● Balancing postures Vrikshasana, Garudasana, Namaskarasana, Natrajasana</li> </ul>	
<b>Module-V : Practical (pranayama, meditation, Bandhas, Mudras)</b>	12 hrs
<ul style="list-style-type: none"> <li>● Pranayama Breath awareness, Sectional breathing, Nadishuddhi, Bhastrika, Ujjai, Cooling pranayama (Sitali, Sitkari and Sadanta), Bhramari Pranayama</li> <li>● Bandhas and Mudras: Jivha Bandha, Jalandhara Bandha, Uddiyana Bandha, Mula Bandha, Maha Bandha, Maha Mudra, Shanmukhi Mudra, Vipareet Karni Mudra</li> <li>● Cyclic Meditation, Yoga Nidra.</li> </ul>	

**Suggested laboratory experiments / other activities:**

Demonstration during Presentation

**Pedagogic tools:**

1. Chalk and Talk
2. PPT and Videos.
3. Physical activities
4. Assignment
5. Group discussion

**Reference Books:**

1. Yoga written by Dr. H R Nagendra & Dr. R Nagarathna published by swami Vivekananda yoga research foundation, July 2016, Bangalore.ISBN:978-81-87313-16-8
2. New Perspectives in Stress Management written by Dr. H R Nagendra & Dr. R Nagarathna published by swami Vivekananda yoga research foundation, Bangalore.ISBN:978-81-87313-01-4
3. Pranayama–The Art and Science written by Dr. R Nagarathna published by Swami Vivekananda Yoga Prakashana Bangalore, published year 2011, 3 rd Ed.
4. Yoga and Health written by Adhyatm Ananda 1ST ED Published by GGRK, AHMEDABAD
5. Raja yoga written by Swami Vivekananda Published by Advaita Ashrama, KOLKATA, published year 2012

#### **Suggested reading / E-resources**

1. <https://www.coursera.org/learn/engineering-health-yoga-physiology>
2. <https://www.coursera.org/lecture/positive-psychiatry/yoga-and-mental-health-b6xpk>
3. <https://patanjaliyogacertification.org/>

#### **Suggested MOOCs:**

1. [https://onlinecourses.swayam2.ac.in/aic19\\_ed29/preview](https://onlinecourses.swayam2.ac.in/aic19_ed29/preview)
2. <https://www.nios.ac.in/online-course-material/vocational-courses/diploma-in-naturopathy-and-yogic-science.aspx>

#### **Methods of Assessment & Tools:**

(Though the credit has to be awarded at the end of the course i.e. two semesters, it is recommended to consolidated assessment in two stages one at end of each semester. Components used for assessment can be different as per the nature of the course)

<b>S.N.</b>	<b>Component</b>	<b>Content</b>	<b>Duration</b>	<b>Marks</b>	<b>Sub Total</b>
1	<b>Attendance</b>	--	--	<b>10</b>	
2	<b>Assignments</b>	--	--	<b>10</b>	
3	<b>Practical Skill Assessment</b> (Continuous Assessment during the semester)			<b>40</b> (20 Marks for Each Semester)	
4	<b>Course Mid Examination</b>			<b>20</b>	
5	<b>Course End Examination</b>			<b>20</b>	

<b>Total</b>	<b>100</b>	<b>100</b>
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**At the end of the course no marks are given, only remarks are given as follows:**

**REMARKS:**

<b>Range of Marks</b>	<b>Remarks</b>
90-100	Excellent
75-89	Very Good
60-74	Good
40-59	Fair
< 40	Not Completed



Course Code	Course Title	Course Credit and Hours
<b>21AECO026</b>	<b>Sports</b>	<b>2 Credit - 4 hrs / wk</b>

**Objective of the course:**

1. All around development
2. To equip the students with the scientific knowledge of body response to various types of exercise.
3. Maintenance of fitness for optimal health and well being
4. Attainment of knowledge and the growth of positive attitude towards physical activity and sports.

**Target Skills (Course outcomes) :**

1. Compare the relationship between general education and physical education
2. Understand knowledge about the theory and practice of yoga and its nature, scope, development of yoga through ages
3. Plan training program for athletes engaged in different sports activities to achieve high performance in sports
4. Develop skills to establish daily caloric requirement and to design diet plan
5. Do officiate, supervise various sports tournaments and orient them in organizing sports events at all level

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other) :**

Physical Education is normally referred to as the science that aims to develop all-inclusive aspects of human personality through physical and sports activities. It caters to the need for developing capability of the students on physical, mental and social aspects. Physical education is not only concerned with the physical outcome that accrue from participation in physical activities but also the development of knowledge and attitude conducive to lifelong learning and participation in motor activities.

**Reference:**

Link of model curriculum of various government bodies:

1. [https://nscindia.org/sites/default/files/MC\\_SPFQ1101\\_Community%20Sports%20Coach\\_V1.3.1%2026032020.pdf](https://nscindia.org/sites/default/files/MC_SPFQ1101_Community%20Sports%20Coach_V1.3.1%2026032020.pdf)
2. [https://nscindia.org/sites/default/files/MC\\_SPFQ1107\\_Fitness%20Trainer\\_Final%20250621.pdf](https://nscindia.org/sites/default/files/MC_SPFQ1107_Fitness%20Trainer_Final%20250621.pdf)

**Course Description:**

Physical Education and Sports contains subjects varying from History and foundation of Physical Education to Nutrition, Sports Training, yoga etc which are aimed to give thorough knowledge and skills to the students. This aims to address SDG 3: Good Health and Well Being.

Course Content		Hours
<b>Module-I: History and foundation of physical education</b>		50 hrs
Theory	<ul style="list-style-type: none"><li>● Introduction of physical education</li><li>● Historical development of physical education in India</li><li>● Philosophical foundation of physical education</li><li>● Foundation of physical education</li></ul>	20

Practical	<ul style="list-style-type: none"> <li>● Volleyball, Basketball, Handball, Badminton</li> <li>● Basic skills for Volleyball, Basketball and Badminton</li> <li>● Techniques and Tactics for the games like Badminton, Volleyball and Basketball</li> <li>● Ground marking of Badminton and Volleyball.</li> <li>● Officiating</li> </ul>	30
<b>Module-II : yoga</b>		50 hrs
Theory	<ul style="list-style-type: none"> <li>● History of yoga</li> <li>● Exercise yoga</li> <li>● Meditation yoga</li> <li>● Importance of yoga in our life</li> </ul>	20
Practical	<ul style="list-style-type: none"> <li>● yoga</li> <li>● Hockey, Kho-Kho, Judo, swimming</li> <li>● Basic skills required for Hockey, Judo, Swimming</li> <li>● Technique and tactics for Kho-Kho and Judo</li> <li>● Officiating</li> <li>● Ground marking for Kho-Kho and Hockey</li> </ul>	30
<b>Module-III : Sports training</b>		50 hrs
Theory	<ul style="list-style-type: none"> <li>● General rules and regulation do have and don't of different game like Kabbadi, cricket, Rifle Shooting.</li> <li>● Introduction of sports training</li> <li>● Training components</li> <li>● Load</li> <li>● Training program and planning</li> </ul>	20

Practical	<ul style="list-style-type: none"> <li>● Physical training of Kabbadi , Cricket, Rifle shooting ,</li> <li>● Basic skills require for the games</li> <li>● Technique and tactics for the each games</li> <li>● Officiating</li> <li>● Ground marking for Kabbadi, and Cricket.</li> </ul>	30
<b>Module-IV : Nutrition</b>		50 hrs
Theory	<ul style="list-style-type: none"> <li>● Nutrients: ingestion to energy metabolism</li> <li>● Introduction of Nutrition and weight management</li> <li>● Nutrition and weight management before game</li> <li>● During Game</li> <li>● After game</li> </ul>	20
Practical	<ul style="list-style-type: none"> <li>● Football , Lawn tennis, Athletics</li> <li>● Basic skills of Football and Athletics</li> <li>● Technique and tactics for Lawn tennis and Football</li> <li>● Officiating</li> <li>● Ground marking of Athletics.</li> </ul>	30

**Suggested laboratory experiments / other activities:**

1. Football, Cricket Kit
2. General equipments for ground marking
3. Sports material for volleyball and Badminton.

**Pedagogic tools:**

1. Chalk & Board
2. Sports equipment
3. Motivational Videos

#### Reference Books:

1. History of sports and physical education , C. S. Tomar, Khel Sahitya Kendra.(2009)
2. Sports health and physical education, Mandeep Singh , Khel Sahitya Kendra.(2009)
3. Science of sports training, Hardayal Singh, D.V.S Publication.(1991)
4. Officiating and coaching, Sunil Chaturvedi, Khel Sahitya Kendra.(2013)
5. Physical education encyclopedia, Amit Arjun Budhhe, Laxmi Punction (2013)

#### Suggested reading / E-resources

1. <https://www.gyanjosh.com/test/sports-gk/sport-gk-7/0>
2. [https://www.edudel.nic.in//welcome\\_folder/support\\_material\\_2016\\_2017/12/sm\\_12\\_phyedn\\_eng\\_201617.pdf](https://www.edudel.nic.in//welcome_folder/support_material_2016_2017/12/sm_12_phyedn_eng_201617.pdf)
3. <https://www.coursera.org/courses?query=sports>

#### Suggested MOOCs:

1. [https://onlinecourses.swayam2.ac.in/cec19\\_ed09/preview](https://onlinecourses.swayam2.ac.in/cec19_ed09/preview)
2. <https://www.my-mooc.com/en/categorie/sports>

#### Methods of Assessment & Tools:

(Though the credit has to be awarded at the end of the course i.e. four semesters, it is recommended to consolidated assessment in two stages one at end of each semester. Components used for assessment can be different as per the nature of the course)

S.N.	Component	Content	Duration	Marks	Sub Total
1	Attendance	--	--	10	
2	Assignments	--	--	10	

3	<b>Practical Skill Assessment</b> (Continuous Assessment during the semester)			<b>40</b> (20 Marks for Each Semester)	
4	<b>Course Mid Examination</b>			<b>20</b>	
5	<b>Course End Examination</b>			<b>20</b>	
<b>Total</b>				<b>100</b>	<b>100</b>

**At the end of the course no marks are given, only remarks are given as follows:**

**REMARKS:**

<b>Range of Marks</b>	<b>Remarks</b>
90-100	Excellent
75-89	Very Good
60-74	Good
40-59	Fair
< 40	Not Completed

<b>Course Code</b>	<b>Course Title</b>	<b>Course Credit and Hours</b>
<b>21AECO027</b>	<b>National Cadet Corps</b>	<b>24 Credit ( 300 Hrs )</b>

<b>Course Code</b>	<b>Course Title</b>	<b>Hours</b>
21AECO027	National Cadet Corps	300 Hrs
	Semesters I to VI	

<b>CO No.</b>	<b>CO Statement</b>	<b>Blooms taxonomy Level (K<sub>1</sub> to K<sub>6</sub>)</b>
CO1	Imbibe the conduct of NCC cadets.	K2
CO2	Respect the diversity of different Indian culture and Practice togetherness and empathy in all walks of their life.	K2
CO3	Do their own self analysis and will work out to overcome their weakness for better performance in all aspects of life. Understand creative thinking & its components and think divergently and will try to break functional fixedness.	K3
CO4	Make a team and will work together for achieving the common goal send do the social services on different occasions.	K2,K4

<b>Semester – I</b>		
<b>Course Code</b>	<b>Course Title</b>	<b>Hrs</b>
<b>21AECO027</b>	<b>National Cadet Corps-1 (Theory)</b>	<b>Theory-15 hrs</b>

**Objective of the course:**

Cadets will be able to: -

1. Know about the history of NCC, its organization, and incentives of NCC for their career prospects.
2. Acquire knowledge of duties and conduct of NCC cadets.
3. Understand about different NCC camps and their conducts.
4. Understand the concept of national integration and its importance.
5. Understand the concept of self-awareness and emotional intelligence.
6. Understand the concept of critical & creative thinking.
7. Understand the process of decision making & problem solving.
8. Understand the concept of team and its functioning.
9. Understand the concept and importance of Social service.

**Target Skills (Course outcomes) :**

1. Imbibe the conduct of NCC cadets.
2. Respect the diversity of different Indian culture.
3. Practice togetherness and empathy in all walks of their life.
4. Do their own self analysis and will work out to overcome their weakness for better performance in all aspects of life.
5. Understand creative thinking & its components.
6. Think divergently and will try to break functional fixedness.
7. Make a team and will work together for achieving the common goals.
8. Do the social services on different occasions.

**Course Description:**

- This course reinforces the basic understanding of armed force. Cadets will learn about various military tactics like Field craft and battle craft, Weapon Training, Map reading.
- This course creates and awareness about the history of Indian armed forces and the contribution of brave soldiers to the nation security. NCC stands for the National Cadet Corps, which works towards the empowerment of the nation's youth.
- The course encourages the aspirants into several productive activities that keep them away from any unconstructive forces. Course is designed so that cadet can groom their overall personality and also be aware about various challenges to our nation and social issues. By various activity Cadets are able to learn disaster management and community development.
- The course provide information and training on how to join armed forces, other paramilitary forces, state military and civil defense force after completion of the NCC Course successfully. The course shall extend over a period of two years comprising of four semesters.



**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other) :**

- NCC course incorporate based on armed force and students can enhance their knowledge in all three area of armed force.

**Reference: NCC handbook for Cadet**

<b>Course Content (Theory)</b>	<b>Hours</b>
<b>Divided into four Modules, and activities are part of each module.</b>	
<b>Module-I : NCC General (N)</b>	<b>06</b>
<ul style="list-style-type: none"> <li><input type="checkbox"/> Introduction of NCC</li> <li><input type="checkbox"/> History, Aims, Objective of NCC</li> <li><input type="checkbox"/> NCC as Organization</li> <li><input type="checkbox"/> Incentives of NCC</li> <li><input type="checkbox"/> Duties of NCC Cadet</li> <li><input type="checkbox"/> NCC Camps: Types &amp; Conduct</li> </ul>	
<b>Module-II: National Integration &amp; Awareness (NI)</b>	<b>04</b>
<ul style="list-style-type: none"> <li><input type="checkbox"/> National Integration: Importance &amp; Necessity</li> <li><input type="checkbox"/> Factors Affecting National Integration</li> <li><input type="checkbox"/> Unity in Diversity &amp; Role of NCC in Nation Building</li> <li><input type="checkbox"/> Threats to National Security</li> </ul>	
<b>Module III: Personality Development (PD)</b>	<b>03</b>
<ul style="list-style-type: none"> <li><input type="checkbox"/> Intra &amp; Interpersonal skills</li> <li><input type="checkbox"/> Self-Awareness &amp; Analysis</li> <li><input type="checkbox"/> Empathy</li> <li><input type="checkbox"/> Critical &amp; creative thinking</li> <li><input type="checkbox"/> Decision making and problem solving</li> </ul>	
<b>Module IV: Social Service and Community Development (SSCD)</b>	<b>02</b>
<ul style="list-style-type: none"> <li><input type="checkbox"/> Basics of social service and its need</li> <li><input type="checkbox"/> Types of social service activities</li> <li><input type="checkbox"/> Objectives of rural development programs and its importance</li> <li><input type="checkbox"/> NGO's and their contribution in social welfare</li> <li><input type="checkbox"/> Contribution of youth and NCC in Social welfare</li> </ul>	

Sr. No.	List of activities	Hrs
01	15 August: Independence Day	02
02	Cleanliness drive	02
03	Tree plantation	02

Semester – I		
Course Code	Course Title	Hrs
21AECO027	National Cadet Corps-1 (Practical)	Practical-30 hrs

### Course Content Part (II) Practical

#### Objective of the course:

Cadets will be able to: -

1. Understand that drill as the foundation for discipline and to command a group for common goal.
2. Appreciate grace and dignity in the performance of foot drill.
3. Understand the importance of a weapon its detailed safety precautions necessary for prevention of accidents.
4. Develop awareness about different types of terrain and how it is used in battle craft.
5. Develop the concept of various markings on the map and how they are co-related to the ground features.
6. Understand the various social issues and their impact on social life.
7. Develop the sense of self-less social service for better social & community life.

**Target Skills (Course outcomes) :** After completing this course, the cadets will be able to: -

1. Perform foot drill and follow the different word of command.
2. Fire a weapon effectively with fair degree of marksmanship.
3. Undertake point to point navigation and take part in route marches by day and night.
4. Perform the social services on various occasions for better community & social life.

Course Content ( Practical)	Hours
Divided into five Modules, and activities are part of each module.	

<b>Module-I : Drill (D)</b>	<b>12</b>
<input type="checkbox"/> Foot Drill- Drill ki Aam Hidayaten <input type="checkbox"/> Word ki Command, Savdhan <input type="checkbox"/> Vishram, Aram Se <input type="checkbox"/> Murdna, Kadvar Sizing <input type="checkbox"/> Teen Line Banana <input type="checkbox"/> Khuli Line, Nikat Line <input type="checkbox"/> Khade Khade Salute Karna Parade Par <input type="checkbox"/> Visarjan, Line Tod <input type="checkbox"/> Tej Chal <input type="checkbox"/> Tham aur Dhire Chal, Tham	
<b>Module-II: Weapon Training (WT)</b>	<b>05</b>
<input type="checkbox"/> Introduction & Characteristics of .22 rifle <input type="checkbox"/> Handling of .22 rifle	
<b>Module III: Map Reading (MR)</b>	<b>03</b>
<input type="checkbox"/> Definition of Map <input type="checkbox"/> Conventional signs <input type="checkbox"/> Scale and Grid System <input type="checkbox"/> Topographical forms and technical terms <input type="checkbox"/> Relief <input type="checkbox"/> Contours and gradients <input type="checkbox"/> Cardinal points and types of North <input type="checkbox"/> Magnetic Variation and Grid Convergence	
<b>Module IV: Field Craft &amp; Battle Craft (FC &amp; BC)</b>	<b>03</b>
<input type="checkbox"/> Introduction of Field Craft & Battle craft <input type="checkbox"/> Judging Distance <input type="checkbox"/> Method of Judging Distance.	
<b>Module V: Social Service and Community Development (SSCD)</b>	<b>07</b>

<input type="checkbox"/> Cadets will participate in various activities throughout the semester <input type="checkbox"/> e.g., Blood donation Camp <input type="checkbox"/> Swachhata Abhiyan <input type="checkbox"/> Constitution Day <input type="checkbox"/> Jan Jeevan Hariyali Abhiyan <input type="checkbox"/> Beti Bachao Beti Padhao etc	
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Semester – II		
Course Code	Course Title	Hrs
21AECO027	National Cadet Corps-II (Theory)	Theory-15 hrs

<p><b>Objective of the course:</b></p> <p>Cadets will be able to: -</p> <ol style="list-style-type: none"> <li>1. Understand the thinking &amp; reasoning process.</li> <li>2. Understand the process to cope with Stress &amp; emotions.</li> <li>3. Understand the importance of improving communication skills.</li> <li>4. Identify the leadership traits.</li> <li>5. Admire the qualities of great leaders.</li> <li>6. Know about different legal provisions for children &amp; women safety and protection.</li> <li>7. Understand the various rules &amp; measures to be taken to ensure Road/Rail safety.</li> <li>8. Understand &amp; spread awareness about latest Government initiatives for welfare of citizens and contribute towards Nation building.</li> <li>9. Understand concepts of cyber and mobile security.</li> </ol>
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<p><b>Target Skills (Course outcomes) :</b> After completing this course, the cadets will be able to: -</p> <ol style="list-style-type: none"> <li>1. Define thinking, reasoning, critical thinking and creative thinking.</li> <li>2. To think critically about different life related issues.</li> <li>3. Think divergently and will try to break functional fixedness.</li> <li>4. Creatively in their real-life problems.</li> <li>5. Understand the organizations related to disaster management and their functioning.</li> <li>6. Appreciate the role of NCC cadets in disaster management.</li> </ol>
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<b>Course Content (Theory)</b>		<b>Hours</b>
Divided into Three Modules, and activities are part of each module		
<b>Module-1: Personality Development (PD)</b>		<b>05</b>
<input type="checkbox"/> Thinking- Meaning and Concept of thinking, Reasoning, Process of thinking. <input type="checkbox"/> Critical Thinking- Meaning & concept of critical thinking, Features of critical thinking, Process of critical thinking. <input type="checkbox"/> Creative thinking- Meaning & concept of creative thinking, Features of creative thinking, Process of creative thinking, levels of Creativity, Characteristics of creative person.		
<b>Module-2: Leadership Development (LD)</b>		<b>05</b>
<input type="checkbox"/> Leadership capsule <input type="checkbox"/> Important Leadership traits, Indicators of leadership and evaluation. <input type="checkbox"/> Motivation- Meaning & concept, Types of motivation. Factors affecting motivation <input type="checkbox"/> Ethics and Honor codes.		
<b>Module-3: Social Service and Community Development (SSCD)</b>		<b>05</b>
<input type="checkbox"/> Protection of Children & Women Safety <input type="checkbox"/> Road/Rail Safety <input type="checkbox"/> New Government Initiatives <input type="checkbox"/> Cyber and mobile Security Awareness.		

<b>Sr. No.</b>	<b>List of activities</b>	<b>Hrs (aprox.)</b>
01	1 <sup>st</sup> Dec: AIDS day	02
02	7 <sup>th</sup> Dec: Armed forces flag day	02
03	26 <sup>th</sup> January: Republic day	04

<b>Semester – II</b>		
<b>Course Code</b>	<b>Course Title</b>	<b>Hrs</b>
<b>21AECO027</b>	<b>National Cadet Corps-II (Practical)</b>	<b>Practical-30 hrs</b>

**Objective of the course:**

Cadets will be able to: -

1. Understand that drill as the foundation for discipline and to command a group for common goal.
2. Appreciate grace and dignity in the performance of foot drill.
3. Understand the importance of a weapon its detailed safety precautions necessary for prevention of accidents.
4. Use terrain effectively for concealment, camouflage, indicate landmarks and give field signals.

**Target Skills (Course outcomes) : After completing this course, the cadets will be able to: -**

1. Perform foot drill gracefully.
2. Give and follow the different word of command.
3. Fire a weapon effectively with fair degree of marksmanship.
4. Use of bearing and service protractor and locate the places and objects on the ground.
5. Do the social service and feel connected with social problems.

Course Content ( Practical)	Hours
Divided into five Modules, and activities are part of each module	
<b>Module-I : Drill (D)</b>	12
<input type="checkbox"/> Foot Drill Dahine, Baen, Aageaur Piche Kadam Lena <input type="checkbox"/> Tej Chal se Murdna, Tej Chal se Salute Karna, Tej Kadam Taal aur Tham, Tej Kadam Taal se Kadam Badalna <input type="checkbox"/> Teeno Teen se Ek File aur ek file se Teeno Teen Banana	
<b>Module-II : Weapon Training (WT)</b>	04
<input type="checkbox"/> Range procedure & Theory of group <input type="checkbox"/> Short Range firing	
<b>Module-III : Map Reading (MP)</b>	05
<input type="checkbox"/> Protractor Bearing and its conversion methods <input type="checkbox"/> Service protractor and its uses <input type="checkbox"/> Prismatic compass and its uses and GPS <input type="checkbox"/> Navigation by compass and GPS	
<b>Module-IV : Field Craft &amp; Battle Craft (FCBC)</b>	04

<input type="checkbox"/> Indications of landmarks and Targets <input type="checkbox"/> Intro, Definitions, Types of Ground, Indication of Landmarks, Methods of identification of targets, difficult targets	
<b>Module-V: Social Service and Community Development (SSCD)</b>	05
<input type="checkbox"/> Cadets will participate in various activities throughout the semester e.g., Blood donation Camp, Swachhata Abhiyan, Constitution Day, Jan Jeevan Hariyali Abhiyan, Beti Bachao Beti Padhao etc. as per the requirement and similar announced days- National and state level	

<b>Semester – III</b>		
<b>Course Code</b>	<b>Course Title</b>	<b>Hrs</b>
<b>21AECO027</b>	<b>National Cadet Corps-III (Theory)</b>	<b>Theory-15 hrs</b>

**Objective of the course:**

Cadets will be able to: -

1. Understand the life history and leadership qualities of great leaders, sportspersons & entrepreneurs.
2. Understand the various aspects of types of mindset.
3. Understand public speaking methods & qualities.
4. Understand the organizations related to disaster management and their functioning.
5. Understand the role of NCC cadets in disaster management.
6. Understand the various types of adventure activities.
7. Understand the History, Geography & Topography of Border/ Coastal Areas.

**Target Skills (Course outcomes) : After completing this course, the cadets will be able to: -**

1. Admire and get inspired from the accomplishments of leaders from various walks of life.
2. Develop public speaking skills.
3. Understand the importance of positive mindset and optimistic attitude in life.
4. Appreciate the need & requirement for disaster management and his role in disaster management activities.
5. Know the history & geographical peculiarity of our borders & coastal regions.

<b>Course Content (Theory)</b>	<b>Hours</b>
Divided into Five Modules, and activities are part of each module	
<b>Module-I: Personality Development (PD)</b>	05
<input type="checkbox"/> Group Discussions - Change your Mindset <input type="checkbox"/> Public Speaking	
<b>Module-II: Leadership Development (LD)</b>	04
<input type="checkbox"/> Case Studies <ul style="list-style-type: none"> <li>● APJ Abdul Kalam</li> <li>● Deepa Malik</li> <li>● Maharana Pratap</li> <li>● N Narayan Murthy.</li> </ul>	
<b>Module-III : Disaster management(DM)</b>	03
<input type="checkbox"/> Disaster Management Capsule <input type="checkbox"/> Organisation <input type="checkbox"/> Types of Disasters. <input type="checkbox"/> Essential Services <input type="checkbox"/> Assistance <input type="checkbox"/> Civil Defence Organisation.	
<b>Module-IV : Adventure (A)</b>	01
<input type="checkbox"/> Adventure activities.	
<b>Module-V : Border &amp; Coastal Areas (B &amp; C area) and Military History</b>	02



<input type="checkbox"/> History, Geography & Topography of Border/ Coastal Areas.	
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Sr. No.	List of activities	Hrs (aprox.)
01	Environment awareness	02
02	21 June: International day of yoga	03
03	Independence Day	03
04	Cleanliness Drive	02
05	NCC day (The NCC day is observed on the fourth Sunday of November)	03

Semester – III		
Course Code	Course Title	Hrs
21AECO027	National Cadet Corps-III (Practical)	Practical-30 hrs

<p><b>Objective of the course:</b></p> <p>Cadets will be able to: -</p> <ol style="list-style-type: none"> <li>1. Understand that drill as the foundation for discipline and to command a group for common goal.</li> <li>2. Appreciate grace and dignity in the performance of arm drill.</li> <li>3. Understand the concept and importance of social service.</li> <li>4. Understand the importance of a weapon its detailed safety precautions necessary for prevention of accidents.</li> <li>5. Actively participate in social service and community development activities.</li> </ol>
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**Target Skills (Course outcomes) : After completing this course, the cadets will be able to: -**

1. Perform arm drill gracefully.
2. Give and follow the different word of command.
3. Fire a weapon effectively with fair degree of marksmanship.
4. Different positioning for fire and aiming.
5. Use terrain effectively for concealment, camouflage, indicate landmarks and give field signals.
6. Observe surroundings in better way.
7. Develop the qualities of patience and confidence and become better individuals.
8. Will develop physical as well as mental fitness.

<b>Course Content ( Practical)</b>	<b>Hours</b>
Divided into Six Modules, and activities are part of each module	
<b>Module-I : Drill (D)</b>	08
<input type="checkbox"/> Arm Drill <input type="checkbox"/> Rifle ke saath Savdhan, Vishram aur Aram se <input type="checkbox"/> Rifle ke saath Parade Par aur Saj, Rifle ke saath Visarjan, Line Tod <input type="checkbox"/> Bhumi Shastra aur Uthao Shastra, Bagal Shastra aur Baju Shastra	
<b>Module-II : Weapon Training (WT)</b>	04
<input type="checkbox"/> Short Range firing.	
<b>Module-III : Map Reading (MR)</b>	04
<input type="checkbox"/> Setting of Map <input type="checkbox"/> Findings North and Own Position	
<b>Module-IV : Field Craft &amp; Battle Craft (FCBC)</b>	04
<input type="checkbox"/> Observation <input type="checkbox"/> Camouflage <input type="checkbox"/> Concealment	
<b>Module-V: Social Service and Community Development (SSCD)</b>	05

<input type="checkbox"/> Cadets will participate in various activities throughout the semester e.g., <ul style="list-style-type: none"> <li>● Blood donation Camp</li> <li>● Swachhata Abhiyan</li> <li>● Constitution Day</li> <li>● Jan Jeevan Hariyali Abhiyan</li> <li>● Beti Bachao Beti Padhao etc.</li> </ul> As per the requirement and similar announced days- National and State level.	
<b>Module-VI : Obstacle Training (OT)</b>	05
<input type="checkbox"/> Obstacle training - Introduction, Safety-measures, Benefits. <input type="checkbox"/> Obstacle Course- Straight balance, Clear Jump, Gate Vault, Zig- Zag Balance, High Wall	

<b>Semester – IV</b>		
<b>Course Code</b>	<b>Course Title</b>	<b>Hrs</b>
<b>21AECO027</b>	<b>National Cadet Corps-IV (Theory)</b>	Theory-30 hrs

<p><b>Objective of the course:</b></p> <p>Cadets will be able to: -</p> <ol style="list-style-type: none"> <li>1. Develop a sense of time management and social skills.</li> <li>2. Understand the life history &amp; leadership qualities of personalities who have contributed in Nation Building and Literature.</li> <li>3. Understand the role of NCC cadets as 2nd line Defence in 1965 War.</li> <li>4. Develop awareness about various types of Natural and manmade disasters.</li> <li>5. Know about life saving tips during disasters.</li> <li>6. Acquainted about Fire Services.</li> <li>7. Understand importance of Environmental Awareness &amp; conservation.</li> <li>8. Understand importance of General Awareness. Know about Armed Forces.</li> </ol>
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**Target Skills (Course outcomes) : After completing this course, the cadets will be able to: -**

1. Effectively manage time.
2. Develop the qualities of social skills.
3. Imbibe leadership qualities.
4. Do group discussions effectively.
5. Be motivated to serve the nation by joining Armed forces.
6. Contribute in environmental awareness and conservation activities.
7. Keep abreast of current affairs & general awareness.
8. Effectively contribute in managing disaster relief tasks.

<b>Course Content (Theory)</b>	<b>Hours</b>
Divided into five Modules, and activities are part of each module	
<b>Module-I : Personality Development (PD)</b>	04
<input type="checkbox"/> Group Discussions – Social Skills & Time management	
<b>Module-II : Leadership Development (LD)</b>	03
<input type="checkbox"/> Case Studies <ul style="list-style-type: none"> <li>● Ratan Tata</li> <li>● Rabindra Nath Tagore</li> <li>● Role of NCC cadets in 1965 war.</li> </ul>	
<b>Module-III : Disaster management (DM)</b>	10
<input type="checkbox"/> Initiative Trg, Organising Skills <input type="checkbox"/> Dos and Don'ts <input type="checkbox"/> Natural Disasters <input type="checkbox"/> Man Made Disasters <input type="checkbox"/> Fire Services and Fire Fighting	
<b>Environmental Awareness (EA)</b>	03
<input type="checkbox"/> Adventure Environmental Awareness and Conservation	

<b>Module-V : General Awareness (GA)</b>	04
<input type="checkbox"/> General Awareness	
<b>Module-VI : Armed Forces (AF)</b>	06
<input type="checkbox"/> Army, Navy, Air Force <input type="checkbox"/> Central Armed Police Forces.	

Sr. No.	List of activities	Hrs (aprox.)
01	1st Dec: AIDS day	02
02	7th Dec: Armed forces flag day	02
03	26th January: Republic day	03
04	8th March: International women's day	02

<b>Semester – IV</b>		
<b>Course Code</b>	<b>Course Title</b>	<b>Hrs</b>
<b>21AECO027</b>	<b>National Cadet Corps-IV (Practical)</b>	Practical-30 hrs

<p><b>Objective of the course:</b></p> <p>Cadets will be able to: -</p> <ol style="list-style-type: none"> <li>1. Understand that drill as the foundation for discipline and to command a group for common goal.</li> <li>2. Understand various signals to convey messages in the army.</li> <li>3. Get acquainted various section formations.</li> <li>4. Understand the basics of personal and public hygiene.</li> <li>5. Get acquainted with the procedure to treat the wounds and fractures during emergencies.</li> </ol>
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**Target Skills (Course outcomes) : After completing this course, the cadets will be able to: -**

1. Perform weapon drill gracefully.
2. Give and follow the different word of command.
3. Appreciate grace and dignity in the performance of foot drill.
4. Apply signals in there day to day functioning.
5. Provide first aid during the emergencies.
6. Navigate to the given location on ground using compass and GPS.
7. Practice healthy practices for the personal sanitation and hygiene.

<b>Course Content ( Practical)</b>	<b>Hours</b>
<b>Divided into Six Modules, and activities are part of each module</b>	
<b>Module-I : Drill (D)</b>	08
<input type="checkbox"/> Arm Drill <input type="checkbox"/> Salami Shastra <input type="checkbox"/> Squad Drill with Arms	
<b>Weapon Training (WT)</b>	04
<input type="checkbox"/> Short Range firing	
<b>Module-III : Map Reading(MP)</b>	04
<input type="checkbox"/> Map to Ground <input type="checkbox"/> Ground to Map.	
<b>Module-IV : Field Craft &amp; Battle Craft(FCBC)</b>	04
<input type="checkbox"/> Fire and Move Capsule <input type="checkbox"/> Field signal- with hand, with Weapons, Signal with Whistle <input type="checkbox"/> Field signals as means of giving orders <input type="checkbox"/> Field signals by day, Field signals by night <input type="checkbox"/> Section Formation.	
<b>Module-V : Social Service and Community Development (SSCD)</b>	05

<input type="checkbox"/> Cadets will participate in various activities throughout the semester e.g., <ul style="list-style-type: none"> <li>● Blood donation Camp</li> <li>● Swachhata Abhiyan</li> <li>● Constitution Day</li> <li>● Jan Jeevan Hariyali Abhiyan</li> <li>● Beti Bachao Beti Padhao etc</li> </ul> <p style="text-align: center;">As per the requirement and similar announced days- National and State level.</p>	
<b>Module-VI : Health &amp;Hygiene (H&amp;H)</b>	05
<input type="checkbox"/> Hygiene & Sanitation (Hygiene- Personal & Camp Hygiene) <input type="checkbox"/> First Aid in common medical emergencies <input type="checkbox"/> Treatment & Care of Wounds	

<b>Semester – V</b>		
<b>Course Code</b>	<b>Course Title</b>	<b>Hrs</b>
<b>21AECO027</b>	<b>National Cadet Corps-V (Theory)</b>	Theory-15 hrs

<p><b>Objective of the course:</b></p> <p>Cadets will be able to: -</p> <ol style="list-style-type: none"> <li>1. Understand the concept of Team and its functioning.</li> <li>2. Hone Public speaking skills.</li> <li>3. Understand the security set up and management of Border/Coastal areas.</li> <li>4. Acquire knowledge about an Infantry Battalion organisation and its weapons.</li> <li>5. Acquire knowledge about Indo-Pak Wars fought in 1965 &amp; 1971.</li> </ol>
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<p><b>Target Skills (Course outcomes) : After completing this course, the cadets will be able to: -</b></p> <ol style="list-style-type: none"> <li>1. Participate in team building exercise and value team work.</li> <li>2. Improve communication skills by public speaking activities.</li> <li>3. Understand the security mechanism and management of Border/Coastal areas.</li> <li>4. Get motivated to join armed forces.</li> </ol>
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<b>Course Content (Theory)</b>	<b>Hours</b>
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Divided into four Modules, and activities are part of each module	
<b>Module-I : Personality Development (PD)</b>  <input type="checkbox"/> Group Discussions –Team work. <input type="checkbox"/> Public speaking.	<b>06</b>
<b>Module-II: Border &amp; Coastal Areas.</b>  <input type="checkbox"/> Security Setup and Border/Coastal management in the area.	<b>02</b>
<b>Module-III: Introduction to Infantry Battalion and its Equipment.</b>  <input type="checkbox"/> Organisation of Infantry Battalion & its weapons	<b>03</b>
<b>Module-IV: Military History.</b>  <input type="checkbox"/> Study of Battles of Indo-Pak Wars 1965 & 1971.	<b>04</b>

Semester – V		
Course Code	Course Title	Hrs
<b>21AECO027</b>	<b>National Cadet Corps-V (Practical)</b>	Practical-30 hrs

<p><b>Objective of the course:</b></p> <p>Cadets will be able to: -</p> <ol style="list-style-type: none"> <li>1. Understand that drill as the foundation for discipline and to command a group for common goal.</li> <li>2. Appreciate grace and dignity in the performance of ceremonial drill.</li> <li>3. Use the compass and GPS to locate places on the ground and map.</li> </ol>
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<p><b>Target Skills (Course outcomes) : After completing this course, the cadets will be able to: -</b></p> <ol style="list-style-type: none"> <li>1. Perform ceremonial drill and follow the different word of command.</li> <li>2. Do the social service on various occasions and get connected with the community.</li> <li>3. Do all the asana and gain the physical&amp; mental fitness.</li> </ol>
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Course Content ( Practical)	Hours
Divided into Seven Modules, and activities are part of each module	
<b>Module-I : Drill (D)</b>	<b>03</b>



<input type="checkbox"/> Ceremonial Drill. <input type="checkbox"/> Guard Mounting.	
<b>Module-II : Field Craft &amp; Battle Craft.</b>	04
<input type="checkbox"/> Fire control orders. <input type="checkbox"/> Types of fire control orders. <input type="checkbox"/> Fire and Movement- when to use fire and movements tactics, Basic considerations, Appreciation of ground cover, Types of cover, Dead ground, Common Mistakes, Map and air photography, Selection of Fire position and fire control.	
<b>Module-III : Map Reading</b>	04
<input type="checkbox"/> Google Maps & applications	
<b>Module-IV : Weapon Training</b>	04
<input type="checkbox"/> Short Range firing	
<b>Module-V : Social Service and Community Development</b>	05
<input type="checkbox"/> Cadets will participate in various activities throughout the semester e.g., <ul style="list-style-type: none"> <li>● Blood donation Camp</li> <li>● Swachhata Abhiyan</li> <li>● Constitution Day</li> <li>● Jan Jeevan Hariyali Abhiyan</li> <li>● Beti Bachao Beti Padhao etc</li> </ul> <p>As per the requirement and similar announced days- National and State level.</p>	
<b>Module-VI : Health &amp; Hygiene</b>	05
<input type="checkbox"/> Yoga- Introduction, Definition, Purpose, Benefits. <input type="checkbox"/> Asanas-Padamsana, Siddhasana, Gyan Mudra, Surya Namaskar, Shavasana, Vajrasana, Dhanurasana, Chakrasana, Sarvaangasana, Halasana etc.	
<b>Module-VI : Obstacle Training</b>	05

<input type="checkbox"/> Obstacle training – Intro, Safety measures, Benefits. <input type="checkbox"/> Obstacle Course- Straight balance, Clear Jump, Gate Vault, Zig- Zag Balance, High Wall etc.	
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Semester – VI		
Course Code	Course Title	Hrs
21AECO027	National Cadet Corps-VI (Theory)	Theory-30 hrs

<p><b>Objective of the course:</b></p> <p>Cadets will be able to: -</p> <ol style="list-style-type: none"> <li>1. Get acquainted about counselling process its need and importance.</li> <li>2. Know about SSB procedure and different tasks and tests.</li> <li>3. Know about the conduction during the interview.</li> <li>4. Understand the security challenges &amp; role of cadets in Border Areas.</li> <li>5. Know about the modes of entry in Armed forces, CAPF &amp; police.</li> <li>6. Understand the life history &amp; leadership qualities of great generals.</li> <li>7. Learn about 1999 Kargil war.</li> <li>8. Acquire the knowledge about various wars and their heroes.</li> <li>9. Know about various components of communication process.</li> </ol>
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**Target Skills (Course outcomes) : After completing this course, the cadets will be able to: -**

1. Get motivated to join Armed forces, police & CAPF.
2. Write their CV effective and appealing.
3. Face SSB interview effectively in their future.
4. Understand individual responsibilities & role in meetings the security challenges on Border/Coastal areas.
5. Imbibe the feeling of patriotism.
6. Communicate more effectively.

<b>Course Content (Theory)</b>	<b>Hours</b>
Divided into five Modules, and activities are part of each module	
<b>Module-I : Personality Development (PD)</b>	<b>03</b>
<input type="checkbox"/> Career Counselling. <input type="checkbox"/> SSB Procedure. <input type="checkbox"/> Interview Skills.	
<b>Module-II: Border &amp; Coastal Areas</b>	<b>02</b>
<input type="checkbox"/> Security Challenges & Role of cadets in Border management.	
<b>Module-III: Armed Forces</b>	<b>03</b>
<input type="checkbox"/> Modes of Entry into Army, Police and CAPF.	
<b>Module-IV: Military History</b>	<b>19</b>
<input type="checkbox"/> Biographies of Renowned Generals. <input type="checkbox"/> War Heroes: Param Veer Chakra Awardees. <input type="checkbox"/> Study of Battles of Kargil. <input type="checkbox"/> War Movies.	
<b>Module-V: Communication</b>	<b>03</b>
<input type="checkbox"/> Introduction to Communication & Latest Trends.	

<b>Semester – VI</b>		
<b>Course Code</b>	<b>Course Title</b>	<b>Hrs</b>

<b>21AECO027</b>	<b>National Cadet Corps-V (Practical)</b>	Practical-25 hrs
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**Objective of the course:**

Cadets will be able to: -

1. Understand that drill as the foundation for discipline and to command a group for common goal.
2. Appreciate grace and dignity in the performance of ceremonial drill.
3. Know about various knots and lashing used in soldiering.
4. Acquire awareness about the basic weapon system in use in the Armed Forces.

**Target Skills (Course outcomes) : After completing this course, the cadets will be able to: -**

1. Perform foot drill and follow the different word of command.
2. Aiming range and figure targets.
3. Use the different knots and lashing in day-to-day life for different purposes.
4. Develop the feeling of altruism.

<b>Course Content ( Practical)</b>	<b>Hours</b>
<b>Divided into Seven Modules, and activities are part of each module</b>	
<b>Module-I : Drill (D)</b>	03
<input type="checkbox"/> Ceremonial Drill. <input type="checkbox"/> Guard Mounting.	
<b>Module-II : Weapon Training(WT)</b>	04
<input type="checkbox"/> Short Range firing.	
<b>Module-III : Map Reading (MR)</b>	04
<input type="checkbox"/> Google Maps & applications	
<b>Module-IV : Field Craft &amp; Battle Craft(FCBC)</b>	03
<input type="checkbox"/> Knots, Lashing and Stretchers.	
<b>Module-V : Social Service and Community Development(SSCD)</b>	05

<input type="checkbox"/> Cadets will participate in various activities throughout the semester e.g., <ul style="list-style-type: none"> <li>● Blood donation Camp</li> <li>● Swachhata Abhiyan</li> <li>● Constitution Day</li> <li>● Jan Jeevan Hariyali Abhiyan</li> <li>● Beti Bachao Beti Padhao etc</li> </ul> <p>As per the requirement and similar announced days- National and State level.</p>	
<b>Module-VI : Introduction of Infantry Weapons &amp; Equipment(INF)</b>	03
<input type="checkbox"/> Characteristics of 5.56MM INSAS Rifle, Ammunition, Fire Power, Stripping, Assembling & Cleaning Practice.	
<b>Module-VII : Communication (COM)</b>	03
<input type="checkbox"/> Basic Radio Telephony (RT) Procedure. <input type="checkbox"/> Introduction, Advantages, Disadvantages, Need for standard procedures. <input type="checkbox"/> Types of Radio telephony communication. <input type="checkbox"/> Radio telephony procedure, Documentation.	

**Text book:**

- Army NCC Cadet Handbook Common Subject SD/SW
- Army NCC Cadet Handbook Specialized Subject SD/SW

**Reference Book and app**

- NCC book by R K Gupta
- DGNCC Training app
- NCC Hand book by Kanti prakashan
- NCC darpan app
- NCC guide app
- NCC Cadet app

**Pedagogic tools:**

- Chalk and Board
- Power Point Presentation
- Videos
- Handouts
- Field visit
- Activities

**Suggested reading / E-resources**

1. NCC Cadet guide book

**Suggested MOOCs:**

1. NCC Cadet guide book online on DG NCC website

**Methods of Assessment & Tools:**

Components of CIA: **100** marks

<b>Sr No.</b>	<b>Component</b>	<b>Content</b>	<b>Marks</b>
1	Attendance	Regular Institutional Training Parade	10
2	Social Activity	Total 05 social activity Involvement in the activities	10
3	Theory exam	As prescribed in the DGNCC	30
4	Practical exam	Test-1 at the end of 1 <sup>st</sup> year	50
<b>Total Marks</b>			100

**At the end of the course a separate certificate on completion of course will be issued by the CoE having only remarks as follows:**

<b>Letter Grade</b>	<b>Grade Point</b>
<b>O (Outstanding)</b>	<b>9-10</b>
<b>A+(Excellent)</b>	<b>8-9</b>
<b>A (Very Good)</b>	<b>7-8</b>
<b>B+(Good)</b>	<b>6-7</b>
<b>B (Above average )</b>	<b>5-6</b>
<b>C (Average)</b>	<b>4-5</b>
<b>P (Pass)</b>	<b>4</b>
<b>F (Fail)</b>	<b>0</b>
<b>Ab (Absent)</b>	<b>0</b>

Course Code	Course Title	Course Credit and Hours
<b>21AECO028</b>	<b>National Service Scheme (NSS)</b>	<b>2 Credit and 240 Hrs.</b>

**Objective of the course:**

1. To kindle the student's social consciousness.
2. To offer opportunities to engage themselves in creative and constructive social work.
3. To offer opportunities to gain skills in the exercise of leadership.
4. To offer opportunities to enrich their personality.

**Target Skills (Course outcomes) :**

1. Developing qualities of leadership and team building by discovering the latent potential.
2. Developing competence in finding practical solution to individual and community problems.
3. Developing cognitive skills as well as soft skills.

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other) :**

- The newly drafted National Youth Policy (NYP) 2021 envisages a ten year vision for youth development that India seeks to achieve by 2030. It is aligned with the Sustainable Development Goals (SDGs) and serves to 'unlock the potential of the youth to advance India'. Hence, the Co curricular course based on NSS is to integrate social service with the educational process. NSS provides that opportunities for the youth to involve themselves in national and social development through educational institutions and outside agencies.
- Also, The National Education Policy 2020 lays particular emphasis on the development of the creative potential of each individual, in all its richness and complexity. It is based on the principle that education must develop not only cognitive skills - both 'foundational skills' of literacy and numeracy and 'higher-order' cognitive skills such as critical thinking and problem solving – but also social and emotional skills - also referred to as 'soft skills' - including cultural awareness and empathy, perseverance and grit, teamwork, leadership, communication, among others. NSS is, thus, a concrete attempt in overall development of the students.

**Reference:**

- <https://nss.gov.in/sites/default/files/manualNss2006.pdf>
- <https://static.pib.gov.in/WriteReadData/specificdocs/documents/2022/may/doc20225553401.pdf>



**Course Description:**

- The National Service Scheme (NSS) was started to establish a meaningful linkage between the campus and the community. This course will allow students to understand the community in which they work and understand their relationship with the community. This course is an excellent option for anyone to identify the needs and problems of the community and utilize their knowledge in finding practical solution to it. The course aims to develop competence in students required for group living and sharing of responsibilities. It will allow students to acquire leadership qualities and practice national integration with social harmony. This course is applicable to Sustainable Development Goal (SDG) 3, 4, 5, 6, 10, 13 and 16.

<b>Semester – I</b>		
<b>Course Code</b>	<b>Course Title</b>	<b>Hrs.</b>
	NSS - Level 1	60 Hrs.
<b>Course Content</b>		<b>Hours</b>
<b>Divided into five modules and activities are part of each module.</b>		
<b>Module-I: Introduction and Basic Concept of NSS</b>		<b>12 hrs</b>
1. History of NSS 2. Emblem, flag, motto, song, badge etc. 3. Organizational structure, roles and responsibilities of various NSS functionaries <ul style="list-style-type: none"> <li>• <b>Regular Activities:</b> <ol style="list-style-type: none"> <li>1. Orientation Program</li> <li>2. Enrollment of Volunteers</li> <li>3. NSS Day celebrations</li> </ol> </li> <li>• <b>Special Activities:</b> <ol style="list-style-type: none"> <li>1. Tree plantation</li> <li>2. Gandhi Jayanti celebration</li> <li>3. Children’s Day celebration</li> </ol> </li> </ul>		
<b>Module-II: NSS Programmes and Activities</b>		<b>12 hrs</b>

<ol style="list-style-type: none"> <li>1. Concept of regular activities, special camping, day camps</li> <li>2. Maintenance of a diary, collection and analysis of data</li> <li>3. Documentation and report preparation</li> <li>4. Observation of important days and cultural talent expression <ul style="list-style-type: none"> <li>● <b>Regular Activities:</b> <ol style="list-style-type: none"> <li>1. Festival celebrations</li> <li>2. Flag day celebration</li> <li>3. Independence Day celebration</li> </ol> </li> <li>● <b>Special Activities:</b> <ol style="list-style-type: none"> <li>1. Visits to mentally challenged children's schools</li> <li>2. Visits to old age homes</li> <li>3. Blood donation camp / National Blood Donation Day</li> </ol> </li> </ul> </li> </ol>	
<b>Module-III: Understanding Youth</b>	<b>12 hrs</b>
<ol style="list-style-type: none"> <li>1. Definition, profile of youth, categories of youth</li> <li>2. Issues, challenges and opportunities for youth</li> <li>3. Youth as an agent of social change <ul style="list-style-type: none"> <li>● <b>Regular Activities:</b> <ol style="list-style-type: none"> <li>1. Seminar on Life of National Youth Heroes</li> </ol> </li> <li>● <b>Special Activities:</b> <ol style="list-style-type: none"> <li>1. Seminar on Life of National Leaders</li> </ol> </li> </ul> </li> </ol>	
<b>Module-IV: Community Mobilisation</b>	<b>12 hrs</b>
<ol style="list-style-type: none"> <li>1. Mapping of community stakeholders</li> <li>2. Identifying methods of mobilization</li> <li>3. Youth-adult partnership <ul style="list-style-type: none"> <li>● <b>Regular Activities:</b> <ol style="list-style-type: none"> <li>1. Coordination with Voluntary Organizations</li> <li>2. Contacting and carrying out survey of an adopted slum/village</li> </ol> </li> <li>● <b>Special Activities:</b> <ol style="list-style-type: none"> <li>1. Identification of problems of community</li> <li>2. Completion and evaluation of project</li> </ol> </li> </ul> </li> </ol>	
<b>Module-V: Volunteerism and Shramdan</b>	<b>12 hrs</b>

1. Indian tradition of volunteerism 2. Need and importance of volunteerism 3. Shramdan as a part of volunteerism <ul style="list-style-type: none"> <li>● <b>Regular Activities:</b></li> </ul> 1. Participating as a volunteer in various activities arranged by University 2. Observing Joy of Giving Week <ul style="list-style-type: none"> <li>● <b>Special Activities:</b></li> </ul> 1. Participating as a volunteer in various activities arranged by NGO's 2. Van Mahotsava Week	
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<b>Semester – II</b>		
<b>Course Code</b>	<b>Course Title</b>	<b>Hrs.</b>
	NSS - Level 2	60 Hrs.
<b>Course Content</b>		<b>Hours</b>
<b>Divided into five modules and activities are part of each module.</b>		
<b>Module-I: Family, Community and Society</b>		12 hrs
1. Concept of family, community and society 2. Role of an individual in family, community and society 3. Existence is co-existence <ul style="list-style-type: none"> <li>● <b>Regular Activities</b></li> </ul> 1. Mother's Day 2. Sadbhavana Divas <ul style="list-style-type: none"> <li>● <b>Special Activities</b></li> </ul> 1. International Family Day 2. World Population Day		
<b>Module-II: Environment Issues</b>		12 hrs
1. Environment conservation, enrichment and sustainability 2. Waste management 3. Natural resource management <ul style="list-style-type: none"> <li>● <b>Regular Activities:</b></li> </ul> 1. World Environment Day 2. National Pollution Prevention Day 3. International Mother Earth Day <ul style="list-style-type: none"> <li>● <b>Special Activities:</b></li> </ul> 1. World Wildlife Day 2. World Water Day		
<b>Module-III: Life Competencies</b>		12 hrs

1. Definition and importance of life competencies 2. Communication and interpersonal skills 3. Problem solving and decision making <ul style="list-style-type: none"> <li>● <b>Regular Activities:</b></li> </ul> 1. Seminar on life skills <ul style="list-style-type: none"> <li>● <b>Special Activities:</b></li> </ul> 1. Exercise on interpersonal skills, problem solving and decision making	
<b>Module-IV: Social Harmony and National Integration</b>	12 hrs
1. Indian history and culture 2. Role of youth in peace building and conflict resolution 3. Role of youth in Nation building <ul style="list-style-type: none"> <li>● <b>Regular Activities:</b></li> </ul> 1. Republic Day celebration 2. Martyrs Day (Shahid Divas) <ul style="list-style-type: none"> <li>● <b>Special Activities:</b></li> </ul> 1. National Voters Day 2. Anti-terrorism Day	
<b>Module-V: Youth Development Programmes in India</b>	12 hrs
1. National Youth Policy 2. Youth development programmes at the National level and State level 3. Youth focused and Youth led organizations <ul style="list-style-type: none"> <li>● <b>Regular Activities:</b></li> </ul> 1. National Youth Day celebration 2. International Women's Day 3. World Health Day <ul style="list-style-type: none"> <li>● <b>Special Activities:</b></li> </ul> 1. World No Tobacco Day 2. National Youth Week	

<b>Semester – III</b>		
<b>Course Code</b>	<b>Course Title</b>	<b>Hrs.</b>
	NSS - Level 3	60 Hrs.
<b>Course Content</b>		<b>Hours</b>
<b>Divided into five modules and activities are part of each module.</b>		
<b>Module-I: Citizenship</b>		12 hrs

1. Basic features of Constitution of India 2. Fundamental Rights and Duties 3. Human Rights 4. Consumer awareness and the legal rights of the consumer 5. RTI <ul style="list-style-type: none"> <li>● <b>Regular Activities:</b> <ol style="list-style-type: none"> <li>1. World Human Rights Day</li> <li>2. Independence Day celebration</li> <li>3. Celebration of Birth Anniversary of Dr. B. R. Ambedkar as Constitution Day</li> </ol> </li> <li>● <b>Special Activities:</b> <ol style="list-style-type: none"> <li>1. International Peace Day</li> <li>2. Communal Harmony Day</li> <li>3. National Integration day</li> </ol> </li> </ul>	
<b>Module-II: Health, Hygiene and Diseases</b>	12 hrs
1. Definition, needs and scope of health education 2. Food and nutrition 3. Safe drinking water, water borne diseases and sanitation 4. National Health Programme <ul style="list-style-type: none"> <li>● <b>Regular Activities</b> <ol style="list-style-type: none"> <li>1. Health awareness programmes in campus</li> <li>2. Fit India Movement</li> <li>3. Preventive Campaigning on Malaria, Tuberculosis, Dengue, Cancer, HIV/AIDS, Diabetes, Malnutrition, etc.</li> </ol> </li> <li>● <b>Special Activities</b> <ol style="list-style-type: none"> <li>1. Health awareness programmes in community</li> <li>2. Swachh Bharat Abhiyan</li> <li>3. World AIDS Day</li> </ol> </li> </ul>	
<b>Module-III: Youth Health, Yoga and Meditation</b>	12 hrs
1. Healthy Lifestyles 2. History, philosophy and concept of Yoga 3. Yoga as a preventive and curative method 4. Meditation <ul style="list-style-type: none"> <li>● <b>Regular Activities:</b> <ol style="list-style-type: none"> <li>1. Seminar on Yoga and its importance</li> </ol> </li> <li>● <b>Special Activities:</b> <ol style="list-style-type: none"> <li>1. Celebrating International Day of Yoga</li> </ol> </li> </ul>	
<b>Module-IV: Youth and Crime</b>	12 hrs

<ol style="list-style-type: none"> <li>1. Sociological and Psychological factors influencing youth crime</li> <li>2. Peer mentoring in preventing crimes</li> <li>3. Cyber crime and its prevention</li> <li>4. Juvenile Justice <ul style="list-style-type: none"> <li>● <b>Regular Activities:</b> <ol style="list-style-type: none"> <li>1. International Literacy Day</li> <li>2. Seminar on juvenile justice</li> </ol> </li> <li>● <b>Special Activities:</b> <ol style="list-style-type: none"> <li>1. Seminar on cyber crime and its prevention</li> <li>2. International Literacy week</li> </ol> </li> </ul> </li> </ol>	
<b>Module-V: Disaster Management</b>	12 hrs
<ol style="list-style-type: none"> <li>1. Disaster – its meaning and types</li> <li>2. Disaster Preparedness – its meaning and methods</li> <li>3. Disaster Management – Concept and Disaster Cycle</li> <li>4. First Aid techniques and Breathing techniques (Rescue Methods - CPR)</li> <li>5. Role of volunteer as first responder</li> <li>6. Role of Technology in Disaster Response</li> <li>7. Disaster Management Cells at different levels and its functioning</li> <li>8. Help lines Numbers <ul style="list-style-type: none"> <li>● <b>Regular Activities</b> <ol style="list-style-type: none"> <li>1. Awareness on disaster management by NDRF team</li> </ol> </li> <li>● <b>Special Activities</b> <ol style="list-style-type: none"> <li>1. World Day for Safety and Health at Work</li> </ol> </li> </ul> </li> </ol>	

<b>Semester – IV</b>		
<b>Course Code</b>	<b>Course Title</b>	<b>Hrs.</b>
	NSS - Level 4	60 Hrs.
<b>Course Content</b>		<b>Hours</b>
<b>Divided into five modules and activities are part of each module.</b>		
<b>Module-I: Youth Leadership</b>		12 hrs

<ol style="list-style-type: none"> <li>1. Meaning and types of leadership</li> <li>2. Qualities of good leaders and traits of leadership</li> <li>3. Importance and role of youth leadership</li> <li>4. Issues, challenges and opportunities for youth. <ul style="list-style-type: none"> <li>● <b>Regular Activities</b> <ol style="list-style-type: none"> <li>1. Activities like games, elocution, sports to build leadership skills</li> <li>2. Participation in youth development programmes</li> </ol> </li> <li>● <b>Special Activities</b> <ol style="list-style-type: none"> <li>1. Celebrating National youth day</li> <li>2. Leadership workshops</li> </ol> </li> </ul> </li> </ol>	
<b>Module-II: Project Cycle Management</b>	12 hrs
<ol style="list-style-type: none"> <li>1. Project planning</li> <li>2. Project implementation and monitoring</li> <li>3. Project evaluation: impact assessment <ul style="list-style-type: none"> <li>● <b>Regular Activities</b> <ol style="list-style-type: none"> <li>1. Studying case studies</li> </ol> </li> <li>● <b>Special Activities</b> <ol style="list-style-type: none"> <li>1. Preparing case studies</li> </ol> </li> </ul> </li> </ol>	
<b>Module-III: Civil/Self Defense</b>	12 hrs
<ol style="list-style-type: none"> <li>1. Civil defense services, aims and objectives of civil defense</li> <li>2. Needs for self defense training <ul style="list-style-type: none"> <li>● <b>Regular Activities</b> <ol style="list-style-type: none"> <li>1. Seminar on civil defense</li> </ol> </li> <li>● <b>Special Activities</b> <ol style="list-style-type: none"> <li>1. Seminar on self defense</li> </ol> </li> </ul> </li> </ol>	
<b>Module-IV: Additional Life Skills</b>	12 hrs
<ol style="list-style-type: none"> <li>1. Positive thinking</li> <li>2. Self confidence and self esteem</li> <li>3. setting life goals and working to achieve them</li> <li>4. Management of stress including time management <ul style="list-style-type: none"> <li>● <b>Regular Activities</b> <ol style="list-style-type: none"> <li>1. Seminar on life skills</li> </ol> </li> <li>● <b>Special Activities</b> <ol style="list-style-type: none"> <li>1. Seminar on life goals</li> </ol> </li> </ul> </li> </ol>	
<b>Module-V: Vocational Skills and Entrepreneurship Development</b>	12 hrs

1. Definition and Meaning 2. Qualities of good entrepreneur 3. Steps/ways in opening an enterprise 4. Role of financial and support service institutions <ul style="list-style-type: none"> <li>● <b>Regular Activities</b></li> </ul> 1. Seminar on Entrepreneurship <ul style="list-style-type: none"> <li>● <b>Special Activities</b></li> </ul> 1. Hands on vocational skills	
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**Suggested other activities:**

**1. Day Camps:**

If NSS volunteers fail to complete the prescribed 120 hours in social work under NSS programme due to disturbance caused to academic session. NSS unit organizes day camps to complete the prescribed 120 hours of NSS regular work. This camp of 8 hours duration is to be organized on weekends and holidays. Students do the community work for 16 hours in 2 consecutive days. Such camps can be organized selectively when felt necessary.

**2. Special Camping Programmes:**

Special Camping forms an integral part of National Service Scheme. It has special appeal as it provides unique opportunities to the students for group living, collective experience sharing and constant interaction with community. Special camping is organized generally on various developmental issues of national importance. Every year 50 percent of the volunteers of NSS unit are expected to participate in special camps which is of seven to ten days duration.

**Pedagogic tools:**

1. Chalk and Talk
2. PPT and Videos.
3. Hands-on activities
4. Assignments
5. Group discussion

**Reference Books:**



1. National Service Scheme Manual (Revised), 2006 Government of India, Ministry of Youth Affairs and Sports, New Delhi.
2. Environmental Studies by P K Pandey (Mahaveer Publications)
3. Fundamentals of Entrepreneurship by H Nandan (PHI)

### **Suggested reading / E-resources**

1. Case material as a Training Aid for Field Workers, Gurmeet Hans.
2. Guide to Report Writing by Michael Netzley and Craig Snow (Pearson)
3. Biodiversity, Environment and Disaster Management by Shamna Hussain (Unique Publishers)

### **Suggested MOOCs:**

1. Mind Education by Prof. Kim Soo Yeon, International Youth Fellowship  
Link: [https://onlinecourses.swayam2.ac.in/aic19\\_as05/preview](https://onlinecourses.swayam2.ac.in/aic19_as05/preview)
2. Introduction to NGO Management by Prof Neeti Agrawal & Prof Nayantara Padhi, Indira Gandhi National Open University  
Link: [https://onlinecourses.swayam2.ac.in/nou22\\_hs19/preview](https://onlinecourses.swayam2.ac.in/nou22_hs19/preview)
3. Developing life skills by Dr. M. N. Mohamedunni Alias Musthafa, Central University of Kerala  
Link: [https://onlinecourses.swayam2.ac.in/cec21\\_ed08/preview](https://onlinecourses.swayam2.ac.in/cec21_ed08/preview)
4. Indian Society - Social Problems and Issues by Dr. Sobhana Mishra, EMRC Director (Retd) Madurai Kamaraj University  
Link: [https://onlinecourses.swayam2.ac.in/cec21\\_hs31/preview](https://onlinecourses.swayam2.ac.in/cec21_hs31/preview)

### **Methods of Assessment & Tools:**

(Though the credit has to be awarded at the end of the course i.e. two semesters, it is recommended to consolidated assessment in two stages one at end of each semester. Components used for assessment can be different as per the nature of the course)

<b>S.N.</b>	<b>Component</b>	<b>Content</b>	<b>Duration</b>	<b>Marks</b>	<b>Sub Total</b>
1	<b>Active Participation in Activities</b>	--	--	<b>50</b>	<b>50</b>

2	<b>Theory Attendance</b>	--	--	<b>10</b>	<b>10</b>
3	<b>Theory Exam</b>	--	--	<b>20</b>	<b>20</b>
4	<b>Summary Report</b>	--	--	<b>20</b>	<b>20</b>
<b>Total</b>				<b>100</b>	<b>100</b>

**At the end of the course no marks are given, only remarks are given as follows:**

**REMARKS:**

<b>Range of Marks</b>	<b>Remarks</b>
90-100	Excellent
75-89	Very Good
60-74	Good
40-59	Fair
< 40	Not Completed

Course Code	Course Title	Course Credit and Hours
<b>21AECO029</b>	<b>Concepts in Coexistence for Holistic Human Living</b>	<b>2 Credit - 4 hrs / wk</b>

**Objective of the course:**

1. The objective of this course to further the basic introduction provided in the mandatory 'Introduction to Human Values & Holistic Living' course offered in Semester 1 & 2.
2. The course aims to provide a sound conceptual base on different aspects of Nature & Coexistence, and mans place and role in it.
3. Based on this Holistic Vision, it shall enable students to study & explore every dimension of their living. This shall enable them to see the need for qualitative transformation in their consciousness via value based & ethical inputs.
4. This will equip students with the tools needed to undertake this study & practice this lifelong, via systematic study & practice

**Target Skills (Course outcomes) :**

1. Have a **Basic Vision** of the inherent Harmony & Coexistence in Nature
2. **Understand** the Human Goal as Happiness, Prosperity, Peace & Coexistence
3. **Identify** the need for resolution in the material, behavioural, intellectual & existential aspects of Living in order to be Happy
4. **Appreciate** their role & responsibility in Society
5. **Develop commitment** to live with Ethics & undertake further study & practice to deepen their understanding.

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other) :**

- The Co curricular course based on Concepts in Coexistence for Holistic Human Living is propounded by Shri A. Nagraj, Amarkantak.

**Reference:**

- <https://madhyasth-darshan.info>
- [www.jvidya.com](http://www.jvidya.com)

**Course Description:**

- Concepts in Coexistence for Holistic Human Living facilitate Knowledge, Wisdom and science of Co-Existence. This is an alternative to Materialism & Theism/Spiritualism. The course aims to address SDG 14 and 15: Life Below Water and Life on Land

<b>Course Content</b>	<b>Hours</b>
<b>Module-I: Discussion about current state &amp; Exploring Life &amp; Living</b>	16 hrs
<ul style="list-style-type: none"><li>● Current state of a human and health</li><li>● Current state of an family</li><li>● Current state of a society</li><li>● Current state of nature</li><li>● Exploring 4 orders in existence</li><li>● Need of transformation in this current state?</li><li>● Basic questions in human life</li><li>● Why there is a need to study human?</li><li>● Thoughts( Based on influence, peer pressure, natural acceptance), behaviour and work</li><li>● Meaning of development - Right understanding, relations and facility</li><li>● What is permanent success - Competition or Cooperation?</li></ul>	
<b>Module-II : Exploring and understanding humans &amp; Basic Introduction to the Human Relationships</b>	16 hrs

<ul style="list-style-type: none"> <li>● Understanding humans- BODY and SELF(ME)</li> <li>● Activities in the Self and the Body</li> <li>● Harmony in body - Responsibility of Self towards the body</li> <li>● Harmony in self</li> <li>● Universal human goals and human evaluation: Universal, Eternal, Liveable, Communicable, Verifiable.</li> <li>● Am I related to other Human Beings?</li> </ul> <p>Applying Self observation(nirikshan), Examination(parikshan) and Survey(sarvekshan) in understanding of humans</p> <ul style="list-style-type: none"> <li>● Way of living? As an animal or as a human? (jinda rehna and jeena)</li> <li>● Does relationship exist?</li> <li>● The basis for Relationship: Similarity in Humans</li> <li>● Living in Family <ul style="list-style-type: none"> <li>○ Father-Mother &amp; Son-Daughter</li> <li>○ Brother – Sister &amp; Friends</li> <li>○ Husband-Wife</li> </ul> </li> <li>● Living in society <ul style="list-style-type: none"> <li>○ Teacher-Student</li> <li>○ Colleague- co-worker</li> <li>○ Existence-co-existential relationships</li> </ul> </li> </ul>	
<p><b>Module-III : Basic Introduction to the values (feelings) in relationships &amp; Humane Social Organization &amp; Evolution of 4 orders in existence</b></p>	16 hrs
<ul style="list-style-type: none"> <li>● Trust</li> <li>● Respect</li> <li>● Affection</li> <li>● Care</li> <li>● Guidance</li> <li>● Glory &amp; Reverence</li> <li>● Gratitude</li> <li>● Love</li> <li>● Evolution and Development in Existence</li> <li>● Space(vyapak), basis of the entire existence</li> <li>● Universal laws of existence - Vikaskram vikas, jagrutikram jagruti</li> </ul>	
<p><b>Module-IV : 4 orders and their dimensions &amp; Understanding the Human Being &amp; the Conscious Self (Jeevan)</b></p>	16 hrs

<ul style="list-style-type: none"> <li>● Recognizing dimensions of 4 order(roop, gun, swabhav, dharma)</li> <li>● Changeable and unchangeable properties with respect to dimensions of 4 order.</li> <li>● The Conscious Self (Jeevan)– construction</li> <li>● Introduction to the 10 Activities in the Conscious Self</li> <li>● Knowledge of Humane Conduct (manviya acharan)-introducing mulya(values), charitra(character), neeti.</li> </ul>	
<b>Module-V : Understanding Nature Relationship &amp; Views and Feedback of self-evaluation of the content covered in this course</b>	16 hrs
<ul style="list-style-type: none"> <li>● Exercise –. Identify the subjects and the outcome should be there in your concerned branch keeping in mind the sustainability approach.</li> <li>● Feedback sharing of all the students</li> </ul>	

**Pedagogic tools:**

1. Chalk and Talk
16. PPT and Videos.
17. Hands-on activities
18. Assignment
19. Group discussion

**Reference Books:**

1. A Practical Introduction to Values, Ethics & Holistic Living – Shriram Narasimhan
2. Knowledge, Wisdom & Science of Coexistence for Humane Living– an introduction. - Shriram Narasimhan
3. Sah-Astitva-vad ek Parichay – A Nagraj, Jeevan Vidya Prakashan, Amarkantak
4. Jeevan vidya ek Parichay – A Nagraj, Jeevan Vidya Prakashan, Amarkantak
5. Adhyayan Bindu - A Nagraj, Jeevan Vidya Prakashan, Amarkantak

**Suggested reading / E-resources**

1. Human Values in Madhyasth Darshan By Dr. Shyam Kumar | AKTU Digital Education(<https://www.youtube.com/watch?v=l4x26FPFJYs>)
2. <https://www.youtube.com/watch?v=28wbdZGhPwA&list=PLWDeKF97v9SMRfe5PK1HPYnEcrrJOL6K7>
3. [www.jvidya.com](http://www.jvidya.com)
4. <https://www.teachmint.com/tfile/studymaterial/uhv/uhv/rrgaurrsangalgp/9d83b566-c4c1-40d1-be67-e266fdde11da>

**Suggested MOOCs:**

1. <https://www.coursera.org/learn/the-science-of-well-being>

**Methods of Assessment & Tools:**

(Though the credit has to be awarded at the end of the course i.e. two semesters, it is recommended to consolidated assessment in two stages one at end of each semester. Components used for assessment can be different as per the nature of the course)

S.N.	Component	Content	Duration	Marks	Sub Total
1	<b>Attendance</b>	--	--	<b>10</b>	
2	<b>Assignments</b>	--	--	<b>10</b>	
3	<b>Practical Skill Assessment</b> (Continuous Assessment during the semester)			<b>40</b> (20 Marks for Each Semester)	
4	<b>Course Mid Examination</b>			<b>20</b>	
5	<b>Course End Examination</b>			<b>20</b>	
<b>Total</b>				<b>100</b>	<b>100</b>

**At the end of the course no marks are given, only remarks are given as follows:**

**REMARKS:**

<b>Range of Marks</b>	<b>Remarks</b>
90-100	Excellent
75-89	Very Good
60-74	Good
40-59	Fair
< 40	Not Completed



Course Code	Course Title	Course Credit and Hours
<b>21AECO030</b>	<b>Study of Ancient Indian Paintings and Crafts</b>	<b>2 Credit - 4 hrs / wk</b>

**Objective of the course:**

1. To create awareness for Indian art forms and culture
2. To aware students about the heritage of India and art techniques
3. Train the students in the field of different art forms and create a living out of it.
4. Train the student to demonstrate their art work and to develop skills in the field of fine arts

**Target Skills (Course outcomes) :**

1. Developing a sensitivity and respect in students minds for the Indian fine arts
2. Skill building for students to prepare art works that can be turned in to a profession and to earn living out of it.

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other) :**

- This course is based on different fine art skills which helps students to understand our heritage and creates awareness
- In 21<sup>st</sup> century western arts and culture are popular. This course is a humble effort to explain rich Indian fine art roots and methods to cultivate art skills among students.
- It will boost creativity among students which is the need of the hour.

**Reference:**

- 1) <https://www.nqr.gov.in/sites/default/files/NSQF%20Handicrafts%20excel%20template.pdf>
- 2) <https://hcssc.in/wp-content/uploads/2022/03/HCSSC-Brochure-Org-comp-compressed.pdf>
- 3) [https://www.nqr.gov.in/sites/default/files/QP\\_Decorative%20Painter%20Glassware.pdf](https://www.nqr.gov.in/sites/default/files/QP_Decorative%20Painter%20Glassware.pdf)

**Course Description:**

- Indian fine art Course sheds a light on the rich history and culture of Indian fine art forms and techniques. Indian crafts and products are believed to be very intricate. This course offers many craft techniques, painting techniques and pottery painting, Rangoli techniques and understanding of Indian art forms and incorporating all in to Indian Home Décor, color schemes and over all artistic creativity among students.
- This course endorses **SDG 4** – Quality education including sustainable living and understanding roots through arts.

<b>Course Content</b>	<b>Hours</b>
<b>Module-I: Introduction to the Art Forms of India</b>	10 hrs
<ul style="list-style-type: none"><li>● State wise arts and Painting Methodology</li><li>● Ancient Art Forms Across the Centuries</li><li>● History of Arts during Colonial Period – Lost History in Foreign Museums</li><li>● Biography of Influential Indian Artists and their Body of Work</li><li>● Cave Paintings &amp; Structures – Ajanta Ilora Caves</li><li>● Temple Structure &amp; Temple Paintings</li></ul>	
<b>Module-II : Paper Crafting and Cardboard Crafts</b>	18 hrs
<ul style="list-style-type: none"><li>● Indian &amp; World History of Paper making and Paper crafting</li><li>● Origami – a brief History and Practice Work</li><li>● Bicycle making out of Waste News Paper</li><li>● Pen Stand making out of Waste News Paper</li><li>● Flower Making Techniques</li><li>● Paper Bags</li><li>● Wall Hangings</li><li>● Cardboard Truck</li><li>● Greeting Cards</li><li>● Door Hangings</li></ul>	
<b>Module-III : Indian Painting methods</b>	16 hrs
<ul style="list-style-type: none"><li>● Pichwai Painting,</li><li>● Madhubani Painting</li><li>● Kalighat Painting</li><li>● Warli Painting</li><li>● Folk Arts- Tribal Arts – Mandala Arts</li></ul>	

<b>Module-IV : Pottery - Traditional – Diwali Crafts</b>	20 hrs
<ul style="list-style-type: none"> <li>● Earthen Pots painting</li> <li>● Earthen Plate painting</li> <li>● Glass Bottle painting</li> <li>● Wall Painting – Stencil art</li> <li>● Aarti Thali Making</li> <li>● Wall Hangings</li> <li>● Toran- Bandhanwar</li> <li>● Rangoli Techniques</li> <li>● Clay Art – Mirror Art</li> <li>● Lippan Work from Kutchh</li> </ul>	
<b>Module-V : Aesthetics in Indian style Home Decor</b>	16 hrs
<ul style="list-style-type: none"> <li>● Home Decor Trends &amp; Theme</li> <li>● Color Chart ,Schemes and Representation</li> <li>● Inclusion of Indian Heritage in Home Decor</li> <li>● Ideas of Sustainable Living through Home Décor</li> </ul>	

**Suggested laboratory experiments / other activities:**

1. Visit to a nearby Art Museum
2. Visit to Chitranagari – Balbhavan – RMC unit
3. Inviting an Art Expert for special session
4. Student Presentations on acclaimed Indian Artists and their body of work
5. Event like “Art Mela” where students can arrange Exhibition cum Sale for their Art work
6. A panel discussion on “How the modern techniques are useful or harmful to traditional art forms”
7. 7. Visit to National Institute of Design - Ahmedabad

**Pedagogic tools:**

1. Chalk and Talk
2. PPT and Videos.
3. Hands-on activities
4. Assignment
5. Group discussion

**Reference Books:**

1. Indian Art by Partha Mittar
2. The History of Indian art by Anil Rao & Sandhya Ketkar

**Suggested reading / E-resources**

1. [www.caleidoscope.in](http://www.caleidoscope.in)

**Suggested MOOCs:**

NA

**Methods of Assessment & Tools:**

(Though the credit has to be awarded at the end of the course i.e. two semesters, it is recommended to consolidated assessment in two stages one at end of each semester. Components used for assessment can be different as per the nature of the course)

S.N.	Component	Content	Duration	Marks	Sub Total
1	<b>Attendance</b>	--	--	<b>10</b>	
2	<b>Assignments</b> (A Report writing , Essay writing or Photography of Indian art work/temple structure/heritage site/Art Gallery etc)	--	--	<b>10</b>	
3	<b>Practical Skill Assessment</b> (Continuous Assessment during the semester)			<b>40</b> (20 Marks for Each Semester)	
4	<b>Practical Mid Examination</b>			<b>20</b>	
5	<b>Practical End Examination</b>			<b>20</b>	
<b>Total</b>				<b>100</b>	<b>100</b>

**At the end of the course no marks are given, only remarks are given as follows:**

**REMARKS:**

<b>Range of Marks</b>	<b>Remarks</b>
90-100	Excellent
75-89	Very Good
60-74	Good
40-59	Fair
< 40	Not Completed

Course Code	Course Title	Course Credit and Hours
<b>21AECO031</b>	<b>Interpersonal Relationship Dynamics for Managerial Effectiveness</b>	<b>2 Credits - 4 hrs / wk</b>

**Objective of the course:**

1. To enhance understanding of the communication process in general and of the interpersonal and personal communication processes for group discussions, presentations & public speaking.
2. To develop functional interpersonal communication skills to influence and lead the building of more open, effective, and rewarding relationships, even with people whom you may initially experience as difficult.
3. To lead each participant toward mastery of the skills needed to develop and maintain healthy interpersonal relationships with the goal of helping each other's progress.
4. To increase student ability to understand and diagnose interpersonal dynamics as well as to increase personal understanding of how s/he impacts on others.
5. To help the students develop a scientific temperament in studying and understanding human behavior.

**Target Skills (Course Outcomes) :**

- Interpersonal Relationships
- Communication Skill
- Public Speaking

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other) :**

- The Co-curricular course based on Dynamic management, Interpersonal relationships Management, Communication skill, And Public speaking
- Corporate organization's want potential & skillful workforce for the smooth operation and functions

**Reference**

1. <https://nptel.ac.in/courses/110107143>,
2. <https://nptel.ac.in/courses/109107155>

**Course Description:**

1. This course is an excellent option to develop interpersonal communication skills to influence and lead the building of more open, effective, and rewarding relationships, even with people whom you may initially experience as difficult.
2. The Co-curricular course draft to develop on Interpersonal Relationships Management Skills, Communication Skills and Public Speaking Skills.
3. The course aims to address SDG 4: Quality Education.

<b>Course Content</b>	<b>Hours</b>
<b>Module-I: Interpersonal Communication</b>	16 Hrs

<ul style="list-style-type: none"> <li>● Interpersonal Communication: What Is It?</li> <li>● Interpersonal Communication Concepts</li> <li>● Interpersonal Communication and Group Communication</li> <li>● The Communication Process &amp; Models</li> <li>● Approaches to Interpersonal Communication</li> <li>● Principles of Body Language Behavior</li> <li>● Principles of Perception &amp; Work Ethics</li> <li>● Principles of Communication with Self-Confidence</li> <li>● Good Interpersonal Communication</li> <li>● Interpersonal Communication Values</li> <li>● Barriers in Communication: Conflict Resolution</li> </ul>	
<b>Module-II : Development of Communication Skills</b>	16 Hrs
<ul style="list-style-type: none"> <li>● Mindful Listening Skills &amp; Its Importance</li> <li>● Speaking Skills &amp; Its Importance</li> <li>● Reading Skills &amp; Its Importance</li> <li>● Writing Skills &amp; Its Importance</li> <li>● Improving Pronunciation, Accuracy &amp; Fluency</li> <li>● Verbal &amp; Non-Verbal De-Escalation</li> <li>● Development of Assertive Styles &amp; Techniques in Communication</li> <li>● Public Speaking Skills &amp; Participating in Conversations</li> <li>● Strategies for Presentations &amp; Interactive Communication</li> <li>● Blocks &amp; Barriers to Effective Communication</li> </ul>	
<b>Module-III : Building Blocks of Interpersonal Relationships</b>	16 Hrs
<ul style="list-style-type: none"> <li>● Define Interpersonal Skills &amp; their relevance</li> <li>● Theory &amp; Practices of Interpersonal Relationships</li> <li>● Understanding Ourselves &amp; Other People</li> <li>● Development of Interpersonal Relationships with Peers</li> <li>● Interpersonal Attraction &amp; Mate Selection</li> <li>● Developmental Milestones: Emotions &amp; Tripartite Brain</li> <li>● Social Network: Attractive &amp; Supportive</li> <li>● Relationship Dynamics</li> <li>● Basic Processes in Relationships</li> <li>● Attraction &amp; Social Cognition</li> <li>● Team Integration: Commitment</li> <li>● Managing Conflict in Relationships</li> <li>● Cultivating Emotional Intelligence: Brain Power</li> <li>● Managing Diversity</li> </ul>	
<b>Module-IV : Psychological Ownership</b>	16 Hrs



<ul style="list-style-type: none"> <li>● Concept &amp; Definition of Psychology</li> <li>● Roots of Psychology</li> <li>● Psychology as a Scientific Discipline</li> <li>● Basic Psychological Processes</li> <li>● Key Perspectives in Psychology- Behavioral, Cognitive, Humanistic, Psychodynamic &amp; Socio-cultural</li> <li>● Social Psychology</li> <li>● Environmental Psychology</li> <li>● Health Psychology</li> <li>● Positive Psychology</li> <li>● Psychology Assessment</li> </ul>	
<p><b>Module-V : Managerial Effectiveness: Emotional Competence &amp; Intelligence</b></p>	<p>16 Hrs</p>
<ul style="list-style-type: none"> <li>● Definition &amp; Dimensions of Managerial Effectiveness</li> <li>● Concept of Competence &amp; Emotional Competence</li> <li>● Competency Approach for Self Development</li> <li>● Factors Influencing Emotional Competence &amp; Intelligence</li> <li>● Emotional Intelligence &amp; Transformation</li> <li>● Critical Thinking as Emotional Intelligence q</li> <li>● Leadership Skills &amp; Styles for Excellence</li> <li>● Work Attitudes &amp; Behavior</li> <li>● Progressive Discipline: Responsibility &amp; Accountability</li> <li>● Emotional Attachment to the Organization: Strongly Committed Individual</li> </ul>	

**Suggested Laboratory Experiments / Other Activities: NA**

**Pedagogic Tools:**

1. Chalk and Talk

2. PPTs and Videos
3. Interpersonal Intelligence Activity
4. Assignment
5. Group Discussion
6. Term building exercises
7. Role Playing
8. Conducting Corporate Interviews
9. Debate
10. Writing Stories or News for an imaginary business

**Reference Books:**

1. Astrid, French. Interpersonal Skills. Sterling Publishers.SIT Management Series. New Delhi: 1998.
2. Bhattacharya, S.K. Achieving Managerial Excellence: Insights from Indian Organisations. Macmillan.
3. Bhatnagar, Nitin and Mamta Bhatnagar. Communicative English for Engineers and Professionals. Pearson: New Delhi, 2010.
4. Brooks, Margret. Skills for Success. Listening and Speaking. Level 4 Oxford University Press, Oxford: 2011.
5. Cary L. Cooper and Ivan Robertson, Well-being: Productivity and Happiness at Work, Palgrave Macmillan.
6. Fred Luthans and Carolyn M. Youssef, Psychological Capital: Developing the Human Competitive Edge, Oxford University Press.
7. Gopaldaswamy Ramesh & Mahadevan Ramesh; “The Ace of Soft Skill: Attitude, Communication & Etiquette for Success” Pearson Education India.
8. Jessica Pryce-Jones, Happiness at Work: Maximizing Your Psychological Capital for Success, Wiley.
9. Nitin Bhatnagar; “Effective Communication and Soft Skills”; Pearson Education India.
10. Richard Nelson-Jones, Basic Counselling Skills: A Helper's Manual, SAGE.
11. S Michael Olpin and Margie Hesson, Stress Management for Life: A Research-Based Experiential Research Cengage.

### Suggested Reading / E-Resources

To be shared / provided PPTs and Lecture Notes

### Suggested MOOCs:

1. [https://www.edx.org/learn/public-speaking?hs\\_analytics\\_source=referrals&utm\\_source=mooc.org&utm\\_medium=referral&utm\\_campaign=mooc.org-topics](https://www.edx.org/learn/public-speaking?hs_analytics_source=referrals&utm_source=mooc.org&utm_medium=referral&utm_campaign=mooc.org-topics)
2. <https://www.edx.org/course/empathy-and-emotional-intelligence-at-work>
3. <https://www.edx.org/course/public-speaking-2>
4. <https://www.edx.org/course/intercultural-communication-at-work-land-the-job-and-do-it-well>
5. <https://www.edx.org/course/critical-thinking-problem-solving-3>

### Methods of Assessment & Tools:

1. The course awarded 1 credit at the end of the course i.e. two semesters, it is recommended to consolidated assessment in two stages one at end of each semester.
2. The students will be evaluated continuously based on their participation in learning experiences, theory, and evaluation through tests and assignments and will also be evaluated at the end of course under CEE (Course End Exam) which will be 100% internal.
3. Minimum 80% attendance is required, if not able to fulfill it then only by the permission of Programme Coordinator and Principal will be allowed to compensate in the next year.
4. Only remarks will be given at the end of the course.
5. A separate certificate on completion of each course will be issued by the Controller of Examination.
6. Degree will be awarded only after receiving of the certificate.
7. In event of non-completion of course, the student has to re-do the course or opt for another one.

The pattern of evaluation with percentage weightage will be as specified below:

S.N.	Component	Content	Duration	Marks	Sub Total
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1	<b>Attendance</b>	Theory: Min. 80%	For full course	<b>10</b>	10
2	<b>Assignments</b>	Total 5 units	For full course	<b>10</b>	10
3	<b>Practical Skill Assessment</b> (Continuous Assessment during the semester)	Number will be decided by coordinator (as per batch)	For full course	<b>40</b> (20 Marks for Each Semester)	40
4	<b>Course Mid Examination</b>	Full syllabus	3 Hrs.	<b>20</b>	20
5	<b>Course End Examination</b>	Full syllabus	3 Hrs.	<b>20</b>	20
<b>Total</b>				<b>100</b>	<b>100</b>

At the end of the course no marks are given, only remarks are given as follows:

**REMARKS:**

<b>Range of Marks</b>	<b>Remarks</b>
90-100	Excellent
75-89	Very Good
60-74	Good
40-59	Fair
< 40	Not Completed

Course Code	Course Title	Course Credit and Hours
<b>21AECO032</b>	<b>Service Marketing</b>	<b>2 Credit - 4 hrs / wk</b>

**Objective of the course:**

1. To create awareness about Marketing Related to Services
2. To aware students about application area of Service Marketing Strategies in their own domain area.
3. Exemplify students to correlate Service Marketing with their own domain area.
4. Train the student to build Marketing Strategies related to Service Business.

**Target Skills (Course outcomes) :**

1. Skill development to analyze Service Marketing Strategies of different service business.
2. Skill development to create Marketing Strategies related to Service Business.

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other) :**

- The Co-curricular course based on Service Marketing belongs to area of advance marketing strategies in Service Business Environment.
- Services are emerging and highly growing in current business era and Service business environment is highly penetrated. So it has become necessary for the students to learn about the Marketing Strategies related to Service businesses, which will help them to become a successful entrepreneur in Service sector.

**Reference:**

Qualification pack, Regional Service Marketing Manager Course (ASC/Q0701), Service Marketing, Automotive Skills Development Council.

Reference Link: <https://nsdcindia.org/qp-nos-results>

**Course Description:**

The Indian economy is becoming increasingly reliant on services. With increased competition and picky shoppers, relationship management has become a must for marketers to attract, keep, and develop customers. The course is meant to give students an understanding of emerging trends in the service sector in a developing economy and to address challenges related to national service management. By focusing on problems and techniques relevant to service marketing, the course aims to augment core marketing and marketing strategy courses. It addresses issues that are frequent in the marketing of services, such as intangibility (inability to inventory), trouble coordinating demand and supply, quality control, and client retention. The course curriculum addresses the strategies utilized by successful services marketers to solve these challenges. This Course will serve the 9<sup>th</sup> goal of **Sustainable Development** that is Industry, Innovation and Infrastructure growth and development by assisting learners to develop their own sustainable service units.

Course Content	Hours
<b>Module-I: Basics of Services Marketing</b>	16 hrs
<ul style="list-style-type: none"><li>● Introduction of Services</li><li>● Role of Services in Economy</li><li>● Difference between Goods and Services</li><li>● Technology in Services</li><li>● Emergence of Self Services</li><li>● Internet Services</li><li>● Introduction to service Marketing Mix</li><li>● Segmenting and Targeting Service Market</li><li>● Positioning Services into market</li><li>● Four Categories of Services<ol style="list-style-type: none"><li>1) People-Processing</li><li>2) Mental-Stimulus Processing</li><li>3) Possession-Processing</li><li>4) Information-Processing</li></ol></li><li>● Customer's Decision Making</li><li>● Customer Expectations and Perceptions of Services – Zone of Tolerance</li></ul>	
<b>Module-II : Service Marketing Mix</b>	18 hrs

<ul style="list-style-type: none"> <li>● Product Decisions <ul style="list-style-type: none"> <li>1) Core and Supplementary Elements</li> <li>2) Branding of Service Products</li> <li>3) Flower of Service</li> <li>4) New Service Development</li> </ul> </li>   <li>● Price Decisions <ul style="list-style-type: none"> <li>1) Pricing Objectives</li> <li>2) Pricing Strategies</li> <li>3) Revenue Management</li> </ul> </li> <li>● Place Decisions <ul style="list-style-type: none"> <li>1) Distribution Channel in Services</li> <li>2) Role of Consumers in Service Delivery</li> <li>3) Franchising</li> </ul> </li> <li>● Promotion Decisions <ul style="list-style-type: none"> <li>1) Objectives of Communication in Services</li> <li>2) Tools for Service Communication</li> <li>3) Crafting Messages for the Communication</li> <li>4) Timing and Budget Decisions</li> </ul> </li> </ul>	
<b>Module-III : Extended Marketing Mix</b>	16 hrs
<ul style="list-style-type: none"> <li>● People <ul style="list-style-type: none"> <li>1) Employee's Role in Service Delivery</li> <li>2) Recruiting and Training Service Employees</li> <li>3) Service Culture and Leadership</li> </ul> </li> <li>● Process <ul style="list-style-type: none"> <li>1) Designing Services Process</li> <li>2) Service Blue Prints</li> <li>3) Service Process Redesign</li> <li>4) Self Service Technologies</li> </ul> </li> <li>● Physical Evidence <ul style="list-style-type: none"> <li>1) Service Environment and its Purpose</li> <li>2) Consumer Response Theory</li> <li>3) Dimensions of Service Environment</li> <li>4) Holistic Design of Service Environment</li> </ul> </li> <li>● Strategies for Managing Capacity and Demand</li> </ul>	
<b>Module-IV : Service Quality and Relationship Management</b>	14 hrs

<ul style="list-style-type: none"> <li>● Service Quality and Relationship Management <ul style="list-style-type: none"> <li>1) Gap Model</li> <li>2) Measuring Service Quality</li> <li>3) Improving Service Quality and Productivity</li> <li>4) Importance of Customer Loyalty</li> <li>5) Wheel of Loyalty</li> <li>6) Building a Foundation for Loyalty</li> <li>7) Strategies for developing Loyalty Bonds with Customers</li> </ul> </li> <li>● Relationship Marketing <ul style="list-style-type: none"> <li>1) Strategies for Reducing Customer Defections</li> <li>2) Customer Relationship Management</li> <li>3) Objectives of Customer Relationship Management</li> <li>4) Failures in Customer Relationship Management Implementation</li> <li>5) Rightly Implementing Customer Relationship Management</li> </ul> </li> </ul>	
<b>Module-V : Complain Handling and Service Recovery</b>	16 hrs
<ul style="list-style-type: none"> <li>● Customer Complaining Behavior <ul style="list-style-type: none"> <li>1) Customer Response Option to Service Failure</li> <li>2) Understanding Complaining Behavior</li> <li>3) Consumer's Expectations Behind a Complain</li> </ul> </li> <li>● Customer Responses to Effective Service Recovery <ul style="list-style-type: none"> <li>1) Impact of Service Recovery on Customer Loyalty</li> <li>2) The Service Recovery Paradox</li> </ul> </li> <li>● Principles of Effective Service Recovery</li> <li>● Service Guarantee <ul style="list-style-type: none"> <li>1) Power of Service Guarantee</li> <li>2) Designing Service Guarantee</li> <li>3) Dilemma in Service Guarantee</li> </ul> </li> <li>● Discouraging Abuse and Opportunistic Customer Behavior <ul style="list-style-type: none"> <li>1) Seven Types of Jaycustomers</li> <li>2) Consequences of Dysfunctional Consumer Behavior</li> <li>3) Dealing with Consumer Fraud</li> </ul> </li> </ul>	

**Suggested laboratory experiments / other activities:**

1. Case Study analysis
2. 7P Model for any one Service Business



**Pedagogic tools:**

3. Chalk and Talk
4. PPT and Videos
5. Assignment
6. Group Discussion

**Reference Books:**

- 1) Jochen Wirtz, Crystopher Lovelock (2016), Service Marketing, World Scientific Publishing Co. Inc., New Jersey.
- 2) Valarie A. Zeithaml, Mary Jo Bitner, Dwayne D. Gremler (2018), Service Marketing – Integrating Customer Focus across the firm, McGraw-Hill Education, 2 Penn Plaza, New York.

**Suggested reading / E-resources**

1. <https://1lib.in/book/3611327/c431ec>
2. <https://1lib.in/book/3559592/bd3641>

**Suggested MOOCs:**

1. <https://nptel.ac.in/courses/110107142>

**Methods of Assessment& Tools:**

1. The course awarded 1 credit at the end of the course i.e. two semesters, it is recommended to consolidated assessment in two stages one at end of each semester.
2. The students will be evaluated continuously based on their participation in learning experiences, theory, and evaluation through tests and assignments and will also be evaluated at the end of course under CEE (Course End Exam) which will be 100% internal.
3. Minimum 80% attendance is required, if not able to fulfill it then only by the permission of Programme Coordinator and Principal will be allowed to compensate in the next year.
4. Only remarks will be given at the end of the course.

5. A separate certificate on completion of each course will be issued by the Controller of Examination.
6. Degree will be awarded only after receiving of the certificate.
7. In event of non-completion of course, the student has to re-do the course or opt for another one.

The pattern of evaluation with percentage weightage will be as specified below:

<b>S.N.</b>	<b>Component</b>	<b>Content</b>	<b>Duration</b>	<b>Marks</b>	<b>Sub Total</b>
1	<b>Attendance</b>	Theory: Min. 80%	For full course	<b>10</b>	10
2	<b>Assignments</b>	Total 5 units	For full course	<b>10</b>	10
3	<b>Practical Skill Assessment</b> (Continuous Assessment during the semester)	Number will be decided by coordinator (as per batch)	For full course	<b>40</b> (20 Marks for Each Semester)	40
4	<b>Course Mid Examination</b>	Full syllabus	3 Hrs.	<b>20</b>	20
5	<b>Course End Examination</b>	Full syllabus	3 Hrs.	<b>20</b>	20
<b>Total</b>				<b>100</b>	<b>100</b>

**At the end of the course no marks are given, only remarks are given as follows:**

**REMARKS:**

<b>Range of Marks</b>	<b>Remarks</b>
90-100	Excellent
75-89	Very Good
60-74	Good
40-59	Fair
< 40	Not Completed

Course Code	Course Title	Course Credit and Hours
<b>21AECO033</b>	<b>Quantitative Research Management Techniques (QRMT)</b>	<b>2 Credit - 4 hrs / wk</b>

**Objective of the course:**

1. Enable the students to understand, prepare & analysis of summary of research cases and use correct research tools to get correct business decision.
2. Enable the students to identify and use of appropriate test in various cases under correct assumptions.
3. Inculcate deeper knowledge in Parametric and Non - Parametric Test and using appropriate test and obtaining quantitative output.
4. Understand various methods of writing of academic research paper.

**Target Skills (Course outcomes) :**

1. Skill development to analyze quantification of data through various research techniques in different domain areas.
2. Skill development to create academic research paper with the use of quantitative data analysis.

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other) :**

- The Co-curricular course based on Quantitative Research Management Techniques belongs to area of advance quantitative analysis in research of various specialized domain.
- Research is emerging and highly growing in current era and qualitative and quantitative research is highly penetrated. So it has become necessary for the students to learn about the management of research related to their own domain, which will help them to become a successful researcher in their own sector.
- Field research strengthens academic rigor, theories and methodologies, complements desk research and brings a different vantage point to understanding conflict. One constant risk in academic research is the tendency to be reductionist, and to focus on an isolated issue and miss the dynamic connections between it and its wider context.

**Reference**

Reference Link: <https://www.usip.org/publications/2021/04/getting-source-importance-field-research>

**Course Description:**

The objectives of this paper are to develop an understanding of the basic concepts of Data Analysis for any research and analytics which helps in applying the same in practice. This Paper develops the ability amongst the students to do analysis of various elements of research cases and helps in decision making process. The paper of Quantitative Research Management Techniques concentrates on conceptual understanding of various aspects of research testing methods both parametric and non-parametric. It will also help to make at least one publication in the credit of the student profile. It endeavoring research discipline and describing various testing methods available for research across various field of study. An attempt has been made to provide a solid foundation on which students can successfully build and enhance their studies related to data analysis along with qualitative research management techniques as a whole irrespective of their core studies. This course aims to address SDG 4 – Quality Education.

<b>Course Content</b>	<b>Hours</b>
<b>Module-I: Sources &amp; Collection of Data and Report Writing</b>	16 hrs

<ul style="list-style-type: none"> <li>● Experiments: Concept of Experiments, Internal &amp; External Validity, Threats to Internal Validity, Threats to External Validity, Experimental Design &amp; their Classification, Limitations of Experiments.</li> <li>● Field Work &amp; Data Preparation: Fieldwork Process, Data Preparation, Data Preparation Process: Preliminary Questionnaire Screening, Editing, Coding.</li> <li>● Data Entry &amp; Descriptive Analysis Using Excel: Presentation of Data, Cross Tabulation, Frequency Distribution, Correlation, Creating Graphs in Excel.</li> <li>● Research Proposal: Writing a Research Proposal, Content of Research Proposal.</li> <li>● Research Report: Meaning, Purpose, Characteristics of Good Report, Types of Report, Structure of Report.</li> </ul>	
<b>Module-II : Statistical Inference: Hypothesis Testing for Two Populations</b>	18 hrs
<ul style="list-style-type: none"> <li>● Introduction To Hypothesis Testing</li> <li>● Hypothesis Testing Procedure</li> <li>● Two-Tailed And One-Tailed Tests Of Hypothesis</li> <li>● Type I And Type II Errors</li> <li>● Hypothesis Testing For The Difference Between Two Population Means Using The Z Statistic</li> <li>● Hypothesis Testing For The Difference Between Two Population Means Using The T Statistic (Case Of A Small Random Sample, <math>N_1, N_2 &lt; 30</math>, When population Standard Deviation Is Unknown)</li> <li>● Statistical Inference About The Difference Between The Means Of Two Related Populations (Matched Samples)</li> <li>● Hypothesis Testing For The Difference In Two Population Proportions</li> <li>● Hypothesis Testing About Two Population Variances (F Distribution)</li> <li>● <b>Case Study and Practical Problems including Numerical Solutions and Discussion</b></li> </ul>	
<b>Module-III : Analysis of Variance and Experimental Designs</b>	16 hrs

<ul style="list-style-type: none"> <li>● Introduction</li> <li>● Introduction To Experimental Designs</li> <li>● Analysis Of Variance</li> <li>● Completely Randomized Design (One-Way Anova)</li> <li>● Applying The F-Test Statistic</li> <li>● Randomized Block Design</li> <li>● Factorial Design (Two-Way Anova)</li> <li>● <b>Case Study and Practical Problems including Numerical Solutions and Discussion</b></li> </ul>	
<b>Module-IV : Hypothesis Testing for Categorical Data (Chi-Square Test)</b>	14 hrs
<ul style="list-style-type: none"> <li>● Introduction</li> <li>● Defining Chi-Square-Test Statistic</li> <li>● Chi-Square - Goodness-Of-Fit Test <ul style="list-style-type: none"> <li>For Uniform Distribution</li> <li>For Poisson Distribution</li> <li>For Normal Distribution</li> </ul> </li> <li>● Hypothesis Testing For A Population Proportion Using Chi-Square Goodness-Of-Fit Test As An Alternative Technique To The Z-Test</li> <li>● Chi-Square Test Of Independence: Two-Way Contingency Analysis</li> <li>● Hypothesis Testing With Chi-Square Statistic For Test Of Independence</li> <li>● <b>Case Study and Practical Problems including Numerical Solutions and Discussion</b></li> </ul>	
<b>Module-V : Non-Parametric Statistics</b>	16 hrs

<ul style="list-style-type: none"> <li>● Introduction</li> <li>● Runs Test For Randomness Of Data <ul style="list-style-type: none"> <li>Small-Sample Runs Test</li> <li>Large-Sample Runs Test</li> </ul> </li> <li>● Mann–Whitney U Test <ul style="list-style-type: none"> <li>Small-Sample U Test</li> <li>U Test For Large Samples</li> </ul> </li> <li>● Wilcoxon Matched-Pairs Signed Rank Test <ul style="list-style-type: none"> <li><b>Wilcoxon Test For Small Samples (<math>N \leq 15</math>)</b></li> <li>Wilcoxon Test For Large Samples (<math>N &gt; 15</math>)</li> </ul> </li> <li>● Kruskal–Wallis Test</li> <li>● Friedman Test</li> <li>● <b>Case Study and Practical Problems including Numerical Solutions and Discussion</b></li> </ul>	
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**Suggested laboratory experiments / other activities:**

1. Case Study analysis
2. Review of Journals of specific domain
3. Review of conference papers

**Pedagogic tools:**

1. Chalk and Talk
2. PPT and Videos
3. Case Study
4. Assignment
5. Group Discussion

**Reference Books:**

1. Bajpai, N. (2016). Business Research Methods, Pearson Education India.
2. Black, K. (2016). Business statistics: for contemporary decision making. John Wiley & Sons. – 6<sup>th</sup> Edition
3. Turban, E., King, D., Sharda, R., & Delen, D. (2013); Business Intelligence: A Managerial Perspective on Analytics; Prentice Hall, New York.

### Suggested reading / E-resources

1. <https://ccsuniversity.ac.in/bridge-library/pdf/Research-Methodology-CR-Kothari.pdf>
2. [https://faculty.ksu.edu.sa/sites/default/files/business-statistics-for-contemporary-decision-making-by-ken-black\\_0.pdf](https://faculty.ksu.edu.sa/sites/default/files/business-statistics-for-contemporary-decision-making-by-ken-black_0.pdf)

### Suggested MOOCs:

1. [https://onlinecourses.nptel.ac.in/noc22\\_ge08/preview](https://onlinecourses.nptel.ac.in/noc22_ge08/preview)

### Methods of Assessment & Tools:

1. The course awarded 1 credit at the end of the course i.e. two semesters, it is recommended to consolidated assessment in two stages one at end of each semester.
2. The students will be evaluated continuously based on their participation in learning experiences, theory, and evaluation through tests and assignments and will also be evaluated at the end of course under CEE (Course End Exam) which will be 100% internal.
3. Minimum 80% attendance is required, if not able to fulfill it then only by the permission of Programme Coordinator and Principal will be allowed to compensate in the next year.
4. At least 1 research paper must be published in any journal. (UGC care is expected)
5. Only remarks will be given at the end of the course.
6. A separate certificate on completion of each course will be issued by the Controller of Examination.
7. Degree will be awarded only after receiving of the certificate.
8. In event of non-completion of course, the student has to re-do the course or opt for another one.

The pattern of evaluation with percentage weightage will be as specified below:

S.N.	Component	Content	Duration	Marks	Sub Total
1	<b>Attendance</b>	Theory: Min. 80%	For full course	<b>10</b>	10
2	<b>Assignments</b>	Total 5 units	For full course	<b>10</b>	10
3	<b>Practical Skill Assessment</b> (Continuous Assessment during the semester)	Number will be decided by coordinator (as per batch)	For full course	<b>40</b> (20 Marks for Each Semester)	40



4	<b>Publication of Research Paper</b>	Full syllabus	For full course	<b>20</b>	20
5	<b>Course End Examination</b>	Full syllabus	3 Hrs.	<b>20</b>	20
<b>Total</b>				<b>100</b>	<b>100</b>

At the end of the course no marks are given, only remarks are given as follows:

**REMARKS:**

<b>Range of Marks</b>	<b>Remarks</b>
90-100	Excellent
75-89	Very Good
60-74	Good
40-59	Fair
< 40	Not Completed

Course Code	Course Title	Course Credit and Hours
<b>21AECO034</b>	<b>Managerial Economics- Theory and Applications</b>	<b>2 Credit - 4 hrs / wk</b>

**Objective of the course:**

1. To make students aware regarding the fact that principles of business economics are helpful in increasing efficiency of business which can make decision making easier.
2. To make students familiar regarding how the concepts of business economics can be put into practice in business.
- 3 To make students familiar regarding how the concepts of business economics can be put into practice in business.
4. To understand and appreciate the usefulness of concepts and focus on application areas through case study.

**Target Skills (Course outcomes) :**

1. To make students aware about economics theories and its applications.
2. To develop analytical skills in students.
3. To Improve cognitive skills and improve decision making skills

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other) :**

Students will get idea about managerial economic theory and practical use in Business. They will learn basic concepts that facilitates in managing business activities and managing risk and challenges.

**Reference:**

1. The link of regional need <https://desagri.gov.in/en/document-report/gujarat-3/>

**Course Description:**

Managerial Economics is designed to guide and help students in managing business activities. Students will learn and able to take crucial management decisions. This course will help in understanding economics concepts and its practical application. The course aims to address SDG The course aims to address SDG 4: Quality Education

<b>Course Content</b>	<b>Hours</b>
<b>Module- I Nature &amp; Significance Of Managerial Economics</b>	<b>16hrs</b>
<ul style="list-style-type: none"> <li>● Introduction</li> <li>● Nature of Managerial Economics</li> <li>● The Management Revolution</li> <li>● Role of Managerial Economics</li> <li>● Scope of Managerial Economics</li> <li>● Objectives of Managerial Economics</li> <li>● Decision Making : An Explosion</li> <li>● Game Theory and Decision Making</li> <li>● Decision Making under uncertainty</li> </ul>	
<b>Module-II : Demand Forecasting</b>	<b>16hrs</b>
<ul style="list-style-type: none"> <li>● Meaning and Introduction</li> <li>● The significance of Demand Forecasting</li> <li>● Short – term &amp; long- term foresting</li> <li>● Statistical &amp; non-statistical Methods</li> <li>● Criteria of a Good Forecasting Methods</li> <li>● Business Forecasting Functions</li> <li>● Reflection on practical considerations</li> </ul>	
<b>Module-III :Break – Even Analysis and Cost Control</b>	<b>16 hrs</b>
<ul style="list-style-type: none"> <li>● Meaning and definition</li> <li>● The Break-even Chart</li> <li>● Formula for determination of BEP</li> <li>● Assumptions of BEP</li> <li>● Usefulness and limitations of BEA</li> <li>● Practical Problems</li> <li>● Techniques of Cost Control</li> <li>● Areas of Cost Control</li> </ul>	
<b>Module-IV : Theory of Profit Maximization</b>	<b>16hrs</b>
<ul style="list-style-type: none"> <li>● “Firm” or “ Industry”</li> <li>● Meaning and concepts</li> <li>● Marginal cost marginal revenue equality approach</li> <li>● MC = MR Approach in reality</li> <li>● The goal of Profit Maximization between dream and reality</li> <li>● An estimation problem</li> </ul>	

<b>Module-V : Pricing policy and Methods</b>	<b>16 hrs</b>
<ul style="list-style-type: none"> <li>● Introduction</li> <li>● Objectives of Pricing Policy</li> <li>● Factors involved in Pricing Policy</li> <li>● Pricing Methods</li> <li>● Marginal Pricing</li> <li>● Administered Pricing</li> <li>● Marginal Cost pricing</li> <li>● Skimming Pricing</li> <li>● Penetration Pricing</li> <li>● Predatory Pricing</li> </ul>	

**Suggested laboratory experiments / other activities:**

**Pedagogic tools:**

1. Chalk and Talk
2. PPT and Videos.
3. Hands-on activities
4. Assignment
5. Group discussion

**Reference Books:**

1. Mehta, P. L. (1999). *Managerial Economics*. Sultan Chand & Co.
2. Mithani, D. M. (2016). *Managerial Economics – Theory & Applications*. Himalaya Publishing House.
3. Mithani, D. M. (2018). *Micro Economics*. Himalaya Publishing House.

**Suggested reading / E-resources**

1. U- tube Video lectures (khan academy)

**Methods of Assessment& Tools:**

(Though the credit has to be awarded at the end of the course i.e. two semesters, it is recommended to consolidated assessment in two stages one at end of each semester. Components used for assessment can be different as per the nature of the course)

S.N.	Component	Content	Duration	Marks	Sub Total
1	Attendance	--	--	10	
2	Assignments	--	--	10	
3	Practical Skill Assessment (Continuous Assessment during the semester)			40 (20 Marks for Each Semester)	
4	Course Mid Examination			20	
5	Course End Examination			20	
<b>Total</b>				<b>100</b>	<b>100</b>

At the end of the course no marks are given, only remarks are given as follows:

**REMARKS:**

Range of Marks	Remarks
90-100	Excellent
75-89	Very Good
60-74	Good
40-59	Fair
< 40	Not Completed

Course Code	Course Title	Course Credit and Hours
21AECO035	Operation of Stock Exchange	2 Credit - 4 hrs / wk

**Objective of the course:**

1. To understand the basic of investment and to get the idea about investment planning and various types of securities
2. To understand the working of the Primary Market and to be aware of investors protection methods in Primary Market.
3. To get the holistic idea about BSE, NSE, and it's trading practices.
4. To understand the various market indices and its calculation.

**Target Skills (Course outcomes) :**

1. Skill development regarding the different investment avenues.
2. Skill development regarding how the stock market is operated and how the trading is to carried out on different platforms.

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other) :**

- The Co-curricular course based on The Operation of Stock Exchange belongs to area of Investment Analysis and Portfolio Management.
- The operation of Stock Exchange is the wide concept through which a person is able to understand the different stock exchanges in India like BSE, and NSE. As an investor what are the rights of the investors must be known to investors and for this investors need to understand the various steps to be taken by SEBI and role of SEBI. To get the idea regarding operation of stock exchange one must be aware about different market indices to get the idea about the market performance.

**Reference:**

1. The Link of NISM: <https://www.nism.ac.in/academics/>

**Course Description:**

The operation of Stock Exchange course provide fundamental information about the working of the different stock exchanges of India and students can explore the stock market and can get idea about the different investment options and its risk and return structure. This course is an excellent option for anyone who wants to get the knowledge of trading and settlement

procedures. The course aims to address SDG The course aims to address SDG 4: Quality Education

<b>Course Content</b>	<b>Hours</b>
<b>Module-I: Introduction to Investment and Structure</b>	<b>20hrs</b>
<ul style="list-style-type: none"> <li>● Investment</li> <li>● Speculation</li> <li>● Gambling and Investment</li> <li>● Investment Objectives</li> <li>● Investment Process</li> <li>● Investment Planning</li> <li>● Securities Market</li> <li>● Types of securities</li> <li>● Bond</li> <li>● Investment Information</li> </ul>	
<b>Module-II : New Issue Market</b>	<b>20hrs</b>
<ul style="list-style-type: none"> <li>● Primary Market</li> <li>● Functions of Primary Market</li> <li>● Types of Issues</li> <li>● Types of Investors</li> <li>● Parties involved in the New Issue</li> <li>● Placement of the Issue</li> <li>● Concept of Book Building and its Process</li> <li>● Pricing of New Issues</li> <li>● Allotment of Shares</li> <li>● Green Shoe Option</li> <li>● Investors Consideration</li> <li>● Investor Protection in Primary Market</li> </ul>	
<b>Module-III :Secondary Market</b>	<b>20hrs</b>

<ul style="list-style-type: none"> <li>● History of Stock Exchanges in India</li> <li>● Functions of a Stock Exchange and Market Segments</li> <li>● Regulators</li> <li>● Stock Exchange Members/Brokers</li> <li>● Investors</li> <li>● Trading</li> <li>● Day Trading</li> <li>● Settlement</li> <li>● Bombay Stock Exchange (BSE)</li> <li>● National Stock Exchange (NSE)</li> <li>● Depository</li> <li>● Depository Participants</li> </ul>	
<b>Module-IV : Stock Market Indices</b>	<b>10hrs</b>
<ul style="list-style-type: none"> <li>● Importance of Indices</li> <li>● Computation of the Stock Index</li> <li>● Differences between Indices including (BSE-100, BSE-200, BSE Mid-Cap and BSE Small Cap, NSE-S&amp;P CNX Nifty, CNX Nifty Junior)</li> </ul>	
<b>Module-V : Security and Exchange Board of India (SEBI)</b>	<b>10hrs</b>
<ul style="list-style-type: none"> <li>● Objectives of SEBI</li> <li>● Functions of SEBI</li> <li>● Organization of SEBI</li> <li>● Role of SEBI in the Primary market</li> <li>● Insider trading and SEBI</li> </ul>	

**Suggested laboratory experiments / other activities:**

NA

**Pedagogic tools:**

1. Chalk and Talk
2. PPT and Videos.
3. Hands-on activities
4. Assignment
5. Group discussion



**Reference Books:**

- Security Analysis and Portfolio Management by PunithavathyPandian, Vikas Publishing House PVT LTD.
- Investment Analysis and Portfolio Management by Prasanna Chandra, Tata McGraw- Hill Publishing Company Limited.

**Suggested reading / E-resources**

1. <https://www.investopedia.com>

**Suggested MOOCs:**

1. <https://www.coursera.org/learn/financial-markets-global>

**Methods of Assessment& Tools:**

(Though the credit has to be awarded at the end of the course i.e. two semesters, it is recommended to consolidated assessment in two stages one at end of each semester. Components used for assessment can be different as per the nature of the course)

S.N.	Component	Content	Duration	Marks	Sub Total
1	Attendance	--	--	10	
2	Assignments	--	--	10	
3	Practical Skill Assessment (Continuous Assessment during the semester)			40 (20 Marks for Each Semester)	
4	Course Mid Examination			20	
5	Course End Examination			20	
<b>Total</b>				<b>100</b>	<b>100</b>

**At the end of the course no marks are given, only remarks are given as follows:**

**REMARKS:**

<b>Range of Marks</b>	<b>Remarks</b>
90-100	Excellent
75-89	Very Good
60-74	Good
40-59	Fair
< 40	Not Completed

Course Code	Course Title	Course Credit and Hours
<b>21AECO036</b>	<b>Indian Financial System</b>	<b>2 Credit - 4 hrs / wk</b>

**Objective of the course:**

1. To Develop the basic understanding of Indian Economy
2. To aware students about Indian financial system
3. Develop an understanding of basic concepts of Financial Market and Services
4. Enhance the Knowledge of students about International Economic Institutions.

**Target Skills (Course outcomes) :**

1. Basic understanding of Indian economy
2. Awareness regarding Indian Financial System

**Justification and references for the course (Mapping with NSDC/NSQF/Sector Skill Council/Regional needs/any other) :**

- Indian Financial markets have been increasingly getting spotlight in recent times due to covid 19 and financial revolutions in terms of opening up of the market to the global economy, streaming of the regulatory framework, and adoption of modern technologies and so on. Many innovative financial products are introduced to cater to the varied needs of both corporate and individual consumers of financial services.
- The course content includes a study of the Indian financial system along with financial market, financial intermediaries and different financial services. The course also includes economic reforms that India had experience after the independence to cater various need along with international economic institutions who have great impact on Indian economy.

**Reference:**

1. The link related to NPTEL <https://nptel.ac.in/courses/110105121>

**Course Description:**

Indian Financial System is a Descriptive subject that requires only basic interest in Indian Economy. This class will allow students to make aware regarding various dimensions of financial system. This course is an excellent option for anyone who ever wanted to know about Indian economy and financial operations and international economic institutions. No prior commerce knowledge is needed. The course aims to address Indian economic reforms along with international economic institutions, Indian financial system with its various components. The course aims to address SDG The course aims to address SDG 4: Quality Education

<b>Course Content</b>	<b>Hours</b>
<b>Module- I :Economic Reforms and International Economic Institutions</b>	<b>16 hrs</b>
<ul style="list-style-type: none"> <li>● Liberalization</li> <li>● Privatization</li> <li>● Globalization</li> <li>● Industrialization and economic development</li> <li>● Industrial growth and structural changes</li> <li>● International Economic Institutions: <ul style="list-style-type: none"> <li>○ IBRD/ World Bank</li> <li>○ IMF</li> <li>○ WTO</li> <li>○ IFC</li> <li>○ IDA</li> </ul> </li> </ul>	
<b>Module-II : An Introduction to Indian financial system</b>	<b>16 hrs</b>
<ul style="list-style-type: none"> <li>● Formal and informal financial sectors</li> <li>● Components: Indian financial system <ul style="list-style-type: none"> <li>○ Financial institutions</li> <li>○ Financial Markets</li> <li>○ Financial instruments</li> <li>○ Financial services</li> </ul> </li> <li>● Regulators: MoF, SEBI, RBI, IRDA</li> <li>● Interaction among the financial system components</li> <li>● Savings and investment</li> </ul>	
<b>Module-III :Financial Market</b>	<b>16 hrs</b>
<ul style="list-style-type: none"> <li>● Evolution of financial Market and Globalization</li> <li>● Saving and Investments</li> <li>● Types of financial Market <ul style="list-style-type: none"> <li>○ Money Market</li> <li>○ Capital Market</li> </ul> </li> <li>● Financial Instruments <ul style="list-style-type: none"> <li>○ Money Market Instruments</li> <li>○ Capital Market Instruments</li> </ul> </li> </ul>	
<b>Module-IV : Financial Services: Investment Banking &amp; Credit rating</b>	<b>16 hrs</b>

<ul style="list-style-type: none"> <li>● Introduction</li> <li>● Functions of investment Bank</li> <li>● Types of Investment Bank</li> <li>● Investment Banking Services</li> <li>● Merchant banking services</li> <li>● SEBI Regulation</li> <li>● Introduction &amp; Meaning of Credit rating <ul style="list-style-type: none"> <li>○ Factors affecting rating assigned</li> <li>○ Nature of credit rating</li> <li>○ Instruments for rating</li> <li>○ Functions of a credit rating agency</li> </ul> </li> <li>● The growth of credit rating industry in India</li> <li>● Credit rating Agencies in India <ul style="list-style-type: none"> <li>○ CARE</li> <li>○ ICRA</li> <li>○ CRISIL</li> </ul> </li> </ul>	
<b>Module-V : Mutual Funds</b>	<b>16 hrs</b>
<ul style="list-style-type: none"> <li>● Introduction, History and Concepts</li> <li>● Advantages and limitation of Mutual Funds from Investor Point of View</li> <li>● Types of Mutual Funds</li> <li>● Equity fund</li> <li>● Debt fund</li> <li>● Hybrid fund</li> <li>● SIP</li> <li>● SEBI Guidelines</li> <li>● Association of Mutual funds in India (AMFI)</li> <li>● UTI</li> </ul>	

**Suggested laboratory experiments / other activities:**

1. Visits websites of BSE, NSE, SEBI
2. demo practice for selected Scripts

**Pedagogic tools:**

1. Chalk and Talk

2. PPT and Videos.
3. Hands-on activities
4. Assignment
5. Group discussion

**Reference Books:**

1. Bharti, P. (2018). *Indian Financial System*. Pearson Education India.
  2. Desai, V. (2010) *Financial Markets and Financial Services*. Himalaya Publishing House.
  3. Avdhani V. A. (2011). *Investment Management*. Himalaya Publishing House
- Gordon E. & Natarajan K. (2016). *Financial Markets and Services*. Himalaya Publishing House

**Suggested reading / E-resources**

NA

**Suggested MOOCs:**

1. <https://corporatefinanceinstitute.com/>

**Methods of Assessment& Tools:**

(Though the credit has to be awarded at the end of the course i.e. two semesters, it is recommended to consolidated assessment in two stages one at end of each semester. Components used for assessment can be different as per the nature of the course)

S.N.	Component	Content	Duration	Marks	Sub Total
1	<b>Attendance</b>	--	--	<b>10</b>	
2	<b>Assignments</b>	--	--	<b>10</b>	
3	<b>Practical Skill Assessment</b> (Continuous Assessment during the semester)			<b>40</b> (20 Marks for Each Semester)	
4	<b>Course Mid Examination</b>			<b>20</b>	
5	<b>Course End Examination</b>			<b>20</b>	
<b>Total</b>				<b>100</b>	<b>100</b>

**At the end of the course no marks are given, only remarks are given as follows:**

**REMARKS:**

<b>Range of Marks</b>	<b>Remarks</b>
90-100	Excellent
75-89	Very Good
60-74	Good
40-59	Fair
< 40	Not Completed

<b>18AECO001</b>	<b>Environmental Assessment and Management</b>	<b>Duration 96 Hrs</b>	<b>01 Credit</b>
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### **ELIGIBILITY**

Any undergraduate student can opt for the course.

### **DURATION OF THE COURSE**

The course shall extend over a period of one year comprising of two semesters in one academic year.

### **OBJECTIVES OF THE COURSE**

To enable the students to

1. Know fundamentals of ecology and environment along with its management.
2. Understand environmental impact assessment (EIA) as an environmental management tool.
3. Assess the risk for Environmental Exposure.
4. Understand the concept of life cycle assessment (LCA) as an environmental management tool and its potential for identifying all the environmental impacts throughout the entire life cycle of a product.
5. Develop an integrated waste management system for your locality involving the public.

### **SCHEME OF INSTRUCTION AND EXAMINATIONS**

Course Code	Course	Total Hrs of Instructions	Exam Duration Hrs	Marks allotted			Credit
				CIA	CEE	Total	
<b>18AECO001</b>	<b>Environmental Assessment and Management Theory Practical</b>	48 Hrs-Theory 48 Hrs-Practical	01 Hr 30 min-Theory 02 Hrs-Practical	20 Theory 10 Practical	40 Theory 30 Practical	30 70	01
		<b>96</b>		<b>30</b>	<b>70</b>	<b>100</b>	<b>01</b>

**CIA: Continuous Internal Assessment & CEE: Course End Exam**



## STRUCTURE OF THE COURSE

### SYLLABUS (THEORY):

Unit 1	<b>Principles of Environment Management (EM):</b> <ul style="list-style-type: none"><li>• Introducing Environmental Management (EM)</li><li>• Participants in EM: Ethics and Environment, International Environmental involvement, Environmental Concerns in India,</li><li>• Ecology and the environment, Processes of Ecosystem, Ecological footprint</li><li>• Succession: Role of succession in restoration and recovery of ecosystem, Features of succession, Effect of imbalance on the ecosystem.</li></ul>	( 10 Hrs )
Unit 2	<b>Environmental Toxicology:</b> <ul style="list-style-type: none"><li>• Introduction, Toxicological study</li><li>• Postwar development &amp; the environment, Present state of the world</li><li>• Environmental Toxicology: Air pollution, Stratosphere ozone depletion, Exposure &amp; its effects</li><li>• Risk assessment for environmental exposure</li></ul>	( 6 Hrs )
Unit 3	<b>Environmental Impact Assessment (EIA):</b> <ul style="list-style-type: none"><li>• Introduction to EIA,</li><li>• Evaluation of EIA in Worldwide and India, Forecasting Environmental changes,</li><li>• Strategic Environmental Assessment (SEA),</li><li>• Environmental Clearance procedure in India</li></ul>	( 10 Hrs )
Unit 4	<b>Life Cycle Assessment &amp; Environmental Economics:</b> <ul style="list-style-type: none"><li>• Life Cycle Assessment, Evaluation and its purpose</li><li>• Procedures &amp; Different Application of LCA</li><li>• Economics and Environment: Ecological economics. &amp; Environmental valuation</li><li>• Economics of Natural Resources</li><li>• Environmental and regional economics</li></ul>	( 10 Hrs )
Unit 5	<b>Integrated Waste Management (IWM):</b> <ul style="list-style-type: none"><li>• Basics of IWM: Characteristics, planning &amp; implementation</li><li>• benefits of IWM for developing economics</li><li>• Waste Management Modelling</li><li>• Public education and involvement</li></ul>	( 4 Hrs )

## SYLLABUS (PRACTICAL):

### General:

- 1
  - Sample collection: Grab and composite sample, Ambient Air Sampling, Stack and Exhaust pipe sampling. ( 4 Hrs )
  - Identification of common/ General facilities/ Equipment/ Chemicals/ Glassware used weighing chemicals & making up solution.
- 2 **Common chemical method for examination of water:** pH determination ( 2 Hrs )
- 3 **Common chemical method for examination of water:** Turbidity ( 2 Hrs )
- 4 **Common chemical method for examination of water:** Conductivity ( 2 Hrs )
- 5 **Common chemical method for examination of water:** Alkalinity ( 2 Hrs )
- 6 **Demonstration of air pollution monitoring equipment:** High Volume Combo sample for PM<sub>2.5</sub>, PM<sub>10</sub> ( 2 Hrs )
- 7 **Demonstration of air pollution monitoring equipment:** Dust sampler for PM<sub>100</sub> ( 2 Hrs )
- 8 **Demonstration of air pollution monitoring equipment:** Stack sampling ( 2 Hrs )
- 9 **Demonstration of noise pollution monitoring equipment:** determination of noise level ( 2 Hrs )
- 10 **Environmental Impact Assessment (EIA):**
  - Examples related to EIA concepts, ( 10 Hrs )
  - Evaluation of EIA of case study
- 11 **Life Cycle Assessment & Environmental Economics:**
  - A case study of Life Cycle Assessment ( 10 Hrs )
  - Preparation of Life Cycle Assessment Model of a case study
- 12 **Integrated Waste Management (IWM):**
  - Visit any village/ town ( 10 Hrs )
  - Solve and minimize the waste of case study which is taken by student.

### Reference Books:

1. Vijay Kulkarni and Ramachandra T.V., 2006. Environmental Management, Commonwealth Of Learning, Canada and Indian Institute of Science, Bangalore.
2. Ramachandra T.V., 2006. Management of Municipal Solid Waste, Commonwealth Of Learning, Canada and Indian Institute of Science, Bangalore.
3. E.P. Odum 1971, Principles of Environmental Science and Technology.
4. CPCB, (1997) "Pollution Control acts, Rules and Notifications issued there under "Pollution Control Series –PCL/2/1992, Delhi, D: Central Pollution Control Board.

## GUIDELINES FOR THE COMPLETION OF THE COURSE:

1. Minimum 80% attendance is required, if not able to fulfil it then only by the permission of Programme Coordinator and Principal will be allowed to compensate in the next year.
2. Only remarks will be given at the end of the course.
3. A separate certificate on completion of each course will be issued by the CoE.
4. Degree will be awarded only after receiving of the certificate.
5. In event of non-completion of course, the student has to re-do the course or opt for another one.

## EVALUATION NORMS: Distribution of 100% CIA components:

*The course carries 1 credit and the students will be evaluated continuously based on their participation in learning experiences, theory, and evaluation through tests and assignments and will also be evaluated at the end of course under CEE ( Course End Exam) which will be 100% internal. The pattern of evaluation with percentage weightage will be as specified below:*

### Distribution of 100% CIA components: Theory

S. No.	Component	Content	Duration	Marks	Sub Total
a)	Attendance	-	-	-	10
b)	One Assignment	-	-	10	10
c)	Test-I	Any 2 Units	1.5 Hrs	10 (set for 30)	10
d)	Course End	All 5 Units	02 Hrs	20 (set for 50)	20
<b>Grand Total</b>					<b>50 Marks</b>

### Distribution of 100% CIA components: Practical

S. No.	Component	Content	Duration	Marks	Sub Total
a)	Attendance	All Practicals	-	-	10
b)	One Assignment	-	-	10	10
c)	Test-I	50% of Experiments	02 Hrs	10 (set for 30)	10
d)	Course End	All experiments	03 Hrs	20 (set for 50)	20
<b>Grand Total</b>					<b>50 Marks</b>

**At the end of the course no marks are given, only remarks are given as follows:**

**REMARKS:**

<b>Range of % Marks</b>	<b>Remarks</b>
90-100	Excellent
75-89	Very Good
60-74	Good
40-59	Fair
39- and below	Not Completed

<b>18AECO002</b>	<b>Animation &amp; Multimedia</b>	<b>Duration 96 Hrs</b>	<b>01 Credit</b>
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## **ELIGIBILITY**

Any undergraduate student can opt for the course.

## **DURATION OF THE COURSE**

The course shall extend over a period of one year comprising of two semesters in one academic year.

## **OBJECTIVES OF THE COURSE:**

The students will be able to

1. Prepare for the profession of multimedia.
2. Apply knowledge of basic storyboarding to prepare for a movie
3. Apply concept of Unity 3D and using their imagination skill they can build game.
4. Understand what to learn about the job roles and skills most essential to game production.

## **SCHEME OF INSTRUCTION AND EXAMINATIONS**

<b>Course Code</b>	<b>Title</b>	<b>Total Hrs</b>	<b>Maximum marks</b>			<b>Credit</b>
			<b>CIA</b>	<b>CEE</b>	<b>Total</b>	
<b>18AECO002</b>	<b>Paper 1: Multimedia Tools With In-built practical</b>	<b>40</b>	<b>30</b>	<b>20</b>	<b>50</b>	<b>01</b>
	<b>Paper 2: Unity 3D With In-built practical</b>	<b>56</b>	<b>30</b>	<b>20</b>	<b>50</b>	

**CIA: Continuous Internal Assessment & CEE: Course End Exam**

## **STRUCTURE OF THE COURSE**

## **SYLLABUS**

### **SEM - III**

**Unit 1: Introduction to Multimedia Tools with Windows Movie Maker using Images [ 10 Hrs]**

- Tour of software
- Make a movie from Images and give visual effects
- Edit, Insert, Trim images
- Merge and Hide default Audio and Edit at particular time line
- Convert into MP4 or any other Video Format

**Unit 2: Windows Movie Maker create a Movie using Video [10 Hrs]**

- Make a movie from video
- Trim video at particular time
- Add Caption, give animation with visual effects
- Merge Video and make a slow or fast motion video
- Export video on social media

**Unit 3: Create a Movie with Open shot [ 10 Hrs]**

- Import Photos
- Insert and trim Audio
- Apply Transition to video
- Add Animation to Video
- Export video social media

**Unit 4: Create a Movie with Light Works [10 Hrs]**

- Import Photos and videos
- Trim Video According to Timeline
- Add Audio according to Timeline
- Give 3D effect with adding 3D text
- Create a Movie and export on social media

**SEM - IV**

**Unit 1: Welcome to Unity! Exploring the Unity User Interface [ 6 Hrs]**

- Creating Unity accounts
- Install Unity configuration
- Understand the Unity Asset Store, model asset optimization
- Understand video game art principles and industry terminology
- Differentiate Unity services

**Unit 2: Representation of 2D and 3D objects on game scene [14 Hrs]**

- Flat objects representing
- Unity3D coordinate systems
- Principle of 3D objects representation. 3D objects meshes. Triangulation and polygonalization.

- Rendering pipeline with sequence
- Rendering matrices (world matrix, projection matrix, and view matrix)

**Unit 3: Approach to game scene designing and rapid game prototyping [12 Hrs]**

- Concept of Game Object in Unity3D.
- Hierarchy window. Principle of complex GameObjects creation.
- Particle system components.
- Principles of game scenes designing.
- Decorating a game scene by different assets

**Unit 4: Game scenes prototyping & Game physics [12 Hrs]**

- Setting camera and layouts.
- Transform component (changing transform properties and resetting them).
- User Interface scenes designing
- Creating and reusing package for user interface scenes designing
- Anchoring Canvas elements
- Peculiarities of designing 3D scenes and mathematical principles
- Components providing game physics. Rigid body and colliders

**Unit 5: Scripting & Resulting project [12 Hrs]**

- Game lifecycle (Awake, Start, Update, Fixed Update, and Destroy).
- Hierarchy of classes for development games in Unity3D
- Vectors and basic operations for 3DModels processing
- Game Objects interaction in scripting

**GUIDELINES FOR THE COMPLETION OF THE COURSE:**

1. Minimum 80% attendance is required, if not able to fulfil it then only by the permission of Programme Coordinator and Principal will be allowed to compensate in the next year.
2. Only remarks will be given at the end of the course.
3. A separate certificate on completion of each course will be issued by the Controller of Examination.
4. Degree will be awarded only after receiving of the certificate.
5. In event of non-completion of course, the student has to re-do the course or opt for another one.

**EVALUATION NORMS: Distribution of 100% CIA components:**

*The course carries 1 credit and the students will be evaluated continuously based on their participation in learning experiences, theory, and evaluation through tests and assignments and will also be evaluated at the end of course*

*under CEE which will be 100% internal. The pattern of evaluation with percentage weightage will be as specified below*

<b>S.N</b>	<b>Component</b>	<b>Content</b>	<b>Duration</b>	<b>Marks</b>	<b>Sub Total</b>
1	Attendance	Theory: Min. 80%	For full course	10	10
2	Unit Test	4 practical Test at end of each 2 units.	1 Hr for Each	30	30
3	Assignment	4 Assignment to be submitted inform of practical task. 2 in each semester.		20	20
4	Course End Exam (CEE)	Full syllabus (In Semester IV before second Internal)	2 Hrs	40	40
				<b>Total</b>	<b>100</b>

**At the end of the course no marks are given, only remarks are given as follows:**

**REMARKS:**

<b>Range of % Marks</b>	<b>Remarks</b>
90-100	Excellent
75-89	Very Good
60-74	Good
40-59	Fair
39- and below	Not Completed



<b>18AECO003</b>	<b>Renewable Energy Sources</b>	<b>Duration 80 Hrs</b>	<b>01 Credit</b>
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### **ELIGIBILITY**

Any undergraduate student can opt for the course.

### **DURATION OF THE COURSE**

The course shall extend over a period of one year comprising of two semesters in one academic year.

### **OBJECTIVES OF THE COURSE:**

To enable the students to

1. Understand the fundamental knowledge of renewable energy source
2. Analyze Sustainable development using solar & wind energy
3. Perform analysis of Solar cell/module/Array modelling,
4. Design module and its output analysis
5. Identify various components of Wind Energy Conversion system
6. Grid integration with PV & Wind power generation.
7. Prepare economic analysis for Commercial/ Industrial/ Residential PV& Wind energy conservation systems.

### **SCHEME OF INSTRUCTION AND EXAMINATIONS**

<b>Course Code</b>	<b>Course</b>	<b>Total Hrs of Instructions</b>	<b>Exam Duration Hrs</b>	<b>Marks allotted</b>			<b>Credit</b>
				<b>CIA</b>	<b>CEE</b>	<b>Total</b>	
<b>18AECO003</b>	<b>Renewable Energy Sources</b>	30 Hrs-Theory	01 Hr-Theory	30	20	50	01
		50 Hrs-Practical	02 Hrs-Practical	30	20	50	
		<b>80</b>		<b>60</b>	<b>40</b>	<b>100</b>	<b>01</b>

**CIA: Continuous Internal Assessment      &      CEE: Course End Exam**

## STRUCTURE OF THE COURSE

### SYLLABUS

#### Theory:

#### SEM III

Topics	Teaching Hrs.
<b>Unit 1: Introduction to Renewable Energy Sources</b>	<b>6</b>
<ul style="list-style-type: none"><li>• Need for use of renewable energy source</li><li>• Review of energy sources</li><li>• Present energy consumption/utilization pattern</li><li>• Environmental impact of fossil fuels</li><li>• Growth of renewable energy sector in India</li><li>• Impact of renewable energy on economy</li><li>• Renewable Energy for sustainable development</li></ul>	
<b>Unit 2: Power Generation from Solar PV system</b>	<b>4</b>
<ul style="list-style-type: none"><li>• Operating principle</li><li>• Photovoltaic cell concepts</li><li>• Types of solar cells, fabrication of SPV cells</li><li>• Cell, module, array (Series and parallel connections)</li><li>• SPV system components and their characteristics</li><li>• Block diagram of general SPV system</li></ul>	
<b>Unit 3: Configuration of Solar PV Systems</b>	<b>4</b>
<ul style="list-style-type: none"><li>• Grid Tied System (On Grid)<ul style="list-style-type: none"><li>○ Block Diagram</li><li>○ Working</li><li>○ Merits &amp; demerits</li></ul></li><li>• Stand Alone System (Off Grid)<ul style="list-style-type: none"><li>○ Block Diagram</li><li>○ Working</li><li>○ Merits &amp; demerits</li></ul></li></ul>	

#### SEM IV

<b>Unit 4: Power Generation from Wind energy</b>	<b>5</b>
<ul style="list-style-type: none"><li>• Basic principle of wind energy generation</li><li>• Power extracted from wind</li><li>• Force on blades &amp; turbines</li><li>• Wind energy conversion system</li><li>• Site selection for wind mill</li><li>• Applications of wind energy</li></ul>	
<b>Unit 5: Classification of Turbines &amp; Construction of Wind mill</b>	<b>8</b>
<ul style="list-style-type: none"><li>• Classifications of WECS</li><li>• Schemes of electric power generation from wind.</li><li>• Block Diagram &amp; construction of each block for wind mill.</li></ul>	

### SEM III

#### Topics

Teaching  
Hrs.

- Types of wind turbines & wind generators.
- Comparison/ advantages and disadvantages of WECS.

#### LIST OF PRACTICALS (SEM-III)

Exp.	Topic	Hrs.
1	Identification of various electrical terminologies.	2
2	Study of different measuring instruments of SPV.	2
3	To observe power generation from Solar PV panel with different configuration.	2
4	To understand working of different power converters.	2
5	Design & development of 1-Phase Bridge inverter circuit.	2
6	To study various parameters of Battery.	2
7	Design & development of Battery chargers.	2
8	To calculate payback analysis (Real time data) of SPV system.	2
9	To analyze & apply various SPV Govt. Schemes.	2
10	Design & develop the basic solar charge controller circuit.	2
11	To understand & design Solar MPPT System.	2
12	Design & development of Standalone SPV System.	4

#### (SEM-IV)

Exp.	Topic	Hrs.
1	To understand various standards of Grid Integration System.	2
2	Design & development of Grid Connected SPV System.	2
3	Evaluate the cut-in speed of wind turbine experimentally.	2
4	Demonstrate the power analysis at turbine output (for high wind speeds).	2
5	Evaluate the coefficient of performance of wind turbine.	2
6	Expert talk on installation of rooftop solar system	6
7	Visit of Solar Power Plant. Analysis of various aspects of SPV Systems.	4
8	Visit of Wind farm. Analysis of various aspects of wind farm.	4

**Reference Books:**

1. C.S. Solanki, “Solar Photovoltaics: Fundamentals, Technologies and Applications”, PHI Learning Pvt. Ltd, 2nd Edition, 2011
2. H. Abu Rab, M. Malinowski, Kamal Al-Haddad, “Power Electronics for Renewable Energy Systems, Transportation and Industrial Applications”, Wiley-IEEE Press, 2014
3. G.L. Johnson, “Wind Energy Systems”, Prentical Hall, 1985
4. Renewable Energy Technologies, Solanki, Chetan S. , PHI Learning, New Delhi, 2011
5. Wind Power Technology, Earnest, Joshua, PHI Learning, New Delhi, 2013
6. Wind Power in Power System, Thomas Ackermann, John Willey & Sons, 2005
7. Renewable Energy Resources, J. Twidell and T. Weir, E & F N Spon Ltd, London, 1999

**GUIDELINES FOR THE COMPLETION OF THE COURSE:**

1. Minimum 80% attendance is required, if not able to fulfil it then only by the permission of Programme Coordinator and Principal will be allowed to compensate in the next year.
2. Only remarks will be given at the end of the course.
3. A separate certificate on completion of each course will be issued by the CoE.
4. Degree will be awarded only after receiving of the certificate.
5. In event of non-completion of course, the student has to re-do the course or opt for another one.

**EVALUATION NORMS: Distribution of 100% CIA components:**

*The course carries 1 credit and the students will be evaluated continuously based on their participation in learning experiences, theory, and evaluation through tests and assignments and will also be evaluated at the end of course under CEE ( Course End Exam) which will be 100% internal. The pattern of evaluation with percentage weight age will be as specified below:*

**Model II: Theory & Practical****Distribution of 100% CIA components: Theory**

Sr.	Component	Content	Duration	Marks	Sub Total
a)	Attendance	-	-	-	10
b)	One Assignment	Design / Analysis of SPV system components	-	10	10
c)	Test-I	Any 3 units	01 Hrs	10 (set for 30)	10

d)	Course End Exam	All 5 Units	02 Hrs	20 (set for 40)	20
<b>Grand Total</b>					<b>50 Marks</b>

**Distribution of 100% CIA components: Practical**

Sr	Component	Content	Duration	Marks	Sub Total
a)	Attendance	-	-	-	10
b)	One Assignment	Report on industrial visit	-	10	10
c)	Test-I	10-12 experiments	02 Hrs	10 (set for 30)	10
d)	Course End Exam	All experiments	03 Hrs	20 (set for 40)	20
<b>Grand Total</b>					<b>50 Marks</b>

**At the end of the course no marks are given, only remarks are given as follows:**

**REMARKS:**

Range of % Marks	Remarks
90-100	Excellent
75-89	Very Good
60-74	Good
40-59	Fair
39- and below	Not Completed

<b>18AECO004</b>	<b>Career Life after placement</b>	<b>Duration 80 Hrs</b>	<b>01 Credit</b>
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### **ELIGIBILITY**

Any undergraduate student can opt for the course.

### **DURATION OF THE COURSE**

The course shall extend over a period of one year comprising of two semesters in one academic year.

### **OBJECTIVES OF THE COURSE**

To enable the students to

- Identify their strengths determine how to change their weakness to a strength.
- Understand the role of career habitudes for career success.
- Explain the benefits of Net weaving over traditional networking.
- Understand the importance of building the authentic relationship to grow in career.

### **SCHEME OF INSTRUCTION AND EXAMINATIONS**

<b>Course Code</b>	<b>Course</b>	<b>Total Hrs of Instructions</b>	<b>Exam Duration Hrs</b>	<b>Marks allotted</b>			<b>Credit</b>
				<b>CIA</b>	<b>CEE</b>	<b>Total</b>	
<b>18AECO004</b>	<b>Career Life after placement With In-built practical</b>	80	03	60	40	100	01
		<b>80</b>		<b>60</b>	<b>40</b>	<b>100</b>	<b>01</b>

## STRUCTURE OF THE COURSE

### SYLLABUS:

<b>Unit -1</b>	<b>Making Career Plan and Life Skill</b>	<b>(16 Hrs)</b>
	<ul style="list-style-type: none"><li>• Making Career Plan</li><li>• Salary or Start-Up?</li><li>• Eight Principles of Effective Career</li><li>• Life Skill : Basic Human Requirement</li></ul>	
<b>Unit-2</b>	<b>Finding the Mentor and Coach</b>	<b>(16 Hrs)</b>
	<ul style="list-style-type: none"><li>• Finding the Mentor and Coach</li><li>• Difference between Mentor and Coach</li><li>• The Importance of a Mentor and Coach</li><li>• Co-existence and harmony in the self</li><li>• Co-existence and harmony in the Family</li></ul>	
<b>Unit-3</b>	<b>Career Habitudes and Personality types at work</b>	<b>(16 Hrs)</b>
	<ul style="list-style-type: none"><li>• Habitudes and Career Success</li><li>• Habitudes and Leadership</li><li>• Habitudes for Mid-Career Professionals</li><li>• Personality types at works</li><li>• Types under stress and identify your weakness</li></ul>	
<b>Unit-4</b>	<b>Net Weaving and Building Authentic Relationships</b>	<b>(16 Hrs)</b>
	<ul style="list-style-type: none"><li>• Net Weaving vs. Traditional Networking</li><li>• Net Weaving as a Career Enhancement Tool</li><li>• The Five Levels of Net Weaving</li><li>• 11 Ways to Build Trust</li><li>• Building Authentic Relationships</li></ul>	
<b>Unit-5</b>	<b>CV and Life Skills</b>	<b>(16 Hrs)</b>
	<ul style="list-style-type: none"><li>• Importance of CV</li><li>• Effective CV writing</li><li>• Co-existence and harmony in the society</li><li>• Co-existence and harmony in the nature</li><li>• Co-existence and harmony in the existence</li></ul>	

### Reference Books:

- 1) R.R Gaur, R Sangal, G P Bagaria, "A foundation course in Human Values and professional Ethics", 2009.
- 2) Dr.Tim Elmore,"Habitudes for New Professionals: The Art of Launching Your Career

### **GUIDELINES FOR THE COMPLETION OF THE COURSE:**

1. Minimum 80% attendance is required, if not able to fulfil it then only by the permission of Programme Coordinator and Principal will be allowed to compensate in the next year.
2. Only remarks will be given at the end of the course.
3. A separate certificate on completion of each course will be issued by the CoE.
4. Degree will be awarded only after receiving of the certificate.
5. In event of non-completion of course, the student has to re-do the course or opt for another one.

### **EVALUATION NORMS: Distribution of 100% CIA components:**

*The course carries 1 credit and the students will be evaluated continuously based on their participation in learning experiences, theory, and evaluation through tests and assignments and will also be evaluated at the end of course under CEE (Course End Exam) which will be 100% internal. The pattern of evaluation with percentage weightage will be as specified below:*

### **Distribution of 100% CIA components:**

<b>S. No.</b>	<b>Component</b>	<b>Content</b>	<b>Duration</b>	<b>Marks</b>	<b>Sub Total</b>
a)	Attendance	-	-	10	10
b)	One Assignment	-	-	30	30
c)	Test-I	Any 2 Units	1.5 Hrs	20	20
d)	Course End Exam	All 5 Units	02 Hrs	40	40
<b>Grand Total</b>					<b>100 Marks</b>

**At the end of the course no marks are given, only remarks are given as follows:**

### **REMARKS:**

<b>Range of % Marks</b>	<b>Remarks</b>
90-100	Excellent
75-89	Very Good
60-74	Good
40-59	Fair
39- and below	Not Completed



<b>18AECO005</b>	<b>3D Printing Technology</b>	<b>Duration 80 Hours</b>	<b>1 Credit</b>
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### **ELIGIBILITY**

Any undergraduate student can opt for the course.

### **DURATION OF THE COURSE**

The course shall extend over a period of one year comprising of two semesters in one academic year.

### **OBJECTIVES OF THE COURSE**

To enable the students to

1. Gain knowledge regarding CAD/CAM cycle.
2. Make and model prototype from given drawing.
3. Understand basic fundamental of 3D printing.
4. Enhance technical skill for preparing 3D printed parts.

### **SCHEME OF INSTRUCTION AND EXAMINATIONS**

<b>Course Code</b>	<b>Title</b>	<b>Total Hrs</b>	<b>Maximum marks</b>			<b>Credit</b>
			<b>CIA</b>	<b>CEE</b>	<b>Total</b>	
<b>18AECO005</b>	<b>3D Printing Technology</b>	<b>80</b>	<b>60</b>	<b>40</b>	<b>100</b>	<b>01</b>

## STRUCTURE OF THE COURSE

### *SYLLABUS*

- Unit 1 CAD, CAM and Prototyping (10 Hrs)**
- Introduction to computer Aided Design (CAD), Computer Aided Manufacturing (CAM).
  - Introduction to prototyping and its importance.
  - Traditional Prototyping Vs. Rapid Prototyping (RP).
- Unit 2 CAD/CAM and RPT Tooling (24 Hrs)**
- Introduction to Feature based modeling and component preparing by using software. (Hands on training on 3D modeling software)
  - Fundamental of Manual Part programming
  - Different G and M codes for CNC and VMC machine.
  - Conventional Tooling Vs. Rapid Tooling,
  - Classification of Rapid Tooling, Direct and Indirect Tooling Methods, Soft and Hard Tooling methods.
- Unit 3 Introduction to 3D Printer - Parts and Construction (12 Hrs)**
- Process Physics, Tooling, Process Analysis, Material and technological aspects,
  - Applications, limitations and comparison of various rapid manufacturing processes.
  - Introduction to Stepper motor, nozzle, cooling fan, thermocouple, extruder, display unit, working table, electronic circuit and frame.
- Unit 4 Introduction to prototyping software (10 Hrs)**
- File exchange formats, G-code generation,
  - Machine settings, Inserting 3D model, viewpoint, Material setting,
  - Print setup, infill pattern, skirt, Brim, support structures and support and print pattern.
- Unit 5 3D Printer : Performance Analysis (24 Hrs)**
- Introduction to input parameters and its importance,

- Process parameters and effect of output parameters and its effect.
- Hands on training on 3D printer of the modelled part.

### **Guidelines for the completion of the Course:**

1. Minimum 80% attendance is required, if not able to fulfil it then only by the permission of Programme Coordinator and Principal will be allowed to compensate in the next year.
2. Only remarks will be given at the end of the course.
3. A separate certificate on completion of each course will be issued by the CoE.
4. Degree will be awarded only after receiving of the certificate.
5. In event of non-completion of course, the student has to re-do the course or opt for another one.

### ***Evaluation Norms:***

*The course carries 1 credit and the students will be evaluated continuously based on their participation in learning experiences, theory, and evaluation through tests and assignments and will also be evaluated at the end of course under CEE which will be 100% internal. The pattern of evaluation with percentage weightage will be as specified below:*

### **Distribution of 100% CIA components: Theory**

<b>S. No.</b>	<b>Component</b>	<b>Content</b>	<b>Duration</b>	<b>Marks</b>	<b>Sub Total</b>
1	Attendance	Theory: Min.80 %	Full course	10	10
2	Assignments	-	-	-	20
3	Test-I	-	1 Hr.	20	20
4	Course End Exam	Full Syllabus	2.5Hrs	50	50
<b>Grand Total</b>					<b>100 Marks</b>

**At the end of the course no marks are given, only remarks are given as follows:**

### **Remarks:**

<b>Range of % Marks</b>	<b>Remarks</b>
90-100	Excellent

75-89	Very Good
60-74	Good
40-59	Fair
39- and below	Not Completed

<b>18AECO006</b>	<b>Decentralized Solar Power System</b>	<b>Duration 80 Hrs</b>	<b>01 Credit</b>
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### **ELIGIBILITY**

Any undergraduate student can opt for the course.

### **DURATION OF THE COURSE**

The course shall extend over a period of one year comprising of two semesters in one academic year.

### **OBJECTIVES OF THE COURSE**

To enable the students to

1. Understand the concept of Decentralized Solar Power System
2. Focus on Sustainable development & Energy efficient alternatives
3. Develop Self-sufficiency in generating power
4. Implement the design in rural areas

### **SCHEME OF INSTRUCTION AND EXAMINATIONS**

<b>Course Code</b>	<b>Course</b>	<b>Total Hrs of Instructions</b>	<b>Exam Duration Hrs</b>	<b>Marks allotted</b>			
				<b>CIA</b>	<b>CEE</b>	<b>Total</b>	
<b>18AECO006</b>	<b>Decentralized Solar Power System Theory Practical</b>	Practical are designed with each theory session	01 Hr-Theory 02 Hrs-Practical	30 30			01
		<b>80</b>		<b>60</b>	<b>40</b>	<b>100</b>	<b>01</b>

**CIA: Continuous Internal Assessment**

**CEE: Course End Exam**

## STRUCTURE OF THE COURSE

### SYLLABUS:

#### THEORY (SEM-III)

- Unit 1 Basics of Electricity ( 10 Hrs )**
- Voltage, Current,
  - Electrical Power, DC and AC Power,
  - Measurement of Electrical Quantities,
  - Estimating the energy requirement
  - Daily energy consumption of a house
- Unit 2 Solar Cells and Solar PV modules ( 10 Hrs )**
- What it is and how it generates electricity,
  - Parameters of the Solar Cells,
  - Factors affecting the Solar Power Generation,
  - Solar PV module and measuring the module parameters
- Unit 3 Solar PV module array ( 8 Hrs )**
- Observing and measuring parameters of 10 Watt, 20 Watt, 40 Watt Solar Panels,
  - Connection of modules in series,
  - Connection of modules in parallel
- Unit 4 Implementation-1 ( 4 Hrs )**
- Connect solar panel with DC lamp and DC fan and observe
- Unit 5 Implementation-2 ( 8 Hrs )**
- Need of voltage regulation

- Develop basic voltage regulator

### **THEORY (SEM-IV)**

<b>Unit 1</b>	<b>Basics of Batteries</b>	<b>( 6 Hrs )</b>
	<ul style="list-style-type: none"> <li>• Rechargeable batteries and know how it works,</li> <li>• Commonly available rechargeable batteries,</li> <li>• Understanding the parameters of batteries like battery terminal voltage, charge storage capacity, Depth of discharge etc.,</li> <li>• Series connection of batteries and parallel connection of batteries</li> </ul>	
<b>Unit 2</b>	<b>Concepts of power conversion and charge controller</b>	<b>( 10 Hrs )</b>
	<ul style="list-style-type: none"> <li>• Concepts of DC to AC conversion(Inverter),</li> <li>• Various types of charge controllers,</li> <li>• Study of simple Linear Charge Controller using MOSFET</li> <li>• Develop the circuit for battery low voltage indication and cut off circuit using operational amplifier LM 339</li> </ul>	
<b>Unit 3</b>	<b>Solar PV System Design</b>	<b>( 04 Hrs )</b>
	<ul style="list-style-type: none"> <li>• Concepts of various types of solar PV system,</li> <li>• Detailed understanding of standalone solar PV system with DC load, charge controller circuit and battery</li> </ul>	
<b>Unit 4</b>	<b>Develop standalone Solar PV system(stage-1)</b>	<b>( 08 Hrs )</b>
	<ul style="list-style-type: none"> <li>• Design, develop and implementation with following load</li> <li>• One DC Lamp-12V DC, 3W/5W</li> <li>• Two DC Lamps-12V DC, 3W/5W</li> <li>• Four DC Lamps-12V DC, 3W/5W</li> </ul>	
<b>Unit 5</b>	<b>Solar PV system design &amp; implementation</b>	<b>( 12 Hrs )</b>
	<ul style="list-style-type: none"> <li>• Design, develop and implementation with following load</li> </ul>	

- One DC Lamp(12V DC,3W/5W) and one DC Table Fan(12V DC,15W)
- One BLDC Ceiling Fan – 12V DC,30W
- One DC Lamp(12V DC, 3W/5W) and one Ceiling Fan(12V DC,30W)
- One DC Water Pump(12V DC)

### **LIST OF PRACTICALS (SEM-III)**

1. Understanding the basic terms about electricity. These terms are current, Voltage, Power, Energy, AC power, DC power.
2. Learn the use of multi meter to measure the electrical quantities.
3. Estimate of electrical energy consumed by appliances.
4. To study the various parameters of solar PV module.
5. Develop I-V curve of Solar PV module with measuring current and voltage of PV module at various operating point. Calculate the power at each point and show maximum power point.
6. Study the effect of change in angle of light falling on PV module.
7. Connect the two solar panels in series and measure current and voltage of PV module at various operating point.
8. Connect the two solar panels in parallel and measure current and voltage of PV module at various operating point.
9. Connect the typical 12V DC LED bulb directly with solar panel and observe the effect with different position of solar PV module.
10. Develop regulated DC voltage from unregulated DC voltage of solar PV module.

### **LIST OF EXPERIMENTS (SEM-IV)**

1. Study the various parameters of battery.
2. Study basic electronic components which are necessary in developing solar PV based system.
3. Develop the basic solar charge controller circuit.
4. Develop circuit to cut off battery from load at low voltage.
5. Demonstration of Standalone Solar PV system for DC loads.  
Specifications: 250W Solar Panel, Solar charge controller, 24V DC, 28W LED lights (2 Nos.), 24V DC BLDC ceiling fans (2 Nos.)
6. Demonstration of Standalone Solar PV system for AC loads.  
Specifications: 250W Solar Panel, Solar hybrid inverter, regular AC loads of 2 tube lights and 2 ceiling fans
7. Student will develop a decentralized solar power system with necessary specifications

### **Reference Books:**



## 1. Solar Photovoltaic Technology and Systems, Chetan Singh Solanki, PHI

### **GUIDELINES FOR THE COMPLETION OF THE COURSE:**

1. Minimum 80% attendance is required, if not able to fulfil it then only by the permission of Programme Coordinator and Principal will be allowed to compensate in the next year.
2. Only remarks will be given at the end of the course.
3. A separate certificate on completion of each course will be issued by the CoE.
4. Degree will be awarded only after receiving of the certificate.
5. In event of non-completion of course, the student has to re-do the course or opt for another one.

### **EVALUATION NORMS: Distribution of 100% CIA components:**

*The course carries 1 credit and the students will be evaluated continuously based on their participation in learning experiences, theory, and evaluation through tests and assignments and will also be evaluated at the end of course under CEE ( Course End Exam) which will be 100% internal. The pattern of evaluation with percentage weightage will be as specified below:*

#### **Distribution of 100% CIA components: Theory**

S. No.	Component	Content	Duration	Marks	Sub Total
a)	Attendance	-	-	-	10
b)	One Assignment	-	-	10	10
c)	Test-I	Units from SEM-III	1.5 Hrs	10 (set for 30)	10
d)	Course End	All Units	02 Hrs	20 (set for 50)	20
<b>Grand Total</b>					<b>50 Marks</b>

#### **Distribution of 100% CIA components: Practical**

S. No.	Component	Content	Duration	Marks	Sub Total
a)	Attendance	-	-	-	10
b)	One Assignment	-	-	10	10

c)	Test-I	50% of Experiments	02 Hrs	10 (set for 30)	10
d)	Course End Exam	All experiments	03 Hrs	20 (set for 50)	20
<b>Grand Total</b>					<b>50 Marks</b>

**At the end of the course no marks are given, only remarks are given as follows:**

**REMARKS:**

<b>Range of % Marks</b>	<b>Remarks</b>
90-100	Excellent
75-89	Very Good
60-74	Good
40-59	Fair
39- and below	Not Completed

<b>18AECO007</b>	<b>Herbal Medicine</b>	<b>Duration 80 Hrs</b>	<b>01 Credit</b>
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### **ELIGIBILITY**

Any undergraduate student can opt for the course.

### **DURATION OF THE COURSE**

The course shall extend over a period of one year comprising of two semesters in one academic year.

### **OBJECTIVES OF THE COURSE:**

To enable the students to

1. Understand raw material as source of herbal drugs.
2. Know use of plants in treatment of diseases.
3. Identify the medicinally active constituents in plants.
4. Know the evaluation parameters of herbal drugs.

### **SCHEME OF INSTRUCTION AND EXAMINATIONS**

Course Code	Course	Total Hrs of Instructions	Marks allotted			Credit
<b>18AECO007</b>	Herbal Medicine	40 Hrs-Theory 40 Hrs-Practical				01
		<b>80</b>	<b>60</b>	<b>40</b>	<b>100</b>	<b>01</b>

**CIA: Continuous Internal Assessment**

**CEE: Course End Exam**

## STRUCTURE OF THE COURSE

### SYLLABUS

#### Theory

##### Unit.1 Herbs as raw materials:

(04 Hrs)

- Definition of herbs and herbal medicine
- Herbal medicinal product
- Selection, identification and authentication of herbal materials
- Classification of drugs: Alphabetical, Morphological, Taxonomical, Chemical and Pharmacological.

##### Unit.2 Adulteration and drug evaluation:

(04 Hrs)

- Drug adulteration
- Drug evaluation and WHO guidelines for the assessment of herbal drugs

##### Unit.3 Introduction to active constituents of drugs:

(06 Hrs)

- Properties, classification and chemical tests of carbohydrates, lipids, alkaloids, glycosides, volatile oil, tannin, resin.

##### Unit.4 Plant drugs:

(22 Hrs)

- Biological sources, geographical sources, macroscopic study, chemical constituents, therapeutic efficacy of following categories of drugs.
- Laxatives: Aloes, Castor oil, Isapghula, Senna
- Carminatives & G.I. regulators: Coriander, Fennel, Dill, Cumin, Ajawan, Linseed, Cardamom, Ginger, Black pepper, Long Pepper, Asafoetida, Nutmeg, Cinnamon, Clove, Harde, Bahra, Badiya
- Drugs use in heart diseases: Garlic
- Brain tonic: Shankhapusphi, Brahmi
- Anthelmintic: Kalijiri, Vidang
- Immunomodulator: Galo, Ashwagandha, Tulsi, Kesar
- Antitussives: Vasaka, , Liquorice
- Antiobesity: Guggul, Saragavo
- Antidiabetics: Gymnema sylvestre, Methi, Karela
- Diuretics: Gokhru, Punarnava
- Antiseptics: Neem, Curcuma
- Antimalarials: Cinchona
- Antioxidant: Amla, Lemon

##### Unit.5 Indian Systems of Medicine:

(04 Hrs)

- Introduction of Ayurvedic system of medicine.
- Preparation and standardization of Ayurvedic formulations.

#### Reference Books:

1. Kokate, C. K., Purohit, A. P. and Gokhale S. B. (2014). Pharmacognosy. Pune, India: Nirali Prakashan.
2. Rangari, V.D. (2003). Pharmacognosy & Phytochemistry. Nashik, India: Career Publications.
3. Shah Biren and Seth, A. K. (2010). Pharmacognosy and Phytochemistry, India: Elsevier, a division of Reed Elsevier India Pvt. Ltd.
4. Evans, W.C. (2009). Trease and Evans Pharmacognosy. London: W.B. Saunders & Co.
5. Pharmacopoeia Commission for Indian Medicine & Homoeopathy. (2016). The Ayurvedic Pharmacopoeia of India. Part I and Part II. Govt. of India, Ministry of Health and Family Welfare, Dept. of Indian Systems of Medicine and Homeopathy. Gaziabad, India: Pharmacopoeia Commission for Indian Medicine & Homoeopathy.
6. Government of India. Ministry of Health and Family Welfare, Department of Indian System of Medicine and Homeopathy. (2011). The Ayurvedic Formulary of India. Vol. I, II and III. New Delhi, India: Government of India, Department of Indian System of Medicine and Homeopathy.

### **List of Practicals:**

1. Study of Morphology of crude drugs.
2. Study of Chemical tests for identification of active constituents.
3. Preparation of plant extracts.
4. Determination of swelling index.
5. Isolation of starch from Potato.
6. Determination of moisture content in crude drug.
7. Determination of extractive values of crude drug.
8. Determination of Ash value of crude drug.
9. Determination of foaming index of crude drug.
10. Preparation of Ayurvedic formulations.

### **GUIDELINES FOR THE COMPLETION OF THE COURSE:**

1. Minimum 80% attendance is required, if not able to fulfil it then only by the permission of Programme Coordinator and Principal will be allowed to compensate in the next year.
2. Only remarks will be given at the end of the course.
3. A separate certificate on completion of each course will be issued by the Controller of Examination.
4. Degree will be awarded only after receiving of the certificate.
5. In event of non-completion of course, the student has to re-do the course or opt for another one.

### **EVALUATION NORMS: Distribution of 100% CIA components:**

*The course carries 1 credit and the students will be evaluated continuously based on their participation in learning experiences, theory, and evaluation through tests and assignments and will also be evaluated at the end of course*

*under CEE ( Course End Exam) which will be 100% internal. The pattern of evaluation with percentage weightage will be as specified below:*

**Distribution of 100% CIA components: Theory**

S. No.	Component	Content	Duration	Marks	Sub Total
a)	Attendance	-	-	10	10
b)	One Assignment	-	-	10	10
c)	Test-I	Any 2 Units	1.5 Hrs	10	10
d)	Course End Exam	All 5 Units	02 Hrs	20	20
<b>Grand Total</b>					<b>50 Marks</b>

**Distribution of 100% CIA components: Practical**

S. No.	Component	Content	Duration	Marks	Sub Total
a)	Attendance	-	-	10	10
b)	One Assignment	-	-	10	10
c)	Test-I	50% of Experiments	02 Hrs	10	10
d)	CEE	All experiments	03 Hrs	20	20
<b>Grand Total</b>					<b>50 Marks</b>

**At the end of the course no marks are given, only remarks are given as follows:**

**REMARKS:**

Range of % Marks	Remarks
90-100	Excellent
75-89	Very Good
60-74	Good
40-59	Fair
39- and below	Not Completed

<b>18AECO008</b>	<b>Entrepreneurship Development</b>	<b>Duration 80 Hrs</b>	<b>01 Credit</b>
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### **ELIGIBILITY**

Any undergraduate student can opt for the course.

### **DURATION OF THE COURSE**

The course shall extend over a period of one year comprising of two semesters in one academic year.

### **OBJECTIVES OF THE COURSE:**

To enable the students to

1. Develop the understanding of the concept, process and factors responsible behind the development of entrepreneurship.
2. Make them aware regarding various forms of Business Organisations and to develop ability of choosing the best – suitable one.
3. Nurture creative & analytical thinking.
4. Develop skills to expand their family business.
5. Develop competence to prepare business plan and execute in practical life.

### **SCHEME OF INSTRUCTION AND EXAMINATIONS**

#### **Model I: Only Theory**

<b>Course Code</b>	<b>Title</b>	<b>Total Hrs</b>	<b>Maximum marks</b>			<b>Credit</b>
			<b>CIA</b>	<b>CEE</b>	<b>Total</b>	
<b>18AECO008</b>	<b>Entrepreneurship Development</b>	<b>80</b>	<b>60</b>	<b>40</b>	<b>100</b>	<b>01</b>

**CIA: Continuous Internal Assessment      &CEE: Course End Exam**

## STRUCTURE OF THE COURSE

### SYLLABUS

#### Theory

- Unit 1 Introduction to Entrepreneurship (8 Hrs)**
- Meaning, Characteristics and functions of Entrepreneur and Entrepreneurship
  - Role of Entrepreneurship in countries economic development
  - Concept of Leadership and styles of Leadership
  - Concepts of Creativity, Innovation and Invention, Types of Innovations
  - Case Study of contemporary entrepreneurs
  - *Role Playing & Brainstorming Activities (Practical)*
- Unit 2 Forms of Business Organisations and Social Entrepreneurship (8 Hrs)**
- Types of Enterprise (Micro, Small, Medium & Large Enterprise)
  - Sole Proprietorship, Partnership, Private Ltd., Public Ltd., One Person Company (OPC), Limited Liability Partnership (LLP) – comparisons of all
  - Concept of Franchisee, Types of Franchisee
  - Social Entrepreneurship, Characteristics and functions of social entrepreneur
  - Concept of Cooperative sector and Nonprofit organisation
  - Case study of contemporary social entrepreneurs
  - *Product Demonstration: Best out of waste (Practical)*
- Unit 3 Family Business and Entrepreneurship (8 Hrs)**
- Meaning, characteristics, types and culture of Family business
  - Conflict management, Role of Women in family business and development of women entrepreneurship
  - *Practical Study: Designing a Development – Expansion plan for existing family business*
- Unit 4 Source of Fund and Government schemes (8 Hrs)**
- **Source of Fund** : Seed Capital, Bootstrap Finance, Cloud Funding, Friends and Families, Angel Investor, Venture Capitalist, Private Equity, Bank Loan, Issue of Share, Business Incubators, Grants and Subsidies
  - **Government Schemes**: Startup India, Make in India, UDHYOGAadhar, Prime Minister's Employment Generation Programme (PMEGP), The Credit Guarantee Fund Scheme for Micro and Small Enterprises (CGMSE),



Marketing Promotion Schemes - Technology Up gradation and Quality Certification

- *Chart Presentation of various government schemes (Practical)*

**Unit 5 Business Model Canvas and Business Plan (8 Hrs)**

- **Business Model Canvas**: Idea Generation (Eureka Moment), Customer Segmentation, Customer Relationships, Channels of Distribution, Value Proposition, Key Activities, Key Resources, Key Partners, Cost Structure, Revenue Structure
- **Business Plan**: Vision & Mission, Problem business trying to address, Solutions business trying to deliver, Market Size and Nature, Competition and Competency, Marketing Strategy, Operational Strategy, Cost, Finance details about projected investment required and proposed financial outcome, BEP Level, Risk Evaluation
- Developing the business plan including marketing mix (Practical)

**Reference Books:**

1. Desai V., “Fundamentals of Entrepreneurship and Small Business Management”, Himalaya Publishing House, Delhi.
2. S.S.Khanka, “Entrepreneurial Development”, S Chand, Delhi.
3. Norman M. Scarborough, “Essentials of Entrepreneurship and Small Business Management”, Pearson Education, 2016
4. Peter Leach & Tatwamasi Dixit, “Indian Family Business Mantras”, Rupa Publications India, 2015
5. Arya Kumar, “Entrepreneurship: Creating and Leading an Entrepreneurial Organization”, Pearson Education India, 2012

**GUIDELINES FOR THE COMPLETION OF THE COURSE:**

1. Minimum 80% attendance is required, if not able to fulfil it then only by the permission of Programme Coordinator and Principal will be allowed to compensate in the next year.
2. Only remarks will be given at the end of the course.
3. A separate certificate on completion of each course will be issued by the Controller of Examination.
4. Degree will be awarded only after receiving of the certificate.
5. In event of non-completion of course, the student has to re-do the course or opt for another one.

**EVALUATION NORMS: Distribution of 100% CIA components:**

*The course carries 1 credit and the students will be evaluated continuously based on their participation in learning experiences, theory, and evaluation through tests and assignments and will also be evaluated at the end of course*

*under CEE ( Course End Exam) which will be 100% internal. The pattern of evaluation with percentage weightage will be as specified below:*

***Distribution of 100% CIA components:***

<b>S.N</b>	<b>Component</b>	<b>Content</b>	<b>Duration</b>	<b>Marks</b>	<b>Sub Total</b>
1	Attendance	Theory: Min. 80%	For full course	10	10
2	Unit Test	Total 5 unit tests		25	25
3	Assignment & Practical	Number will be decided by coordinator (as per batch)		25	25
4	Course End Exam (CEE)	Full syllabus	3 Hrs	40	40
				<b>Total</b>	<b>100</b>

**At the end of the course no marks are given, only remarks are given as follows:**

**REMARKS:**

<b>Range of % Marks</b>	<b>Remarks</b>
90-100	Excellent
75-89	Very Good
60-74	Good
40-59	Fair
39- and below	Not Completed

<b>18AECO009</b>	<b>Tally PRO</b>	<b>Department of Commerce</b>	<b>Duration 100 Hrs</b>	<b>01 Credit</b>
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### **ELIGIBILITY**

Any undergraduate student can opt for the course.

### **DURATION OF THE COURSE**

The course shall extend over a period of one year comprising of two semesters in one academic year.

### **OBJECTIVES OF THE COURSE:**

To enable the students to

1. Understand Fundamentals of Accounting
2. Make them aware about how the Computerised System of Accounting works
3. Learn practical aspects of Computerised Accounting

### **SCHEME OF INSTRUCTION AND EXAMINATIONS**

<b>Course Code</b>	<b>Course</b>	<b>Total Hrs of Instructions</b>	<b>Exam Duration Hrs</b>	<b>Marks allotted</b>			
				<b>CIA</b>	<b>CEE</b>	<b>Total</b>	
<b>18AECO009</b>	Tally PRO Thory (in built practical)	30 Hrs- Theory 70 Hrs- Practical	3 Hrs - Practical	30	70	100	01
		<b>100</b>		<b>30</b>	<b>70</b>	<b>100</b>	<b>01</b>

**CIA: Continuous Internal Assessment      &      CEE: Course End Exam**

## STRUCTURE OF THE COURSE

### SYLLABUS:

#### Theory

#### **Unit.1 Introduction (30 Hrs)**

- Fundamentals of Accounting
- Maintaining Chart of Accounts in Tally
- Fundamentals of Inventory Management
- Stock Keeping Units

#### **Unit.2 Transactions in Tally – I (19 Hrs)**

- Recording Day to Day Transactions
- Accounts Receivable and Payable Management
- Banking
- Allocation and Tracking of Expenses and Incomes
- Key Takeaways

#### **Unit.3 Transactions in Tally – II (17 Hrs)**

- MIS Reports
- Storage and Classification of Inventory
- Management of Purchase and Sales Cycles
- Price

#### **Unit.4 Goods and Services Tax (20 Hrs)**

- Introduction to GST
- Getting Started with GST (Goods)
- Advance adjustments and Entries (Goods)
- Getting Started with GST (Services)
- Advance adjustments and Entries (Services)

#### **Unit.5 Conceptual Framework (13 Hrs)**

- Tax Deducted at Source (TDS)
- Securing Financial Information
- Data Management and Financial Year End Process

#### Reference Books:

1. Courseware Provided by Tally Education Pvt. Ltd.

#### GUIDELINES FOR THE COMPLETION OF THE COURSE:

1. Minimum 80% attendance is required, if not able to fulfil it then only by the permission of Programme Coordinator and Principal will be allowed to compensate in the next year.
2. Only remarks will be given at the end of the course.

3. A separate certificate on completion of each course will be issued by the Controller of Examination.
4. Degree will be awarded only after receiving of the certificate.
5. In event of non-completion of course, the student has to re-do the course or opt for another one.

**EVALUATION NORMS: Distribution of 100% CIA components:**

*The course carries 1 credit and the students will be evaluated continuously based on their participation in learning experiences, theory, and evaluation through tests and assignments and will also be evaluated at the end of course under CEE ( Course End Exam) which will be 100% internal. The pattern of evaluation with percentage weightage will be as specified below:*

**Distribution of 100% CIA components: Theory (In built Practical)**

S. No.	Component	Content	Duration	Marks	Sub Total
a)	Attendance	-	-	-	10
b)	One Assignment	-	-	10	10
c)	Test-I	Any 2 Units	1.5 Hrs	10 (set for 30)	10
<b>Grand Total</b>					<b>30 Marks</b>

**Distribution of 100% CIA components: Practical**

S. No.	Component	Content	Duration	Marks	Sub Total
a)	Attendance	-	-	-	10
b)	Test-I	40-50% of Experiments	02 Hrs	10 (set for 50)	10
c)	Course End Exam	All experiments	03 Hrs	50 (set for 100)	50
<b>Grand Total</b>					<b>70 Marks</b>

**At the end of the course no marks are given, only remarks are given as follows:**

**REMARKS:**

<b>Range of % Marks</b>	<b>Remarks</b>
90-100	Excellent
75-89	Very Good
60-74	Good
40-59	Fair
39- and below	Not Completed

<b>18AECO010</b>	<b>Plant Tissue Culture</b>	<b>Duration 90 Hrs</b>	<b>1 Credit</b>
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### ELIGIBILITY

Students enrolled in any undergraduate programme of this University, shall be eligible for admission.

### DURATION OF THE COURSE

The course shall extend over a period of one year comprising of two semesters in one academic year.

### ADMISSION

Admission will be given to student on first come basis after the wide circulation of announcement and one day workshop on career prospective of this course. Personal interviews will also be conducted if the number of enrollees increases.

### OBJECTIVES OF THE COURSE:

The objective of the programme is to introduce career and market-oriented, skill enhancing add-on courses that have utility for job, self-employment and empowerment of the students.

After completion of this course, student will be able to :

- Understand the principle and application of plant tissue culture
- Define and describe components of plant tissue culture medium and methodology of preparation of medium
- Independently establish in vitro culture of plant

### SCHEME OF INSTRUCTION AND EXAMINATIONS

Semester-III									
Course Code	Course	Hrs of Instruction / week			Exam Duration (Hrs)	Max Marks			Credit
						CIA	CEE	Total	
		Th	Pr	Tu					
<b>18AECO010</b>	Plant Tissue Culture	2	4	-	2	60	40	100	01

**\*CIA: Continuous Internal Assessment & CEE: Course End Exam**

## **STRUCTURE OF THE PROGRAMME**

The COC- PTC shall have a curriculum comprising theory and practical courses with a specified syllabus. The course will be offered to all the under graduate students as co-curricular course (along with the pool of other course offered by other departments of the University) under the category of SEC (skill enhancement course) of under graduate as directed in UGC guideline for choice based credit system. The course will be of total one credit and comprising ninety hours.

## **SYLLABUS**

<b>Course Content: Theory</b>	<b>30 Hrs</b>
<b>UNIT 1 Basic of plant tissue culture</b>	6 hrs
<ul style="list-style-type: none"><li>• History, Scope and Applications of Plant Tissue Culture</li><li>• Concept of cellular totipotency and differentiation</li><li>• Laboratory Planning and Designing</li><li>• Plant tissue culture media: component and preparation</li></ul>	
<b>UNIT 2 Establishment of cultures</b>	6 hrs
<ul style="list-style-type: none"><li>• Explant: types, collection and preparation</li><li>• Sterilization and aseptic inoculation of explants on suitable medium</li><li>• Different stages of plant tissue culture</li><li>• Micropropagation pathways</li></ul>	
<b>UNIT 3 Variability in Tissue Culture</b>	6 hrs
<ul style="list-style-type: none"><li>• Somaclonal variations: Origin and causes of variation</li><li>• Molecular mechanism of variation</li><li>• Scope of somaclonal variation in interspecific crosses</li><li>• Methods to detect the variations</li></ul>	
<b>UNIT 4 Hardening of tissue culture derived plantlets</b>	6 hrs
<ul style="list-style-type: none"><li>• Basics and introduction to hardening and acclimatization</li><li>• Factors affecting hardening and acclimatization of tissue culture grown plants</li><li>• Primary and secondary hardening units; operation and managements</li><li>• Hardening and acclimatization – success and bottlenecks</li></ul>	



## **UNIT5 Commercialization of tissue culture**

6 Hrs

- SWOT analysis of tissue culture industries
- Scaling-up production and automation in plant propagation
- Global market of plant tissue culture
- Commercial opportunities in plant tissue culture with special reference to plant tissue culture industries in India

## **Course content: Laboratory Exercises**

60 Hrs

1. Plant tissue culture: laboratory organization and facilities requirements
2. To study principles, methodology and handling of equipments used in plant tissue culture
3. Preparations of stock solutions for tissue culture medium preparation
4. Preparation of Plant tissue culture media (M S medium)
5. To study explant characteristics, preparation of explant and aseptic inoculation of explant
6. In vitro culture of suitable explant for induction of callus
7. In vitro establishment of shoot culture using mature node explant
8. In vitro establishment of shoot culture using mature internodes explant
9. In vitro establishment of shoot culture leaf explant
10. Root induction in *in vitro* raised shoots
11. To study the hardening and acclimatization of tissue culture raised plantlets
12. Study of growth characteristics of callus
13. Establishment of cell suspension culture from callus
14. Study of growth in suspension culture using spectrophotometric/cell count method
15. Encapsulation of somatic embryos/shoot buds for production of synthetic seeds

## **Reference Books:**

1. Chawla, H.S. (2002). Introduction to Plant Biotechnology. Oxford & IBH Publishers.

2. Narayanaswamy, S. (1994). Plant cell and tissue culture. Tata McGraw-Hill Education.
3. Bhojwani, S. S., & Razdan, M. K. (1986). Plant tissue culture: Theory and practice (Vol. 5). Elsevier.
4. Gamborg, O. L., & Phillips, G. (Eds.). (2013). Plant cell, tissue and organ culture: fundamental methods. Springer Science & Business Media.
5. George, E. F., Hall, M. A., & De Klerk, G. J. (Eds.). (2007). Plant propagation by tissue culture: volume 1. The background (Vol. 1). Springer Science & Business Media.
6. Smith, R. (2012). Plant tissue culture: Techniques and Experiments. Elsevier Science.
7. Joshi, N. and Purohit, S. D. (2010). A Practical Manual of Plant Biotechnology. Apex Publishing House

### **GUIDELINES FOR THE COMPLETION OF THE COURSE:**

1. Minimum 80% attendance is required, if not able to fulfil it then only by the permission of Programme Coordinator and Principal will be allowed to compensate in the next year.
2. Only remarks will be given at the end of the course.
3. A separate certificate on completion of each course will be issued by the Controller of Examination.
4. Degree will be awarded only after receiving of the certificate.
5. In event of non-completion of course, the student has to re-do the course or opt for another one.

### **EVALUATION NORMS: Distribution of 100% CIA components:**

The course carries 1 credit and the students will be evaluated continuously based on their participation in learning experiences, theory, and evaluation through tests and assignments and will also be evaluated at the end of course under CEE ( Course End Exam) which will be 100% internal. The pattern of evaluation with percentage weightage will be as specified below:

#### **Distribution of 100% CIA components: Theory**

<b>S. No.</b>	<b>Component</b>	<b>Content</b>	<b>Duration</b>	<b>Marks</b>	<b>Sub Total</b>
a)	*Attendance	-	-	10	10
b)	One Assignment	-	-	10	10
c)	Test-I	Any 2 Units	1.5 Hrs	10 (set for 30)	10
d)	<b>Course End Exam</b>	All 5 Units	02 Hrs	20 (set for 50)	20
<b>Grand Total</b>					<b>50 Marks</b>

**Distribution of 100% CIA components: Practical**

<b>S. No.</b>	<b>Component</b>	<b>Content</b>	<b>Duration</b>	<b>Marks</b>	<b>Sub Total</b>
a)	*Attendance	-	-	10	10
b)	One Assignment	-	-	10	10
c)	Test-I	50% of Experiments	02 Hrs	10 (set for 30)	10
d)	<b>Course End Exam</b>	All experiments	03 Hrs	20 (set for 50)	20
<b>Grand Total</b>					<b>50 Marks</b>

**\*10 marks will be awarded to only those students whose attended is more than 80%**

**REMARKS:**

**At the end of the course no marks are given, only remarks are given as follows:**

<b>Range of % Marks</b>	<b>Remarks</b>
90-100	Excellent
75-89	Very Good
60-74	Good
40-59	Fair
39- and below	Not Completed

<b>18AECO011</b>	<b>Bioinformatics</b>	<b>Duration</b> <b>90 Hrs</b>	<b>1 Credit</b>
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### **ELIGIBILITY**

Students enrolled in any undergraduate programme of this University, shall be eligible for admission.

### **DURATION OF THE COURSE**

The course shall extend over a period of one year comprising of two semesters in one academic year.

### **ADMISSION**

Admission will be given to student on first come basis after the wide circulation of announcement and one day workshop on career prospective of this course. Personal interviews will also be conducted if the number of enrollees increases.

### **OBJECTIVES OF THE COURSE:**

The objective of the programme is to introduce career and market-oriented, skill enhancing add-on courses that have utility for job, self-employment and empowerment of the students.

After completion of this course, student will be able to:

- Understand the principle and applications of Bioinformatics
- Analyse the nucleotide and protein sequences
- Analyse the phylogenetic relationship among genic and protein sequences

### **SCHEME OF INSTRUCTION AND EXAMINATIONS**

<b>Semester-III</b>									
<b>Course Code</b>	<b>Course</b>	<b>Hrs of Instruction / week</b>			<b>Exam Duration (Hrs)</b>	<b>Max Marks</b>			<b>Credit</b>
						<b>CIA</b>	<b>CEE</b>	<b>Total</b>	
		<b>Th</b>	<b>Pr</b>	<b>Tu</b>					
18AECO011	Bioinformatics	2	4	-	2	60	40	100	01

**\*CIA: Continuous Internal Assessment& CEE: Course End Exam**

## **STRUCTURE OF THE PROGRAMME**

The COC-Bioinformatics shall have a curriculum comprising theory and practical courses with a specified syllabus. The course will be offered to all the under graduate students as co-curricular course (along with the pool of other course offered by other departments of the University) under the category of SEC (skill enhancement course) of under graduate as directed in UGC guideline for choice-based credit system. The course will be of total one credit and comprising ninety hours.

## **SYLLABUS**

**Course Content: Theory** **30 Hrs**

**UNIT 1 History, Scope and Importance** 6 hrs

- Important contributions
- Aims and scope of Bioinformatics
- Applications of Bioinformatics-challenges and opportunities
- Various file formats for biological sequences

**UNIT 2 Biological Databases** 6 hrs

- Introduction and types of Biological databases
- Bibliographic databases
- Primary sequence databases- nucleic acid and protein
- Secondary databases

**UNIT 3 Sequence Alignment Methods** 6 hrs

- Basics of Sequence alignment
- Pairwise sequence alignment methods: Dot Plot
- Needleman Wunsch and Smith Waterman Algorithm
- Multiple sequence alignment methods-Tools and application

**UNIT 4 Sequence Similarity Searches-1** 6 hrs

- Sequence-based database searches
- BLAST- various versions and algorithm
- FASTA- various versions and algorithms,

- Interpretation of result of sequence similarity search tools

### **UNIT 5 Predictive Methods Using DNA and Protein Sequences**

6 Hrs

- Elements and Concepts of Phylogenetic analysis
- Methods of Construction of phylogenetic trees
- Character and distance-based algorithm
- Reliability of trees. Bootstrap, jackknife tests

### **Course content: Laboratory Exercises**

**60 Hrs**

1. Review the quality of the data and view sequence traces
2. Assembling the sequences and correcting mistakes in the base calls
3. Vector Contamination tool: Vec Screen,
4. Data submission Tools: WebIn, Sequin, Bankit, Sakura.
5. To build query for retrieving scientific records from Pubmeddatabase
6. Retrieving sequence records with NCBI's Entrez Nucleotides and EMBL
7. Getting the gene sequences by exploring and querying the nucleic acid databases.
8. Getting the protein sequences by exploring and querying the protein databases.
9. Sequence File format conversions
10. 3-D Structure Databases: PDB
11. To perform Sequence analysis by using EMBOSS: SMITH & WATERMAN
12. To find the similarity between sequences using FASTA
13. To find the similarity between sequences using BLAST
14. To align more than two sequences and find out the similarity between those sequences: Clustal Omega, Tcofee, MUSCLE
15. Identification of conserved regions in the MSA
16. To study the phylogenetic relationships of nucleotide and protein sequence(s) by using PHYLIP Package.

17. 3-D Protein structure visualization and measurement of bond length, bond angle & Torsion angles using RasMol.

**Reference Books:**

1. Rastogi, S. C., Mendiratta, N., & Rastogi, P. (2003). Bioinformatics: Concepts, skills & applications. New Delhi: CBS & Distributor
2. Baxevanis, A.D., & Ouellette, B.F. (2001). Bioinformatics: A practical guide to the analysis of genes and proteins. New York: John Wiley & sons
3. David W.M (2004) “Bioinformatics sequence and genome Analysis”, Cold spring harbor laboratory press.
4. Ignacimuthu, S. (2005). Basic bioinformatics. Harrow, Middlesex, U.K.: Alpha Science International.
5. Agostino, M. J. (2013). Practical bioinformatics. New York: Garland Science.
6. Ye, S. Q. (2008). Bioinformatics a practical approach. Boca Raton: Chapman & Hall/CRC.

**GUIDELINES FOR THE COMPLETION OF THE COURSE:**

1. Minimum 80% attendance is required, if not able to fulfil it then only by the permission of Programme Coordinator and Principal will be allowed to compensate in the next year.
2. Only remarks will be given at the end of the course.
3. A separate certificate on completion of each course will be issued by the Controller of Examination.
4. Degree will be awarded only after receiving of the certificate.
5. In event of non-completion of course, the student has to re-do the course or opt for another one.

**EVALUATION NORMS: Distribution of 100% CIA components:**

The course carries 1 credit and the students will be evaluated continuously based on their participation in learning experiences, theory, and evaluation through tests and assignments and will also be evaluated at the end of course under CEE(Course End Exam) which will be 100% internal. The pattern of evaluation with percentage weightage will be as specified below:

**Distribution of 100% CIA components: Theory**

S. No.	Component	Content	Duration	Marks	Sub Total
a)	*Attendance	-	-	10	10
b)	One Assignment	-	-	10	10
c)	Test-I	Any 2 Units	1.5 Hrs	10 (set for 30)	10
d)	<b>Course End Exam</b>	All 5 Units	02 Hrs	20 (set for 50)	20

<b>Grand Total</b>	<b>50 Marks</b>
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**Distribution of 100% CIA components: Practical**

<b>S. No.</b>	<b>Component</b>	<b>Content</b>	<b>Duration</b>	<b>Marks</b>	<b>Sub Total</b>
a)	*Attendance	-	-	10	10
b)	One Assignment	-	-	10	10
c)	Test-I	50% of Experiments	02 Hrs	10 (set for 30)	10
d)	<b>Course End Exam</b>	All experiments	03 Hrs	20 (set for 50)	20
<b>Grand Total</b>					<b>50 Marks</b>

**\*10 marks will be awarded to only those students whose attended is more than 80%**

**REMARKS:**

**At the end of the course no marks are given, only remarks are given as follows:**

<b>Range of % Marks</b>	<b>Remarks</b>
90-100	Excellent
75-89	Very Good
60-74	Good
40-59	Fair
39- and below	Not Completed



<b>18AECO012</b>	<b>Preparation for Competitive Exams for Academic Vertical Mobility in Life Science</b>	<b>Duration (100 Hrs)</b>	<b>01 Credit</b>
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### **ELIGIBILITY**

Student of any branch of Life Science.

### **DURATION OF THE COURSE**

The course shall extend over a period of one year comprising of two semesters in one academic year.

### **OBJECTIVES OF THE COURSE:**

To enable the students to:

1. Able to identify solutions to problems encountered in context of competitive exam.
2. Explain and apply appropriate analytical concepts to competitive exams in Life Sciences.
3. Able to recognize the component of various subjects and its weightage.
4. Build up the conceptual and logical reasoning in Science.

### **SCHEME OF INSTRUCTION & EVALUATION**

<b>Course Code</b>	<b>Title</b>	<b>Total Hrs</b>	<b>Maximum marks</b>			<b>Credit</b>
			<b>CIA</b>	<b>CEE</b>	<b>Total</b>	
<b>18AECO012</b>	<b>Preparation for Competitive Exams for Academic Vertical Mobility in Life Science</b>	<b>100</b>	<b>60</b>	<b>40</b>	<b>100</b>	<b>01</b>

**CIA: Continuous Internal Assessment & CEE: Course End Exam**

### **STRUCTURE OF THE COURSE**

#### **SYLLABUS:**

**Unit.1 General Biology : (10 Hrs)**

- Cell organelles and their function, internal transport systems of plants and animal.
- Cellular reproduction and regulation
- Cytoskeleton, Signaling, Cancer Biology.
- populations and communities, genesis and diversity of organisms, evolution;

- Animal hormones ,Plant hormones, Plant and animal diseases.

**Unit.2 Basics of Biochemistry: (10 Hrs)**

- Vitamins & Enzyme mechanisms and kinetics
- Carbohydrates structure and function catabolism & anabolism
- Protein structure, amino acid metabolism
- Fatty acid catabolism, oxidation of fatty acid.
- Fatty acid anabolism, Cholesterol & its derivative

**Unit.3 Classical and Molecular genetics: (10 Hrs)**

- Problems on Mendelian principles & penetrance and expressivity
- linkage and crossing over, sex linkage
- Mutagen and mode of action, Genome organization, population genetics.
- Replication, Transcription & Translation
- Gene regulation in prokaryotes & eukaryotes

**Unit.4 Microbiolog, Immunology, Applied Biology (10 Hrs)**

- General character & classification of algae, fungi & bacteria,
- Antibiotics & mode of action, bacterial genetics, archaebacteria, virus,
- Type of immunity, cell & organ of immune system, Antigen and Antibody.
- MHC, compliment system, cytokine, hypersensitivity,Autoimmunity, HIV & other immunodeficiency.
- Vaccine production, Basics of cell culture methods for plants ,Basics of cell culture methods for animals, Transgenics, Molecular approaches to disease diagnosis

**Unit.5. Physical and Chemical Science (10 Hrs)**

- Motion, Work, Energy and Power, Thermodynamics,Gravitation, simple harmonic motion, Circular motion, Projectile Motion, Work, energy & power, Friction
- Optics & Dual Nature of Matter and Radiations, Electrostatics & Current electricity
- Magnetic Effects of Current ,Semiconductor Devices & logic gates
- Bonding, Periodic properties, Coordination compounds,Chemical equilibrium & kinetics, Acid-base concepts., Mechanism of organic reactions, Periodic properties
- Chemistry of Functional Groups, Important Aromatic hydrocarbons.

**Reference Books :**

- 1 Hopkins, W.G. and Huner, A. (2008). Introduction to Plant Physiology. 4th edition, John Wiley and Sons. U. S.A.
- 2 Gyton C. and Hall J.E. (2011) Textbook of Medical Physiology, 11<sup>th</sup> edition, Elsevier, USA.
- 3 Nelson, D. L., Lehninger, A. L., & Cox, M. M. (2008). *Lehninger principles of biochemistry*. Macmillan.
- 4 Odum, E.P. (2005). Fundamentals of ecology. 5<sup>th</sup> edition Cengage Learning India Pvt. Ltd., New Delhi.
- 5 Stryer, B. (1981). *Biochemistry*. San Francisco. WH Freeman and Co.
- 6 Nelson & Cox (2013) Lehninger. Principles of Biochemistry, 6th Edition, W. H. Freeman, USA
- 7 Voet & Voet (2011) Fundamentals of Biochemistry, 4<sup>th</sup> Edition, John Wiley & Sons, USA
- 8 Raghavan, V. (2000) Developmental Biology of Flowering plants, Springer, Netherlands
- 9 Cooper, G. M., & Hausman, R. E. (2000) The cell, Sunderland: Sinauer Associates.
- 10 Agarwal, R.S. (2013) Quantitative Aptitude for Competitive Examinations, 20th edition, S Chand.
- 11 Watson, J. D., Baker, T. A., Bell, S. B., Gann, A., Levine, M., & Losick, R. (2008). *Molecular biology of the gene*. 6<sup>th</sup> edn. New York: Pearson Education.
- 12 Brown, T. A. (2006). *Genomes*. Garland science
- 13 Wilson, K., & Walker, J. (2010). *Principles and Techniques of Biochemistry and Molecular Biology* (7<sup>th</sup> Edition). Cambridge University Press.
- 14 Abbas, A. K., Lichtman, A. H., & Pillai, S. (2014). Basic immunology: functions and disorders of the immune system. Elsevier Health Sciences.
- 15 Morrison R.T. (2010), Organic Chemistry, 7<sup>th</sup> edition, Pearson Education, USA.
- 16 Lee J.D. (2008) Concise Inorganic Chemistry, Oxford; Fifth edition
- 17 Verma H.C. (2015) Concepts of Physics, vol-1 & 2, Bharati Bhawan, India
- 18 Halliday, D., Resnick, R., Walker, J. (1960) Fundamental of Physics, John Wiley & Sons, Inc.

### **Guidelines for the completion of the Course:**

1. Minimum 80% attendance is required, if not able to fulfil it then only by the permission of Programme Coordinator and Principal will be allowed to compensate in the next year.
2. Only remarks will be given at the end of the course.
3. A separate certificate on completion of each course will be issued by the Controller of Examination.
4. Degree will be awarded only after receiving of the certificate.
5. In event of non-completion of course, the student has to re-do the course or opt for another one.

### **EVALUATION NORMS: Distribution of 100% CIA components:**

The course carries 1 credit and the students will be evaluated continuously based on their participation in learning experiences, theory, and evaluation through tests and assignments and will also be evaluated at the end of course under CEE ( Course End Exam) which will be 100% internal. The pattern of evaluation with percentage weightage will be as specified below:

**Distribution of Components of Exams:** 100 marks

Five Tests: 25 marks, Assignment: 25 marks, Attendance: 10 marks and CEE: 40 Marks

<b>Preparation for Competitive Exams for Academic Vertical Mobility in Life Science</b>					
<b>Sr.</b>	<b>Component</b>	<b>Content</b>	<b>Duration</b>	<b>Marks</b>	<b>Sub Total</b>
<b>Semester III</b>					
1.	Test-I (End of 1 <sup>st</sup> month)	1 <sup>st</sup> unit	01 hr	30 (set for 5)	5
2.	Test -II (End of 2 <sup>nd</sup> month )	2 <sup>nd</sup> unit	01 hr	30 (set for 5)	5
3	Test -III (End of 3 <sup>rd</sup> month)	3 <sup>rd</sup> unit	01 hr	30 (set for 5)	5
<b>Subtotal =</b>					<b>15</b>
<b>Semester IV</b>					
1.	Test -IV (End of 4 <sup>th</sup> month)	4 <sup>th</sup> unit	01 hr	30 (set for 5)	5
2.	Test -V (End of 5 <sup>th</sup> month )	5 <sup>th</sup> unit	01 hr	30 (set for 5)	5
3.	<b>Assignment-1</b> <b>Assignment-2</b>	Solving Competitive Exam paper  Concept mapping		10  15	<b>25</b>
	<b>Attendance</b>	Minimum 80%	Both semesters		<b>10</b>
<b>Subtotal=</b>					<b>45</b>
4.	<b>CEE</b>	All units	02 hrs	40	<b>40</b>
<b>Grand Total(15+10+ 40+25+10)=</b>					<b>100</b>

**Remarks:**

<b>Range of % Marks</b>	<b>Remarks</b>
90-100	Excellent
75-89	Very Good
60-74	Good
40-59	Fair
39- and below	Not Completed

<b>18AECO013</b>	<b>Biofertilizer</b>	<b>Duration 80 Hrs</b>	<b>01 Credit</b>
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### ELIGIBILITY

Any undergraduate student can opt for the course.

### DURATION OF THE COURSE

The course shall extend over a period of one year comprising of two semesters in one academic year.

### OBJECTIVES OF THE COURSE

To enable the students to

1. Generate self income
2. Perform sustainable agricultural practice
3. Manage soil health
4. Perform research for development of sustainable agriculture practice

### SCHEME OF INSTRUCTION AND EXAMINATIONS

Course Code	Course	Total Hrs of Instructions	Exam Duration Hrs	Marks allotted			Credit
				CIA	CIA	Total	
18AECO013	Biofertilizer	30 Hrs- Theory	01 Hr- Theory	30	20	50	01
		50 Hrs- Practical	02 Hrs- Practical	30	20	50	
		<b>80</b>		<b>60</b>	<b>40</b>	<b>100</b>	<b>01</b>

### STRUCTURE OF THE COURSE

#### SYLLABUS:

#### THEORY

##### Unit 1:

**(04 Hrs)**

- Soil and Plant nutrients
- Classification of nutrients
- Introduction of biofertilizers

- Benefits of biofertilizers

**Unit 2:** (05 Hrs)

- Classification of biofertilizers
- Selection of biofertilizers
- Steps involved in biofertilizer production
- Quality control of Biofertilizers

**Unit 3:** (06 Hrs)

- Introduction of compost
- Process of composting
- Vermi compost
- Advantage of compost

**Unit 4:** (08 Hrs)

- Types of Microbial biofertilizers
- Overview of Nitrogen fixation
- Overview of Phosphate solubilisation
- Concept of PGPR

**Unit 5:** (07 Hrs)

- Introduction of algae as biofertilizer
- Process overview of algal biomass induction
- VAM as Biofertilizer
- Methods for biofertilizers applications

**List of Practicals**

1. Introduction of laboratory glass wares and plastic wares.
2. Introduction of laboratory equipments.
  - a. Balance
  - b. Auto pipette
  - c. pH meter
  - d. Autoclave
  - e. Laminar Air flow
  - f. Microscope
  - g. Colony counter
  - h. Incubator
3. Soil nutrient analysis using flame photometer and AAS (Demonstration)
4. Safety rules and hygiene for microbiological laboratories.
5. Calculations for buffer and media/reagent preparation.
6. Preparation of media.
7. Specimen observation of important biofertilizer producing microorganisms

8. Estimation of IAA by suitable method.
9. Isolation of Azotobacter from soil
10. Isolation of Azospirillum from soil.
11. Isolation of Rhizobium from root-nodules.
12. Isolation of Phosphate solubilising bacteria from soil.
13. Production of Biofertilizers using nitrogen fixing isolates and packaging
14. Production of Biofertilizers using phosphate solubilising isolates and packaging
15. Isolation of VAM fungi from soil. (Demonstration).
16. Determination of heterocyst frequency of blue-green bacteria.
17. Microbial limit test for PSB market fertilizer product.
18. Testing of biofertilizer on seed germination.
19. Testing of biofertilizer on plant growth.
20. Visit to industry/farm/field/institute/laboratory.

**Text Books:**

1. Agriculture Microbiology–G. Rangaswami & D. J. Bagyaraj
2. Soil Microbiology by Subbarao.
3. Practical Microbiology–R. C. Dubey and D.K.Maheshwari
4. Biofertilizers –Arun Sharma.

**Reference Books:**

1. Agriculture Microbiology by Rangaswamy.
2. Biofertilizers –Vyas & Vyas (Ekta Publication).
3. Biotechnology–S. S. Purohit.
4. Text-book of Biotechnology–G.R.Chhatwal.
5. Experimental Microbiology–Rakesh J. Patel & Kiran R. Patel.(Vol.I&II)
6. Fertilizer Control Order–1985amended up to June, 201123.
7. Practical Biochemistry by Plummer.
8. Microbial technology by Pepler & Periman

**GUIDELINES FOR THE COMPLETION OF THE COURSE:**

1. Minimum 80% attendance is required, if not able to fulfil it then only by the permission of Programme Coordinator and Principal will be allowed to compensate in the next year.
2. Only remarks will be given at the end of the course.
3. A separate certificate on completion of each course will be issued by the CoE.
4. Degree will be awarded only after receiving of the certificate.
5. In event of non-completion of course, the student has to re-do the course or opt for another one.

**EVALUATION NORMS: Distribution of 100% CIA components:**



The course carries 1 credit and the students will be evaluated continuously based on their participation in learning experiences, theory, and evaluation through tests and assignments and will also be evaluated at the end of course under CEE ( Course End Exam) which will be 100% internal. The pattern of evaluation with percentage weight age will be as specified below:

**Distribution of 100% CIA components: Theory**

S. No.	Component	Content	Duration	Marks	Sub Total
1	Attendance	-	-	-	10
2	One Assignment	-	-	10	10
3	Test-I	Any 2 Units	1.5 Hrs	10 (set for 30)	10
4	Course End Exam	All 5 Units	02 Hrs	20 (set for 50)	20
<b>Grand Total</b>					<b>50 Marks</b>

**Distribution of 100% CIA components: Practical**

S. No.	Component	Content	Duration	Marks	Sub Total
1	Attendance	-	-	-	10
2	One Assignment	-	-	10	10
3	Test-I	50% of Experiments	02 Hrs	10 (set for 30)	10
4	Course End Exam	All experiments	03 Hrs	20 (set for 50)	20
<b>Grand Total</b>					<b>50 Marks</b>

**At the end of the course no marks are given, only remarks are given as follows:**

**REMARKS:**

Range of % Marks	Remarks
90-100	Excellent
75-89	Very Good
60-74	Good
40-59	Fair
39- and below	Not Completed

<b>18AECO014</b>	<b>Quantitative Aptitude &amp; Logical Reasoning for Government &amp; Bank Competitive Exams</b>	<b>Duration 160 Hrs</b>	<b>01 Credit</b>
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**Objectives: To enable the students to**

1. Create awareness among the youth of Saurashtra particularly from the deprived sections, about aims and objectives, procedures and relative advantages of various competitive examinations.
2. Inculcate in them the culture of serving the community and the nation.
3. Plan and conduct coaching and training programmes for successful participation in competitive examination.

### **SCHEME OF INSTRUCTION & EVALUATION**

<b>Course Code</b>	<b>Title</b>	<b>Total Hrs</b>	<b>Maximum marks</b>			<b>Credit</b>
			<b>CIA</b>	<b>CEE</b>	<b>Total</b>	
<b>16UAECO04</b>	<b>Quantitative Aptitude &amp; Logical Reasoning for Government &amp; Bank Competitive Exams</b>	<b>160</b>	<b>50</b>	<b>50</b>	<b>100</b>	<b>01</b>

### **STRUCTURE OF THE COURSE SYLLABUS**

**Unit.1 General Fundamentals of Mathematics for Competitive Exams : (15 Hrs)**

- Divisibility Test, Simplification, Division algorithm, unit digit in given number, cube root, cube, square root, square, relations of number, introduction to vedic mathematic techniques.

**Unit.2 Arithmetic : (65 Hrs)**

- HCF & LCM, Average, Percentage, Ratio & Proportion, Profit Loss & Discount, Partnership & Mixture, Simple & Compound Interest, Time Work & Distance, Area, Volume

**Unit.3 Algebra : (20 Hrs)**

- Permutation & Combination, Probability, Coordinate Geometry, Linear equation, Quadratic equation, Factorization, Polynomials

**Unit.4 Trigonometry & Geometry : (25 Hrs)**

- **Trigonometry:** Trigonometric Ratio and Identities, Trigonometric Functions & their Properties, Height and Distance
- **Geometry:** Angles & sides related properties, Theorems of Geometry, Properties of triangles, Similarity & Congruence related Postulates

**Unit.5 Reasoning : (35 Hrs)**

- **Verbal Reasoning :** Alphabet, Series, Analogy, Classification, Coding/Decoding, Blood relationship, Symbols & Notations, Distance & Direction, Ranking/Arrangement, Input, Syllogism, Problem solving, Cause & Effect, Assumption, Conclusions/ Inferences, Courses of Action. Data sufficiency, Data Analysis and Miscellaneous
- **Non - Verbal Reasoning:** Series, Analogy, Classification and Miscellaneous

**Practical:** Practice Session & Wkly Multiple objective test of 25 marks

**Reference Books:**

1. Quantitative aptitude by Agrawal R. S. , Publishers: S. Chand & Co., New Delhi
2. Objective Arithmetic by Rajesh Verma, Publishers: Arihant Publications (India) Ltd. , New Delhi
3. Quickwer Maths by M. Tyra, Publishers: BSC Publishing Co. Pvt. Ltd., Delhi
4. Analytical Reasoning by M K Pandey, Publishers: BSC Publishing Co. Pvt. Ltd., Delhi
5. Reasoning by Agrawal R. S , Publishers:Kiran Publication, New delhi.
6. Reasoning, Verbal, Non verbal & Analytical by B S Sijwali & Indu Sijwali Publishers: Arihant Publications (India) Ltd. , New Delhi

**Guidelines for the completion of the Course:**

1. Minimum 80% attendance is required, if not able to fulfil it then only by the permission of Programme Coordinator and Principal will be allowed to compensate in the next year.
2. Only remarks will be given at the end of the course.
3. A separate certificate on completion of each course will be issued by the CoE.
4. Degree will be awarded only after receiving of the certificate.
5. In event of non-completion of course, the student has to re-do the course or opt for another one.

**Evaluation Norms:**

The course carries 1 credit and the students will be evaluated continuously based on their participation in learning experiences, theory, and evaluation through tests and assignments and will also be evaluated at the end of course under CEE which will be 100% internal. The pattern of evaluation with percentage weightage will be as specified below:

**Distribution of 100% CIA components:**

S.N	Component	Content	Duration	Marks	Sub Total
1	Attendance	Theory: Min. 80%	For full 160 hrs course	10	10
		P Practice Session & Weekly Multiple objective test: At least 75% of tests to be attended			
2	Unit Test	Total 5 unit tests (at the end of each unit)	1 Hr each	each 06 (set for 30)	30
3	Assignment	Number will be decided by coordinator (as per batch)	-	10	10
4	Course End Exam (CEE)	Full syllabus	3 Hrs	50	50
				<b>Total</b>	<b>100</b>

At the end of the course no marks are given, only remarks are given as follows:

**Remarks:**

Range of % Marks	Remarks
90-100	Excellent
75-89	Very Good
60-74	Good
40-59	Fair
39- and below	Not Completed

<b>18AECO15</b>	<b>Treatment Of Environmental Waste</b>	<b>Duration 80 Hrs</b>	<b>01 Credit</b>
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**Objective: To enable the students to**

1. Gain insight into the design and recycling of municipal solid waste.
2. Understand various treatments for recycling of gas and wastewater for reuse and disposal.
3. Understand the design and operation of Plastic waste-to-energy facility.
4. Develop a basic knowledge about the E-waste recycling process.

### **SCHEME OF INSTRUCTION & EVALUATION**

Course Code	Title	Total Hrs	Maximum marks			Credit
			CIA	CEE	Total	
<b>18AECO015</b>	<b>TREATMENT OF ENVIRONMENTAL WASTE</b>	<b>80</b>	<b>50</b>	<b>50</b>	<b>100</b>	<b>01</b>

### **STRUCTURE OF THE COURSE SYLLABUS**

#### **Unit.1 Municipal Solid Waste Treatment :**

**(20 Hrs)**

- Definition of solid waste,
- waste generation,
- sources and types of solid waste
- sampling and characterization,
- Determination of composition of MSW, storage and handling of solid waste.
- Unit operations for separation and processing, Materials Recovery facilities,
- Waste transformation through combustion and aerobic composting, anaerobic methods for materials recovery and treatment.
- Energy recovery – Incinerators

#### **Unit.2 Waste Water Treatment :**

**(20 Hrs)**

- Sources and types of waste water.
- Physical, chemical and biological treatment of waste water:
- Primary treatment- sedimentation, primary clarifier, final clarifier, flocculation.
- Secondary treatment- Trickling filter, activated sludge process, biological tower, combined filtration and aeration process.
- Tertiary treatment - Chemical precipitation, Membrane filtration, Reverse osmosis, Ion exchange, Electro-dialysis and Effluent disinfections,

- Design aspects of effluent treatment plant (ETP),
- Concept, operation and maintenance of common effluent treatment plant (CETP).
- Reuse of treated water in industries, agriculture, oil refineries, thermal power stations and domestic uses.

### **Unit.3 Gas Treatment :**

**(10 Hrs)**

- Various sources of waste gases,
- Recovery of important gases CO<sub>2</sub>, SO<sub>2</sub>, NO etc.
- Recycling process: Electrostatic precipitation, bag filters, wet/dry grid arrestors.
- Absorption in liquids by Scrubbers, adsorption on solids.
- Combustion: flaring, thermal incineration, catalytic oxidation

### **Unit.4 Electronic Waste (E-Waste) Treatment :**

**(10 Hrs)**

- Sources of generation, categories, segregation, constituents of E-wastes,
- Collection and transport, recycling of e-waste and its environmental consequences,
- E-Waste (Handling and Management) Rules 2011.

### **Unit.5 Plastic Waste Treatment :**

**(20 Hrs)**

- Introduction to Plastic Waste,
- Sources, Separation processes: Primary recycling, secondary recycling, and tertiary recycling.
- Use of waste plastic as filler,
- Recycling of Various Plastics: HDPE, Acrylics, PET, PVC, Engg. Plastics, Medical Plastics.

### **Text Books :**

1. Reddy, M.A. (2010), *Text book of Environmental Science and Technology*. India: BS Publications.
2. Hammer, M. J. and Hammer M. J. Jr., (2002), *Water and Wastewater Technology-IV*. India: Prentice Hall of India.
3. Leidner, J., (2004), *Plastic waste: Recovery of Economic Value*. USA: Marcel Dekker Inc.

### **Reference Books :**

1. Dara, S. S., (2004). *A text book of Environmental Chemistry and Pollution Control*. India: S. Chand (G/L) & Company Ltd.
2. Rao, M. N., (1993). *Air pollution*. New York: McGraw Hill.
3. Kreith, F. and Tchobanoglous, G.(2002), *Handbook of Solid Waste Management*. New York: McGraw Hill Professional
4. Rao, M. N and Datta, A. K. (2012), *Wastewater Treatment*. New Delhi: IBH Publishing Company.

**Guidelines for the completion of the Course :**

1. Minimum 80% attendance is required, if not able to fulfil it then only by the permission of Programme Coordinator and Principal will be allowed to compensate in the next year.
2. Only remarks will be given at the end of the course.
3. A separate certificate on completion of each course will be issued by the CoE.
4. Degree will be awarded only after receiving of the certificate.
5. In event of non-completion of course, the student has to re-do the course or opt for another one.

**Evaluation Norms :**

*The course carries 1 credit and the students will be evaluated continuously based on their participation in learning experiences, theory, and evaluation through tests and assignments and will also be evaluated at the end of course under CEE which will be 100% internal. The pattern of evaluation with percentage weightage will be as specified below:*

**Distribution of 100% CIA components :**

Sr. No.	Component	Content	Marks	Sub Total
1.	Attendance	Min. 80 %	10	10
2.	Assignments	Two - Each of 10 Marks	10	20
3.	Test	First two units	20	20
4.	Course End Exam	Total syllabus Each Unit 10 Marks	50	50
<b>Total</b>			<b>100</b>	<b>100</b>

**Remarks:**

Range of % Marks	Remarks
90-100	Excellent
75-89	Very Good
60-74	Good
40-59	Fair
39- and below	Not Completed

<b>18AECO016</b>	<b>Quantitative Aptitude &amp; logical reasoning for industrial placement</b>	<b>Total Duration 80 hrs</b>	<b>1 Credit</b>
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**Objectives:-**

Upon completion of the course students will be able to

1. Understand the concepts of Quantitative Aptitude, mathematical logic and reasoning with emphasis on analytical ability and computational skill needed in for industrial placement.
2. Solve problems requiring Quantitative Aptitude & logical reasoning.
3. Perform well in competitive tests conducted for industrial placement.
4. Develop their critical thinking skills, professional skills, social skills and Corporate specific approaches.
5. Become an accomplished employee.

**UNIT I: COUNTING ABILITY**

**(17Hrs)**

- **Vedic Mathematics**
  - Number system
  - Simplification
  - Square roots & Cube roots
  - Mathematical operation tactics
  - Surds and Indices
- **Modern Mathematics**
  - Probability
  - Permutation and Combination
  - Applied Permutation and Combination
  - Set Theory
  - Progression

**UNIT II: ARITHMETICAL ABILITY**

**(17Hrs)**

- Averages and Ages
- Ratio and Proportion
- Percentage
- Profits and Loss
- Interests
- Time, Work and Remuneration
- Pipes and Cistern
- Speed, Time and Distance



### UNIT III: REASONING ABILITY

(16Hrs)

- **Analytical Reasoning**
  - Basic English
  - Coding and Decoding
  - Comparisons and Rankings
  - Seating Arrangement
  - Selection and Matching
  - Sequencing
  - Syllogism
- **Critical Reasoning**
  - Statement and Assumption
  - Statement and Conclusion
  - Statement and Strong/Weak Argument
  - Cause and Effects

### UNIT IV: ARITHMETICAL REASONING, GEOMETRY AND MENSURATION

(16Hrs)

- **Arithmetical reasoning**
  - Mathematical Puzzles
  - Calendar
  - Clock
  - Direction Sense
- **Geometry**
  - Lines and Angle
  - Triangle
  - Square
  - Circle
- **Menstruation**
  - Area
  - Volume

### UNIT V: CAPABILITIES

(14Hrs)

- **Intra-Personal Skills**
  - Self Awareness
  - Self Analysis and Assessment
  - Goal Setting

- Self Management
- Self Motivation
- Attitude
- Ethics and Values
- Study Skills/Habits etc.
- **Inter-Personal Skills**
  - Emotional Intelligence (Emotion Management)
  - Communication Skills(Presentation Skills)
  - Team Working Skill
  - Volunteerism
  - Problem Solving Skills/ Creativity Skills.
  - Decision Making Skill.
  - Time and Stress Management etc.
- **Case Studies**
  - Implementation of Whole Personality
- **Resume**

**TEXT BOOKS: -**

1. B.S.Sijiwali and InduSijiwali, (2014), *Non-Verbal Reasoning*, Arihant publication
2. B.S.Sijiwali and InduSijiwali, (2014), *Verbal & Analytical Reasoning*, Arihant publication.
3. Dr. R.S.Agarwal, (2017), *Quantitative Aptitude*, S.Chand publication.

**REFERENCE BOOKS:-**

1. B.S.Sijiwali and InduSijiwali, (2014), *A New Approach to reasoning*, Arihant publication
2. BrijeshTripathi, Dr. SatyajeetRawat and Neetika Goyal, (2012), *Pathfinder for CDS Examination*, Arihant publication.
3. Jaikishan and Preamkishan ,(2014), *How to Crack Test of Reasoning:in all Competative Exam*, Arihant publication.
5. Rajesh Varma, (2018), *Fast Track Objective Arithmetic*, Arihant publication.

**Evaluation norms for Co-Curricular Course-100% CIA**

- Only remarks will be given at the end of the course
- A separate certificate on completion of each course will be issued by the CoE

**100% CIA components**

S.N	Component	Content	Duration if any	Mark	Sub Total
1.	Attendance	Min. 80%	For full 80 Hrs. course	10	10
2.	Assignment	Two assignments each of 10 marks		10	20
3.	Test – I to V	Each test of 10 marks from each unit	-	10	50

4.	Test	Full syllabus of the theory	1 hour	20	20
<b>Total</b>					100

- All above are compulsory components
- In event of non-completion of course, the student has to re-do the course or opt for another one.

<b>18AECO017</b>	<b>E-Marketing</b>	<b>Duration 80 Hrs</b>	<b>01 Credit</b>
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### Objectives:

#### To enable the students to

1. Work with a general model of online marketing and place online marketing tools, instruments and theories into a broader theoretical model/framework
2. Understand what the importance is of online marketing and social media to contemporary marketing
3. Learn how to use the internet as a research method and learn and practice on how to publish information on the internet themselves
4. Learn how to advertise in websites
5. Understand how to generate revenue from advertisement

### SCHEME OF INSTRUCTION & EVALUATION

Course Code	Title	Total Hrs	Maximum marks			Credit
			CIA	CEE	Total	
<b>18AECO017</b>	<b>E-Marketing</b>	<b>80</b>	<b>60</b>	<b>40</b>	<b>100</b>	<b>01</b>

### STRUCTURE OF THE COURSE

#### SYLLABUS

#### **Unit.1 Overview of E-Marketing : (10 Hrs)**

- Introduction
- Objectives, Definition of e-marketing, features of e-marketing
- Scope and Benefits of e-marketing
- Problems in e-marketing
- E-marketing techniques
- Digital marketing and Internet Marketing

#### **Unit.2 Building Websites using Word press & Social Media Marketing : (20 Hrs)**

- Building websites for e-marketing
- Introduction & Installation of Word press
- Working with content
- Creating basic theme

- Creating Widgets and Plugins
- Introduction to Social Media
- Social Networking Platforms
- Blogging
- Micro blogging using twitter
- Facebook Marketing
- Youtube Marketing

**Unit.3 Search Engine Optimization :**

**(10 Hrs)**

- What is SEO
- What Is Search\_Marketing
- White Hat SEO
- What Is Black SEO
- Browser Addon
- SEO project management
- Determining Top Competitors
- Benchmarking Current Indexing Status
- Benchmarking Current Rankings
- Benchmarking Current Traffic Sources and Volume
- Conduct SEO/Website SWOT Analysis
- The Theory Behind Keyword Research
- Traditional Approaches: Domain Expertise
- Site Content Analysis
- Keyword Research Tools
- Google Tag Manager in detail with tagging

**Unit.4 Analytics Using Webmaster Tools :**

**(20 Hrs)**

- Webmaster Tools (Google, Bing)
- Google AdSense
- Understanding Google AdSense,
- Configuring your First Add,
- Using Advance Add Placement Strategy,
- Allowing and Blocking Ads, Using Performance Report,
- Advanced Administration(Accessing Messages, Reviewing Payment Setting)

**Unit .5 Other E-marketing Techniques :**

**(20 Hrs)**

- E-mail marketing

- Google Site(site.google)
- Google Adword
- Exploring where ads show up
- Understanding the structure
- Creating an account
- Choosing between billing options, Starting Your First Campaign,

**Reference Books :**

1. *Lorrie Thomas*, 2011, **The McGraw-Hill 36-Hour Course: Online Marketing**, McGraw-Hill Education
2. *Stephanie Leary*, 2010, **Beginning WordPress 3**, Apress
3. *Dan Zarrella*, 2009, **The Social Media Marketing Book**, O'Reilly Media
4. *Eric Enge, Stephan Spencer, Rand Fishkin, Jessie C Stricchiola*, 2009 , **The Art of SEO : Mastering Search Engine Optimization**, O'Reilly Media
5. *Jerri L. Ledford*, 2009, **SEO: Search Engine Optimization Bible [2nd Edition]**, Wiley India

**Guidelines for the completion of the Course :**

1. Minimum 80% attendance is required, if not able to fulfil it then only by the permission of Programme Coordinator and Principal will be allowed to compensate in the next year.
2. Only remarks will be given at the end of the course.
3. A separate certificate on completion of each course will be issued by the CoE.
4. Degree will be awarded only after receiving of the certificate.
5. In event of non-completion of course, the student has to re-do the course or opt for another one.

**Evaluation Norms :**

*The course carries 1 credit and the students will be evaluated continuously based on their participation in learning experiences, theory, and evaluation through tests and assignments and will also be evaluated at the end of course under CEE which will be 100% internal. The pattern of evaluation with percentage weightage will be as specified below:*

**Distribution of 100% CIA components: Theory**

S. No.	Component	Content	Duration	Marks	Sub Total
a)	Two Assignments	-	-	10 each	20
b)	Test-I	Any 2 Units	1.5 Hrs	10 (set for 30)	10
c)	Course End Exam	All 5 Units	02 Hrs	20 (set for 50)	20
<b>Grand Total</b>					<b>50 Marks</b>

**Distribution of 100% CIA components: Practical**

<b>r. No.</b>	<b>Component</b>	<b>Content</b>	<b>Duration</b>	<b>Marks</b>	<b>Sub Total</b>
a)	Two Assignments	-	-	10 each	20
b)	Test-I	50% of Experiments	02 Hrs	10 (set for 30)	10
c)	Course End Exam	All experiments	03 Hrs	20 (set for 50)	20
<b>Grand Total</b>					<b>50 Marks</b>

**Remarks :**

<b>Range of % Marks</b>	<b>Remarks</b>
90-100	Excellent
75-89	Very Good
60-74	Good
40-59	Fair
39- and below	Not Completed

<b>18AECO018</b>	<b>Web Designing</b>	<b>Duration 100 Hrs</b>	<b>01 Credit</b>
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### **ELIGIBILITY**

Any undergraduate student can opt for the course.

### **DURATION OF THE COURSE**

The course shall extend over a period of one year comprising of two semesters in one academic year.

### **OBJECTIVES OF THE COURSE:**

To enable the students to

1. Understand the principles of effective, dynamic and interactive web page designing.
2. Understand the graphic design principles that relate to web design and learn how to implement these theories into practice.
3. Develop skills of analyzing the usability of a web site.
4. Learn the language of the web: HTML and CSS.
5. Practice of JavaScript to enhance HTML documents dynamically.

### **SCHEME OF INSTRUCTION AND EXAMINATION**

Course Code	Course	Total Hrs of Instructions	Exam Duration Hrs	Marks allotted			Credit
				CIA	CEE	Total	
<b>18AECO018</b>	<b>Web Designing</b>	75 Theory 25 Hrs Practical	01 Hr Theory 02 Hrs- Practical	60	40	100	01
		<b>100</b>		<b>60</b>	<b>40</b>	<b>100</b>	<b>01</b>

**CIA: Continuous Internal Assessment      &      CEE: Course End Exam**



## STRUCTURE OF THE COURSE

### SYLLABUS

#### **Unit - 1 Introduction (20 Hrs)**

- Introduction to Internet
- What is HTML, Block Structure of HTML
- Basic tags : Texts formatting, Line breaks, Link, Color, Image, List creation, Table

#### **Unit - 2 Introduction of Frame & Form (10 Hrs)**

- Use of Frame Tags
- HTML multimedia: HTML Plug-in, HTML Audio, HTML Video
- HTML FORM: Controls of Forms
- Introduction to HTML 5.

#### **Unit - 3 Introduction of CSS (20 Hrs)**

- Use of CSS, Types of CSS, Creating class and id.
- CSS Properties: Background, Text, Font, Table, Border, Margin, Padding, Align, Image property.
- Page layouts: Use of DIV and SPAN tag. Introduction to DHTML

#### **Unit - 4 Introduction to Javascript (15 Hrs)**

- Use of scripting language, difference between client side script and server side script,
- Javascript syntax, variables, Operators
- Control structures: Control statements, Looping statements, Sequential statements, Use of Dialog boxes, User defined functions, Built-in objects and properties: Number, Date, Math, String, Array. Browser Objects: History, Window, Location, Built-in functions

#### **Unit - 5 Use of Events (10 Hrs)**

- Mouse events, Keyboard events, Timer events, other events
- Javascript DOM: Methods and Properties.
- Error handling: throw and try catch block

### **Text Books**

1. *Ivan Bayross, 2009, Web Enabled Commercial Application Development Using HTML, JavaScript, DHTML and PHP (English) [Fourth Edition], Published by BPB Publications, New Delhi. (UNIT 1 to 5)*

### **Reference Books**

1. *Kogent Learning Solutions*, 2015, **Web Technologies HTML, Javascript, PHP, Java, JSP, ASP.NET, XML and AJAX Black Book**, Dreamtech Press, New Delhi
2. *Danny Goodman, Michael Morrison, Paul Novitski, Tia Gustaff Rayl*, 2010, **JavaScript Bible**, [Seventh Edition] Wiley Inc. IN

#### **GUIDELINES FOR THE COMPLETION OF THE COURSE:**

1. Minimum 80% attendance is required, if not able to fulfil it then only by the permission of Programme Coordinator and Principal will be allowed to compensate in the next year.
2. Only remarks will be given at the end of the course.
3. A separate certificate on completion of each course will be issued by the Controller of Examination.
4. Degree will be awarded only after receiving of the certificate.
5. In event of non-completion of course, the student has to re-do the course or opt for another one.

#### **EVALUATION NORMS: Distribution of 100% CIA components:**

*The course carries 1 credit and the students will be evaluated continuously based on their participation in learning experiences, theory, and evaluation through tests and assignments and will also be evaluated at the end of course under CEE ( Course End Exam) which will be 100% internal. The pattern of evaluation with percentage weightage will be as specified below:*

#### **Distribution of 100% CIA components: Theory**

<b>S. No.</b>	<b>Component</b>	<b>Content</b>	<b>Duration</b>	<b>Marks</b>	<b>Sub Total</b>
a)	Attendance	-	-	-	10
b)	One Assignment	-	-	10	10
c)	Test-I	Any 2 Units	1.5 Hrs	10 (set for 30)	10
d)	Course End	All 5 Units	02 Hrs	20 (set for 50)	20
<b>Grand Total</b>					<b>50 Marks</b>

#### **Distribution of 100% CIA components: Practical**

<b>S. No.</b>	<b>Component</b>	<b>Content</b>	<b>Duration</b>	<b>Marks</b>	<b>Sub Total</b>
a)	Attendance	-	-	-	10
b)	One Assignment	-	-	10	10
c)	Test-I	50% of Experiments	02 Hrs	10 (set for 30)	10
d)	Course End	All experiments	03 Hrs	20 (set for 50)	20
<b>Grand Total</b>					<b>50 Marks</b>

**At the end of the course no marks are given, only remarks are given as follows:**

**REMARKS:**

<b>18AECO019</b>	<b>General Awareness</b>	<b>Self study</b>	<b>01 Credit</b>
	<b>Range of % Marks</b>	<b>Remarks</b>	
	90-100	Excellent	
	75-89	Very Good	
	60-74	Good	
	40-59	Fair	
	39- and below	Not Completed	

### **OBJECTIVES OF THE PROGRAMME:**

**To enable the students to**

1. Get trained in General Awareness for the various levels of competitive examinations.
2. Have latest information about the concepts of different fields
3. Be updated on several common fields.

### **SYLLABUS**

**Entire content is classified into following categories:**

<b>Sr. No.</b>	<b>Category</b>	<b>Number of Questions per Category</b>
1	Science	500
2	History and Culture	250
3	Sports (Global, National)	250
4	Current Affairs	250
5	Civic and Social Reforms, Constitution	250
6	Geography	250
7	Literary Works	250

The content of the above categories is in the form of Multiple Choice Questions (MCQ). Care has been taken to see that the stem is prepared correctly with proper distracters. The number of distracters for each question is three and the fourth would be the correct answer.

The MCQs are in English and also translated into Gujarati. The purpose of dual language of MCQs is to prepare students to appear for competitive examinations at global, national, and state levels.

The material for the study would be available for the students in the form of a book, or as a soft copy.

### **Blue print of question paper and evaluation**

Every student registered for the course would prepare for the examination through self study. There would be no Continuous Internal Assessment (CIA). The student would appear only for the Course End computer based examination.

- Duration of exam - 60 minutes
- Number of questions - 100 MCQs
- Marks per question - 1 Mark
- Total marks of CEE - 100

Supplementary examinations would be conducted depending upon the requirements from time to time.

**At the end of the course no marks are given, only remarks are given as follows:**

#### **Remarks:**

<b>Range of % Marks</b>	<b>Remarks</b>
90-100	Excellent
75-89	Very Good
60-74	Good
40-59	Fair
39- and below	Not Completed

<b>18AECO020</b>	<b>Network Administration</b>	<b>Duration 80hrs</b>	<b>1 Credit</b>
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## ELIGIBILITY

Any undergraduate student with basic Knowledge of Networking can opt for the course.

## DURATION OF THE COURSE

The course shall extend over a period of one year comprising of two semesters in one academic year.

## Objectives:

To enable the students to

1. Understand basic concepts of network
2. Understand how network works
3. Understand requirements and importance of different transmission media
4. Understand role of different network devices
5. Install and configure server
6. Learn different network simulator tools
7. Learn to simulate and monitor network using tools
8. Learn to configure the basic server and DNS in detail with implementation

## SCHEME OF INSTRUCTION AND EXAMINATION

Course Code	Course	Total Hrs of Instructions	Exam Duration Hrs	Marks allotted			Credit
				CIA	CEE	Total	
<b>18AECO020</b>	<b>Network Administration</b>	75 Theory 25 Hrs Practical	01 Hr Theory 02 Hrs- Practical	60	40	100	01
		<b>100</b>		<b>60</b>	<b>40</b>	<b>100</b>	<b>01</b>

**CIA: Continuous Internal Assessment & CEE: Course End Exam**

## **STRUCTURE OF THE COURSE**

### **SYLLABUS:**

#### **Unit -1 Basics of Network & Transmission media (10 hrs)**

- Network concepts
  - What is network, Network model-Peer to peer, Client-server
- Network Services- File service, Print service, Communication service, Database service, Security service, Application service
- Network models and LAN sharing
  - OSI reference model
  - Disk quota, compression, mapping of network drive, File and print sharing
- Network Cable
  - Guided media
  - Unguided media

#### **Unit – 2 Network Devices Switching concepts (10 hrs)**

- Network devices
  - LAN card, MODEM, DSL & ADSL, HUB (Active, passive and smart), Repeater, switch, bridge, router, Wireless switch, wireless router, access point
- Switching technology
  - Circuit switching, Message switching, Packet switching

#### **Unit – 3 Network devices, Protocols and Simulators Tools (20 hrs)**

- Protocols
  - HTTP, FTP, SMTP, POP3, TCP /IP
- IP addressing
  - IPv4 with class structure
  - Migration from IPv4 to IPv6
- Network Monitoring Tools (Online/ Offline)
  - WireShark
  - OpenNMS
  - Zenoss Core etc
  - Monitor Network performance

#### **Unit – 4 Server Administration (20 hrs)**

- Installation of Server
- Installation and configuration of Active Directory

- Active Directory Installation & Configuration
- Securing active directory domain services
- Domains, Trees, Forests concept
- Accounts(User, Group,Computer)
- Policy (Security and audit)
- Logging Events
- Creating network drive
- DNS & Installing DNS

### **Unit – 5 Network Administration, Configuration & Troubleshooting**

**(20 hrs)**

- Network Simulation Tools details
- Network Simulation applications(Using Tool)
  - Basic router setup
  - Setting up router name and password
  - Basic switch setup
  - Switch configuration
  - Setting up telnet
  - Interfaces Configuration
  - VLAN & VTP setup

### **Reference Books**

1. *Glenn Berg*, 1998, **MCSE Networking Essential**, Glenn Berg Tech. Media
2. *Behrouz A. Forouzan*, 2006, **Data Communication and Networking (SIE)**, McGraw-Hill
3. *Andrew S. Tanenbaum*, 2002, **Computer Networks** [Fourth Edition], Pearson Publication

### **GUIDELINES FOR THE COMPLETION OF THE COURSE:**

1. Minimum 80% attendance is required, if not able to fulfil it then only by the permission of Programme Coordinator and Principal will be allowed to compensate in the next year.
2. Only remarks will be given at the end of the course.
3. A separate certificate on completion of each course will be issued by the CoE.
4. Degree will be awarded only after receiving of the certificate.
5. In event of non-completion of course, the student has to re-do the course or opt for another one.

### **EVALUATION NORMS: Distribution of 100% CIA components:**

The course carries 1 credit and the students will be evaluated continuously based on their participation in learning experiences, theory, and evaluation through tests and assignments and will also be evaluated at the end of course under CEE ( Course End Exam) which will be 100% internal.

**Distribution of 100% CIA components: Theory**

S. No.	Component	Content	Duration	Marks	Sub Total
a)	Attendance	-	-	-	10
b)	One Assignment	-	-	10	10
c)	Test-I	Any 2 Units	1.5 Hrs	10 (set for 30)	10
d)	Course End	All 5 Units	02 Hrs	20 (set for 50)	20
<b>Grand Total</b>					<b>50 Marks</b>

**Distribution of 100% CIA components: Practical**

S. No.	Component	Content	Duration	Marks	Sub Total
a)	Attendance	-	-	-	10
b)	One Assignment	-	-	10	10
c)	Test-I	50% of Experiments	02 Hrs	10 (set for 30)	10
d)	Course End	All experiments	03 Hrs	20 (set for 50)	20
<b>Grand Total</b>					<b>50 Marks</b>

At the end of the course no marks are given, only remarks are given as follows:

**REMARKS:**

Range of % Marks	Remarks
90-100	Excellent
75-89	Very Good
60-74	Good
40-59	Fair
39- and below	Not Completed



<b>18AECO021</b>	<b>Basic Programming with Python</b>	<b>Duration 80 hrs</b>	<b>1 Credit</b>
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## ELIGIBILITY

Any undergraduate student with basic understanding of programming can opt for the course.

## DURATION OF THE COURSE

The course shall extend over a period of one year comprising of two semesters in one academic year.

## Objectives:

To enable the students to

1. Develop a basic understanding of Python programming language.
2. To acquire core programming skills in Python.
3. To learn how to design object-oriented programs with Python classes.
4. To be able to perform various operations on file.
5. Create console-based applications using python.

## SCHEME OF INSTRUCTION & EVALUATION

Course Code	Title	Total Hrs	Maximum marks			Credit
			CIA	CEE	Total	
<b>18AECO021</b>	<b>Basic Programming with Python</b>	<b>80</b>	<b>60</b>	<b>40</b>	<b>100</b>	<b>01</b>

## STRUCTURE OF THE COURSE

### SYLLABUS:

#### Unit -1 Introduction to Python

(20hrs)

- **Introduction**
  - What is programming?
  - what kinds of things can programmers build?
  - History
  - Features
  - Installing python
  - Setting up path

- Working with Python
- Executing program
- Garbage collection
- Basic Syntax
- Variable and Data Types

## **Unit -2 Data Types, Condition Statements**

**(16hrs)**

- **Data types**
  - Comments
  - Built-In Data Types
  - Sequences
  - Sets
  - Literals
  - User-Defined Data Types
  - Constants
  - Identifiers
  - Reserved Words
  - Naming Convention
- **Conditional Statements**
  - If
  - If-else
  - Nested if-else

## **Unit - 3 Looping, Control Structure and Array**

**(20hrs)**

- **Looping**
  - For
  - While
  - Nested loops
- **Control Statements**
  - Break
  - Continue
  - Pass
- **Array:**
  - Creating,
  - Importing,
  - Index,
  - Processing,
  - Types Of Array,
  - Different Ways Of Creating Array,
  - Operations On Array,

- Attributes Of An Array,
- Operations On Array – Indexing, Slicing.

#### **Unit - 4 String, List, Tuple and Dictionary**

**(22hrs)**

- **String**
  - Creating Strings and operations with strings
  - Characters
  - String slices
- **List**
  - Accessing list
  - Operations
  - Working with lists
- **Tuple**
  - Accessing Tuple
  - Operations
  - Working with lists
  - Function and Methods
- **Dictionary**
  - Accessing values in dictionaries
  - Working with dictionaries
  - Properties
  - Functions

#### **Unit - 5 Function, File Handling and Object oriented programming**

**(22hrs)**

- **Function**
  - Defining a function
  - Calling a function
  - Types of functions
  - Function Arguments
- **File Handling**
  - Types of files,
  - Opening and closing,
  - Working with text files,
  - Various operations with files,
- **Object oriented programming**
  - Introduction To Oops,
  - Basic Principal Of Oop
  - Problems In Procedure-Oriented Approach,
  - Classes And Objects

## Reference books

1. Dr. R. NageswaraRao – 2017, *Core Python Programming* by Edition, Dreamtech Press
2. Kenneth A. Lambert, *Fundamentals of Python – First Programs*, CENGAGE publication.
3. John V Guttag, *Introduction to Computation and Programming Using Python* , PHI publication
4. Laura Cassell, *Python Projects*, WROX
5. Magnus Lie Hetland, *Beginning Python from Novice to Professional*, by APress

## GUIDELINES FOR THE COMPLETION OF THE COURSE:

1. Minimum 80% attendance is required, if not able to fulfil it then only by the permission of Programme Coordinator and Principal will be allowed to compensate in the next year.
2. Only remarks will be given at the end of the course.
3. A separate certificate on completion of each course will be issued by the Controller of Examination.
4. Degree will be awarded only after receiving of the certificate.
5. In event of non-completion of course, the student has to re-do the course or opt for another one.

## EVALUATION NORMS: Distribution of 100% CIA components:

*The course carries 1 credit and the students will be evaluated continuously based on their participation in learning experiences, theory, and evaluation through tests and assignments and will also be evaluated at the end of course under CEE ( Course End Exam) which will be 100% internal. The pattern of evaluation with percentage weightage will be as specified below:*

### Distribution of 100% CIA components: Theory

S. No.	Component	Content	Duration	Marks	Sub Total
a)	Attendance	-	-	-	10
b)	One Assignment	-	-	10	10
c)	Test-I	Any 2 Units	1.5 Hrs	10 (set for 30)	10
d)	Course End	All 5 Units	02 Hrs	20 (set for 50)	20
<b>Grand Total</b>					<b>50 Marks</b>

### Distribution of 100% CIA components: Practical

S. No.	Component	Content	Duration	Marks	Sub Total
a)	Attendance	-	-	-	10
b)	One Assignment	-	-	10	10
c)	Test-I	50% of Experiments	02 Hrs	10 (set for 30)	10
d)	Course End	All experiments	03 Hrs	20 (set for 50)	20
<b>Grand Total</b>					<b>50 Marks</b>

**At the end of the course no marks are given, only remarks are given as follows:**

### REMARKS:

Range of % Marks	Remarks
90-100	Excellent
75-89	Very Good
60-74	Good
40-59	Fair
39- and below	Not Completed

<b>18AECO022</b>	<b>Tech. Implementer and Trouble-shooter</b>	<b>Duration 80 hrs</b>	<b>1 Credit</b>
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### **ELIGIBILITY**

Any undergraduate student with basic understanding of programming can opt for the course.

### **DURATION OF THE COURSE**

The course shall extend over a period of one year comprising of two semesters in one academic year.

### **Objectives:**

To enable the students to

1. Understand the application testing.
2. Understand the Testing In Terms Of Bugs & Requirement.
3. Applying Test cases & test report.
4. Understand the Configuration And Implementation.
5. Creating an application real-time project

### **SCHEME OF INSTRUCTION & EVALUATION**

<b>Course Code</b>	<b>Title</b>	<b>Total Hrs</b>	<b>Maximum marks</b>			<b>Credit</b>
			<b>CIA</b>	<b>CEE</b>	<b>Total</b>	
<b>18AECO022</b>	<b>Tech. Implementer and Trouble-shooter</b>	<b>80</b>	<b>60</b>	<b>40</b>	<b>100</b>	<b>01</b>

### **STRUCTURE OF THE COURSE**

### **SYLLABUS:**

#### **Unit -1 Application Understanding, Testing, Testing In Terms of Bug & Requirement**

**(14 hrs)**

- **Introduction**
  - Brief about Application
- **Detail About Application**

- Domain Knowledge
- Functional Scope of Application
- System Requirement of Application
- **Testing in Terms of Bug**
  - Introduction
  - Defect/Bug Life cycle in Application Testing
  - Bug Testing Tools
  - Bug Testing Methods
  - Negative data Testing
- **Testing in Terms of Requirement**
  - Introduction
  - Requirement Analysis
  - Data testing in terms of Requirement
  - Testing with Positive required data

## **Unit – 2 Test Cases & Test Report**

**(18 hrs)**

- **Introduction**
  - Brief about the Unit
- **Different type of Test Cases**
  - Functionality Test Case
  - Integration Test Case
  - Performance Test Case
  - Database Test Case
  - Security Test Case
  - User Acceptance Test Case
- **Different Testing Types**
  - Unit Testing
  - Integration Testing
  - System Testing
  - Smoke Testing
  - Interface Testing
  - Regression Testing
  - Beta/Acceptance Testing
- **Test Report**
  - Analysis of Test Result
  - Formation of Test Report Document
  - Document Testing in terms of Report Layout, Title of Report, Logo, Header Footer Formation, Page Numbering Formation etc.

### **Unit – 3 Configuration and Implementation**

**(16 hrs)**

- **Introduction**
  - Brief about Configuration of Admin
- **Implementation**
  - Apply Configuration to System
  - Report update and system changes
  - Coordination between tech team and client
  - Understanding of client needs
  - Data migration

### **Unit – 4 Training & Troubleshoot**

**(16 hrs)**

- **Introduction**
  - Brief about Configuration of Admin
- **Roles & Responsibilities**
  - User Training
  - Start an internal user group & Plan
  - Leverage existing resources
  - Technical & Application Support
  - Capture the Knowledge
  - Project Management
  - Gap Finding
  - Logical Update and Troubleshoot

### **Unit – 5 Project**

**(16 hrs)**

- **Mini Project of Industry**

### **Reference Book**

1. Bret Pettichord, CemKaner, and James Marcus Bach (2001), *Lessons Learned in Software Testing* Foundations of Software Testing: ISTQB Certification | Book by Dorothy Graham
2. Boris Beizer (1983), *Software Testing Techniques*
3. CemKaner, Hung Q Nguyen, and Jack Falk, 1988, *Testing Computer Software*

### **GUIDELINES FOR THE COMPLETION OF THE COURSE:**

1. Minimum 80% attendance is required, if not able to fulfil it then only by the permission of Programme Coordinator and Principal will be allowed to compensate in the next year.
2. Only remarks will be given at the end of the course.
3. A separate certificate on completion of each course will be issued by the Controller of Examination.
4. Degree will be awarded only after receiving of the certificate.



5. In event of non-completion of course, the student has to re-do the course or opt for another one.

**EVALUATION NORMS: Distribution of 100% CIA components:**

*The course carries 1 credit and the students will be evaluated continuously based on their participation in learning experiences, theory, and evaluation through tests and assignments and will also be evaluated at the end of course under CEE ( Course End Exam) which will be 100% internal. The pattern of evaluation with percentage weightage will be as specified below:*

**Distribution of 100% CIA components: Theory**

S. No.	Component	Content	Duration	Marks	Sub Total
a)	Attendance	-	-	-	10
b)	One Assignment	-	-	10	10
c)	Test-I	Any 2 Units	1.5 Hrs	10 (set for 30)	10
d)	Course End	All 5 Units	02 Hrs	20 (set for 50)	20
<b>Grand Total</b>					<b>50 Marks</b>

**Distribution of 100% CIA components: Practical**

S. No.	Component	Content	Duration	Marks	Sub Total
a)	Attendance	-	-	-	10
b)	One Assignment	-	-	10	10
c)	Test-I	50% of Experiments	02 Hrs	10 (set for 30)	10
d)	Course End	All experiments	03 Hrs	20 (set for 50)	20
<b>Grand Total</b>					<b>50 Marks</b>

**At the end of the course no marks are given, only remarks are given as follows:**

**REMARKS:**

Range of % Marks	Remarks
90-100	Excellent
75-89	Very Good
60-74	Good
40-59	Fair
39- and below	Not Completed

<b>18AECO023</b>	<b>Instrument calibration &amp; Maintenance</b>	<b>Duration 80 Hrs</b>	<b>01 Credits</b>
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**Objectives:**

1. To familiarize the students with different instruments like spectrophotometer, Audio Frequency oscillators, PH meter, PCR machine, Incubator. Conductivity meter, Polari meter etc.
2. To understand importance of calibration for measuring instruments.
3. To develop understanding among the students for the functioning and applications of the various instruments.

**SCHEME OF INSTRUCTION AND EXAMINATIONS**

Course Code	Course	Total Hrs of Instructions	Exam Duration Hrs	Marks allotted			
				CIA	CEE	Total	
<b>18AECO023</b>	<b>Instrument calibration &amp; Maintenance</b>	Practical are designed with each theory session	01 Hr- Theory	30			01
			02 Hrs- Practical	30			
		<b>80</b>		<b>60</b>	<b>40</b>	<b>100</b>	<b>01</b>

**CIA: Continuous Internal Assessment & CEE: Course End Exam**

**UNIT 1 : Spectrophotometer (05 HRS)**

- Introduction to spectrophotometer and types of spectrophotometer
- Calibration requirements, Types of Calibration
- Maintenance
- Spectrophotometer applications, Structure identification
- To study rate of reaction, Determination of dissociation constant

**UNIT 2 : AUDIO FREQUENCY OSCILLATORS (AFO) (05 HRS)**

- Introduction, Principle and working AFO

- Types of audio frequency oscillators, Calibration methods
- Specification of AFO, Frequency range, Control, Accuracy
- Distortion and noise level, Synchronization
- Applications of AFO

### **UNIT 3 : INCUBATOR**

**(05 HRS)**

- Introduction, Principle and working, Calibration methods
- Quality control and maintenance
- Applications, Growth and storage of bacterial cultures, Biochemical and haematological studies
- Pharmaceutical work and food analysis, Genetic engineering
- To create new organism, To make insulin and other essential biological proteins, to improve nutritional content of fruits.

### **UNIT 4 : PCR MACHINE**

**(05 HRS)**

- Introduction, Construction and working
- Calibration methods, maintenance
- Sample Acquisition and Preparation
- Applications of PCR machine genetic testing, Prenatal testing
- Forensic applications, to understand genetic fingerprinting

### **UNIT 5 : PH METER**

**(05 HRS)**

- Introduction, construction and working
- Calibration and maintenance
- Types of PH meter
- Application of PH meter, Chemical laboratory work
- Soil measurement in agriculture, measurement of water quality for water supply system

### **UNIT 6 : Digital Potentio Meter**

**(05 HRS)**

- Introduction, construction and working
- Calibration and maintenance
- Stability, Precision and accuracy in digital potentio meter
- Application of digital potentio meter, Chemical laboratory work
- Computer connectivity and software understanding

**UNIT 7 : Digital Conductivity Meter****(05 HRS)**

- Introduction, construction and working
- Calibration and maintenance
- Auto temperature in conductivity meter
- Application of digital conductivity meter, Chemical laboratory work
- Computer connectivity and software understanding

**UNIT 8 : Digital Polari Meter****(05 HRS)**

- Introduction, construction and working
- Calibration and maintenance
- Application of Polari meter, Chemical laboratory work
- Computer connectivity and software understanding

**Reference Books:**

1. J Michael Hollas, Modern Spectroscopy, Wiley publication.
2. John H Moore, Building Scientific instruments, Cambridge university press.
3. Degen, PCR applications manuals 3rd edition.
4. Stephen A Busin, A to Z of Quantitative PCR , Intl Univ line

**List of Experiments:**

- Calibration of PH meter
- Maintenance and calibration of polarimeter
- Maintenance and calibration of Microscopes
- Maintenance of Air oven
- Maintenance and calibration of Ultrasonic non-destructive tester

**GUIDELINES FOR THE COMPLETION OF THE COURSE:**

1. Minimum 80% attendance is required, if not able to fulfil it then only by the permission of Programme Coordinator and Principal will be allowed to compensate in the next year.
2. Only remarks will be given at the end of the course.
3. A separate certificate on completion of each course will be issued by the CoE.
4. Degree will be awarded only after receiving of the certificate.
5. In event of non-completion of course, the student has to re-do the course or opt for another one.

## EVALUATION NORMS:

### Distribution of 100% CIA components:

The course carries 1 credit and the students will be evaluated continuously based on their participation in learning experiences, theory, and evaluation through tests and assignments and will also be evaluated at the end of course under CEE ( Course End Exam) which will be 100% internal. The pattern of evaluation with percentage weightage will be as specified below:

### Distribution of 100% CIA components: Theory

S. No.	Component	Content	Duration	Marks	Sub Total
a)	Attendance	-	-	-	10
b)	One Assignment	-	-	10	10
c)	Test-I (in Sem III, , before Second internal)	Units from SEM-III	1.5 Hrs	10 (set for 30)	10
d)	Course End (Exam in Sem IV , before Second internal)	All Units	02 Hrs	20 (set for 50)	20
<b>Grand Total</b>					<b>50 Marks</b>

### Distribution of 100% CIA components: Practical

Sr. No.	Component	Content	Duration	Marks	Sub Total
a)	Attendance	-	-	-	10
b)	One Assignment	-	-	10	10
c)	Test-I (in Sem III, , before Second internal)	50% of Experiments	02 Hrs	10 (set for 30)	10
d)	Course End (Exam in Sem IV , before Second internal)	All experiments	03 Hrs	20 (set for 50)	20

<b>Grand Total</b>	<b>50 Marks</b>
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**At the end of the course no marks are given, only remarks are given as follows:**

**REMARKS:**

<b>Range of % Marks</b>	<b>Remarks</b>
90-100	Excellent
75-89	Very Good
60-74	Good
40-59	Fair
39- and below	Not Completed

<b>18AECO024</b>	<b>Yogic Science</b>	<b>Duration 80 Hrs</b>	<b>01 Credits</b>
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### **ELIGIBILITY**

Any undergraduate student can opt for the course.

### **DURATION OF THE COURSE**

The course shall extend over a period of one year comprising of two semesters in one academic year.

### **OBJECTIVES OF THE COURSE :**

1. To have good health.
2. To practice mental hygiene.
3. To possess emotional stability.
4. To integrate moral values.
5. To attain higher level of consciousness.

### **SCHEME OF INSTRUCTION & EVALUATION**

Course code	Title	Total Hrs.	Maximum marks			Credit
			CIA	CEE	TOTAL	
18AECO024	Yogic Science	80 hours	60	40	100	01

### **STRUCTURE OF THE COURSE**

#### **Syllabus**

#### **Unit 1: Foundations of Yoga: History, Evolution of Yoga and Schools of Yoga (6 Hrs)**

- Origin of Yoga, History and Development of Yoga
- Misconceptions
- Aim and Objectives of Yoga
- True Nature and Principles of Yoga
- Introduction to Schools (Streams)of Yoga

#### **Unit 2: Yoga and Health**

**(12 Hrs)**

- Definition & Importance of Health According to WHO
- Concept of Health and Disease in Indian Systems of Medicine
- Yogic Concept of Health and Disease

- Concepts of Trigunas, Pancha-mahabhutas, Pancha-prana
- Mental and Emotional ill Health
- Alabdha-bhumikatva, Anavasthitatva, Duhkha and Daurmanasya
- Yogic Diet-General Introduction of Ahara
- Yogic Principles of Healthy Living

**Unit 3: Applications of Yoga (12 Hrs)**

- Yoga in Education: Salient features of Yoga Education
- Factors of Yoga Education
- Yoga for Stress Management
- Yoga for Personality Development

**Unit 4: Practical Yoga (38 Hrs)**

- Yogic Practices
- Shatkarmas Dhauti (Kunjal), Vastra dhauti, Danda dhauti, Laghoo and Poorna sankhaprakshalana, Neti (Sutra and Jala), Kapalbhata, Agnisara, Nauli and trataka
- Yogic Sukshma Vyayama
- Suryanamaskar
- Asnas (yogic postures)
- Standing Postures Ardhakati chukrasin
- Sitting postures Paschimottanasana
- Prone postures Bhujangasana, Salabhasana, Sarvangasana, Matsyasana, Shavasana, Setubandhasana,
- Balancing postures Vrikshasana, Garudasana, Namaskarasana, Natrajasana

**Unit 5: Practical (pranayama, meditation, Bandhas, Mudras) (12 Hrs)**

- Pranayama Breath awareness
- Bandhas and Mudras
- Cyclic Meditation
- Yoga Nidra.

**Text Books:**

1. Yoga written by Dr. H R Nagendra & Dr. R Nagarathna published by swami Vivekananda yoga research foundation, July 2016, Bangalore.ISBN:978-81-87313-16-8
2. New Perspectives in Stress Management written by Dr. H R Nagendra & Dr. R Nagarathna published by swami Vivekananda yoga research foundation, Bangalore.ISBN:978-81-87313-01-4
3. Pranayama–The Art and Scince written by Dr. R Nagarathna published by Swami Vivekananda Yoga Prakashana Bangalore, published year 2011, 3 rd Ed.



4. Yoga and Health written by Adhyatm Ananda 1ST ED Published by GGRK, AHMEDABAD
5. Raja yoga written by Swami Vivekananda Published by Advaita Ashrama, KOLKATA, published year 2012.

**Guidelines for the completion of the course:**

1. Minimum 80% attendance is required, if not able to fulfill it then only by the permission of programme Coordinator and Principal Will be allowed to compensate in the next years.
2. Only remarks will be given at the end of the course.
3. A separate certificate on completion of each course will be issued by COE.
4. In the event of non-completion of course, the student has to re-do the course or opt for another one.

**Evaluation Norms:**

The course carries 1 credit and the students will be evaluated continuously based on their participation in learning experiences, theory and evaluation through tests and assignments and will also be evaluated at the end of course under CEE which will be 100% internal. The pattern of evaluation with percentage Weightage will be as specified below:

**Distribution of 100% CIA components:**

Sr. No.	Component	Content	Duration	Marks	Sub Total
1	Assignment 1	Units 1&2	-	20	20
2	PPT Presentation	Units 1,2 & 3	10 min.	20	20
3	Practicals	Units 4 &5	3-4 Hrs	20	20
4	CEE	All units	2 hr.	40	40
<b>Grand Total</b>					<b>100</b>

- At the end of the course a separate certificate on completion of course will be issued by the CoE having only remarks as follows:

**Remarks:**

Range of % Marks	Remarks
90 – 100	Excellent
75 – 89	Very Good
60- 74	Good
40 – 59	Fair

39 - and below	Not Completed
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<b>18AECO025</b>	<b>National Cadets Corps</b>	<b>200 Hrs (4 Hrs/ Week)</b>	<b>1 credit</b>
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### **ELIGIBILITY:**

Any under graduate student can opt for the course with following eligibility.

- Age should be 15 to 25 year.
- Candidate must be medically fit.

### **DURATION OF THE COURSE**

- The course shall extend over a period of two years comprising of four semesters with two semesters in one academic year. Each semester normally consists of 45 theory & practical lectures as regular institutional training and 5 Special activities.

### **STRUCTURE OF THE COURSE**

- The NCC course shall have a curriculum comprising theory and practical courses with a specified syllabus by DG NCC. The curriculum of course is a blend of theory courses and activities as regular institutional training and special activities. In addition one special camp is compulsory either in the semester 3 or 4

### **ENROLMENT:**

- Candidate get enrolled on voluntary basis
- If no of candidate are found more than available vacancies there would be a selection.
- A certificate holder, instrument player, state and national level sports person would be given priority.

### **OBJECTIVES OF THE COURSE**

National cadet core is offered to college student under Ministry of defence to develop leadership qualities, to create a responsible and trained human resource and to provide an opportunity to the youth of the country to serve for the nation.

1. To Provide additional benefit to the NCC cadet of the college
2. To generate more interest and awareness about NCC to the students of the college
3. To generate Pool of Trained NCC Cadet to achieve the aims of NCC prescribed by DG NCC
4. To give the touch of regimental way of living like army through ATC and special camps
5. To imbibe the confidence and will to work.

## SCHEME OF INSTRUCTION & EVALUATION

Course code	Course	Instruction hrs/week	Maximum Marks			Total credit
			CIE	SEE	T	
	<b>NCC Break up</b>  First & Second Semester Theory Social activities  Third & Fourth Semester Theory Social activities Special Camp	<b>4 hrs/week (2 Years)</b>	<b>100</b>	<b>-</b>	<b>100</b>	<b>1 credit</b>

### Semester –I

Course code	SEMESTER	PAPER TITLE	Instruction hrs/week
	<b>I</b>	<b>NCC Common Subjects level-I</b> <b>NCC Special Subjects level-I</b> <b>Personality Development level-I</b>	<b>4 hrs /week</b>

#### NCC Common Subject Level-I

- The NCC
- Foot Drill-1
- Social Awareness & Community Development-1
- Environment awareness and conservation-1
- Health & Hygiene -1

#### NCC Special Subject Level-I

- Armed Forces
- Military History

### **Personality Development Level -I**

- Introduction to personality Development
- Factors influencing /shaping personality :Physical ,social ,psychological & Philosophical
- Self awareness-1
- Self awareness-2
- Self awareness-3
- Develop your Mind set

### **MANDATORY SOCIAL ACTIVITY:**

- 15 August: Independence Day
- Cleanliness drive
- NCC day

### **Semester –II**

<b>Course code</b>	<b>SEMESTER</b>	<b>PAPER TITLE</b>	<b>Instruction hrs/week</b>
	<b>II</b>	<b>NCC Common Subjects Level -II NCC Special Subjects Level-II Personality Development level -II</b>	<b>4 hrs /week</b>

### **NCC Common Subject Level -II**

- Foot Drill-2
- Health & Hygiene -2
- Weapon Training-1
- Disaster Management -1
- Obstacle Training-1
- Adventure

### **NCC Special Subject Level -II**

- Map Reading-1
- Field craft & Battle craft-1

### **Personality development Level -II**

- Time Management
- Attitude- assertiveness and Negotiation
- Stress Management Skills
- Importance of group/team work
- Interpersonal relationship & communication
- Conflict: Motive & Resolution

### **MANDATORY SOCIAL ACTIVITIES**

- 1 Dec: AIDS day
- 7 Dec: Armed forces flag day
- 26 January: Republic day

### **Semester –III**

<b>Course code</b>	<b>SEMESTER</b>	<b>PAPER TITLE</b>	<b>Instruction hrs/week</b>
	<b>III</b>	<b>NCC Common Subjects level III NCC Special Subjects level -III Leadership level-I</b>	<b>4 hrs /week</b>

### **NCC Common Subject level III**

- National Integration and Awareness
- Drill with Arms
- Ceremonial drill
- Social Awareness & Community Development-2
- Environment awareness and conservation-2
- Obstacle Training-2

### **NCC Special Subject level III**

- Introduction to Infantry Weapons & Equipment-1
- Communication-1

### **Leadership Level -I**

- Types of leader ship
- Effects Of Leader ship With historical examples
- Communication Skill-1

- Communication Skill-2
- Communication Skill-3
- Problem solving Skills

**MANDATORY SPECIAL ACTIVITY:**

- Environment awareness
- 21 June: International day of yoga
- Independence Day
- Cleanliness Drive
- NCC day

**Semester –IV**

<b>Course code</b>	<b>SEMESTER</b>	<b>PAPER TITLE</b>	<b>Instruction hrs/week</b>
	<b>IV</b>	<b>NCC Common Subjects Part-IV NCC Special Subjects Part-IV Leadership Level-II</b>	<b>4 hrs /week</b>

**NCC Common Subject Level-IV**

- Drill with Arms -2
- Ceremonial drill -2
- Weapon Training-2
- Disaster Management-2
- Social Awareness & Community Development-3
- Environment awareness and conservation-3
- Obstacle Training-3

**NCC Special Subject Level-IV**

- Map Reading-2
- Field craft & Battle craft-2
- Introduction to Infantry Weapons & Equipment-2
- Communication-2

**Leadership Level-II**

- Self confidence, courage and self conviction
- Values/code of ethics

- Sociability : Social skills etiquettes & mannerism
- Critical and creative thinking
- Body Language
- Influencing skills
- Interview skills

### **MANDATORY SPECIAL ACTIVITY:**

- 1 Dec: AIDS day
- 7 Dec: Armed forces flag day
- 26 January: Republic day
- 8 march: international women's day

### **GUIDELINES FOR THE PROGRAMME**

1. Minimum 80% attendance is required, if not able to fulfil it then only by the permission of NCC Officer and the principal will be allowed to compensate in the next year.
2. Degree will be awarded only after receiving of the certificate.
3. Additional award will be given on being selected for national level activities like RDC, TSC, National Games, YEP, NIC etc.
4. Institutional training theory Syllabus is as prescribed by DG NCC and training plan by DG NCC, New Delhi.
5. During Sem –I & II ( 1<sup>st</sup> Year Of Training ) cadet need to be attend\_ 15 parade (each parade is of 3 period of 40 minutes so, 45 periods including practical).
6. During Sem III or Sem IV ( 2<sup>nd</sup> Year Of Training)cadet need to be attend 18 parade (1 parade = 3 period of 40 minutes so, 54 periods including practical)&One Annual Training Camp is compulsory (being eligible for B Certi exam).
7. Mandatory special activities are compulsory during each semester as per syllabus.(Special case of absence considered only when the cadet found in severe medical problem during the activities).
8. Successfully completion of one training year and one theory and practical exam in the month of February/march.
9. The evaluation shall comprise of Continuous Internal Evaluation (CIE) for regular institutional training 10 special activities in each year.
10. 80 % attendance will be minimum required for getting the certificate.
11. Participation is compulsory in special camp in second year.

### **Distribution of 100% CIE component**

<b>SR No.</b>	<b>Component</b>	<b>Content</b>	<b>Marks</b>	<b>Sub total</b>
1	<b>Attendance</b>	Regular Institutional Training Parade	<b>10</b>	<b>10</b>
2	<b>Social Activity</b>	Total 15 social activity Involvement in the activities	<b>15</b>	<b>15</b>



3	<b>Theory exam</b>	As prescribed in the DG NCC Syllabus first year (semester I&II) As prescribed in the DG NCC Syllabus Second year (semester III&IV)	<b>10</b> <b>10</b>	<b>20</b>
4	<b>Practical exam</b>	<b>Test-1</b> at the end of 1 <sup>st</sup> year Drill test-1 , Map Reading-1 <b>Test-2</b> at the end of 2 <sup>nd</sup> year Drill -2 ,MR-2, WT, FC&BC, Leadership, Responsibility,	<b>15</b> <b>30</b>	<b>45</b>
5	<b>Special Activity</b>	<b>Camp only in second year</b>	<b>10</b>	<b>10</b>
<b>Total</b>			<b>100</b>	<b>100</b>

<b>18AECO026</b>	<b>QUALITY ASSURANCE IN INDUSTRY</b>	<b>Duration 80 HRS</b>	<b>01 CREDIT</b>
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## **ELIGIBILITY**

Any undergraduate student can opt for the course.

## **OBJECTIVE:**

1. Develop and implement the check lists and SOPs
2. Understand Good Regulatory Practices in the
3. Prepare for the readiness and conduct of audits and inspections.

### **UNIT-I INTRODUCTION TO GOOD MANUFACTURING PRACTICES 15 HRS**

- Introduction to Current Good Manufacturing Practices
- Principles of GMP (Directive 91/356/EEC), Article 6 to Article 14
- WHO cGMP guidelines GAMP-5
- Medical device, IVDs Global Harmonization Task Force(GHTF) Guidance docs

### **UNIT-II FUNDAMENTAL OF GOOD LABORATORY PRACTICES 15 HRS**

- Good Laboratory Practices: Introduction, USFDA GLP Regulations
- Controlling the GLP inspection process
- Documentation, Audit, goals of Laboratory Quality Audit, Audit tools
- Future of GLP regulations

### **UNIT-III GOOD AUTOMATED LABORATORY PRACTICES 15 HRS**

- Good Automated Laboratory Practices: Introduction to GALP
- Principles of GALP, GALP Requirements, SOPs of GALP
- Training Documentation
- Software Evaluation checklist, relevant ISO and QCI Standards.

### **UNIT-IV GOOD DISTRIBUTION PRACTICES 15 HRS**

- Good Distribution Practices: Introduction to GDP
- Principles, Personnel, Documentation, Premises and Equipment
- Deliveries to Customers, Returns, Self-Inspection
- Provision of information, Stability testing principles
- WHO GDP, USP GDP (Supply chain integrity)
- CDSCO guidance and ISO standards

## UNIT-V CONCEPTS OF QUALITY MANAGEMENT

20 HRS

- Quality management systems: Concept of Quality,
- Total Quality Management, Quality by design, Six Sigma concepts,
- Types of Qualification, Validation master plan (VMP)
- Validation of utilities [Compressed air, steam, water systems]
- Heat Ventilation and Air conditioning (HVAC) and Cleaning Validation.
- The International Conference on Harmonization (ICH) process, ICH guidelines to establish quality, safety and efficacy of drug substances and products, ISO 13485 and other relevant CDSCO regulatory guidance documents.

### TEXT BOOKS:

1. P. P. Sharma, (2000 ,) *How to practice GLP*, India Vandana Publications
2. Sandy Weinberg, (2003), *Good Laboratory Practice Regulations*. USA: Library of Congress Cataloging-in-Publication Data.

### REFERENCE BOOKS:

1. Vikash Kumar Chaudhari, Vijay Yadav, Praveen Kumar Verma<sup>1</sup>, Amit Kumar Singh  
Review On Good Manufacturing Practice (Gmp) For Medicinal Products
2. John Sharp.,(2004),*Good Pharmaceutical Manufacturing Practice: Rationale and Compliance*, U.S.CRC Press
3. Donald C.Singer,(2005),*Laboratory Auditing for Quality and Regulatory compliance*,CRC Press

### Guidelines for the completion of the Course :

6. Minimum 80% attendance is required, if not able to fulfil it then only by the permission of Programme Coordinator and Principal will be allowed to compensate in the next year.
7. Only remarks will be given at the end of the course.
8. A separate certificate on completion of each course will be issued by the CoE.
9. Degree will be awarded only after receiving of the certificate.
10. In event of non-completion of course, the student has to re-do the course or opt for another one.

### Evaluation Norms :

The course carries 1 credit and the students will be evaluated continuously based on their participation in learning experiences, theory, and evaluation through tests and assignments and will also be evaluated at the end of course under CEE which will be 100% internal. The pattern of evaluation with percentage weightage will be as specified below:

***Distribution of 100% CIE components: Theory***

<b>S. No.</b>	<b>Component</b>	<b>Content</b>	<b>Duration</b>	<b>Marks</b>	<b>Sub Total</b>
a)	Attendance	Minimum 80%	Full Course	10	10
b)	Assignment-I	-	-	10	20
	Assignment-II	-	-	10	
c)	Test-I	Any 2 Units	1.5 Hrs	10 (set for 30)	10
	Test-II	Any 2 Units	1.5 Hrs	10 (set for 30)	10
d)	Course End Exam	All 4 units	02 Hrs	20 (set for 50)	20
	Course End Exam	All 5 units	02 Hrs	20 (set for 50)	20
<b>Grand Total</b>					<b>100 Marks</b>

**At the end of the course no marks are given, only remarks are given as follows:**

**Remarks:**

<b>Range of % Marks</b>	<b>Remarks</b>
90-100	Excellent
75-89	Very Good
60-74	Good
40-59	Fair
39- and below	Not Completed

<b>18AECO027</b>	<b>Sports</b>	<b>Duration 100 HRS</b>	<b>01 CREDIT</b>
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**Eligibility:** Any undergraduate student can opt for the course.

**OBJECTIVE OF THE COURSE**

1. Buildup physical fitness
2. Buildup sportsmen spirit
3. Sports Awareness

**JOB OPPORTUNITY**

All competitive examination body will give extra credit and marks.

**100% CIE component**

<b>Sir no.</b>	<b>Component</b>	<b>Content</b>	<b>Marks</b>	<b>Sub total</b>
1	<b>Attendance</b>	<ul style="list-style-type: none"> <li>✓ Regularity in coaching</li> <li>✓ Regularity in practice</li> </ul>	<b>20</b>	<b>20</b>
2	<b>Practical Exam</b>	<ul style="list-style-type: none"> <li>✓ Ground measurement/marking any two out door and one indoor games</li> <li>✓ Skill of game any two out door and one indoor games</li> </ul>	<b>30</b>	<b>30</b>
3	<b>Theory Exam</b> 30 MCQ type questions	<ul style="list-style-type: none"> <li>✓ Spots GK</li> <li>✓ Ground measurement</li> <li>✓ Games skills</li> <li>✓ Nutrition</li> <li>✓ Fitness</li> <li>✓ Yogasan</li> </ul>	<b>30</b>	<b>30</b>
4	<b>Special Points</b>	<ul style="list-style-type: none"> <li>✓ Participate in inter collegiate tournaments</li> <li>✓ Participate in adventure activities like tracking mountaineering</li> <li>✓ Participate in inter university, national or international level</li> </ul>	<b>20</b>	<b>20</b>
<b>Total</b>			<b>100</b>	<b>100</b>

**Remarks:**

<b>Sr no</b>	<b>Marks</b>	<b>Grading</b>	<b>Remarks</b>
<b>1</b>	<b>90-100</b>	<b>A+</b>	<b>Excellent</b>
<b>2</b>	<b>75-89</b>	<b>A</b>	<b>V. Good</b>
<b>3</b>	<b>60-75</b>	<b>B</b>	<b>Good</b>
<b>4</b>	<b>40-59</b>	<b>C</b>	<b>Fair</b>

5	39- and below	NC	NC
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## GAMES AND SPORTS:

### OUTDOOR GAMES:

- VOLLEY BALL
- BASKET BALL
- HAND BALL
- HOCKEY
- KHO-KHO
- KABBADI
- CRICKET
- ATHLETICS
- FOOTBALL

### INDOOR GAMES:

- BADMINTON
- CHESS
- TABLE TENNIS
- JUDO
- WRESTLING
- YOGA
- RIFLE SHOOTING
- LOAN TENNIS
- SWIMMING

### Various sports and games (inter collegiate participation)

Sir No.	Games	Result	Remarks
1	Swimming (boys and girls)	Champion	2 payer selected in all india national
2	Chess (boys and girls)		Only participated
3	Kabbadi (boys)		Only participated
4	Badminton (boys and girls)		Only participated
5	Valley ball (boys)	Semi final	2 payer selected in national
6	Handball (boys)	May be	Champion or runners up
7	Handball (girls)	May be	1 or 2 payer will select in national
8	Basketball (boys and girls)	May be	Will achieve good result
9	Football (boys)	May be	Will achieve good result
10	Hockey (boys)	May be	Champion or runners up
11	Softball (boys)	May be	Champion or runners up
12	Wait and power lifting (boys)	May be	Champion or runners up
13	Wrestling (boys and girls)	May be	Will achieve good result

<b>14</b>	<b>Judo (boys and girls)</b>	<b>May be</b>	<b>Will achieve good result</b>
<b>15</b>	<b>Cricket (boys)</b>	<b>May be</b>	<b>Will achieve good result</b>
<b>16</b>	<b>Valley ball (girls)</b>	<b>May be</b>	<b>Will achieve good result</b>
<b>17</b>	<b>Loan tennis (boys and girls)</b>	<b>May be</b>	<b>Will achieve good result</b>
<b>18</b>	<b>Rifle shooting (boys and girls)</b>	<b>May be</b>	<b>Will achieve good result</b>
<b>19</b>	<b>Athletics (boys and girls)</b>	<b>May be</b>	<b>Will achieve good result</b>
<b>20</b>	<b>Yoga (boys and girls)</b>	<b>May be</b>	<b>Will achieve good result</b>

<b>18AECO028</b>	<b>National Service Scheme</b>	<b>Duration 100 HRS</b>	<b>01 CREDIT</b>
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### Semesters I, II, III & IV

#### ELIGIBILITY

Any undergraduate student can opt for the course.

#### DURATION OF THE COURSE

The course shall extend over a period of two years comprising of four semesters with two semesters in one academic year. Each semester normally consists of 5-6 theory lectures and 3 regular and 2 Special activities and one special camp only in fourth semester.

#### OBJECTIVES OF THE COURSE

1. To kindle the student's social consciousness
2. To offer opportunities
  - i) to work with and among people
  - ii) to develop awareness and knowledge of social realities
  - iii) to engage themselves in creative and constructive social work
  - iv) to gain skills in the exercise of leadership.
  - v) to enrich their personality

#### SCHEME OF INSTRUCTION AND EXAMINATIONS

Course code	Course	Total Hrs	Maximum Marks			Total credit
			CIE	CEE	Total	
<b>18AECO028</b>	<b>NSS: Break up</b>	<b>40-50 Hrs</b>  <b>Per semester</b>  <b>(2 Years)</b>	<b>100</b>	<b>-</b>	<b>100</b>	<b>01 credit</b>
	<i>First &amp; Second Semester</i> Theory Regular activities Special activities					
	<i>Third &amp; Fourth Semester</i> Theory Regular activities Special activities Special Camp					



## **STRUCTURE OF THE COURSE**

The NSS course shall have a curriculum comprising theory and activities with a specified syllabus. The curriculum of course is a blend of theory topics and activities as regular and special. In addition one special camp is compulsory in the IV semester.

### **Syllabus**

#### **Semester –I**

##### **Theory Paper-1:**

###### **Introduction to NSS**

- NSS-History and Objectives & Aspects of NSS Programme
- Emblem, flag, motto, song, symbol , badge etc.
- Definition, profile of youth
- Issues, challenges and opportunities for youth
- Youth as an agent of social change
- Concept of regular activities, special camping

###### **Regular Activities :**

- Orientation Program-[NSS Song & various types of clapping]
- 15th August-Independence Day celebration and Enrollment
- Festival celebrations
- Visit eg. mentally challenged children's school
- Charity programme-[Before Diwali vacation]
- 24th Sept.-NSS Day Celebrations

###### **Special Activities :**

- Tree plantation
- 26th August- Anti Atomic/Hiroshima Day
- 2nd October-Gandhi Jayanti
- 14th November-Children's Day
- Notice Board activity for auspicious days –July to December-Date and its significance

## **Semester –II**

### **Theory Paper-2:**

#### **Leadership & Youth Development**

- Meaning and types of leadership
- Qualities of good leaders
- Traits of leadership
- Importance and role of youth leadership
- National Youth Policy
- Youth Development Programmes at national level, State level and Voluntary sector

#### **Regular Activities**

- Visit to old age Home
- New Year celebration
- Charity Programme
- 26<sup>th</sup> January-Republic day
- Health Awareness

#### **Special Activities**

- Presentation on Indian National leaders
- HIV Awareness
- Small skits on leadership
- Notice Board activity for auspicious days –January to June- Date and its significance

## **Semester –III**

### **Theory Paper-3:**

#### **Family, Community and Society**

- Individual as an entity
- Individual as a member of a family
- Individual as a member of a community and
- Individual as a member of a society.
- Role of individual to safeguard nature

- Rights & Responsibilities as citizen of India

### **Regular Activities**

- 2<sup>nd</sup> October-Swatch Bharat initiative
- 2.15<sup>th</sup> August –One item to be presented
- Festival celebrations
- Activity where Family is involved
- Activity where Society is involved

### **Special Activities**

- 24<sup>th</sup> Sept. NSS Day celebration
- Balanced Diet
- Organization of HIV Awareness
- Notice Board activity for auspicious days –January to June- Date and its significance

## **Semester –IV**

### **Theory Paper-4:**

#### **General Health Awareness**

- Definition, needs and scope of health education
- Healthy Lifestyles
- First Aid
- Programmes associated with safety
- Yoga as a tool for healthy lifestyle
- Safe drinking water, water borne diseases and sanitation

#### **Regular Activities**

- Preparation of any item of safety importance
- 26<sup>th</sup> January –One item to be presented
- New Year Celebrations
- Health Awareness
- Yoga practice

## Special Activities

- Health Awareness
- Flag Day Celebrations
- Interaction with juniors
- Notice Board activity for auspicious days –January to June- Date and its significance

## Special Camp compulsory for all the NSS Cadets

### GUIDELINES FOR THE COURSE

1. Minimum 80% attendance is required, if not able to fulfil it then only by the permission of Programme co-ordinator and the Principal will be allowed to compensate in the next year.
2. The evaluation shall comprise of Continuous Internal Evaluation (CIE) for activities and two tests in the two years, one at end of each year for Paper 1&2 and Paper 3 &4 respectively.
3. Participation is compulsory in special camp in fourth semester.
4. Degree will be awarded only after receiving of the certificate.
5. Additional award will be given on being selected for national level activities like RDC, YEP, NIC etc. and it will be considered equivalent to special activities for that semester.
6. In event of non-completion of course, the student has to re-do the course or opt for another one.

### EVALUATION NORMS

#### Distribution of 100% CIE components:

S.No.	Component	Content	Marks	Sub Total
1.	<b>Attendance</b>	Min.80%	07	<b>07</b>
2.	<b>Activities*</b>	Regular-12	24	<b>48</b>
		Special-8	24	
3.	<b>Compulsory</b>	Special Camp only in Sem. IV	10	<b>10</b>
4.	<b>Test-I</b>	Theory of First year	10 (Set for 20)	<b>30</b>
	<b>CEE</b>	Theory of Full Syllabus	20 (Set for 40)	
5.	<b>Special marks</b>	Participation at RDC-State level	03	<b>05</b>
		Participation at RDC-National level	04	
		Participation at NIC	04	
		Participation at YEP	05	
			<b>TOTAL</b>	<b>100</b>

\*Sub components for each type of activity:

S.No.	Component	Regular Activity	Special Activity	Special Camp
1.	Attendance	05	07	Compulsory
2.	Active Participation	05	08	10
3.	Responsibility	05	07	10
4.	Report writing	05	08	10
	<b>(Total) Set for total</b>	<b>(2) 20</b>	<b>(3) 30</b>	<b>(10)30</b>

- At the end of the course a separate certificate on completion of course will be issued by the CoE having only remarks as follows:

- **Remarks:**

Range of % Marks	Remarks
90-100	Excellent
75-89	Very Good
60-74	Good
40-59	Fair
39- and below	Not Completed