IARE

INSTITUTE OF AERONAUTICAL ENGINEERING

RESEARCH & DEVELOPMENT CENTER

RESEARCH INITIATIVES

24 YEARS OF Excellence

NAAC ACCREDITATION A++ GRADE

nirf INDIA RANKINGS 2024 TOP 200 ENGINEERING RANK 151-200

NBA NATIONAL BOARD OF ACCREDITATION TOP 100 INNOVATION RANK 11-50

Research and Development (R&D) plays a crucial role in driving innovation. It involves investing time and resources into developing new technologies and capabilities, which are then transformed into innovative products, processes, and services. In recent years, the Institute of Aeronautical Engineering (IARE) has made significant strides in R&D initiatives, consistently encouraging both faculty and students to think creatively and generate comperhencive ideas that can bring about meaningful societal changes

1. Research Objectives

·Identify and encourage faculty members about funded research opportunities from academic, research, industry, or government organizations.

·Encourage faculty members and students to publish research papers in reputable national and international journals and conferences.

·Establish collaborations with universities, research centers, and industries on research projects that advance knowledge, address societal needs, and enhance applied teaching.

·Create awareness and guide faculty and students on the importance of IPRs, while motivating innovators to develop new ideas and assisting them in protecting their innovations.

2. Focused Research Area

Institute is not only dedicated to advancing core and emerging research areas but also actively promoting awareness of the Sustainable Development Goals (SDGs) among faculty and students, fostering a commitment to sustainability across the academic community. These facilities are provided for both students and research associates to implement research-based projects under the guidance of faculty. Facilities can be utilized by B.Tech, M.Tech students and research scholors extensively for their project and research work.

Center for Artificial Intelligence and Deep Learning Solutions

The center is to develop comprehensive image processing and text understanding techniques that can be used in various applications such as quantitative analysis, medical imaging, gaming, and visualizations. More recently, we are extending our research interests by employing text, speech, and vision processing techniques to develop various real-time applications.

Center for Alternative Energy Sources

The Center is focused on developing sustainable energy solutions. It aims to advance knowledge in renewable energy technologies such as solar, wind, bioenergy, and hydrogen power. The center fosters interdisciplinary collaboration, providing students and researchers with hands-on experience in cutting-edge energy systems, while promoting eco-friendly practices to address global energy challenges. Through research, development, and outreach programs, the center contributes to the growth of alternative energy solutions for a cleaner and more sustainable future.

Center for Advanced Power Engineering Research

The Center focuses on cutting-edge research in power systems and energy technologies. Its activities include exploring advanced power generation, transmission, and distribution methods, with an emphasis on smart grids, renewable energy integration, and energy storage solutions. Researchers at the center work on enhancing grid stability, efficiency, and sustainability, while addressing challenges in energy management and power electronics.

Center for Automation and Robotics (CAR)

The center focuses on product design and prototyping, Computer Aided Design (CAD) and Computer Aided Manufacturing (CAM) technologies and simulations, 3D printing, metalwork and welding, electronics design, assembly, and industrial metrology.

Center for Aerospace Research and Development

The center focuses on aeromodelling, UAVs, basic flight training. Apart from these, the center is also focuced to make the building blocks of an aircraft such as, aerodynamics research, aircraft propulsion, new smart materials, automated manufacturing process. Center also promotes aeromodelling and UAV through collegiate clubs, student clubs and also SAE aero design challenges.

Center for IoT, Sensor and Instrumentation Engineering

The center actively involved in theoretical and applied research in the broad areas of Wireless networks (Sensor, adhoc and cellular), Signal Processing, Virtual instrumentation and IoT. The center collaborates with NI Instrumentation and offers facilities for PCB routing and etching to support prototype design development.

Center for Big Data Computing

B2DC is actively involved in theoretical and applied research in the broad areas of Big Data, Predictive Analytics, Machine Learning, Data Visualization, Natural Language Processing, cloud computing and Internet of Things (IoT). The center focus on solving real-world challenges by utilising Big Data and Data Science technologies through extensive academic research.

Center for Developing AR/VR Solutions

The Center is dedicated to pioneering research in augmented reality (AR) and virtual reality (VR) technologies. Its research activities focus on creating immersive, interactive environments for applications in fields like education, healthcare, gaming, and industry training. The center explores innovative solutions for real-world problems using these technologies.

Center for Cloud Computing Development

The Center is focused on advancing research in cloud computing technologies. Its activities include optimizing cloud infrastructure, enhancing security and scalability, and developing innovative cloud-based solutions for data storage, processing, and management. The center explores areas such as distributed computing, virtualization, cloud-native applications, and edge computing.

Center for Materials Testing and Characterization

The Center focuses on testing the strength and durability of various materials. It specializes in fatigue and tribological testing, ensuring materials meet high standards for safety and performance. The Center uses advanced equipment to evaluate metals, polymers, composites, and other materials used in industries like aerospace and automotive.

Center for Analysis and Design of Structures

The center focuses on structural analysis, design, and optimization. Key areas include earthquake-resistant designs, structural health monitoring, and behavior of structures under various loads. The center also explores innovative materials like high-performance concrete and composites to improve the safety, efficiency, and sustainability of buildings and infrastructure.

Center for Advanced New Materials and Energy Research

The center focuses on developing new nanomaterials for energy storage, harvesting, and conversion. The center explores sustainable energy systems with reduced environmental impact. It also investigates nanomaterials for applications in electronics and healthcare.

Center for Cybersecurity & Blockchain

The center focuses on protecting systems and data from cyber threats, including cryptography, network security, and ethical hacking. Blockchain technology research targets enhancing smart contracts, decentralized applications, blockchain security, and addressing scalability and integration with various industries.

3. JNTUH Recognized Research Departments

The following Departments are the recognized Research Centers of the Jawaharlal Nehru Technological University Hyderabad (JNTUH) offering Ph.D. programs:

·Department of Computer Science & Engineering
·Department of Electronics & Communication Engineering
·Department of Mechanical Engineering
·Department of Aeronautical Engineering

Guidelines for admission to Research Program:

Admissions will be made to Full-Time (Regular research scholars) Ph.D. research programs offered by the JNTUH every year.

Eligibility:

B.Tech. and M.Tech in appropriate/relevant branch of Engineering (Candidates must have Post Graduate degree in concerned discipline with a minimum of 55 % of marks in aggregate in the qualifying examination as per above eligibility. For SC / ST / BC candidates the aggregate shall be 50% as per UGC-2016 guidelines).

Mode of Selection:

Based on the performance in Entrance Examination conducted by JNTUH and Interview performance including the due weightage to percentage of marks obtained in undergraduate and postgraduate qualifying examinations.

The candidates who qualify the UGC-NET / UGC CSIR NET/ SLET / GATE / GPAT / Teacher Fellowship conducted by Govt., who passed M.Phil program, and other tests as per UGC-2016 guidelines are not required to take the written test conducted by the JNT University Hyderabad. However, they should appear for the interview as per schedule, which will be displayed in the JNTUH website.

4. Research Collaborations

Institute proactively collaborates with both international and Indian universities, as well as national-level research laboratories, to foster research and academic partnerships.
These initiatives include faculty and student exchange programs, which enhance educational experiences and broaden perspectives. Additionally, Institute engages in industry collaborations to elevate the quality of research and ensure that it remains relevant and impactful in real-world applications. These concerted efforts aim to drive innovation and maintain high academic standards.

The primary objectives of research collaborations are
·Foster a stronger research inclination by promoting collaborative publications and research collaboration with premier international universities and institutes in India like the IISC, IIT, etc.
·Enhance the research culture by featuring renowned researchers and experts by hosting events like discussions, meetings, and workshops.

5. Student Research Experience

For many students, an education at Institute is more than just a classroom experience. Hundreds of students are working with faculty on research projects, gaining lab or field experience, giving presentations, and authoring publications. These experiences provide vital additions to one's resume and greatly increase acceptance rates into Jobs and post-graduate programs abroad.

Summer Research Internship (SRI)

The Summer Research Internship (SRI) Program infuses real-world experiences into engineering education. Engineering students work in interdisciplinary teams from fifth semester onwords on creative projects that emphasize the design process and the creation of a thoughtfully engineered, tested and validated outcome or prototype.

Full Semester Research Internship – Abroad

Spending a semester during the final year at abroad will not only enrich students academic experience but will also help prepare students to practice engineering across national boundaries after they graduate.

IARE students can participate in several study abroad programs. In recent years, our students have studied in USA, Australia, Singapore, England, Malaysia, Vietnam, Thailand, Italy, Spain, Japan and Taiwan, which are just a few of the countries from which our students can choose. The International Relations website lists many of the details that have already been worked out.

Global Research & Internship Program (GRIP)

Participation in the Global Research & Internship Program (GRIP), enhances student career potential through life-changing global work and research experience.

The GRIP offers outstanding B.Tech / M.Tech students the opportunity to intern or conduct research with a variety of organizations and universities abroad for 8 to 12 weeks over the summer/spring during the course of study. As part of the GRIP program, students collaborate with people from different disciplines, embrace and adapt to new challenges, and gain global exposure that makes students stand out when applying for jobs or higher studies.

6. Faculty Seed Money Grant

The purpose of the research seed money is to create a vibrant atmosphere of research among young faculty and researchers. Depending on the quality of proposals, up to 15 faculty members per academic year will be approved to receive seed money for a tune of up to Rs. 5,00,000/-. However, this is not a constraint for high potential and cross-disciplinary research partnerships.

Objectives of seed money grant:

·Create opportunities for teachers to engage in real-life research projects and secure sponsorships, while testing novel ideas and generating preliminary results before submitting proposals to external agencies.

·Promote inter-faculty collaboration in emerging areas to generate intellectual property, develop products/processes, and attract and retain talent.

·Create an enabling environment to foster socially useful research with commercialization potential, while developing strong external proposals for targeted funding opportunities.

7. Externally Funded Research Grants

Institute is committed to advancing knowledge and promoting cutting-edge research that addresses pressing global challenges. To further this mission, Institute collaborates with various international and national funding agencies that support research projects across diverse disciplines. These collaborations provide Institute researchers with the necessary resources to pursue groundbreaking research and make a significant impact on society.

National Funding Agencies

विश्वविद्यालय अनुदान आयोग
University Grants Commission
Quality higher education for all

University Grants Commission (UGC), New Delhi, Govt. of India

Council for Scientific and Industrial Research (CSIR), Ministry of Science & Technology, Govt. of India

All India Council for Technical Education (AICTE), New Delhi, Govt. of India

Department of Defence Research & Development (DRDO), Ministry of Defence, Govt. of India

सत्यमेव जयते
इलेक्ट्रॉनिकी एवं सूचना प्रौद्योगिकी मंत्रालय
MINISTRY OF
ELECTRONICS AND INFORMATION TECHNOLOGY

सत्यमेव जयते
विज्ञान एवं प्रौद्योगिकी विभाग
DEPARTMENT OF
SCIENCE & TECHNOLOGY

सत्यमेव जयते
नवीन एवं नवीकरणीय ऊर्जा मंत्रालय
MINISTRY OF
NEW AND RENEWABLE ENERGY

8. Research Ethics and Integrity

Research Ethics and Integrity at Institute involve ensuring that research is conducted with honesty, transparency, and respect for ethical standards. This includes adhering to ethical guidelines for research involving human and animal subjects, maintaining accurate and honest data reporting, avoiding plagiarism, and ensuring proper acknowledgment of contributions. The faculty and students are adviced in the usage of Generative AI that can create academic work that may be biased, discriminatory, or not aligned with the goals of higher education, or that goes beyond the students' level of understanding. Institutes also emphasize the importance of ethical decision-making, protecting the confidentiality and privacy of research participants, and addressing conflicts of interest to uphold the credibility and trustworthiness of the research process.

Promoting Original Work and Preventing Plagiarism

•Declare and implement the technology-based mechanism using iThenticate software so as to ensure that documents such as thesis, dissertation, publications or any other such documents are plagiarism- free at the time of their submission.

•The iThenticate software shall be made accessible to all engaged in research work including students, faculty and researchers.

•Every student submitting a thesis, dissertation, or any other such documents, shall submit an undertaking certifying that the document has been prepared by them and it is their original work and free of plagiarism. The same must be duly certified by the supervisor too.

•The undertaking shall include the fact that the document has been duly checked through a plagiarism detection tool.

iThenticate

Ethical Principles:

The following is a rough and general summary of some ethical principles that various codes address:

- Honesty: Strive for honesty in all scientific communications. Honestly report data, results, methods and procedures, and publication status. Do not fabricate, falsify, or misrepresent data. Do not deceive colleagues, research sponsors, or the public.

- Objectivity: Strive to avoid bias in experimental design, data analysis, data interpretation, peer review, personnel decisions, grant writing, expert testimony, and other aspects of research where objectivity is expected or required. Avoid or minimize bias or self-deception. Disclose personal or financial interests that may affect research.

- Integrity: Keep your promises and agreements; act with sincerity; strive for consistency of thought and action.

- Carefulness: Avoid careless errors and negligence; carefully and critically examine your own work and the work of your peers. Keep good records of research activities, such as data collection, research design, and correspondence with agencies or journals.

- Openness: Share data, results, ideas, tools, resources. Be open to criticism and new ideas.

- Transparency: Disclose methods, materials, assumptions, analyses, and other information needed to evaluate your research.

- Accountability: Take responsibility for your part in research and be prepared to give an account (i.e. an explanation or justification) of what you did on a research project and why.

- Intellectual Property: Honor patents, copyrights, and other forms of intellectual property. Do not use unpublished data, methods, or results without permission. Give proper acknowledgment or credit for all contributions to research. Never plagiarize.

- Confidentiality: Protect confidential communications, such as papers or grants submitted for publication, personnel records, trade or military secrets, and patient records.

- Responsible Publication: Publish in order to advance research, not to advance just your own career. Avoid wasteful and duplicative publication.

- Responsible Mentoring: Help to educate, mentor, and advise students. Promote their welfare and allow them to make their own decisions.

- Social Responsibility: Strive to promote social good and prevent or mitigate social harms through research, public education, and advocacy.

- Non-Discrimination: Avoid discrimination against colleagues or students on the basis of sex, race, ethnicity, or other factors not related to scientific competence and integrity.

- Competence: Maintain and improve your own professional competence and expertise through lifelong education and learning; take steps to promote competence in science as a whole.

- Legality: Know and obey relevant laws and institutional and governmental policies.

- Human Subjects Protection: When conducting research on human subjects minimize harms and risks and maximize benefits; respect human dignity, privacy, and autonomy; take special precautions with vulnerable populations; and strive to distribute the benefits and burdens of research fairly.

9. Publications and Indexing

Academic research publications are essential for the dissemination of knowledge, advancement of science, and the academic reputation of researchers and institutions. They provide a formal avenue for researchers to share their findings, contribute to their field, and engage with the broader scholarly community.

Institute encourages faculty and students to publish their research outcomes in high-quality and reputed journals and conferences

Types of Academic Publications

1. Journal Articles: Peer-reviewed articles published in academic journals are the most common form of research publication. They can be original research, reviews, or theoretical papers.

2. Conference Papers: Presentations and papers delivered at academic conferences. These are often preliminary findings or works in progress.

3. Books and Monographs: Comprehensive works that cover a specific topic in detail. They are usually authored or edited by experts in the field.

4. Book Chapters: Contributions to edited volumes, where different authors write chapters on various aspects of a broader topic.

Indexing evaluates and categorizes academic publications based on criteria like quality and relevance, serving as a benchmark for assessing their reliability, impact, and visibility in the scholarly community

Web of Science (WoS): WoS is a widely recognized and prestigious indexing database that covers a broad range of disciplines. Journals indexed in WoS are considered reputable and have a higher impact on the academic community. WoS evaluates journals based on rigorous selection criteria, including citation analysis, content quality,and editorial standards.

Clarivate Web of Science™

Scopus: Scopus is another widely used indexing database that covers a wide range of disciplines. Scopus evaluates journals based on criteria such as content quality, peer-review process, editorial standards, and citation analysis. Journals indexed in Scopus are considered prestigious and have higher visibility in the academic community.

Scopus

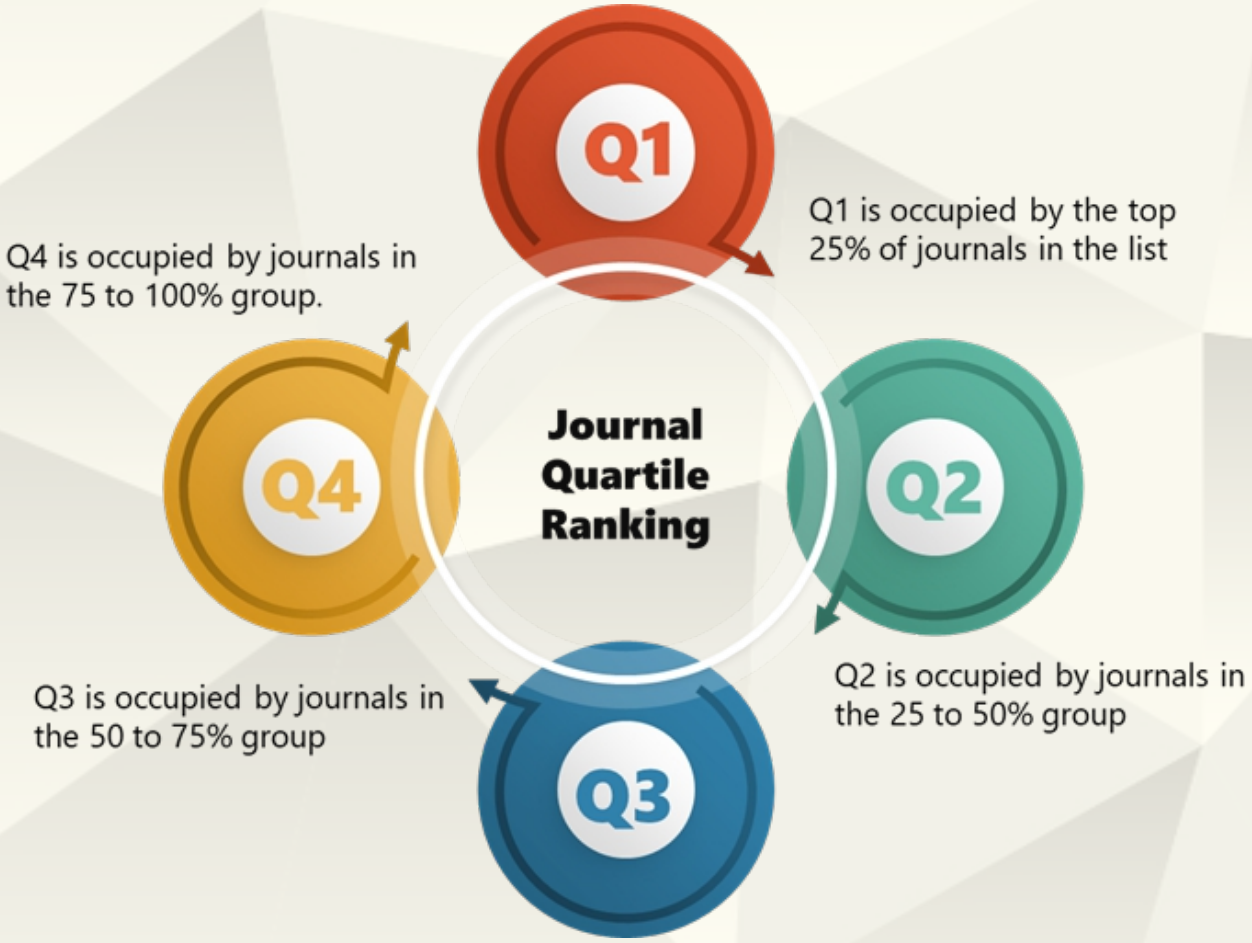
SJR (SCImago Journal Rank) and JCR (Journal Citation Reports) are two metrics used to evaluate the impact and quality of academic journals.

SJR: This metric measure journal impact based on citations and the prestige of citing journals, using Scopus data to reflect the average weighted citations received in a given year from papers published in the past three years.

JCR: Published by Clarivate Analytics, provides citation metrics like the Impact Factor (IF), measuring the average number of citations to articles in a journal over two years, using data from the Web of Science to assess journal importance.

Both SJR and JCR are internationally recognized standards for identifying the quartile of a journal. Each subject category of journals is divided into four quartiles: Q1, Q2, Q3, Q4.

Q1 is occupied by the top 25% of journals in the list
Q2 is occupied by journals in the 25 to 50% group
Q3 is occupied by journals in the 50 to 75% group
Q4 is occupied by journals in the 75 to 100% group.



10. Intellectual Property Rights (IPRs)

Intellectual Property Rights (IPRs) play a crucial role in fostering innovation and protecting the creations of individuals and institutions. IPR is essential for safeguarding the intellectual contributions of faculty and students. Institute is keen to facilitate faculties and staff of Institute in a proactive manner in the generation, protection and transaction of Intellectual Property which offer potential and scope for shared benefits to both institute and inventors.

The office of Intellectual Property Management and Commercialization (IPMC) deals with following activities relating to intellectual property of the Institute.

·Create awareness and guide faculty and students on the importance of IPRs, while motivating innovators to develop new ideas and assisting them in protecting their innovations.

·Ensure that inventions, literary works, designs, and other creations are adequately protected through patents, copyrights, trademarks, and relevant IP laws, and offer guidance and resources for securing these protections.

·Promote IP commercialization, facilitate industry partnerships for technology transfer, and provide dispute resolution mechanisms for IP issues.
·Enable IP Policy adoption and implementation at the Institute.

11. Research Incentives

The Institute of Aeronautical Engineering is continuously encouraging, supporting, and promoting R&D activities towards achievements by establishing incentive policy

·Provide incentive grants for journal articles and conference papers published in refereed Scopus and WoS indexed journals or proceedings within the Engineering subject categories (Engineering / Computer Science / Materials Science / Energy / Chemical Engineering), and also grant incentives for each citation of these publications that contributes to improving the institute's h-index.

·Faculty who secures sponsored research projects / schemes from agencies like DST, AICTE, or UGC will receive an incentive during the project / scheme and upon successful completion and report submission.

·Faculty and students will receive separate incentives once their patent is published, granted and commercialized.

·Reimburse the registration fees for workshops, FDPs, and STTPs, as well as membership fees for professional organizations.

12. Guidelines for Faculty to get Eligibility as Research Supervisor

Institute is focusing on research programmes and need based science and technology, which may be solutions for societal problems. Various International / National / State level universities are offering guideship to the faculty working in both autonomous and affiliated colleges.

The eligibilty criteria for research supervisor is given below as per the Jawaharlal Nehru Technological University Hyderabad (JNTUH) norms

·A Ph.D Degree from a University recognized by the UGC

·A ratified faculty of the institute having minimum 5 years of teaching experience

·A minimum of two years of either teaching or research experience after acquiring the Ph.D degree

·A minimum of five research publications (should not be an outcome of the Ph.D research work) after the award of Ph.D degree in refered journals of the relevant discipline / subjects in the SCOPUS / WOS.

13. Guidelines for Departments to get JNTUH Recognized Research Centre

JNTUH encourages autonomous institutions to set up research centers that promote collaboration across disciplines, support research programs, and offer facilities, funding, and guidance to research scholors.

Eligibility:

·The Departments should have at least one M.Tech programme running.

·At least two eligible Supervisors should be available in the respective department.

·The Supervisor (proposed) should have five years of prior service out of which minimum three years (as ratified faculty in any college) in the same college / Institution / Organisation.

·Preference will be given to those Institutions having NAAC / NBA accreditation / Sponsored research projects from UGC / DST / AICTE / and other Government Agencies / Corporate Sector (or) Public Sector undertakings.

·In-house R&D Centers recognized by Department of Scientific and Industrial Research (DSIR) will also be given due preference.

Find out more:
www.iare.ac.in

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