3.1.1	The institution's Research facilities are frequently updated and there are well defined policy for promotion of research which is uploaded on the institutional website and implemented

AY – 2021-2022

Registrar
Atmiya University
Rajkot

Atmiya University Rajkot

MEMORANDUM OF UNDERSTANDING
Between

ATMIYA UNIVERSITY
Rajkot, Gujarat, India

and

Cloud Folks, Rajkot

Whereas the above-named institutions recognize that a Memorandum of Understanding (MOU) would be of mutual benefit and would serve as an indication of continued interest in academic cooperation, it is understood that:

1. Each institution will promote one or more of the following activities based on their respective Academic and Industrial needs:
   - Skill development programs are conducted by Cloud folk experts at Atmiya University.
   - Guest lectures are conducted by Cloud folk's experts at Atmiya University.
   - Coursesoffered by cloud folks hub are attended by students of Atmiya University with special discounts.
2. Specific exchanges or activities that may be developed under the framework of this MOU shall be mutually discussed and agreed upon in writing by both parties prior to the initiation of that activity. Terms of cooperation and details of exchanges, joint programs or activities are to be developed through bilateral discussion and agreement on a case-by-case basis and attached as additions succeeding to the signing of this MOU. Each institution further agrees to appoint respective coordinators at the appropriate time for the specific activities agreed upon.
3. This MOU will become effective on the date of the last signature. It shall remain in force for a Period of five (5) year/s with the understanding that either institution may terminate it by giving 30 days' notice to the other party in writing, unless an earlier termination date is mutually agreed upon. The MOU may be amended or extended by mutual written consent of the Parties.

The parties hereby establish this MOU by duly signing it as of the respective date below.

Mr. Darshan Jani
H.O.D
Department of B.Tech.-IT
Atmiya University
Rajkot
DATE:14/2/2022
SEAL:

Head of Department
Department of Information Technology
Faculty of Engineering & Technology
Atmiya University
Rajkot

Mr. Bhavesh Atara
Founder
Cloud Folks Hub
Rajkot
DATE:14/2/2022
SEAL:

CloudFolks HUB
Proprietor

Registrar
Atmiya University
Rajkot

Atmiya University
Rajkot

Report on

"Capacity building session on cloud computing and career opportunity with AZURE"

Organized by

Information Technology Department,

ATMIYA UNIVERSITY - RAJKOT.

Date –26 July 2023

Chief Patron – Sadhu Tyagvallabhdas

Convener –Mr. Darshan N Jani, Mr. Hiren M Bhatt, AU-IT, Rajkot

Organizing Committee members-
Mr.Piyush D Kashiyani, Ms. Hemangi Joshi, Mr. Mialn N Gohel
IT Department
No. of Participants – 64

Report on

"Capacity building session on cloud computing and career opportunity with AZURE"

Organized by

Information Technology Department,

ATMIYA UNIVERSITY - RAJKOT.

Date –26 July 2023

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IT Department

Registrar
Atmiya University
Rajkot

Atmiya University
Rajkot

Session Moments

Session Moments

Registrar
Atmiya University
Rajkot

Atmiya University Rajkot

Glimpses of the event:

This event is arranged as a part of **"AWS Cloud IT department"**

Key Points of Session:-

- **Students should make their career in the city which is best for their field.**
- **Students must choose a goal and work on that after college hours.**
- **Students must use LinkedIn and improve their Resume everyday.**
- **There are a lot of different fields in Information Technology but The CLOUD field is connected to all the fields.**
- **So students must consider their career in CLOUD COMPUTING.**
- **The future of Cloud is extremely bright because all businesses will work on the cloud.**

Glimpses of the Event

Glimpses of the event:

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Key Points of Session:-

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- **The future of Cloud is extremely bright because all businesses will work on the cloud.**

Glimpses of the Event

Registrar
Atmiya University
Rajkot

Atmiya University
Rajkot

SUMMARY REPORT

"Session by Vishesh Thakkar on Career Opportunity in cloud computing"

Organized by

Department Information Technology, FoET

Date – 16/02/2022

Patron – Param Pujya Tyagvallabh Swamiji, Secretary,

Sarvoday Kelavani Samaj

Chief Convenor – Dr. G.D. Acharya Professor-Emeritus, Atmiya University

Convener – Prof. Darshan Jani, HOD – IT, FoET

Organizer – Department of Information Technology

No. of Participants – 170

Registrar
Atmiya University
Rajkot

Atmiya University Rajkot

With the blessings and vision of Param Pujya Tyagvallabh Swamiji, support and encouragement Principal Dr. G. D. Acharya and Head of Department Asst. Prof. Darshan Jani, we, at Atmiya University, Rajkot, had arranged the session titled **"Career opportunity in cloud computing by Vishesh Thakkar"**.

Talk was delivered by Vishesh Thakkar from aims career solution, for 8th, 6th & 4th semester of the students of I.T & C.E students. He has also guided on career opportunities & how to prepare our self for future, which are the parameters & country based processes were discussed briefly.

Objectives

1. Demonstrate awareness the future planning for career in **AWS**.
2. Provide the knowledge to the students about all different cloud services providers.
3. Motivate the students for learning different cloud platforms.

GLIMPESES OF THE EXPERT TALK

Registrar
Atmiya University
Rajkot

Atmiya University Rajkot

Registrar
Atmiya University
Rajkot

Atmiya University Rajkot

MEMORANDUM OF UNDERSTANDING

BETWEEN

Hemchandracharya North Gujarat University, Patan

&

ATMIYA UNIVERSITY
(Established under the Gujarat Private University Act 11, 2018)
Yogidham Gurukul, Kalawad Road, Rajkot - 360005, Gujarat (INDIA)

Registrar
Atmiya University
Rajkot

Atmiya University, Rajkot-Gujarat-India

Atmiya University Rajkot

MEMORANDUM OF UNDERSTANDING

BETWEEN

HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN

AND

ATMIYA UNIVERSITY, RAJKOT

WHERE AS:

Hemchandracharya North Gujarat University ((hereinafter referred as HNGU) is a State University in Gujarat, established by the Ordinance No. 5 of 1986 dated 17.5.1986 which was later passed as the North Gujarat University Act No.22 of 1986 on 11/9/86 by the Legislative Assembly of Gujarat. With a view to catering to the peculiar cultural and educational needs of the North Gujarat area, the University has been functioning since then and growing and expanding steadily.

And

Atmiya University (hereinafter referred as AU), is a State Private University, established by Act 11 2018 of Government of Gujarat and recognized under Section 2f the UGC .

In accordance with a mutual desire to promote and develop collaborative activities , both HNGU and AU agree to the following statement of intent on academic and research cooperation as per the specified scope of activities in this MoU.

The details of specific cooperation interventions may be designed by mutual consent; and the same can be incorporated into specific additional agreements upon signature by the institutions' appropriate authorities.

A. Objectives

1. Strengthening capacity building of student and faculty members through mutual expertise;
2. Complementing resources and capabilities of each-other through sharing of knowledge resources, physical resources and knowledge capital for the mutually agreed activities;
3. Creating collective efforts for creation, dissemination and application of knowledge; and
4. Facilitating knowledge exchange between the two institutions for larger societal impact.

B. Scope of Activities

1. Conducting faculty training and capacity building initiatives (including refresher courses/ seminars) on identified themes.
2. Organizing faculty and student exchange programmes.
3. Supporting education and training programmes on languages, literature and life-skills.

I/c. Registrar
Hemchandracharya
North Gujarat University
PATAN

Atmiya University
Rajkot

Registrar
Atmiya University
Rajkot

4. Jointly designing and undertaking collaborative projects.
5. Organizing joint conferences, seminars, workshops.
6. Extending physical and knowledge resources to the students and faculty of the partner university.
7. Any other activities/initiatives, as agreed mutually.

C. Initially Identified Intervention Areas (to be amended from time to time)

1. Role of AU:

a. Design and delivery of courses and short-programmes for the students and faculty of HNGU as well as it's affiliating institutions, preferably in the following areas:

   i. Human-Values
   ii. Sustainable Development Goals
   iii. Life Skills

b. Hosting HNGU faculty and students for academic projects/ assignments
c. Providing support facilities to visiting scholars and faculty from HNGU.
d. Organizing (and participating in) joint academic events including conferences, seminars, and workshops.
e. Sending students and faculty to HNGU for different academic related activities including laboratory/field research, training, etc.
f. Participating in joint proposals for grant nationally and internationally.

2. Role of HNGU:

a. Design and delivery of faculty development programme for AU
b. Hosting AU faculty and students for academic, research & innovative projects/ assignments.
c. Providing support facilities to visiting scholars and faculty from AU.
d. Supporting joint organization of academic events including conferences, seminars, and workshops.
e. Permitting participation of students and faculty to AU for different academic related activities.
f. Participating in joint grant proposals for grant nationally and internationally and dissemination of the same.

Outcomes of shared knowledge and intellectual deliberations (like research, innovation or other data) may be disseminated and claimed jointly.

D. General

1. Both the organizations agree that all financial arrangements necessary to implement this MOU or any subsequent agreement must be negotiated according to the regulation of each institution and depends on the availability of funds.
2. Both institutions agree to extend sharing of physical, knowledge and intellectual resources to partner institution as per the applicable norms of their respective

Vc. Registrar
Hemchandracharya
North Gujarat University
PATAN

Atmiya University Rajkot

Registrar
Atmiya University
Rajkot

Atmiya University Rajkot

institutions, preferably on complementary basis without any charges, including use of research laboratory, as and when possible.

3. Travel, routine expenses of the visiting students shall be the responsibility of the institutions they belong to unless the same is covered through some third party funding sources.
4. This MOU establishes a foundation of mutual understanding and interest and does not itself entail any financial obligations for either institution;
5. This MOU will take effect from the date of its signing and shall be valid for the period of THREE (03) years from that date, unless terminated earlier upon six months' notice by either institutions;
6. This MOU may be revoked or modified by mutual agreement between the institutions and may be extended beyond its initial three year term by mutual agreement.

This MOU is being signed on 21st December **2021 and will stand effective from the same date.**

Registrar
Registrar
Hemc. Jracharya
Gujarat University
Patan

Hemchandracharya North Gujarat University

Patan
Gujarat, India

Registrar

Atmiya University

Rajkot
Gujarat, India

Atmiya University Rajkot

Registrar
Atmiya University
Rajkot

Atmiya University Rajkot

ATMIYA UNIVERSITY

Hemchandracharya North Gujarat University

An International Workshop on

Algorithms, Complexity and Some Recent Advances in Graph Theory-2023

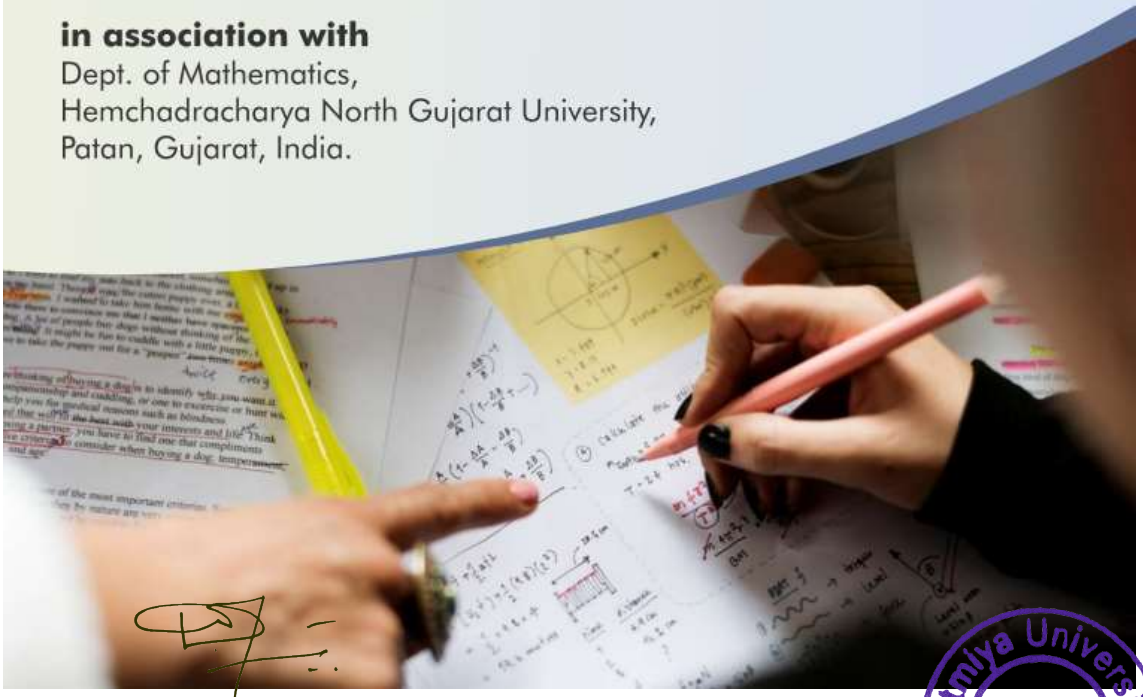
8th February, 2023

Organized by

Dept. of Mathematics, Dept. of Computer Science & Dept. of Computer Engg.
Atmiya University, Rajkot, Gujarat, India.

in association with

Dept. of Mathematics,
Hemchadracharya North Gujarat University,
Patan, Gujarat, India.



Registrar
Atmiya University
Rajkot

Atmiya University Rajkot

About Atmiya University

ATMIYA University is a private, non-profit multi-disciplinary university committed to foster knowledge creation and dissemination in various disciplines through value-based education. The campus is spread over 23.5 acres of land located in the heart of Rajkot city. The University has 210+ highly qualified faculty members with rich research and industrial experience backgrounds. 100+ faculty members have undergone training specifically related to innovation, start-up, IPR, etc. The University has 56 computer laboratories with 2000+ systems, 7 IBM servers and a high-speed internet facility with a dual fibre backbone and offers 64 programs through 6 faculties and 23 departments. The University has several state-of-the-art laboratories which include various domain-specific laboratories and facilities like the Center of Excellence for Embedded Systems & Robotics, Center for Renewable Energy Resources, Central Instrumentation Facility, iMAC Laboratory, Rapid Prototyping Laboratory, Tinkering Laboratory, Testing & Consultancy Centre for Material Testing & Environment, etc.

ATMIYA University emphasizes training young minds with consonance of higher education and human values and, aims to spread eternal happiness and create a happy society in the true sense. The motto of the University is सुहृदंसर्वभूतानाम् *(suhradam sarva-bhutanam)* which means well-wisher of all living beings. Brahmswaroop Hariprasad Swamiji Maharaj and HDH Premswaroop Swamiji Maharaj, the spiritual successors of Lord Swaminarayan are the mentors of ATMIYA University. With their blessings, P.P. Tyagvallabh Swamiji has envisioned state-of-the-art educational facilities and transformed them into reality!

ATMIYA University is keen on promoting innovation and entrepreneurship activities at the campus. As a part of these, several courses and components have been introduced in the curriculum framework which is implemented as per the aspirations of National Education Policy - 2020. Curriculum includes skill enhancement courses as a compulsory component. Further, emphasis is laid on components promoting creativity, innovation, community engagement, skill development, etc. along with domain knowledge as well as inter and transdisciplinary education. The University has signed MoUs with International Academic Institutions including University of Miyazaki (Japan), Keck Graduate Institute (California, USA), Lincoln University College (Malaysia) along with different national academic institutions, government and private organizations.

Registrar
Atmiya University
Rajkot

Atmiya University

About Hemchadracharya North Gujarat University (HNGU)

Acharya Hemachandra was an Indian Jain saint and scholar during 1088 AD to 1177 AD who contributed remarkably to Jain literature and grammar of Sanskrit language.

Hemchandracharya North Gujarat University was established on 17-05-1986. The lush green campus of university is spread over an area of 212.5 acres. There are 19 postgraduate and 3 Undergraduate departments on the campus. More than 1, 50, 000 students are studying in 405 affiliated collages. The university was accredited with 'A' Grade (CGPA 3.02) by NAAC in the last cycle.

Objectives of the Workshop

- To learn the basics of Algorithms and determine its NP- Completeness by study of Complexity.
- To learn about Line Graphs and Line Digraphs and study of some properties and characteristics of line graphs.
- To introduce new algorithms to recognize line graphs.
- To provide a platform for the researchers and the mathematicians to discuss the relation between mathematics and computer science.

Registration Details

Registration fees:

- For PG Students: Rs. 200/-
- For Research Scholar: Rs. 300/-
- For Faculty/Academician: Rs. 350/-
- For International Participants: $ 10

For payment & registration, visit:

http://seminar.atmiya.edu.in

Last date of Registration
31st January, 2023

Registrar
Atmiya University
Rajkot

Atmiya University Rajkot

Resource Persons

DR. JAY S. BAGGA
Professor of Computer Science,
Ball State University, Muncie, Indiana, USA.

DR. LOWELL W. BEINEKE
Professor of Mathematics,
Purdue University Fort Wayne, Fort Wayne, Indiana, USA.

Chief Patron

P.P. TYAGVALLABH SWAMIJI
President,
Atmiya University, Rajkot, India.

Patrons

DR. SHEELA RAMCHANDRAN
Hon. Pro Chancellor,
Atmiya University,
Rajkot, Gujarat, India.

DR. SHIV TRIPATHI
Hon. Vice Chancellor,
Atmiya University,
Rajkot, Gujarat, India.

DR. JAYESH DESHKAR
Hon. Pro Vice Chancellor,
Atmiya University,
Rajkot, Gujarat, India.

Co-Patron

DR. ROHITKUMAR N. DESAI
Hon. Vice Chancellor, HNGU, Patan, India

Academic Secretary

DR. S. K. VAIDYA
Professor and Head,
Department of Mathematics,
Saurashtra University, Rajkot, Gujarat, India.

Convener

DR. D. D. VYAS
Registrar,
Atmiya University,
Rajkot, Gujarat, India.

Co-Convener

DR. CHIRAG PATEL
Registrar,
HNGU,
Patan, Gujarat, India.

Registrar
Atmiya University
Rajkot

Atmiya University

Rajkot

Azadi Ka Amrit Mahotsav

Hemchandracharya North Gujarat University

Patan, Gujarat(INDIA)

Department of Mathematics

in association with

ATMIYA University

Rajkot, Gujarat(INDIA)

Cordially invite for the inaugural function of

NATIONAL CONFERENCE ON
Emerging Trends in Discrete Mathematics
(NCETDM - 2022)

Date: 17th February 2022 (Thursday) **Time: 10:00am**

PROGRAM SCHEDULE

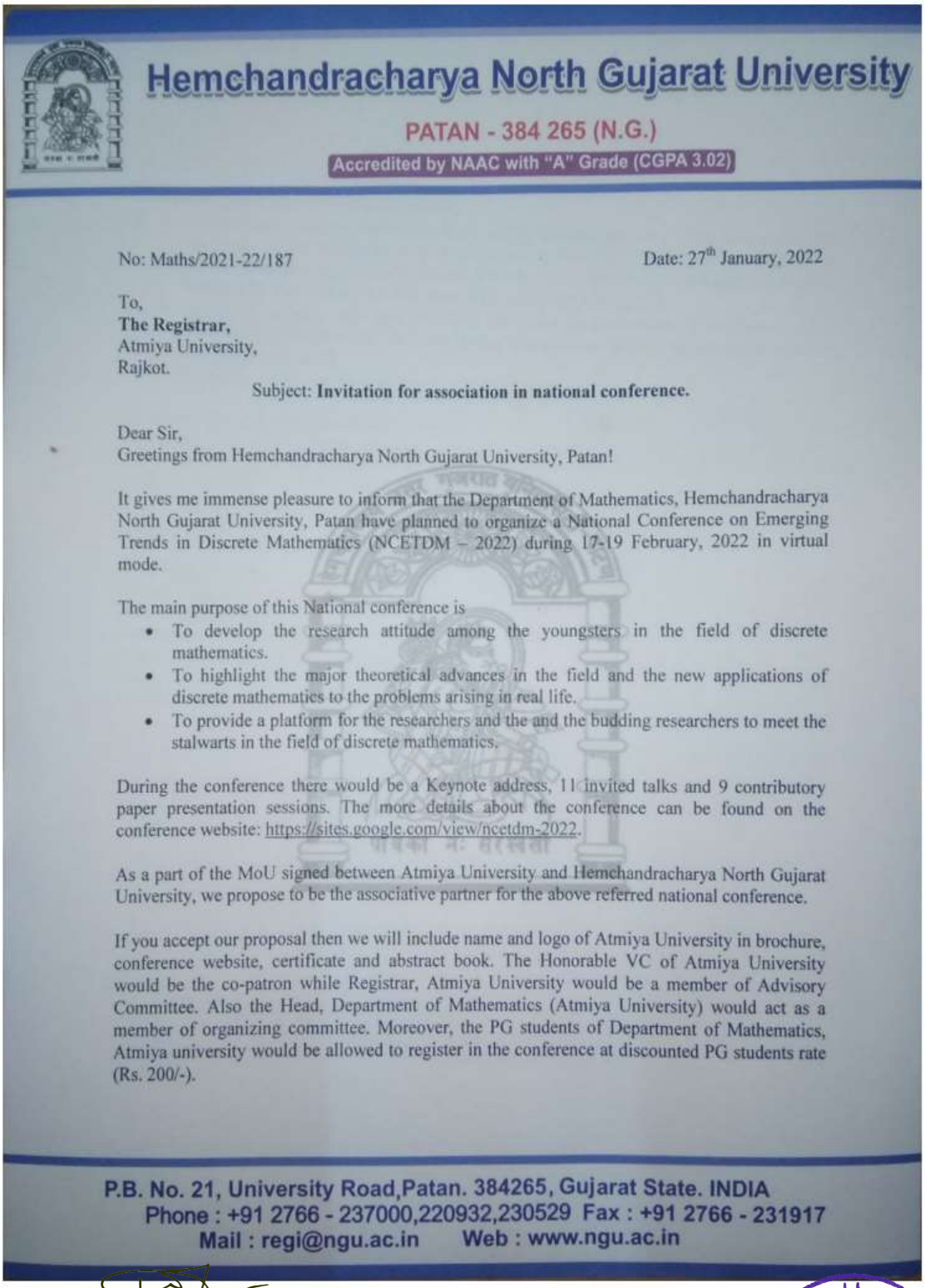
Welcome Address:	**Dr. Atulkumar V. Kadia** (Convener, NCETDM - 2022) Head, Department of Mathematics, Hemchandracharya North Gujarat University, Patan
About the Conference:	**Dr. Chirag M. Barasara** Organizing Secretary, NCETDM - 2022
Presidential Address:	**Prof. J. J. Vora** Honourable Vice Chancellor, Hemchandracharya North Gujarat University, Patan
Address by Guest of Honour:	**Dr. Shiv K. Tripathi** Honourable Vice Chancellor, ATMIYA University, Rajkot
Address by Special Invitee:	**Dr. Sheela Ramachandran** Honourable Pro Chancellor, ATMIYA University, Rajkot
Address by Academic Secretary:	**Dr. Samir K. Vaidya** Professor and Head, Department of Mathematics, Saurashtra University, Rajkot
Vote of Thanks:	**Dr. D. D. Vyas** Registrar(I/C), ATMIYA University, Rajkot

Dr. D. M. Patel	Dr. D. D. Vyas	Dr. A. V. Kadia	Dr. C. M. Barasara
I/c Registrar, HNGU, Patan	I/c Registrar, ATMIYA University, Rajkot	Convener, NCETDM - 2022	Organizing Secretary, NCETDM - 2022

Registrar
Atmiya University
Rajkot

Atmiya University, Rajkot

Atmiya University Rajkot



Hemchandracharya North Gujarat University

PATAN - 384 265 (N.G.)

Accredited by NAAC with "A" Grade (CGPA 3.02)

No: Maths/2021-22/187 Date: 27th January, 2022

To,
The Registrar,
Atmiya University,
Rajkot.

Subject: **Invitation for association in national conference.**

Dear Sir,
Greetings from Hemchandracharya North Gujarat University, Patan!

It gives me immense pleasure to inform that the Department of Mathematics, Hemchandracharya North Gujarat University, Patan have planned to organize a National Conference on Emerging Trends in Discrete Mathematics (NCETDM – 2022) during 17-19 February, 2022 in virtual mode.

The main purpose of this National conference is

- To develop the research attitude among the youngsters in the field of discrete mathematics.
- To highlight the major theoretical advances in the field and the new applications of discrete mathematics to the problems arising in real life.
- To provide a platform for the researchers and the and the budding researchers to meet the stalwarts in the field of discrete mathematics.

During the conference there would be a Keynote address, 11 invited talks and 9 contributory paper presentation sessions. The more details about the conference can be found on the conference website: https://sites.google.com/view/ncetdm-2022.

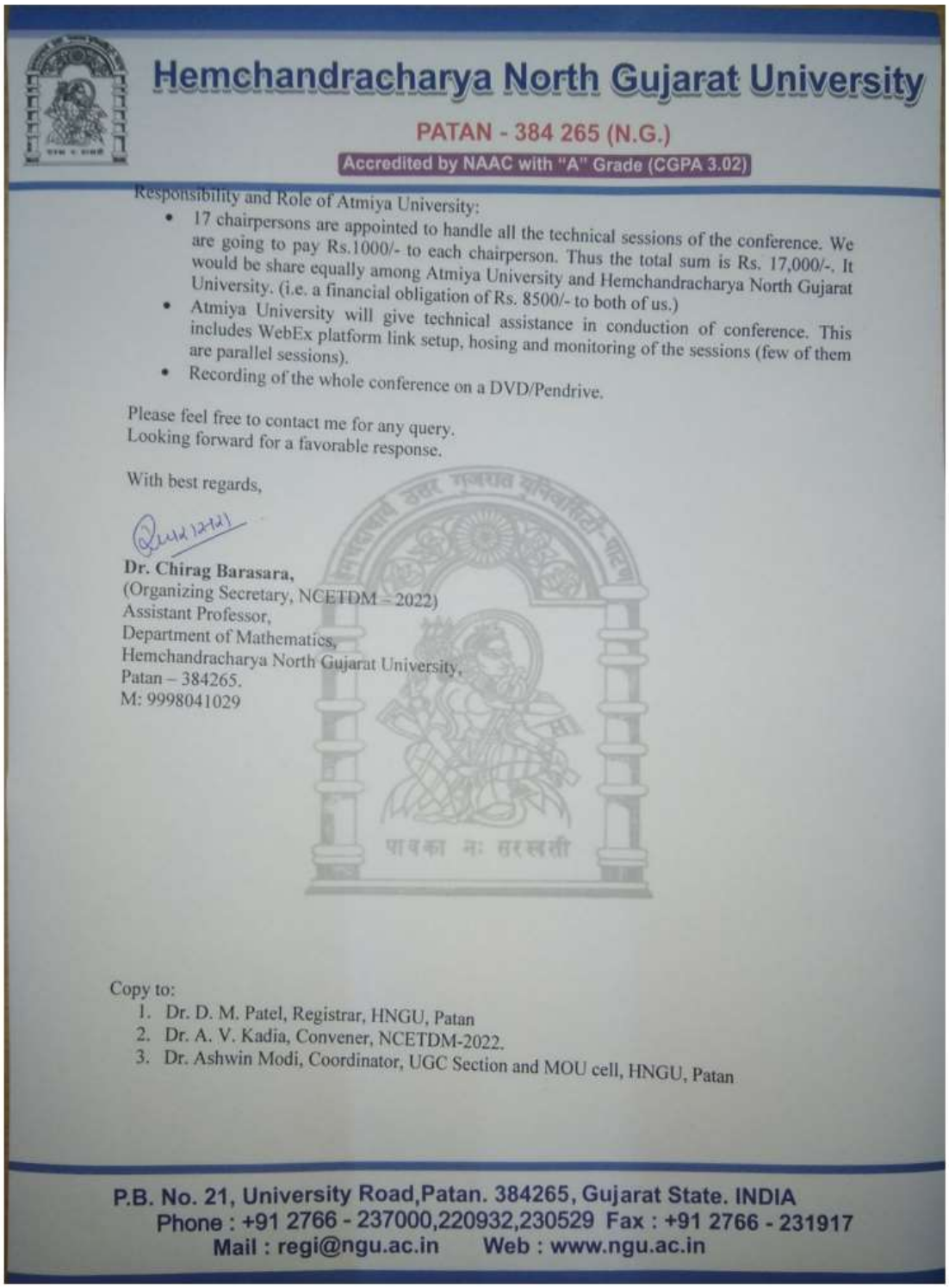
As a part of the MoU signed between Atmiya University and Hemchandracharya North Gujarat University, we propose to be the associative partner for the above referred national conference.

If you accept our proposal then we will include name and logo of Atmiya University in brochure, conference website, certificate and abstract book. The Honorable VC of Atmiya University would be the co-patron while Registrar, Atmiya University would be a member of Advisory Committee. Also the Head, Department of Mathematics (Atmiya University) would act as a member of organizing committee. Moreover, the PG students of Department of Mathematics, Atmiya university would be allowed to register in the conference at discounted PG students rate (Rs. 200/-).

P.B. No. 21, University Road,Patan. 384265, Gujarat State. INDIA
Phone : +91 2766 - 237000,220932,230529 Fax : +91 2766 - 231917
Mail : regi@ngu.ac.in Web : www.ngu.ac.in

Registrar
Atmiya University
Rajkot

Atmiya University Rajkot



Hemchandracharya North Gujarat University

PATAN - 384 265 (N.G.)

Accredited by NAAC with "A" Grade (CGPA 3.02)

Responsibility and Role of Atmiya University:

- 17 chairpersons are appointed to handle all the technical sessions of the conference. We are going to pay Rs.1000/- to each chairperson. Thus the total sum is Rs. 17,000/-. It would be share equally among Atmiya University and Hemchandracharya North Gujarat University. (i.e. a financial obligation of Rs. 8500/- to both of us.)
- Atmiya University will give technical assistance in conduction of conference. This includes WebEx platform link setup, hosing and monitoring of the sessions (few of them are parallel sessions).
- Recording of the whole conference on a DVD/Pendrive.

Please feel free to contact me for any query.
Looking forward for a favorable response.

With best regards,

Dr. Chirag Barasara,
(Organizing Secretary, NCETDM – 2022)
Assistant Professor,
Department of Mathematics,
Hemchandracharya North Gujarat University,
Patan – 384265.
M: 9998041029

Copy to:

1. Dr. D. M. Patel, Registrar, HNGU, Patan
2. Dr. A. V. Kadia, Convener, NCETDM-2022.
3. Dr. Ashwin Modi, Coordinator, UGC Section and MOU cell, HNGU, Patan

P.B. No. 21, University Road,Patan. 384265, Gujarat State. INDIA
Phone : +91 2766 - 237000,220932,230529 Fax : +91 2766 - 231917
Mail : regi@ngu.ac.in Web : www.ngu.ac.in

Registrar
Atmiya University
Rajkot

Atmiya University

Rajkot

NATIONAL CONFERENCE ON

Emerging Trends in Discrete Mathematics

February 17-19, 2022
(Virtual Mode)

IMPORTANT DATES

Full Paper Submission by:	January 10, 2022
Notification to Presenter:	January 25, 2022
Registration and Fee Payments By:	January 31, 2022

OBJECTIVES

The main purpose of this National conference is

- To develop the research attitude among the youngsters in the field of discrete mathematics.
- To highlight the major theoretical advances in the field and the new applications of discrete mathematics to problems arising in industry and business.
- To provide a platform for the researchers and the young mathematicians to meet and discuss with stalwarts in the field of discrete mathematics.

Organized by

Department of Mathematics,
Hemchandracharya North Gujarat University,
Patan – 384265, Gujarat, India.

in association with

ATMIYA University,
"Yogidham Gurukul", Kalawad Road,
Rajkot – 360005, Gujarat, India

https://sites.google.com/view/ncetdm-2022

Registrar
Atmiya University
Rajkot

Atmiya University Rajkot

ABOUT THE UNIVERSITY

Acharya Hemachandra was an Indian Jain saint and scholar during 1088 AD to 1177 AD who contributed remarkably to Jain literature and grammar of Sanskrit language.

Hemchandracharya North Gujarat University was established on 17-05-1986. The lush green campus of university is spread over an area of 212.5 acres. There are 19 postgraduate and 3 Undergraduate departments on the campus. More than 1, 50, 000 students are studying in 405 affiliated collages. The university was accredited with 'A' Grade (CGPA3.02) by NAAC in the last cycle.

ABOUT THE DEPARTMENT

The Department of Mathematics is the pioneering department of the University since 1993. Department offers Postgraduate Program in Mathematics and Ph.D. program in the area of Graph Theory. We focus on the quality education, innovative research and carry out all academic activities in order to realize the Vision and Mission of the University. Alumni of this department are serving at very reputed educational and research institutes. Faculty members of this department are actively taking interest in shaping the career as well as future of the students.

ABOUT THE CONFERENCE

The subject of Mathematics plays a vital role for the all round growth of human kind and all the branches of Mathematics have rigorous applications for solutions of the problems arising in real life. Discrete Mathematics is one of such branches which has paved the path for the growth and development of computer science and it is considered as mathematical language of computer science.

The various domains of discrete mathematics are graph theory, coding theory, block design, matrices and cryptography. Our nation has contributed significantly in the field of graph theory and in Gujarat also, many researchers are working in this emerging field. Considering this fact the National Conference on Emerging Trends in Discrete Mathematics (NCETDM-2022) is organized with the aim to provide the platform to budding researchers.

KEYNOTE SPEAKER

Prof. Ambat Vijayakumar,
Emeritus Professor,
Cochin University of Science and Technology,
Kochi, Kerala, India

INVITED SPEAKERS

- Prof. T. Tamizh Chelvam, MS University, Tamil Nadu
- Prof. Samir K. Vaidya, Saurashtra University, Gujarat
- Prof. Nita H. Shah, Gujarat University, Gujarat
- Prof. R. Kala, MS University, Tamil Nadu
- Prof. H. S. Ramane, Karnatak University, Karnataka
- Fr. Joseph Varghese, Christ University, Karnataka
- Prof. B. Basavanagoud, Karnatak University, Karnataka
- Dr. B. Gayathri, Periyar E.V.R. College, Tamil Nadu
- Dr. Aparna Lakshmanan, CUSAT, Kerla
- Dr. Arti Pandey, IIT Ropar, Punjab
- Dr. Pranjali, University of Rajasthan, Rajasthan

Registrar
Atmiya University
Rajkot

Atmiya University Rajkot

CALL FOR PAPERS

In addition to invited talks by experts, there will be paper presentations. Researchers are requested to submit an abstract in about 200 words and the full paper of the original and unpublished research work in the LaTeX format available on conference website. All the submitted papers are subject to peer – reviewed before the acceptance.

The selected papers shall be published as a special volume in a SCOPUS / WOS / UGC-CARE Listed journal or as a book chapter with reputed international publisher. In this regard, a separate reviewing process shall be initiated and the details would be informed to the contributors after the conference.

REGISTRATION FEES

For paper presentation:	Rs. 500
For participation only:	Rs. 300
For participation by PG students:	Rs. 200

For more details about registration and abstract submission, please visit https://sites.google.com/view/ncetdm-2022

ADVISORY COMMITTEE

- Prof. Nita H. Shah
  Gujarat University, Ahmedabad.
- Prof. Haribhai R. Kataria
  The Maharaja Sayajirao University of Baroda, Vadodara.
- Prof. A. H. Hasmani
  Sardar Patel University, Vallabh Vidhyanagar.
- Prof. Dilip C. Joshi
  Veer Narmad South Gujarat University, Surat.
- Dr. Udayan M. Prajapati
  St. Xavier's Collage, Ahmedabad.
- Dr. Divyang D. Vyas
  ATMIYA University, Rajkot.

ORGANIZING COMMITTEE

PATRON

Prof. J. J. Vora
Honorable Vice- Chancellor,
Hemchandracharya North Gujarat University,
PATAN, GUJARAT, INDIA.

Co-PATRONS

Dr.Sheela Ramachandran
Honorable Pro Chancellor,
ATMIYA University,
RAJKOT, GUJARAT, INDIA.

Dr. Shiv K. Tripathi
Honorable Vice- Chancellor,
ATMIYA University,
RAJKOT, GUJARAT, INDIA.

CONVENER

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Department of Mathematics

in association with

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Rajkot, Gujarat(INDIA)

Cordially invite for the Valedictory function of

NATIONAL CONFERENCE ON
Emerging Trends in Discrete Mathematics
(NCETDM - 2022)

Date: 19th February 2022 (Saturday) **Time: 04:00pm**

PROGRAM SCHEDULE

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- Screening Results

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Synthesis of 8-methyl-2-phenylquinazolin-4(3H)-ones derived Schiff's bases: Spectroscopic properties, SAR, docking approaches and their anticancer and antimicrobial activity

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Synthesis of 8-methyl-2-phenylquinazolin-4(3*H*)-ones derived Schiff's bases: Spectroscopic properties, SAR, docking approaches and their anticancer and antimicrobial activity

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ABSTRACT

A series of new compounds based on 8-methyl-2-phenyl quinazolinone Schiff's base were synthesized from 3-amino quinazolinone intermediates. These compounds were evaluated for their potential as anticancer and antimicrobial agents through docking analysis. Anticancer evaluation was done against sixty different cancer cell lines. Compounds 7b and 7 h showed strong efficacy against Melanoma (MDA-MB-435 Cell lines) and Non-Small Cell Lung Cancer (NCI-H522), respectively. Compound 7 g was found to be predominantly effective against both breast cancer (HS-578T) and central nervous system cancer (SNB-19). The antimicrobial activity results showed that the newly synthesized compounds 7d and 7j, which contain halogen, exhibited potential inhibiting action against selected bacterial and fungal microorganisms. The SAR study revealed that compounds with EDGs like hydroxyl and *meta*-substituted chloro group were found to be more potent in anticancer studies; while compounds with EWGs substituted in the *para* position (7d and 7j) demonstrated higher antimicrobial activity. Moreover, Antimicrobial docking analysis indicated that compounds 7d and 7j have a high affinity towards molecular targets found in both bacteria and fungi, with negative binding energies ranging from -8 to -12.5 kcal/mol. We endorse further evaluation of these compounds in combination with standard antibiotics to potentially increase their synergistic effect.

1. Introduction

The investigation of heterocyclic compounds, as well as various aliphatic compounds like sulfonamide, is crucial for the development of novel drugs that are needed by the agrochemical and pharmaceutical industries. These substances play a vital role in advancing science and medicine, as well as creating medicinal drugs. [1–4]. Quinazolinones and their derivatives was reported for their versatile pharmacological activities especially in antimicrobial properties [5,6]. The fused ring types of quinazolinones heterocycles are considered the most significant group due to their extensive range of therapeutic applications [7–12]. Microbial infections are responsible for more deaths annually worldwide. Chloramphenicol, Ciprofloxacin and Norfloxacin are well-known antibiotics against a series of bacteria, and Nystatin and Griseofulvin are potent antifungal agents that were reported in various studies [13]. Also, these compounds were FDA-approved for the treatment of patients with microbial infections [14]. Although these compounds have significant therapeutic potential against the microbial infections caused by *E. coli, P. aeruginosa, S. aureus, S. pyogenes, C. albicans, A. niger* and *A. clavatus*, they are becoming resistant among patients and there is an urgent for the development for potent compounds [15–17]. A variety of FDA-approved medications, including anticancer and antimicrobial drugs, belong to various structural classes of quinazolinone. These drugs, such as Thymitaq as well as Idelalisib for cancer and Albaconazole for fungal infections, have been extensively researched and reviewed. In our ongoing search for more effective anticancer and antimicrobial drugs, we have developed and synthesized a new series of quinazolines based on the aforementioned rational (Fig. 1) [18].

Acylation of anthranilic acid with acyl chloride is a common method to produce 4(3*H*)-quinazolinone. After ring closure with acetic

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anhydride, the corresponding 1,3-benzoxazin-4-one (benzoxazinone) is derived, which can be treated with various amines to obtain 4(3*H*)-quinazolinone derivatives [19,20]. It's common to have issues with the ring opening of quinazoline during the synthesis of quinazoline from benzoxazinone. To avoid this problem, a modified synthesis technique has been developed for 3-amino-7-chloro-2-phenyl quinazolin-4 (3*H*)-one. Instead of using a solvent, it involves a fusion reaction carried out at 250 °C [21]. We synthesized a new family of Schiff bases that contain 2,3,6-trisubstituted quinazolinone derivatives beginning with 3-methyl-2-aminobenzoic acid. These results align with prior research and our commitment to enhancing our methods and exploring new approaches to drug development [22–32].

2. Experimental

2.1. Chemistry

In the presence of pyridine, we used benzoyl chloride (2) to carry out the *N*-acylation of 2-amino-3-methylbenzoic acid (1). This reaction resulted in the formation of 8-methyl-2-phenyl-4*H*-benzo[*d*][1,3]-oxazin-4-one (3) through dehydrative cyclization. Next, we attempted to mix it with hydrazine hydrate in ethanol to obtain 3-amino-8-methyl-2-phenylquinazolin-4(3*H*)-one (4), but instead, we ended up with a mixture of *N*-(2-(hydrazinecarbonyl)−6-methylphenyl)benzamide (5) due to ring-opening. We conducted an experiment where we repeated the reaction at a temperature of 150 °C without using any solvent. The desired product, which is 3-amino-8-methyl-2-phenylquinazolin-4(3*H*)-one (4), was successfully produced this time without any ring-opened structure (diamides). The fusion process proved to be much more convenient and time-saving as it only takes 1 h, which is significantly shorter than traditional reactions that can take up to 3 h. In the synthesis of quinazoline from benzoxazinone, ring opening is a common occurrence. However, this can be avoided by fusing benzoxazinone at high temperatures. This results in the necessary quinazoline being synthesized without any ring-opened quinazoline (diamides) being formed, as shown in Scheme 1. To produce the corresponding arylidene derivatives of quinazoline, we successfully condensed compound 4 with various substituted aromatic aldehydes in glacial acetic acid (7a-j).

2.2. Materials and methods

The chemicals used were of AnalaR grade of Sigma-Aldrich and used without further purification. The ^{1}H NMR (400 MHz) and ^{13}C NMR (125 MHz) spectra were recorded on a Bruker ultra-shield-400 spectrometer using $CDCl_3$ and DMSO-d_6 as solvents, and tetramethylsilane (TMS) was used as the internal standard for chemical shifts. Coupling constants (*J*) were indicated in hertz (Hz), and abbreviations such as s (singlet), d (doublet), t (triplet), and m (multiplet) were used. The Infrared spectra (ν, cm^{-1}) were recorded on a Shimadzu FTIR 8400S spectrophotometer using KBr pellets. Mass spectra were obtained on a Shimadzu GC-2010+ ultra-spectrometer. Elemental analyses were performed on an ECS 4010 Elemental Combustion System (Costech Instruments, Pioltello) and the resulting data were within the accepted range (±0.40) of the calculated values. The melting point was checked on an electro-thermal melting point apparatus (model 9100, Electrothermal Engineering Ltd.), and the results were reported uncorrected. To check the completion of the reaction, a 20 × 20 cm aluminum-coated sheet of TLC plates 60 F245 (E. Merck) was used. Two mobile phases were used: toluene: ethyl acetate (5:5 V/V) and ethyl acetate: n-hexane (2:8 V/V). The visualization of the plates was done under ultraviolet (UV) light.

2.2.1. Preparation of 8-methyl-2-phenyl-4H-benzo[d][1,3] oxazin-4-one (3)

Initially, 2-amino-3-methylbenzoic acid (1) (0.1 mol) was dissolved in 10 ml of pyridine by stirring. Con. benzoyl chloride (0.2 mol) was gradually added to the solution while stirring continuously at 0 °C to 5 °C. Keep the mixture at the same temperature for 1–2 h. The completion of the synthesis was monitored by TLC using ethyl acetate: toluene (5:5) solvent system. After the reaction is complete, stir it for an additional 1 h at room temperature. While stirring, add 30 ml of process water that has been pre-cooled with ice. The product was separated, filtered, washed with cooled water, and the solid was purified with methanol slurry. The solid was then vacuum dried at 30 °C to 35 °C to obtain the desired compound. LCMS: *m/z* 237 [M^+].

2.2.2. Preparation of 3-amino-8-methyl-2-phenylquinazolin-4(3H)-one (4)

Method-1 (Room temperature method): A mixture of 8-methyl-2-

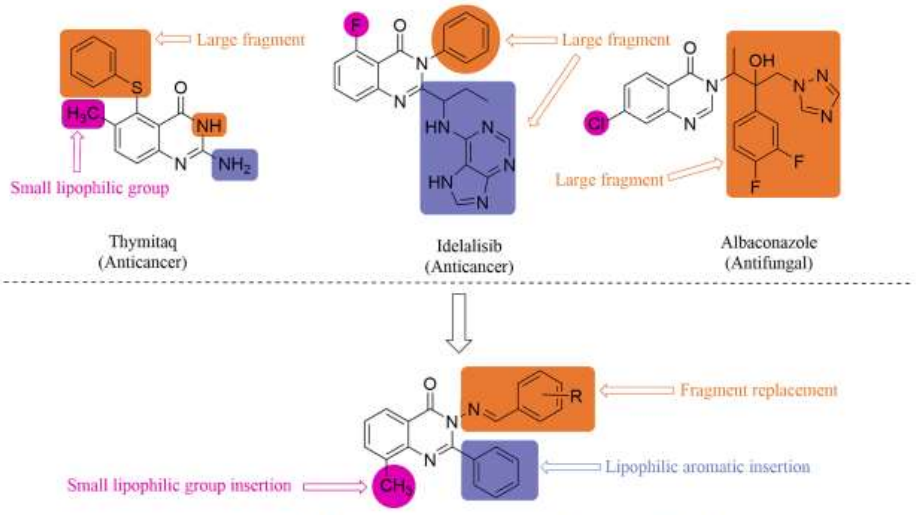

Fig. 1. Reported and proposed anticancer and antimicrobial quinazoline derivatives.

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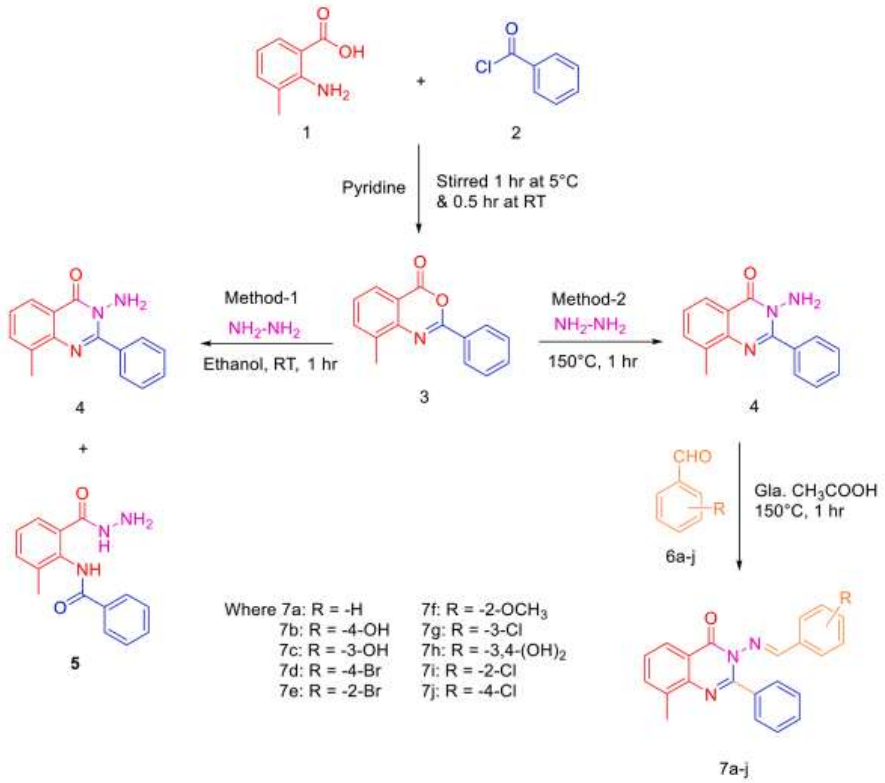

Scheme. 1. Synthetic route for the preparation of compounds 7a-j.

phenyl-4*H*-benzo[*d*][1,3]oxazin-4-one (3) (0.1 mol), ethanol (10 ml) and hydrazine hydrate (1 ml, 99 %) were taken in RBF. Stir the mixture at room temperature for 1 h, while the completion of reaction was monitored by TLC using ethyl acetate: toluene (5:5) solvent system. The reaction mass was poured into a mixture of methanol (2–3 ml) and ice-cold process water (10 ml). The separated products were filtered out, washed with methanol and water solution (2:8), vacuum dry the solid at 30 °C to 35 °C to afford the desired compounds. LCMS: *m/z* 238 [M^+]; LCMS: *m/z* 251 [M^+].

Method-2 (Optimized high temperature fusion method): A mixture of 8-methyl-2-phenyl-4*H*-benzo[*d*][1,3]oxazin-4-one (3) (0.1 mol) and hydrazine hydrate (0.5 mol, 99 %) were taken in RBF. Stir the mixture at 150 °C for 1 h, and the completion of reaction was monitored by TLC using ethyl acetate: toluene (5:5) solvent system. After stirring the mixture, let it cool down before adding a combination of 2–3 ml of methanol and 10 ml of ice-cold distilled water. Then, filter the reaction material and rinse it with a mixture of 8 parts water and 2 parts methanol. The solid was then vacuum dried at 30 °C to 35 °C to obtain the targeted compound (4). ^{1}H NMR ($CDCl_3$, 400 MHz): δ 8.19–8.17 (d, *J* = 0.4 Hz, 1H,), 7.91–7.88 (m, *J* = 2.0 Hz, 2H), 7.66–7.64 (d, *J* = 7.2 Hz, 1H), 7.55–7.51 (m, *J* = 1.6 Hz, 3H), 7.44–7.40 (t, *J* = 8.0 Hz, 1H), 5.05 (s, 2H, NH), 2.66 (s, 3H, CH_3); LCMS: *m/z* 251 [M^+]; Anal. Calcd. for: $C_{15}H_{13}N_3O$: C,71.70; H, 5.12; N, 16.72; Found: C, 71.68; H, 5.10; N, 16.65 %.

2.2.3. General procedure for 3-(aryl-benzylidene-amino)−8-methyl-2-phenylquinazolin-4(3H)-one (7a-j)

At first, 3-amino-8-methyl-2-phenylquinazolin-4(3*H*)-one (4) (0.1 mol) was dissolved in 2–3 ml of glacial acetic acid by stirring. Slowly add a mixture of glacial acetic acid (2 ml) and benzaldehyde derivatives (0.2 mol) into the solution at a temperature of 25 °C-35 °C until it becomes transparent. The mixture was refluxed at 150 °C for 1 h, and the completion of reaction was monitored by TLC using ethyl acetate: n-hexane (2:8) solvent system. After cooling, the reaction mixture was poured into a mixture of methanol (1–2 ml) and ice-cold process water (10 ml). The separated products were filtered out, washed with methanol and water solution (1:9), vacuum dry the solid at 30 °C to 35 °C to afford the desired compounds.

2.2.3.1. 3-(benzylideneamino)−8-methyl-2-phenylquinazolin-4(3H)-one (7a). Yield: 80 %; m.p.: 156–158 °C; IR (KBr, cm^{-1}): 3055 (Aromatic C—H), 2916 (C—H), 1681 (C = O), 1566 (C = N), 1450 (C = C), 1327 (C—N); ^{1}H NMR (DMSO-d_6, 400 MHz): δ 9.05 (s, 1H, N=CH), 8.09–8.07 (d, *J* = 7.2 Hz,1H), 7.77–7.73 (m, *J* = 8.0 Hz,5H), 7.61–7.58 (m, *J* = 5.2 Hz, 1H), 7.53–7.48 (m, *J* = 4.4 Hz, 6H), 2.60–2.51 (s, 3H, CH_3); ^{13}C NMR ($CDCl_3$, 125 MHz): δ 165.6, 159.1, 151.8, 144.7, 136.0, 134.7, 134.4, 132.4, 131.7, 129.8, 129.3, 128.3, 127.2, 126.1, 124.4, 121.0, 16.8; LCMS: *m/z* 339 [M^+]; Anal. Calcd. for: $C_{22}H_{17}N_3O$: C, 77.86; H, 5.05; N, 12.38; Found: C, 77.79; H, 5.03; N, 12.12 %.

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2.2.3.2. 3-((4-hydroxybenzylidene)amino)−8-methyl-2-phenylquinazolin-4(3H)-one (7b). Yield: 90 %; m.p.: 212–214 °C; IR (KBr, cm^{-1}): 3263 (OH), 3070 (Aromatic C—H), 2908 (C—H), 1635 (C = O), 1589 (C = N), 1450 (C = C), 1327 (C—N); ^{1}H NMR (DMSO-d_6, 400 MHz): δ 10.33 (OH), 8.79 (s, 1H, N=CH), 8.06–8.05 (d, *J* = 7.2 Hz, 1H), 7.75–7.71 (m, *J* = 7.2 Hz, 3H), 7.59–7.57 (d, *J* = 8.4 Hz, 2H), 7.50–7.42 (m, *J* = 7.6 Hz, 4H), 6.87–6.85 (d, *J* = 8.8 Hz, 2H), 2.58–2.50 (s, 3H, CH_3); ^{13}C NMR (DMSO-d_6, 125 MHz): δ 169.3, 161.6, 158.1, 151.9, 144.8, 135.7, 134.9, 134.7, 130.7, 129.8, 129.6, 127.6, 126.5, 124.3, 123.2, 121.0, 115.9, 17.0; LCMS: *m/z* 335 [M^+]; Anal. Calcd. for: $C_{22}H_{17}N_3O_2$: C, 74.35; H, 4.82; N, 11.82; Found: C, 74.26; H, 4.75; N, 11.72 %.

2.2.3.3. 3-((3-hydroxybenzylidene)amino)−8-methyl-2-phenylquinazolin-4(3H)-one (7c). Yield: 94 %; m.p.: 208–210 °C; IR (KBr, cm^{-1}): 3302 (OH), 3063 (Aromatic C—H), 2962 (C—H), 1658 (C = O), 1573 (C = N), 1458 (C = C), 1381 (C—N); ^{1}H NMR (DMSO-d_6, 400 MHz): δ 9.80 (OH), 8.93 (s, 1H, N=CH), 8.08–8.06 (d, *J* = 7.6 Hz, 1H), 7.76–7.71 (m, *J* = 7.6 Hz, 3H), 7.51–7.45 (m, *J* = 8.0 Hz, 4H), 7.33–7.29 (t, *J* = 7.6 Hz, 1H), 7.16–7.14 (d, *J* = 9.2 Hz, 2H), 6.98–6.96 (d, *J* = 8.0 Hz, 1H), 2.50 (s, 3H, CH_3); ^{13}C NMR (DMSO-d_6, 125 MHz): δ 169.6, 157.9, 157.7, 151.8, 144.7, 135.7, 134.8, 133.5, 130.1, 129.8, 129.7, 127.6, 124.4, 120.9, 120.3, 119.8, 113.8, 17.0; LCMS: *m/z* 335 [M^+]; Anal. Calcd. for: $C_{22}H_{17}N_3O_2$: C, 74.35; H, 4.82; N, 11.82; Found: C,74.32; H, 4.80; N, 11.75 %.

2.2.3.4. 3-((4-bromobenzylidene)amino)−8-methyl-2-phenylquinazolin-4(3H)-one (7d). Yield: 81 %; m.p.: 236–238 °C; IR (KBr, cm^{-1}): 3047 (Aromatic C—H), 2924 (C—H); 1681 (C = O), 1566 (C = N), 1450 (C = C), 1381 (C—N); ^{1}H NMR ($CDCl_3$, 400 MHz): δ 9.14 (s, 1H, N=CH), 8.22–8.21 (d, *J* = 7.6 Hz, 1H), 7.79–7.77 (d, *J* = 1.2 Hz, 2H), 7.67–7.66 (d, *J* = 7.2 Hz, 1H), 7.57 (s, 4H), 7.49–7.42 (m, *J* = 6.8 Hz, 4H), 2.70 (s, 3H, CH_3); ^{13}C NMR ($CDCl_3$, 125 MHz): δ 163.6, 163.6, 159.1, 151.8, 144.6, 136.1, 134.6, 134.62, 131.6, 131.4, 129.7, 129.5, 129.4, 127.2, 126.3, 126.2, 124.4, 120.9, 16.8; LCMS: *m/z* 417 [M^+]; Anal. Calcd. for: $C_{22}H_{16}BrN_3O$: C, 63.17; H, 3.86; N, 10.5; Found: C, 62.09; H, 3.56; N, 10.11 %.

2.2.3.5. 3-((2-bromobenzylidene)amino)−8-methyl-2-phenylquinazolin-4(3H)-one (7e). Yield: 92 %; m.p.: 218–220 °C; IR (KBr, cm^{-1}): 3063 (Aromatic C—H), 2916 (C—H), 1689 (C = O), 1581 (C = N), 1450 (C = C), 132 (C—N); ^{1}H NMR ($CDCl_3$, 400 MHz): δ 9.60 (s, 1H, N=CH), 8.27–8.25 (d, *J* = 7.6 Hz, 1H), 7.85–7.78 (m, *J* = 2.0 Hz, 3H), 7.67–7.64 (t, *J* = 6.8 Hz, 2H), 7.49–7.42 (m, *J* = 3.6 Hz, 4H), 7.36–7.28 (m, *J* = 2.0 Hz, 2H), 2.70 (s, 3H, CH_3); ^{13}C NMR ($CDCl_3$, 125 MHz): δ 164.2, 159.0, 151.8, 144.6, 136.0, 134.7, 134.6, 132.8, 132.5, 131.8, 129.7, 129.3, 127.9, 127.3, 127.2, 126.2, 125.6, 124.6, 121.0, 16.8; LCMS: *m/z* 417 [M^+]; Anal. Calcd. for: $C_{22}H_{16}BrN_3O$: C, 63.17; H, 3.86; N, 10.5; Found: C, 63.10; H, 3.76; N, 10.20 %.

2.2.3.6. 3-((2-methoxybenzylidene) amino)−8 methyl-2-phenylquinazolin-4(3H)-one (7f). Yield: 89 %; m.p.: 246–248 °C; IR (KBr, cm^{-1}): 3063 (Aromatic C—H), 2924 (C—H), 2839 (OCH_3), 1674 (C = O), 1573 (C = N), 1450 (C = C), 1327 (C—N); ^{1}H NMR ($CDCl_3$, 400 MHz): δ 9.38 (s, 1H, N=CH), 8.26–8.24 (d, *J* = 8.0 Hz, 1H), 7.88–7.82 (m, *J* = 1.2 Hz, 3H), 7.66–7.64 (d, *J* = 7.2 Hz, 1H), 7.49–7.40 (m, *J* = 1.6 Hz, 5H), 6.99–6.94 (t, *J* = 8.0 Hz, 2H), 3.88 (s, 3H, OCH_3), 2.71 (s, 3H, CH_3); ^{13}C NMR ($CDCl_3$, 125 MHz): δ 162.8, 159.0, 158.9, 151.8, 144.8, 135.9, 134.7, 134.3, 133.2, 129.8, 129.2, 127.2, 126.8, 125.9, 124.5, 121.1, 120.8, 120.3, 110.7, 55.1, 16.8; LCMS: *m/z* 369 [M^+]; Anal. Calcd. for: $C_{23}H_{19}N_3O_2$: C, 74.78; H, 5.18; N, 11.37; Found: C, 74.69; H, 5.06; N, 11.09 %.

2.2.3.7. 3-((3-chlorobenzylidene) amino)−8-methyl-2-phenylquinazolin-4(3H)-one (7 g). Yield: 83 %; m.p.: 182–184 °C; IR (KBr, cm^{-1}): 3055 (Aromatic C—H), 2916 (C—H), 1681 (C = O), 1566 (C = N), 1450 (C = C), 1327 (C—N), 763 (C—Cl); ^{1}H NMR ($CDCl_3$, 400 MHz): δ 9.19 (s, 1H, N=CH), 8.23–8.21 (d, *J* = 8.0 Hz, 1H), 7.81–7.78 (d, *J* = 1.2 Hz, 2H), 7.70–7.66 (t, *J* = 10.8 Hz, 2H), 7.58–7.57 (d, *J* = 7.6 Hz, 1H), 7.50–7.42 (m, *J* = 6.0 Hz, 5H), 7.39–7.35 (t, *J* = 8.0 Hz, 1H), 2.70 (s, 3H, CH_3); ^{13}C NMR ($CDCl_3$, 125 MHz): δ 163.1, 159.3, 151.8, 144.5, 136.1, 134.6, 134.5, 134.3, 131.4, 129.7, 129.5, 129.4, 127.7, 127.2, 126.5, 126.2, 124.5, 120.9, 16.8; LCMS: *m/z* 373 [M^+]; Anal. Calcd. for: $C_{22}H_{16}N_3ClO$: C, 70.68; H, 4.31; N, 11.24; Found: C, 70.52; H, 4.30; N, 11.16 %

2.2.3.8. 3-((3,4-dihydroxybenzylidene) amino)−8-methyl-2-phenylquinazolin-4(3H)-one (7 h). Yield: 94 %; m.p.: 256–258 °C; IR (KBr, cm^{-1}): 3225 (OH), 2746 (C—H), 1651(C = O), 1597 (C = N), 1458 (C = C), 1334 (C—N); ^{1}H NMR (DMSO-d_6, 400 MHz): δ 9.83–9.42 (s, 2H, OH), 8.70 (s, 1H, N=CH), 8.06–8.04 (d, *J* = 8.0 Hz, 1H), 7.74–7.70 (m, *J* = 7.6 Hz, 3H), 7.49–7.44 (m, *J* = 8.0 Hz, 4H), 7.17–7.16 (d, *J* = 1.2 Hz, 1H), 7.06–7.03 (d, *J* = 1.2 Hz, 1H), 6.84–6.82 (d, *J* = 8.0 Hz, 1H), 2.58–2.50 (s, 3H, CH_3); ^{13}C NMR (DMSO-d_6, 125 MHz): δ 169.8, 158.0, 151.9, 150.3, 145.7, 144.2, 135.6, 134.9, 134.6, 129.8, 129.6, 127.6, 126.5, 124.3, 123.5, 123.1, 121.0, 115.5, 113.6, 17.0; LCMS: *m/z* 371 [M^+]; Anal. Calcd. for: $C_{22}H_{17}N_3O_3$: C, 71.15; H, 4.16; N, 11.31; Found: C, 71.10; H, 4.09; N, 11.28 %.

2.2.3.9. 3-((2-chlorobenzylidene) amino)−8-methyl-2-phenylquinazolin-4(3H)-one (7i). Yield: 85 %; m.p.: 228–230 °C; IR (KBr, cm^{-1}): 3047 (Aromatic C—H), 2924 (C—H), 1681 (C = O), 1566 (C = N), 1450 (C = C), 1381 (C—N), 763 (C—Cl); ^{1}H NMR (DMSO-d_6, 400 MHz): δ 9.09 (s, 1H, N=CH), 8.08–8.06 (d, *J* = 7.6 Hz, 1H), 7.76–7.72 (m, *J* = 8.4 Hz, 5H), 7.59–7.57 (d, *J* = 7.6 Hz, 2H), 7.49–7.47 (m, *J* = 7.2 Hz, 4H), 2.59–2.50 (s, 3H, CH_3); ^{13}C NMR (DMSO-d_6, 125 MHz): δ 167.8, 157.9, 151.8, 144.6, 137.2, 135.8, 134.9, 134.8, 131.2, 130.1, 129.8, 129.3, 127.6, 126.7, 124.5, 120.9, 17.0; LCMS: *m/z* 373 [M^+]; Anal. Calcd. for: $C_{22}H_{16}N_3ClO$: C, 70.68; H, 4.31; N, 11.24; Found: C, 70.53; H, 4.20; N, 11.15 %.

2.2.3.10. 3-((3-chlorobenzylidene) amino)−8-methyl-2-phenylquinazolin-4(3H)-one (7j). Yield: 80 %; m.p.: 236–238 °C; IR (KBr, v_{max}, cm^{-1}): 3055 (Aromatic C—H), 2924 (C—H), 1689 (C = O), 1581 (C = N), 1450 (C = C), 1327 (C—N), 756 (C—Cl); ^{1}H NMR (DMSO-d_6, 400 MHz): δ 9.50 (s, 1H, N=CH), 8.09 (s, 1H), 7.75 (s, 4H), 7.62 (s, 2H), 7.50–7.42 (s, 5H), 2.60–2.51 (s, 3H, CH_3); ^{13}C NMR (DMSO-d_6, 125 MHz): δ 164.2, 158.0, 152.0, 144.5, 135.7, 135.0, 133.8, 130.2, 130.0, 129.8, 129.7, 127.8, 127.6, 127.5, 126.7, 124.6, 121.0, 17.0; LCMS: *m/z* 373 [M^+]; Anal. Calcd. for: $C_{22}H_{16}N_3ClO$: C, 70.68; H, 4.31; N,11.24; Found: C,70.45; H, 4.28; N, 11.16 %.

2.3. Anticancer screening assay

The Anticancer screening process was assessed by the Developmental Therapeutics Program (DTP) at the National Cancer Institute located in Bethesda, USA. In the initial stage of screening, all compounds (7a-j) were tested against 60 cell lines at a single dose of 10^{-5} M. The 60 human cancer cell lines were categorized into nine subpanels, each representing a different human cancer type, including Leukemia, Non-Small Cell Lung Cancer, Colon, CNS, Melanoma, Ovarian, Renal, Prostate, and Breast Cancer cell lines. The COMPARE application was used to analyze the mean graph obtained from the initial stage screening, following the protocol described in the literature [33].

2.4. Chemicals, cell culture and maintenance

The A459 lung adenocarcinoma and MCF7 breast cancer cells were purchased from NCCS, India. Both A549 and MCF7 cells were cultured in DMEM (Sigma) medium supplemented with 10 % Fetal Bovine Serum (HiMedia), antimycotic solution (HiMedia) and maintained in 5 % CO_2 incubator at 37 °C. The cells were properly maintained for the further use.

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2.5. MTT cytotoxicity assay

The cytotoxicity potential of the compounds was determined using the MTT assay [34]. About 1×10^5 density of cells were seeded in 96-well plated and maintained in 5 % CO_2 incubator at 37 °C for 24 h. Then the cells were treated with the standard anticancer drug doxorubicin (Dox), and compounds 7b, 7 g, and 7 h ranging from at various concentrations (15.6 to 500 μM) to evaluate the dose response relationship (Fig 2). Then the cells were incubated in 5 % CO_2 incubator at 37 °C for 24 h. Then about 50 μL of MTT dye was added to the plates and incubated again for 2 h and following solubilized and then absorbance was measured at 570 nm using Multimode varioscan (Thermo Scientific).

2.6. Antimicrobial screening assay

The antimicrobial activity of synthesized molecules (7a-j) was tested against various gram-positive and negative microorganisms such as *E. coli* [MTCC 443], *P. aeruginosa* [MTCC 1688], *S. aureus* [MTCC 96], *S. pyogenes* [MTCC 442], and fungi such as *C. albicans* [MTCC 227], *A. niger* [MTCC 282] and *A. clavatus* [MTCC 1323]. The minimum inhibitory concentration (MIC) of the synthesized molecules was evaluated through the Mueller Hinton Broth dilution method following the National Committee for Clinical Laboratory Standards (NCCLS) protocol [35]. Initially the microorganisms were cultured in the broth solution and varying concentrations (1000 to 250 μg/mL) were taken in different tubes, to which various concentrations (50, 25, 12.5, and 10 μg/mL) of the compounds were added and incubated for 24 h. Alongside, Chloramphenicol, Ciprofloxacin & Norfloxacin were used as standards against bacteria and Nystatin & Griseofulvin were used as standards against fungal species used in the study. Then the minimum inhibitory concentration (MIC) of the compounds were evaluated by measuring the turbidity of the microbial broth [36].

2.7. Molecular docking analysis

In order to conduct our docking study, we obtained the 3D structures for the bacterial and fungal targets from the Protein Data Bank database, as indicated in Table 1 [37]. Then, we prepared the proteins by removing excess chains, water molecules, and bound ligands. Standard compounds such as Chloramphenicol, Ciprofloxacin, Norfloxacin, Nystatin, and Griseofulvin were retrieved from the PubChem database, as shown in Table 2 [38]. Additionally, we predicted the 2D structures and smiles of our compounds using Chemdraw, and their 3D structures were retrieved using Open Babel. Finally, we minimized the compounds' energies using the MMFF94 force field in the Avogadro program version 1.2.0. [39].

The synthesized compounds were evaluated for their binding affinities and energies against various bacterial and fungal targets using Auto Dock Vina [40,41]. First, suitable active pockets of the targets were identified. Then, the grid box dimensions were set at 25 × 25 × 25 in the X, Y, & Z directions with a point spacing of 0.375 Å. The compounds were docked against the targets using the Lamarckian genetic algorithm with 10 runs. Finally, the docked complexes were visualized using the Discovery Studio visualizer.

Table 1
PDB IDs of bacterial and fungal targets.

Microorganism name	Target	PDB ID
Escherichia coli	CusC	3PIK
E. coli	Multidrug efflux pump submit AcrB	4U8V
Pseudomonas aeruginosa	MexABOprM	6IOL
Pseudomonas aeruginosa	TriABC	6VEJ
Staphylococcus aureus	Cadmium efflux system accessory protein	1U2W
Staphylococcus aureus	Multidrug Efflux Pump MepR	4LLL
Staphylococcus pyogenes	Tagatose-1,6-bisphosphate aldolase	5F2M
Staphylococcus pyogenes	Streptopain	6UQD
Candida albicans	Serine/Threonine phosphatase Z1	5JPF
Candida albicans	Sterol 14-alpha demethylase	5TZ1
Aspergillus niger	Chitinase B	6IGY
Aspergillus niger	Prolyl end proteases	7WAB
Aspergillus clavatus	SPHERULIN-4	5D6T
Aspergillus clavatus	M36 protease	7Z6T

Table 2
PubChem IDs of standard drug compounds.

Target	PubChem ID
Chloramphenicol	5959
Ciprofloxacin	2764
Norfloxacin	4539
Nystatin	6,433,272
Griseofulvin	441,140

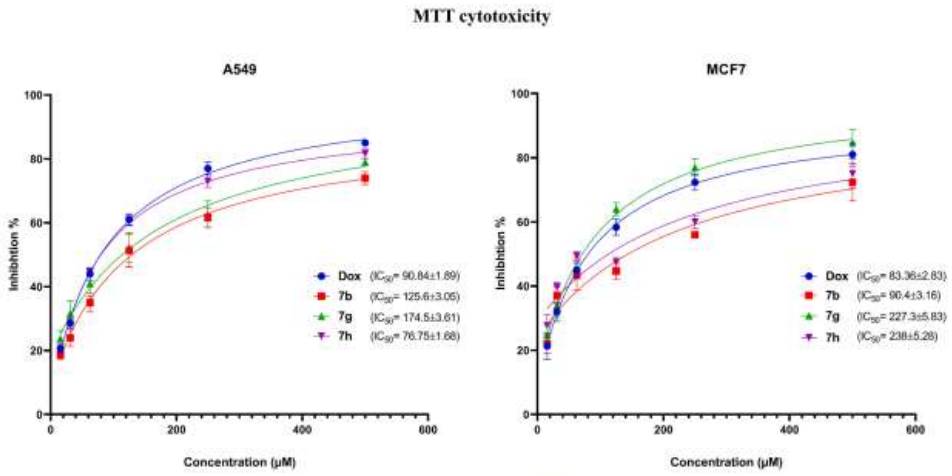


Fig. 2. MTT cytotoxicity.

2.8. Statistics

For the statistical analysis, the graph pad prism 8 was used and the data were represented as Mean ± SD. One-way ANOVA followed by Tukey's test and multiple comparisons test were employed to determine the significant difference between the control and treatment groups. The statistical difference * denotes $p < 0.05$, ** denotes $p < 0.01$, and *** denotes $p < 0.005$.

3. Results and discussion

3.1. Spectral characteristics

In order to ensure the accuracy of the proposed structure, each compound was characterized using FTIR, ^{13}C NMR, ^{1}H NMR, and LCMS techniques. The IR spectrum of compound 7a-j showed an absorption band at 1635–1689 cm^{-1}, which was caused by the C = O group in the quinazoline moiety. Additionally, there was a strong absorption band at 1327–1381 cm^{-1}, which was caused by the C—N linkage present in the rings. The C—Cl stretching vibration appeared at 756–763 cm^{-1}, while the OH broad band appeared at 3225–3302 cm^{-1}. Singlet peaks were observed in the range of δ = 8.7–9.6 ppm in the ^{1}H NMR spectra of compound 7a-j. These peaks indicate that an imine (>HCN=) has been synthesized in the molecules. The formation of this imine was further confirmed by the disappearance of the primary amine peak of compound 4 at 5.05 δ ppm. Peaks in the range of δ = 7.4–6.8 ppm indicate the presence of aromatic protons. The OH peak singlet was observed at 10.33, 9.80, 9.83, and 9.42 ppm for compounds 7b, 7c, and 7 h, respectively. Furthermore, signals for CH_3 protons in compounds 7a-j were detected in the range of δ = 2.50–2.71 ppm. The ^{13}C NMR spectrum of compounds 7a-j exhibited a distinct signal between δ = 169.8–162.8 ppm, which was attributed to the C=NH carbon. Additionally, the signal of O = C—N for all compounds was observed within the range of δ = 157.9–159.3 ppm. The signal of methyl carbon confirmed their appearance in all compounds appeared at δ = 16.8 and 17.0 ppm. The mass spectra of compounds 7a-j showed respective molecular ion peaks that confirm their proposed structure. The experimental part provides the spectral values and C, H, N analysis data for all compounds.

3.2. Anticancer activity

The growth percent and mean growth percent of all compounds were evaluated for anticancer activity of the compounds and tabulated in Table 3, and newly synthesized compounds showed weak to low effects against all 60 evaluated cell lines when given a single dose of 10^{-5} M concentration. Compound 7b demonstrated good activity against Melanoma (MDA-MB-435 Cell lines), which was unusual. On the other hand, Compound 7 g had excellent activity against breast cancer (HS-578T) and cancer of the central nervous system (SNB-19), while Compound 7 h stood out as potent for treating Non-Small Cell Lung Cancer (NCI-H522). In the supplementary material, one-dose graphs with growth percentage values were provided (Figs. 51-60). From the screening analysis we observed that the compounds 7b, 7 g, and 7 h showed significant growth inhibition of cancer cells such as breast cancer, and lung cancer. So, we further performed MTT cytotoxicity assay of compounds 7b, 7 g, and 7 h in comparison with the standard anticancer drug doxorubicin in A459 lung adenocarcinoma and MCF7 breast cancer cells. The results revealed that these compounds are cytotoxic towards the cancer cells which was shown in the Fig. 2. When compared to other compounds 7 h (IC_{50}=76.75±1.68) showed signification inhibition of A549 lung cancer cells, while doxorubicin showed IC_{50}=90.84±1.89. In MCF7 breast cancer cells, 7b (IC_{50}=90.4 ± 3.16) showed signification inhibition compared to other compounds, and the doxorubicin showed IC_{50}=83.36±2.83.

Table 3
Anticancer screening analysis.

Entry	Cancer Type	Active Cell Lines	Growth Percent	Mean Growth Percent
7a	BC	MCF-7	47.40±1.16	89.76±2.20
7b	M	MDA-MB-435	4.20±0.35	47.40±1.75
7c	BC	T-47D	64.54±1.83	94.16±2.1
7d	RC	RXF-393	11.31±0.91	59.54±1.85
7e	BC	T-47D	54.76±1.35	88.27±1.90
7f	BC	T-47D	60.35±2.1	98.40±2.51
7g	CNSC; BC	SNB-19; HS-578T	6.55±0.95; 3.57 ±0.69	58.93±1.85
7h	NSCLC	NCI-H522	4.96±0.61	42.16±1.18
7i	BC	MDA-MB-231/ ATCC	18.11±0.78	60.92±1.12
7j	L	CCRF-CEM	45.75±1.34	86.12±1.2

L = Leukemia; NSCLC = Non-Small Cell Lung Cancer; CRC = Colon Cancer; CNSC = Central Nervous System Cancer; OC: Ovarian Cancer; RC: Renal Cancer; BC: Breast Cancer; *M* = Melanoma.

3.3. Antimicrobial activity

As per the results of the antimicrobial screening, the newly synthesized compounds exhibited varied levels of antimicrobial activity against the tested microorganisms when compared to standard medicines (Table 4). Compound 7d showed good efficacy against *E. coli*, while compounds 7e and 7 g displayed equipotent inhibition against *P. aeruginosa*. Compound 7 g (−3-Cl) and 7j (−4-Cl) showed equipotent inhibition against *S. aureus*, in reference to Chloramphenicol. Compound 7j showed excellent activity, and compounds 7e and 7i exhibited good inhibition against *S. pyogenes*. Among the tested fungal strains, compound 7d was found to be excellent against *C. albicans*, and compounds 7d and 7j showed equipotent inhibition against *A. niger*. None of the compounds were found to be active against *A. clavatus*. The remaining synthetic substances showed only minimal action against the examined microorganisms.

3.4. Molecular interactions of hit compounds with targets

Molecular docking analyses were conducted to evaluate the synthesized compounds and compare them with standard antibiotics, targeting crucial pathogens in both bacteria and fungi. The selected targets for the docking analysis included molecular targets that play a role in the growth, survival, metabolism, and antimicrobial resistance of pathogenic microorganisms. The compounds 7d and 7j were docked against the molecular targets (efflux pumps) pathogenic bacteria such as *E. coli*, *Pseudomonas aeruginosa*, *Staphylococcus aureus*, and *Staphylococcus pyogenes*, as well as pathogenic fungi such as *Candida albicans*, *Aspergillus niger*, and *Aspergillus clavatus*. The binding energies (Kcal/mol) of these compounds, along with those of standard antibiotics such as Norfloxacin, Chloramphenicol, Ciprofloxacin (for bacteria) and Nystatin and Griseofulvin (for fungi), were recorded in Table 5 and 6, respectively.

Protein and ligand complexes' affinity is inversely proportional to the binding energy. This means that the lower the binding energy (negative values), the higher the affinities and vice versa [42–45]. Based on Table 5 and 6, all synthesized compounds have affinities towards molecular targets of bacteria and fungi. Among them, compounds 7d and 7j showed significant binding properties against all bacterial targets. Notably, they demonstrated higher negative binding energies against *E. coli* targets, namely CusC (3PIK) with binding energies of −10.4 Kcal/mol and −10.2 Kcal/mol and Multidrug efflux pump submit AcrB (4U8V) with binding energies of −10.2 Kcal/mol and −10.5 Kcal/mol, respectively. Additionally, compounds 7d and 7j also exhibited significant binding properties against all fungal targets. They also displayed higher negative binding energies against the *A. niger* targets, Chitinase B (6IGY) with −12.5 Kcal/mol and −12.4 Kcal/mol, and Prolyl

Table 4
Antimicrobial screening of the synthesized compounds 7a-j.

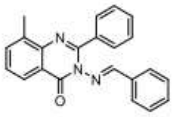
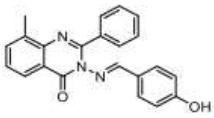
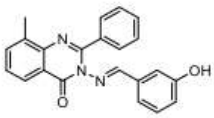
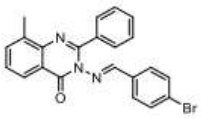
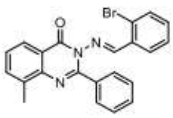
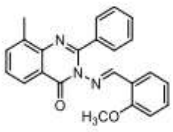
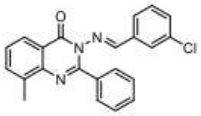
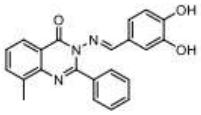
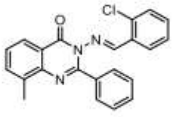
Sr. No	Structure	MINIMUM INHIBITORY CONCENTRATIONS						
		FOR BACTERIA (MIC) in μg/mL				FOR FUNGI (MIC) in μg/mL		
		Gram-negative		Gram-positive		Fungi		
		E.C.[a]	P.A.[b]	S.A.[c]	S .P.[d]	C.A.[e]	A.N.[f]	A.C.[g]
7a		250±3.5	500±4.5	500±4	500±3	N.E.[h]	1200±5.5	1200±4.5
7b		500±2.5	500±3.5	1200±5.5	250±3.5	1000±5.5	N.E.	500±4.5
7c		250±2.5	500±2.5	250±1.5	250±2.5	1200±5	500±4.5	500±5.5
7d		25±0.5	62.5 ± 1.5	100±1.5	100±0.5	100±0.5	100±0.5	250±1.5
7e		100±2.5	50±2.5	100±1.5	50±1	1000±5.5	250±3.5	1000±4.5
7f		500±3.5	1000±4.5	N.E.	500±3.5	1000±4	250±2.5	N.E.
7g		100±0.5	50±1.5	50±2	100±2.5	500±3.5	1000±4	500±3.5
7h		1000±3.5	500±4	250±2.5	500±3.5	N.E.	1000±3	1000±5.5
7i		250±2.5	100±1.5	100±2.5	50±1.5	1000±5.5	500±3.5	250±2

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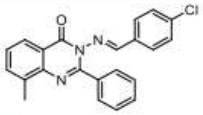
Table 4 (*continued*)

Sr. No	Structure	MINIMUM INHIBITORY CONCENTRATIONS						
		FOR BACTERIA (MIC) in μg/mL				FOR FUNGI (MIC) in μg/mL		
		Gram-negative		Gram-positive		Fungi		
		E.C.[a]	*P.A.*[b]	*S.A.*[c]	*S.P.*[d]	*C.A.*[e]	*A.N.*[f]	*A.C.*[g]
7j		100±1	62.5 ± 1.5	50±0.5	25±0.5	250±1	100±1.5	250±1.5
S.d.[i] 1	Chloramphenicol	50±0.5	50±0.5	50±1	50±0.5	–	–	–
S.d. 2	Ciprofloxacin	10±1	10±1	20±1.5	20±0.5	–	–	–
S.d. 3	Norfloxacin	10±1	10±0.5	10±0.5	10±1			
S.d. 4	Nystatin	–	–	–	–	100±1	100±0.5	100±1.5
S.d. 5	Griseofulvin	–	–	–	–	500±1.5	100±0.1	100±0.5

[a] *E.C.: E. coli* MTCC 443.
[b] *P.A.: Pseudomonas aeruginosa* MTCC 1688.
[c] *S.A.: Staphylococcus aureus* MTCC 96.
[d] *S.P.: Staphylococcus pyogenes* MTCC 442.
[e] *C.A.: Candida albicans* MTCC 227.
[f] *A.N.: Aspergillus niger* MTCC 282.
[g] *A.C.: Aspergillus clavatus* MTCC 1323.
[h] N.E.: Non effective.
[i] S.d.: Standard drug.

Table 5
Binding energies of compounds against bacterial targets.

Compounds	Binding energies (Kcal/mol)							
	3PIK	4U8V	6IOL	6VEJ	1U2W	4LLL	5F2M	6UQD
7a	−7.2	−9.3	−8.6	−7.5	−7	−8.9	−8.2	−8.4
7b	−7.6	−9.3	−8.2	−8.6	−7.1	−8.4	−8.5	−7.6
7c	−8	−9.6	−8.5	−8.5	−7.3	−8.1	−8.5	−7.8
7d	−10.4	−10.2	−8	−8.9	−8.2	−8.1	−8.4	−8.7
7e	−7.5	−8.3	−7.7	−7.7	−8.3	−7.6	−8.4	−7.6
7f	−8.1	−8.5	−7.5	−8.6	−7.9	−8.1	−7.4	−8.3
7g	−7.1	−8.6	−7.8	−8.8	−7.1	−8.1	−8.3	−8.1
7h	−7.2	−8.3	−7.6	−7.9	−7.1	−7.6	−7.8	−7.9
7i	−8.1	−8.4	−8.9	−8.5	−8.1	−7.7	−8.4	−8.6
7j	−10.2	−10.5	−8.5	−8	−8.2	−8.1	−8.1	−8.1
Chloramphenicol	−5.9	−6.5	−5.8	−6.8	−5.8	−6.8	−7.7	−6.6
Ciprofloxacin	−6.5	−8.2	−5.9	−88	−5.3	−8.2	−7.3	−6.3
Norfloxacin	−7.2	−7.1	−6.7	−7.2	−6.6	−7.7	−7.8	−6.5

Table 6
Binding energies of compounds against fungal targets.

Compounds	Binding energies (Kcal/mol)					
	5JPF	5TZ1	6IGY	7WAB	5D6T	7Z6T
7a	−8.6	−8.9	−8.9	−9	−9.3	−8.1
7b	−8.5	−8.6	−8.9	−9.9	−9.4	−8
7c	−8.1	−8.2	−9.1	−8.9	−8.7	−8.2
7d	−9.2	−9.1	−12.5	−10.3	−9.3	−9.7
7e	−8.1	−8.4	−9.7	−9.7	−8.9	−8.4
7f	−8.6	−8.3	−8.7	−9.7	−9.2	−8.5
7g	−8.1	−8.3	−9.4	−8.1	−9.4	−8.3
7h	−8.4	−8.5	−9.1	−9	−9.3	−8.6
7i	−8.4	−8.3	−9	−8.6	−9	−8.6
7j	−9.6	−9.1	−12.4	−11.2	−9.4	−9.7
Nystatin	−7.1	−8.6	−9.8	−9.6	−8.5	−9.2
Griseofulvin	−6.7	−7.6	−7.2	−7.2	−6.7	−6.8

endoprotease (7WAB) with −10.3 Kcal/mol and −11.2 Kcal/mol, respectively.

In addition, the hydrogen bonds are crucial in stabilizing protein-ligand complexes, which ensures the significant activity of the ligand molecule over the protein [34,46–49]. The supplementary Table 1 shows that H-bond interactions, along with other interactions such as hydrophobic interactions, electrostatic interactions, and Vander wall's force, are present. The 3D and 2D binding interactions of 7d and 7j against *E. coli* targets, specifically CusC (3PIK), and Multidrug efflux pump submit AcrB (4U8V), are shown in Fig 3. Further, the 3D and 2D binding interactions of 7d and 7j against *A. niger* targets, namely Chitinase B (6IGY), and Prolyl endoprotease (7WAB), are shown in Fig 4.

From the analysis of protein-ligand interactions, we can see that compound 7d had one hydrogen bond and six other interactions with CusC, as well as one hydrogen bond and two other interactions with the Multidrug efflux pump AcrB. On the other hand, compound 7j had seven other interactions but no hydrogen bond with CusC, and eight other interactions but no hydrogen bond with AcrB. Additionally, 7d showed one hydrogen bond and seven other interactions with Chitinase B, as well as two other interactions but no hydrogen bond with Prolyl endoprotease. Similarly, 7j had one hydrogen bond and six other interactions with Chitinase B, and two other interactions but no hydrogen bond with Prolyl endoprotease. Notably, both 7d and 7j had similar bonding interactions with the molecular targets, as shown in Fig 3 and 4, and supplementary Table 1.

We observed from the docking analysis and antimicrobial data that compounds with halogen groups showed potent activities. Compounds

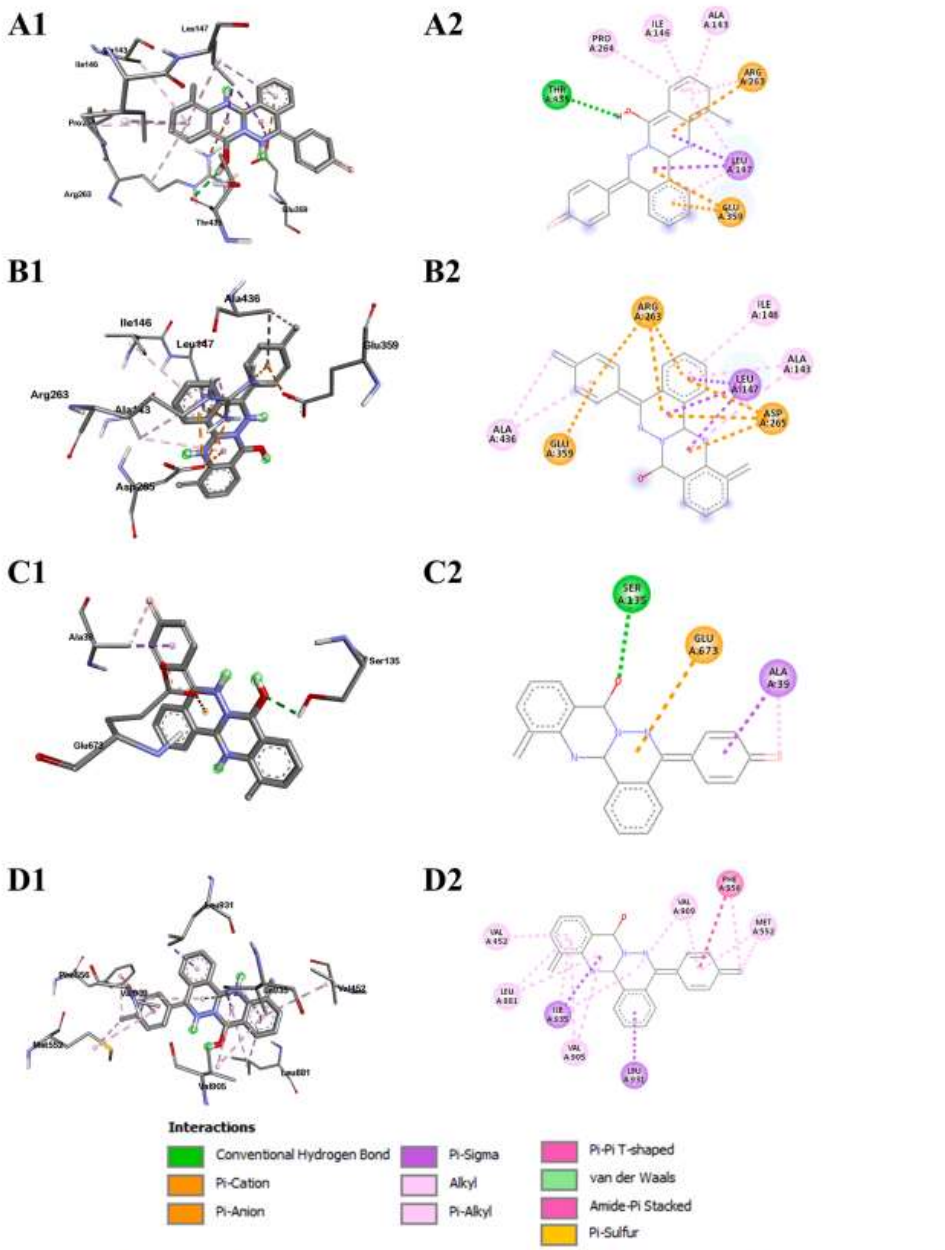


Fig. 3. Binding interactions of 7d and 7j against *E. coli.* targets [3D (left panel) and 2D (right panel) interactions of 7d (A1 and A2) and 7j (B1 and B2) against CusC (3PIK), and the 7d (C1 and C2) and 7j (D1 and D2) against Multidrug efflux pump submit AcrB (4U8V) were shown respectively].

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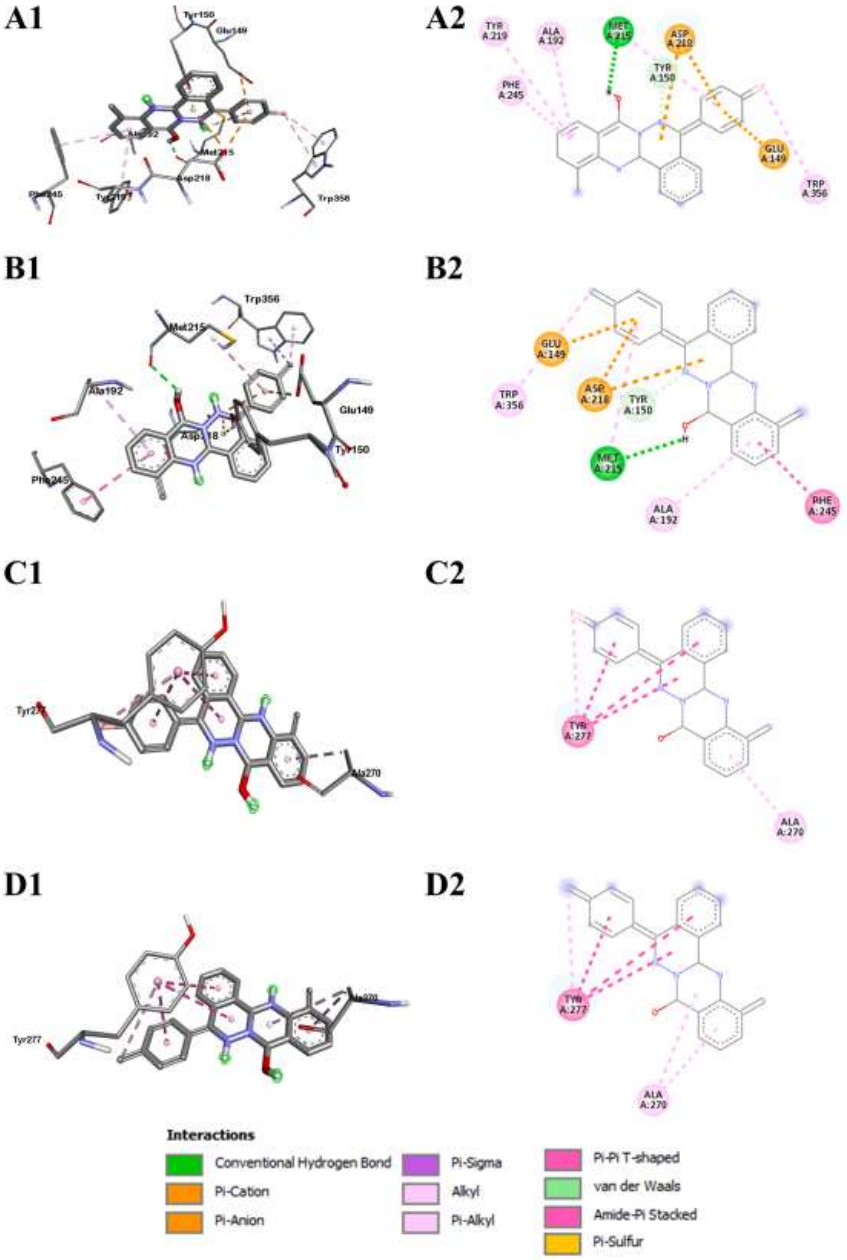

Fig. 4. Binding interaction on of 7d and 7j against *A. niger* targets [3D (left panel) and 2D (right panel) interactions of 7d (A1 and A2) and 7j (B1 and B2) against Chitinase B (6IGY), and the 7d (C1 and C2) and 7j (D1 and D2) against Prolyl endoprotease (7WAB) were shown respectively].

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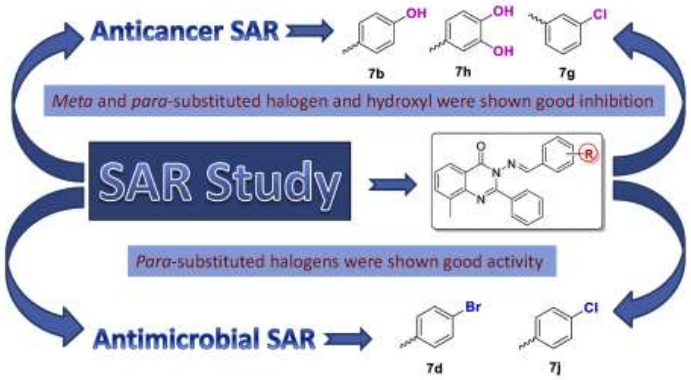

Fig. 5. SAR for anticancer and antimicrobial study.

with bromine (-Br) and chlorine (-Cl) substitutions were found to be more effective than the alcohol-substituted compound. Notably, the substituted groups in the *para* position (7d and 7j) showed higher efficacy than the *meta* and *ortho* position substituted compounds. The MIC of 7d and 7j against all bacterial strains was below 100 μg/mL, and the MIC of 7d and 7j against all fungal strains was below 250 μg/mL, as shown in Table 4. The synthesized compounds, 7d and 7j, exhibited significant binding energies and potent antimicrobial potential against pathogenic bacteria and fungi. Though these compounds showed significant inhibition potential against the molecular targets (growth, survival, metabolism, and antimicrobial resistance, efflux pumps) of the pathogenic microorganisms, we also suggest to evaluate these compounds in combination with standard antibiotics to increase the synergistic effect. Therefore, these compounds can be further investigated as potential leads against these pathogenic microorganisms in the future.

4. SAR study

A study was conducted to investigate the correlation between the structure of a compound and its antimicrobial and anticancer properties. The study found that the only factors that affect the activity of produced compounds are various substitutes (-R) attached to the aromatic ring. The positions of electron-donating groups (EDGs) and electron-withdrawing groups (EWGs) were found to significantly influence the effectiveness of antimicrobials and anticancer agents. It was found that only compounds with halogen substitutes that withdraw electrons were effective in antimicrobial studies. Among these, compounds 7d and 7j with electron-withdrawing groups (-Br and -Cl) at the *para* location showed good antimicrobial action and binding energy compared to compounds with *meta* and *ortho* substituted groups (7e, 7 g and 7i). In anticancer studies, it was found that electron-donating groups like hydroxyl and electron-withdrawing groups like chloro were both effective. However, this study showed that there were limitations to the effects of both types of groups. The good anticancer activity observed in compounds 7b and 7 h was attributed to the presence of EDG (-OH) in the *para* and *meta* positions, while the *meta*-substituted chloro group compound 7 g was also effective against two types of cancer (Fig 5).

5. Conclusion

Several new quinazolinone Schiff's base compounds were synthesized from 3-amino quinazolinone intermediates that were obtained by a modified fusion method. These derivatives were then evaluated for their potential as anticancer and antimicrobial agents through docking analysis. When compared to traditional treatments for anticancer activity in a single dose screening, the newly synthesized compounds exhibited weak to low effect against 60 cancer cell lines tested. However, compound 7b (4-OH) showed strong efficacy against Melanoma (MDA-MB-435 Cell lines). Compound 7 g (3-Cl) was particularly remarkable as it showed efficacy against both breast cancer (HS-578T) and central nervous system cancer (SNB-19). Finally, compound 7 h was found to be successful in treating Non-Small Cell Lung Cancer (NCI-H522). The results of the antimicrobial screening indicated that the newly synthesized compounds 7d and 7j, which contain halogen, showed significant effectiveness in inhibiting microbial growth. Notably, the compounds with substituted groups in the *para* position (7d and 7j) demonstrated higher antimicrobial activity than the ones with substituted groups in the *meta* and *ortho* positions. In addition, docking analysis revealed that compounds 7d and 7j exhibited significant affinities towards molecular targets of both bacteria and fungi. They also showed higher negative binding energies against these targets. Though these compounds showed significant inhibition potential against the various molecular targets (growth, survival, metabolism, and antimicrobial resistance, efflux pumps) of the pathogenic microorganisms, we also suggest to evaluate these compounds in combination with standard antibiotics to increase the synergistic effect. Therefore, these compounds have the potential to be studied further as potential treatments for harmful microorganisms in the near future.

CRediT authorship contribution statement

Naimish Ramani: Writing – original draft, Validation, Methodology, Investigation, Formal analysis, Conceptualization. **Bonny Y Patel:** Writing – review & editing, Visualization, Validation, Supervision, Project administration, Methodology, Investigation, Formal analysis. **Gopal Italiya:** Writing – original draft, Visualization, Validation, Software, Resources, Methodology, Data curation. **Prasanna Srinivasan Ramalingam:** Writing – original draft, Visualization, Validation, Software, Methodology, Investigation, Data curation. **Rudra Mishra:** Writing – original draft, Validation, Investigation, Formal analysis, Data curation. **Sangeetha Subramanian:** Writing – review & editing, Visualization, Validation, Supervision, Project administration, Methodology, Investigation, Formal analysis, Data curation. **Sanjay D Hadiyal:** Writing – original draft, Validation, Investigation, Data curation.

Declaration of competing interest

The authors declare that they have no conflicts of interest for this research publication.

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Data availability

No data was used for the research described in the article.

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Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.molstruc.2024.138256.

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Ajanta POLYMERS

MEMORANDUM OF UNDERSTANDING

Between

DEPARTMENT OF CHEMISTRY, FACULTY OF SCIENCE, ATMIYA UNIVERSITY, RAJKOT

and

AJANTA POLYMER

SURVEY No. 203, PLOT No. 3, NARMADA ROAD, SHAPAR-VERAVAL, RAJKOT - 360024

Whereas the above-named institutions recognize that a Memorandum of Understanding (MOU) would be of mutual benefit and would serve as an indication of continued interest in academic cooperation, it is understood that:

1. Each institution will promote one or more of the following activities based on their respective Academic and Industrial needs: **(Kindly put √ mark)**

A.	Curriculum Design	[ ]	E.	Research and Development	[ ]
B.	Industrial Training & Visits	[√]	F.	Skill Development Programs	[ ]
C.	Internships for Students	[√]	G.	Guest Lectures	[ ]
D.	Placement for Students	[ ]	H.	Faculty Development Programs	[ ]

2. Specific exchanges or activities that may be developed under the framework of this MOU shall be mutually discussed and agreed upon in writing by both parties prior to the initiation of that activity. Terms of cooperation and details of exchanges, joint programs or activities are to be developed through bilateral discussion and agreement on a case-by-case basis and attached as additions succeeding to the signing of this MOU. Each institution further agrees to appoint respective coordinators at the appropriate time for the specific activities agreed upon.

3. This MOU will become effective on the date of the last signature. It shall remain in force for a Period of five (5) year/s with the understanding that either institution may terminate it by giving 30 days' notice to the other party in writing, unless an earlier termination date is mutually agreed upon. The MOU may be amended or extended by mutual written consent of the Parties.

The parties hereby establish this MOU by duly signing it as of the respective date below.

Head
Department of Chemistry
Atmiya University
Rajkot - 360005
Date - 15/02/2022

Head of Department
Department of Chemistry
Faculty of Science
Atmiya University
Rajkot

Mr. Bhavesh Changela
Director
Ajanta Polymer
Shapar-Veraval - 360024
Date - 15/02/2022

FOR, AJANTA POLYMERS

PARTNER

Registrar
Atmiya University
Rajkot

Atmiya University Rajkot

AJANTA POLYMERS

Survey No.203, Plot No. 03, Narmada Gate B/h Inova Cast Pvt. Ltd.,
At, Veraval (Shapar)Ta.Kotda Sangani, Dist.:Rajkot - 360024.
Mobile No.:98252 18230,98795 18230 E-Mail: ajantapolymersbkc@yahoo.com

Date :- 01/02/2021

This is to certify that Mr. Patel Meet Pravinchandra Roll No. 06 B.Sc. Chemistry semester – 6 student of Department of Chemistry ATMIYA UNIVERSITY, Rajkot has successfully completed the Industrial Visit in January 2021.

During the visits he was found to be Inquisitive and having positive attitude with learning initiatives.

We wish him the very best for future academic career.

Thank you.

For,

Ajanta Polymers

(Partner)

Registrar
Atmiya University
Rajkot

Atmiya University

Rajkot

MEMORANDUM OF UNDERSTANDING (MoU)

BETWEEN

ATMIYA UNIVERSITY

RAJKOT - 360005, GUJARAT, INDIA

AND

AIC-NIFTTEA, INCUBATION CENTRE FOR TEXTILES AND APPARELS

TIRUPUR, TAMILNADU, INDIA

Atmiya University Rajkot

Registrar
Atmiya University
Rajkot

AIC-NIFT TEA

Atmiya University Rajkot

தமிழ்நாடு TAMILNADU

BB 687964

9/2/2021 AIC-NIFTTEA INCUBATION CENTRE FOR TEXTILES AND APPARELS, TIRUPPUR.

K. Hemapriya

கே.ஹேமபிரியா,
முத்திரைத்தாள் விற்பனையாளர்
உரிமம் எண். : 3/2008/சே.ரோ
கோவை மாவட்டம், தமிழ்நாடு

MEMORANDUM OF UNDERSTANDING

This Memorandum of Understanding (herein after called as MoU) is entered into on **22nd Day of February ,2021** by and between **Atmiya University, Rajkot - 360005, Gujarat, India,** along with the other institutions under the Sarvoday Kelavani Samaj (the Sponsoring Body), for more expansive reach and outcomes, on campus being represented herein by **SADHU TYAGVALLABHDAS, President, Atmiya University, Rajkot - 360005, Gujarat, India**(herein after referred **as First Party.** The Institution which expression, unless excluded by repugnant to the subject or context shall include its successors-in-office, administrators and assignees).

and

AIC NIFT- TEA, Incubation Center for Textiles and Apparels, Tirupur represented herein by **Mr.S.PERIASAMY, CEO, AIC NIFT-TEA Incubation Centre for Textiles and Apparels, East of TEKIC, Mudalipalayam, Tirupur – 641606, Tamilnadu** (hereinafter referred to as **"Second Party",** company which expression, unless excluded by or repugnant to the subject or context shall include its successors – in-office, administrators and assignees).

Atmiya University Rajkot

AIC-NIFT TEA

Registrar
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Rajkot

Atmiya University Rajkot

First Party and Second Party are hereinafter jointly referred to as 'Parties' and individually as 'Party')

WHEREAS:

A) First Party & Second Party believe that collaboration and cooperation between themselves will promote more effective use of each of their resources and provide each of them with enhanced opportunities to the Students.

B) The Parties intent to cooperate and focus their efforts on cooperation within area of Entrepreneurship development, Education and Research.

C) Both the Parties, being legal entities in themselves desire to sign this MOU for advancing their mutual interests.

D) **AIC NIFT- TEA, Incubation Centre for Textiles and Apparels, Tirupur**, supported by Atal Innovation Mission, the Second Party is engaged in Entrepreneurship Development, New product Development and Innovation, Skill Development, Education and R&D Services in ***Textiles and Apparels*** and related fields. ATMIYA University bestows wisdom and knowledge upon the learner to recognize this particular role. ATMIYA University emphasizes to train young minds in consonance with the doctrines of higher education and human values. The aim of this University is to spread eternal happiness and to create a happy society in letter and spirit.

Now, Therefore of the Mutual Promises set forth in this MoU that, both the Parties here to agree as Follows:

Clause 1- Co-operation

1.1. Both Parties shall work towards common interests and objectives, and they shall establish channels of communication and cooperation that will promote and advance their respective operations within the **Institution** and its related wings. The Parties shall keep each other informed of potential opportunities and shall share all information that may be relevant to secure additional opportunities for one another.

1.2. First Party and Second Party cooperation will facilitate effective utilization of the intellectual capabilities of the faculty of First Party providing significant inputs to them in identifying new technology & sustainable business, encouraging research collaborations and promote entrepreneurial services keeping in mind the needs of the Incubation Center, the Second Party.

Clause 2 -Objectives of the MoU

2.1. The budding graduates and faculty members from the Institution could play a key role in Developing business potential concepts and ideas, building innovative solutions, and

Page 3 of 6

Registrar
Atmiya University
Rajkot

Atmiya University Rajkot

Entrepreneurship. Both parties believe that close cooperation between the two would be of major benefit to the student community and faculty members to enhance their Entrepreneurial skills and knowledge.

2.2. **Entrepreneurship Forums & Visits:** Incubation Center and Institution interaction will give an insight in to the latest developments / requirements of the Start-ups; the Second Party to permit the faculty and students of the First Party to visit its premises and also Participate in Entrepreneurship forums and workshops to make presentations, participate in panel discussion or other similar events for the First Party. The Second Party will provide its Incubation facilities / hands-on training / Internship Programmes / Pre-Incubation Programmes of the learners enrolled with the First Party on terms agreeable to both the parties.

2.3. **Research and Development:** Both Parties have agreed to carry out the joint research activities in Textiles and Apparel and related fields.

2.4. AIC-NIFT TEA act as a Knowledge Transfer Centre (KTC) and interface between Educational Institutions and Industry. As a KTC AIC – NIFT TEA will facilitate the transfer of knowledge, ideas of students / faculty.

2.5. **Faculty Development Programs:** Second Party to train the faculty members of First Party for imparting training as per the requirement of Entrepreneurship and Startups on Entrepreneurial mind set, Entrepreneurial methods, Design thinking, Designing Business models and Building Network and Eco system at an agreeable fee fixed with the mutual consent of both first and second party at the time when required.

2.6. **Startup Business:** Second Party will actively engage to help the aspiring students and faculty members of the First Party into Successful Startups.

2.7. Both Parties to obtain all internal approvals, consents, permissions, and licenses of whatsoever nature required for the terms specified herein.

2.8. There is no financial commitment on the part of **Atmiya University,** the First Party and **AIC-NIFT TEA Incubation Centre for Textiles and Apparels**, the Second Party to take up any programme mentioned in the MoU.

2.9. Both Parties agree to respect each other's rights to intellectual property. Further, the intellectual property rights that arise as a result of any activity under this MoU will be worked out on a case-by-case basis, and will be consistent with the officially laid down IPR policies of both the Parties.

Registrar
Atmiya University
Rajkot

Atmiya University Rajkot

3. Role of Parties:

The First Party: ATMIYA UNIVERSITY

- May work jointly on research projects with AIC-NIFTTEA, the nature of sharing of roles and responsibilities as would be specific to each research project.
- Will conduct Innovation, Incubation and Entrepreneurship related short term programmes for students and faculty members of the Institution to nurture the entrepreneur dreams of the stakeholders.
- Will conduct market surveys, project feasibility studies and such other studies which will be of benefit for both the Atmiya University and AIC-NIFTTEA.
- Will offer its consultancy services in the field of textiles, technical textiles, management and allied disciplines.

The Second Party: AIC-NIFTTEA Incubation Centre

- Will coordinate with Atmiya University in framing and updating periodically the curriculum and syllabus for various textile related courses.
- Will facilitate access to the facilities of its members to the Atmiya University faculty and students for the purposes of practical knowledge in general and study of specific issue in particular that may be identified.
- Will offer students of Atmiya University in doing their internship training / project works with AIC-NIFTTEA.
- Will facilitate students of Atmiya University in taking up training programmes at AIC-NIFTTEA as part of the curriculum.

Clause 4-Validity

4.1 This Agreement will be valid in force for a period of 3 years from the date of signing of agreement subject to renewal by mutual consent of both the parties. However, both the parties reserve their right to terminate the agreement at any time by giving one-month prior notice in writing.

Clause 5-Relationship between the Parties

5.1 It is expressly agreed that **First Party** and Second **Party** are acting under this MOU as independent contractors, and the relationship established under this MOU shall not be construed as a partnership. Neither Party is authorized to use the other Party's name in any way, to make any representations or create any obligation or liability, expressed or implied, on behalf of the other Party, without the prior written consent of the other Party. Neither Party shall have, nor represent itself as having, any authority under the terms of this MoU to make agreements of any kind in the name of or binding upon the other Party, to pledge the other Party's credit, or to extend credit on behalf of the other Party.

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Atmiya University
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Atmiya University Rajkot

Clause 6 – Arbitration Clause

6.1 Any divergence or difference derived from the interpretation or application of the MoU shall be resolved by arbitration between the parties as per the Arbitration Act, 1996. The place of the arbitration shall be at District Head Quarters of the First Party.

Agreed and Signed on: 22nd Day of February ,2021

ATMIYA UNIVERSITY,
Yogidham Gurukul, Kalawad Road
Rajkot - 360005,
Gujarat, India.

Authorized Signatory

SADHU TYAGVALLABHDAS,
President, Atmiya University,
Rajkot - 360005, Gujarat, India
https://atmiyauni.ac.in/

Witness1:

Atmiya University Rajkot

AIC NIFT-TEA
Incubation Centre for Textiles and Apparels
SIDCO, Mudalipalayam, Tirupur- 641606,
Tamil Nadu.

Authorized Signatory

Mr. S.PERIASAMY
Chief Executive Officer
AIC-NIFTTEA Incubation Centre
http://www.aicnifttea.org

Witness2:

INCUBATION CENTRE FOR TEXTILES AND APPARELS AIC-NIFT TEA TIRUPUR

Registrar
Atmiya University
Rajkot

Page 5 of 5

Atmiya University

Rajkot

Registrar
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Rajkot

Atmiya University Rajkot

Timestamp	Name	Department	Institute / Entity name	Mobile	E-mail	Innovation Stage
3-9-2021 17:13:06	Jhanvi Vadi	Bsc. Microbiology	Aatmiya university	9879642668	jhanvivadi.31@gmail.com	Ideation, prototype, Scaleup
3-12-2021 10:10:07	Nandaniya krisha ashokbhai	B. Sc microbiology	Aatmiya university	9016819608	Krishanandaniya28@gmail.com	prototype
3-6-2021 10:23:00	Shefali A Patel	Biotechnology	Aatmiya University	6351766128	shefalichovatiya2712@gmail.com	Scaleup
3-5-2021 21:02:44	Prof. Darshan V. Patel	Mechanical Engineering	Ahmedabad institute of Technology, Ahmedabad	8401304649	darshan.patel@aitindia.in	Ideation, prototype, Scaleup
3-15-2021 14:54:59	Langhnoja Akash M	Mechanical	AITS	8320598092	langhnojaakashami@gmail.com	Ideation
3-15-2021 14:00:15	Parth Patel	Civil	AITS	6353777853	1129parth@gmail.com	Ideation
3-12-2021 19:11:08	mungra sneha prakashbhai	BSc Biotechnolgy	Atamiya university	7436044970	snehupatel1315@gmail.com	prototype
3-6-2021 21:16:45	Rajvi donga	IMBA	Atmiy institution of management	Vivo y12	rajvidonga5347@gmail.com	Ideation
3-7-2021 13:10:22	Chandresh	BBA EFB	Atmiya	8849206644	chandreshbapu178@gmail.com	prototype
3-6-2021 13:57:16	Jayesh pidhadiya	Commerce (EM)	Atmiya	9737897689	jaypidhadiya2004@gmail.com	Ideation
3-15-2021 10:12:22	Monish sagar	Mechanical	Atmiya	+919033737212	Monish sagar	Ideation
3-8-2021 18:04:31	Trivedi Mihir Pareshbhai	BBA(EFB)	Atmiya	9428747396	mihirtrivedi1702@gmail.com	Ideation
3-6-2021 13:50:40	Yash patel	Commerce	Atmiya	8866230224	Yashsavaliya413@gmail.com	Ideation
3-10-2021 9:38:00	Brinda vadukiya	Imba	Atmiya instead of technology	9510363790	brinda2242@gmail.co	Ideation
3-6-2021 18:22:44	Jhanvi dedakiya	B.com	Atmiya Institute	9428586182	janvidedakiya@gmail.com	Ideation
3-6-2021 21:21:35	Trada GunjanKumar	Imba	Atmiya institute of management	9016383040	gunjantrada521@gmail.com	Scaleup
3-15-2021 8:43:44	Nandaniya Rohan	B.com	Atmiya institute of technology	8780444075	rohannandaniya@gmail.com	Ideation, Scaleup
3-15-2021 14:54:56	Jitendra Rameshbhai Sagathiya	Mechanical Engineering	Atmiya Institute Of Technology And Science	8347752272	sagathiyajitendra27@gmail.com	Ideation
3-15-2021 13:32:00	Kevin Pansuriya	Mechanical engineering	Atmiya institute of technology and science	9624337677	kkpansuriya8@gmail.com	Ideation
3-6-2021 23:41:36	Bhojani umang	B.com	Atmiya university	9173369814	bhojaniumang9295@gmail.com	Ideation
3-10-2021 18:26:16	Aarti gohil	MSc biotechnology	Atmiya University	8200632843	gohilaarti55@gmail.com	Ideation, prototype, Scaleup
3-15-2021 12:27:36	Abhilasha Kumari	Biotechnology	Atmiya University	7984268137	abhilasha16kumari@gmail.com	Ideation
3-16-2021 9:42:33	Bhavya	Bio technology	Atmiya University	076 0088 9998	bhavyaparmar999@gmail.com	Ideation, prototype
3-15-2021 14:28:10	Bhimani Krishna	Msc microbiology	Atmiya University	7567978652	bhimanikrishna12@gmail.com	Ideation
3-10-2021 16:15:58	Bhoomi vora	B.sc. Microbiology	Atmiya university	7016076922	bhoomivora1502@gmail.com	prototype, Scaleup
3-6-2021 10:46:12	CHAVDA MADHAV GHUSABHAI	B.com Logistics	Atmiya University	8849888743	chavdamadhav60@gmail.com	Ideation
3-6-2021 10:37:45	Darshan Bhimani	Bcom logistics	Atmiya University	9426928271	darshanbhimani7291@gmail.com	Ideation
3-7-2021 1:34:03	Dhwani Chitroda	FOBC	Atmiya University	09769113327	dhwanichitroda@gmail.com	Scaleup
3-6-2021 9:13:58	Divyang S Tiwari	Management	Atmiya University	09712343120	placement@atmiyauni.ac.in	Ideation, prototype, Scaleup
3-6-2021 9:03:53	Dr. M. Sandeep kumar	Commerce	Atmiya University	8098045456	sandeep.kumar@atmiyauni.ac.in	Ideation
3-10-2021 15:23:57	Ganjani Sagar Kamleshbhai	Microbiology	Atmiya University	9879099583	sagarkganjani127@gmail.com	Scaleup
3-10-2021 12:53:49	Happy	B. Sc microbiology	Atmiya University	9978244451	lakkadhappy66@gmail.com	prototype
3-6-2021 17:05:57	Harsh Patadiya	IMBA	Atmiya university	9511965276	harshpatadiya882@gmail.com	Ideation, prototype, Scaleup
3-6-2021 10:39:28	Itisha vekariya	B. Com logistics	Atmiya university	9328517250	Vekariyaitisha@gmail.com	Ideation
3-7-2021 8:18:15	Jadeja Amardeepsinh	B.com	Atmiya University	9773432493	amardeepsinh288@gmail.com	Ideation
3-12-2021 21:36:26	Jaina Mitulkumar Patel	BSc. Biotechnology	Atmiya University	9978152909	jainapatel.199@gmail.com	Ideation, prototype, Scaleup
3-6-2021 10:37:36	kajal sindhav	boom logistics	atmiya university	6353437626	kajalsindhav123@gmail.com	Ideation
3-6-2021 10:39:25	Karena Mohit Pareshbhai	B.com logistics	Atmiya University	8128413377	mohitkarena222@gmail.com	Ideation
3-6-2021 9:01:18	Krunal Vekariya	B.com (logistics)	Atmiya University	7624040367	krunalpatel8817@gmail.com	Ideation, prototype, Scaleup
3-10-2021 14:30:31	Kukkad Naimin Gafarbhai	Microbiology	Atmiya University	7624069402	kukadnazmin78892@gmail.com	Ideation, prototype, Scaleup
3-15-2021 21:39:49	Kuvadiya Sanjana dilipbhai	Bsc biotechnology	Atmiya University	6351797477	kuvadiyasanjana@gmail.com	Ideation
3-6-2021 23:26:34	Megha Ruparelya	Microbiology	Atmiya university	6351551120	megharuparelya1512@gmail.com	Ideation
3-6-2021 10:36:30	Mihir Hitenbhai Ranpura	Commerce	Atmiya University	7405393338	mihiranpura22@gmail.com	Ideation
3-6-2021 9:41:25	Pambhar Rajen Hasmukhbhai	Bsc Microbiology	Atmiya University	9106721180	rajenpatel2119@gmail.com	Ideation, prototype, Scaleup
3-7-2021 9:46:50	Parsaniya Freny Vikrambhai	BSc microbiology	Atmiya University	9428891400	frenyparsaniya@gmail.com	prototype
3-6-2021 10:36:23	Parth Gajera	boom logostics	atmiya university	7600066117	parthgajera3345@gmail.com	Ideation
3-6-2021 20:54:25	Pritam Yadav	B.com (logistics)	Atmiya University	7652006735	preetsyadav147@gmail.com	Ideation
3-15-2021 12:26:48	Sarika Singh	Biotechnology	Atmiya University	6353500580	sarikasingh37594@gmail.com	Ideation
3-7-2021 10:33:40	Talpara Janvi Sanjaybhai.	Bsc Microbiology Sem-2	Atmiya University	9427023203	janvitalapara@gmail.com	prototype
3-15-2021 14:09:05	Teli Mitangi	M.Sc. Biotechnology	Atmiya University	9427802154	mitangiteli@gmail.com	Ideation
3-6-2021 10:38:26	Vagh Jaydeep H.	B.Com(Logistics)	Atmiya University	9426664248	jaydeepvagh58@gmail.com	Ideation
3-12-2021 21:31:05	Avni ruturaj dhamdhere	Biotechnology	Atmiya University	8200358944	avnidhamdbere@gmail.com	Ideation, prototype, Scaleup
3-6-2021 10:37:22	Deep Bakori	B.com logistics	Atmiya university	7990153753	deeppatel7826@gmail.com	Ideation
3-6-2021 10:36:55	Dharmik gosai	B.com logistics	Atmiya University	8980591010	Dharmikgosai4947@gmail.com	Ideation
3-6-2021 9:48:30	Divyanshu Solanki	Bsc Microbiology	Atmiya University	8320852003	divyanshusolanki18@gmail.com	Ideation
3-6-2021 17:52:32	Harshkumar Kiritbhai Parmar	Mechanical- CAD/ CAM	Atmiya university	7698019041	hkparmar777@gmail.com	Ideation, prototype, Scaleup
3-6-2021 10:37:58	jhanvi tanti	boom logistics	atmiya university	9327960260	jhanvitanti03@gmail.com	Ideation
3-6-2021 10:58:51	Khushi modia	Bsc microbiology	Atmiya University	9825800568	Khushimodia10@gmail.com	Ideation
3-7-2021 12:51:59	Kukad Tashin T.	BBA(EFB)	ATMIYA UNIVERSITY	9737833674	tashinkukad3@gmail.com	Ideation
3-6-2021 13:39:37	Mansi parmar	Microbiology	Atmiya university	8200497210	mansiparmar201@gmail.com	Ideation
3-6-2021 9:45:46	Mansi Vaishnav Deepakbhai	B.Sc.Microbiology	Atmiya University	9727350443	mansivaishnav272@gmail.com	Scaleup
3-15-2021 19:17:15	Maru vibhuti ashokbhai	Civil	Atmiya university	+918980228056	Vibhutimaru777@gmail.com	Ideation
3-6-2021 9:42:36	Mehul Baraiya	Electronics & Communication	Atmiya University	9374141890	Mehul.baraiya.29989@gmail.com	Ideation
3-14-2021 19:22:51	Patel aastha bhaveshbhai	B.sc biotechnology	Atmiya University	8849328892	aastha192pt@gmail.com	Ideation
3-12-2021 21:30:04	Patel yesha chetanbhai	Biotechnology	Atmiya University	8160195222	Pyesha310@gmail.co	Ideation, prototype, Scaleup
3-12-2021 12:22:38	POOJA BOPALIYA	Biotechnology	Atmiya university	9574387873	poojabopaliya@gmail.com	Ideation
3-10-2021 19:42:39	PRIYAL PANDYA .S	IMBA	Atmiya University	9265191354	Priyalpandya3@gmail.com	Ideation
3-6-2021 10:35:18	Riddhi Bhalodiya	BCom logistics	Atmiya University	9265543435	riddhibhalodiya660@gmail.com	Ideation
3-6-2021 10:37:05	Rushit	B.com(L)	Atmiya university	9537207023	Sojitrarushit.1@gmail.com	Ideation
3-7-2021 11:28:46	Sanjana Ramani	B.sc.Microbiology	Atmiya University	9574299115	sanjanaramani41@gmail.com	prototype
3-15-2021 19:15:21	Thumar Ruhi Jitendrabhai	Civil	Atmiya university	8866515260	ruhipatel9973@gmail.com	Ideation
3-6-2021 16:31:00	Trayambak Tiwari	IMBA	Atmiya University	7991781379	tiwaritrayambak7247@gmail.com	Ideation
3-12-2021 13:00:54	Varsani Dilip ratnabhai	Biotechnology	Atmiya University	8238500832	varsanidilip735@gmail.com	Ideation
3-6-2021 10:59:56	VATSAL MEHTA	Business and Commerce	Atmiya University	9714568522	mehtavatsal884@gmail.com	Ideation
3-15-2021 15:51:53	Dhruvi Patadia	Biotechnology	Atmiya University of science and technology	8849137278	dhruvipatadia3@gmail.com	Ideation
3-7-2021 6:30:06	Dharmesh Vasoya	Computer Science	Atmiya University, Rajkot	8000375478	dharmesh.vasoya@gmail.com	prototype
3-6-2021 9:15:30	Ashish Kothari	Electronics and Communication Engineering	Atmiya University, Rajkot, Gujarat	9898374961	amkothari.eo@gmail.com	Ideation
3-6-2021 10:54:28	Sumanlal M S	Mechanical Engineering	College of Engineering Trivandrum	+918891153224	sumanlalms91@gmail.com	Ideation, prototype, Scaleup
3-6-2021 6:14:08	Mahendran P	General	G. Venkataswamy Naidu College	9442662855	gurumagi@gmail.com	Ideation
3-6-2021 14:10:57	S. Mohana Priya	B. VOC Fashion Technology	G. Venkataswamy Naidu College	9566326649	monavijit94@gmail.com	prototype
3-6-2021 10:23:20	Nivedha B	B.voc Fashion Technology	G.V.N college	9976626939	niveth.b@gmail.com	Ideation, prototype
3-6-2021 20:11:37	rojarj2001@gmail.com	B.Sc costume design and fashion	G.V.N. college	9566932193	rojarj2001@gmail.com	Ideation
3-6-2021 21:53:04	M.Divya prabha	B.sc Costume Design and fashion	G.Venkatasamy Naidu College	8610750365	divijiya333@gmail.com	Ideation
3-6-2021 20:05:03	R.Krishnaveni	CDF	G.Venkataswamy naidu college	9047818099	rkrishnaveni1704@gmail.com	Ideation
3-6-2021 21:11:04	V.SANTHANALAKSHMI	Costume Design and Fashion	G.Venkataswamy Naidu College	9942960349	santhanalakshmi@gvncollege.edu.in	Ideation
3-6-2021 6:46:14	Dr.B.N. prathibha	computer Science	G.Venkataswamy Naidu College	94435 26285	prathibha@gvncollege.edu.in	prototype
3-6-2021 19:48:03	ragavikvp2001@gmail.com	B.Sc Costume design and fashion 1 year	G.Venkataswamy Naidu college kovilpatti	7010346684	ragavikvp2001@gmail.com	Ideation
3-15-2021 10:06:55	Yash Parmar	Inter Disciplinary	GEC- Rajkot - GHIT VVNAGAR	+91 9106521858	yashpamar759@gmail.com	Ideation
3-15-2021 10:04:15	Dhaval Kakkad	Automobile Engineering	Government Engineering College, Rajkot	+91 9824998048	dhavalkakkad2201@gmail.com	Ideation
3-6-2021 20:10:27	Saranya	B.Sc costume design & fashion	Gvn	9944387950	Saranyamathavan2@gmail.com	Ideation
3-5-2021 17:26:44	Rithik.K	B.Com	Hindustan college of arts and science	8383979914	rithikkrishi826@gmail.com	Ideation, prototype
3-5-2021 16:42:00	S.Vishnu Ram	B.Com	Hindustan college of arts and science	8383245238	vishnuramasv25082000@gmail.com	Ideation
3-5-2021 17:27:48	Sharma	B.com	Hindusthan College of arts and science	7639543581	sharmaseeni.22@gmail.com	Ideation, prototype, Scaleup
3-15-2021 19:54:08	Kiranya.K.R	B.Sc-Computer Technology	KG College Of Arts and Science	9751128028	kiranyaraj12345@gmail.com	Ideation
3-5-2021 21:49:09	Sathya Priya Kanagaraj	B. Sc Computer Technology	KG College of Arts And Science	8056745930	sathyapriyasathya0@gmail.com	Ideation
3-15-2021 19:29:35	Subasini.P	Computer Technology	KG college of arts and science	7094067662	subasinip21@gmail.com	Ideation
3-5-2021 21:38:09	Krishnapriya	Computer science	KG COLLEGE OF ARTS AND SCIENCE	9500944445	Krishnapriya.p@kgcas.com	Ideation, prototype, Scaleup
3-6-2021 8:45:13	JAYASHREE C	BCA	KGCAS	9442918400	jayashree3602@gmail.com	Ideation, prototype, Scaleup
3-5-2021 22:05:47	Ranjithkumar B	COMPUTER SCIENCE	KGiSL Institute of Technology	9659677721	ranjithkumar.b2018@kgkite.ac.in	Ideation, prototype
3-5-2021 22:08:21	Dineshkumar	Artifical intelligence and data science	Kgisl institute of technology	9442713344	dineshkumar2002052012@gmail.com	Ideation
3-6-2021 15:45:39	R.priyadharshini	B.sc costume design and fashion	Nifttti	9629251669	Dharshini31521@gmail.com	Ideation, prototype, Scaleup
3-5-2021 23:22:50	Dr.kmpachiyappan	Hod cdf	PSG cas	9790034560	kmpachiyappan@gmail.com	Ideation
3-6-2021 9:44:13	P.PRABHAKARAN	Computer Applications	PSG College of Arts & Science	9965102662	prabhakaranpsgcas@gmail.com	Ideation
3-6-2021 17:44:23	S.sangeetha	Commerce	PSG college of Arts and Science	9843871360	Sangeetha@psgcas.ac.in	prototype
3-6-2021 18:22:14	A.Ramamani	Corporate Secretaryship	Psg college of Arts and science coimbatore	9094120324	ramamanidhamaraj@gmail.com	Ideation
3-6-2021 8:06:22	Radhika Rajalakshmi	Freelancer	Rudhras'-Handicrafts-(using natural fibre)	9790632347	radhikagcr@gmail.com	Ideation
3-10-2021 12:09:02	PAVITHRA. R	BA.ENGLISH	SRI JAYENDRA SARASWATHI MAHA VIDYALAYA COLLEGE OF ARTS AND SCIENCE.	9344418229	mohipavi5@gmail.com	Ideation
3-10-2021 12:20:06	S.GAYATHRI	BA English Literature	Sri Jayendra Saraswathy Maha Vidyalaya CAS	9677562928	gayathrivishnu62@gmail.com	Ideation
3-10-2021 21:03:33	Lakshana	Boom	Sri jayendra saraswathy Maha vidyalaya college of arts and science	8825567001	lakshanachandru2001@gmail.com	Ideation
3-10-2021 17:46:25	Vinayagamurthi.P	Dept.of Costume Design and Fashion	Sri Jayendra Saraswathy Maha Vidyalaya College of Arts and Science	9362675828	vmcostume@gmail.com	Scaleup
3-10-2021 21:40:19	KISHORE KUMAR S	BCA	Sri Jayendra Saraswati Maha Vidyalaya college of arts and science,Singanallur, coimbatore	7550369735	kkisho332@gmail.com	Ideation
3-5-2021 19:50:20	Ganar Ahilya Pralhadrao	Earth science	SRTMU Nanded	8080694468	ahilyaganar@yahoo.com	Ideation
3-7-2021 6:13:09	Lakshmimanokaran	Beauty and fitness	Vikashni beaty salon	9894425252	lakshmi.mano80@gmail.com	Scaleup
3-8-2021 10:45:02	Yagnik movaliya	B.Sc Biotechnology	Virani science College	9664597525	Movaliya.yagnik.k@gmail.com	Ideation

List of Students

Registrar
Atmiya University
Rajkot

Atmiya University Rajkot

MEMORANDUM OF UNDERSTANDING
Between

ATMIYA UNIVERSITY
Rajkot, Gujarat, India

and

K7 international (under the company – Kamania computer academy (P. ltd)), Rajkot

Whereas the above-named institutions recognize that a Memorandum of Understanding (MOU) would be of mutual benefit and would serve as an indication of continued interest in academic cooperation, it is understood that:

1. Each institution will promote one or more of the following activities based on their respective Academic and Industrial needs:
   - Skill development programs are conducted by K7 international (under the company – Kamania computer academy (P. ltd)) experts at Atmiya University.
   - Guest lectures are conducted by K7 international (under the company – Kamania computer academy (P. ltd)) experts at Atmiya University.
   - Courses offered by K7 international (under the company – Kamania computer academy (P. ltd)) hub are attended by students of Atmiya University with special discounts.
2. Specific exchanges or activities that may be developed under the framework of this MOU shall be mutually discussed and agreed upon in writing by both parties prior to the initiation of that activity. Terms of cooperation and details of exchanges, joint programs or activities are to be developed through bilateral discussion and agreement on a case-by-case basis and attached as additions succeeding to the signing of this MOU. Each institution further agrees to appoint respective coordinators at the appropriate time for the specific activities agreed upon.
3. This MOU will become effective on the date of the last signature. It shall remain in force for a Period of five (5) year/s with the understanding that either institution may terminate it by giving 30 days' notice to the other party in writing, unless an earlier termination date is mutually agreed upon. The MOU may be amended or extended by mutual written consent of the Parties.

The parties hereby establish this MOU by duly signing it as of the respective date below.

Darshan

Mr. Darshan Jani
H.O.D
Department of B.Tech.-IT
Atmiya University
Rajkot
DATE:14/2/2022
SEAL:

Head of Department
Department of Information Technology
Faculty of Engineering & Technology
Atmiya University
Rajkot

Akkamania

Mr. Ajesh Kamania
Founder
K7 international (under the company – Kamania computer academy (P. ltd))Rajkot
DATE: 19/3/2021
SEAL:

Kamania Computer Academy (P.) Ltd.
Director

Registrar
Atmiya University
Rajkot

Atmiya University Rajkot

SUMMARY REPORT

Guidance session on "How to prepare for Abroad Study"

Organized by

Department Information Technology, FoET

Date – 08/02/2022

Patron – Param Pujya Tyagvallabh Swamiji, Secretary, Sarvoday Kelavani Samaj

Chief Convenor – Dr. G.D. Acharya Professor-Emeritus, Atmiya University

Convener – Prof. Darshan Jani, HOD – IT, FoET

No. of Participants – 51

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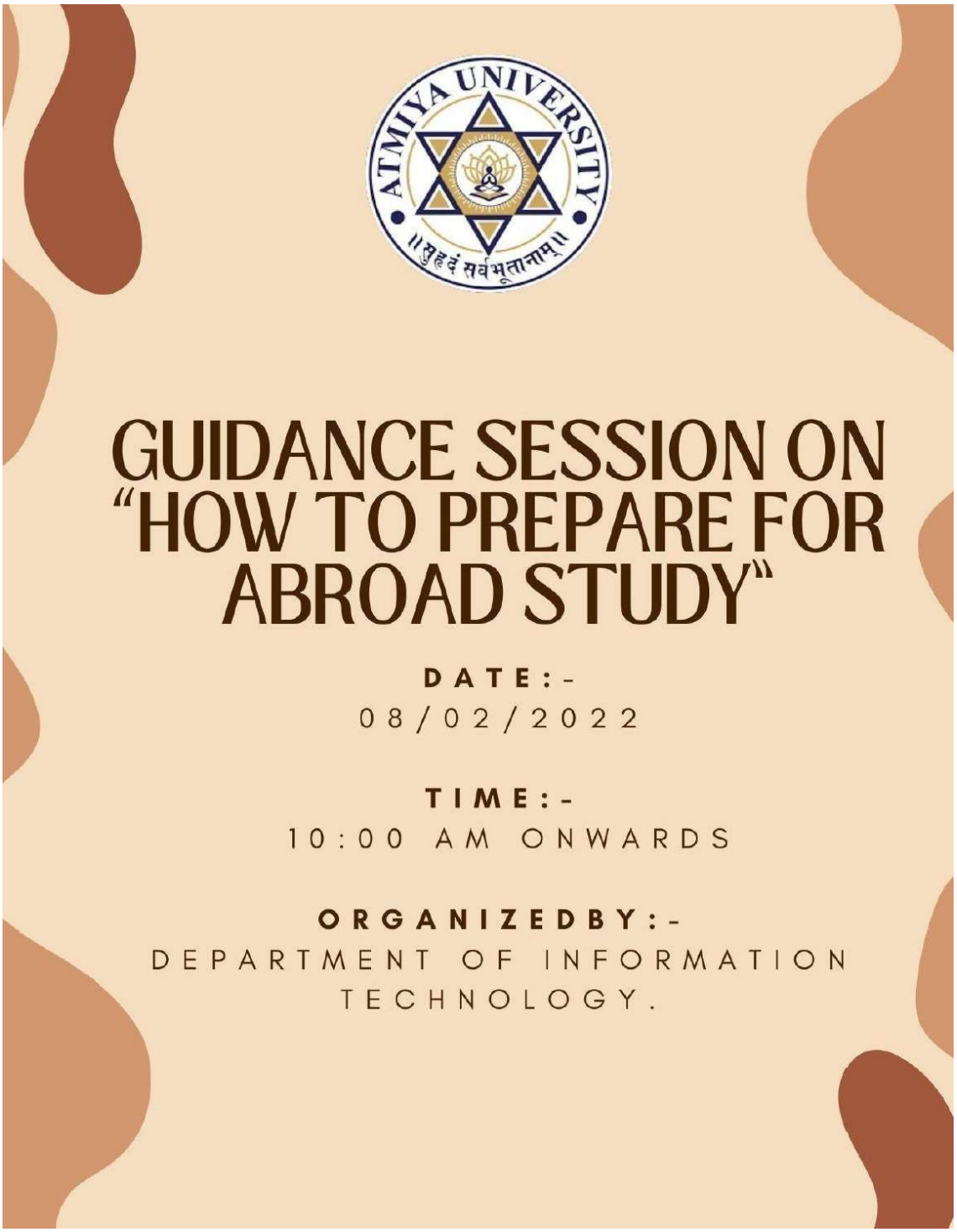
Rajkot



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Glimpse of Event:-

With the blessings and vision of Param Pujya Tyagvallabh Swamiji, support and encouragement Principal Dr. G. D. Acharya and Head of Department Asst. Prof. Darshan Jani, we, at Atmiya University, Rajkot, had arranged GUIDANCE SESSION BY KAMANIYA GROUP ON HOW TO PREPARE FOR ABROAD STUDY".

Talk was delivered by Kunal Kamaniya, for 8th, 6th & 4th semester of the students. He has also guided. How to prepare for the abroad study, Which are the parameters & country based processes were discussed briefly.

Objectives:-

1. Demonstrate awareness of own cultural values and biases and how these impact their ability to work with others.
2. Demonstrate knowledge of diversity with a focus on the populationor topic of interest in the specific Study Abroad program.
3. Communicate appropriately and effectively with diverse individuals andgroups.
4. Demonstrate an increased capacity to analyze issues with appreciation for disparate viewpoints.

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GLIMPESES OF THE EXPERT TALK

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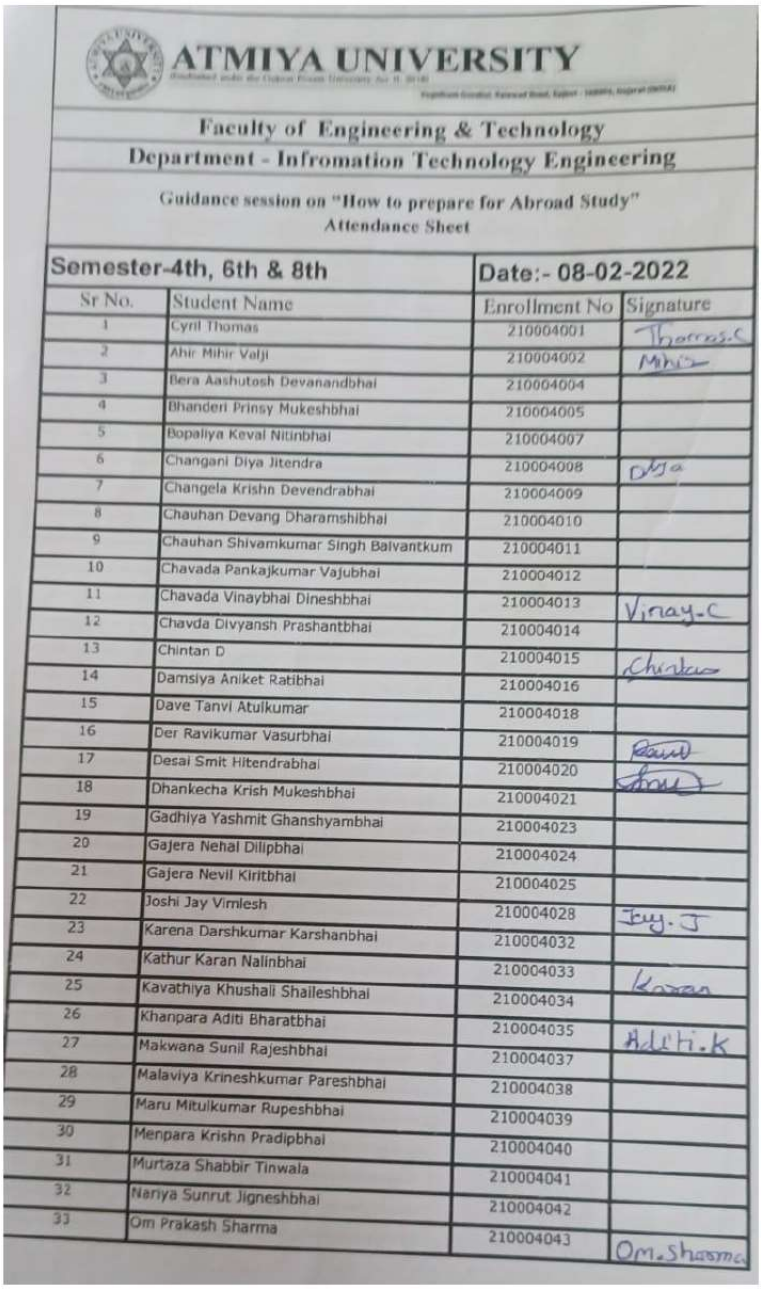

ATMIYA UNIVERSITY

Faculty of Engineering & Technology

Department - Infromation Technology Engineering

Guidance session on "How to prepare for Abroad Study"

Attendance Sheet

Semester-4th, 6th & 8th — Date:- 08-02-2022

Sr No.	Student Name	Enrollment No	Signature
1	Cyril Thomas	210004001	Thomas.C
2	Ahir Mihir Valji	210004002	Mihir
3	Bera Aashutosh Devanandbhai	210004004	
4	Bhanderi Prinsy Mukeshbhai	210004005	
5	Bopaliya Keval Nitinbhai	210004007	
6	Changani Diya Jitendra	210004008	Diya
7	Changela Krishn Devendrabhai	210004009	
8	Chauhan Devang Dharamshibhai	210004010	
9	Chauhan Shivamkumar Singh Balvantkum	210004011	
10	Chavada Pankajkumar Vajubhai	210004012	
11	Chavada Vinaybhai Dineshbhai	210004013	Vinay.C
12	Chavda Divyansh Prashantbhai	210004014	
13	Chintan D	210004015	Chintan
14	Damsiya Aniket Ratibhai	210004016	
15	Dave Tanvi Atulkumar	210004018	
16	Der Ravikumar Vasurbhai	210004019	Ravi
17	Desai Smit Hitendrabhai	210004020	Smit
18	Dhankecha Krish Mukeshbhai	210004021	
19	Gadhiya Yashmit Ghanshyambhai	210004023	
20	Gajera Nehal Dilipbhai	210004024	
21	Gajera Nevil Kiritbhai	210004025	
22	Joshi Jay Vimlesh	210004028	Jay. J
23	Karena Darshkumar Karshanbhai	210004032	
24	Kathur Karan Nalinbhai	210004033	Karan
25	Kavathiya Khushali Shaileshbhai	210004034	
26	Khanpara Aditi Bharatbhai	210004035	Aditi.K
27	Makwana Sunil Rajeshbhai	210004037	
28	Malaviya Krineshkumar Pareshbhai	210004038	
29	Maru Mitulkumar Rupeshbhai	210004039	
30	Menpara Krishn Pradipbhai	210004040	
31	Murtaza Shabbir Tinwala	210004041	
32	Nariya Sunrut Jigneshbhai	210004042	
33	Om Prakash Sharma	210004043	Om.Sharma

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34	Padsala Chintan Jaysukhbhai	210004045	
35	Pandya Krishna Vijaykumar	210004046	
36	Parmar Dhavalkumar Lalitbhai	210004047	
37	Patel Dhruvkumar Digendrabhai	210004048	
38	Patel Omkumar Dharmeshbhai	210004049	
39	Patel Shruti	210004050	Shruti.P
40	Patoliya Ishaben Sanjaybhai	210004051	Isha
41	Poshiya Mita Sanjaybhai	210004052	Mita.P
42	Radadiya Hetvi Arvindbhai	210004053	Hetvi
43	Rajyaguru Prayagraj Udaybhai	210004055	
44	Rank Harshil Manishbhai	210004056	
45	Rathod Mohit Karabhai	210004057	
46	Soliya Bhaveshbhai Jayantibhai	210004060	
47	Tanna Utsav Dipakbhai	210004063	
48	Thasaniya Mohib Bahaudinbhai	210004064	
49	Vaghasiya Prit Ramnikbhai	210004065	V. Prit
50	Variya Divyesh Kanubhai	210004066	
51	Virani Mishri Shaileshbhai	210004067	
52	Virpja Darsh Rajnikant	210004068	
53	Zala Dhruvibe Gajendrasinh	210004070	
54	Ambaliya Dixit Kishorbhai	221004001	Dixit
55	Bhatt Parth Amitbhai	221004002	
56	Gajera Shruti Dineshbhai	221004003	
57	Hansaliya Tamankumar	221004004	
58	Korat Mohil Bhupatbhai	221004005	
59	Makadiya Nayana Kantibhai	221004006	
60	Marsoniya Parth Narendrabhai	221004007	Parth.M
61	Pagada Harsh Alpeshbhai	221004008	
62	Suchak Aditya Prashantbhai	221004009	
63	Trivedi Yashvi Haridas	221004010	Yashvi
64	Ajwani Dhairya Rameshbhai	200004001	
65	Ashar Priyanshu Girishbhai	200004002	
66	Babariya Kishan Dineshbhai	200004003	
67	Barasiya Yagnik Kantibhai	200004004	
68	Bhimani Devam Dhirajlal	200004005	Devam.D
69	Chandarana Yash Prafulbhai	200004006	
70	Chavda Diya Ravibhai	200004007	Diya.C
71	Delvadiya Pragatiben Bhailalbhai	200004008	
72	Dhorajiya Brijesh Ashokbhai	200004009	
73	Dudhatra Kishan Sureshbhai	200004010	
74	Ghadiya Tisha Jagdish	200004011	Tisha
75	Gupta Gaurav Dineshbhai	200004012	
76	Jetpariya Diksha Arvindbhai	200004013	
77	Kajaria Vishal Vinesh	200004014	Vishal

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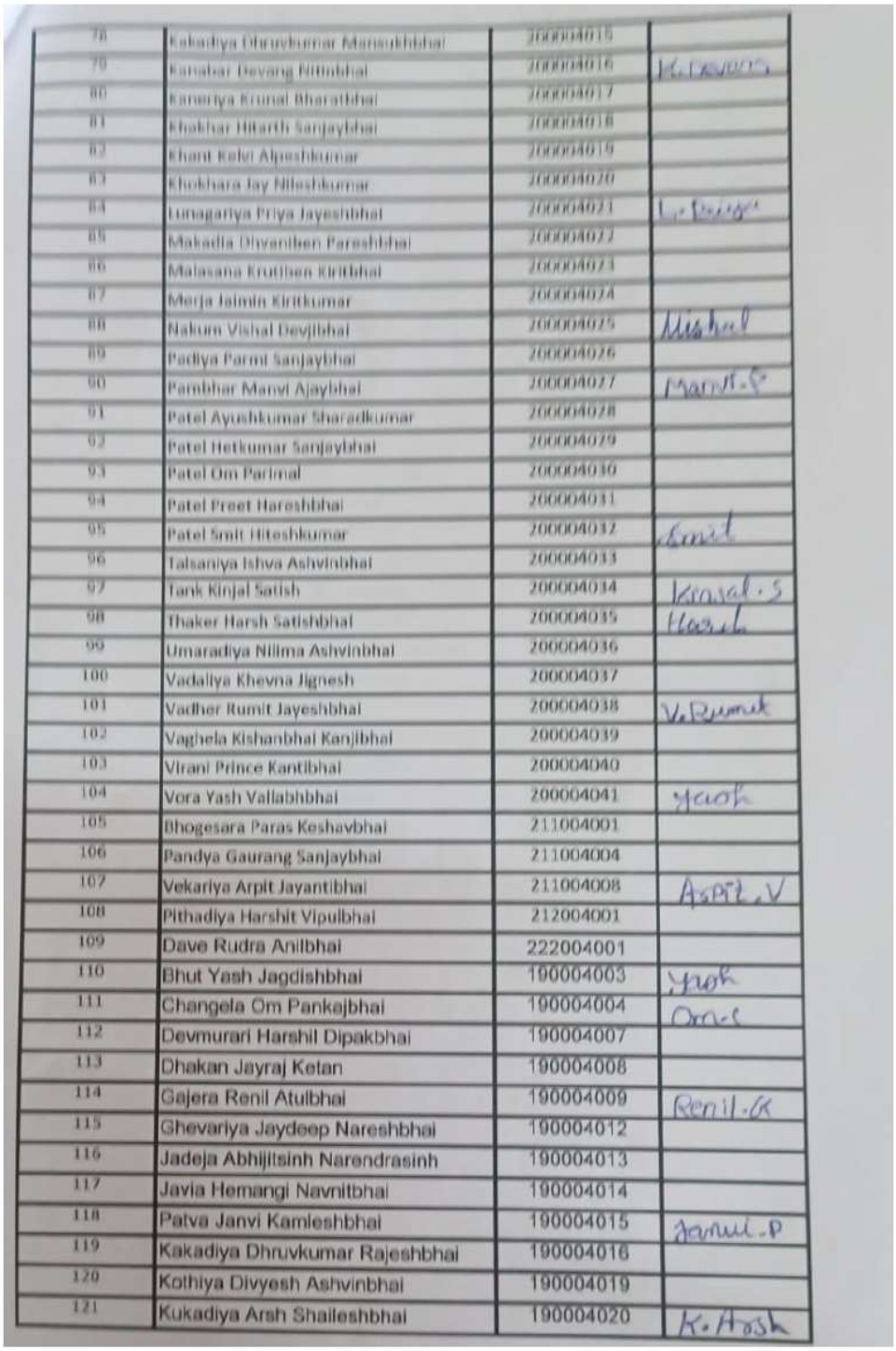

78	Kakadiya Dhruvkumar Mansukhbhai	200004015	
79	Kanabar Devang Pittabhai	200004016	K.Devang
80	Kaneriya Krunal Bharatbhai	200004017	
81	Khakhar Hitarth Sanjaybhai	200004018	
82	Khant Kalvi Alpeshkumar	200004019	
83	Khokhara Jay Nileshkumar	200004020	
84	Lunagariya Priya Jayeshbhai	200004021	L.Priya
85	Makadia Divyaniben Pareshbhai	200004022	
86	Malasana Krutiben Kiritbhai	200004023	
87	Merja Jaimin Kiritkumar	200004024	
88	Nakum Vishal Devjibhai	200004025	Vishal
89	Padiya Parmi Sanjaybhai	200004026	
90	Pambhar Manvi Ajaybhai	200004027	Manvi.P
91	Patel Ayushkumar Sharadkumar	200004028	
92	Patel Hetkumar Sanjaybhai	200004029	
93	Patel Om Parimal	200004030	
94	Patel Preet Hareshbhai	200004031	
95	Patel Smit Hiteshkumar	200004032	Smit
96	Talsaniya Ishva Ashvinbhai	200004033	
97	Tank Kinjal Satish	200004034	Kinjal.S
98	Thaker Harsh Satishbhai	200004035	Harsh
99	Umaradiya Nilima Ashvinbhai	200004036	
100	Vadaliya Khevna Jignesh	200004037	
101	Vadher Rumit Jayeshbhai	200004038	V.Rumit
102	Vaghela Kishanbhai Kanjibhai	200004039	
103	Virani Prince Kantibhai	200004040	
104	Vora Yash Vallabhbhai	200004041	Yash
105	Bhogesara Paras Keshavbhai	211004001	
106	Pandya Gaurang Sanjaybhai	211004004	
107	Vekariya Arpit Jayantibhai	211004008	Arpit.V
108	Pithadiya Harshit Vipulbhai	212004001	
109	Dave Rudra Anilbhai	222004001	
110	Bhut Yash Jagdishbhai	190004003	Yash
111	Changela Om Pankajbhai	190004004	Om.C
112	Devmurari Harshil Dipakbhai	190004007	
113	Dhakan Jayraj Ketan	190004008	
114	Gajera Renil Atulbhai	190004009	Renil.G
115	Ghevariya Jaydeep Nareshbhai	190004012	
116	Jadeja Abhijitsinh Narendrasinh	190004013	
117	Javia Hemangi Navnitbhai	190004014	
118	Patva Janvi Kamleshbhai	190004015	Janvi.P
119	Kakadiya Dhruvkumar Rajeshbhai	190004016	
120	Kothiya Divyesh Ashvinbhai	190004019	
121	Kukadiya Arsh Shaileshbhai	190004020	K.Arsh

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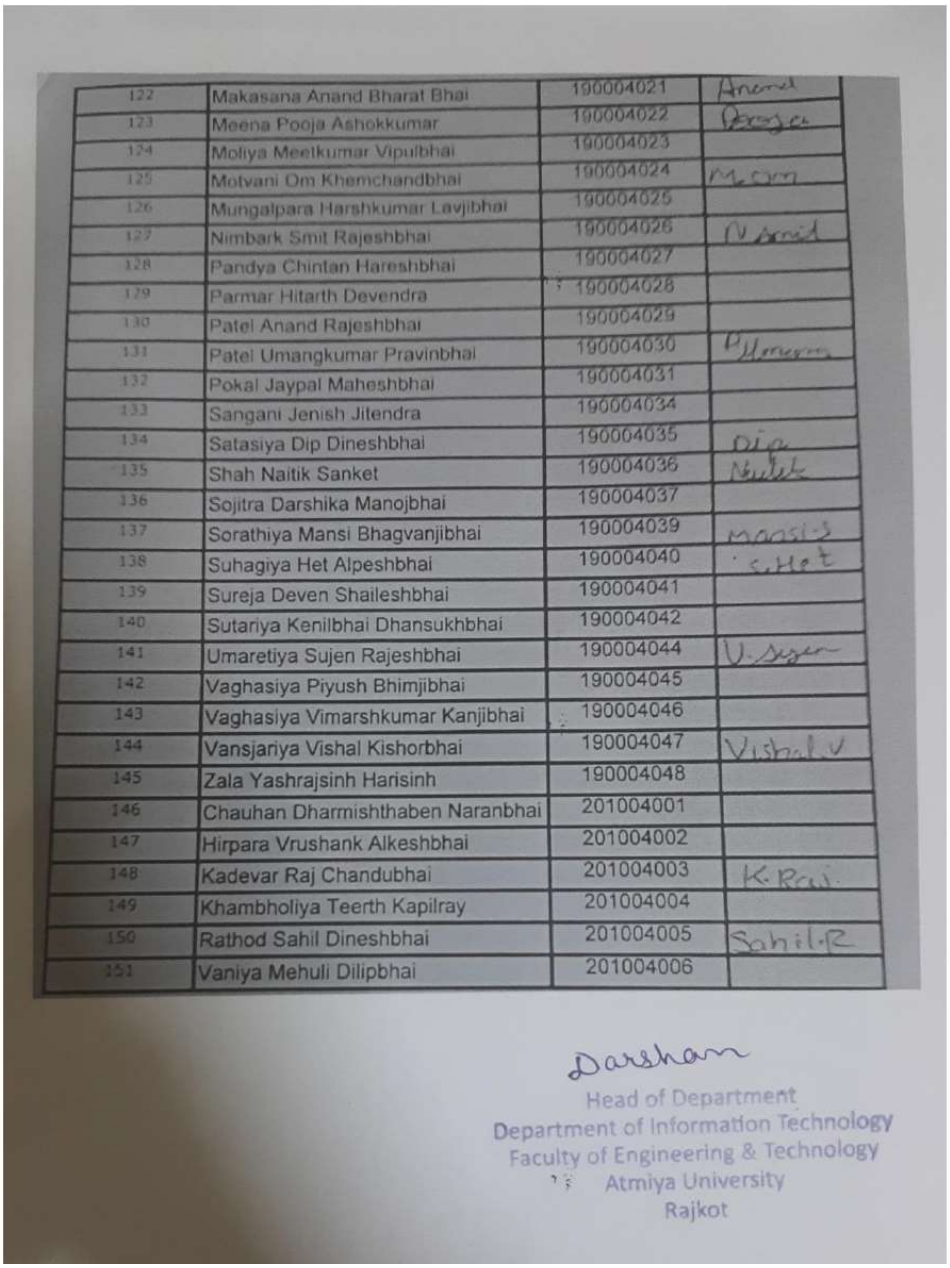

122	Makasana Anand Bharat Bhai	190004021	Anand
123	Meena Pooja Ashokkumar	190004022	Pooja
124	Moliya Meetkumar Vipulbhai	190004023	
125	Motvani Om Khemchandbhai	190004024	M.Om
126	Mungalpara Harshkumar Lavjibhai	190004025	
127	Nimbark Smit Rajeshbhai	190004026	N.Smit
128	Pandya Chintan Hareshbhai	190004027	
129	Parmar Hitarth Devendra	190004028	
130	Patel Anand Rajeshbhai	190004029	
131	Patel Umangkumar Pravinbhai	190004030	P.Umang
132	Pokal Jaypal Maheshbhai	190004031	
133	Sangani Jenish Jitendra	190004034	
134	Satasiya Dip Dineshbhai	190004035	Dip
135	Shah Naitik Sanket	190004036	Naitik
136	Sojitra Darshika Manojbhai	190004037	
137	Sorathiya Mansi Bhagvanjibhai	190004039	Mansi.S
138	Suhagiya Het Alpeshbhai	190004040	S.Het
139	Sureja Deven Shaileshbhai	190004041	
140	Sutariya Kenilbhai Dhansukhbhai	190004042	
141	Umaretiya Sujen Rajeshbhai	190004044	U.Sujen
142	Vaghasiya Piyush Bhimjibhai	190004045	
143	Vaghasiya Vimarshkumar Kanjibhai	190004046	
144	Vansjariya Vishal Kishorbhai	190004047	Vishal.V
145	Zala Yashrajsinh Harisinh	190004048	
146	Chauhan Dharmishthaben Naranbhai	201004001	
147	Hirpara Vrushank Alkeshbhai	201004002	
148	Kadevar Raj Chandubhai	201004003	K.Raj
149	Khambholiya Teerth Kapilray	201004004	
150	Rathod Sahil Dineshbhai	201004005	Sahil.R
151	Vaniya Mehuli Dilipbhai	201004006	

Darshan
Head of Department
Department of Information Technology
Faculty of Engineering & Technology
Atmiya University
Rajkot

Registrar
Atmiya University
Rajkot

Atmiya University
Rajkot

MEMORANDUM OF UNDERSTANDING

Between

ATMIYA UNIVERSITY
(Established under the Gujarat Private University Act 11, 2018)
Yogidham Gurukul, Kalawad Road, Rajkot - 360005, Gujarat (INDIA)

And

NAGRIK FOUNDATION
नागरिक फाउंडेशन

8B, Vandana Building, 11 Tolstoy Marg,
New Delhi, Delhi 110001

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Rajkot

Atmiya University, Rajkot-Gujarat-India

Atmiya University Rajkot

MEMORANDUM OF UNDERSTANDING

Between

Atmiya University, Rajkot, India

And

Nagrik Foundation, New Delhi, India

A. Atmiya University (hereinafter referred as AU), having address at: Yogidham Gurukul, Kalawad Road, Rajkot-360005, Gujarat, India and Nagrik Foundation (hereinafter referred as NF), having address at: 8B, Vandana Building, 11 Tolstoy Marg, New Delhi, Delhi-110001, India, enter into this agreement on 6th Day of January 2022.

B. Both AU and NF hereby agree upon the following terms and conditions for cooperation for:

i. Promotion of Sustainable Development Goals (SDG) related education and outreach programmes through different interventions.

ii. Facilitating participation of AU in **SDG Choupal**, a flagship initiative of NF.

iii. Joint promotion and coordination of South South 17: **Education Alliance for Sustainable Development** (SS17: EASD). Coordinating formation of EASD as a Trust in near future to take post-launch activities forward, as per agreed action agenda mutually agreed upon.

iv. Development and coordination of **SDG Resource Centre** at AU.

v. Organization of joint conferences, workshops, roundtables and other events.

vi. Participation in **joint research and consulting** (including externally funded research calls).

vii. Collaborating and supporting each other in the area of '**Development Journalism and Media**'.

viii. Any other such interventions, which deem fit for promotion of SDGs.

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Rajkot

Atmiya University Rajkot

C. General Terms

i. This Agreement shall commence on the date when the representatives of both institutions affix their signatures and shall continue thereafter for five (5) years subject to revision or modification by mutual agreement.

ii. Either party may, by notice in writing of no less than one (01) month, terminate this Agreement.

iii. For any specific activity under this MoU, AU and NFI will discuss and sign separate 'Terms of Agreement', which will be appended to this MoU from time to time.

Signed for and on behalf of **Atmiya University**

Dr. Shiv K. Tripathi
Vice Chancellor
Date:

Signed for and on behalf of Nagrik Foundation

Mr. Deepak Dwivedi
Chairperson
Date:

Witnessed by:

Dr. Divyang D. Vyas

Witnessed by:

Rtn Sandeep P. Saxena

Registrar
Atmiya University
Rajkot

Atmiya University Rajkot

District Education Office,
Karansinhji Highschool campus,
Opp. City Guest House,
Rajkot

Ref: ડઇ-૨૧૨૦૨૨૫૮-૩૦

Date: 06.05.2022

To whom it may concern

Recommendation Letter - SDG Initiatives at Atmiya University, Rajkot

It is my pleasure to write this Recommendation-Letter for Atmiya University, Rajkot. I know the Atmiya Group of Institutions as well as Atmiya University for more than last 5 years as District Education Officer of Rajkot District. Being a partner in 'Rajkot SDG Aware City' project, I have closely been associated with the sustainability and SDG related efforts of Atmiya University.

I find Atmiya University leadership as well as SDG project team to be highly committed towards the cause of SDG education and dissemination through teaching, research and extension activities. The frequent questions and activity facilitation requests from the faculty members and staff members of the university displays their continuous engagement with the cause of making community SDG aware.

The university has been actively engaged in the SDG and Human Values through a number of courses they offer. I would like to specifically mention about the 'Rajkot SDG Aware City' project, which approaches the SDG related outreach in very innovative and holistic manner. Through orienting and training the students in SDG and Human Values, Atmiya University is creating a great foundation not only for the accomplishment of SDG 2030 but also beyond that.

The Atmiya approach to SDG integration in higher education is quite unique in terms of integration of teaching, research and outreach, irrespective of subject discipline and level of education. Further, the type of collective action created through Atmiya SDG initiatives is truly a model for effective and efficient mobilization of masses through educational activities.

I am quite impressed by the approach adopted by Atmiya University, as it does not force the students towards SDG action rather it educates them through courses; and the outreach projects help in translating the knowledge to action by involving community members and public. Based on the initial results and successful SDG awareness journey, I am confident that this model has the great scalability in terms of adaptation and implementation by other academic institutions and universities.

Being an important stakeholder in the education system of the Gujarat state, I support this initiative for larger sustainability impact through mass dissemination and education about SDG linked behaviour and action. I am confident that the UN SDG Action Award will be quite helpful in not only inspiring the thousands of hard-working boys and girls but also improve opportunity for cross-border knowledge transfer, particularly among institutions and universities.

I wish the Atmiya University SDG team all the best!

Thanking you.

Yours' sincerely,

OFFICE OF DISTRICT EDUCATION OFFICER ★ RAJKOT ★ RAJKOT DISTRICT

District Education Officer
Rajkot

District Education Officer
Rajkot
Mobile and Email: 9909970214 and rajkotdeo11@gmail.com

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Atmiya University
Rajkot

Atmiya University

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Atmiya University

SUSTAINABLE DEVELOPMENT GOALS

SDG CHOUPAL | NAGRIK FOUNDATION

1.0 Background/ Introduction

Member countries of the United Nations launched Sustainable Development Goals (SDGs) in 2015 to set the unified direction of global development till 2030. The set of 17 SDGs i.e. 16 goals in different development areas + 1 goal (SDG17) focusing on innovation and cross-sectoral partnerships to support realization of remaining 16 goals, present a comprehensive system to plan and track development progress across in any country or regional context.

This is important to note that different countries, societies and organizations can plan and implement activities for SDGs as per the development priorities in their specific context. In India, the NITI Aayog is central nodal agency to coordinate the planning and implementation of SDGs. Different state Governments and other organizations are planning the activities in view of the specific development needs. However, based on the initial experiences in SDGs, it is quite clear that direct or indirect participation of all the stakeholders, including citizens, are essential for meaningful efforts to realize SDGs.

Higher education is an important area for not only contributing through education for SDGs but also as a catalyst to trigger collective action movement for SDGs involving all the stakeholders. In view of the SDG 17.16, which focuses on innovative multi-stakeholder partnerships, ATMIYA University, jointly in association with SDG Choupal (an initiative of Nagrik Foundation, launched at NITI Aayog), has planned to implement 'Rajkot – SDG Aware City' project through involvement of all the stakeholders in Rajkot. As there is no such reported initiative so far globally, this is first of its' kind project in the world.

We request all the citizens of historical city of Rajkot to participate and support this noble cause for smooth and resource-effective implementation of SDGs in the city. Also, this would present a global partnership model for universities and communities for collaborative development action.

2.0 Why this project ?

- Helps in creating awareness among masses about the desired action and behaviour for sustainable planet.
- Optimizes resources in training and capacity building through stakeholder involvement.
- Creates a model of collective action for responsible citizen-focused sustainable development.
- Will be a model for university-community partnership for larger good

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Rajkot

Atmiya University, Rajkot-Gujarat-India

Atmiya University Rajkot

SUSTAINABLE DEVELOPMENT GOALS

SDG CHOUPAL | NAGRIK FOUNDATION

3.0 Focus Areas

- Awareness about sustainability and its' understanding in local context.
- Orientation towards sustainable development linked behaviour at different levels from individual households to business, industries, NGOs, Government Departments, Schools and Media.
- Capacity building activities for organizations.
- Outreach and extension programmes.
- Research assistance in local need assessment for development.

4.0 Project Duration

Phase 1: 04 January to 24 October 2024 (Report release on United Nations Day 24th October 2022)

5.0 Proposed Activities (indicative but not limited to)

1) Orientation and Training Program (through internal and external resource persons)
   - School, College and University Teachers and other staff
   - Personnel from Government and Private Sectors
   - Members from NGO
2) Public Awareness Programs (primarily through students & NGOs)
   - Door-to-door / Shop-to-shop / Office-to-office campaign
   - Campaigns at ward offices, public parks and other such public places
   - Campaigns through participation in various exhibitions, trade fair and other such programs
3) General awareness initiatives
   - Hoardings and displays at prime locations, public parks, public transport vehicles, public transport stations, public offices ,etc
   - Radio Channels
   - During festivals
   - Social messages for screening in cinema halls
4) Creating interactive digital platform for sharing views, best practices, initiatives, etc related to this project and recognizing / awarding individuals for their initiatives/contributions

4.0 Impact, Monitoring and Assessment

- Each programme/activity in the project will integrate monitoring and evaluation (M&E) component for objective impact assessment.
- Activities/ Programme progress to be shared digitally as well as through printed material.

Registrar
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Rajkot

Atmiya University Rajkot

SUSTAINABLE DEVELOPMENT GOALS

SDG CHOUPAL | NAGRIK FOUNDATION

- Summarized result of all programmes/activities to be released in the form of Consolidated Report.

5.0 Project Partners

- Project Promoters
  - o Atmiya University, Rajkot
  - o SDG Choupal, Nagrik Foundation, New Delhi
- Supporting Partner (to be included/decided based on voluntary commitment
  - o Rajkot Municipal Corporation
  - o Department of Education, Rajkot
  - o Industries and Corporate Houses in Rajkot
  - o Local Industry Associations
  - o Local Professional Associations
  - o Religious institutions/ charity organizations
  - o Schools and Colleges
  - o Government Departments and Agencies
  - o EASD (Education Alliance for Sustainable Development) Members
  - o SDG Choupal Members
  - o Development Agencies (National/ Regional/ International)
  - o NGOs
  - o Community based organizations
  - o Other organizations/ association (not in categories above)

6.0 Contact

The Coordinator

Rajkot SDG Aware City Project
Atmiya University,
Rajkot – 360005 Gujarat
Email: ss17easd@atmiyauni.ac.in

The Convenor

SDG Choupal
8-B, Vandana Building, Tolstoy Marg,
New Delhi - 110001

Registrar
Atmiya University
Rajkot

Atmiya University

Government of Gujarat

Vibrant GUJARAT 2022

MEMORANDUM OF UNDERSTANDING
(Strategic Partnership)

This Memorandum of Understanding is entered on **5th January 2022** at Science City, Ahmedabad during Vibrant Gujarat Summit 2022.

between

Consortia of Global Institutions led by Atmiya University and SDG Choupal

and

Government of Gujarat

Consortia of Global Institutions led by Atmiya University and SDG Choupal wishes to forge Strategic Partnership for SDG related global knowledge exchange and action interventions among partner institutions in global south, focusing on SDG.

Government of Gujarat would facilitate Consortia of Global Institutions led by Atmiya University and SDG Choupal to obtain necessary permissions / registrations / approvals /clearances etc. from the concerned departments of the State, as per the existing policies / rules and regulations of the State Government.

For and on behalf of Government of Gujarat	**For and on behalf of Consortia of Global Institutions led by Atmiya University and SDG Choupal**
Signature	Signature
Name: Dr Vimal V. Prajapati	Name: Dr. Shiv K. Tripathi
Designation: Joint Director (Academic)	Designation: Vice Chancellor
Contact no.:079-23253538	Contact no.: 7572970002
Email: jd-academic-dte@gujarat.gov.in	Email: vc@atmiyauni.ac.in
Contact address: Block No.2, 6th Floor, Karmyogi Bhavan, Sector-10 A, Gandhinagar, 382010	Contact address: Yogidham, Kalawad Road, Rajkot
Department: Directorate of Technical Education	Department: Atmiya University, Rajkot

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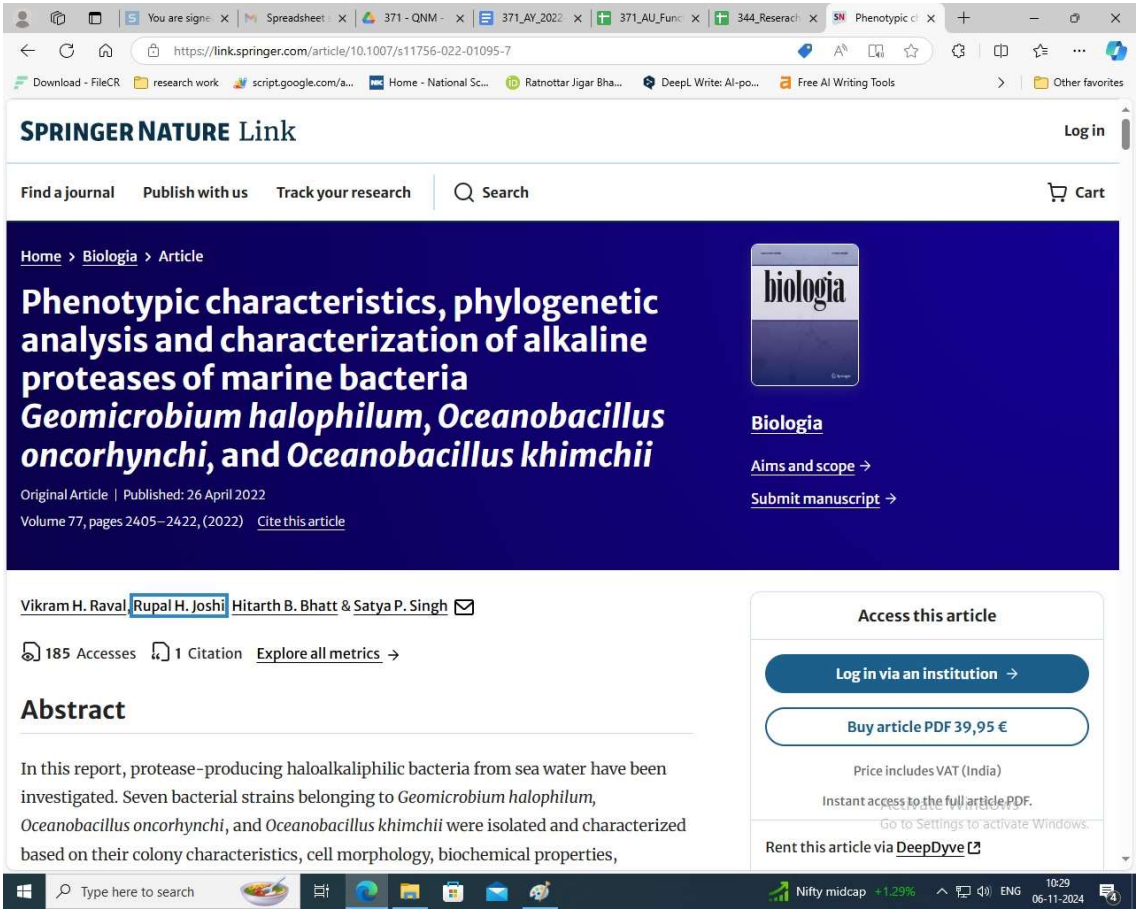

Joint Publication with Gujarat University 26-04-2022

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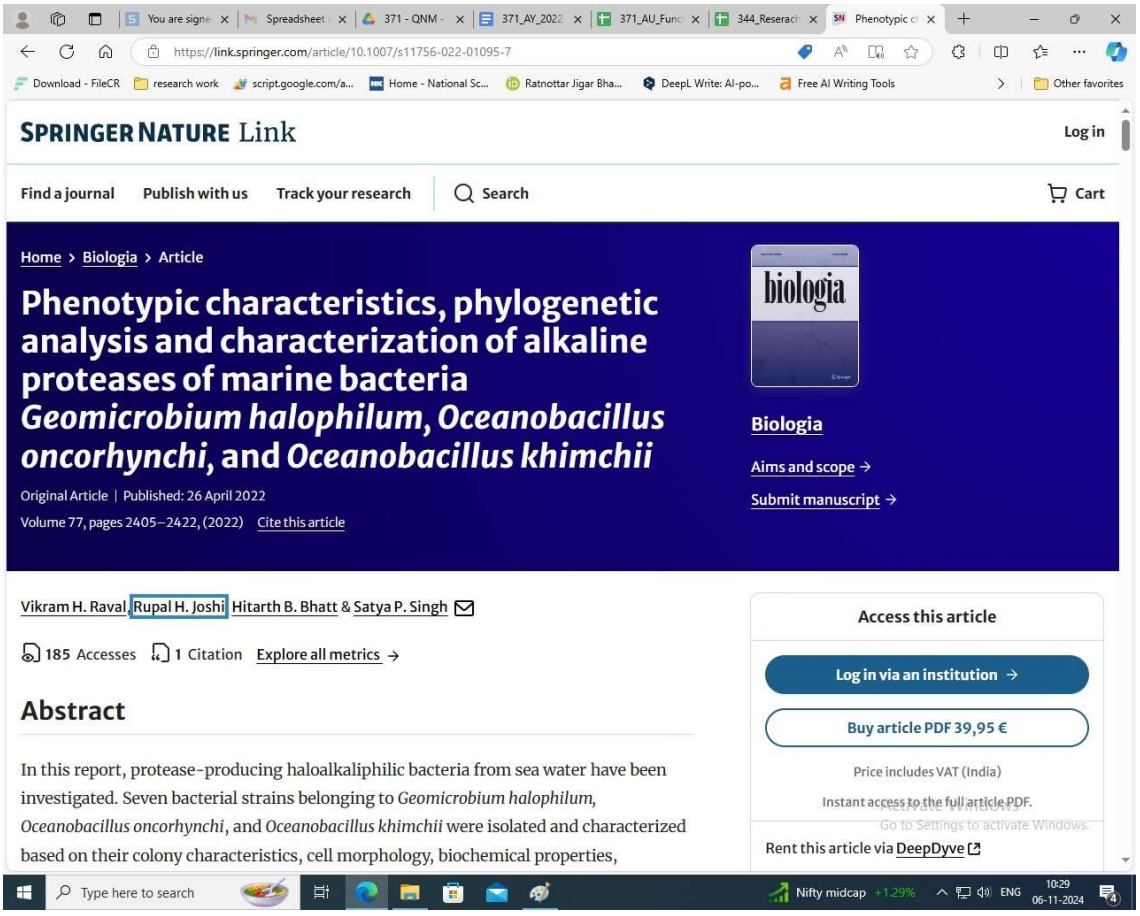

Joint Publication with Saurashtra University 26-04-2022

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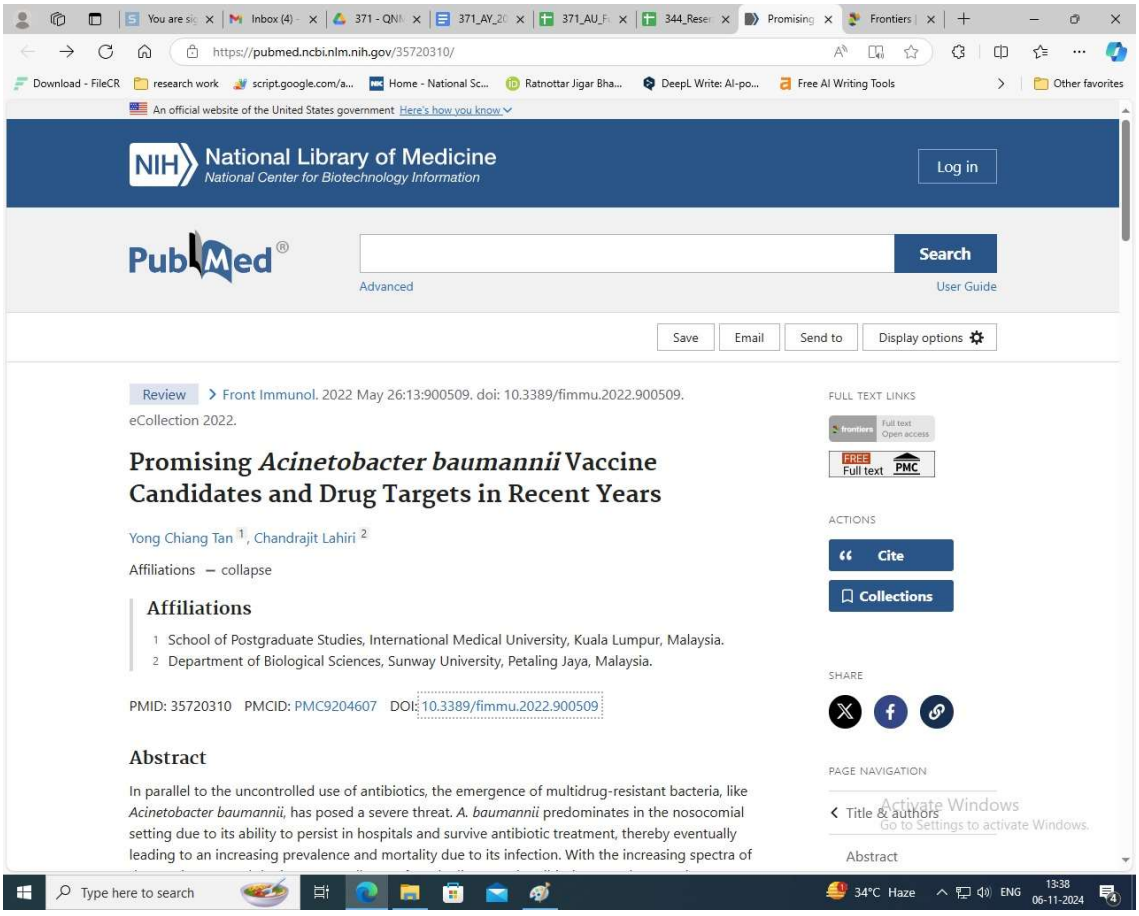

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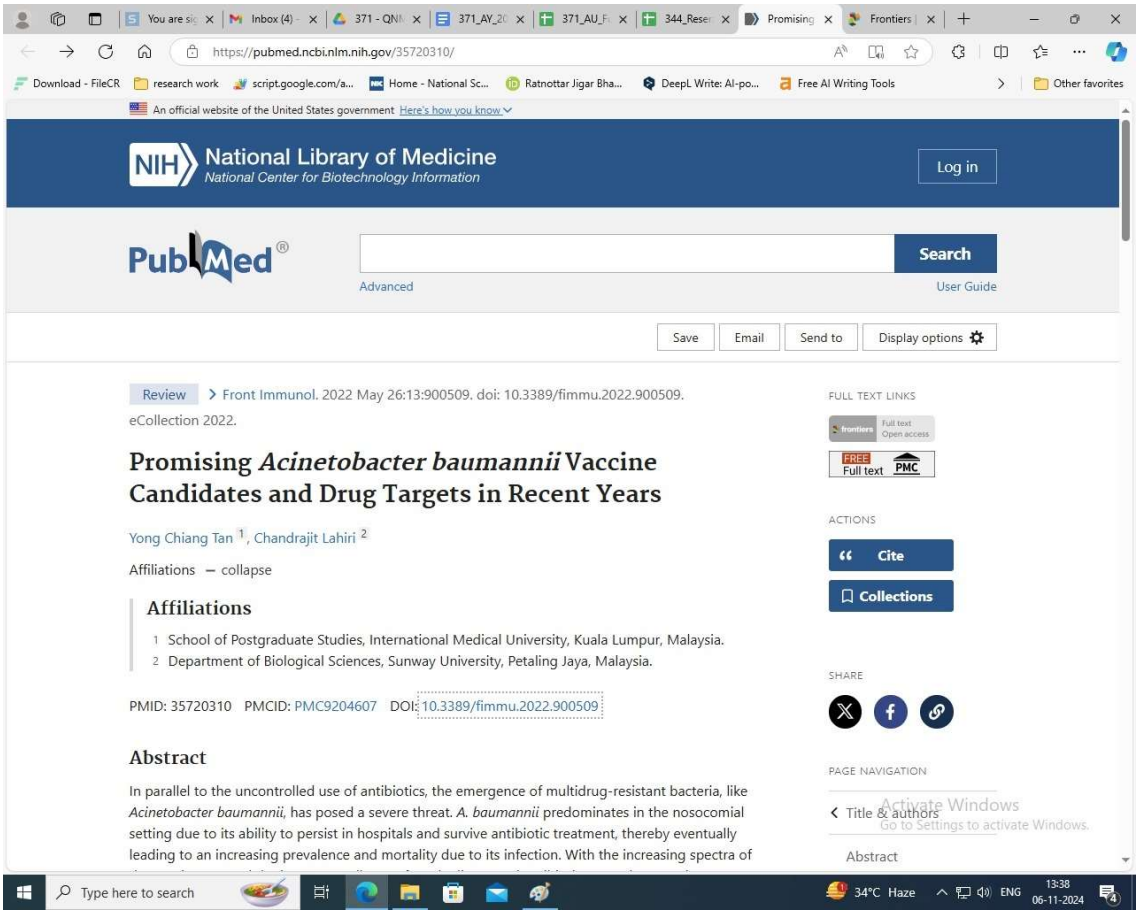

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Joint Publication with Sunway University, Petaling Jaya, Malaysia 05-07-2021

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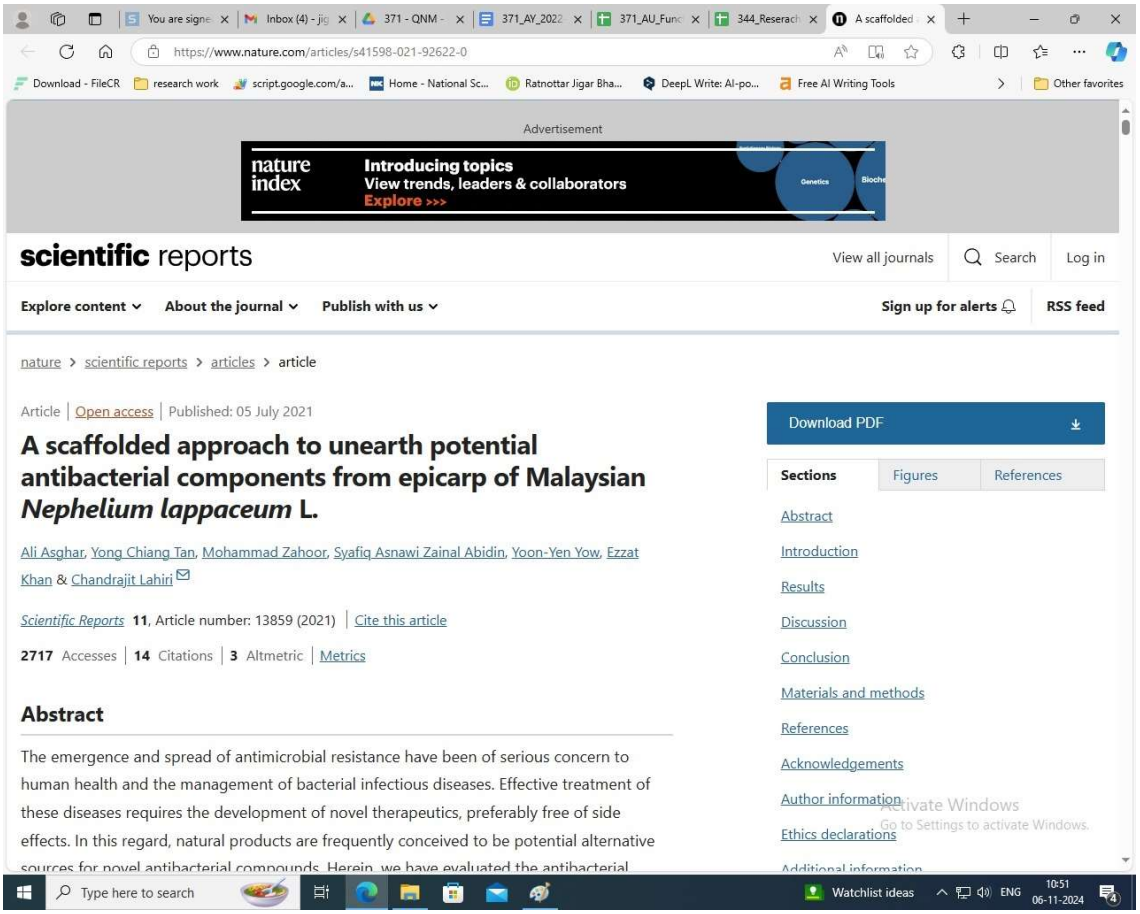

Joint Publication with Monash University Malaysia 05-07-2021

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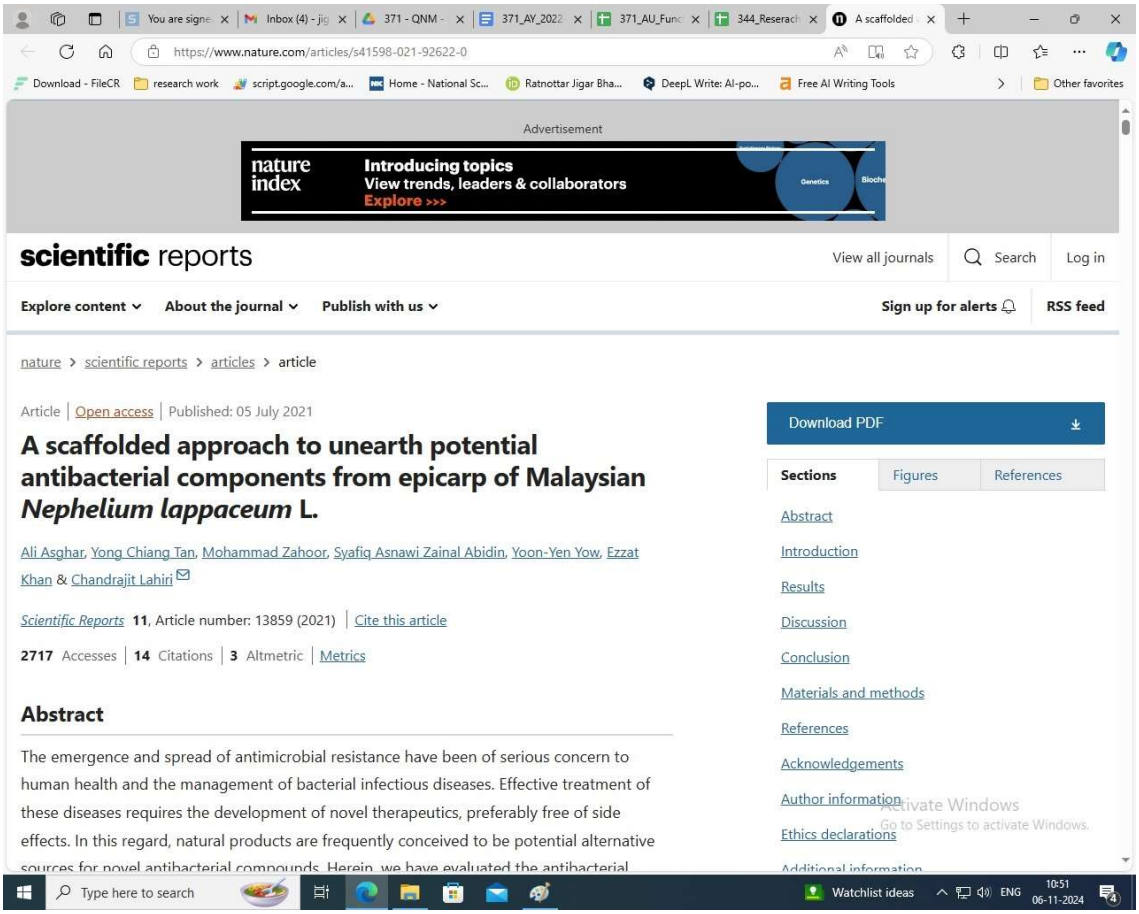

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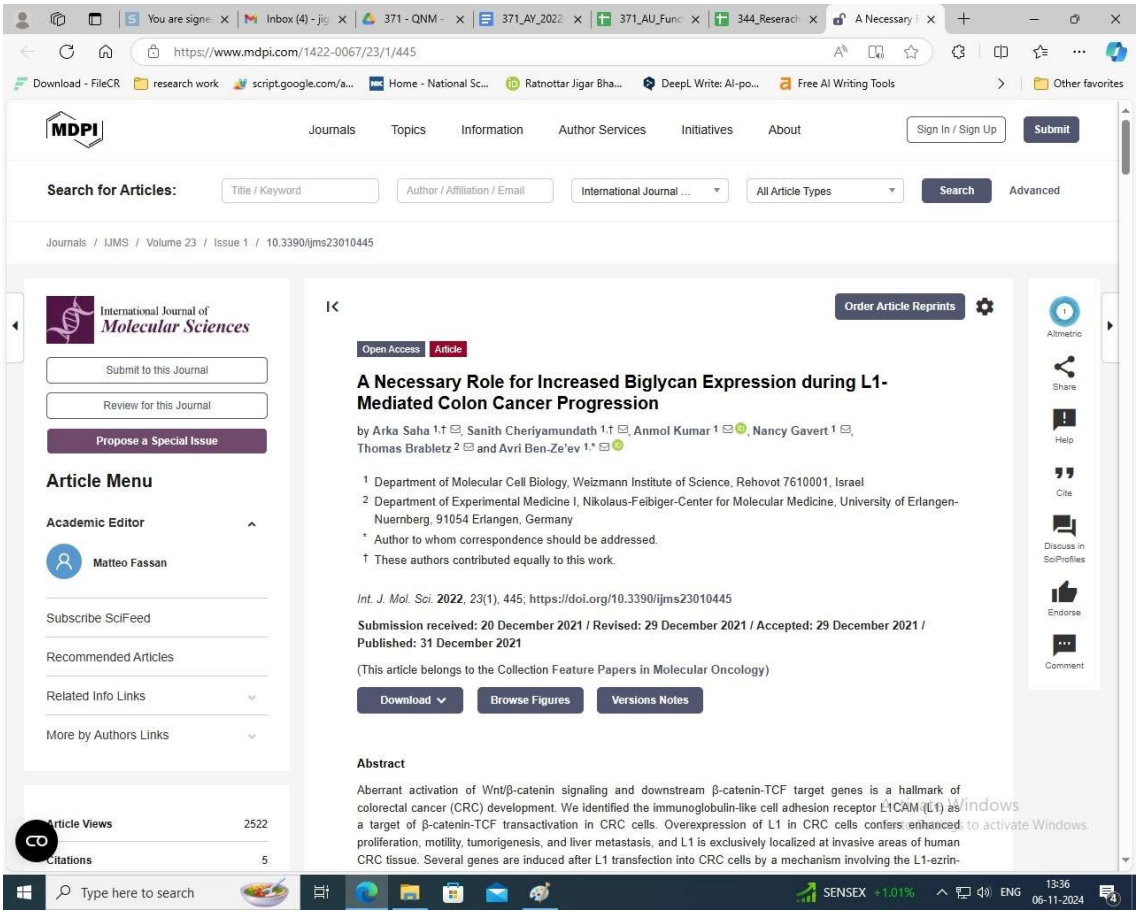

Joint Publication with Weizmann Institute of Science, Israel 31-12-2021

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