

वार्षिक प्रतिवेदन Annual Report 2022-23



भारतीय प्रौद्योगिकी संस्थान तिरुपति
Indian Institute of Technology Tirupati

आओ संवाद से सह सृष्टि करें!
Come, Converse and Cocreate!





वार्षिक प्रतिवेदन Annual Report
2022-23



भारतीय प्रौद्योगिकी संस्थान तिरुपति
Indian Institute of Technology Tirupati



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भारतीय प्रौद्योगिकी संस्थान तिरुपति
TIRUPATI

భారతీయ సాంకేతిక విజ్ఞాన సంస్థ తిరుపతి
भारतीय प्रौद्योगिकी संस्थान तिरुपति
INDIAN INSTITUTE OF TECHNOLOGY TIRUPATI

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INDIAN INSTITUTE OF TECHNOLOGY TIRUPATI



DIRECTOR'S REPORT

It is immensely pleasing for me to present the 8th progress report of our Institute. The Institute obtained 56th rank in the National Institutional Ranking Framework (NIRF) Rankings - 2022 in the Engineering category in the first ever ranking of the Institute after attaining the eligibility for the purpose, since three batches of students had graduated. During this year, the Institute started M. Tech in RF and Microwave Engineering, which is an addition to the existing PG programmes of the Institute, including M. Tech programmes in the disciplines of Civil Engineering (Environmental and Water Resources Engineering, Geotechnical Engineering, Structural Engineering, and Transportation & Infrastructure Engineering), Computer Science & Engineering, Electrical Engineering (Microelectronics & VLSI, Signal Processing and Communications) and Mechanical Engineering (Design and Manufacturing), and M. Sc. in Mathematics and Statistics, Chemistry, and Physics. Further, becoming the third IIT after Delhi and Bombay to start a master's programme in Public Policy (MPP), IIT Tirupati began admitting students to the MPP programme of the Department of Humanities and Social Sciences from this year. The Institute is gearing up to add B. Tech programmes in Material Science and Engineering and Engineering Physics to the existing list of branches, namely, Chemical Engineering, Civil Engineering, Computer Science & Engineering, Electrical Engineering and Mechanical Engineering, from the academic year 2024-25.

The enrolled student strength of the year 2022-23 has been 1461 which includes 898 B. Tech students, 180 M. Tech students, 93 M. Sc. Students, 17 MPP students, 44 MS (by research), and 229 PhD scholars. The overall percentage of the girl students registered under various programmes of the Institute remains above 22% even this year.

Research and teaching are the two core strengths of any academic Institution. With a team of 110 faculty members, IIT Tirupati has been engaged in cutting-edge research and teaching at the Institute. The perseverance has started fructifying in the forms of research publications, grants, international collaborations, etc. In the past one year, 139 research articles, one book, and 13 book chapters, were published; the faculty members presented 106 research papers and delivered a total of 127 lectures in and around the globe. A total of 32 sponsored research projects worth around Rs. 16.39 Crores, and 35 industrial consultancies worth Rs. 3.39 Crores were received by the Institute faculty members during this year.

IIT Tirupati has been organising national and international level seminars, conferences, and workshops to facilitate the interaction of the faculty members and students of the Institute with scholars from across the world. During the period the Institute organised four international conferences/seminars, two symposiums, eleven workshops, two GIAN courses, two entrepreneurial/start-up interactive sessions, one FDP, and one training programme. The Institute, for the benefit of its faculty and students, invites scholars from across the world to deliver special talks on various topics. The Institute hosted 46 invited special talks, and one lecture under distinguished lecture series during the period under discussion. The Institute also organised an orientation programme for providing an overview of the Institute and the curriculum for the seventh batch of students at the onset of the new academic year.

In the foregone years, the Institute inked Memorandums of Understanding (MoU) with multiple national and international educational institutions, Govt. research and development agencies, Public Sector Undertakings, Government bodies, and Industry associates. The following bodies signed MoUs with us in 2022-2023: National Atmospheric Research Laboratory (NARL), Gadanki, Indian Naval Academy, Ezhimala, University of Agder, Norway, Tata Consultancy Services Ltd. (TCS), Hindustan Shipyard Limited (HSL), M/s KYNDRYL Pvt. Ltd, IIT Guwahati Technology Innovation and Development Foundation, Coconut Development Board and Raman Research Institute (RRI). These associations have added substantially to the multidimensional growth of the Institute in the past few years.

In addition to the academic rigor, students at IIT Tirupati are encouraged to actively participate in the extra-curricular activities by engaging with their peers in social service activities, club activities, and cultural programmes, etc. Participation in NSS activities offers students a direct linkage with the society and teaches them humility and gratitude. The NSS activities during the year included NSS Day plantation drive, Gandhi Punyaha, poster and video making competition, food distribution, Swachhata Pakhwada-2022, and blood donation camps. SPIC MACAY Heritage club is actively engaged in providing the students an opportunity to engage with the Indian classical music and arts promoting it among the Institute fraternity. Events like Cheryl Painting Workshop, Carnatic Music Concert, Koodiyattam and Sitar Concert were organised by this Heritage Club. The students run about 14 clubs and societies under which they organise various extra-mural activities, like FIT India, Cyclothon, Intra IIT Tournament, and International Yoga Day on the campus. Every year students organize an annual techno-cultural fest named 'Tirutsava' that gives them a chance to identify their creative and analytic sides. There has been a very active participation from the students in the annual Inter-IIT Sports and Inter-IIT Technical meets facilitated by the different student clubs of the Institute.

Post-pandemic, the placement challenges were dealt with utmost care and companies across the globe hired our students. IIT Tirupati's Career Development Centre provided excellent placement and internship opportunities, with a strong emphasis on year-round

career development and career guidance activities. The Institute witnessed a good placement season for the 2023 graduating batch. Around 140+ companies participated in the recruitment process and offered diverse roles to the students. Major recruiters include Microsoft, Amazon, Analog Devices, Goldman Sachs, PayTM, Texas Instruments, Synopsys, Indeed, Mathworks, IBM, Salesforce, ServiceNow, Thermax, Jio, Tata ELXSI, TCS, Optum, Publicis Sapiient, Aarti Industries, Ceremorphic, ICICI Bank, Capgemini, Kyndryl, Versa Networks, Ugam Solutions, L&T Group, Deloitte, ZS Associates, Razor Group and others.

Since its inception, the Institute has been striving to create suitable academic infrastructure to meet global standards and the expectations of the students. In spite of the challenges posed by the pandemic, proper planning and coordination among IIT Tirupati, architectural consultants (SGA and ADPL), CPWD, and the main contractor (Kalpataru Projects International Ltd), considerable progress was made in creating the infrastructural facilities on the permanent campus of the Institute located in Yerpedu. In the initial years, the Institute operated from its temporary campus situated on the Tirupati-Renigunta road in the premises of Krishna Theja Group of Institutions. The Institute vacated the temporary campus in June 2022 and became fully operational from its permanent campus in July 2022. I take this opportunity to thank the Management of the Krishna Theja Institution for all the support that we received during our operations from the temporary campus. The construction of the permanent campus is underway in two Phases to cater to 2,500 students, 250 faculty members and 275 staff members. Facilities under Phase 1 campus to cater to 1200 students have been created in three stages. The Institute has completed the construction of two department buildings with offices for about 100 faculty members and about 50 laboratories, named Academic Buildings 1 and 2, a Central Instrumentation Facility, a Lecture Hall Complex and an Administrative Block in the Academic Zone. In the Hostel Zone, two hostels with 500 rooms each, a central dining facility, and sports facilities have been constructed. The Residential Zone includes Director's Bungalow, 168 apartments for faculty and staff, and a 20-room Visitors' Hostel. Also, a pre-nursery school "Little Elly" and a Creche have been started to make lives more comfortable for the on-campus residents. In front of the Administrative Block, two man-made lakes spanning 10 acres, with a capacity of 80 million litres through water harvesting, add to the beauty and sustainability of the campus premises. Recognising the sustainable construction, health and safety practices adopted at the site, our construction projects have received 17 awards from national and international agencies. In addition, the construction project of the Institute recently received the Achievement Award for Best Construction Projects – 2023, from Construction Industry Development Council (CIDC), in recognition of the excellence maintained in the project that contributes to the built environment.

On behalf of the IIT Tirupati fraternity, I would like to place on record our sincere thanks to the Ministry of Education, Government of India for the encouraging efforts and continued support. We are grateful to the Ministers, Officials, and Staff of MoE for their invaluable help and guidance. We acknowledge our indebtedness to our mentor institute IIT Madras for its generous counsel and support. We are also thankful to the Andhra Pradesh Government for the much-needed assistance that they have provided us at every step of the way in order to allow us to reach this milestone. We sincerely thank the chairman and all the members of the Board of Governors for their wise counsel, support and guidance, for enabling us to scale new heights.

Jai Hind!

Prof. K. N. Satyanarayana
Director



1. ORGANISATION

IITs are autonomous statutory institutions of national importance for higher education and research in engineering, science and technology. There are 23 such Institutes of distinction across the country today. IIT Tirupati (IITT), established in 2015 and situated in the temple town of Tirupati, aspires to be a leading institute in imparting technical, scientific, and humanistic education that serves humanity at large. The academic policies of the Institute are decided by the Senate, while, for the overall administration and governance, the Board of Governors is responsible. Various affairs related to finance are administered and counselled by the Finance Committee, and Building and Works Committee advises the Institute on the matters related to the construction of all major capital works. This Chapter of the report details about the organisational structure of the Institute with the names of the persons involved. The chapter further apprises about the faculty and staff members of the Institute.

1.1 GOVERNANCE

Board of Governors

Chairman	Shri K. Sanjay Murthy, IAS Secretary, Department of Higher Education, Ministry of Education, Government of India
Members	Prof. K. N. Satyanarayana, (Ex-officio) Director, IIT Tirupati
	Shri J Syamala Rao, IAS Special Chief Secretary to Govt. of Andhra Pradesh Higher Education Department/ Principal Secretary (HE), Govt of Andhra Pradesh
	Shri G. Yoganand Chairman & Managing Director, Manjeera Constructions Ltd, Hyderabad
	Prof. K. Srinivasa Reddy, Professor, Dept. of Mechanical Engineering, IIT Madras
	Shri M. Raja Mahender Reddy Managing Director, M/s. Venkateswara Pesticides & Allied Chemicals Pvt Ltd, Hyderabad
	Shri Rakesh Ranjan, Addl. Secretary, TE Dept. of Higher Education, Ministry of Education, Govt. of India
	Prof. C.P. Rao, Professor of Chemistry, IIT Tirupati (up to June 16, 2022).
	Prof. A. Raghuramaraju, Professor, Dept. of Humanities and Social Sciences, IIT Tirupati (up to June 16, 2022).
	Prof. KSMS Raghavarao, Professor, Dept. of Chemical Engineering, IIT Tirupati (from June 17, 2022)
	Prof. Sashidar Gumma, Professor, Dept. of Chemical Engineering, IIT Tirupati (from June 17, 2022).

Special Invitee	Prof. K. N. Ganesh , (up to June 16, 2022) Director, IISER Tirupati
Member Secretary	Shri A. V. V. Prasad , (up to February 14, 2023) Registrar, IIT Tirupati
	Prof. KSMS Raghavarao , (from February 15, 2023) Registrar In-charge, Professor, Dept. of Chemical Engineering, IIT Tirupati

Finance Committee

Chairman	Chairman , Board of Governors, IIT Tirupati
Members	Director , IIT Tirupati
	Add. Secretary (TE) , Ministry of Education, Government of India
	Joint Secretary & FA , Ministry of Education, Government of India, or his/her representative
	Dean, Planning & Infrastructure , IIT Tirupati
	Prof. David Koilpillai , Professor Dept. of Electrical Engineering, IIT Madras
Member Secretary	Registrar , IIT Tirupati

Institute Deans

	Dr. Suresh Jain , Dean – Academic Affairs (up to May 19, 2022)
	Dr. Sashidhar Gumma , Dean – Academic Affairs (from May 19, 2022)
	Dr. N. Venkaiah , Dean- Student Affairs
	Dr. A. Murali Krishna , Dean – Planning & Infrastructure
	Dr. M. V. Kartikeyan , Dean – Faculty Affairs (up to October 4, 2022)
	Dr. Muthukumar Palanisamy , Dean- Faculty Affairs (from October 29, 2022)
	Dr. E. Anil Kumar , Dean – Sponsored Research & Consultancy
	Dr. Sasidhar Gumma , Dean – International & Alumni Affairs

Senate

Chairman	Prof. K. N. Satyanarayana , Director, IIT Tirupati
Secretary	Shri A. V. V. Prasad , Registrar, IIT Tirupati (up to February 14, 2023)
	Prof. KSMS Raghavarao , Registrar In-charge, Professor, Dept. of Chemical Engineering, IIT Tirupati (from February 15, 2023)

Members (Deans)	Dr. Suresh Jain, Dean – Academic Affairs (up to May 19, 2022)
	Dr. Sashidhar Gumma, Dean – Academic Affairs (from May 19, 2022)
	Dr. N. Venkaiah, Dean- Student Affairs
	Dr. A. Murali Krishna, Dean – Planning & Infrastructure
	Dr. M. V. Kartikeyan, Dean – Faculty Affairs (up to October 4, 2023)
	Dr. Muthukumar Palanisamy, Dean- Faculty Affairs (from October 29, 2023)
	Dr. E. Anil Kumar, Dean – Sponsored Research & Consultancy
	Dr. Sasidhar Gumma, Dean – International & Alumni Affairs
All Heads of the Department	Dr. Sunil Kumar Thamida, Chemical Engineering
	Prof. Chebrolu Pulla Rao, Chemistry
	Dr. B. Krishna Prapoorna, Civil and Environmental Engineering
	Dr. Venkata Ramana Badarla, Computer Science and Engineering
	Dr. N. N. Murty, Electrical Engineering
	Dr. Rahul A. Sirohi, Humanities and Social Sciences
	Dr. M. Panchatcharam, Mathematics & Statistics
	Dr. Madan Mohan Avulapati, Mechanical Engineering
All Professors of the Institute	Dr. Reetesh Kumar Gangwar, Physics
	Prof. KSMS Raghavarao, Chemical Engineering
	Prof. A Raghuramaraju, Humanities and Social Sciences (up to October 31, 2022)
	Prof. Muthukumar Palanisamy, Mechanical Engineering
Educationists of Repute and not Employees of the Institute	Prof. Suresh Jain, Civil and Environmental Engineering (up to May 19, 2022)
	Prof. N. Venkata Reddy, Dept. of Mechanical Engineering, IIT Hyderabad
	Prof. K. Sethupathi, Dept. of Physics, IIT Madras
Persons from Industry, R&D	Prof. Pramod K. Nayar, Dept. of English, University of Hyderabad
	Mr. Daiva Prakash Geddam, Senior General Manager, Head-Product Development-New Energy, Amara Raja Batteries Ltd, Tirupati
Faculty Members from the Institute	Dr. M Durga Rao, Scientist, National Atmospheric Research Laboratory, ISRO, Gadanki, A. P.
	Dr. M. Nabil, Chemical Engineering
	Dr. Gouri Prasanna Roy, Chemistry (up to November 30, 2022)
	Dr. Debasish Mondal, Chemistry (From February 3, 2023)
	Dr. Gowri Asaithambi, Civil and Environmental Engineering

	Dr. Mahendran V, Computer Science and Engineering
	Dr. Rama Krishna Sai Gorthi, Electrical Engineering
	Dr. Prabha Shankar Dwivedi, Humanities and Social Sciences
	Dr. Ishapathik Das, Mathematics and Statistics
	Dr. Girish Kumar Rajan, Mechanical Engineering
	Dr. Vinay Pramod Majety, Physics
Invitees	Dr. Durga Prasad Challa, Chairman, Admissions
	Dr. Rajesh. S, Advisor, Academic Courses
	Dr. Anki Reddy Katha, Advisor, Academic Research
	Dr. Rajesh Viswanathan, Associate Dean, Academic Affairs, IISER Tirupati
	Dr. Mamilla Ravi Sankar, Workshop In-charge
	Dr. Bijily Balakrishnan, Chairperson, Council of Wardens
	Mr. Shameer K.K, Assistant Librarian
Special Invitees (Student Members from the Institute)	Student General Secretary
	Academic Affairs Secretary
	Research Affairs Secretary

Building and Works Committee

Chairman	Director, IIT Tirupati
Members	Sri K Nanda Kumar, CGM P&M, APSPDCL
	Sri Kanaka Raju, CE, CPWD, SDG Office, Chennai
	Sri S. Ramanujam, Rtd. Director, DCSEN, DAE, Mumbai
	Dr. Janmejoy Gupta, HoD, Architecture, SPA, Vijayawada
	Prof. A. Muralikrishna, Dean – Planning and Infrastructure, IIT Tirupati
Member Secretary	Registrar, IIT Tirupati
Invitees	Shri. B. S. Reddy, CE cum ED CPWD IIT Tirupati
	Dr. B. Janaki Ramaiah, Chairman Engineering Unit, IIT Tirupati
	Shri. KRSK Chaitanya, Head Engineering Unit, IIT Tirupati
	Shri. S Jagannadha Rao, EE & SM (C) TPD I CPWD
Member Secretary	Shri. Raunak Srivastav, EE & SM (E) TPD CPWD
	Shri. N. Sadgurumoorthy, AEE IIT Tirupati Project

1.2 NEW FACULTY AND STAFF ENTRANTS

New Faculty Members who joined in 2022-2023

SN	Name	Designation and Department	PhD from	Previous Employment
1.	Murari Singh	Assistant Professor Grade-I	Jawahar Lal Nehru University, New Delhi	The University of Texas at Austin, Austin, USA.
2.	Muthukumar P	Professor	Indian Institute of Technology Madras	IIT Guwahati

New Staff Members who joined in 2022-2023

SN	Name	Designation	Department/Section
1.	Kasimsetty Sairam Krishna	Junior Assistant	Finance and Accounts
2.	Addepalli Haritha	Junior Assistant	Academic Research
3.	Konduru Harika	Junior Technician	Chemical Engineering
4.	Ajay J	Junior Assistant	Material Management - Procurement
5.	Arcot Likhitha	Junior Assistant	Registrar Office
6.	B Vijay Kumar Naik	Junior Assistant	Computer Science and Engineering
7.	Mohite Mahadev Shahaji	Junior Library Technician	Library Automation System
8.	Ramkumar B S	Junior Technical Superintendent	Computer Centre
9.	Ajsal E A	Junior Assistant	Chemistry
10.	Ajithraj R A	Junior Technical Superintendent	Computer Centre
11.	Sai Prabhath Upparu Gonabhavi	Junior Technician	Chemistry
12.	Kothapalli Venkata Sai Roshan Kishore	Junior Assistant	Academic Courses
13.	Jayasri N	Junior Assistant	Mechanical Engineering
14.	Ganjikunta Balaji Kiran	Junior Assistant	Establishment
15.	S Sunil Kumar Bharadwaj	Junior Assistant	Civil and Environmental Engineering
16.	Vijay Kumar Aakarapu	Junior Technical Superintendent	Electrical Engineering

SN	Name	Designation	Department/Section
17.	Singareddy Anjaneyulu	Junior Superintendent	Material Management - Procurement
18.	Sivanathan M	Junior Technical Superintendent	Civil and Environmental Engineering
19.	L Sankar Naidu	Junior Superintendent	Establishment
20.	Upendram Jagadeswara Raju	Junior Superintendent	Finance and Accounts
21.	Thota Satish Babu	Junior Technical Superintendent	Physics
22.	Pramod Kumar Meher	Junior Library Superintendent	Library Automation System
23.	Pallagani Maneesha	Junior Assistant	Chemical Engineering

1.3 FACULTY PROFILE

IIT Tirupati after completing its fifth round of recruitment for the various departments, advertised for the Special Recruitment Drive on December 07, 2022, to recruit faculty from the various reserved categories. Four departments have already completed their selection process while that of the remaining five will be completed by May 2023. The total number of faculty is 105. This will help the Institute maintain the optimum faculty-student ratio.

DEPARTMENT OF CHEMICAL ENGINEERING

The Department of Chemical Engineering, instituted in 2018, offers undergraduate and postgraduate programmes. The undergraduate curriculum attempts to achieve a balance between fundamental courses and industry-oriented design courses. This helps students appreciate each course's relevance and relate its concepts to application in the process industry. At the postgraduate level, the department currently offers M.S. (by research) and PhD programmes. The faculty members in the department are actively engaged in various research areas such as Food Technology, Colloids and Interfaces, Nanomaterials, Advanced Separations, Catalysis, Microfluidics, Corrosion Engineering, and Machine Learning for Process Systems.

Faculty Members

Name and Qualifications	Major Areas of Specialisation
Professor	
Dr. Sasidhar Gumma, PhD (Cleveland State University)	Metal-organic frameworks, Adsorption
Dr. KSMS Raghavarao, PhD (Institute of Chemical Technology, Mumbai)	Food Process Engineering; Separation Processes

Name and Qualifications	Major Areas of Specialisation
Associate Professor	
Dr. T. Sunil Kumar, PhD (University of Notre Dame, USA) Head of the Dept	Microfluidics and Corrosion Simulation
Dr. Katha Anki Reddy, PhD (Indian Institute of Science, Bangalore, India)	Energy and Environmental Sciences, Granular Physics
Assistant Professor	
Dr. Anil B. Vir, PhD (Indian Institute of Technology Madras)	Microreactor and multiphase reaction
Dr. M. Nabil, PhD (Indian Institute of Technology Madras)	Process Optimization & Control, Machine Learning for Process System
Dr. Narendra Singh, PhD (Indian Institute of Technology Kanpur)	Photocatalysis, Surface engineering of polymer
Dr. Trivikram Nallamilli, PhD (Indian Institute of Technology Madras)	Colloid and interfacial Phenomena, Soft matter and Food physics
Dr. Nilesh Choudhary, PhD [Academy of Scientific and Innovative Research (CSIR-NCL)]	Multi-scale molecular simulation for applied materials and complex systems
Dr. Shamik Misra, PhD (Indian Institute of Technology Bombay)	Process systems engineering, Renewable energy, and sustainability
Dr. S. Uday Kumar, PhD (Indian Institute of Technology Roorkee)	Nanobiotechnology and Biomaterials

DEPARTMENT OF CHEMISTRY

The Chemistry department at IIT Tirupati was established in 2015. The department offers PhD and M.Sc programmes in Chemistry. It offers core and elective courses in chemistry and allied areas for Bachelor's and Master's students of both science and engineering streams in the institute. The department is striving to provide ideal learning and research environment, placing IIT Tirupati at the forefront of chemistry research. Research is carried out in all major areas of chemical sciences. Currently, the department has ten regular faculty members and two INSPIRE faculty with the expertise spanning across the areas of Theoretical and Computational Chemistry, Inorganic, Bioinorganic & Materials Chemistry and Organic Chemistry. The department initiated its M.Sc. program in 2020. The 2021 and 2022 batch students have completed their academic requirements and all the 26 students will be receiving their M.Sc. degree in Chemistry during the convocation - 2023. The current strength of Master's students is 31, and the doctoral students are 27. The department has been actively involved in establishing an advanced research facility that houses various state of the art equipment and characterisation tools for carrying out cutting-edge research. The department is already equipped with a well-established lab facility for B.Tech chemistry laboratory teaching. We are now ready with the state of the art laboratory for Masters's and PhD students to conduct their experimental research. With all these, the department is maintaining a positive slope in its publication pattern by targeting to establish its reputation in the international scenario.

Faculty Members

Name and Qualifications	Major Areas of Specialisation
Professor	
Dr. Chebrolu Pulla Rao PhD (Indian Institute of Science, Bangalore)	Bioinorganic chemistry including Chemosensors Materials for water purification and in drug delivery, including anticancer agents
Associate Professor	
Dr. Gouriprasanna Roy, PhD (Indian Institute of Science, Bangalore), Head of the Dept	Chemical Biology, Bioinorganic Chemistry
Assistant Professor	
Dr. Arun Kumar Manna, PhD (JNCASR, Bangalore)	Theoretical and Computational Chemistry
Dr. Debasish Mondal, PhD (IACS, Kolkata)	Theoretical Chemistry
Dr. P. Gandeepan, PhD (National Tsing Hua University, Hsinchu, Taiwan)	Transition Metal Catalysis, Sustainable Organic Synthesis
Dr. Prasenjit Mondal, PhD (Indian Institute of Technology Bombay)	Coordination Chemistry and Bioinorganic Chemistry
Dr. Rajib Kumar Biswas, PhD (Indian Institute of Science, Bangalore)	Theoretical and Computational Chemistry
Dr. Someswara Rao Sanapala, PhD (Indian Institute of Technology Bombay)	Organic Chemistry
Dr. Sourav Chakraborty, PhD (IACS, Kolkata)	Supramolecular Chemistry, Material science
Dr. Srikrishna Bera, PhD (Westfälische Wilhelms-Universität, Münster, Germany)	Reaction Development, Asymmetric Synthesis
Dr. Venkaiah Chintalapudi, PhD (University of Hyderabad, Hyderabad)	Total synthesis of bioactive natural products, Asymmetric catalysis

DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING

The Department of Civil and Environmental Engineering (CEE) at the Indian Institute of Technology (IIT Tirupati) was set up in 2015. CEE offers numerous courses at the undergraduate level (Bachelor of Technology or B.Tech) to introduce students to academic research and themes relevant to the civil engineering industry along with postgraduate level leading to Master of Technology (M.Tech), Master of Science by Research (MS), and Doctor of Philosophy (PhD) degree programs. Most of the courses are

structured in a problem-solving and/or a design-based approach, which are currently the key demands of the industry. Undergraduate research is encouraged by the Institute by providing B.Tech students an opportunity to work on research projects with the CEE faculty as part of their curriculum. In addition, CEE offers M.Tech degrees in four specializations: environmental and water resources engineering, geotechnical engineering, structural engineering, and transportation and infrastructure engineering along with dual-degree programmes in all of the aforementioned streams. The Department is now home to over 270 students, about 150 of whom are postgraduate students, pursuing various advanced degree programs in CEE.

CEE focuses on achieving excellence in pedagogy and research, relevant to the natural environment as well as sustainable and resilient infrastructure, with a focus on quality-of-life initiatives of national and international importance, and as part of this, CEE has been nurturing engineers and scientists of the future through quality education and training, state-of-the-art research as well as offering technical expertise to academia, industry, and society through various outreach activities. As part of capacity-building measures, CEE has been training and educating engineers and practitioners focused on current industrial needs through short-term courses, workshops, webinars, and symposia. CEE envisages developing and offering new curricula that align with the emerging areas such as sustainability, big-data, machine learning, life cycle analysis, econometrics as well as innovation and entrepreneurship to solve challenges of the 21st Century. Furthermore, the futuristic curricula will enable avenues for students to develop micro-specializations and obtain dual/minor degrees.

Faculty Members

Name and Qualifications	Major Areas of Specialisation
Professor	
Dr. K. N. Satyanarayana, PhD (Clemson University, USA) Director, IIT Tirupati	Construction Project Management
Dr. A. Murali Krishna, PhD (Indian Institute of Science, Bangalore)	Earthquake Geotechnics
Dr. Suresh Jain, PhD (Indian Institute of Technology Delhi)	Air quality modelling and management; Environmental risk assessment
Associate Professor	
Dr. B. Krishna Prapoorna, PhD (Arizona State University, USA), Head of the Dept	Transportation Engineering
Dr. Gowri Asaithambi, PhD (Indian Institute of Technology Madras)	Transportation Engineering
Assistant Professor	
Dr. Avadh Bihari Narayan, PhD (Indian Institute of Technology Kanpur)	Remote sensing, Geodesy

Name and Qualifications	Major Areas of Specialisation
Dr. A. V. Rahul, PhD (Indian Institute of Technology Madras)	Concrete 3D printing, Rheology of cement-based material
Dr. Bijily Balakrishnan, PhD (Indian Institute of Technology Madras)	Reinforced Concrete Design, Prestressed Concrete Design
Dr. B. Janaki Ramaiah, PhD (Indian Institute of Technology Delhi)	Geotechnical and Geoenvironmental Engineering
Dr. Behera Prasanna Kumar, PhD (Indian Institute of Technology Kanpur)	Durability of concrete structures, Corrosion of reinforcing steel
Dr. M. Nithyadharan, PhD (Indian Institute of Technology Madras)	Metal structures and Earthquake resistant design
Dr. Prasanna V. Sampath, PhD (Michigan State University, East Lansing, USA)	Environmental Engineering
Dr. Roshan Srivastav, PhD (Indian Institute of Technology Madras)	Water Resources Management, Climate Change, Remote Sensing
Dr. Shihabudheen M. M., PhD (Indian Institute of Technology Madras)	Environmental Engineering

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

The Department of Computer Science and Engineering at IIT Tirupati, established in 2015, offers academic programs such as B.Tech in CSE and M.Tech in CSE, and the research programs M.S in CSE and PhD in CSE. The undergraduate degree gives great importance to fundamental courses as well as the latest technologies by offering courses such as Machine Learning, Deep Learning, Parallel Computing, Distributed Systems etc. Courses in the curriculum cover basics and advanced levels, and have been planned to nurture innovation, ethics, and societal interaction. A special emphasis is on Laboratory courses which provide an exposure to students on the design and development of end-to-end systems. Each programme follows a rigorous and diversified course curriculum with an emphasis on fundamentals, project-driven, and industry-relevant courses. The M.Tech. programme in CSE focuses on Data Science and Systems. The Department is actively engaged in research areas including algorithms, machine learning, reinforcement learning, computer networks, software engineering, parallel computing, computer organisation and architecture, theoretical computer science, and mathematical modelling.

Faculty Members

Name and Qualifications	Major Areas of Specialisation
Associate Professor	
Dr. Venkata Ramana Badarla, PhD (Indian Institute of Technology Madras), Head of the Dept	Wireless Networks, Cloud Computing, IOT

Name and Qualifications	Major Areas of Specialisation
Assistant Professor	
Dr. Ajin George Joseph, PhD (Indian Institute of Science, Bangalore)	Reinforcement learning, Stochastic approximation algorithms
Dr. Jaynarayan Tudu, PhD (Indian Institute of Science, Bangalore)	Power-aware Computer Architecture, Digital VLSI Test and Verification
Dr. Kalidas Yeturu, PhD (Indian Institute of Science, Bangalore)	Machine Learning, Big Data Technologies
Dr. Raghavendra Kanakagiri, PhD (Indian Institute of Technology Madras)	Parallel Computing
Dr. S. Raja, PhD (Institute of Mathematical Sciences, Chennai)	Theoretical Computer Science, Algorithms and Complexity
Dr. G. Ramakrishna, PhD (Indian Institute of Technology Madras)	Algorithmic Engineering
Dr. Sridhar Chimalakonda, PhD (Indian Institute of Information Technology Hyderabad)	Software Engineering, Computing for Education
Dr. V. Mahendran, PhD (Indian Institute of Technology Madras)	Delay-Tolerant Networks, Software Defined Networks and IOT

Adjunct Faculty

Dr. B. Yagnanarayana, Ph.D. (Indian Institute of Science, Bangalore)	Digital Signal Processing, Speech, Computer Vision and Neural Networks
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DEPARTMENT OF ELECTRICAL ENGINEERING

The Department of Electrical Engineering offers B.Tech, M.Tech, M.S./Ph.D degree programmes at IIT Tirupati. The department is active in the research areas of all the major sub-disciplines of Electrical Engineering. More specifically, the faculty members of the department are involved in the research areas of signal processing, machine learning, medical imaging, nanoelectronics, device modeling, semiconductor devices, digital design & cyber security, power electronics, power systems and smart grids, industrial automation, robust & optimal control, electronic instrumentation, physical layer secrecy, performance analysis of networked systems and distributed algorithms on networks. The department offers a four year B.Tech degree program in Electrical Engineering since 2015. The department started a two year M.Tech program in Signal Processing & Communication in which students are chosen through the GATE examination. This program was started in July 2018. The program consists of theoretical courses in advanced topics in signal processing, communication, power electronics, and power systems along with practical sessions. The department now has well equipped signal processing, communication laboratory, power electronics, power systems, drives instrumentation and electronics labs.

Faculty Members

Name and Qualifications	Major Areas of Specialisation
Associate Professor	
Dr. N. N. Murty, PhD (Institute of Technology BHU, Varanasi) Head of the Dept	Defect identification and characterisation in semiconductors (Diamond, SiC)
Dr. Rama Krishna Sai Gorthi, PhD (Indian Institute of Technology Madras)	Signal/Image Processing, Computer Vision and Pattern Recognition & Machine Learning
Assistant Professor	
Dr. Abhishek Kumar Jha., PhD (Indian Institute of Technology Kanpur)	RF and Microwaves, Applied Electromagnetics
Dr. K. P. Naveen, PhD (Indian Institute of Science, Bangalore)	Performance Analysis of Wireless Networks
Dr. Parthajit Mohapatra, PhD (Indian Institute of Science, Bangalore)	Advanced communication techniques for future wireless networks, Physical Layer Secrecy
Dr. Pooja Vyavahare, PhD (Indian Institute of Technology Bombay)	Distributed function computation and optimisation, Analysis of communication networks
Dr. Prasanth Vooka, PhD (Indian Institute of Technology Madras)	Measurements and Instrumentation, Capacitive Sensors and Signal-Conditioning Circuits
Dr. P. S. Saikrishna, PhD (Indian Institute of Technology Madras)	Industrial Automation, Robust & Optimal Control and Cloud Computing QoS Management
Dr. Srujana Kagita, PhD (Indian Institute of Technology Delhi)	RF and Microwave Components and Antennas
Dr. Subrahmanyam Gorthi, PhD (Swiss Federal Institute of Technology, Switzerland)	Medical Image Analysis
Dr. Swapnil Bhuktare, PhD (Indian Institute of Technology Bombay)	Nanoelectronics, Spintronics
Dr. Vignesh V., PhD (Indian Institute of Technology Kanpur)	Power System Dynamics, Smart Grids
Dr. Vijaya Kumar Gurugubelli, PhD (Indian Institute of Technology Madras)	Device Modeling, Nanoelectronics, High-Voltage Devices, Sensors

Name and Qualifications	Major Areas of Specialisation
Dr. Viju Nair N, PhD (Indian Institute of Science, Bangalore)	Power Electronics
Dr. Vikram Pudi, PhD (Indian Institute of Technology Madras)	Digital Design, Cyber Security and Cryptography
Professor of Practice	
Lt Dr. Gen Anil Kapoor (Punjabi University, Patiala)	Design Thinking, Industrial Engineering & Automation

DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES

The Department of Humanities and Social Sciences at IIT Tirupati, established in 2015, offers elective courses in the areas of Economics, English, Philosophy, Finance, and Organisational Behaviour for all engineering disciplines in Undergraduate programmes. The department also offers compulsory courses in the area of English and Professional Ethics. In addition, proficiency courses in foreign languages such as Spanish, German, Sanskrit, and Japanese are offered to students in the first year of their B.Tech programme. The department launched its first PG programme called Master of Public Policy (MPP) in 2022. The department also offers PhD in a wide variety of disciplines such as Economics, English, Philosophy, Finance and Organisational Behaviour. The faculty members are actively engaged in research in the areas of Social and Political Philosophy, Contemporary Indian Thought, Development Economics, Climate Change Economics, Environmental Economics, Natural Resource Management, Behavioural Economics, Indian Theories of Language and Literature, Comparative Literary Studies, Conflict Literature, Gender Studies, Empirical Asset Pricing, Financial Engineering and Risk Management, Organisational Leadership, Sustainable HRM, Decent Work and Work Engagement. The faculty members are actively involved in organising several workshops/seminars and conferences.

Faculty Members

Name and Qualifications	Major Areas of Specialisation
Professor	
Dr. A. Raghuramaraju, PhD (Indian Institute of Technology Kanpur)	Social and Political Philosophy
Associate Professor	
Dr. Bharat Kumar, PhD (University of Hyderabad)	Social and Political Philosophy, Contemporary Indian Thought
Assistant Professor	
Dr. Rahul A. Sirohi, PhD (University of Illinois at Urbana Champaign), Head of the Dept	Development Economics, Comparative Political Economy of Asia and Latin America, Applied Microeconomics

Name and Qualifications	Major Areas of Specialisation
Dr. Bibhuti Mary Kachhap, PhD (Indian Institute of Technology (ISM) Dhanbad)	South Asian Literature and Cultural Studies
Dr. Chandra Sekhar Bahinipati, PhD (Madras Institute of Development Studies, Chennai)	Economics of Climate Change, Environmental Economics, Natural Resource Management, Development Economics
Dr. Prabha Shankar Dwivedi, PhD (Dr. H. S. Gour Central University, Sagar)	Comparative Literary Studies, Indian Theories of Language and Literature, and Indic Religions
Dr. Sanchayan Nath, PhD (Indiana University Bloomington, USA)	Sustainability, Public Policy and Governance
Dr. Saranya Kshatriya, PhD (Indian Institute of Technology Madras)	Empirical Asset Pricing, Financial Engineering and Risk Management
Dr. Shailendra Singh, PhD (Jamia Millia Islamia, New Delhi)	South Asian Narratives, Gender Studies
Dr. Vaneet Kashyap, PhD (Indian Institute of Technology Roorkee)	Industrial and Organisational Psychology, Organisational Behaviour

DEPARTMENT OF MATHEMATICS AND STATISTICS

The Department of Mathematics and Statistics at IIT Tirupati started in 2015. The department offers mathematical, statistical and computing courses for all disciplines of IIT Tirupati at undergraduate, postgraduate and research levels. The department specialises in the areas of pure and applied mathematics, industrial mathematics & statistics, machine learning and data science. The faculty members of the department are engaged in various research areas of mathematics and statistics, including Representation Theory, Analytic Number Theory, Additive Number Theory, Algebraic Groups, Ergodic Theory, Fractals, Fixed Point Theory, Partial Differential Equations, Numerical Analysis, Inverse Problems, Industrial Mathematics, Mathematical Modelling, Generalized Linear Models, Machine Learning, Statistical Signal Processing, Statistical Finance, and Environmental Statistics. The department currently offers M.Sc. (Mathematics and Statistics) and Ph.D. programmes. The department is interested in interdisciplinary research to address real-world problems. We collaborate with experts at the national and international levels, both from academia and industry. Weekly seminars are conducted to the benefit of faculty members, researchers and students; experts around the globe are invited to deliver seminars. The department conducts workshops and training schools, inviting students from throughout the country and researchers from all around the world to meet and discuss ideas and developments in mathematics and statistics.

Faculty Members

Name and Qualifications	Major Areas of Specialisation
Assistant Professor	
Dr. M. Panchatcharam, PhD (Indian Institute of Technology Madras & TU Kaiserslautern, Germany), Head of the Dept	Numerics for PDEs, Computational Fluid Dynamics

Name and Qualifications	Major Areas of Specialisation
Dr. Ananya Lahiri, PhD (Indian Institute of Technology Kanpur)	Statistics and Probability
Dr. Dr. Durga Prasad Challa, PhD (Johannes Kepler University & RICAM, Linz, Austria)	Forward and Inverse Scattering Problems, Scientific Computing, Cloaking and Effective Medium Theories
Dr. Ishapathik Das, PhD (Indian Institute of Technology Bombay)	Generalised Linear Models, Machine Learning
Dr. Krishna Kishore, PhD (Indiana University, Bloomington)	Automorphic representations
Dr. S. Rajesh, PhD (Indian Institute of Technology Madras)	Fixed-Point Theory
Dr. B. Ravinder, PhD (The Institute of Mathematical Sciences, Chennai)	Representation theory of Lie algebras, Combinatorics
Dr. Srijanani Anurag Prasad, PhD (Indian Institute of Technology Kanpur)	Fractals, Functional Equations
Dr. Shilpak Banerjee, PhD (The Pennsylvania State University, USA)	Ergodic Theory, Dynamical Systems

DEPARTMENT OF MECHANICAL ENGINEERING

The Department of Mechanical Engineering at IIT Tirupati offers undergraduate courses titled “Engineering Drawing” and “Engineering Mechanics” to all the engineering disciplines, and “Advanced Mechanics of Solids” to the UG and PG Students of Mechanical Engineering and Civil Engineering departments. The department is active in research in the areas of applied solid mechanics, dynamics, thermal fluid engineering, fluid mechanics, materials research, and manufacturing engineering. The faculty members of the department are engaged in the following research areas:

Solid mechanics and design: Composite materials, non-destructive testing, vibrations, contact mechanics, plasticity, phase transformations in solids, nonlinear elasticity, hydraulic fracturing, multiscale modeling, robotics, control systems, theoretical and computational solid mechanics.

Fluid and thermal engineering: Sprays, combustion, porous radiant burners, internal combustion engines, alternate fuels, fluid flow diagnostics, energy storage including hydrogen and thermal energy storage, waste heat recovery, refrigeration and air-conditioning, sorption heating and cooling systems, wind energy research, aerodynamics, theoretical fluid mechanics, wave hydrodynamics, and computational fluid dynamics.

Manufacturing engineering and materials research: Advanced manufacturing processes, additive manufacturing, smart manufacturing, welding science and technology, numerical modeling of manufacturing processes, sustainable manufacturing, advanced composite materials development, surface engineering and tribology, computational metrology, mechanical metallurgy.

Robotics and Automation: Dynamics and control of field and service robots, multi-domain robots, Attitude estimation and control of autonomous aerial vehicles, mechatronics

The Mechanical Engineering Department presently offers B.Tech, M.Tech in Design and Manufacturing, and PhD programs. A new M.Tech program in Thermal Engineering and Energy Systems has been approved by the Senate, and will begin from the July-2023 semester. Both UG and PG programs of the department include courses in the core areas of mechanical engineering. Also, a wide number of advanced courses are offered in line with the active research topics relevant to the department and interdisciplinary research. The Department is fully active in organising symposiums, seminars, and workshops to train the faculties and students from the institute and other institutions, thus promoting research collaboration. The faculty members from the department are actively collaborating with industries, research organisations, and other universities on problems which are relevant to society and industries.

Faculty Members

Name and Qualifications	Major Areas of Specialisation
Professor	
Dr. Anil Kumar Emadabathuni, Ph.D. (Indian Institute of Technology Madras)	Hydrogen Storage, Thermal Energy Storage, Adsorption Heating and Cooling Systems
Associate Professor	
Dr. Mamilla Ravi Sankar, Ph.D. (Indian Institute of Technology Kanpur), Head of the Dept	Advanced Materials and Manufacturing, Ultra-Precision Machining
Dr. N. Venkaiah, Ph.D. (Indian Institute of Technology Madras)	Computational Metrology, Machining, Optimisation Techniques
Assistant Professor	
Dr. Madan Mohan Avulapati, Ph.D. (Indian Institute of Science, Bangalore), Head of the Dept	Liquid atomisation, Combustion, Alternative fuels for IC engines and gas turbines
Dr. Ajay Kumar, Ph.D. (Indian Institute of Science, Bangalore)	Metal Casting, Metal Forming, Materials Processing and Mechanical Behavior of Materials, Tribology
Dr. Anup Basak., Ph.D. (Indian Institute of Technology Kanpur)	Solid Mechanics, Computational Mechanics
Dr. Balaji Subramanian, Ph.D. (Swiss Federal Institute of Technology Zurich, Switzerland)	Wind energy, Experimental fluid mechanics/aerodynamics
Dr. Degala Venkata Kiran, Ph.D. (Indian Institute of Technology Bombay)	Welding science and technology
Dr. Girish Kumar Rajan, Ph.D. (Pennsylvania State University, USA)	Fluid Mechanics and Applied Mathematics

Name and Qualifications	Major Areas of Specialisation
Dr. Mitikiri Yujendra, PhD (University of Florida, Gainesville)	Robotics, controls, analog circuits
Dr. P. Venkataraman, PhD (Nanyang Technological University, Singapore.)	Hydraulic fracturing, Multiscale modelling
Dr. Sriram Sundar, PhD (The Ohio State University, Columbus, Ohio, U.S.A)	Vibrations, Contact mechanics, Gear and brake dynamics
Dr. Subbareddy Daggumati, PhD (Ghent University, Belgium)	Advanced Fibre Reinforced Composite Materials, Computational Solid Mechanics
Dr. Thiyagarajan R, PhD (Indian Institute of Technology Madras)	Robotics and automation, Dynamics and control of field and service robots, Mechatronics, Additive manufacturing

Visiting Faculty

Dr. N. N. Kishore, PhD (Indian Institute of Technology Kanpur)	Composite Materials, FEM and Non-Destructive Testing
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Professor of Practice

Dr. V. R. Ganesan, PhD	Automotives, New Technologies in Mechanical Engg, Alternate forms of mobility
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DEPARTMENT OF PHYSICS

The Department of Physics offers courses at the undergraduate, postgraduate and research levels. Department runs M.Sc. in Physics since 2021. The faculty members are actively involved in research in the theoretical and experimental aspects of Atomic, Molecular, Optical physics (AMOP) and Condensed Matter Physics (CMP). To facilitate the exchange of ideas and provide additional research exposure to the students, the department hosted number of invited talks during the academic year 2022-23. Different research and teaching laboratories are being set up in the department with the Institute funding and various external grants.

Faculty Members

Name and Qualifications	Major Areas of Specialisation
Assistant Professor	
Dr. Reetesh Kumar Gangwar, PhD (Indian Institute of Technology Roorkee), Head of the Dept	Atomic and Molecular Physics, Plasma Physics

Name and Qualifications	Major Areas of Specialisation
Dr. Aniket Uday Joglekar, PhD (University of Chicago)	Astroparticle Physics, Beyond the SM Physics.
Dr. Aravinda S, PhD (Poornaprajna Institute of Scientific Research, Bengaluru)	Quantum information and computation, Quantum Foundations.
Dr. Arijit Sharma, PhD (Raman Research Institute, Bengaluru)	Experimental Atomic Physics and Quantum Optics, Precision Laser Spectroscopy
Dr. B. Koteswara Rao, PhD (Indian Institute of Technology Bombay)	Strongly Correlated Electron Systems, Geometrically Frustrated Magnets
Dr. Murari Singh, PhD (Jawahar Lal Nehru University, Delhi)	Computational Soft Matter Physics
Dr. Ranjan Krishna Modak, PhD (Indian Institute of Science, Bangalore)	Theoretical Condensed Matter Physics
Dr. Rudra Sekhar Manna, PhD (Goethe University Frankfurt, Germany)	Experimental Condensed Matter Physics
Dr. Shaon Sahoo, PhD (Indian Institute of Science, Bangalore)	Theoretical Condensed Matter Physics
Dr. Vinay Pramod Majety, PhD (Ludwig Maximilians University, Germany)	Theoretical Ultrafast Physics
Adjunct Faculty	
Dr. P. C. Deshmukh, PhD (Nagpur University)	Photo absorption processes in free/Confined atoms

1.4 TECHNICAL AND ADMINISTRATIVE STAFF

TECHNICAL STAFF

IIT Tirupati completed its fifth round of recruitment for technical staff. Along with regular recruitments, some ad hoc staff members were also engaged to assist the faculty members in regular course work and conduct experiments in laboratories effectively.

Name	Designation	Name	Designation
Mr. P. Mallikarjuna	Assistant Executive Engineer	Mr. A. K. Suresh	Junior Technical Superintendent
Mr. Sadgurumoorthy Narni	Assistant Executive Engineer	Mr. Ajithraj R. A.	Junior Technical Superintendent
Mr. R. S. K. Chaitanya Kotagiri	Executive Engineer	Ms. Aswini R.	Junior Technical Superintendent

Name	Designation
Mr. G. Ramesh	Junior Technical Superintendent
Mr. Jagadeesh M.	Junior Technical Superintendent
Mr. K. N. Dwaraka Natha	Junior Technical Superintendent
Mr. Kollu Homprakash	Junior Technical Superintendent
Mr. Kumar Bellikatti	Junior Technical Superintendent
Mr. Maligireddy Venkat Reddy	Junior Technical Superintendent
Mr. Mohanapriya P.	Junior Technical Superintendent
Mr. Nagarajan R.	Junior Technical Superintendent
Mr. Nunsavathu H. Rao Naik	Junior Technical Superintendent
Mr. P. Vamshi Sesha Sayan	Junior Technical Superintendent
Mr. Prodduturu Dasthagiri	Junior Technical Superintendent
Mr. Pujari Dinesh Khanna	Junior Technical Superintendent
Mr. Ramesh Kumar B.	Junior Technical Superintendent
Mr. Rameshkrishnan A.	Junior Technical Superintendent
Mr. Ramkumar B. S.	Junior Technical Superintendent
Mr. Rapolu Mallikarjun	Junior Technical Superintendent
Mr. S. Venkata Narayana	Junior Technical Superintendent
Mr. S. Ruthrapathi	Junior Technical Superintendent
Mr. Sai Chaitanyapilla	Junior Technical Superintendent

Name	Designation
Mr. Sanyasinaidu Gottapu	Junior Technical Superintendent
Mr. Senthil T.	Junior Technical Superintendent
Mr. Sivanathan M.	Junior Technical Superintendent
Mr. Thota Satish Babu	Junior Technical Superintendent
Mr. Uday Kumar Voma	Junior Technical Superintendent
Mr. Vadapalli Durga Rama Pavan	Junior Technical Superintendent
Mr. Vijay Kumar Aakarapu	Junior Technical Superintendent
Mr. Y. Suravardhana Reddy	Junior Technical Superintendent
Mr. Abijith P. M.	Junior Technician
Mr. Gorapalli Sravya	Junior Technician
Mr. Gunji Ravi	Junior Technician
Ms. Konduru Harika	Junior Technician
Mr. Manugonda Sunil Kumar	Junior Technician
Mr. Midathana Ramesh	Junior Technician
Mr. Parthiban K.	Junior Technician
Mr. Priyangan A.	Junior Technician
Mr. Sai Prabhath Upparu Gonabhavi	Junior Technician
Mr. Tandelu Balaram	Junior Technician
Mr. Thaddi Sai Praveen	Junior Technician
Mr. Babu Raj M.	Technical Officer
Mr. Suneel Kumar M.	Technical Officer
Mr. T. Sathish Kumar	Technical Officer
Mr. Ramagiri Niranjana	Senior Technician
Mr. G. Venkata Subba Reddy	Horticulture Officer

ADMINISTRATIVE STAFF

In the year 2022-2023, the Institute completed its fifth round of recruitment for administrative staff. A total of 39 positions (both administrative and technical posts) were advertised for in the period under consideration. In addition, some staff members have also been recruited on an ad hoc basis to support administrative work in the Institute. Following is a section-wise list of all the administrative staff members at IIT Tirupati during 2022-2023:

Name	Designation	Name	Designation
ADMINISTRATION			
Mr. A. V. V. Prasad (up to February 14, 2023)	Registrar	Mr. Hemanth Kumar S. G.	Junior Assistant
Prof. K S M S Raghavarao (from February 15, 2023)	Registrar (i/c)	Mr. Md. Abdul Rafi SK	Junior Assistant
Mr. Chaman Mehta	Deputy Registrar	Mr. Mohammad Ishaq Alikhan	Junior Assistant
Mr. V. Adinarayana	Project Advisor	Mr. P. Midhun Kumar	Junior Assistant
Mr. Sahad Parammal	Junior Superintendent	Mr. Udaiyakumar R.	Junior Assistant
Mrs. Sandhya Y.	Junior Superintendent	Mr. Vamsi Kiran V.	Junior Assistant
Mr. Ameer Zerwani	Junior Assistant	Mr. Venkateswara Rao D	Junior Assistant
Mrs. G. Haritha	Junior Assistant	Mr. V. Kushal Reddy	Junior Assistant
		Ms. Akkala Supraja	Junior Assistant

ACADEMIC AFFAIRS

Mr. Chaman Mehta	Deputy Registrar
Mr. Arun Kalyan Kuppannagari	Assistant Registrar
Mrs. Sandhya Y	Superintendent
Mr. Amit Kumar Goswami	Junior Superintendent
Mr. R. Lokesh	Junior Assistant
Mr. Prattipati Vidya Sagar	Junior Assistant
Mr. Mohammad Ishaq Alikhan	Junior Assistant

FINANCE AND ACCOUNTS

Mr. T. Siva Kumar	Project Advisor
Mr. Madhu N	Assistant Registrar
Mr. Vijay Y.	Junior Superintendent
Mr. G. Ramoji Rao	Junior Assistant
Mr. V. Dinesh Kumar	Junior Assistant
Mr. Upendram Jagadeshwara Raju	Junior Assistant
Mr. Rajanbabu Lankapalli	Assistant Registrar

CENTRE FOR SPONSORED RESEARCH AND CONSULTANCY

Dr. K. Tiruppathi	Chief Manager
Ms. Vinoda	Project Manager
Ms. Ramya	Project Assistant
Ms. Swarajita	Assistant Manager a/c
Mr. Abdul	Junior Executive

COMPUTER CENTRE

Mrs. Aswini R.	Junior Technical Superintendent
Mr. G. Ramesh	Junior Technical Superintendent
Mr. M. Venkat Reddy	Junior Technical Superintendent
Mr. Senthil T.	Junior Technical Superintendent

Name	Designation
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ENGINEERING UNIT

Mr. V. S. D. Raja	Project Advisor
Mr. R. S. K. Chaitanya	Executive Engineer
Mr. Sadgurumoorthy Narni	Assistant Executive Engineer
Mr. Chaitanya Subba Reddy	Junior Engineer - Electrical
Mr. G. Venkata Subba Reddy	Horticulture Officer

Name	Designation
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Mr. Senthamil Selvan A.	Junior Engineer
Mr. R. Niranjan	Senior Technician
Mr. G. Ravi	Junior Technician
Mr. Muthu Karuppasamy.S.	Project Officer
Ms. Aruna Sowdambigai	Project Associate

ELECTRICAL ENGINEERING

Mr. T. Sathish Kumar	Technical Officer
Ms. Sheela Reddy	Assistant Registrar
Mr. L. Sankar Naidu	Junior Assistant
Mr. Y. Vamsi Krishna	Junior Assistant
Mr. Velakara Pavan Kumar	Junior Assistant

ESTABLISHMENT

Mr. S. K. Sahoo	Deputy Registrar
Ms. Sheela Reddy	Assistant Registrar
Mr. L. Sankar Naidu	Junior Assistant
Mr. Y. Vamsi Krishna	Junior Assistant
Mr. Velakara Pavan Kumar	Junior Assistant

HEALTH CENTRE

Dr. K. Venkata Ramarao	Medical Officer
Dr. Sruthi Kodidini	Medical Officer
Mr. J. Sessa Naidu	Staff Nurse
Ms. Pakala Nagamani	Staff Nurse
Mr. K Kishore Kumar	Staff Nurse

HOSTELS

Mr. A. S. Kalyana Ramakrishnan	Manager
Mr. Aari Kranti Kumar	Junior Executive
Mr. K. S. Janakiraman	Senior Project Assistant

HINDI CELL

Umesh Kumar Singh	Assistant Registrar, Head, Hindi Cell
Vijayalakshmi	Hindi Consultant

LIBRARY

Mr. Shameer K. K.	Assistant Librarian
Mrs. Fathima Azra Fazal	Junior Technical Superintendent

NSS

Mr. Mahesh Kumar Mulakala	NSS Program Officer
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INTERNATIONAL AND ALUMNI AFFAIRS

Mr. N.B. Harshavardhan Reddy	International Officer
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Name	Designation
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PURCHASE AND STORES

Mr. S. K. Sahoo	Deputy Registrar
Mr. Harikrishna Reddy	Assistant Registrar
Mr. Ramesh R	Assistant Registrar
Mr. N. Gnanasekhar	Junior Assistant
Mr. S. Anjaneyulu	Junior Assistant
Mrs. B. Silpa	Junior Assistant
Mr. A. Jayagopal	Junior Assistant
Mr. Saligari Akhil Rathna	Junior Assistant
Mr. Chalapaka Kanaka Venkata Mani Brahmam	Junior Assistant
Mr. Chintakrindi Manicharan	Junior Assistant

Name	Designation
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PLACEMENT

Mr. Pushpak Kumar	Placement Officer
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SPORTS

Dr. Iyappan I.	Physical Education Officer
Mr. Vasudeva Rao V.	Physical Training Instructor

SECURITY

Chakravarthi Kandregula	Assistant Security Officer
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2. ACADEMIC PROGRAMMES

Presently, the Institute offers admissions to the B. Tech programme in the following disciplines:

- Chemical Engineering
- Civil Engineering
- Computer Science & Engineering
- Electrical Engineering
- Mechanical Engineering

During the academic year 2022-23, the Institute launched M. Tech programmes in the areas of RF and Microwave Engineering in Electrical Engineering, M. Tech programmes in the disciplines of Civil Engineering (Environmental and Water Resources Engineering, Geotechnical Engineering, Structural Engineering, and Transportation & Infrastructure Engineering), Computer Science & Engineering, Electrical Engineering (Microelectronics & VLSI, Signal Processing and Communications) and Mechanical Engineering (Design and Manufacturing) were started in the previous academic years. A total of 93 students were admitted to the M. Tech programme during the aforementioned academic session.

The Institute started M.Sc. programmes in Physics and Chemistry during the academic year 2020-21 while the M. Sc. in Mathematics and Statistics was launched during the academic year 2019-20. A total of 40 students have been admitted in the M. Sc. Programmes during the year 2022-2023.

IIT Tirupati has continued admitting students to its M.S. (Research) and PhD programmes in the disciplines of Engineering, Sciences, and Humanities and Social Sciences with focus on research.

IIT Tirupati has also started Master of Public Policy (MPP) in the year 2022 under the Department of Humanities & Social Sciences and 17 students were admitted in the first batch against the sanctioned seats of 20.

The following section contains the details about the student statistics and fellowships regarding all courses in IIT Tirupati.

2.1 STUDENT STATISTICS

B. Tech Programme

In the academic year 2022-23, 222 students joined the Institute against 237 sanctioned seats. Out of a total of 222 students admitted, 178 were boys, and 44 were girls. The overall percentage of the girl students registered under various programmes of the Institute is 22.10%. The break-up of the students admitted is summarized year wise in the tables below:

Table 2.1: Details of the B. Tech students admitted to the Institute

Year	General		EWS		OBC		SC		ST		Total
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	
2018	67	14	-	-	40	8	23	5	12	2	171**
2019	64	13	11	5	40	10	24	5	13	2	192***
2020	68	18	16	5	51	13	27	8	13	5	224***
2021	65	17	20	6	53	13	28	8	13	5	228****
2022	60	13	25	6	51	12	27	8	15	5	222*****

* Including 2 preparatory course students

*** Including 10 preparatory course students

***** Including 6 preparatory course students

** Including 3 preparatory course students

**** Including 8 preparatory course students

M.Tech Programme

Table 2.2: Details of the M.Tech students admitted to the Institute

Year	Boys	Girls	Total
2019	44	15	59
2020	63	6	69
2021	63	18	81
2022	80	13	93

M.SC. PROGRAMME

Table 2.3: Details of the M.Sc. students admitted to the Institute

Year	Boys	Girls	Total
2019	5	5	10
2020	27	15	42
2021	27	16	43
2022	32	8	40

M.S. (Research) Programme

Table 2.4: Details of the M. S. (Research) Scholars admitted to the Institute

Year	Boys	Girls	Total
2018	9	2	11
2019	8	2	10
2020	9	4	13
2021	8	7	15
2022	8	2	10

PH.D. PROGRAMME

Table 2.5: Details of the Ph.D. Scholars admitted to the Institute

Year	Boys	Girls	Total
2018	23	12	35
2019	32	14	46
2020	46	17	63
2021	40	17	57
2022	39	22	61

Master of Public Policy (MPP)

Table 2.6: Details of the MPP Students admitted to the Institute

Year	Boys	Girls	Total
2022	9	8	17

Table 2.7: Details of the students enrolled in the Institute

Programmes	Boys	Girls	Total
B. Tech	713	185	898
M. Tech	146	34	180
M.Sc.	72	21	93
MS (Research)	36	8	44
PhD	162	67	229
MPP	9	8	17
Total	1138	323	1461

2.2 FINANCIAL ASSISTANCE

B.TECH SCHOLARSHIP

The scholarships available to the students admitted to the B. Tech Programme in the Institute include Institute Merit-Cum-Means Scholarship, SC/ST scholarship and Institute Fee Studentship as per Government of India norms. A table is given below for the reference:

Table 2.7: Details of the scholarships offered to the B. Tech students:

Sl.No.	Type of Scholarship	Details of Scholarship	No. of Students			
			2019	2020	2021	2022
1.	Merit-cum-Means scholarship for 25% of the students admitted whose parents' income is not more than Rs. 4.5 lakh per annum	<ul style="list-style-type: none"> Exempted payment of tuition fee, Rs. 1000/- per month pocket allowance 	49	38	45	26
2.	Free Studentship for 10% of the students admitted whose parents' income is not more than Rs. 4.5 lakhs per annum	<ul style="list-style-type: none"> Exempted payment of tuition fee 	7	0	0	0
3.	SC/ST Studentship for students whose parents' income is not more than Rs. 4.5 lakhs per annum	<ul style="list-style-type: none"> Rebate in mess charges up to Rs. 8000 per semester, Free lodging Rs. 250/- per month pocket allowance 	13	12	19	17
4.	Vidya Lakshmi Scheme	<ul style="list-style-type: none"> Reimbursement of the amount of interest levied on the tuition fee component in education loan taken by the students whose family income is less than Rs. 9 lakh per annum 	18	11	4	10

M.SC. SCHOLARSHIP

Sl.No.	Type of Scholarship	Details of Scholarship	No. of Students	
			2021	2022
1.	Merit Scholarship	<ul style="list-style-type: none"> Rs. 1000/- per month and exemption of tuition fees 	10	10
2.	Free Studentship	<ul style="list-style-type: none"> Exemption of tuition fees 	4	4
3.	50% Free Studentship	<ul style="list-style-type: none"> Exemption of 50% tuition fees 	3	4

MPP SCHOLARSHIP

Sl.No.	Type of Scholarship	Details of Scholarship	No. of Students
			2022
1.	Merit Scholarship	<ul style="list-style-type: none"> Rs. 1000/- per month and exemption of tuition fees 	4
2.	Free Studentship	<ul style="list-style-type: none"> Exemption of tuition fees 	2
3.	50% Free Studentship	<ul style="list-style-type: none"> Exemption of 50% tuition fees 	2

Assistantship Available to M. Tech, M.S. (Research), and PhD Scholars

The students admitted to M. Tech get HTTA (Half Time Teaching Assistance) of Rs. 12,400/month, and scholars admitted to M.S. (Research) get HTRA (Half Time Research Assistantship) of Rs. 12,400/month, and PhD scholars get a fellowship (HTRA) of Rs. 31,000/month for the first 2 years, and Rs. 35,000/month from the 3rd year.

3. ACADEMIC INFRASTRUCTURE

Since its inception, improving academic infrastructure has been one of the primary goals of IIT Tirupati. The Institute has constructed a number of facilities on its Permanent Campus in Stages 1A, 1B, and 1C of the first phase construction. All engineering and science laboratories, workshops, a multipurpose building (consisting of classrooms, library, computer centre, and health centre) were constructed in the Stage 1A phase of the constructions. A classroom complex that was built under Stage 1B was made operational during the 2019-20 academic year. A large number of classrooms of different sizes and seating capacity have been constructed and made operation since August 2022 under Stage 1C. This section of the report provides a glimpse of the several academic facilities and laboratories created in the Institute particularly during the year 2022 and 2023.

3.1 CLASSROOMS

A total of seventy-three classrooms of different seating capacities have been constructed under Stage 1A, 1B, and 1C and have been operational since 2018 in various stages. The details of the classrooms that were created have been summarised in the Table below.

Sl. No	Description	Classroom seating capacity					Remarks
		40-seater	60-seater	90-seater	120-seater	240-seater	
1	South Campus	9	12		2		Constructed under Stage 1A & 1B.
2	Academic Building-1 (AB-1)		9				
3	Academic Building-2 (AB-2)	4	6		1		
4	Lecture Hall Complex (LHC)	12	12		4	1	Constructed under Stage 1C
5	Central Instrumentation Facility (CIF)			1			

All the classrooms are equipped with desktop computers with Internet access, projectors, screens, and audio systems. One of the 120-seater classrooms is an electronic virtual classroom with video conferencing facilities with a 1 Gbps bandwidth connection and is already in use for the purpose of holding interactive classes and invited talks.

3.2 COMPUTING & NETWORK FACILITIES

The Computer Center (CC) caters to the students, faculty, and staff of IITT by providing various computational and IT related facilities including, but not limited to, internet connectivity through LAN and Wi-Fi, email, VPN, virtual machines, HPC, software licenses, application development, website maintenance, and process automation. The computer center is responsible for the central computing and networking infrastructure at IITT. IITT has a state-of-the-art data center facility where computing, networking, and telecom infrastructure is hosted along with associated administrative and academic applications. The primary focus of the computer center is on high availability, scalability, automation, and security.

The computer center encourages the adoption of free and open-source software (FOSS) in the institute to minimize the financial burden of expensive proprietary software without compromising the functional needs of end-user departments.

The Head of CC heads the Computer Center. To efficiently coordinate all the CC services, it is divided into five verticals: Computers, Networks, Software, Systems, and Workflow. A faculty advisor supervises each of these verticals. The Head and the advisors committee periodically review the activities and assess the functioning of each vertical. They also define IT policies and update them periodically.

3.2.1 Data Centers

The CC is responsible for the central computing infrastructure at IITT. The Computer Center has moved to the newly constructed Department Building-2 where there is dedicated space allocated for 2 data centers. The first data center (DC1) is located on the ground floor covering an area of 815 sqft. It hosts the computing infrastructure related to the ongoing research projects of the faculty members. The second data center (DC2) is located in a space of size 2140 sqft on the first floor, and it will host critical computational resources (servers, network switches, storage units and specialized IT infrastructure) and applications of the institute. The DC2 can host as many as 40 smart racks and is expected to meet the space requirements for the next 10 years. As part of current expansions, it is planned to commission 10 Smart Racks in this state-of-the-art DC2 to host institute and departments' IT infrastructure, and also expand the institute virtualization and HPC infrastructure to meet the growing demands of the research activities.

In addition, there is a third data center located in the south campus, which is to be converted into a Disaster Recovery center in near future.

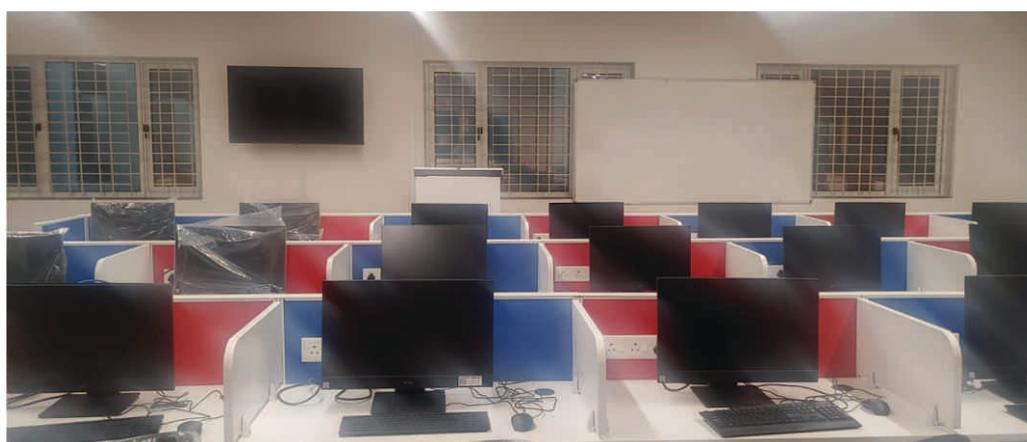


■ Data Centre 1

3.2.2 Computer Laboratories

The computers vertical is responsible for managing the hardware such as the computers, printers, audio, and video equipment. The team is involved in maintaining the computer laboratories of CC, classroom AV setup, video conferencing facilities, printer services, and desktop/laptop computers issued to the faculty and staff members. The team also provides support to organise institute-wide events, workshops, conferences, talks, recruitment interviews, etc.

The Computer Center currently has four laboratories. Three computer labs are set up in the DB2 each with capacities 63, 56, and 28 respectively, and the fourth lab situated in the south campus has a capacity of 30, thus leading to the combined seating capacity of about 180 across all computer labs. The new CC labs being set up will have state-of-the-art audio and video infrastructure to conduct the laboratory sessions, online demonstrations, and competitive exams etc.



A view of Computer Laboratories

3.2.3 Networking Infrastructure

The campus-wide network is set up in the permanent campus with an objective of a minimum of 10G backbone network connectivity for the campus from Day 1, and scalable to 25G in the future. There are four zones in the campus: the Academic zone, the Residential zone, the Hostel zone, and the existing South campus zone. Except for the south campus zone, each zone is connected to Data Center 2 (DC2) via a 144-core Optical Fibre Cable (OFC) ring. The south campus zone is connected to DC2 via a 48-core OFC ring. The core capacity of OFCs being laid is sufficiently large enough to cater to the connectivity needs of future expansions for the next 20-25 years. The networking infrastructure being set up aims at enabling fault-tolerant connectivity for critical infrastructure through High Availability (HA) functionality. Further, it offers wireless connectivity with the latest wifi technology (WiFi6) catering to the needs of both high user density and high end-to-end bandwidth scenarios. To enhance the bandwidth and offer redundant connectivity, in addition to the existing 1 Gbps primary Internet link, an additional 1 Gbps Internet link is being set up.

The CC provides Internet services to all the users. The network setup includes 2 Cisco core switches - 3850 and 9407, Cisco catalyst layer two switches, Juniper router, Sophos-330 XG firewall. The Institute has a 1 Gbps internet ILL connection from NKN (National Knowledge Network). In addition, another 1Gbps backup ILL is also available to connect crucial IT infrastructure. The south campus is equipped with a 10G passive network infrastructure. The academic and administrative buildings have wired and WiFi-based wireless connectivity, and all hostels have WiFi connectivity. In the permanent campus, all the Cisco wireless routers are integrated with Cisco wireless controller Cisco 5520. Each building in the permanent campus is connected with a 12 core OFC connection. Users can avail internet facility using either of the following two channels:

1. Wired Internet Services are made available to all the eligible users across the IITT campus.
2. Wireless Internet Services: IITT campus is also enabled with Wi-Fi. The Wi-Fi services are made available to all the academic and administrative buildings and the student hostels.

The entire network is monitored and managed through network management software. Perimeter-level security is managed through a firewall solution from Sophos.

The vertical also takes care of analog and digital telephony services. The services are being provided using the Openscape X8 System. The vertical also oversees the surveillance system, which covers all the important places in and around the campus for monitoring and recording the footage in the Institute server.

In addition, Edu roam service that offers seamless internet connectivity to students, researchers, and staff is available in the institute.



IP PBX Setup

Sophos-330 XG firewall and network rack



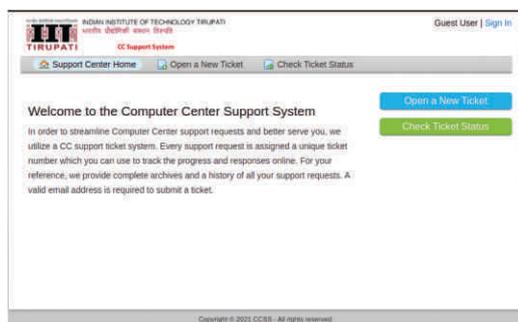
3.2.4 Software Vertical

The software vertical oversees the institute's software procurement, installation, and maintenance. It supports the institute with different licensed software to avoid pirated or unlicensed versions of the software. As part of the policy, the institute provides essential software to faculty and staff such as Windows OS, PDF Editor, Microsoft Apps, and Kaspersky Antivirus, and Microsoft Apps for Students. In addition, CC provides the software licenses to software such as Windows 10 Education, Microsoft 365 Apps, MATLAB, KASPERSKY, Mathematica, Foxit Phantom PDF, Origin Pro, Autocad, Creo Software, COMSOL Multiphysics, OrCAD Software, VIVADO, Simulia Abaqus, Ansys, Bentley, ChemDraw, GeoStudio 2018, CSI, Cadence, AspenONE for Universities, Microsoft Project Professional 2019, Converge, TCAD etc.

In addition, the vertical develops and maintains the websites and portals, including but not limited to the institute's website, department websites, intranet portal, admissions, course proposal, CSRC, feedback, services, recruitment etc. The vertical also looks after the institutional email services to the institute community.

3.2.5 Ticketing System

To timely serve various service requests from the stakeholders, the Computer Center has implemented a ticketing system - CC Support System (ccss.iittp.ac.in).



Software Support System



3.2.6 High Performance Computing and Cloud Infrastructure

The CC-Systems vertical offers cloud computing and HPC services to the users of the institute. A Private Cloud Data Centre has been established to facilitate the provisioning of Infrastructure as a Service (IaaS) by offering customized virtual servers/machines for various departments requiring heavy to moderate computing infrastructure with 24x7 operational availability. The data center is built using the VMware virtualization platform on HP, Supermicro servers and HP 3PAR SAN storage.

The Computer Centre has set up an HPC cluster, Lotus, to carry out research and academic activities. The cluster is built using Supermicro high-end



Smart Racks hosting VMware, HPC, and GPU clusters (South Campus DC)



VMware virtualization setup



Racks hosting Project Servers/Workstations

servers, storage and Infiniband Network along with required software components. The lotus cluster uses PBS Pro as a job scheduler and has 24 CPU compute nodes + 2 GPU nodes. Each node has 24 cores and 96 GB RAM. Total available disk space in /home and /storage is 1.3 TB and 100 TB, respectively. Currently, 10 GB in /home and 2 TB in /storage are allocated to each user. The cluster has seven queues - cpu15d, cpu7d, cpu3d, cpu2d, cpu1d, cpu1h, and gpu4d, with appropriate resources grouped together.

Also, the CC-Systems vertical has recently set up a GPU cluster, Orchid, using the unused workstations and servers to support the ongoing research activities. The orchid cluster currently has one master node and 5 GPU nodes. Each node has 20 CPU cores, 128 GB memory, and 3 Nvidia GeForce GTX 1080Ti 11GB GPUs totaling 80 CPU cores, 512GB RAM, and 12 GPUs. The orchid cluster uses the PBS Pro as the job scheduler. Currently, there are two queues, q4h and workq with a maximum wall time of 4 hours and 10 days respectively.

CC-Systems vertical also hosts the servers/workstations/compute setup procured using project funding. It takes responsibility in providing necessary infrastructure such as rack space, network connections and comfort cooling.

3.2.7 Workflow and Office Automation

The Institute aims to achieve operational efficiency, transparency, and accountability by enabling its activities (workflows) using appropriate information technology and process documentation. The vertical takes care of all the activities related to the workflow system. As per Government of India General Financial Rules (GFR) and rules of the Institute, recently an IT firm has been identified to implement the workflow system for IITT. In this process, it has zeroed in on twelve modules, which includes a. Finance, Accounts, and Audit, b. Stores, Purchase and Inventory Management, c. Human Resources, d. Academics, e. Placements, Student Affairs, Hostel Management, f. Health Centre, g. Library Management, h. Engineering Unit, i. International and Alumni Affairs, j. System Administration and Integration, k. General Administration, and l. SRC-Projects and CEP. The workflow system is commissioned and is in use at IIT Tirupati. The workflow vertical coordinates with the module owners and the IT firm in the timely completion of the new features and enhancements related to each of the modules of the workflow system in the institute.

3.3 SCIENCE LABORATORIES

For the first-year undergraduate, postgraduate and PhD students, Physics and Chemistry laboratories have been developed with the state-of-the-art facilities. During the year 2022-23, the laboratories got further equipped with added experimental setups. Following are the details of the science laboratories on the campus:

3.3.1 Chemistry Laboratory

The undergraduate chemistry laboratory was established in January 2016. First-year B.Tech. students experience well designed and concept-oriented experiments related to chemical sciences and engineering.

Some of the exciting experiments are listed below.

- Preparation of Aspirin: an analgesic drug
- Liquid-liquid extraction of caffeine from different brands of tea
- Determination of the strength of the citrus fruit juice by using conductometric titration
- Quantitative estimation of the copper content in alpha-brass by using the colorimeter
- Determining the temporary and permanent hardness of water samples collected in and around the IIT campus.

The state-of-the-art MSc and PhD research labs are established in 2020 equipped with modern facilities for conducting MSc practical course, Master's project work and the PhD research.

Major equipment available in the chemistry laboratory

The Department of Chemistry is equipped with a couple of high-end workstations to cater to computational research need. In addition to this, the theoretical Chemistry Research group has established a moderate HPC 'Bose' having 8-computer nodes, one master node and adequate hard disk storage to do the computational research.

<ul style="list-style-type: none"> • Computing Facility: 7 Workstations each having Dual Socket with 20 processors & 128 GB RAM, running at a clock-speed of 3.1 GHz. 	<ul style="list-style-type: none"> • Type I & III Water Purifying System
<ul style="list-style-type: none"> • UV-Vis-NIR Spectrometer 	<ul style="list-style-type: none"> • CO₂ Incubator
<ul style="list-style-type: none"> • UV-Vis Spectrometer 	<ul style="list-style-type: none"> • HPC Cluster and Accessories
<ul style="list-style-type: none"> • FTIR-ATR 	<ul style="list-style-type: none"> • Microprocessor Based Conductivity/TDS Meter
<ul style="list-style-type: none"> • Fluorescence Spectrometer 	<ul style="list-style-type: none"> • Microprocessor Based pH Meter
<ul style="list-style-type: none"> • Electrochemical Workstation 	<ul style="list-style-type: none"> • Digital Storage Oscilloscope
<ul style="list-style-type: none"> • Inverted Microscope 	<ul style="list-style-type: none"> • Digital Hot Plate with Magnetic Stirrers
<ul style="list-style-type: none"> • Digital Color Camera with Accessories 	<ul style="list-style-type: none"> • Electronic Analytical Balance
<ul style="list-style-type: none"> • Mini-Sub Cell GT Horizontal Electrophoresis System 	<ul style="list-style-type: none"> • Hot Air Oven
<ul style="list-style-type: none"> • UV-Photoreactor 	<ul style="list-style-type: none"> • Ice Flacking Machines
<ul style="list-style-type: none"> • Table Top Refrigerated Centrifuge 	<ul style="list-style-type: none"> • Rotary Evaporator
<ul style="list-style-type: none"> • Digital Polarimeter 	<ul style="list-style-type: none"> • Fume Hood to Handle Hazardous Chemicals
<ul style="list-style-type: none"> • Mini Rotary Shaker 	<ul style="list-style-type: none"> • Bio-Safety Cabinet
<ul style="list-style-type: none"> • Multimode Microplate Reader 	<ul style="list-style-type: none"> • UV-Cabinet-with UV Filter
<ul style="list-style-type: none"> • TGA Equipment 	<ul style="list-style-type: none"> • Benchtop Conductivity Meter
<ul style="list-style-type: none"> • Lyophilizer 	<ul style="list-style-type: none"> • Benchtop pH Meter
<ul style="list-style-type: none"> • Freezer (-20 °C) 	<ul style="list-style-type: none"> • Distilled Water Plant – 4-litre Capacity
<ul style="list-style-type: none"> • Freezer (-80 °C) 	<ul style="list-style-type: none"> • Digital colorimeter
<ul style="list-style-type: none"> • Industrial Refrigerator (2 nos, 0 °C) 	<ul style="list-style-type: none"> • Melting Point Apparatus
<ul style="list-style-type: none"> • Syringe Infusion Pump 	<ul style="list-style-type: none"> • Water Baths
	<ul style="list-style-type: none"> • Oil Free Portable Vacuum Pumps



A view of Chemistry Laboratory

3.3.2 Physics Laboratory

The Department of Physics has teaching laboratories for the first-year undergraduate programme and for the postgraduate programme. The undergraduate laboratory was set up with the inception of the Institute in 2015 and has been constantly upgraded since then based on the increasing intake in the B. Tech programme. The Master's level teaching laboratories have been set up during the academic year 2020-21. All the laboratories host several state-of-the-art equipment that enable students to have hands-on experience and develop a better understanding of various physics concepts. In addition, research laboratories in the areas of experimental Atomic, Molecular and Optical Physics, experimental Condensed matter physics and computational physics are being developed with financial support from the Institute and external agencies.

Undergraduate Physics Laboratory

The laboratory is equipped with a wide variety of experiments in basic and applied Physics, covering the subjects of classical mechanics, optics, electromagnetic theory, solid state physics, electronics, and computations programming such as with MATLAB, etc. The laboratory also has a dedicated partition for conducting the darkroom experiments. The experiments are designed to train the first year B. Tech students with various aspects of physical measurements.

The available equipment are as follows:

- | |
|-------------------------------------|
| • Compound pendulum |
| • Planck's constant apparatus |
| • Ultrasonic Interferometer |
| • Equipotential lines mapping setup |
| • Hall effect apparatus |
| • Newton rings setup |
| • Spectrometer |
| • Digital storage oscilloscope |
| • Four probe method apparatus |
| • LCR circuit |
| • Stefan constant setup |

Postgraduate Physics Laboratory

The Department of Physics initiated the two-year M.Sc. program in Physics in August 2020. A robust and contemporary laboratory component has been included in the curriculum to ensure adequate hands-on experience and training. Two general laboratories christened as PG Physics LAB I and PG Physics LAB II were developed. In addition, a third Advanced Physics Laboratory is being developed that would train students on advanced experimental techniques that enable them to embark on a robust research career. A dedicated darkroom facility has also been developed that hosts classical and Quantum optics experiments.



Physics Laboratory I: View of arrangement of various general physics experiments

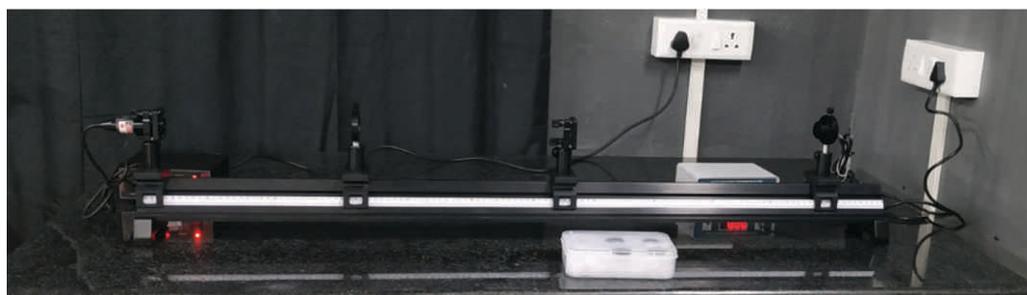


PG Physics Lab II: View of the dark room housing the optics and atomic and molecular physics experiments

Major Equipment Installed

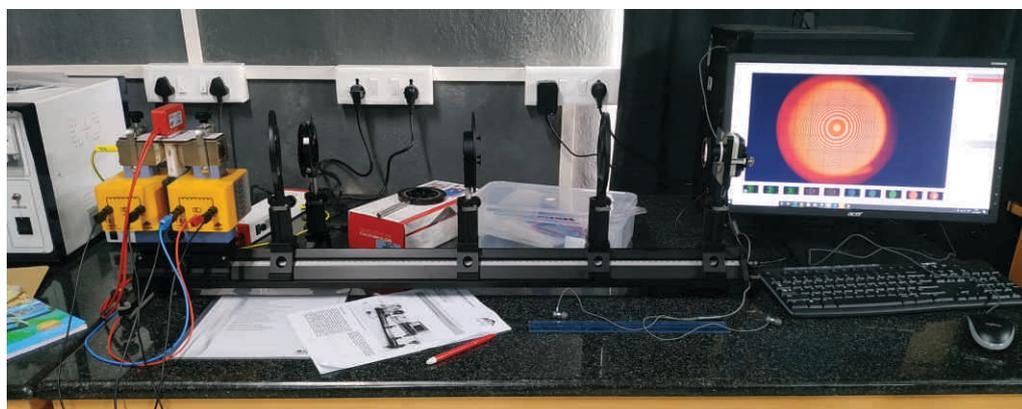
The following are the major equipment installed:

1. Single Slit Diffraction and Heisenberg's Uncertainty Principle Setup consists of a diode laser, and photodetector mounted on a sliding rail. It is used to study diffraction patterns from various single slits. Slits widths can be calculated by analysing the patterns. The system is equipped with a micrometer translation stage to control the distances between various optical elements. The equipment can also be used to verify the uncertainty principle.



Single slit
diffraction setup

2. Zeeman's Effect Apparatus consists of a Fabry-Perot etalon, a mercury lamp, an electromagnet, and a photodetector mounted on a sliding rail. The magnetic field can be varied, and the splitting of mercury atomic levels due to Zeeman's effect can be observed. The setup can be used to determine the polarisation state of the individual Zeeman components.



Zeeman effect
apparatus

3. Faraday Effect Setup



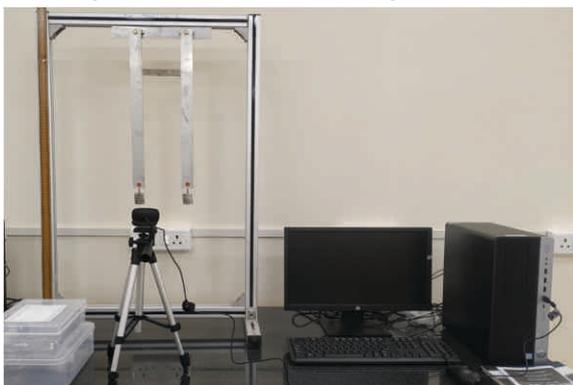
Fig.14 Faraday
Effect setup

4. UV-VIS Spectroscopy of Atoms and Molecules



UV-VIS emission and absorption spectroscopy of gas and liquid phase systems

5. Coupled Pendulum Set Up



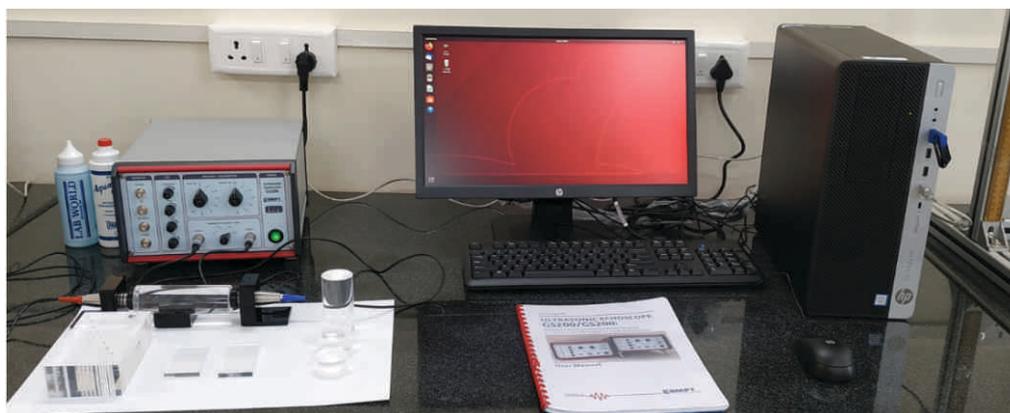
Coupled Pendulum setup along with a high-resolution camera

6. Millikan's Oil Drop Apparatus



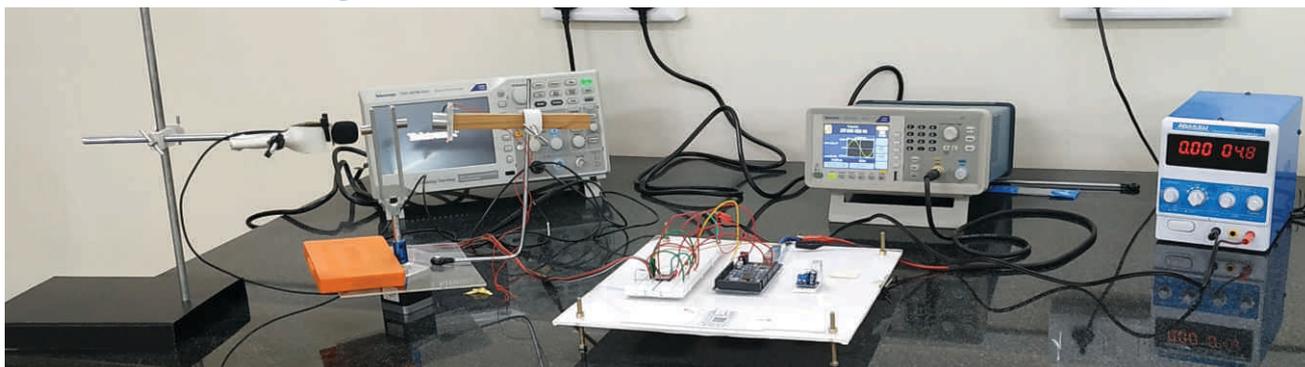
Millikan's Oil Drop apparatus to determine the charge of an electron

7. Ultrasonic Waves in Solids



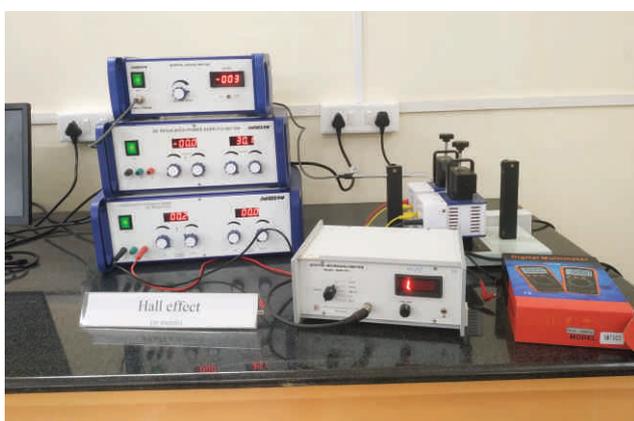
Ultrasonic waves in solids apparatus with various acrylic solids

8. Radiation from Tuning Fork



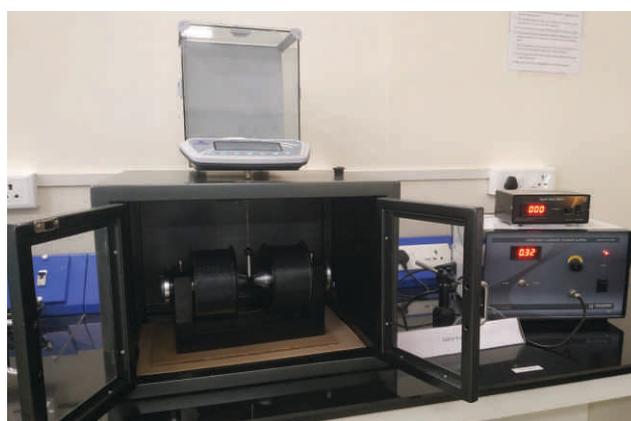
Radiation from Tuning Fork setup

9. Hall Effect Apparatus



Hall effect apparatus for metals

10. Gouy's Method for Magnetic Susceptibility



Gouy's balance for measurement of the Magnetic Susceptibility

11. Apparatus to Measure Heat Capacity of Solids

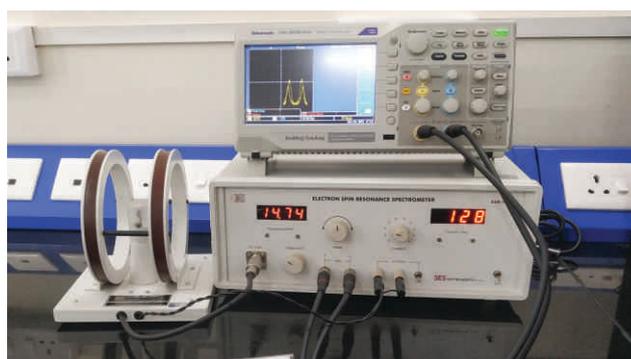


Apparatus to measure the heat capacity

12. Electron Spin Resonance (ESR)

The setup consists of an RF oscillator, a Helmholtz coil, a digital storage oscilloscope and the sample - Diphenyl Picryl Hydrazyl (DPPH).

The Electron Spin Resonance (ESR) setup with Helmholtz coil and digital oscilloscope





13. Ferromagnetic Hysteresis Apparatus

The setup consists of transformer coils with a ferromagnetic core and a power supply and can be used to study the ferromagnetic hysteresis curve.

Ferromagnetic hysteresis apparatus

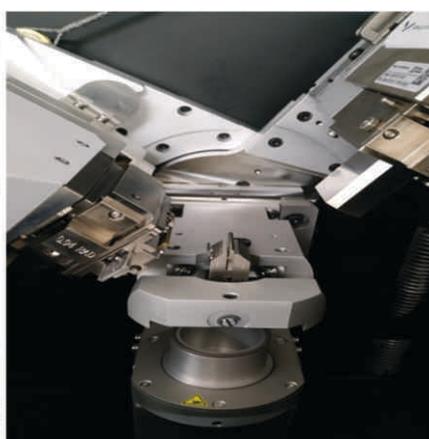
14. LCR Meter for the Dielectric Constant Measurement

LCR meter for the dielectric constant measurement



Advanced Physics Laboratory

Benchtop X-ray Diffraction (XRD): A benchtop X-ray diffractometer (XRD) is used to characterise the structural properties of different varieties of solid crystalline materials. It is a widely used technique and is required by various departments. The instrument has been installed at the Advanced Physics Laboratory. It serves both the purposes of teaching and research for our Institution's internal users and opens the services for external users from other academic institutions and industries. It measures the X-ray diffraction pattern for the different varieties of materials such as single-crystalline, poly-crystalline, nano-crystalline solid samples. The measurement can be carried from the 2 theta angles from 0° to 90° with a maximum resolution of 0.005° . X'Pert HighScore Plus software can be used to analyse the data with access to the crystallographic open database (COD). It has a 600 W copper X-ray source and is capable of providing large intensities. Its fast scan mode drastically reduces data acquisition time without compromising data quality.



The Benchtop AERIS Panalytical X-ray diffractometer (Left), inner view of the diffractometer having the X-ray source, sample stage and detector (Right)

3.4 ENGINEERING LABORATORIES

Faculty members of the different streams of Engineering at IIT Tirupati are keenly involved in developing laboratory facilities for their respective disciplines. Details of the laboratories developed or being developed during the year 2022-23 are hereunder:

3.4.1 Chemical Engineering Laboratories

The first phase of Laboratories for B. Tech/MS & Ph.D. programs in the Department of Chemical Engineering at IIT Tirupati was inaugurated by the Institute's Director Prof. K. N. Satyanarayana in 2022. The event was graced by eminent professors of Chemical Engineering like Prof. K. Krishnaiah (IIT Madras & IIT Tirupati), Prof. D. P. Rao (IIT Delhi) and Prof. T. Renganathan (IIT Madras). It was organized by the faculty, staff and students of the Chemical Engineering Department headed by Dr. T. Sunil Kumar. The department also produces high purity oxygen in their mini oxygen plant.



The following are the laboratories in recently built Academic Building-I that facilitate the teaching and research in the Dept. of Chemical Engineering.

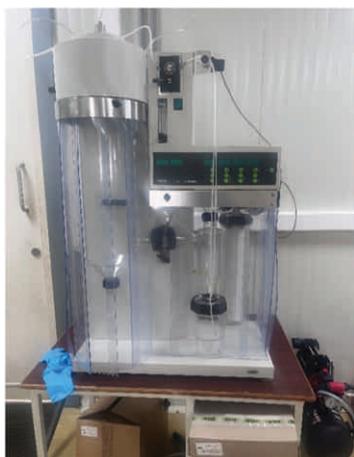
- | | | |
|-----------------------|--------------------------|------------------------|
| 1. Prandtl Laboratory | 2. Joule Laboratory | 3. Reynolds Laboratory |
| 4. Mc Cabe Laboratory | 5. Lavenspiel Laboratory | 6. Laplace Laboratory |
| 7. Nicolas Laboratory | 8. Thiele Laboratory | 9. Langmuir Laboratory |

3.4.1.1 Prandtl Laboratory

This Laboratory addresses the interdisciplinary aspect of heat and momentum transport. Especially the focus is on equipment for natural and forced convection and heat transfer equipment such as heat exchangers.

List of equipment in the Laboratory:

• Mini Spray Dryer	• Packed and Fluidized Bed
• Laminar Flow Cabinet	• Terminal Settling Velocity
• Shell and Tube Heat Exchanger	• Heat Transfer through Composite Wall
• Double Pipe Heat Exchanger	• Heat Transfer in Extended Surface Area



Mini Spray Dryer



Laminar Air Flow Cabinet



Shell and Tube Heat Exchange

3.4.1.2 Joule Laboratory

This Laboratory specializes in the field of nanotechnology and its application in various biomedical disciplines and specific thrust areas of research includes theragnostic nanomaterials, interfacial nano-bio interactions, tissue engineering, nanocarrier design, and bioactive nanofibers.

List of equipment in the Laboratory:

- Electro-Spinning Unit
- Co₂ Incubator
- Orbital Shaking Incubator
- Water Purification System (Type-1)
- UV Transilluminator

- Gel Electrophoresis System
- Colony Counter
- Vertical Autoclave
- Centrifuge



Electrospinning Unit



Co₂ Incubator



Orbital shaking Incubator

3.4.1.3 Reynolds Laboratory

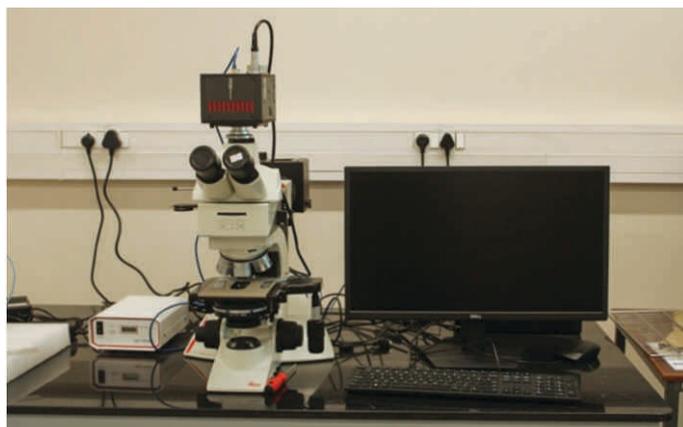
The broad research theme of Reynold laboratory revolves around Microfluidics, applied to multiphase flow systems, biorefinery, polymerization, food science, and bioprocessing areas. Presently, the lab is working towards harnessing the combined potential of aqueous two-phase system (ATPS) and microfluidics for food

processing and food quality applications. The Reynolds laboratory is equipped with various equipment/instruments such as Microfluidic set-up, optical microscope, high speed camera, HPLC, GC-MS etc.

List of equipments:

- Micro Stater Fluidic Kit
- High-Speed Camera
- Optical Microscope

- Hot Air Oven
- HPLC
- GC-MS



Optical Microscope



Micro Stater Fluidic Kit

3.4.1.4 McCabe Laboratory

The McCabe laboratory is for teaching and research on separation processes in the chemical industry. It includes processes such as distillation, gas absorption, diffusion, drying, membrane processes etc. Equipment such as gas absorption apparatus can also be used to conduct advanced research on development of solvents for carbon dioxide capture. It is planned to develop apparatus for humidification and tray drying for remote operation (IoT application).

Major Equipment

- Micro & Ultra Filtration System
- Rotary Evaporator
- Vapour Pressure Tester

- Vapour in Air Diffusion system
- Liquid Density Meter
- Infrared Camera



Rotary Evaporator



Micro & Ultra Filtration System

3.4.1.5 Levenspiel Laboratory for Reaction Engineering

The Levenspiel laboratory aims to implement the knowledge of the chemical reaction engineering course and conduct research. It will cover the fundamental reaction engineering experiments such as kinetics of reactions, batch, and continuous reactors, non-ideality of reactors, etc. this laboratory is equipped with Batch Reactor, Plug Flow Reactor, Continuous stirred Tank Reactor, and Thermogravimetric Analysis (TGA)/Differential Scanning Calorimetry(DSC).



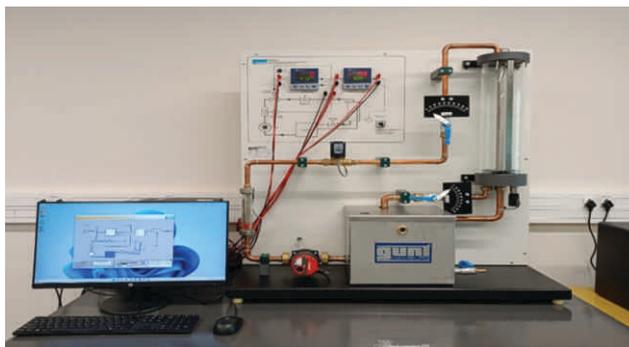
Continuous Stirred Tank Reactor

3.4.1.6 Laplace Laboratory for Process Control and Automation

The Laplace laboratory aims at demonstrating classical and modern control concepts. This laboratory is equipped with First and Second Order Systems, a Level/Flow control demonstration unit, and Multivariable Control: Stirred Tank.



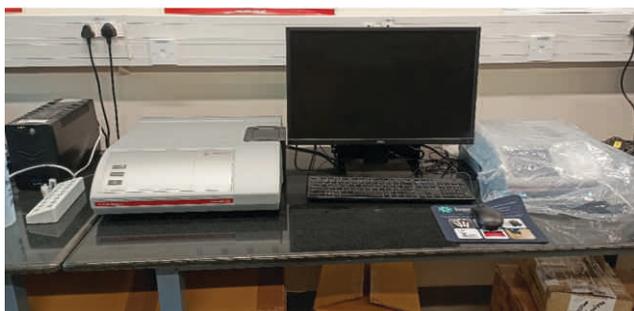
Multivariable Control Stirred Tank



Level & Flow Control demonstration unit

3.4.1.7 Nicolas Laboratory

Nicolas laboratory is equipped with food technology based on the unit operations involved in chemical engineering, they can be easily adopted for food science and technology, one of the thrust areas of our institute. This laboratory is equipped with a sterilizer, Particle Size Analyzer, fermentor, deep freezer, Membrane System and Isothermal titration calorimeter.



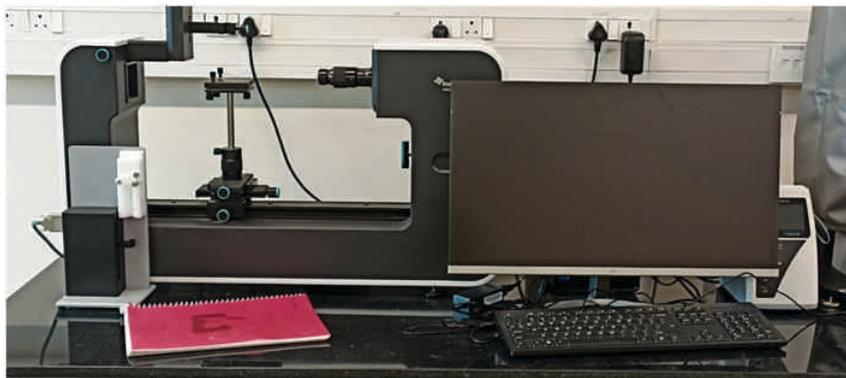
Litsizer



Particle Size Analyzer

3.4.1.8 Thiele Laboratory

Thiele laboratory is equipped to synthesize the materials (e.g nano materials, thin films, etc.) via different techniques, which will be useful for research in the field of catalysis, photo catalysis, water splitting, CO₂ reduction, energy Storage, etc. This Laboratory is equipped with a Microwave Synthesis System, UV Visible Spectrophotometer, Electrochemical Workstation, Force Tensiometer, Optical Tensiometer and Spin Coating Unit.



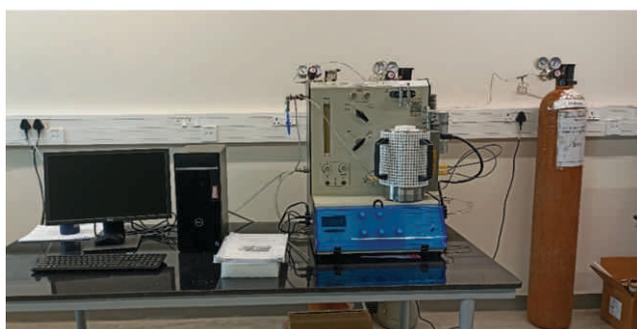
Optical Tensiometer



Force Tensiometer

3.4.1.9 Langmuir Laboratory

The Langmuir Laboratory will be used for research and teaching on advanced separation processes, biogas upgradation, natural gas and hydrogen storage, development, and characterization of functionalized nanomaterials for carbon capture, water treatment etc. This laboratory is equipped with a Automated Gas Sorption Analyzer (BET) and Automated Chemisorption Analyzer (TPR/TPD/TPO).



Automated chemisorption Analyzer TPR, TPD



Automated Gas Absorption Analyzer

3.4.2 Civil and Environmental Engineering Laboratories

The Civil Engineering Laboratories are located in the Lab-1 block in an area of 5400 sq. ft housing the facilities to conduct UG/PG laboratory classes and high-quality research. Further, additional laboratory facilities covering an area of over 40000 square feet are also being created on-campus through the Institute funds with the support of Ministry of Education (MoE) and Ministry-sponsored research grants. The laboratories also provide exposure to students in activity-based learning and hands-on problem-solving. CEE is currently involved in various sponsored research projects funded by national and international agencies in excess of Rupees Twenty Crore. The faculty members are engaged in several national and international collaborative projects with centers of excellence, universities, and research institutes. The following are laboratories that facilitate the teaching and research in the Dept. of Civil and Environmental Engineering.

1. Structural Engineering Laboratory
2. Transportation Laboratory
3. Building Material Laboratory
4. Geotechnical Engineering Laboratory
5. Environmental Engineering Laboratory
6. Hydraulics & Water Resources Engineering Laboratory
7. Surveying Laboratory
8. Non-destructive Testing Laboratory

3.4.2.1 Structural Engineering Laboratory

The Structural Engineering Laboratory at IIT Tirupati consists of state-of-the-art table-top equipment for undergraduate instruction and advanced equipment for research purposes. The equipment in the UG laboratory facilitates students to understand the fundamental concepts related to the mechanics of materials.

The list of equipment available is given below:

• Stress analysis in a thin-walled cylinder	• Analysis of statically indeterminate beam
• Buckling behaviour of Struts	• Analysis of suspension Bridge
• Deformation of straight beam	• Three Hinged arch
• Deformation of bars under bending or torsion	• Unsymmetrical bending of beams
• Bending stresses in beam	• Pendulum impact tester
• Torsion testing machine	



A view of table top structural Engg. Lab

Major research equipment available in the laboratory:

Servo hydraulic universal testing machine (UTM) of 100kN Capacity

MTS-100kN servo hydraulic fatigue rated load frame with cross head-mounted actuator UTM to study the range of materials including plastics, elastomers, steel, aluminium, alloys and more for a range of tests specified below,

- Monotonic (Tensile/ compressive) loading
- Reversed cyclic tests
- Fatigue tests (Low cycle & High cycle), fracture toughness and crack propagation studies
- Three/four-point bending tests
- Range of test fixtures compatible with the UTM for advanced material characterisation

Data Acquisition System (DAQ) and displacement transducers

The following HBM make DAQ and transducers available

- 16 Channel DAQ system for strain gauges – 1 No
- 8 Channel universal DAQ system – 2 No
- Linear Variable Displacement Transducer 0-20 (4 Nos), 0-50mm (2 Nos), 0-100 mm (1 No)
- Strain Gauges starter kit and Installation Kit – 1 No each



A view of lab with 100kN UTM and DAQ system

Servo controlled Universal Testing Machine (UTM) of 1200kN capacity

Zwick Roell Servo controlled electro-mechanical Universal testing machine (UTM) of 1200kN capacity to test high strength steel rebars (0~60mm diameter), multi-wire strands (0~20mm diameter) and metal flat coupons (0~60 mm thick, up to 100 mm wide) under monotonic tensile loading. The machine is specially equipped with the following displacement transducer, a) contact type extensometer for re-bars and flat specimens, and b) Non-contact Laser type extensometer for Stranded Wires.



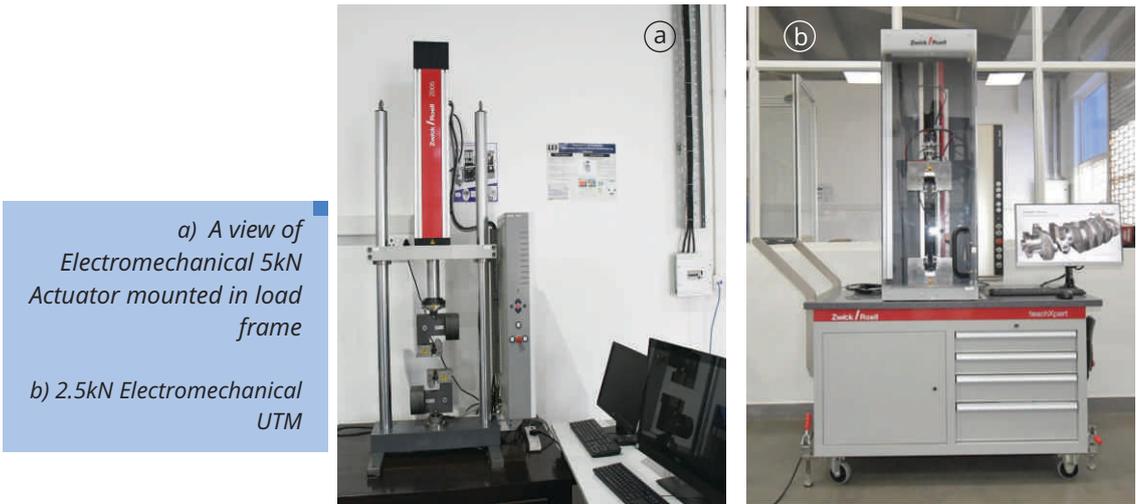
High capacity Electro-mechanical UTM in Structural Engg lab

Electro-mechanical actuator of 5kN actuator

Zwick Roell electro-mechanical actuator of 5kN capacity is with load frame for testing films, fibres, elastomer, geotextiles and composites, under monotonic and cyclic loading.

Low force UTM of capacity 2.5 KN with necessary test fixtures

Zwick Roell Electromechanical UTM with 2.5 kN capacity for testing like ceramics, plastics, rubber, individual natural and composite fibres, matrix materials, agricultural products, biomaterials such as tissues, packaging materials, foams, composite films and membranes under different loading scenarios such as under tensile, compression, shear and flexure.



a) A view of Electromechanical 5kN Actuator mounted in load frame
b) 2.5kN Electromechanical UTM

Compressive Testing Machine

The family of CTM has a wide range of testing capacity with high precision (i.e., 15 kN to 5000 kN). Major components of the equipment are

- 5000 kN CTM for concrete and rock test
- 15 kN & 500 kN frame for mortar test
- 350 kN bending test frame.



Family of Compressive Testing Machine



Universal Vibration Apparatus

3.4.2.2 Transportation Engineering: Advanced Pavement Systems (APS) Laboratory

The Advanced Pavement Systems (APS) laboratory at IIT Tirupati is currently housed inside a state-of-the-art sustainable building on the permanent campus. The equipment housed in this laboratory allows for undergraduate teaching and postgraduate and doctoral research activities in the areas of sustainable transportation infrastructure and pavements/materials. The APS laboratory is divided into two major sections, as listed under.

The details of the state-of-the-art equipment and accessories under each head is provided below.

- A) Asphalt Binder Characterization Equipment, Semi-automated penetrometer, Ring and ball apparatus, Ductilometer, Rotational viscometer, Dynamic shear rheometer and Pressure aging vessel
- B) Asphalt Concrete and Cement Concrete Mixtures Characterization Equipment, Asphalt mixer, Pan mixer, Marshall Compactor, Marshall stabilometer and Vacuum pycnometer, Superpave gyratory compactor, Los Angeles Abrasion test

Major research facilities available

Universal Testing Machine or Dynamic Testing System: This state-of-the-art equipment and several associated accessories are capable of characterising various pavement materials such as asphalt concrete, pervious concrete, soil, unbound granular materials, fibres, and plastics. The machine houses a computer programmable control unit and a 16-channel data acquisition control system that is flexible to use any transducer in any channel, which are automatically calibrated on power-up. The following test configurations are available within the system:

- i. Uniaxial cyclic compression
- ii. Indirect tensile modulus, creep compliance, and strength
- iii. Indirect tensile fatigue
- iv. Four-point bending on both asphalt concrete and low-strength cement concrete
- v. Dynamic modulus
- vi. Resilient modulus
- vii. Triaxial test
- viii. Semi-circular bending



A View of Transportation Engineering Lab



Equipment in Advanced Pavement Systems Laboratory at IIT Tirupati:

(a) Rotational viscometer (b) Marshall stabilometer (c) asphalt mixer (d) Marshall compactor (e) Softening point apparatus (f) Penetrometer (g) Universal testing machine 30 kN capacity (h) Ductilometer (i) Dynamic shear rheometer (j) Pressure aging vessel (k) Los Angeles abrasion testing machine

3.4.2.3 Building Materials Laboratory

The main objectives of experimental studies on building materials and its components are to facilitate quality control and compliance with specifications. These studies impart an understanding of the test methods to find the physical and mechanical properties of building materials such as concrete ingredients such as cement, coarse and fine aggregates, wet and hardened concrete, brick and tile, etc.

The lab is equipped with the following major equipment:

- 2000kN Load Controlled Compression Testing Machine (CTM)
- Vee Bee Consistometer, Flow Table, Compaction Factor Apparatus, Slump Cone
- Pycnometer and Cylindrical Metal Measure

- Cement Mortar Vibrator, Table Vibrator and Poker Vibrator
- Pan type concrete mixer 130-litre capacity and Drum type concrete mixer 60-litre capacity



a) 2000 kN Load
Controlled Compression
Testing Machine

b) Automated
aggregate bin

The experimental studies performed in the lab have been categorised into:

- **Tests on cement:** Normal consistency; Initial and final setting times; Specific gravity; Soundness; Fineness; Compressive strength of cement cubes
- **Tests on coarse aggregate:** Specific gravity; Bulk density; Impact value; Abrasion value; Crushing value
- **Tests on fine aggregate:** Specific gravity; Bulk density; Particle size distribution
- **Tests on fresh and hardened concretes:** Slump test; Compaction factor test; Flow table test; Vee Bee Consistometer test; Compressive strength of concrete cubes and cylinders; Split tensile strength; Modulus of rupture
- **Tests on brick:** Compressive strength; Water absorption; Warpage; Efflorescence; Dimensional tolerance
- **Tests on tile:** Transverse strength of tiles; Wear resistance of tiles

3.4.2.4 Geotechnical Engineering Laboratory

The Geotechnical Engineering Laboratory at IIT Tirupati is equipped with the basic and state-of-the-art equipment for Undergraduate and Postgraduate studies to characterise the physical, hydraulic, and mechanical properties of soils under static and seismic loading conditions. In addition to the basic equipment, the laboratory is also fully equipped with advanced testing facilities for research purposes. The laboratory facilities are created to train and prepare the civil engineering students to meet the industry need in providing solutions to real-life geo-engineering, geo-hazards and geo-environmental related issues.

The basic equipment for conducting routine soil characterisation include:

- **Soil classification** - to classify the soil based on grain size distribution analysis is done using a set of sieves, sieve shaker, hydrometer analysis and Atterberg limit tests.
- **Automatic compactor** - to determine the maximum dry density and optimum moisture content of soils for earthwork applications.
- **Automatic soil sample extruder** - manual-cum-hydraulic 60 kN capacity soil sample extruder for extracting samples from 38 mm diameter to 150 mm diameter and up to 600 mm length.
- **Permeability tests** - the permeability of coarse-grained soil and fine-grained soils are measured using the constant head and falling head apparatus, respectively.
- **Consolidation settlement** - 3-gang unit to determine the magnitude and rate of 1D-consolidation settlement of fine-grained soil deposits
- **Direct shear testing** - used to determine the shear strength parameters of cohesionless soils and the interface friction parameters between soil-concrete and soil-geotextile on a small scale.



3-gang Oedometer setup



Automated direct shear apparatus

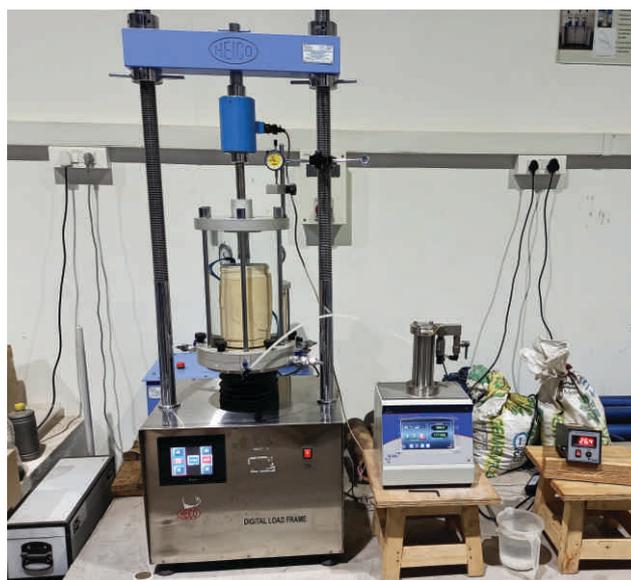
Advanced geotechnical testing equipment

Automated Stress-path Triaxial Equipment

- Used to measure the stress-strain, volume change or pore pressure behaviour of soils under varied combination stresses.
- Can be used to test the specimens of soils of diameter from 38 mm diameter to 150 mm diameter.
- Can also be used to measure the permeability using constant gradient method.
- Can be used to apply axial load up to 50 kN and confining pressures up to 2000 kPa.



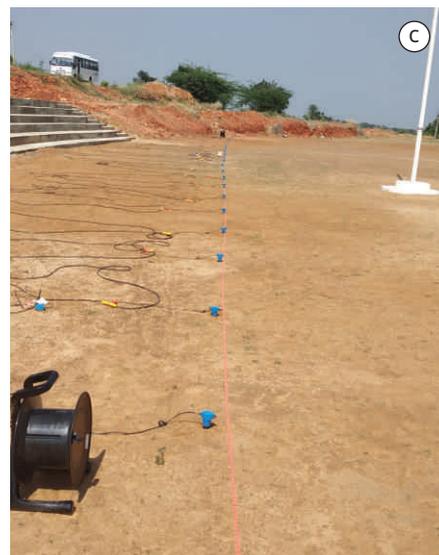
Automated stress-path static triaxial apparatus with permeability measurement



100 kN load frame for large size triaxial testing

Automated Cyclic Triaxial Equipment

- to determine the maximum dry density and optimum moisture content of soils for ear



a) Automated electro-mechanical 20kN actuator cyclic triaxial apparatus with bender element facility

b) Automated double-wall chamber unsaturated triaxial apparatus with 50 kN load frame

c) MASW setup with 24-channel seismograph to measure in-situ shear wave velocity

3.4.2.5 Environmental Engineering Laboratory

The Environmental Engineering program at IIT Tirupati is designed to give an insight into the core skills required to be a professional environmental engineer. The undergraduate and graduate-level courses are designed with strong practical components to acquire hands-on experience and equip students to understand better and solve real-life environmental issues. The laboratory is equipped with state-of-the-art facilities to perform advanced water, wastewater, and air quality analyses. A team of faculty and students is dedicated to research and development and offer engineering solutions to address diverse industrially and socially relevant environmental problems.

Environmental Engineering Laboratories

- Advanced Instrumentation Facility
- Air and Water Quality Laboratory
- Microbiology Laboratory

A View of Environmental Engineering Wet Lab



Major Analytical Instrumentation Facilities

- UV/Vis Spectrophotometer
- Fluorescence Spectrophotometer
- Inductively Coupled Plasma Mass Spectrometer (ICP-MS)
- Gas Chromatography – Triple Quadrupole Mass Spectroscopy (GCMS- MS)
- Single Zone Tube Furnace
- High-Performance Liquid Chromatography
- Ion Chromatography

- Total Organic Carbon Analyser with a Solid Sample Module
- Digital Storage Oscilloscope
- FT-IR
- Fluorescence Microscope
- Respirable Dust PM10 Sampler
- Fine Particulate PM 2.5
- Indoor Air Quality Monitor



Views of Analytical Instrumentation Facility



3.4.2.6 Hydraulics & Water Resources Engineering Laboratory

The Hydraulics and Water Resources Engineering Laboratory at IIT Tirupati boasts of futuristic equipment for undergraduate instruction and advanced equipment for research purposes. The laboratory allows students to understand the various aspects of fluids at rest and in motion in engineering applications. For instance, students learn the fundamentals of fluid mechanics and hydraulics, such as hydrostatic pressure on plane surfaces, Bernoulli's principle, flow measurement devices, the impact of jets on surfaces, frictional losses in pipes, and flow over weirs and notches.



View of few equipment in Hydraulics & Water Resources Lab



Rainfall Simulator

Research equipment includes an Advanced Hydrologic Investigation module that can be used for studying a variety of hydrological processes. For instance, this apparatus can be used to study the effects of rainfall of varying durations and intensities on runoff generated and storage capacities of soils. It can also be used to study seepage flow and the effects of wells on groundwater levels over time. This apparatus can also study the flow behaviour in rivers, impact of obstacles in the riverbed, sediment transport, etc.

3.4.2.7 Surveying Laboratory

The Surveying Laboratory is equipped with a wide range of instruments available for conducting the experiments. This includes relatively simple equipment like Prismatic Compasses, Vernier Theodolites, Dumpy Levels, Plane Tables and associated accessories like Ranging Rods, Cross Staff, Arrows, Pegs, etc. More sophisticated equipment, such as Auto Levels, Hand-held GPS devices, and Total Station (5" and 1" accuracy) are also available in the laboratory. Civil Engineering students are trained to use all the necessary equipment in order to learn the fundamentals of surveying.

3.4.2.8 Seismological Observatory Station

The observatory station is established by the National Center for Seismology under the Ministry of Earth Sciences. This records any seismic related activities in the Southern portion of Andhra and the Northeastern part of Tamil Nadu.



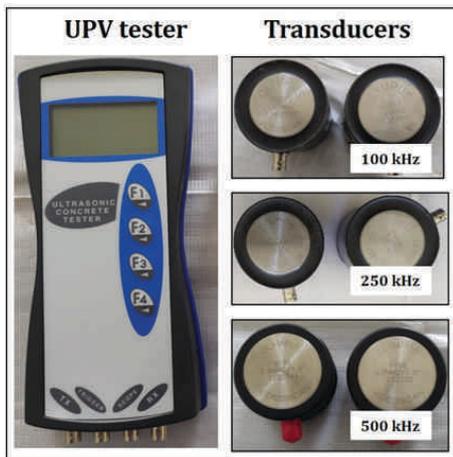
Few Glimpses of the Seismological Observatory Station Setup



3.5.2.9 Non-Destructive Testing Laboratory

Modern urban built environment is largely concentrating on infrastructure creation, and the demand for concrete and steel structures in this context is enormous. Ensuring quality in construction process, and

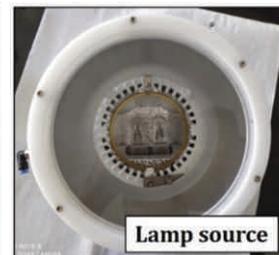
assessing the condition of a structure are imperative in ensuring sustainable infrastructure. Structures usually undergo deterioration when exposed to environment due to deleterious agents like chlorides, carbon dioxide, sulphates etc. Instead of adopting a corrective approach, philosophy of maintenance of infrastructure shall be proactive in nature, and hence, condition assessment of structures plays a significant role in infrastructure creation and maintenance, and this is normally achieved using non-destructive testing and evaluation. Non-destructive testing (NDT) is carried out to detect defects and anomalies in test specimens without affecting them. This is carried out as part of inspection processes, and is normally centred around the idea that the existing performance/service of the structure is not hindered while inspecting. Currently, the NDT and health monitoring laboratory at IIT Tirupati is equipped in estimating in-situ strength and quality of structures.



Ultrasonic pulse velocity



Infrared thermography



Laser vibrometer



Oscilloscope

3.4.3 Electrical Engineering Laboratory

The Department of Electrical Engineering at IIT Tirupati has set up state-of-the-art lab facilities to provide practical exposure to students. Through these laboratories, over the course of their B. Tech curriculum, students get exposed to various aspects of Electronics, Signal Processing and Communication, Power Systems, and Control and Instrumentation, providing an overall exposure to the broad area of Electrical Engineering. The details of the specific laboratories are as follows:

3.4.3.1 Signal Processing Laboratory

The Signal Processing lab is used for conducting digital signal processing, machine learning, wireless communication, medical imaging and many more core/elective courses.

The key equipment in this lab are:

<ul style="list-style-type: none"> 30 GPU Workstations with four RTX 2080 Ti Graphics Cards in each 	<ul style="list-style-type: none"> GigE Vision and Stereo Vision Cameras
<ul style="list-style-type: none"> 3D Fringe Projection Profilometry System 	<ul style="list-style-type: none"> 20 ADSP KIT ADZS-SC589-EZLITE sponsored by ADI
<ul style="list-style-type: none"> Cytocube Model-R, Portable Slide Profiler with Software 	<ul style="list-style-type: none"> 12 TMS320C6748 by Texas Instruments



Asus Z10PE-D8 Workstations (Available - 26)



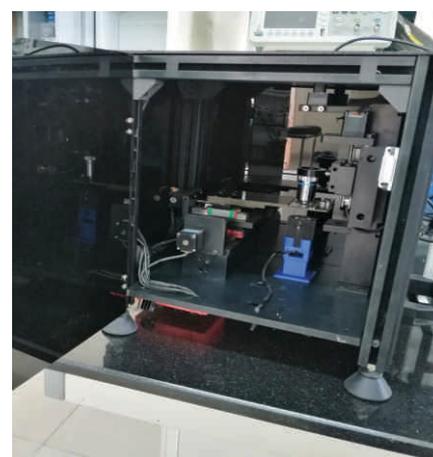
Supermicro Workstations (Available - 4)



3D Fringe Projection System



Cytocube Model-R portable slide profiler



3.4.3.2 Advanced Electrical Engineering Laboratory

The Advanced Electrical Engineering Laboratory is a multidisciplinary laboratory for guiding final year Electrical Engineering students. The laboratory is equipped with equipment to introduce students to advanced topics in interdisciplinary engineering areas such as Internet of Things, Robotics, Cloud Computing, Advanced Electro-hydraulics, Advanced Electro-Pneumatics, and Programmable controllers for industrial automation, Renewable Energy systems (Solar and Wind).

3.4.3.3 Machines Laboratory

The Electrical Machines laboratory is equipped with various electrical machines (DC and synchronous machines), transformers (single-phase and three-phase) along with resistive load bank, rectifiers, DC/AC drives to experimentally demonstrate the working principle of these machines to teach our undergraduate students as well to conduct the research in this area.





3.4.3.4 Integrated Electronics Laboratory

The Integrated Electronics laboratory is well equipped with 30 workbenches consisting of a Tektronix function generator, Digital Storage Oscilloscope, a power supply, and a computer. This facility is used for hardware and software laboratory courses for both Electrical and Computer Science Engineering students starting from the third semester along with all the five branches in the 1st year as a part of workshop practice. This laboratory is equipped with all the basic electronics equipment required for B.Tech. courses like mixed-signal oscilloscopes, multimeters, LCR meters along with three National Instruments Engineering Laboratory Virtual Instrumentation Suite ELVIS III boards and Analog System Lab Pro-Development kits developed by Texas Instruments. In addition, the department has also procured FPGA boards (Zynq-Zybo 7000 series board) which can be used for both basic B.Tech introductory laboratory courses and advanced VLSI design courses and projects. The laboratory also has software tools like OrCAD schematic capture and PSPICE, which are very helpful in analysing transistor and OpAmp amplifiers characteristics, DC analysis, AC analysis and transient analysis of any circuit (either passive or active).



Workbenches with DSO, AFG, RPS & Computer

3.4.3.5 Semiconductor Devices Laboratory

Semiconductor devices lab at IIT Tirupati under the EE department is being established with an aim to complement the existing solid-state devices related courses. The lab recently got equipped with the following instruments:

- Thermal evaporator (for metals and organics)
- Variable temperature Hall measurement system
- Alpha spectrometer

In addition, the instruments available in the lab are the following:

Substrate Cleaning: Class 100 compatible Polypropylene wet chemical bench, Ultrasonicator, Programmable hot plate with a magnetic stirrer, Oven (up to 250 C) and UV/Ozone cleaner

Thin Film deposition: DC/RF sputtering unit (chiller included), Spin-coating unit

Electrical/Optical characterisation: Semiconductor Parameter Analyser with High-power (up to 1100 V) SMU, Mercury Probe, Optical microscope

Bonding & Packaging: Manual wire bonder

These equipment sets are being used to conduct research in wide bandgap semiconductor devices and thin-film sensors collaborating with other R&D labs such as CSIR-CEERI, Pilani.

The key equipment in this lab are:

• Table-top wirebonder (Bench-top thermosonics wire bonder for Wedge 7 Ball bounds)	• Optical Microscope
• Table-top DC/RF sputtering unit with accessories	• Dell Precision 3630 Tower Xeon Processors
• Gas test chamber	• Hall Measurement system
• Bench top Oven	• Alpha Spectroscopy
• Hot Plate with Magnetic stirrer	• Four probe resistivity measurement system
• Semiconductor parameter analyzer	• Single zone high temperature tube furnace
• Mercury probe station with accessories	• Variable temperature cryogenic probe station
• Clean room compatible wet chemical bench	• MDO 350MHz
• Ultrasonic bath with heater mech basket	• UV OZONE CLEANER
• Water purification system	• Ferroelectric Characterization unit
• Spin coating unit with UV Curing system	• Chilling unit (50L Capacity Chiller)
• Thermal evaporation system tailored for organic thin films	• Impedance Analyzer

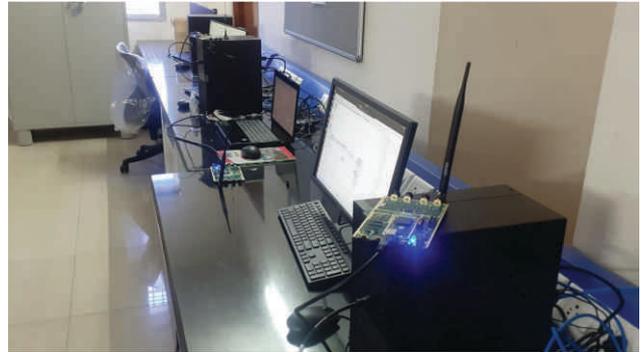
3.4.3.6 Wireless Communication and Network Laboratory

The Wireless Communicate and Network (WCN) Lab at IIT Tirupati was established in the summer of 2020. The WCN lab is equipped with Universal Software Radio Peripheral - Software Defined Radio (USRP-SDR) kit and high-end computing facilities to support academic requirements and to carry out research work. The

current facilities are being used to carry out advanced experiments for the graduate level. Besides teaching, these sets of equipment are also being used for research and development purposes. The current facilities can be used to carry advanced research for present and next-generation wireless networks such as 5G and communication beyond 5G.

Major equipment procured in this financial year are as follows:

- USRP B210 SDR Kit (10 quantities)
- USRP N210 SDR Kit (4 quantities)
- DELL Optiplex 7070 Desktop (6 quantities)
- DELL Optiplex 5070 Desktop (7 quantities)
- Dell Optiplex 5080 Desktop (3 quantities)



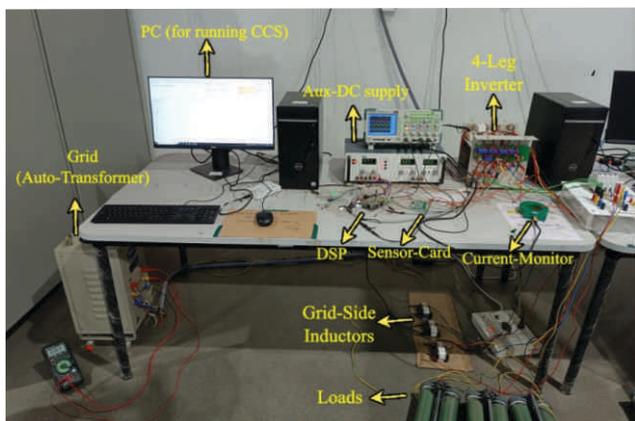
USRP-SDR Kit Setup with Desktop



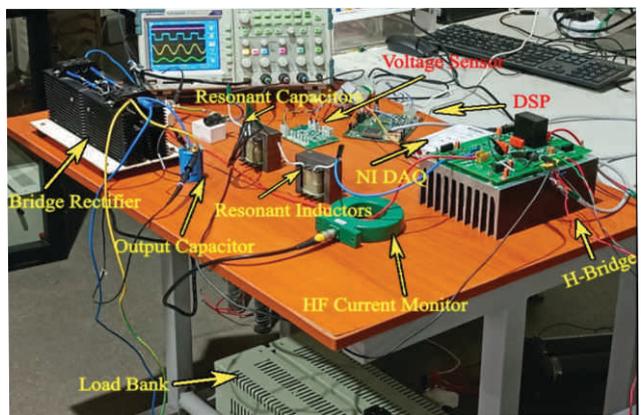
Wireless Communication and Network (WCN) Laboratory

3.4.3.7 Electric Drives Laboratory

This lab is now equipped with all the high-end instruments for research work to be carried out in the field of power electronics applications particularly in EV Charging, renewable energy integration, and high-power density and efficient resonant converters. The equipment sets include bidirectional DC power supply, high

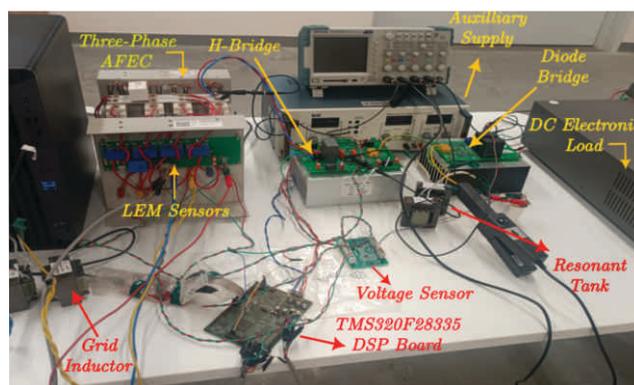


Standalone Three-Phase AFEC



Standalone Resonant Converter

end oscilloscopes, DC electronic load, HF current monitors, thermal imager, several auxiliary power supplies etc. Several works related to modeling and control applications in power electronics are carried out in this lab. The current focus is to indigenously develop the high frequency converters required for EV and low power applications using SiC and GaN devices. This lab also facilitates research on motor drives applications and several machines are under procurement.



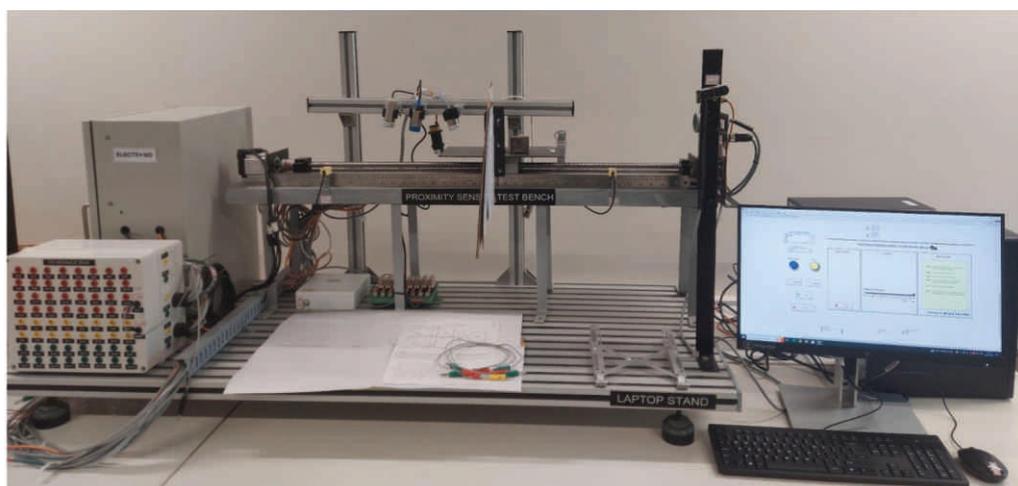
Cascaded System Hardware Setup

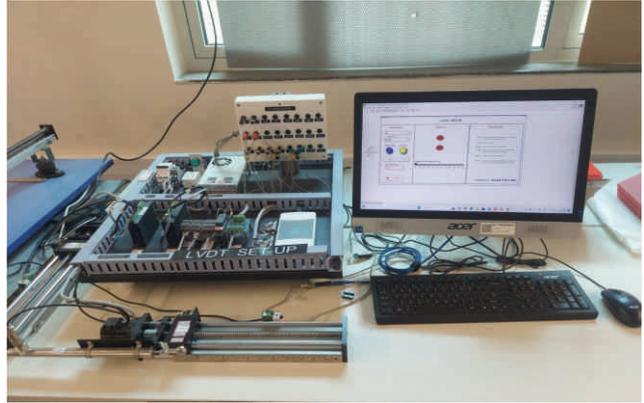
3.4.3.8 Electronic Instrumentation Laboratory

The Electronic Instrumentation Lab is a critical component of engineering and science education, designed to provide students with practical experience in working with a wide range of electronic instruments used for measurement, testing, and analysis of electrical signals and circuits. The lab is equipped with various instruments including oscilloscopes, function generators, digital multimeters, LCR meters, signal generators, power supplies, mixed-signal oscilloscopes, 6.5-digit digital multimeters, precision power analyzer, data acquisition systems, and data loggers.

The lab utilizes LabVIEW and data acquisition systems to enhance its capabilities, allowing students to create custom measurement setups, automate experiments, and analyze data in real-time. The Data Acquisition Systems (DAQs) enable students to interface with sensors and convert analog signals into digital data for analysis. The MSO allows simultaneous analysis of analog and digital signals, while the 6.5-digit DMM and power analyser ensures precision measurements. This enables students to develop practical skills in automation, data analysis, and advanced measurement techniques.

Students work with tools like oscilloscopes, function generators, digital multimeters, signal generators, and power supplies. This lab serves as a crucial platform where students can apply theoretical knowledge from lectures and textbooks to real-world scenarios, enhancing their understanding of electronic principles and measurement techniques. Overall, the Electronic Instrumentation Lab equips students with essential skills for careers in electronic engineering, research, and industrial automation.





Piezo Vibration Experiment Test Setup

3.4.3.9 VLSI and Embedded System Laboratory

The VLSI Lab is used for conducting the UG/PG practical, research activities at M.S and PhD level and to provide hands-on design experience with professional design (EDA) platforms. The main objective is to learn the fundamental and advanced principles of VLSI circuit design in the digital and analog domains. This lab also familiarizes implementation of logical modules on FPGAs. The VLSI-Lab is a practical laboratory for the design of integrated digital circuits (ASICs). During the different phases of the lab, the students design, specify, implement, and verify digital circuits with hardware description languages, industrial EDA tools, FPGA-based rapid prototyping, and hardware test setups.

Facilities/Softwares Available:

- Equipped with 10 Workstations for Research and Development
- Synopsys Tools Software, Cadence Tools Software & Mentor Graphics tool Software with enough number of licenses etc.
- Equipped with High performance ZYBO FPGA Boards
- EDGE Artix 7 FPGA Development Board [which is the upgraded version of EDGE Spartan 6 board]
- The PYNQ-ZU is a Xilinx Zynq Ultrascale+ development board, designed to be used with the PYNQ framework
- Digilent Genesys 2 board is an advanced, high-performance, ready-to-use digital circuit development platform based on the latest Kintex-7™ Field Programmable Gate Array (FPGA) from Xilinx

3.4.3.10 Nanoelectronics Laboratory

The Nanoelectronics Lab was established in 2023. The lab primarily caters to the needs of undergraduate, Master's, and doctoral students in the broad area of Nanoelectronics and Semiconductor Devices.

The key equipment sets and Software tools in this lab are:

- Nanovoltmeter
- AsiaPac Advanced TCAD University Bundle 3 Years TSL Network Floating License
- Number of Licenses: 5 (FIVE)

- Synopsys QuantumATK - Materials and Device Simulation (with NEGF) - Standard Academic Bundle
- 5 Licenses of QuantumATK (DFT/Semi-empirical) + NEGF
- 5 Licenses of ATK Master Forcefield (Classical)
- 2 Licenses of VNL (GUI)
- 2 Licenses of VNL Links (VASP Interface)
- 256 MPICH Slaves for faster simulation
- Floating License, All licenses on single cluster

3.4.3.11 RF and Microwave Lab

The RF and Microwave Lab too was established this year (2023). The lab primarily caters to the needs of undergraduate, master's and doctoral students in the broad area of RF and Microwave.

The key equipment sets and Software tools in this lab are:

<ul style="list-style-type: none"> 4-port Vector Network Analyzer (VNA) working up to 43.5 GHz Keysight 	<ul style="list-style-type: none"> Cadence AWR Microwave Office University: 40 Users License
<ul style="list-style-type: none"> Perpetual License of CST STUDIO SUITE™ "Educational License" and CST Acceleration token with 1 year maintenance 1 unit (25 licences) 	<ul style="list-style-type: none"> Package, Term Floating License (License fee is NIL)
<ul style="list-style-type: none"> Keysight ADS Premier University Bundle License - 5 Users 	<ul style="list-style-type: none"> Cadence AWR Visual System Simulator University - 40 Users License
	<ul style="list-style-type: none"> Package, Term Floating License (License fee is NIL)

3.4.4 Mechanical Engineering Laboratories

The mechanical engineering laboratories cater to the practical experience provided to undergraduate and postgraduate students and carry out high-quality research by the research scholars of the department. The laboratories are equipped with facilities to demonstrate principles in all the domains of mechanical engineering. The laboratories which have been developed in the year 2022-2023 are hereunder:

3.4.4.1 Applied Mechanics Laboratory

In the applied mechanics laboratory, the students perform experiments related to basic principles of solid mechanics, fluid mechanics, and dynamics. Students from both Civil and Mechanical Engineering departments conduct their experiments on these equipment sets, ranging from Reynold's apparatus, Bernoulli's principle, impact of jets on flat and curved surfaces, frictional head losses in pipes, estimation of flow rates in pipes using venture meter/orifice meter, estimating meta-centric height of floating bodies, to flow visualisation using streamlines.

3.4.4.1.1 Fluid Mechanics Laboratory

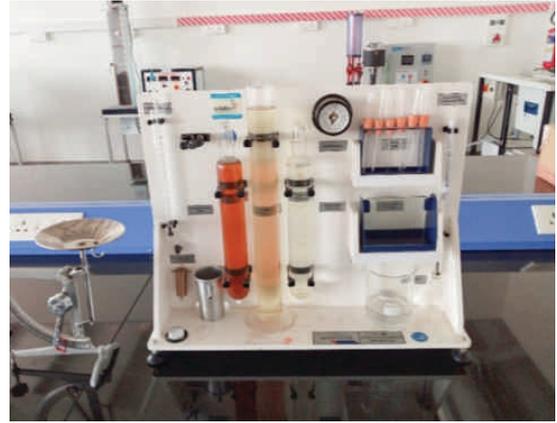
The Fluid Mechanics Laboratory is designed to fortify students' theoretical knowledge which they learn in Fluid mechanics course.

The laboratory consists of the following experimental setups:

<ul style="list-style-type: none"> Reynolds experiment setup to visualise laminar and turbulent flows 	<ul style="list-style-type: none"> Experimental setup to study losses in different pipe segments
<ul style="list-style-type: none"> Different flow measuring set-ups such as venturimeter, orifice plate, rotameter. 	<ul style="list-style-type: none"> Fluid property measurement equipment to measure density, viscosity, surface tension
<ul style="list-style-type: none"> Free and forced vortex experimental setup 	<ul style="list-style-type: none"> Water flow bench to visualise flow around different shapes
<ul style="list-style-type: none"> Impact of jet on surfaces to verify momentum conservation 	<ul style="list-style-type: none"> Experimental setup to study the stability of floating bodies
<ul style="list-style-type: none"> Experimental setup to verify Bernoulli's theorem 	



A view of Fluid Mechanics Laboratory



3.4.4.1.2 Solid Mechanics Laboratory

The Solid Mechanics laboratory consists of a universal testing machine for tensile tests, hardness testing machine, torsion measurement, stresses in thick and thin cylinders, strain measurement using strain gauges, bending of beams, photoelasticity measurements and impact tester.



Rockwell Hardness Tester



Thick Cylinders

3.4.4.1.3 Dynamics Laboratory

Dynamics laboratory consists of bearing friction setup, a setup for determining the dynamic forces in a reciprocating engine, gyroscope, flywheel, a setup of a disc rolling on an inclined plane, worm and wheel apparatus.

3.4.4.2 Applied Thermal Engineering Laboratory

Applied Thermal Engineering Laboratory has been set up to provide hands-on experience to students on thermal engineering concepts such as Internal Combustion Engines, refrigeration and air conditioning, fuel property measurements.

The laboratory consists of the following experimental setups:

- Two-cylinder CRDi Diesel engine setup
- Single cylinder petrol engine setup with open ECU
- Bomb calorimeter
- Vapour compression refrigeration system
- Air conditioning trainer setup
- Dunuoy Ring tensiometer
- Rheometer



Two-cylinder CRDi Diesel engine setup



Bomb calorimeter



Rheometer



Gas Sorption Analyser

3.4.4.2.1 Heat Transfer Laboratory

The heat transfer laboratory at IIT Tirupati is also a part of the applied thermal engineering laboratory. It has various experimental setups to enhance students' understanding of concepts of heat transfer.

This laboratory consists of the following experimental setups:

- Thermal conductivity measurement of solids and fluids
- Linear and Radial heat conduction setups
- Free and forced convection over different objects
- Pool boiling and condensation experimental setup
- Heat exchanger setup with tube in tube, shell and tube, Plant and fin and jacketed vessel heat exchangers
- Different temperature measurement instruments and their calibration
- Thermal conductivity measurements of insulating materials
- Experimental setup to verify Kirchoff's law and Stephen Boltzmann Law



Stephen Boltzmann Law experiment



Thermal conductivity measurement setup

3.4.4.3 Metrology Laboratory

Metrology Laboratory has been set up for the students to perform various measurement related experiments. We have versatility in the equipment, unlike any other metrology lab. We have basic

measurement tools (e.g., Vernier, micrometer etc.) to advanced equipment (e.g., 3D scanner, CMM) to meet the present-day Industry requirements. Also, we had equipment like Autocollimator, height gauge, surface roughness tester. This lab also houses the following metrology hand tools: GO & NOGO ring, plug and feeler gauges, sine bar, dial gauge setup with magnetic base and thread plug gauge.

The Metrology Laboratory is designed to strengthen students' theoretical knowledge, which they learned in the Metrology course. The laboratory consists of the following experimental setups.

a) Surface Roughness Tester
b) Digital Height gauge



3.4.4.4 Machine Tools Laboratory

Machine tools laboratory has been set up for the students to perform experiments related to the advanced machining process. This laboratory has advanced machines like CNC Lathe, CNC Milling, CNC Wire cut EDM, CNC milling, CNC lathe and 3D Printer. 3D Printer lab has been set up so that the students can give CNC Program through Master Cam, AutoCAD Software.

The Machine Tools Laboratory is designed to strengthen students' theoretical knowledge, which they learned in the Manufacturing course. The laboratory consists of the following experimental setups.

- 3D PRINTER
- CNC WIRE CUT EDM
- CNC MILLING
- CNCLATHE



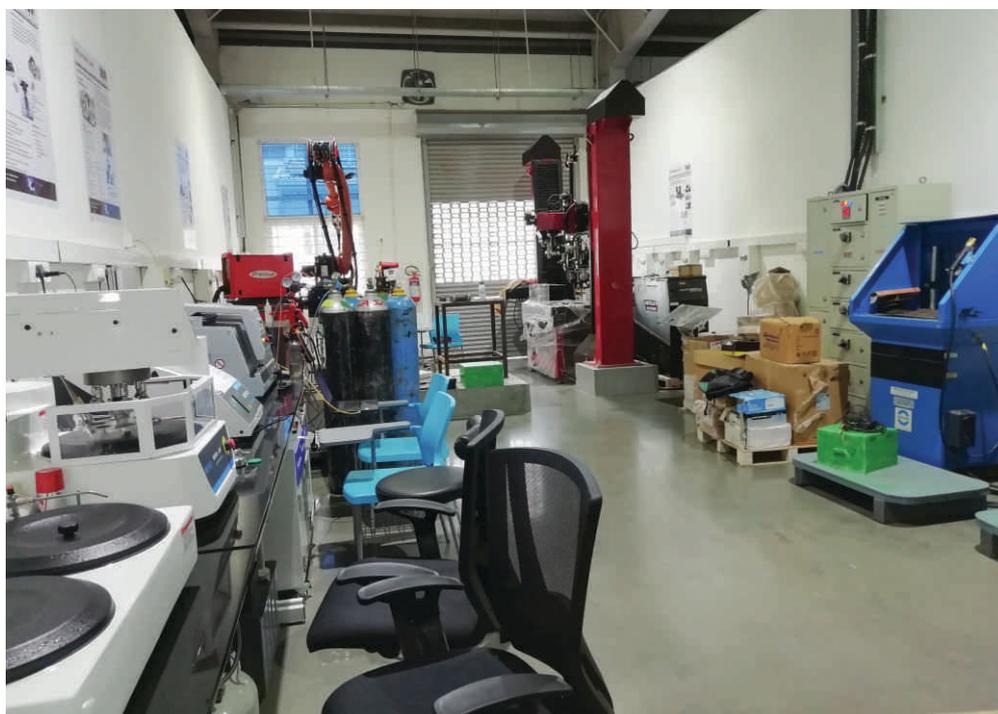
3.4.4.5 Joining and Metallography (JAM) Laboratory

JAM lab is developed to train undergraduate and postgraduate students on the latest joining processes and metallographic studies. JAM lab is being used actively by five Ph.D. and four M. Tech. students who are pursuing their research there.

The JAM lab consists of the below-mentioned equipment:

Joining facilities
• Shielded Metal Arc welding process
• Gas Tungsten Arc welding process
• Robotic Gas metal arc welding process
• Submerged arc welding process
• Down drought tables

Metallography facilities
• Precision cutting machine
• Hot mounting press
• Double disc polishing machine
• Single disc automatic polishing machine
• Stereomicroscope
• Upright metallurgical microscope
• Heat treatment furnace (1200°C)
• Heat treatment furnace (1600°C)
• Melting furnace (1500°C)



A view of joining and metallography (JAM) laboratory

3.4.4.6 Spray Research Laboratory

Spray research lab has been established to conduct fundamental and applied research on sprays and combustion. The research carried out in the laboratory finds application in the areas of spray combustion, nutrient delivery in agriculture, spray coatings etc.

The Spray research lab consists of the below mentioned list of equipment:

<ul style="list-style-type: none"> High Imaging systems (Photron SAZ and Photron SA1.1) including long distance microscope and lenses 	<ul style="list-style-type: none"> High pressure liquid and gas supply systems with flow controllers (max. 3 MPa)
<ul style="list-style-type: none"> Particle Image Velocimetry Setup (TSI) 	<ul style="list-style-type: none"> High pressure high temperature spray chamber (up to 60 bar and 800K)
<ul style="list-style-type: none"> Spraytec from Malvern with 0.1 to 900 um measurement range 	<ul style="list-style-type: none"> Spray tower with optical access
	<ul style="list-style-type: none"> Schlieren Imaging setup

3.4.4.7 Foundry Laboratory

Advanced metal casting facilities (Stir Casting, Squeeze Casting, Pressure Infiltration and Induction Furnace) have been established at the department of Mechanical Engineering IIT Tirupati. These facilities are used for new materials development such as alloys, composites, metal foams, composite foams and high entropy alloys etc. Foundry 4.0 Student Activity Center (F4SAC) was also started in association with Indian Institute of Foundrymen (IIF) Chennai and Andhra Chapter on 9th October 2021.

3.4.4.8 Metal Casting/Forming Simulation Facilities

Metal Casting/Forming Simulation software facilities have been started at Advanced Materials Manufacturing and Tribology Lab. The following software are available for students:

1. Z-CAST PRO Stress

- o Flow Simulation
- o Solidification Simulation
- o Heat Stress Simulation

2. AFDEX – Metal Forming Simulation Software

AFDEX is an Intelligent Metal Forming Simulation tool. It is based on Rigid or Elasto thermo-visco-plastic finite element analysis using quadrilateral/tetrahedral elements thus providing faster and higher accuracy results. AFDEX is a general-purpose metal forming simulator, which meets the requirements of intelligent bulk-metal-forming (BMF) simulation (BMFS).

3. VCNC PRO – CNC Simulation Software

4. QFORM Software

QForm is a professional engineering software for simulation, analysis and optimization of metal forming processes based on the Finite Element Method. QForm software allows simulation of an entire technological chain at high speed and excellent reliability and provides a wide range of possibilities for process analysis.

3.4.4.9 Tribology and Surface Engineering

The group has an outstanding history of experimental tribology research and focusing on tribological issues of fouling, friction and corrosion, and the use of advanced techniques to understand bio tribological performance at the interface of artificial material. We develop novel self-repairing, adaptive, regenerative multifunctional surfaces for smart applications. The Department of Mechanical Engineering has started Advanced Materials Manufacturing and Tribology (AM²T) Research Laboratory at IIT Tirupati. The Tribology and Surface Engineering facility was inaugurated on 3rd June 2022 by Prof. Satish V. Kailas, President TSI. A multifunctional Tribometer MFT-5000 has been procured for various tribology tests.

3.5 CENTRAL WORKSHOP

The Central Workshop is located in the Lab-2 building on the permanent campus. The Central Workshop was set up in a space of 5400 sq. ft with facilities for training B. Tech students and assist the scholars in their research works. The Central Workshop consists of the following sections:

- Machine Shop
- Carpentry
- Fitting
- Foundry
- Welding
- Pneumatic & Hydraulics
- Sheet Metal Fabrication

In the first year of the B. Tech programme, workshop training sessions for all Engineering branches are held in the Central Workshop. In the odd semester, the Central Workshop hosts various machining processes like Lathe, Milling, Carpentry, Sheet Metal, Foundry and Fitting for the students, while in the even semester, the students undergo training in basics of Electrical, Electronics, Instrumentation and Communication. The workshop also has Pneumatics and Hydraulics training kits and welding simulator to train the students. The Central Workshop is also equipped with various power tools like Sander, Zig saw, Planar and power saw. The students learn the welding process through a Welding simulator where students can feel the actual welding through the simulation before they actually perform it. This helps the students to practice welding many times without wasting the electrode as well as self-learning techniques. The Arc welding facility in the Central Workshop is equipped with a welding booth where the booth is isolated. There is an in-built vacuum system, which sucks the welding smoke and provides the Workshop environment pollution-free. The safety of the students is given a high priority. Therefore, while conducting the different experiments, machinery work and welding processes, safety goggles, masks, leather apron, face shield and leather gloves are provided. The Central workshop facilities are also utilised by various scholars for their research works on machining and fabrication of their setup. Recently, the workshop added a precision Surface Grinder, in order to extend additional support to the research scholars and also for the fabrication works of the students project.



A View of Carpentry & Fitting Shop, Central Workshop



A View of Pneumatic & Hydraulic Training Kit



Precision Surface Grinder



Fig.29 A View of Lathe Machines, Central Workshop



Fig.30 A View of Milling Machines, Central Workshop

3.6 CENTRAL LIBRARY

The Central Library of the Institute was established in the year 2015 with the mission to support and facilitate learning, teaching, and research activities in IIT Tirupati by providing resources, facilities, and services. In accordance with the objectives of the Institute, the Library aims to develop a comprehensive and dynamic resource collection which includes e-resources, which will be useful for the faculty and students, supporting their scholarly advancements. The library balances its efforts toward supporting both the educational and research functions of the institution.

The library shifted to the Department Block 2 building in March 2023. The present area is more spacious and can accommodate more users. The library is open through the year with the following timings,

Monday to Friday	09.00 am to 10.30 pm
Saturday & Semester Breaks	09.00 am to 07.00 pm
Sunday & Public Holidays	10.30 am to 05.00 pm



A view of Central Library

The library has integrated its services with the institute-wide ERP system in the past year. The library implemented the MyLOFT remote access tool during the pandemic, which started in 2020, to help IIT Tirupati members who were off-campus to access all library e-resources easily. The library is equipped with a library automation system using KOHA open-source integrated library software with Online Public Access Catalogue (OPAC), which has enabled computerising the library operations. The library uses KOHA for library management and daily operations. The OPAC allows users to search for books and check their transaction details. The library has RFID technology to enhance circulation services and enable users to issue and return books. It has also helped fortify the security of library holdings, complemented by the introduction of CCTV within the Library.

In order to provide research support for the Institute, the library procured plagiarism checking software (Turnitin) and an academic writing support tool (Grammarly Premium). INFLIBNET has provided plagiarism-checking software (Urkund/Ouriginal). The library actively responds to users' needs, which include meeting their article requests, plagiarism detection requirements, and any other information or research-related queries they may have.

The library is also working on bringing all IIT Tirupati faculty profiles on the institute's IRINS portal which will help showcase the institute's research output and scholarly network. During this period, the central library added 608 printed books, including textbooks and reference books on Engineering, Science, and Humanities and Social Sciences.

The library has renewed the existing collection of e-resources, including databases like SCOPUS, SciFinder, CMIE, CCDC, and other resources like EBSCO Management Collection, Taylor & Francis, Science and Technology plus Arts and Humanities Collection, Wiley 100 Title Collection, etc. The library has newly procured AWS Online Education Library and PressReader which is a digital platform providing access to more than 7000+ magazines and newspapers from countries across the globe.

Total number of resources available in central library presently is as follows,

• Books	8800
• CD-ROM	80
• Newspapers (Print)	05
• e-Books	592
• e-Journals	8000+
• Print Journals	5+
• Databases	22
• Standards	03

e-Shodh Sindhu Consortium Membership

The Central Library is an active member of the e-Shodh Sindhu Consortium.

The library has been conferred with 2021 Highest Usage Award for ACS Journals amongst 3rd Generation IITs in South India.



4. SPONSORED RESEARCH PROJECTS AND INDUSTRIAL CONSULTANCIES

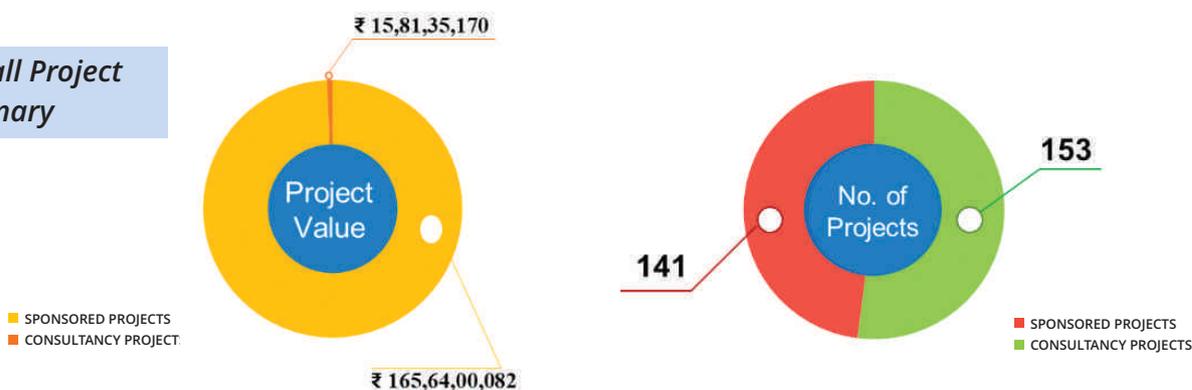
4.1 CENTRE FOR SPONSORED RESEARCH AND CONSULTANCY

IIT Tirupati right from its establishment in 2015 initiated interaction with industries, research organisations, other academic institutions, and governmental agencies for taking up the sponsored research projects and consultancies. To promote sponsored research, industrial consultancy, and innovations at the Institute, a dedicated centre called Centre for Sponsored Research and Consultancy (CSRC) was set up in the year 2017. This Centre is responsible for the promotion, facilitation, coordination, and administration of all the research and innovation related activities.

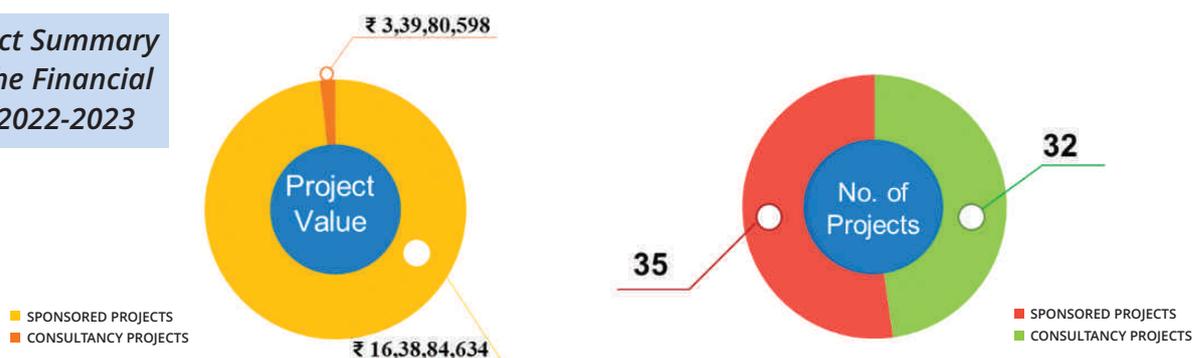
4.1.1 Sponsored Research Project and Industrial Consultancy

Faculty members of IIT Tirupati are actively engaged in research and sponsored projects and industrial consultancies with various Government/Private agencies. A total of 141 sponsored research projects and 153 industrial consultancies worth around Rs. 182.00 crores have been received by the Centre for Sponsored Research and Consultancy since its inception. During the year 2022-23, the Centre received 32 sponsored research projects worth Rs. 16.39 crore (approx.) and 35 consultancy projects worth Rs. 3.39 crore (approx.). The research potential of the Institute can well be assessed by the total number of sponsored research projects, and consultancies received in such a short span of time.

Overall Project Summary



Project Summary for The Financial Year 2022-2023



4.1.2 Innovation and Startup Promotion

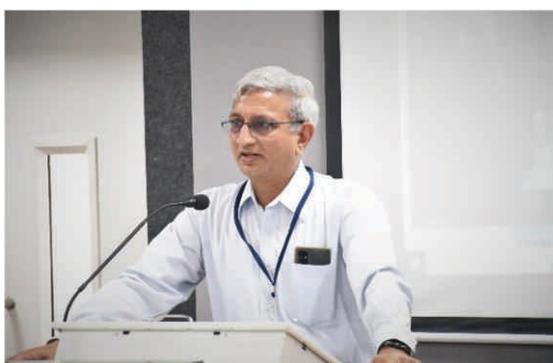
IIT Tirupati has prepared and implemented Innovation and Business Incubation Policy for the promotion of startups and innovation at the Institute. CSRC has formed a Section-8 Company called “IIT Tirupati Innovation & Incubation Foundation” (IITT IIF) and the necessary approval for the same was obtained from the Ministry of Corporate Affairs (MCA), Govt. of India on 28th November 2022. IIT Tirupati Innovation & Incubation Foundation mainly focuses on promoting technology-based start-up business ventures with all the necessary resources/support. It will play a major role in Startups to evolve and grow into mature business ventures and will seek to promote a culture of innovation and entrepreneurship on the campus, build and nurture an innovative and entrepreneurial ecosystem, support creation of technology driven IP centric startups in the focus areas, working closely with the industry, government agencies, et cetera. Few of our faculty members have already registered their startups and some more startups registrations are in the pipeline. The first board of Directors meeting for the IITT IIF was also conducted on 20th December 2022.



IITT IIF Board of Directors Meeting

4.1.3 Industry Relations

CSRC has fully focused on creating an industry vibrant eco-system inside the campus to address various problems faced by industries. In order to build good industry connections, CSRC has started conducting domain focused Industry-Academia Conclaves with regular intervals. CSRC organized one day Industry Academia Conclave focusing on Electronics Manufacturing on 16th July 2022 at IIT Tirupati, Yerpedu campus. IIT Tirupati Faculty from Electrical Engineering Department and many eminent Industry experts presented their expertise and expectations in the Industry Academia Conclave program to mutually understand the strength and capabilities so that one can align the research area for the benefit of the Industry & Academia which in turn would strengthen the collaborations.



Few images of welcome address, Institute growth and achievements presented by Prof. K. N. Satyanarayana (Director, IIT Tirupati) during IAC-Inaugural session

A total of 45 participants which includes 18 industry experts from many big industries such as M/s Bharat FIH Foxconn; M/s Nokia India Private Limited; M/s Siemens Digital Industries Software; M/s Amara Raja Electronics Ltd.; M/s Efftronics Systems Pvt. Ltd.; M/s Dixon Technologies; M/s Wipro Pari; M/s Kalyani Rafael Advanced Systems Ltd.; and M/s Coreiot Technologies etc. attended this conclave.



BHARAT FIH Failure Analysis & Debugging Capability

Analysis Setup

- > 5 years Debugging and Rework experience
- > 15 years experienced technical trainer

Spectrum Analyzer

- Frequency: 900 to 5.5 GHz
- Aperture/Key light
- 144000 / 144000 CSA

Communication Tester

- 15MHz/20
- Radio & Network
- Supports 4G / 5G Technologies
- All Non-cellular Technologies

DC Power supply

- Voltage: 0-15V
- Current: 0-3A

DSO

- 200 MHz
- 4ns edge
- 4 Channels
- Autoscale: 500K/200K

Multimeter

- Keypad: 5625A
- 4.5 N Digit

X-Ray Machine

BGA Rework Machine

Hot air rework station

Pre-Heater

Static Eliminator

Soldering station



Presentation by Mr. Suresh Reddy, Sr. Manager, M/s Bharat FIH Foxconn



Nokia has an unparalleled presence in India

Employees across all offices in 27 locations

16,000+

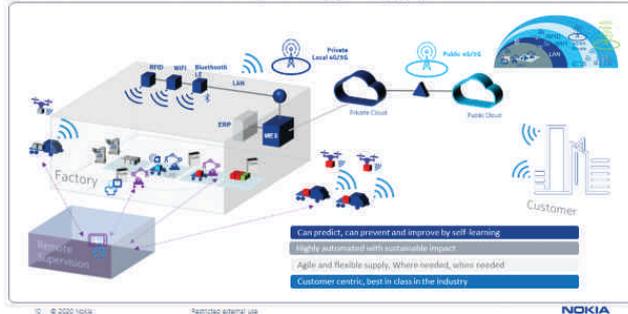
- # of production units from Chennai Factory (as of Mar-2022)
- Strong workforce at R&D Center Bangalore
- # of subscribers served on Nokia installed networks

~6,250,000 | 7,300 | 6.6 bn

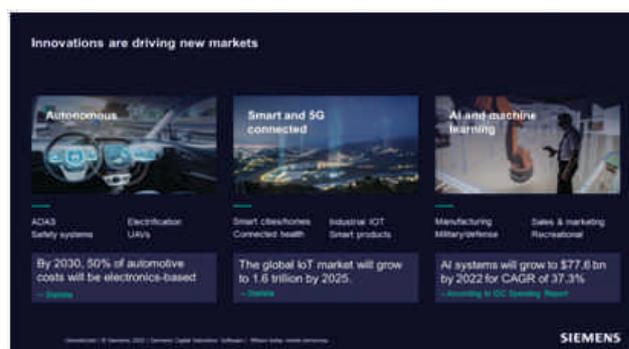
Manufacturing Journey of Chennai Factory...



Vision : The Conscious Factory and Digital Supply Chain



Presentation by Mr. Parameswaran S, Head - Operations Improvement, M/s Nokia India Private Limited



Presentation by Mr. Madhan Thiruvengkatchalam, Industry Portfolio Director, M/s Siemens Digital Industries Software

4.1.4 Innovation Council

Innovation Council of the Institution is an initiative of the Ministry of Education (MoE) through MoE Innovation Cell (MIC) in collaboration with AICTE for Higher Educational Institutions to systematically foster the culture of innovation and start-up ecosystem in education institutions.

IIT Tirupati formed the Innovation Council during the academic year 2022-23 and actively participated in various activities such as Analog Hardware Design Contest, School Community Program, and Smart Laundry System. The Council's role is to engage a large number of faculty, students and staff in various innovation and entrepreneurship related activities such as Ideation, Problem-Solving, Proof of Concept Development, Design Thinking, Intellectual Property Rights, Project Handling and Management at Pre-incubation/Incubation stage, et cetera, so that innovation and entrepreneurship ecosystem gets established and stabilised in IIT Tirupati.

4.1.5 IIT Tirupati - DRDO Cell/Centre

The Indian Institute of Technology Tirupati is keen to conduct directed research in advanced technologies for the defence needs of the nation with the objective of creating a World-Class Research Centre in future to develop cutting-edge technologies and contributing to "Aatmanirbhar Bharat." To that end, IIT Tirupati started initial discussion with Prof. V. Kamakoti (Director, IIT Madras), Prof. Manu Santhanam (Dean, IC&SR, IIT M), Dr. O R Nandagopan (Director, DIA-RCoE, IIT Madras Research Park), Dr. Varadarajan (Sci. F, DIA-RCoE), along with IITT team members at IIT Madras on 17th November 2022. Subsequently, DRDO Scientist team (DIA RCoE Director & team visited IIT Tirupati and interacted with IIT Tirupati faculty members on 17th December 2022 to understand the DRDO systems related research problems and IITT research strengths et cetera. Based on the discussions and the presentations made by the IIT Tirupati faculty members, a few

verticals like Quantum Technology, RF & Microwave and Advance Manufacturing & Material Development have been identified as areas of interest by the DRDO team. Accordingly, the committee suggested for the necessary approval from the DRDO Head Office in order to create IIT Tirupati - DRDO cell at the institute which will be executed through DIA-RCoE, IIT Madras team. The request letter was also communicated to the DRDO Head Office and approval for the same is awaited.

4.1.6 Sponsored Research Projects (received during 2022-23)

1. **Dr. Anki Reddy Katha:** "A Mathematical Model for the Dynamics of Wiggling Objects in a Granular Medium," funded by Science and Engineering Research Board (SERB), amount sanctioned-Rs.6.60 Lakhs, January 2023 – January 2026.
2. **Dr. Anup Basak:** "On General Thermo-Mechanical Criteria for Martensitic Phase Transformations from Material Heterogeneities," funded by Science and Engineering Research Board (SERB), amount sanctioned-Rs.6.60 Lakhs, January 2023 – January 2026.
3. **Dr. Aravinda S:** "The Quantum Complexity of Dual-Unitary and Bernoulli Quantum Many-Body Circuits," funded by Science and Engineering Research Board (SERB), amount sanctioned-Rs.13.24 Lakhs, October 2022 – October 2024.
4. **Dr. Bhuktare Swapnil Sopanrao:** "Acoustic Control of Spintronic Devices," funded by Science and Engineering Research Board (SERB), amount sanctioned-Rs.53.02 Lakhs, January 2023 – January 2026.
5. **Dr. Bijily Balakrishnan:** "Development of Ultra-High-Performance Concretes (UHPCs) for Road/Bridge Infrastructure in Urban Areas," funded by Kerala Highway Research Institute (KHRI), amount sanctioned-Rs.1.58 Crore, August 2022 – August 2024.
6. **Dr. Krishna Prapoorna Biligiri and Team:** "DST FIST Program to Strengthen Research Facility in the Department," funded by Department of Science and Technology (DST), amount sanctioned-Rs.1.58 Crore, January 2023 – January 2028.
7. **Dr. Krishna S Addepalli:** "Carbonless Alternative Fuels for Transportation," funded by Science and Engineering Research Board (SERB-Ramanujan Fellowship), amount sanctioned-Rs.1.19 Crore Lakhs, August 2022 – August 2027.
8. **Dr. Mamilla Ravi Sankar:** "Evaluation of Various Traditional Indian Blood Purification (Raktamokshan) Medicines Using 3D Bio-Printed Microfluidic Organ-On-Chip Platforms," funded by IKS Division of MoE@AICTE, amount sanctioned-Rs.14.44 Lakhs, January 2023 – January 2025.
9. **Dr. Mamilla Ravi Sankar:** "Material and Process Development for Additive Manufacturing and Post-Processing of Tools Made of Modified Hot Work Tool Steel (ModAMtool)," funded by Department of Science and Technology, amount sanctioned: Rs.69.60 Lakhs, March 2022 – March 2025.
10. **Dr. Mamilla Ravi Sankar:** "Research on 3D Printing of Waste Porcelain," funded by Department of Science and Technology, amount sanctioned: Rs.3.30 Lakhs, November 2022 – May 2023.
11. **Dr. Narendra Singh:** "Nanotechnology Interventions for Process Intensification for Production of Value-Added Products from Coconut," funded by Coconut Development Board (CDB), amount sanctioned-Rs.42.61 Lakhs, January 2023 – July 2025.
12. **Dr. N N Murty and Team:** "DST FIST Program to Strengthen Research Facility in the Department," funded by Department of Science and Technology (DST), amount sanctioned-Rs.1.46 Crore, January 2023 – January 2028.
13. **Dr. Prabha Shankar Dwivedi:** "Folk and Ritual Songs of Banaras and Mirzapur: An Ethnographic Study," funded by Indian Council for Social Science and Research, March 2022 – March 2024.
14. **Dr. Ranjan Modak:** "Optimal Protocols Beyond Adiabaticity," funded by Department of Science and Technology (DST-INSPIRE), amount sanctioned-Rs.28 Lakhs, September 2022 – September 2026.

15. **Dr. Roshan Srivastav:** "Chanakya Fellowship," funded by IIT Tirupati Navavishkar I-Hub Foundation, amount sanctioned-Rs.14.88 Lakhs, September 2022 – September 2023.
16. **Dr. Shihabudheen Maliyekkal:** "Centre of Excellence [CoE] Proposal on Membrane Technologies for Desalination, Brine Management, and Water Recycling," funded by Department of Science and Technology (DST), amount sanctioned-Rs.97.36 Laks, February 2023 – February 2028.
17. **Dr. Someswara Rao Sanapala:** "Synthetic Studies Towards Glycoconjugate Vaccine Against Antimicrobial Resistant Enterococcus Faecium," funded by Science and Engineering Research Board (SERB), amount sanctioned-Rs.30.69 Lakhs, October 2022 – October 2024.
18. **Dr. Sourav Chakraborty:** "Polyoxovanadate Decorated Supramolecular Architectures for Energy Storage Application," funded by Science and Engineering Research Board (SERB), amount sanctioned-Rs.32.74 Lakhs, September 2022 – September 2024.
19. **Dr. Sridhar Chimalakonda:** "A Virtual AR/VR Museum for Science and Technology Literacy," funded by Department of Science and Technology, amount sanctioned: Rs.25.31 Lakhs, February 2022 – February 2024.
20. **Dr. Sridhar Chimalakonda:** "Multiview Source Code Representation Learning," funded by IBM Global University Program/IITTP, amount sanctioned: Rs.2.43 Lakhs, November 2022 – November 2023.
21. **Dr. Sridhar Chimalakonda:** "Semi-Automatically Generating Documentation to Facilitate Software Maintenance in Legacy Software Systems," funded by Science and Engineering Research Board (SERB), amount sanctioned-Rs.29.51 Lakhs, December 2022 – December 2024.
22. **Dr. Srikrishna Bera:** "Asymmetric Synthesis of Alkyl Amines by Enantioselective Umpolung Nickel Catalysis of Imines," funded by Science and Engineering Research Board (SERB), amount sanctioned-Rs.33 Lakhs, September 2022 – September 2024.
23. **Dr. Subba Reddy Daggumati:** "Fatigue Damage Analysis of Composite Laminates & Structures Under Multi-Axial Variable Amplitude Load," funded by Science and Engineering Research Board (SERB), amount sanctioned-Rs.40.59 Lakhs, March 2023 – March 2026.
24. **Dr. Thamida Sunil Kumar:** "Reducing Chemicals Related to Low Global Warming Potential," funded by Ministry of Environment, Forest & Climate Change (MEFCC), amount sanctioned-Rs.50.00 Laks, March 2023 – March 2028.
25. **Dr. Venkaiah Chintalapudi:** "The Cyclopiane Diterpenes: Total Syntheses of Conidiogenone B, Conidiogenone, and Conidiogenol," funded by Science and Engineering Research Board (SERB), amount sanctioned-Rs.32.50 Lakhs, September 2022 – September 2024.
26. **Dr. Viju Nair R:** "Enabling Silicon Carbide Based Power Converters for Integrating Photovoltaics and Multiple Energy Sources," funded by Science and Engineering Research Board (SERB), amount sanctioned-Rs.39.93 Lakhs, December 2022 – November 2025.
27. **Dr. Yujendra Bharathi Mitikiri:** "Atest-Bed for the Design, Development, and Validation of Autonomous Control of Fixed-Wing Unmanned Aerial Vehicles," funded by Science and Engineering Research Board (SERB), amount sanctioned-Rs.12.93 Lakhs, February 2023 – February 2025.
28. **Prof. E. Anil Kumar:** "CSRC Promotional Activity at IIT Tirupati," funded by M/s Kyndryl & Wunderman Thompson Pvt. Ltd., amount sanctioned-Rs.24.00 Lakhs, November 2022.
29. **Prof. Muthukumar Palanisamy:** "Design, Development and Integration of Hydrogen Based Energy Storage and Conversion System for Underwater Applications," funded by IIT Guwahati Technology Innovation and Development Foundation (TIH/TD), amount sanctioned-Rs.30.00 Lakhs, September 2022 – September 2023.
30. **Prof. Muthukumar Palanisamy:** "Design, Development, Testing and Commercialization of Porous Radiant Burners for Domestic Cooking and Industrial Applications," funded by Indian National Academy of Engineering (INAE), amount sanctioned – Rs.67.89 Lakhs, September 2022 – September 2025.

31. **Prof. Muthukumar Palanisamy:** "DST-IIT Bombay Energy Storage Platform on Hydrogen," funded by Department of Science and Technology (DST), amount sanctioned-Rs.35.19 Lakhs, September 2022 – April 2024.
32. **Prof. KSMS Raghavarao:** "IKS Center for Kalamkari Art, Natural Farming, and Food Preservation at IIT Tirupati," funded by IKS Division of MoE@AICTE, amount sanctioned-Rs.29.00 Lakhs, January 2023 – January 2025.

4.1.7 Industrial Consultancies (received during 2022-23)

1. **Dr. Behera Prasanna Kumar:** "Investigation of the Roof at Srikalahasteeswara Temple, Srikalahasti, A.P.," funded by Sri Kalahasteeswara Swamy Vari Devasthanam, amount sanctioned-Rs.1.00 Lakhs, November 2022 – December 2022.
2. **Dr. Behera Prasanna Kumar:** "Testing & Verified Tiles," funded by Aparna Enterprises Ltd, amount sanctioned-Rs.1.77 Lakhs, April 2022.
3. **Dr. Behera Prasanna Kumar:** "Third-party Quality Control: Field and/or Laboratory Testing," funded by IITP-Common Testing, amount sanctioned-Rs.15.00 Lakhs, December 2022 – December 2025.
4. **Dr. Bijily Balakrishnan:** "Technical Recommendations of the Feasibility of the Proposed New Ramps in PID Building for AIIMS Mangalagiri," funded by All India Institute of Medical Sciences, Mangalagiri, Andhra Pradesh, amount sanctioned-Rs.2.59 Lakhs, June 2022 – July 2023.
5. **Dr. Bijily Balakrishnan (PI) and Dr. A. V. Rahul (Co-PI):** "Design Vetting of Concrete 3D Printed Structures," funded by MICOB Private Limited, amount sanctioned-Rs.1.29 Lakhs, September 2022 – October 2023.
6. **Dr. Bijily Balakrishnan (PI) and Dr. M Nithyadharan (Co-PI):** "Investigation on the Structural Soundness and Stability of Government Hospital Mangalagiri," funded by All India Institute of Medical Sciences, Mangalagiri, Andhra Pradesh, amount sanctioned-Rs.2.59 Lakhs, April 2022 – July 2022.
7. **Dr. Bijily Balakrishnan (PI) and Dr. M Nithyadharan (Co-PI):** "Technical Recommendations of the Feasibility of the Proposed New Ramps in PID Building for AIIMS Mangalagiri," funded by All India Institute of Medical Sciences, Mangalagiri, Andhra Pradesh, amount sanctioned-Rs.2.59 Lakhs, April 2022 – July 2022.
8. **Dr. B. Janaki Ramaiah:** "Advanced Soil Testing for OKKA Site in Kerala and OAWB Site in Andaman for Coastal Marine Construction and Engineering Limited (COMACOE)," funded by Coastal marine Construction & Engineering Limited, amount sanctioned-Rs.4.00 Lakhs, February 2023 – March 2023.
9. **Dr. B. Janaki Ramaiah:** "Development of Value-Added Natural Pure Organic Products for Food and Wellness Sectors," funded by IIIT Sri City, Chittoor, amount sanctioned-Rs.1.18 Lakhs, April 2022 – May 2022.
10. **Dr. B. Janaki Ramaiah:** "Geotechnical Investigations of Foundations Soil Along the Proposed Earthen Bund Alignment of Summer Storage Tank at Juvvalapalem Irrigation Tank, Naidupeta, Nellore District, Andhra Pradesh," funded by Public Health Department, Govt of Andhra Pradesh, amount sanctioned-Rs.33.00 Lakhs, June 2022 – October 2022.
11. **Dr. B. Janaki Ramaiah:** "Laboratory Testing of Disturbed and Undisturbed Soil Samples from Three Boreholes Drilled at the Bed of Trail Race Channel of Hydroelectric Project, Polavaram, A.P.," funded by Megha Engineering and Infrastructures Limited, amount sanctioned-Rs.2.95 Lakhs, April 2022 – May 2022.
12. **Dr. B. Janaki Ramaiah:** "Laboratory Testing of Plastic Concrete Specimens of 681 Numbers Prepared 81 Panels of the Diaphragm Wall at the Downstream Cofferdam of Polavaram Project, A.P.," funded by Megha Engineering and Infrastructure Limited, amount sanctioned-Rs.24.51 Lakhs, September 2022 – December 2022.
13. **Dr. B. Janaki Ramaiah:** "Laboratory Testing of Plastic Concrete Specimens Prepared from Spoil Concrete Between Chainage 39.9m and 166.5m at Downstream Cofferdam of Polavaram Projects, A.P.," funded by Megha Engineering and Infrastructures Limited, amount sanctioned-Rs.5.84 Lakhs, April 2022 – May 2022.

14. **Dr. B. Janaki Ramaiah:** "Preparation & Submission of Design and Drawings of Sheet Pipe Wall at EPCC-06-SRU UNIT for Rajasthan Refinery Project (RRP), Pachpadra, Rajasthan," funded by Megha Engineering and Infrastructure Limited, amount sanctioned-Rs.2.36 Lakhs, August 2022 – September 2022.
15. **Dr. B. Janaki Ramaiah (PI) and Dr. Behera Prasanna Kumar (Co-PI):** "Laboratory Testing of Plastic Concrete Specimens Prepared with Four Different Percentages of Retarders to Evaluate their Unconfined Compression Strength, Confined Compression Strength and Permeability at 7 Days and 14 Days of Curing Time," funded by Megha Engineering and Infrastructures Limited, amount sanctioned-Rs.3.54 Lakhs, June 2022 – July 2022.
16. **Dr. B. Janaki Ramaiah (PI) and Dr. M Nithyadharan (Co-PI):** "Proof Checking of Design and Drawings of Reinforced Soil Wall at Deoli-Kota Section in the State of Rajasthan," funded by M/s Ramesh Kumar Bansal, amount sanctioned-Rs.1.46 Lakhs, November 2022 – December 2022.
17. **Dr. B. Janaki Ramaiah (PI) and Prof. A Murali Krishna (Co-PI):** "Geotechnical Investigations of Foundations Soil Along the Proposed Bund Alignment of SS Tank at Mangalampadu Cheruvu, Sullurupeta, Nellore District, Andhra Pradesh," funded by Public Health Department, Govt of Andhra Pradesh, amount sanctioned-Rs.33.00 Lakhs, June 2022 – September 2022.
18. **Dr. B. Janaki Ramaiah (PI) and Prof. A Murali Krishna (Co-PI):** "Getting the Designs and Drawings of Foundations Prepared by Tata Consulting Engineers Ltd., for High Transmission Lines of Different Types of Towers for Madhya Pradesh Power Transmission Co. Ltd.," funded by Tata Consulting Engineers Limited, amount sanctioned-Rs.14.75 Lakhs, April 2022 – June 2022.
19. **Dr. B Krishna Prapoorna:** "Experimental Study on Pervious Concrete: An Eco-Friendly Concrete Pavement; Investigations of Thermophysical Properties of Pervious Concrete: Phenomenological and Climatological Perspectives," funded by University of Sharjah, amount sanctioned-Rs.10.79 Lakhs, July 2022 – June 2025.
20. **Dr Chandra Sekhar Bahinipati:** "Reviewing Grant Applications," funded by The Wellcome Trust Limited, amount sanctioned-Rs.0.17 Lakhs, September 2022 – October 2022.
21. **Dr. Degala Venkata Kiran:** "SAW and Tandem SAW Welding of PEB Grades," funded by Tata Steel Limited, amount sanctioned-Rs.1.41 Lakhs, April 2022 – November 2022.
22. **Dr. Degala Venkata Kiran:** "The Residual Stress and Distortion Analysis of the Multi-Pass are Welded Joints of Naval Grade Steel Plates," funded by Defense Research and Development Organization (DRDO), amount sanctioned-Rs.10.00 Lakhs, November 2022 – November 2023.
23. **Dr. Degala Venkata Kiran (PI) and Dr. Subbareddy Daggumati (Co-PI):** "Structural Integrity Assessment for the WAAM Printed Tube Components," funded by AGP City Gas Private Limited, amount sanctioned-Rs.32.00 Lakhs, March 2023 to March 2026.
24. **Dr. M Nithyadharan:** "Structural Vetting of the Steel Superstructure of BMRCL Repair Bay Shed," funded by Metroof Structures Private Limited, amount sanctioned-Rs.2.36 Lakhs, July 2022.
25. **Dr. M Nithyadharan (PI) and Dr. Bijily Balakrishnan (Co-PI):** "Proof Checking of Structural Design of Hangar by M/s Karekar & Associate Bengaluru for HAL, Bengaluru," funded by Megha Engineering and Infrastructures Limited, amount sanctioned-Rs.1.42 Lakhs, May 2022 – August 2022.
26. **Dr. N. Trivikram Reddy (PI) and Prof. KSMS Raghavarao (Co-PI):** "Development of Value Added Natural Pure Organic Products for Food and Wellness Sectors," funded by M/s Jama Botanics Private limited, amount sanctioned-Rs.18.50 Lakhs, April 2022 – April 2025.
27. **Dr. Shihabudheen M Maliyekkal:** "SiNON Consulting Project for Drug Encapsulation - Phase II," funded by SiNON-USA, amount sanctioned-Rs.70.00 Lakhs, October 2022 – October 2023.
28. **Dr. Shihabudheen M Maliyekkal:** "Source Apportionment Studies: Chemical analysis of air samples," funded by Indian Institute of Technology Madras (IITM), amount sanctioned-Rs.2.27 Lakhs, June 2022 – July 2022.

29. **Dr. Shihabudheen M Maliyekkal:** "Water Quality Analysis," funded by IITP-Common Testing, amount sanctioned-Rs.5.00 Lakhs, November 2022 – November 2025.
30. **Dr. Sriram S:** "Digital Twin Framework for Automobile Brake NVH," funded by Altair Engineering India, Bangalore, amount sanctioned-Rs.28.32 Lakhs, February 2023 – February 2025.
31. **Dr. Thamida Sunil Kumar:** "Scale Up Calculations and Demos of 2G Bioethanol Pilot Plant ASN Fuels Private Limited," funded by ASN Fuels Private Limited, amount sanctioned-Rs.3.00 Lakhs, April 2022 – March 2023.
32. **Dr. Vignesh V:** "Study of Existing Lighting Protection Systems at LPG Plant Plants of IOCL with Respect to Provisions in OISD GDN 180 and IEC/IS 62305," funded by Indian Oil Corporation Limited, amount sanctioned-Rs.3.61 Lakhs, October 2022.
33. **Dr. Murali Krishna:** "Vetting of 2 Sub-Soil Investigation Reports for City Gas Distribution Works in Kerala," funded by AGP City Gas Private Limited, amount sanctioned-Rs.0.88 Lakhs, February 2022.
34. **Prof. Murali Krishna:** "Vetting of 4 Geotechnical Investigation Reports for MES EPC Vizag Project Site," funded by CH Veeraraghavulu Construction Pvt. Ltd., amount sanctioned-Rs.1.20 Lakhs, November 2022 – December 2022.
35. **Prof. P. Muthukumar:** "Testing of DI and D2 Device for Performance Improvement in LPG Stove," funded by M/s Mittal Intellectual Properties OPC Private Limited, amount sanctioned-Rs.0.88 Lakhs, November 2022.

4.1.8 Patents Filed and Granted (During 2022-23)

1. **Dr. Degala Venkata Kiran, Dr. N Venkaiah and Mr. Adapa Mahanth Kumar:** "Trans-Rotary Narrow Gap Submerged Arc Welding Torch," Indian patent filed in the year 2022.
2. **Dr. Gouriprasanna Roy:** "Selone-Based Tyrosinase Inhibitors as Anti-Browning Agents and Antioxidants in Food Processing," Indian patent filed in the year 2022.
3. **Dr. Gouriprasanna Roy, Dr. Kumar Swamy Reddy N, Dr. P. Gandeepan, Dr. Rakesh Kumar Rai (IITTP) & Ruhvenile Biomedical Pvt Ltd:** "Portable Oxygen Generating Device," Indian patent filed in the year 2022.
4. **Dr. Kalidas Yeturu:** "Method and System for Real-Time Annotation and Training of Sub-Region Models in Scanned Documents" Indian patent filed in the year 2022.
5. **Dr. Mamilla Ravi Sankar, Dr. Nasina Venkaiah and Shaik Mahaboob Basha:** "A Polysaccharide Based Abrasive Medium and Preparation Process Thereof" Indian patent filed in the year 2022.
6. **Dr. Shihabudheen M Maliyekkal:** "Method of Manufacturing Super Capacitor Coin-Cell with Optimized Graphenic Electrode Material" Indian patent filed in the year 2022.
7. **Dr. Shihabudheen M Maliyekkal:** "Surface Modified Alkali-Resistant Glass Fibers and Uses Thereof" Indian patent filed in the year 2022.
8. **Dr. Shihabudheen M Maliyekkal, Dr. M. Nityadharan, Abin Azis, Shibil A. G., Afrah H, Sonali S, Uthra K.:** "Method of Preparing an Environmental-Friendly Bio-Inspired Sealant Composite" Indian patent granted in the year 2022.
9. **Dr. Shihabudheen M Maliyekkal, Dr. Soujit Sengupta, G. Vajitha and Abin Aziz:** "Plasma-UV Assisted Bulk Production of Graphenic Material with Tunable Surface Area and Porosity" Indian patent filed in the year 2022.
10. **Dr. Soujit Sengupta, Abins Aziz, and Dr. Shihabudheen M Maliyekkal:** "IOT Integrated Automated Capacitive Deionization (CDI) System" Indian Design patent granted in the year 2022.

5. MEMORANDUMS OF UNDERSTANDING SIGNED BY IIT TIRUPATI

MoUs and academic associations with universities, research institutes and laboratories, and industries of international repute are prioritised to nurture collaborative educational and research activities. IIT Tirupati has inked Memoranda of Understanding with many institutions in India and abroad that aim to uphold institutional collaborations of mutual interest at various levels such as exchange visits of faculty, students, and research staff, joint conferences and workshops, and student internships.

Since its inception, IIT Tirupati has inked around fifty Memorandums of Understanding (MoU) with Educational Institutions, Govt. Research and Development agencies, Public Sector Undertakings, Government bodies, and Industry associates. Following are details of MoUs that were signed during the year 2022-2023.

5.1 NATIONAL ATMOSPHERIC RESEARCH LABORATORY (NARL), GADANKI

An MoU was signed between National Atmospheric Research Laboratory, Gadanki and IIT Tirupati on April 06, 2022, for the exchange of academic knowledge and communicating ideas and solutions among the research fraternity. It was signed in the presence of ISRO Chairman Sri Somnath.

5.2 INDIAN NAVAL ACADEMY, EZHIMALA

An MoU was signed between IIT Tirupati and INA, Ezhimala to recognizing mutual interest and benefits in the fields of technical education, projects and research; faculty training and development and dissemination of technical knowledge, etc. on a long-term non-commercial basis on May 12, 2022.

5.3 UNIVERSITY OF AGDER, NORWAY

An MoU was signed between University of Agder, Norway and IIT Tirupati on June 14, 2022, to promote academic collaboration between the two institutes in areas of mutual interest.

5.4. LITTLE ELLE

An MoU was signed with Shree Vaishnavi Educational Society [Little Elly], for starting of preschool on IIT Tirupati Campus on July 27, 2022, for a period of three years (from August 22, 2022 to August 21, 2025).



5.5 TATA CONSULTANCY SERVICES LTD. (TCS)

IIT Tirupati signed a MoU with Tata Consultancy Services Ltd. on August 8, 2022, for academic and research collaborations.

5.6 HINDUSTAN SHIPYARD LIMITED (HSL)

An MoU was signed between IIT Tirupati and Hindustan Shipyard Limited (HSL) in the presence of the Defence Minister, Hon'ble Shri Rajnath Singh-ji during DEFEXPO-2022, Bandhan event at Gandhinagar, Gujarat on October 20, 2022.



5.7 M/S KYNDRYL PVT. LTD

An MoU was signed between IIT Tirupati and M/s Kyndryl Pvt. Ltd on October 31, 2022, in order to promote research, innovation, and incubation activities for the students and research community in the Institute.

5.8 IIT GUWAHATI TECHNOLOGY INNOVATION AND DEVELOPMENT FOUNDATION

An MoU was signed between IIT Tirupati and IIT Guwahati called Technology Innovation and Development Foundation on November 21, 2022, to enable research work in the area of Hydrogen Storage.

5.9 COCONUT DEVELOPMENT BOARD

An MoU was signed between IIT Tirupati and Coconut Development Board for the project proposal "Nanotechnology Interventions for Process Intensification for Production of Value-Added Products from Coconut" under the Technology mission on coconut on January 17, 2023.

5.10 RAMAN RESEARCH INSTITUTE (RRI)

An MoU was signed between Raman Research Institute (RRI), Inter-University Centre for Astronomy and Astrophysics for the joint production of a precision ion-trap.

6. RESEARCH PUBLICATIONS AND ACHIEVEMENTS

IIT Tirupati fosters a rich academic environment, where faculty members and students are actively engaged in innovative teaching-learning activities contributing to the technical growth of the nation. Institutes like IITs are well known for their research contributions; in this line, IIT Tirupati faculty members are vigorously involved in the research and development of technological advancements. Being a new Institute, IIT Tirupati is busy creating world-class research facilities on campus. All the Institute faculty members are also engaged in quality research publication and presentation of their research outputs at the prestigious conferences of international repute. The research contribution in terms of publication, conference participation, and research projects undertaken are highlighted in the present chapter of the report:

6.1 RESEARCH PUBLICATIONS

During the period April 2022 – March 2023, a total of 139 research articles in various journals of high repute, one book, 13 book chapters, and 12 newspaper articles were published by the faculty members of the Institute. Please refer to Appendix – I for more details on the research publications.

6.2 CONFERENCE PROCEEDINGS/PRESENTATIONS

The faculty members of IIT Tirupati are actively engaged in presenting their research outputs in the conferences/seminars of international repute. IITT faculty members presented 106 research papers in conferences/seminars during the year 2022-23. Please refer to Appendix – II for more details on the conference proceedings and presentations.

6.3 INVITED LECTURES DELIVERED BY THE IITT FACULTY MEMBERS

The Institute faculty members are invited to deliver special talks/lectures to various academic institutions in India and abroad. During this period, 127 lectures were delivered by IITT faculty members. Please refer to Appendix – III for more details on the invited talks delivered by the Institute faculty members.

6.4 AWARDS AND ACHIEVEMENTS

Unperturbed by the restrictions in movement and the general constraints of the pandemic, our faculty, staff, and students have maintained their academic consistency. They have received academic distinctions, honours and awards, and memberships on editorial boards of journals and prestigious international societies. Please refer to Appendix – IV for more details on the invited talks delivered by the Institute faculty members.

6.5 MEMBERSHIP OF PROFESSIONAL BODIES AND EXTENSION/EXTRACURRICULAR ACTIVITIES

The faculty members of the Institute hold the memberships of various professional bodies that contribute to the growth of their respective fields. The faculty members are also actively contributing to the extension and extracurricular activities in their respective disciplines that help academia variously. Please refer to Appendix – V for more details on the membership of professional bodies, and extension and extracurricular activities of the Institute faculty members.

7. ACADEMIC EVENTS

IIT Tirupati has been organising national and international level seminars, conferences, and workshops to facilitate the interaction of the faculty members and students of the Institute with scholars from across the world. During the period under discussion, the Institute organised four international conferences/seminars, two symposiums, eleven workshops, two GIAN courses, two entrepreneurial /startup interactive sessions, one FDP, and one training programme. The Institute, for the benefit of its faculty and students, invites scholars from across the world for delivering special talks on various topics. The Institute hosted 46 invited special talks, and one lecture under distinguished lecture series during the period under discussion. The Institute also organised an orientation programme for providing an overview of the Institute and the curriculum for the seventh batch of students at the onset of the new academic year.

7.1 ACADEMIC ORIENTATION PROGRAMME

The Institute conducted its 7th Orientation Programme (Online) on October 31, 2022, to induct the 2022-2026 batch of B. Tech students. Also, Orientation Programmes were conducted on July 25 and July 26, 2022, to induct the 2022-2024 batch of M. Tech, M. Sc, and MPP students and MS/PhD scholars admitted during July-Dec 2022 semester. The students and their parents were briefed about the academic programmes and the facilities available at IIT Tirupati. An interactive session followed it for the parents with the Director and the Deans of the Institute.

7.2 CONFERENCES/WEBINARS/SYMPOSIUMS/WORKSHOPS ORGANISED

11th Annual Conference on Deep Foundation Technologies for Infrastructure Development in India (DFI-India 2022)

A three-day 11th Annual Conference of DFI-India 2022 on “Deep Foundation Technologies for Infrastructure Development in India” was organised by Deep Foundations Institute of India (DFI of India) in collaboration with Indian Institute of Technology Tirupati, and Indian Geotechnical Society – Tirupati Chapter during September 15-17, 2022. The Conference offered a broad forum to geotechnical professionals to present, discuss and debate many aspects of the latest technologies appropriate for the speedy execution of deep foundation for major infrastructure projects in India.

International Conference on Credit Markets and Policies in South Asia

Dr. Rahul A. Sirohi and Dr. Chandra Sekhar Bahinipati organized an International Conference on “Credit Markets and Policies in South Asia: Issues and Challenges,” December 7-9, 2022 (in collaboration with YSI South Asia Working group & INET, New York), at IIT Tirupati, India. The conference focused on gearing young scholars from across India to conduct research in the intersections of finance and development.

18th International Conference on Information Systems Security (ICISS 2022)

The Department of Computer Science and Engineering hosted the International Conference on Information Systems Security (ICISS 2022), the 18th edition of the conference, from December 16 to 20, 2022. Alongside the broader objectives, the ICISS 2022 emphasized enhancing the cooperation between India and Australia on information security research activity. The conference had about 100 registered participants for the conference including 10 participants from abroad.



ICSSR-JSPS Joint Seminar on Socio-Economic Impacts of COVID-19

Dr. Chandra Sekhar Bahinipati organized a five-day seminar on “Understanding and addressing systemic risks behind the socio-economic impacts of COVID-19 in India and Japan: Developing a roadmap for a resilient and sustainable future” (in collaboration with Institute for Global Environmental Strategies, Japan), in Tokyo, Japan, on November 21-25, 2022. The seminar provided an overview of the systemic risks of COVID-19 in Japan and India, and the impact of COVID-19 on the domestic economy in these countries.



Symposium on Innovation and Entrepreneurial Ecosystem

A one-day symposium on “Building Innovation, Incubation & Entrepreneurial Ecosystem across HEIs of AP” was jointly organised by CSRC, IIT Tirupati and Sri Padmavati Mahila Visvavidyalayam (SPMVV). The Symposium was held on August 17, 2022, at Sri Padmavati Mahila Visvavidyalayam, Tirupati. Dr. Abhay Jere, Chief Innovation Officer, Innovation Cell, Ministry of Education, Govt of India, interacted with the participants and delivered a talk focusing on the need for Innovation & Incubation.

Symposium on Sustainability and Impact of Climate Change

A two-day symposium on “Water Management: Sustainability & Impact of Climate Change” was organised in hybrid mode at IIT Tirupati on 6th and 7th March 2023. The symposium was organised by Dr. Narendra Singh, Dr. M. Nabil, Prof. KSMS Raghavarao, and Dr. Roshan Kumar Srivastav.

International Workshop on 5G and Beyond Wireless Communication

A two-day international workshop on “5G and beyond wireless communication: Application to Positioning and Precision Technologies” was organized jointly by Indian Institute of Technology Tirupati, Tirupati, Linköping University, Sweden, and Technology Innovation Hub (TIH), Tirupati during March 18-19, 2023. The workshop was conducted under the umbrella of the Indo-Sweden VR-DST project titled “Physical Layer Secrecy for IoT Networks with Heterogeneous Traffic.”

Workshop on Abstract Mathematics and Applications

A three-day workshop was conducted by P. Mariappan at ANJA college from December 28 to December 30, 2022. This workshop was funded by ANJAC Alumnus.

Workshop on Advanced Metrology

The Department of Mechanical Engineering organised a workshop on “Advanced Metrology” during December 5 - 9, 2022.

Workshop on Business Model Canvas

A one-day workshop titled “Beyond the Innovation - Business Model Canvas” was organized by the Centre for Sponsored Research and Consultancy (CSRC), IIT Tirupati on March 16, 2023 at IIT Tirupati jointly with T-Hub Hyderabad team. The workshop focused on how to apply Business Model to make the startup journey successful.

Workshop on Emerging Learning Methods and Systems (ELMS)

A three-day workshop on Emerging Learning Methods and Systems (ELMS) was organised as a part of the “Indo-Norwegian Collaboration in Intelligent Offshore Mechatronics Systems (INMOST)” project by the faculty members from Department of Electrical Engineering of the Institute and faculty of Engineering and Science, UiA during July 15-17, 2022. This workshop highlighted the basics of various learning methods, particularly, (i) Supervised Machine Learning (ML), (ii) Deep Learning (DL), (iii) Reinforcement Learning (RL), and (iv) Social and Distributed Learning. It also presented an overview of the application of these methods to solving various system-level problems in various domains like computer vision, automotive, and industrial applications.

Workshop on Foundry 4.0 Innovation

Dr. Ajay Kumar organised Foundry 4.0 Innovation Workshop and Nelcast Foundry Visit in association with IIF Chennai and IIC IIT Tirupati on 24th and 25th Feb 2023. Nelcast Foundry Managing Director Mr. Deepak Reddy Ponnnavolu along with IIF Chennai Chapter Chairman Mr. Sakthivel R. Thirunavukkarasu and foundry members were present.



International Workshop on Geospatial Data Science and GeoAI

A two-day workshop was organized by P. Mariappan in online mode from June 7 to June 8, 2022. It was funded by IITNIF.

Workshop on Nanomechanical & Nanotribological Testing

Dr. Ajay Kumar organized a one-day Scientific Workshop on Nanomechanical & Nanotribological Testing on June 3, 2022, in association with Industron and Bruker.



Workshop on Next Generation Mapping Technologies

A one-day workshop titled "Next Generation Mapping Technologies for Built-up Infrastructure and Assets-Opportunities and Challenges" was organized by the Centre for Sponsored Research and Consultancy (CSRC), IIT Tirupati on 21st March 2023 in collaboration with IIT Tirupati Navavishkar I-Hub Foundation. The workshop focused on the potential innovation and the future for the Built-up Infrastructure and Assets-Opportunities etc.

Workshop on Public Policy Development

Dr. Sanchayan Nath and Dr. Chandra Sekhar Bahinipati co-organized the Workshop on Public Policy Development for Amrit Kaal conducted on 17-18 February 2023 at the Indian Institute of Technology Madras. This workshop was based on an initiative of the Ministry of Education, Government of India, and is the first of a series of national level workshops that are planned to be conducted across clusters of nodal educational institutions in India.

Workshop-cum-Conference on Statistical methods in Finance (Statfin)

It is an annual workshop cum conference organized by Chennai Mathematical Institute, Indian Statistical Institute, and North Dakota State University. This year it was organized from June 28 to July 2, 2022 in the online mode. The workshop and conference are intended to build a statistical finance network and research collaboration and the participants, as well as the speakers, are academics, faculty and students, and industry practitioners. Ananya Lahiri is one of the organizers of Statfin 2021 from IIT Tirupati.

Online GIAN Course on The Advaita Vedanta Tradition and the Possibilities for a Hindu Theology of Liberation

A GIAN course on "The Advaita Vedanta Tradition and the Possibilities for a Hindu Theology of Liberation," was hosted in online mode by Dr Bharath Kumar and Prof. A. Raghuramaraju, during April 25-29, 2022, at the Indian Institute of Technology Tirupati. Prof. Anantanad Rambachan, Professor of Religion at St. Olaf College, Minnesota, USA, was the teaching faculty for the course. As many as 100 participants from all over the country participated in the course.

GIAN programme on Total Factor Productivity and Macroeconomic Development

A week-long virtual GIAN programme on “Total Factor Productivity and Macroeconomic Development” was organised by the Department of Humanities and Social Sciences during December 12-19, 2022. The course was coordinated by Dr. Rahul A. Sirohi and delivered by Dr. Paulo Henrique Vaz, Assistant Professor and Vice-head of the Graduate Program in Economics at the Federal University of Pernambuco (UFPE), Brazil.

Remote Sensing and Geospatial Technology for Landslide Mitigation and Management in Northeastern Region

A 5-day training program was conducted by P. Mariappan at NIT Mizoram from June 24 - 28, 2022. It was also funded by IITNIF.

FDP on Developing Leadership and Team Management Skills

ATAL FDP on “Developing Leadership and Team Management Skills” was organised by the Department of Humanities and Social Sciences, IITT during December 5-16, 2022. The programme was sponsored by AICTE Training and Learning (ATAL) Academy, New Delhi.

Entrepreneurship Interactive Session

CSRC organised an event titled “An Interactive session from Lab to Market” to promote Startup /Entrepreneurship activity on August 24, 2022. Students and faculty members participated and interacted with the expert and Chief Guest Dr. Vivek Kumar Rai, Scientist-F, Technology Development Board, Department of Science and Technology.

Startup Interactive Session

CSRC organised an interactive session and technical talk titled “How to do a Startup” on November 12, 2022. The event was part of Institution's Innovation Council (IIC) activity at IIT Tirupati for the benefit of students and Faculty to promote Startup/Entrepreneurship, where students and faculty members participated and interacted with the expert and Chief Guest, Mr. D M Naveen Giri, Founder ASN Fuel Pvt. Ltd.

7.3 INVITED TALKS HOSTED BY IIT TIRUPATI

1. **Dr. Anik Bhaduri**, Associate Professor, Griffith University, Australia & Director, Sustainable Water Future Programme, Future Earth, delivered a talk on “System Thinking in the Understanding of the State of Land and Water for Agriculture”, on January 7, 2023.
2. **Dr. Anilatmaja Aryasomayajula**, Associate Professor, IISER Tirupati, India, delivered a lecture on “Sup-norm bounds of modular forms”, on September 16, 2022.
3. **Dr. Arabinda Kumar Padhee**, IAS Director, Country Relations and Business Affairs, ICRISAT, New Delhi, delivered a talk on “Policy Pathways for a Sustainable Indian Food System”, on July 28, 2022.
4. **Dr. Badri Narayanan Gopalkrishnan**, Head, Trade and Commerce, NITI Aayog, New Delhi, delivered a talk on “Global Trade and Disruptive Technologies”, on August 2, 2022.
5. **Dr. Buddhananda Banerjee**, Assistant Professor, IIT Kharagpur, India, delivered a talk on “A more powerful test identifying the change in mean of functional data”, on August 26, 2022.
6. **Dr. Chitrabhanu Chaudhuri**, Assistant Professor, National Institute of Science Education and Research

- Bhubaneswar, India, delivered a talk on “Counting Genus 1 curves on Del Pezzo Surfaces”, on October 11, 2022.
7. **Dr. Debargha Banerjee**, Associate Professor, IISER Pune, India, delivered a talk on “Ramanujan Congruences and its Applications”, on September 2, 2022.
 8. **Dr. D. Sujatha**, Assistant Professor, Institute of Pharmaceutical Technology, Sri Padmavati Mahila Visvavidyalayam, Tirupati, delivered a lecture on “Nutraceutical aspects and commercial potential of millets”, on October 26, 2022.
 9. **Dr. G. Sireesha**, Assistant Professor, Department of Home Science, Sri Padmavati Mahila Visvavidyalayam, Tirupati, delivered a lecture on “Millets: a solution to agrarian and nutritional challenges”, on October 26, 2022.
 10. **Dr. Kosuri Shankarraju**, Associate Professor, IIT Ropar, India, delivered a lecture on “Decreasing rearrangement on finite and infinite dimensional spaces”, on January 13, 2023.
 11. **Dr. Manik Banik**, Associate Professor, S. N. Bose National Centre for Basic Sciences, delivered a talk on “Bell’s theorem: The Most Profound Discovery of Science”, on October 20, 2022.
 12. **Dr. Naveen Narisetty**, Associate Professor, University of Illinois at Urbana-Champaign, USA, delivered a talk on “Statistical Inference via Conditional Bayesian Posteriors for High-Dimensional Linear Regression”, on January 24, 2023.
 13. **Dr. Neeraja Sahasrabudhe**, Assistant Professor, IISER Mohali, India, delivered a talk on “Preferential Attachment Trees with Fitness”, on October 28, 2022.
 14. **Dr. Nilanjan Ghosh**, Director, Centre for New Economic Diplomacy, & ORF Kolkata Centre, & President, Indian Society for Ecological Economics, delivered a talk on “Water Governance in South Asia: from reductionist arithmetic hydrology to holistic ecohydrological paradigm”, on August 1, 2022.
 15. **Dr. Nithin Nagraj**, Associate Professor, IISc, India, delivered a lecture on “Chaos, Noise, and Machine Learning”, on August 19, 2022.
 16. **Dr. Pramod Padmanabhan**, Assistant Professor, School of Basic Sciences, Indian Institute of Technology, Bhubaneswar, India, delivered a talk on “Braid Group in Physics”, on September 30, 2022.
 17. **Dr. Puneet Sharma**, Associate Professor, IIT Jodhpur, India, delivered a talk on “Topological Dynamics: An Introduction”, on August 19, 2022.
 18. **Dr. Ramachandrarao Yalla**, Assistant Professor, University of Hyderabad, India, delivered a talk on “Fiber-Based Nanophotonic Platforms for Manipulating Solid-State Quantum Emitters”, on March 15, 2023.
 19. **Dr. Ramakrishna Nanduri**, Associate Professor, IIT Kharagpur, delivered a talk on “On regularity of symbolic Rees algebras and symbolic powers of edge and vertex cover ideals of graphs”, on March 17, 2023.
 20. **Dr. Rituparna Sen**, Associate Professor, Chennai Mathematical Institute, delivered a talk on “Functional Data Analysis: Applications in Finance”, on February 28, 2023.
 21. **Dr. Sajal K. Das**, Daniel St. Clair Endowed Chair, Missouri University of Science and Technology, USA, delivered a talk on “Securing Cyber-Physical and IoT Systems in Smart Living Environments”, on December 19, 2022.
 22. **Dr. Siddhartha Das**, Assistant Professor, IIIT Hyderabad, India, delivered a talk on “Grey/Green Gas Conversion with Plasma Probed by Optical Diagnostics”, on February 8, 2023.

23. **Dr. Souradeep Majumder**, Assistant Professor, IISER Tirupati, India, delivered a talk on “An Introduction to Intersection Theory”, on November, 1 2022.
24. **Dr. Sreekar Vadlamani**, Associate Professor, TIFR-CAM Bangalore, delivered a talk on “A graphical approach to understanding the spatio-temporal variability of Indian summer monsoon rainfall”, on March 3, 2023.
25. **Dr. Sumit Vij**, University of Geneva, Switzerland & Wageningen University and Research, the Netherlands, delivered a talk on “Public Policy: Perspectives from Global South and the North”, on August 8, 2022.
26. **Dr. Vasudeva Rao Allu**, Associate Professor, IIT Bhubaneswar, India, delivered a talk on “Bohr radius for certain classes of analytic and harmonic mappings”, on November 18, 2022.
27. **Dr. Vijayendra Rao**, Head and Lead Economist World Bank, delivered a talk on "Can Economics Become More Reflexive? Exploring the Potential of Mixed-Methods", on April 22, 2022.
28. **Prof. Arni Srinivas**, August University, delivered a talk on “Opportunities available for Mathematics and Statistics Students” and interacted with the students and scholars on May 26, 2022.
29. **Prof. Dianne Henderson**, Penn State University, USA, delivered a lecture on “Understanding nonlinear surface water waves on deep water”, on October 21, 2022.
30. **Prof. Jeffrey R. Vincent**, Forest Economics and Management, Nicholas School of the Environment, Duke University USA, delivered a talk on “Restoring Global Forests: Opportunities and Challenges”, on September 27, 2022.
31. **Prof. Jens Newig**, Head, Institute of Sustainability Governance, Leuphana University Luneburg, Germany, delivered a talk on “Participatory Governance towards Sustainability”, on August 18, 2022.
32. **Professor Joydeep Dutta**, Department of Economic Sciences, IIT Kanpur, delivered a lecture on “Derivatives, Convexity and Optimization”, on February 14, 2023.
33. **Prof. Maria Ángeles Japón Pineda**, Faculty of Mathematics, University of Sevilla, delivered a lecture on “A walk through the fixed-point property in $L^p(\Omega)$ and in variable $L^{p(t)}(\Omega)$ function spaces”, on April 28, 2022.
34. **Prof. Mrinal Kanti Roychowdhury**, University of Texas Rio Grande Valley, USA, delivered a talk on “Quantization for Probability Distributions”, on January 18, 2023.
35. **Prof. Mukul G. Asher**, Professorial Fellow (Retired), Lee Kuan Yew School of Public Policy, National University of Singapore, delivered a talk on “Public Policy Education: How can it help lead to better citizen-centric outcomes?” on July 27, 2022.
36. **Prof. Peter P Mollinga**, School of Oriental & African Studies, University of London, UK delivered a talk on "Water and development: understanding the plurality of productive, consumptive and symbolic uses and meanings of water", on April 8, 2022.
37. **Prof. Rajendra Bhatia**, Ashoka University, India delivered a talk on “The Sylvester Equation”, on January 17, 2023.
38. **Prof. Rajeeva Karandikar**, Chennai Mathematical Institute, India, delivered a lecture on “On Connections between Partial Differential Equations and Diffusion Processes”, on September 23, 2022.
39. **Prof. Siddharth Sareen**, University of Stavanger & Centre for Climate and Energy Transformation, University of Bergen, Norway, delivered a lecture on “Governing Multi-Scalar Low-Carbon Transitions Across Sectors”, on March 28, 2023.

40. **Prof. S. Kaleemullah**, Principal Scientist and Head, Post-Harvest Engineering and Technology Centre, Tirupati, delivered an inaugural lecture on “Millets in diet”, on July 27, 2022.
41. **Prof. S. Lakshmivarahan**, School of CS, University of Oklahoma, Norman, USA, delivered a lecture on “Mathematics of Big Data Analysis”, on February 24, 2023.
42. **Prof. Sundaram Thangavelu**, IISc Bangalore, India, delivered a talk on “How fast can the Fourier transform of a compactly supported function decay?”, on November 11, 2022.
43. **Prof. T. S. Srivatsan**, Department of Mechanical Engineering, The University of Akron, Akron, Ohio, USA, delivered a talk on “Enhancing our understanding of the quasi-static, cyclic fatigue and fracture behaviour of Metal Matrix Composites”, on January 5, 2023.
44. **Prof. Umesh Kadhane**, IIST, Thiruvananthapuram, India, delivered a talk on “Building Understanding of Radiation Processing of Organic Matter in Space”, on March 17, 2023.
45. **Prof. Venkatesh Raman**, Institute of Mathematical Sciences, Chennai, India, delivered a talk on “The Life of a Research Student - An Interaction Session”, on October 20, 2022.
46. **Prof. Vishal Narain**, Management Development Institute, Gurgaon, New Delhi, delivered a talk on “Managing the Commons: Concepts, Issues and Challenges”, on July 29, 2022.

7.4. DISTINGUISHED LECTURE SERIES

1. **Professor Sree Ram Valluri**, Adjunct Research Professor, Department of Physics and Astronomy, University of Western Ontario, Canada, delivered a lecture on “The Mathematical Physics of the Lambert W and Polylogarithm Functions in Science and Engineering”, on 17 Aug 2022.

7.5. OTHER ACADEMIC ACTIVITIES

CAMOST's Second Anniversary Colloquium Series

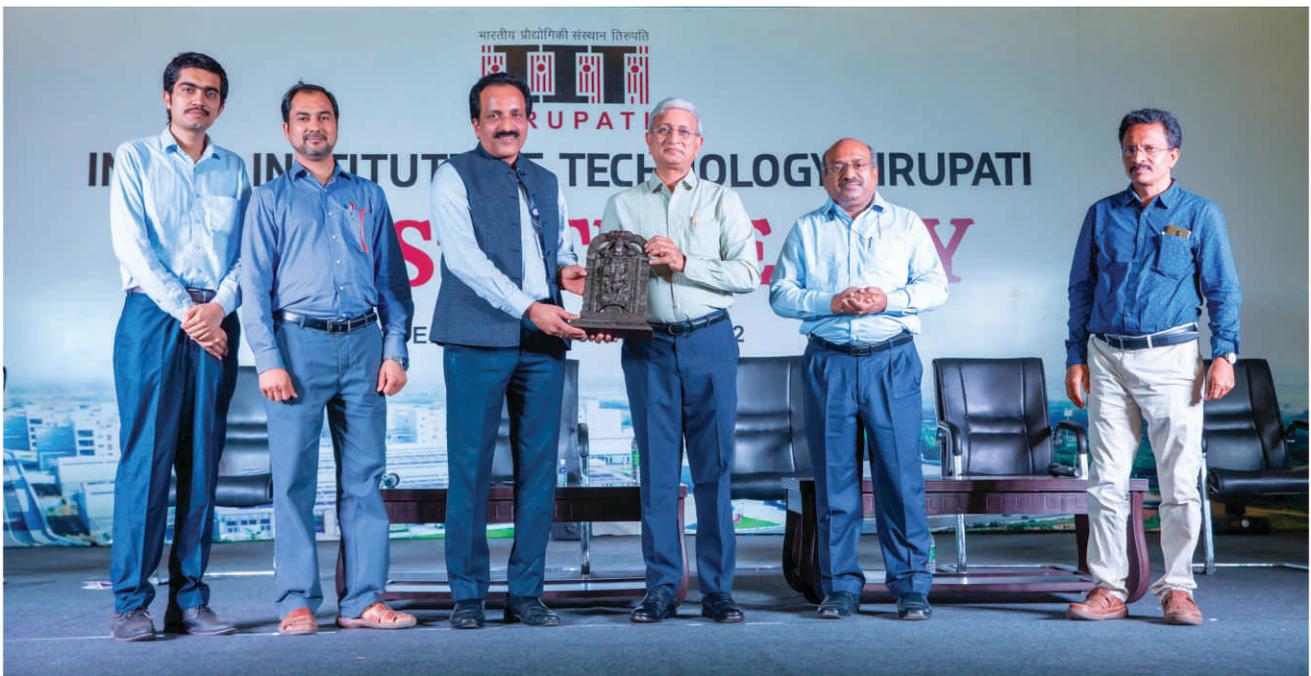
The “Center for Atomic, Molecular, and Optical Sciences & Technologies (CAMOST),” a joint initiative of the IIT Tirupati and the IISER Tirupati, was inaugurated on the eve of the 73rd anniversary of India's Independence Day by Dr. Arabinda Mitra (Scientific Secretary, Office of the Principal Scientific Advisor, Government of India). The CAMOST's Second Anniversary Events started from September 10, 2022.

8. INSTITUTE EVENTS

IIT Tirupati organises various on-campus events to give the students ample opportunity to develop their overall personalities along with expertise in their respective branches. This section of the report details the various events organised by the Institute during the year 2022-23.

7th Institute Day Celebrations

IIT Tirupati celebrated its 7th Institute Day on April 6, 2022, with Shri S. Somnath, Chairman ISRO, as the Honourable Chief Guest. Shri Somnath emphasised the responsibility of IIT graduates in developing indigenous technologies necessary for building Atmanirbhar Bharat. He then awarded medals to the meritorious students. The celebrations ended with various cultural events organised by the students.



Cheryl Painting Workshop

Cheryl Painting Workshop was conducted by Telangana State Awardee Dhanlakota Saikiran from 30th April to 1st May 2022. Students and faculty enjoyed the workshop and learnt a new skill.

Carnatic Music Concert

Faculty and Students gathered on May 22, 2022, at 6:00 pm to listen to the Carnatic vocal concert by Sri Sikkil Gurucharan who was accompanied by Padma Vibhushan Awardee, Sangita Kalanidhi, Kalaimamani Dr Umayalapuram K Sivaraman on Mridangam. Sri Sanjeev V and KanjiraMan Sri B Shree Sundarkumar accompanied them on Violin and Kanjira respectively.

8th International Day of Yoga (21st June 2022)

The Institute's Sports Department and Fitness Club organised the 8th International Day of Yoga on 21st June 2022 in the Indoor complex from 6:30 am to 8:00 am.

The live telecast of the Honorable Prime Minister's address was shown in the Indoor complex for all the participants. A total of 132 members including students, staff, and faculty participated in the programme.



International Year of Millet, 2023

To commemorate the International Year of Millet, IIT Tirupati invited Dr. S. Kaleemullah on 27 July 2022 to deliver a talk. Dr. Kaleemullah, who works as Principal Scientist and Head, Post Harvest Engineering and Technology Centre, Tirupati and is a Rashtriya Ratna Awardee of India International Society, underscored the importance of including Millet in our diet.



Dr. S. Kaleemullah delivering the talk at IIT Tirupati

76th Independence Day

IIT Tirupati celebrated the 76th Independence Day in all its glory and colors. It started off with the march past on the ground at the South campus, followed by the flag hoisting by the Director, Prof. K. N. Satyanarayana. This was followed by multiple cultural programs from both students and faculty. The day ended with prizes and certificates being distributed to all the participants.



Hindi Fortnight Event at IIT Tirupati

The Institute celebrated the Hindi fortnight event from 14th to 28th September 2022. It was inaugurated in the Institute on 14th September 2022 in the presence of Director, Prof. K. N. Satyanarayana. Shri Umesh Kumar Singh, Assistant Registrar (Admin.) and Rajbhasha Adhikari and Ms. Sheela Reddy, Assistant Registrar (Est.) participated in the grand opening ceremony of the Hindi Fortnight as representatives of the Institute at Surat which was inaugurated by the Honourable Home Minister Shri Amit Shah. During the celebration, various competitions like Singing, Just a Minute, Official Hindi Words, Painting, Slogan Writing, Poetry Recitation and Story Writing were organised by the Official Language Section of the Institute. The Chief Guest of the valedictory function, which was held on 29 September 2022, was Prof. Tejaswi Venkappa Kattimani.



Interactive Session on Indian Knowledge Systems



Prof. Ganti Suryanarayana Murthy (National Coordinator, Indian Knowledge Systems Division AICTE-Ministry of Education, Govt. of India) delivered a talk on the various activities by IKS division on 19th September 2022. He discussed what is IKS, its relevance in 21st century and the various initiatives of the IKS division. He discussed in detail the IKS center proposal (Bhasha or research), IKS research proposal, and IKS internship. He further explained the various research areas relevant to IKS initiatives such as Indian psychology and yoga, approaches to artistic traditions, sustainable agriculture, and food preservation methods et cetera.

Director's Re-Appointment

Prof. K. N. Satyanarayana was reappointed as the director of the institute for the second term on 28 September 2022. It was celebrated across the students, staff, and faculty fraternity at large.



Workshop on Writing R&D Grant Proposal for Women Engineers

A two-day workshop on “Writing R&D Grant Proposal for Women Engineers (Formulation, Defense and Implementation of a Grant Proposal)” was held during November 10-11, 2022. The workshop was sponsored by the Science and Engineering Research Board and hosted by the Institute.



74th Republic Day Celebrations

The 74th Republic Day celebrations marked a harmonious blend of academic and administrative brilliance. Graced by the esteemed Chairperson of CPWD as the Guest of Honor and the Director as the Chief Guest, the event's cultural splendor was quite evident through the several performances that were presented by the dynamic JMC crew and the enterprising students of IIT Tirupati. The celebrations culminated in the dignified felicitation of the IIT Tirupati staff, recognising their dedication and contribution.



DST Secretary Visit to IIT Tirupati

Dr. Srivari Chandrashekar, Secretary, DST, visited IIT Tirupati on 8th March 2023. He had an interactive session with the faculty members. Prof. K. N. Satyanarayana gave a brief about the progress of the Institute and an overview of various sponsored projects undertaken by the faculty members of the Institute. The Secretary talked about the various schemes introduced by DST while the faculty members shared some of their own observations/concerns regarding the execution of sponsored projects funded by DST and SERB with him.



DST Secretary addressing faculty at IITT

MEDHA talk on Women Empowerment

MEDHA organised a three-day event for the International Women's Day Celebration. It conducted games for all female housekeeping staff on March 11, 2023. On the second day, it conducted games for female faculty and staff, and faculty spouses and their children living on the campus. The celebration also included a debate on the topic "It's Okay Not to be Perfect" A drawing competition was also held for all the children on the campus. Dr Ramadevi Gourneni, Managing Director of Amara Hospitals, delivered a talk on "Balance in Life" on March 13.



9. CAMPUS INFRASTRUCTURE

IIT Tirupati, since its inception, has been adding new infrastructure facilities to meet the essential needs of the students and faculty as and when required. In the fourth year of its operations, IIT Tirupati started functioning from its Permanent Campus (548.11 acres) located on Yerpedu-Venkatagiri Highway. The construction of the permanent campus is underway in two Phases to cater to 2,500 students, 250 faculty members, and 275 staff members. Facilities under the Phase 1 campus to cater to 1200 students were established in three stages. Stage 1A (Transit Campus), Stage 1B, and Stage 1C (with most of the buildings and facilities) have been completed and occupied stage-wise.

IIT Tirupati began functioning from its Temporary Campus in the year 2015 which was situated on the Tirupati–Renigunta road in the premises of Krishna Teja Group of Institutions. The Temporary Campus has been completely vacated by July 2022 and started functioning in full capacity from its Permanent Campus with all the academic, administration as well as residential activities.

This chapter reports about the progress made in the campuses of the Institute during the period under consideration.

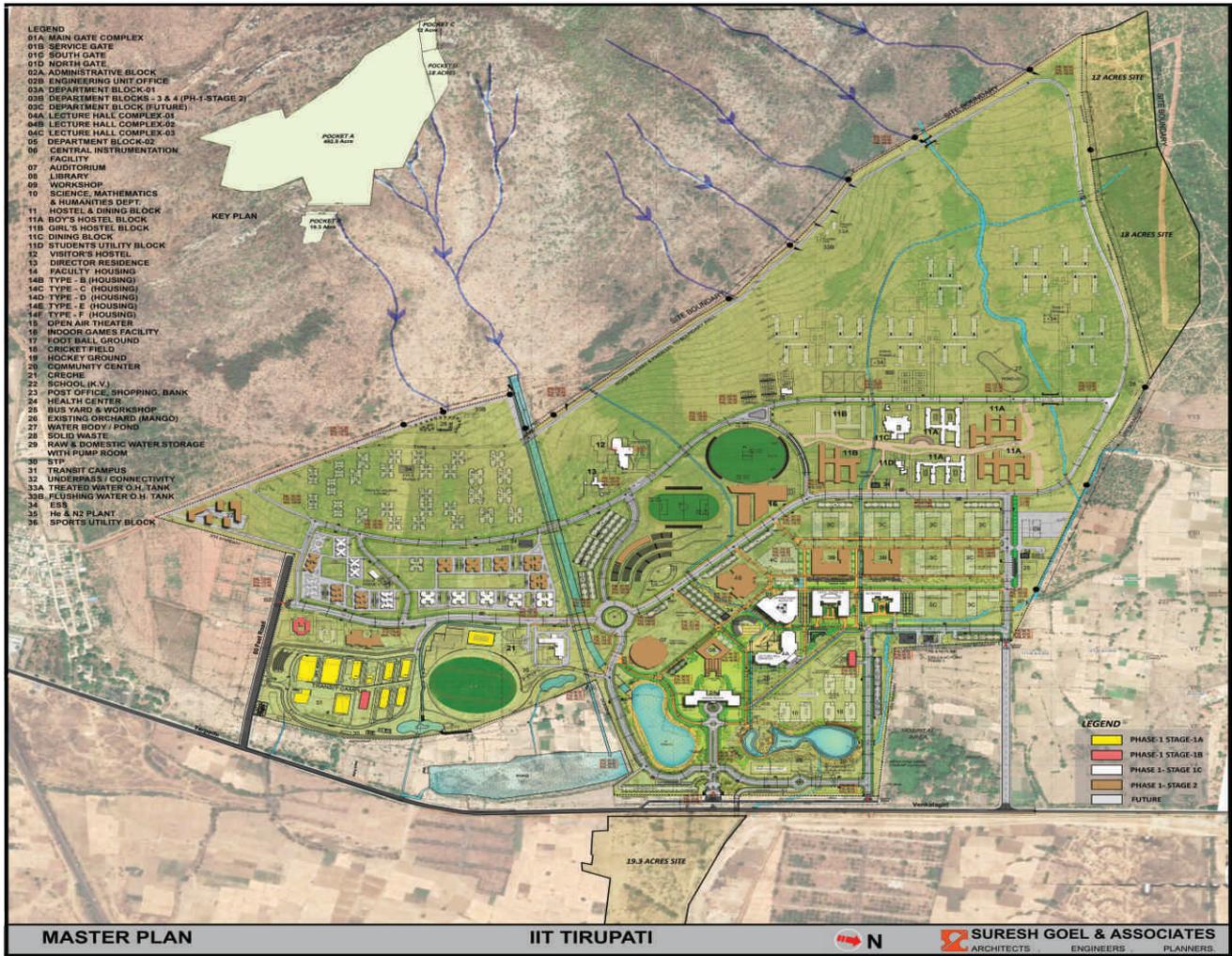
9.1 PERMANENT CAMPUS & MASTER PLAN

The Government of Andhra Pradesh provided land to the Institute to the extent of 548.11 acres to develop the Permanent Campus located on the Yerpedu–Venkatagiri Highway in Merlapaka Village. The Permanent Campus site is 24 km from Tirupati town, 14 km from Renigunta Railway Station and 13 km from the Tirupati Airport. The construction of the compound walls around the site is fully completed.

The Master Plan for the 12,000-student campus has been completed. It includes four zones, namely, Academic Zone, Hostel Zone, Housing Zone, and Recreational Zone, along with a south campus (that has been integrated with the permanent campus) as shown in the figure next.

Salient features of the Master Plan:

- A national highway bifurcates the site. The west campus (528.81 acres) will house the academic campus, and the east campus (19.3 acres) will house a research park. An underpass will connect these two campuses.
- The campus is planned with Green Building features (GRIHA 5/4 Star) as a smart, sustainable, and pedestrian-friendly campus.
- To maintain the ecological features of the campus site, the existing rivulets and water bodies are being retained. In order to preserve the ecology of the permanent campus site, a detailed Ecological Management Plan (EMP) was prepared by Care Earth Trust, a Chennai-based NGO.
- Two water bodies/ponds are being created for the accumulation and storage of runoff. These two ponds will cater to about three months of water supply requirements for the entire campus.



Master Plan, IIT Tirupati

- The locations of the buildings and other facilities are planned to minimise the earthwork (cutting and filling) on the site.
- The buildings are oriented to minimise heat retention.

It has been planned that the Permanent Campus would be constructed in phases. The Campus seeks to provision 2,500 students, 250 faculty members and 275 staff members in the initial phases. The construction is to be taken up in two stages. In Phase 1, buildings, and facilities to cater to 1200 students, Director's residence, 168 faculty and staff members and academic buildings have already been occupied.

All operations had been moved to the permanent campus by July 2022 while the rest of the facilities will be ready in Phase 1 by June 2023. Subsequently, the campus is to be developed in various phases growing over a period of 25-30 years to cater to a 12,000-student campus.

1. PERMANENT CAMPUS PHASE-1 STAGE 1A CONSTRUCTION: (SOUTH CAMPUS; Completed in 2018)
TOTAL BUILT-UP AREA = 21,100 sq.m

The buildings and facilities on the Permanent Campus Stage-1A construction include:

- Five hostels with G+3 floors, each to accommodate about 150 students
- A G+1 floor multipurpose building with a 120-seater studio type classroom, a 60-seater recording studio,

a 60-seater Computer lab, Library, and a Health Centre with two medical examination rooms and a 4-bed ward.

- Two laboratory buildings, Lab 1 and Lab 2 to house laboratories for Civil and Mechanical Engineering (Lab 1), and laboratories for Electrical Engineering and workshop facilities (Lab 2)
- A residential block with four apartments for essential staff
- A maintenance office building
- Indoor sports complex along with outdoor sports facilities
- A dining-cum-kitchen facility for 300 persons in a batch, equipped with a modern and hygienic kitchen
- BT roads with street lighting
- 500 kVA sub-station with a provision to extend DG Power automatically during the external power outages
- Water treatment and Sewage treatment plants



An Aerial View of Stage 1A Campus (South Campus)

The construction of the South Campus includes the following sustainable Eco-Friendly Features:

- Glass Fiber Reinforced Gypsum (GFRG) technology in the construction of hostels and residential blocks.
- PEB structures for laboratories, workshops, dining block, and indoor sports complex.
- Polished concrete flooring in the laboratories
- 48-volt DC light fittings and ceiling fans in hostels
- 220 kWp roof-top grid interactive type solar power plant
- Solar water heater
- High Volume Low Speed (HVLS) fans
- STP with treated water used for flushing and gardening purpose.

'Stage 1A (South Campus)' of the Institute has won the "GRIHA LD Rating Award 2019 from GRIHA Council, New Delhi in the category of Exemplary Demonstration of Sustainable Building Material/Technologies and the first prize in the HUDCO Design Awards – 2018 for the design and construction of an eco-friendly campus with sustainable construction materials and technologies.

2. PERMANENT CAMPUS PHASE-1 STAGE 1B CONSTRUCTION: TOTAL BUILT UP AREA = 7,156 sq.m (Completed in 2019)

The buildings and facilities constructed on the permanent campus Stage-1B include:

- Classroom Building
- Engineering Unit Building
- Hostel Block-F (Sixth Hostel)

Classroom Building: This building is a (G+2) floor housing 13 classrooms, a computer lab, and the Academic Section office. The classrooms include eight 40-seater classrooms, four 60-seater classrooms, and a 120-seater classroom. The computer lab has a 20-seater capacity. The office room is developed to cater to the requirements of the administrative activities related to the academic section. All the access ramps and utilities are constructed to have easy access for specially-abled people.



Aerial view of Classroom Building (G+2)



Typical view of a 40-seater classroom in Classroom Building



Elevation of the Classroom Building

Hostel Block-F (Sixth Hostel):

This hostel with G+4 floors is constructed to accommodate about 180 students. The building is designed and built keeping in view good ventilation and air circulation, and all the access ramps are designed for the specially-abled.

*Outside view of the
Hostel Block – F*



Engineering Unit Building: This is a G+1 floor building constructed to meet the requirements of the administrative activities of the Engineering Unit. It houses the offices of the Dean-Planning and Infrastructure, the Chairman and Head - Engineering Unit, and EU Staff. The ground floor is allotted to the CPWD office.



View of the Engineering Unit Building

3. PERMANENT CAMPUS PHASE-1 STAGE 1C CONSTRUCTION:

TOTAL BUILT-UP AREA = 1,31,355 sqm

The Phase 1 Stage 1C construction started on June 03, 2020, and is progressing reasonably well despite the challenges posed due to the Covid-19 pandemic. It has four Zones: Academic Zone, Hostel Zone, Sports Zone, and Residential Zones.

Academic Zone: Consists of Department Blocks 1 & 2, Lecture Hall Complex, Administrative Block, Central Instrumentation Facility and Gas production building. All the Buildings are fully Air-conditioned except the gas production building.

Department Block 2 Construction is completed and occupied, and Department Block 01 handing over is in progress. Lecture Hall Complex, CIF Building and Administrative Blocks Finishing works are in Progress.

Total built-up area: 62,351 sqm.

Hostel Zone: Two Hostel buildings to accommodate 1,000 students, Dining-cum-Kitchen facility with a wide variety of South Indian, North Indian and Continental dishes.

Hostel 01 was completed and handed over, the Dining block is partly occupied and operational. Hostel 02 finishing works are in progress.

Total built-up area: 30,170 sqm.

Residential zone: 168 quarters for Faculty and Staff, Director's residence, and Visitors' Hostel.

All the residential buildings were completed and occupied.

Type-B qtrs. 16 Flats

Type-C qtrs. 64 Flats

Type-D qtrs. 24 Flats

Type-E qtrs. 32 Flats

Type-F qtrs. 32 Flats

Director's residence is completed and occupied. The Visitors' Hostel is in progress and nearing completion.

Total built-up area: 33,769 sqm

Support Services: Electrical Sub-stations, District cooling plant, Water Treatment Plant, Sewerage Treatment Plant, CCTV surveillance, Roads and Street lighting, Rooftop Solar Power, Solid Waste Management system, Biogas Plant et cetera.

Substations, OHT (Over Head Tanks), HVAC, and Pump rooms are completed and started functioning including ponds. Roads and drains are almost completed and have access to all the buildings.

Total built-up area: 5,065 sqm

Academic Zone

Department Block-1 (G+3): A 120-Seater Classroom, six 60-Seater Classrooms, four 40-Seater Classrooms, eight Meeting rooms, twenty-eight Research Labs, forty-eight Faculty rooms, eight Undergraduate/Post Graduate Labs, twelve Research Scholar rooms et cetera. This block will house the Chemistry, Civil Engineering, Chemical Engineering, Mechanical Engineering, and Physics departments.

Status as of March 2023: Superstructure completed. Finishing work is under progress like polished concrete flooring work, tiling work, and Granite works. As of now, 95% of the work has been completed.



Department Block-1

Department Block-2 (G+3): A G+3 building having Library, Data Centre, and Computer Lab, nine 60-Seater Classrooms, thirty Research Labs, forty-eight Faculty rooms, six Research Scholar rooms, Discussion rooms, 40-Seater Computer labs et cetera. This building will house Computer Science and Engineering, Electrical Engineering, Humanities and Social Sciences, and Mathematics departments.

Status as of March 2023: The building has been fully completed and occupied since August 2022.



Department Block-2



Classroom



Library Facility in Department Block 02



Meeting Room



Laboratories

Lecture Hall Complex: A 240-seater Classroom, four 120-Seater Class Rooms, twelve 60-Seater Class Room, twelve 40-seater Classrooms, Students' Lounge, Faculty Lounge, Canteen, Tinkering Lab, Reading Lab, Physics and Chemistry Lab, Engineering Drawing Hall and Exhibition Hall.

Status as of March 2023: Superstructure completed. Masonry and finishing works are under progress like tiling work, and Granite works. As of now, 85% of the work has been completed.



Lecture Hall complex

Administrative Building (G+4): This building houses offices of the Director, Deans, Registrar, and various Administrative and Academic sections.

Status as of March 2023: The building has been fully completed and ready for occupation, testing and commissioning works are under progress.



Administrative Building

Central Instrumentation Facility Building (G+2): This building houses a cleaning room, and high-precision equipment for the research purposes.

Status as of March 2023: The building structural works have been fully completed, and finishing works are in progress.



Central Instrumentation Facility Building

Hostel Zone

Hostel Buildings Construction:

Hostel - 1 and Hostel - 2 Buildings: Each hostel will house 495 individual student rooms, study room, indoor stadium, gym, warden room, assistant warden rooms, guest rooms et cetera.



View of the Hostels

Status as of March 2023:

Hostel 01 has been fully occupied and started functioning since August 2022. Hostel 02 finishing works are in progress.



Dining Block (G+2):

This building will cater to around 1000 students for dining, along with kitchen and bigger dining spaces.

Status as of March 2023:

The dining block has been partially occupied and started functioning.



Sports Utility Block (G+1):

This building will be used for sports staff and staff equipment stores.

Status as of March 2023:

The sports utility building has been fully completed.

Residential Zone

- 168 quarters for Faculty and Staff
- Director's residence
- Visitors' hostel

Director Residence 1 (G+1)

Fully Completed and occupied in all respects.



Visitors' Hostel (G+2):

All the superstructure works have been completed in all respects, and testing and commissioning works are in progress.

Residential Quarters (168 Flats): Type B, C, D, E and F

All the residential quarters for staff and faculty have been fully completed and occupied.



View of the Residential Quarters

External Services

1. Road formation work is complete and road marking work is in progress.
2. Pond formation work is fully complete and external development work is in progress.
3. Electrical substations are completed and fully operational.



Type B Road Central Circle



Main Gate Complex



Pond 01 Aerial View



Pond 02 Aerial View



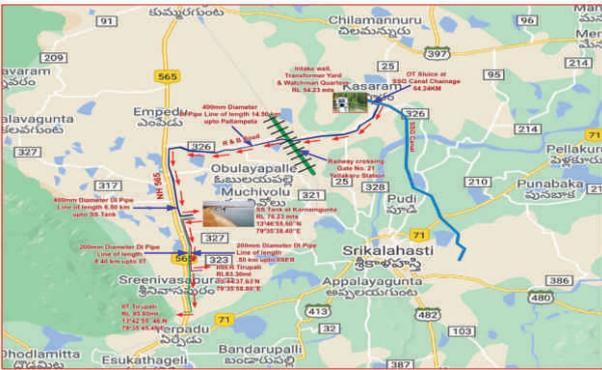
Over Head Tanks



Electrical Substations

Drinking water facility to IIT Tirupati and IISER Tirupati

1. The Rural Water Supply and Sanitation (RWSS) Department, Government of Andhra Pradesh is executing the work as a deposit work.
2. The scheme envisages supplying non-treated water of about 2.5 million litres per day to IIT Tirupati and 1.5 million litres per day to IISER Tirupati from SSG (Satya Sai Ganga canal). As of now, 85% of work has been completed.



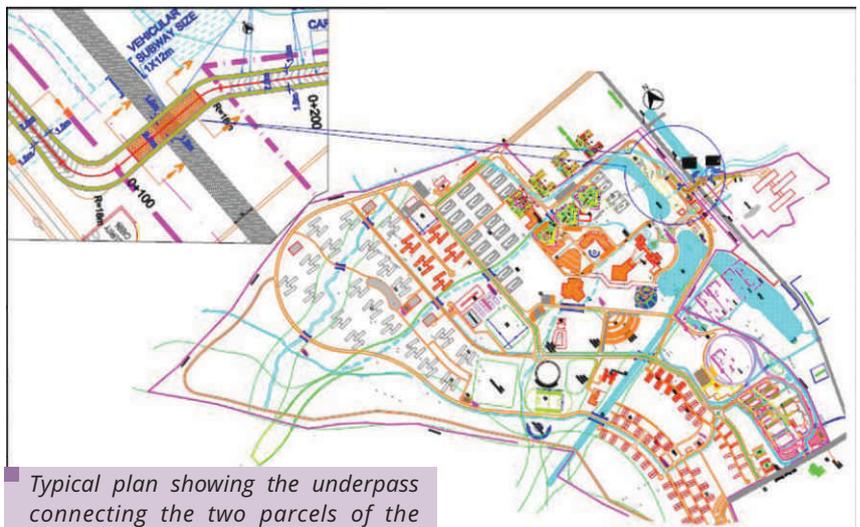
Map showing the drinking water facility at IIT Tirupati and IISER Tirupati



Summer Storage Tank works are in Progress

Underpass between two parcels of land allotted to IIT Tirupati on either side of NH-565

1. The National Highway Authority of India (NHAI), PIU, Tirupati, is executing the plan as a deposit work.
2. The design and estimates have been completed. Tendering is in progress.



Typical plan showing the underpass connecting the two parcels of the campus on either side of NH-565.

9.2 STUDENT HOSTELS AND OTHER FACILITIES

IIT Tirupati constructed four Hostels for boys and three Hostel for Girls in the first phase of construction on the Permanent Campus site in Yerpedu. The total seating capacity of boys' hostels is 1280, and the total capacity of Girls' Hostels is 410. All B. Tech, M. Sc, MPP, M. Tech, MS & PhD students have been accommodated in these hostels. To ensure comfortable living at the hostels, the Institute created all the required facilities at each hostel and provided the students with well-furnished rooms and a dining facility. The Institute has its own primary care health centre in a permanent campus. It has also signed an MoU with a multi-speciality hospital in the town to provide students with cashless treatment.

The Institute has also arranged a transport facility for the students to commute between the hostels and various facilities on the Permanent Campus. The hostels have a 24x7 Wi-Fi facility, IoT washing machines, TV, water coolers, geysers, and common rooms. In addition, Stationery cum General store, Salon, Cafeteria, and food courts are available in the Permanent Campus.



Hostels in South Campus



Hostels & Dining Hall in North Campus

Sports Facilities

An indoor stadium and outdoor sports facilities have also been created for the students on the permanent campus.

Outdoor sports facilities

- Basketball court with Poly Propylene Tiles
- Two volleyball courts

- One Tennis court and a half practice court
- Running track cum football / Cricket Ground

Indoor sports facilities:

- Three badminton courts with vinyl flooring
- Table tennis
- Gym



View of Indoor and Outdoor Sports Facilities

9.3 HEALTH CENTRE

IIT Tirupati has its primary health care centres on both temporary and permanent campuses with two qualified doctors supported by well-trained staff nurses and a 24x7 ambulance service. The Institute provides quality primary care for all emergencies with essential life support and helps the students, faculty, and staff through teleconsultations during a crisis like a pandemic. The emergency care equipment present at the Institute Primary Health Care Centre includes Defibrillator, Multipara Cardiac monitor, ECG machine, Autoclave, O₂ concentrator/O₂ cylinder, etc.



*A View of
Health Centre*

The Health Centre managed the COVID-19 pandemic successfully by following the method of tracing, tracking and treatment. It successfully provided timely health education through guest lectures, emails and displaying charts.

For cashless treatments, the Institute has signed MoUs with Amara Hospital, Hari Priya Dental Hospital, Feroz Dental Hospital, Meghana Dental Hospital and Sri Venkateswara Institute of Medical Sciences, Tirupati. MoUs have already been signed with Apollo Pharmacy at Korlakunta, Renigunta, Padamvathi Puram and Renigunta for cashless medicines. The team of doctors and Nurses are available around the clock to provide first aid, support and guidance to the students, faculty, and staff. We have specialist doctors in ENT, Ophthalmology, Orthopedics, Dermatology, Paediatrics, Physiotherapy and Homeopathy visits once a week.

9.4 VISITORS' HOSTEL

The Visitors' Hostel at IITT is situated at the foothills behind the campus surrounded by greenery with a variety of flora and fauna, which is also characteristic of the pleasant sound of birds along with the national bird peacock seen in the vicinity often. The Visitors' Hostel offers lodging and boarding services for the Institute guests from academia, central/state government administration, alumni, and the parents/wards of the students. The peaceful atmosphere of the Visitors' Hostel offers a pleasant stay, and the visitor can enjoy a scenic view of the entire campus.



Front view of the Visitors' Hostel



Hill view of the Visitors' Hostel

9.4.1 Guest Rooms

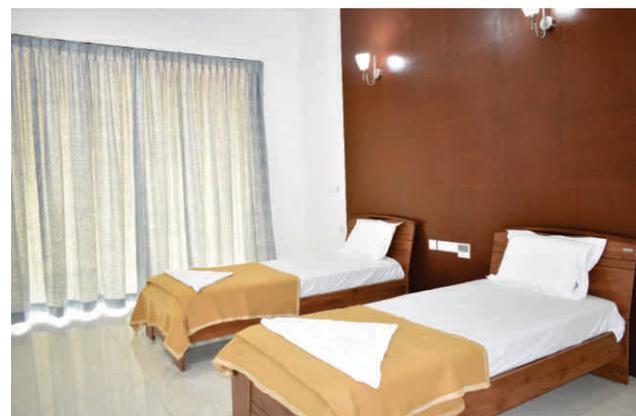
This facility includes two suites on the ground floor and four suites on the first floor, along with three standard rooms on the first floor and eleven on the second floor. The suites offer a comfortable stay to the guests with a spacious living area, dining room, and a bedroom. Further, the standard rooms have single/double bed options based on the guest requirements. The rooms include a study table with a chair, a luggage shelf, and a cupboard. All rooms are centrally air-conditioned, well-furnished and equipped with essential services such as internet, wi-fi and television. The Visitors' Hostel premises have a diesel generator backup and a hybrid solar water heater to supply hot water in the washrooms.



Living Area and Dining



A View of Suite Room: The Master Bedroom



A View of the Standard Room

9.4.2 Meeting Hall and VIP Lounge

The facility also includes a conference room to conduct meetings, and a VIP lounge along with a dining area to host the guests. The first-floor terrace is spacious enough and is effectively utilized to host events and banquet dinners for Institute-level workshops and conferences.

9.4.3 Kitchen and Dining Hall

The Visitors' Hostel has a well-planned spacious kitchen equipped with modern equipment along with the necessary storeroom for vegetables and groceries, a gas bank, and service rooms for catering personnel on the ground floor. The dining hall can comfortably accommodate 70 sit-down meal services to the guests during breakfast, lunch, and dinner. Also, the lounge in front of the dining hall is a convenient space for buffet service and caters to up to 50 guests during official events.



A View of the Dining Facility

9.4.4 Common Facilities

The Visitors' Hostel has a reception, waiting lounge, back office, and manager's office to accommodate officials/staff operating the Visitors' Hostel. The dormitory has also been planned as part of the facility to accommodate drivers of the guests, and the other essential service personnel assisting in the smooth conduct of the operations in the Visitors' Hostel.

Apart from this modern facility, the south campus consists of four semi-furnished apartments that are available for long-term accommodation of all the Institute guests and newly joined faculty.

10. STUDENT ACTIVITIES

In addition to their regular course of academic affairs, the students at IIT Tirupati are actively engaged in organising and participating in various technical, cultural, and sports activities that shape their innovative thinking and enhance their multidimensional talent. The Institute has fostered a number of active clubs in academics, photography, music, drama, dance, technology, astronomy, trekking, volunteering, social services etc. This section of the report summarises the events and activities organised by the students in 2022-23 under the following heads:

(a) Technical and techno-cultural events

(c) Student clubs

(b) NSS activities

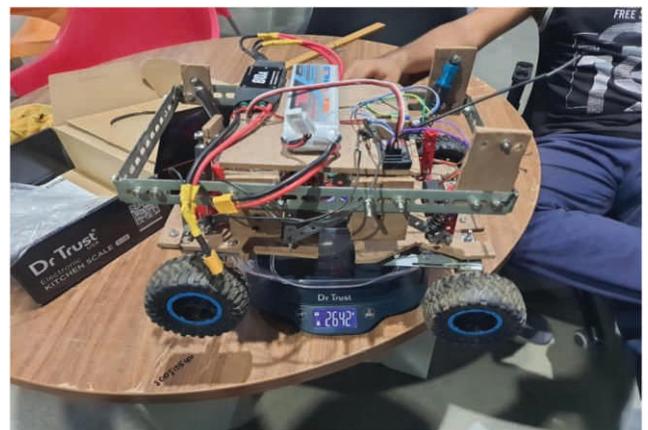
(d) Sports-related activities

10.1 TECHNICAL EVENTS

- **An Arduino Workshop** was organised by Tech Maniacs. The workshop was aimed at using sensors, motors, and wireless communication. It also demonstrated several small projects that showcased the capabilities of Arduino, such as temperature sensor, maze-solving car, PID based self-balancing robot, hand gesture-controlled car, home automation system, etc.

It included concepts such as an introduction to the Arduino platform and its components, basic programming concepts, syntax, input/output with buttons, LEDs and sensors, serial communication with the computer, and controlling motors and servos.

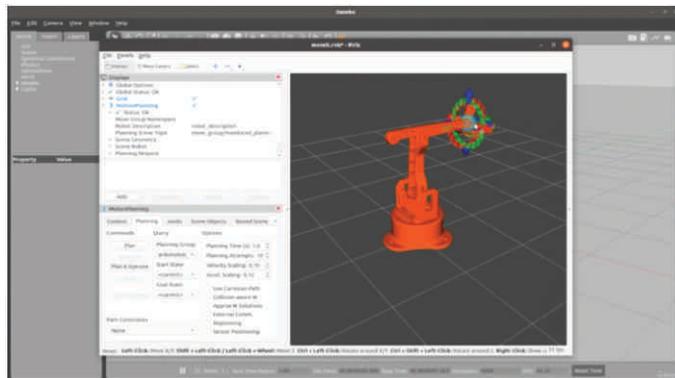
- **RC Escapade** was organised in which six teams participated. Each team was given a fixed budget to build their own remote-controlled car. The teams had to design and assemble the car, incorporating the principles of robotics and electronics. The competition was held in a round-robin format.
- **Interest Groups** were organised where the participants were given a hands-on project to work on. These projects were designed to be challenging but achievable for members with varying levels of experience.



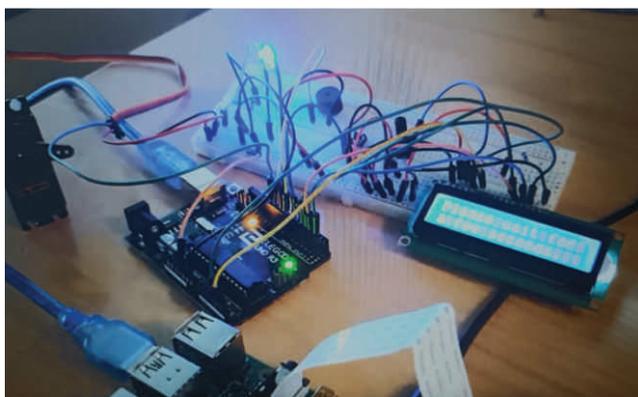
Club Projects:

- Alexa controlled ROS-based manipulator.
- RC Plane
- Quadcopter

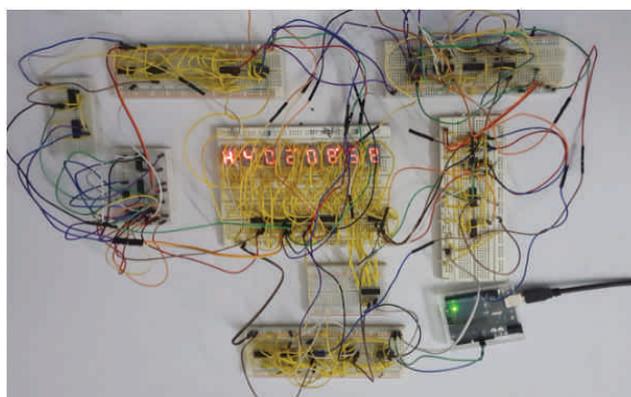
- Telecom System based on Arduino and Raspberry Pi
- 24 Hour Clock



Alexa controlled ROS-based manipulator.



Telecom System based on Arduino and Raspberry Pi



24 Hour Clock

Other Competitions

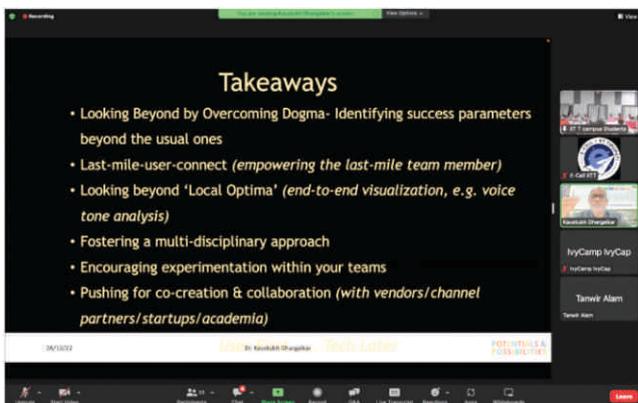
- **Mathworks Minidrone**
- **eYRC**
- **NRC**
- **Shaastra**
- **Digital Wizards signed various MoUs**, such as the MoU with Geoffrey Hinton League, an initiative under univ. AI that agreed to collaborate with ML clubs of top-tier institutes in the country to work in the domain of Data Science and AI. An MoU was also signed with Algo University, backed by YCombinator, for conducting a week-long session involving their sessions and a programming contest, CodeRush. Another MoU was signed with WAGMI - a community of

Blockchain Clubs of all major IITs, NITs and Premier Institutes of the country.

- **The Code Club Orientation** session was an introduction to the activities of Code Club, which basically aims at getting students onboard with programming essentials, and doubt-solving/mentoring sessions.
- **CP Workshop I** was organised to introduce Competitive Programming, the CP Interest Group, and an introduction to competitive programming websites.
- **Installation Workshop** was organised for Guided Installation and setup of CPP, JDK, Python, introduction to VM, and installation of Kali Linux.

- **Security Workshop** was organised to introduce computer networks and security. In the workshop, there was also a small CTF (Capture the Flag) exercise along with different forms of security breaches, live examples of security breaches, and an introduction to ethical hacking with hands-on Kali Linux.
- **ML Workshop** was organised to introduce ML, basics of regression, and classification. The workshop also included an introduction to DL with some hands-on and some basic classification + regression techniques/ InterIIT problem statement discussion.
- **CP Workshop II** was organised to introduce prefix sums, fundamental concepts of prefix/suffix sums and extensive problem-solving.
- **DSA Series 3.0 Session I** was organised. It was a live announcement and heuristics of DSA Series 3.0, a sequel to its preceding version Extensive-Problem-Solving on Arrays.
- **CP Workshop III** was organised. It was an Introduction to Binary Search, Upper Bounds & Lower Bounds. An extensive problem-solving session on Binary Search was also conducted and associated problems were discussed.
- **A workshop** was organised on basic logic building and hands-on Programming language sessions for the first-year students. An introduction to basic C++ syntax and basic problem-solving on hackerank was conducted.
- **DSA Series 3.0 Session II** was organised on advanced problem solving on divide & conquer algorithms on Arrays and extensive list of approaches for such genre of problems.
- **Web Dev Workshop I** was organised on Introduction to web development, and a brief idea about the front-end & and back-end of a website was also given to the students.
- **DSA Series 3.0 Workshop III** was organised on extensive problem-solving on Matrices (Traversal + Search algorithms), Introduction to Stacks and Queues, basic implementation and elementary problem-solving.
- **Web3 Workshop I** was organised in relation to Introduction to Web3 & Blockchain, and practical applications. Much of the web3 jargon was also introduced and the students were briefed about how a Blockchain actually works. There was also live demonstration of a DApp working with a testnet.
- **Basic Workshop** as a sequel to Workshop I: This was a beginner-friendly workshop to get the first years and novice programmers accustomed to the programming environment.
- **DSA Series Workshop IV** was organised in continuation to DSA Series III with discussion on stacks and queues and data structures.
- **DSA Series Workshop V** in continuation to DSA Series Workshop IV: In this workshop, there was a discussion on the augmentation of stack-based data structures in detail.
- **WAGMI Launch Event** was organised for the event launch of WAGMI as DW officially became a part of the Mudrex-backed consortium of Blockchain clubs under the umbrella of WAGMI. The guest speaker discussed the requirements and the uses of Blockchain in the current world.
- **DW Bootcamp on ML** was organised, where students were shown the ins and outs of a neural network. The bootcamp went deep into the mathematical model of Neural Networks and gave the of the mathematics behind it.
- **Code Clash 2023** an educational contest, was conducted by Algo University- a YCombinator-based startup that focuses on ed-tech societies of colleges nationwide.
- An **MOU** was signed with **IvyCamp**, an initiative of IvyCap Ventures, one of India's largest homegrown Venture Capital Funds that leverages the Global Alumni Ecosystems of IITs and IIMs.
- **Astronomy Memethon** was organised by Gagan Vedhi. The event was designed to engage our community and showcase the creativity of our members, and it was a fun and interesting way to kick off the club's activities.

- A session on **“Innovation and Design Thinking for Entrepreneurs”** was organised and Dr. Kaustubh Dhargalkar (Dean – Business Design, Innove REDX & NISP) delivered the talk.



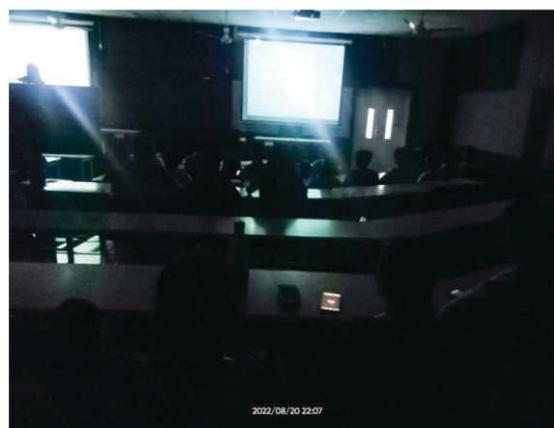
- **15 Days Career Exploration Challenge** was organised by the E-Cell.



- A session on **“Finance for Entrepreneurs”** was organised by the E-Cell. Mr. Gaurav Kumar Rana delivered the keynote address.



- A documentary quiz on **Dark Matter and Dark Energy** was organised by Gagan Vedhi.



- A talk on **Astrobiology** (Online) was organised in collaboration with IISER Tirupati on habitable life outside earth and extra-terrestrial life. Dr. K Ravi Kumar, a NASA scientist, delivered the talk.



- A talk on Astrophysics (Optics and Astronomy Instrumentation) was organised and the speaker was Vivek Pimpalshende.



- A talk was organised on the **Regulation of Planetary Habitability by Stellar Processes** and Dr. Lingam from Florida Institute of Technology was the invitee.
- An online talk was organised on **“The Chemistry and Spectroscopy of Stellar and Planetary Formation.”** The talk revolved around an intellectually stimulating view of astronomy and its advances in the contemporary context. Dr. Eric Herbst from University of Virginia was the speaker.



- An online talk on **“Missions in Search for Signs of Life in Our Solar System”** was organised.



- **LIGO Workshop** was organised. It was a two-day offline workshop on Gravitational Waves Detection by Dr. Apratim and Dr. Suresh from IUCAA Pune.



- **Astrophotography (Universe in Frame) and AstroArt (Astrokes) Competition** under Astrofest AETHEREUM was organised.
- **Star Gazing Event** was organised at RSC Tirupati involved gazing sessions at the given location. Various objects such as ISS (International Space Station), Jupiter, Mars, moon and constellations were observed during the session by the participants with the help of Telescope at RSC.



- **Workshop on Orbital Simulation** was organised to introduce the students to Orbital Simulation Techniques using Python library.
- **Workshop on ML for Astronomy** was a two-hour workshop conducted to teach the participants some basic libraries of python which are needed for Machine Learning.
- **Augmented Reality Workshop** was organised by Technology Innovation Hub at IIT Tirupati in collaboration with the Ideas² team. The workshop offered a 2-day Hands-on Augmented Reality Workshop.

Do you want to make your own "EDITH"?

IITNIF in collaboration with Ideas² presents
A Two Day Hands on Workshop On
AUGMENTED REALITY

17 AND 18 SEPT 2022
TC 1, IITT TRANSIT CAMPUS

- Industry recognized Certificate
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- Projects and Competitions
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Registration Fees ~~₹300/-~~ ₹200/-

Limited Seats Available
Register now!!!

DESCRIPTION
Augmented reality (AR) is the integration of digital information with the user's environment in real time. It has gained immense popularity in the past decade. What once was thought to be mere fiction is now becoming the real world. Join this hands on workshop and catch up with whats happening by familiarizing yourselves with a variety of AR tools and software like

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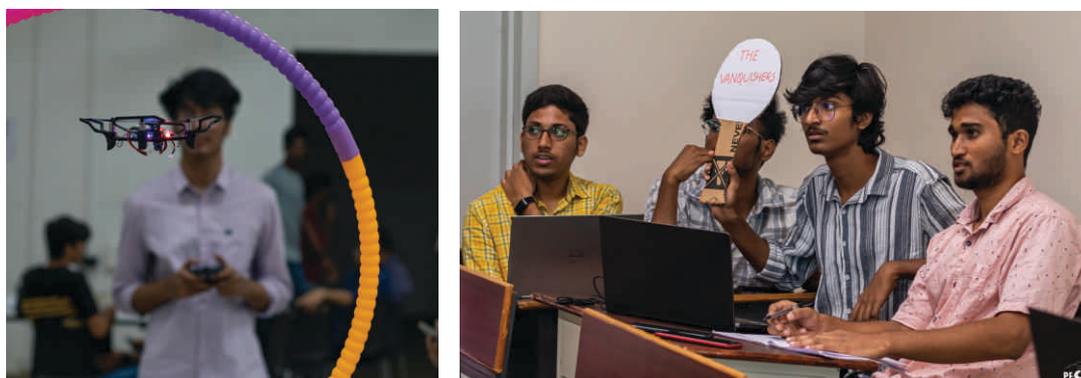
- **Introductory Data Analytics Workshop** was organised. Ideas² team in collaboration with Henry Harvin conducted an Introductory Data Analytics workshop for the student community of IIT Tirupati.
- A talk on **Decentralised Startups** was organised by the E-Cell (Entrepreneur Cell) in collaboration with Lumos Labs. The talk was delivered by Mr. Raghu Mohan who encouraged the attendees to explore a career in entrepreneurship via Crypto Products.
- **Startup Clinic Sessions** were organised twice every month. These sessions were conducted by Dr. Hiran Vedam to help students crystallise their start-up ideas.
- **Block-Chain and Crypto-Currency Workshop** was organised in collaboration with industry professionals and was powered by Jupiter.
- The students organised a **workshop on introducing Arduino** by the use of the online simulator TinkerCad followed by an offline workshop on the same theme where the students were introduced to Arduino and its software and were given hardware to work on to get hands-on experience.

10.2 TIRUTSAVA - 2023: THE SIXTH TECHNO-CULTURAL FEST

Tirutsava is the annual festival of IIT Tirupati which is organised and managed by the students. A techno-cultural extravaganza in every respect, the event consisted of a plethora of technical workshops and captivating professional shows. This year, the famous singer Nikita Gandhi performed for the pro-show on the second day. Her breathtaking performance was followed by that of DJ Nina Suerta on the last day of the event. In addition to these pro-shows, event teams conducted various events like group dance, fashion show, KTM Bike show etc. A convergence of innovation and creativity, the event enthralled participants and spectators alike. From cutting-edge technical insights to mesmerising performances, Tirutsava celebrated the fusion of technology and culture, leaving an indelible mark on all who attended.

10.2.1 Technical Events

Competitive Programme, Stock Market, Techmaniacs, Hackathon, Bridge Contest and Town Planning were the events under Technical that garnered huge crowds and hitherto unforeseen participation. These events had significant amounts of prize money ranging from 10k-100k which was also the highlight for participation.



10.2.2 Cultural Events

Dance Events, Artista, Crime Busters, Singing Events, Cooking and Photography were the most anticipated events of Tirutsava. Many enthusiastic participants from several institutes such as IISER, SV University and IIIT Sri City thronged the campus in a spirited attempt to showcase their skills. It was relished by the students, faculty, and staff.



10.2.3 Literary Events

The artistic side of students was quite apparent in the way in which they participated in Just a Minute, Poetry Writing and Recitation, Spin a Yarn and other writing events. The highlight of all the events though was the

Quiz (General/Mela/SciBiTech Quiz) Contest which had a winning amount of ₹15000. Following closely on the heels of the Quiz Contest was the 'Spin a Yarn' Competition. Around 5-6 solo participants were given a prompt/starting line based on which they had to begin a story. Upon the moderator's call, which was nothing but the word "switch", the next person in order continued to incorporate the incomplete narrative into their story. It was thoroughly hilarious as well as entertaining.

10.2.4 Informal

This event was an extravaganza in itself. Enigma - A mind-boggling digital puzzle hunt constructed on the core philosophy of celebrating abstract thinking and information synthesis was the centre of attraction for all the participants. Manifesting as an engrossingly surreal chase unravelling strange corners of the web was the high spot of this event. Valorant, a 5v5 tactical shooter game developed and published by Riot Games offered another intense multiplayer experience. Call of Duty Mobile and Rocket League consisted of customizing your car and hitting the field. It was almost like competing in one of the most critically acclaimed sports games of all time. Tirutsava provided students the opportunity to take part in Rocket League.

10.3 National Service Scheme Activities

The overall aim of the National Service Scheme (NSS) is to give an extended dimension to the higher education system and orient the student youth to community services. The reason for the formulation of this objective is the general realisation that the students, both college-going and +2 level, have tendencies to alienate themselves from the village/slum masses that form the country's major population. The educated youth, who are expected to take the reins of administration in the future, are found to be unaware of the problems of the village/slum community and, in some instances, are indifferent towards their needs and problems. Therefore, it is necessary to arouse the students' social conscience and provide them with an opportunity to work with the people in the villages and slums. It is felt that their interaction with the common villagers and slum dwellers will expose them to the realities of life and bring about a change in their social perception.

With the four clubs - Schools, Old Age Homes and Orphanage, UBA and Rural Development, Health and Blood Camp, that formed to assist NSS activities, the team NSS could organise various activities towards social and environmental welfare. The various events organised under various clubs and in collaboration with reputed NGOs in the year 2022-2023 are as follows:

10.3.1 Har Ghar Tiranga

Azadi Ka Amrit Mahotsav (AKAM) is a celebration to commemorate the 75 glorious years of our progressive, independent India. The Har Ghar Tiranga campaign is one such initiative that has been launched as part of Azadi Ka Amrit Mahotsav with a vision to inculcate patriotism in the hearts of the citizens by inspiring them to hoist the National Flag between 13th August and 15th August 2022. NSS has encouraged the IIT Tirupati family to commemorate this special event to invoke the feeling of patriotism in the hearts of everyone.



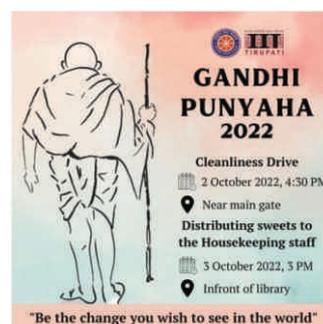
10.3.2 NSS Day Celebrations 2022

Every year the 24th of September has been celebrated as NSS Day since 1969 and is marked across the nation with great enthusiasm. It is the day when this National Service Scheme was officially launched in India. This year on the 54th NSS day as an act of love towards our Mother Nature we organised a Tree Plantation drive. A total of 50 volunteers participated in this drive making the event a grand success.



10.3.3 Gandhi Punyaha

“Be the change you wish to see in the world” (Gandhi). Every year we celebrate Gandhi Jayanti on the occasion of his birth anniversary following his ideologies. This year we organised Cleanliness Drive, Mass Cleaning, and Sweet distribution event for the housekeeping staff.



10.3.4 Cleanliness Drive

Inspired by the Swachh Bharat campaign, the NSS organised a Cleanliness Drive on 2 October 2022 to celebrate Gandhi Jayanti. The main purpose of this activity was to collect the plastic waste spread over the campus and make the students aware of the importance of clean surroundings. Several students came forward and actively took part in collecting all the plastic waste all over the transit campus. Keeping the environment clean is one of the best ways to save Mother Earth. Around 60 students actively participated.

10.3.5 Mass Cleaning

In order to have a positive and peaceful mind our surroundings should be clean and healthy. Having clean surrounding helps us focus and increase our concentration on our work. As a part of Gandhi Punyaha, a Mass Cleaning activity was organised where the students, staff, and faculty were requested to clean their rooms/offices on their own without the help of house cleaning staff.



10.3.6 Sweet Distribution to the Housekeeping Staff

As a token of gratitude for the housekeeping staff, on the occasion of Gandhi Jayanthi, the NSS Team of IIT Tirupati organised a Sweet Distribution activity on the next working day, where the housekeeping staff was presented with sweets as a pleasant gesture for their daily hard work towards keeping the campus clean.



10.3.7 Christmas Celebrations

In collaboration with the Artista Club, the NSS unit organised the “Best Out of Waste” activity on Christmas, that is, the Christmas Tree-Making Competition using the waste around us. Students managed to build different varieties of Christmas trees with unique designs, making the event a success.

10.3.8 Farmed Animals and Us - Webinar by FIAPO

The NSS team in collaboration with the Federation of Indian Animal Protection Organisations (FAIPO) organised an online webinar on the topic – “Farmed Animals and Us.” The webinar was hosted by our speaker “Niyanth Vidi” to enlighten us on how animals and humans should co-exist in today’s world. The webinar was a huge success and had around 180 participants.



10.3.9 Child Sexual Abuse - Webinar by Sakshi

The NSS team (IIT Tirupati) in collaboration with the Sakshi organisation, came up with an online webinar about awareness of the POCSO Act (Protection of Children from Sexual Offences Act 2012) to give insights on the idea of preventing sexual abuse through various means.

10.3.10 Ek Bharat Shreshtha Bharat

The program Yuva Sangam is a 'student exchange program' which aims to enhance interaction and promote mutual understanding between people of North-East states and other states of the country in the areas of Paryatan (Tourism), Parampara (Traditions), Pragati (Development), Prodyogiki (Technology) and Paraspar Sampark



(People-to-People Connect). It is an initiative launched as part of “EK Bharat Shrestha Bharat” by the Ministry of Education, GoI. As a part of this, 28 members from NIT Arunachal Pradesh came to Andhra Pradesh. NSS members actively engaged in volunteering throughout the activities.

10.3.11 Role of Youth in Protecting Community Animals - Webinar by FIAPO

NSS IIT Tirupati in collaboration with the Federation of Indian Animal Protection Organisations (FAIPO) organised a one-hour online webinar on the topic “Role of Youth in Protecting Community Animals.” The webinar was hosted by Meghana Adhikari explaining the role of young students in protecting and spreading awareness about animals. The webinar was quite engaging and had around 150 participants which made the event a huge success.

10.3.12 School Competition at ZPHS Yerpedu

Essay writing and drawing competitions were organised on themes related to the Independence Day in ZPHS Yerpedu. The events saw active participation from the students there as 45 students participated in the essay writing competition whereas 10 students participated in the drawing competition. After the competitions, volunteers interacted with the students and the prizes were distributed to the winners on Independence Day.



10.3.13 School Mela Activity

NSS IIT Tirupati associated with School Mela in inspiring students for future chances and the value of education. School Mela is a US-based non-profit organisation working for unprivileged students. Volunteers from IIT Tirupati inspired the students to achieve their goals. Nearly 210 students received school supplies during the sessions. These sessions were held from 22 August 2022 to 30 August 2022 in schools around Tirupati, namely- ZPHS Panguru, ZPHS Pallam, ZPHS Vampalli, ZPHS Vellamkandriga, ZPHS Akkurthi, ZPHS Obulaipalli, ZPHS Pillamedu, ZPHS Gundeligunta, ZPHS Pedakanaparthi, ZPHS Muchivolu, ZPHS Chellamabapuram, ZPHS Thottambedu, ZPHS Yerpedu.



10.3.14. Old Age Home Visit

Volunteers from IIT Tirupati visited Telugu Talli Old Age Home, Tirupati. They interacted with around 15 people and the volunteers distributed fruits to the people in the old age home. All of the volunteers talked with them for one to two hours. The presence of the volunteers was very much appreciated by the people there.



10.3.15 Green Valley School's Visit to IIT Tirupati

Students from Green Valley School, Gudur visited IIT Tirupati on a study tour. Volunteers from IIT Tirupati helped them explore the campus. It was followed by an interaction session with Dr. Vijaya Kumar Gurugubelli, Dr. Pooja Vyavahare, and students of IIT Tirupati.



10.3.16 School Visit - ZPHS Pallam (5th November 2022)

NSS IIT Tirupati in collaboration with the EPICS MSL Team, IIT Tirupati organised an experiment-filled session for class 6th students of ZPHS Pallam. Various science experiments were demonstrated to the students by the volunteers. We witnessed an active participation from the school students.



10.3.17 School Visit - Kalpataru Prathamik Pathashala

Few of the NSS Coordinators visited Kalpataru Prathamik Pathshala which is a school serving the children of Vishwakarma Awas. This interaction session included many activities such as games, drawing, painting, rhyme-telling, etc. which helped students develop a good bond with the participants there and understand the facilities better.



10.3.18 Open School Visit

On the occasion of National Education Day, students from schools near Tirupati were invited for a campus visit. A guidance session for the students was organised with Ullas Trust. The winners of the annual activity- Science Hack were also invited. Around 120 students from various schools in and around the college participated in the event. Director, Prof. K. N. Satyanarayana, graced the occasion and delivered an inspiring speech for students.



10.3.19 Navodaya Vidyalaya & Govt. Junior College Visit

As a part of the Vigyan Jyothi Scheme, around 50 girl students from Chittoor Navodaya Vidyalaya and Government Junior College visited the IIT Tirupati campus. The students were given a tour of the campus, especially the tour of labs of the campus. After this, they had an interactive session with Dr. Pooja Vyavahare and Mr. Mahesh Kumar Mulakala.

10.3.20 Donate a Meal Activity

NSS-IIT Tirupati organised a *Donate a Meal* activity from 17th to 25th December. In this activity, the students were encouraged to give tiffin or full meals to the people in need. As most of the students were not on campus, they were asked to share pictures for the activity from home. We received 15 responses from the students. It was a very nice experience for them to be able to provide food for the people in need.



10.3.21 JEE Awareness Sessions

NSS, IIT Tirupati held JEE awareness sessions in a few Government Junior Colleges in Srikalahasti as registration for JEE Mains 2023 got underway. The significance of JEE Mains and its registration process was explained by the volunteers. The session was quite interactive, and it was followed by a question-and-answer session.

10.3.22 Donations

NSS-IIT Tirupati planned a blanket donation drive, asking IIT Tirupati students to bring blankets in order to aid people sleeping on roadsides and footpaths in these freezing temperatures. Nearly 30 blankets were collected during the drive, and they were all distributed.



10.3.23 Sessions at ZPHS

NSS unit of IIT Tirupati in collaboration with Ullas Trust, organised a series of useful sessions for the class 9th and class 10th students of ZPHS. These schools include ZPHS Yerpedu, ZPHS Pallam, and ZPHS Panguru. The primary aim of these sessions was to help the students develop their personality. The subsequent sessions focused on teaching the importance of teamwork, memory techniques, etc. to the students. Overall, this event was a huge success as around 150 students from different schools attended each of the sessions. In the last session, the top 5 performers of class 9th and class 10th from each school were awarded a cheque of Rs. 1000/- and certificates from Ullas Trust. A total of 30 cheques were awarded.



10.3.24 Science Hack 3.0

NSS unit of IIT Tirupati organised Science Hack 3.0. It was a national-wide open school science competition. The competition was held for students under two categories: classes 6th to 8th and classes 9th to 10th. We received nearly 70 responses from all over India. The winners and participants received e-Certificates.



SCIENCE HACK 3.0
AN ONLINE PROJECT COMPETITION



6th FEB TO 31st MAR
2023

FOR MORE INFO:
 Mahesh Kumar M NSS Program Officer 98866 45 468 4
 Chandini Student Coordinator 9515 705123

Visit: <https://iittp.ac.in/nss/index.html>
 Mail us: nss@iittp.ac.in
 Instagram: [@nssiit_official](https://www.instagram.com/nssiit_official)



10.3.25 Cybersecurity Awareness

On Feb 27, 2023, NSS-IIT Tirupati organised Cyber Security Awareness Session in SOS village to explain the importance of cyber security, tips, and methods to be safe against cyber threats and attacks. The volunteers used an interactive presentation prepared by the NSS Team to make people visualise and inculcate the risks because of cyber-attacks in this modern era of data and information.

10.3.26 SOS Village Visit

Students from Arunachal Pradesh visited SOS Village as part of the Ek Bharat Shreshtha Bharat program, talked with the SOS village children, and donated some money. Along with the donation of students from Arunachal Pradesh, NSS, IIT Tirupati purchased some stationery for the school children. Four of our NSS volunteers visited the SOS village and distributed the school supplies to the students. Also, the volunteers interacted with a few students in the 10th grade and wished them luck for their examinations.



10.3.27 Blood Donation Camps

NSS-IIT Tirupati, in association with the NTR Trust, conducted a Voluntary Blood Donation Camp for students, faculty, their dependants, non-teaching staff, and security. A total of 89 people showed their interest through the form circulated before the event. Including the spot registrations, a total of 128 people wanted to donate blood out of which 119 were eligible to donate blood.



10.3.28 Eco-Friendly Home 2.0

The main aim of the activity was to create an eco-friendly environment in the nearby surroundings. In this activity, students were asked to find at least one eco-unfriendly activity being done nearby or collect information about the activity on internet or from friends or family members and find some alternative solutions which are useful to creating a healthy and clean environment.



10.3.29 Quiz on Sustainability

Sustainability committee and NSS, IIT Tirupati jointly organised a quiz on environmental sustainability. More than 50 students enrolled for participation in this event, which culminated with the final quiz held among 10 students (5 teams). The questions in the quiz ranged from water conservation, wildlife protection, waste management, sanitation, nutrition, and health. The quiz was evenly contested with the top three teams awarded prizes.



10.3.30 Kitchen Gardening

Inspired by the enthusiasm shown by the NSS volunteers in the previous Kitchen Gardening Activity, the NSS-UBA team restarted the Kitchen Gardening activity under the guidance of our Horticulture Officer, G.V. Subba Reddy, with the help of around 50 girl student volunteers.



10.3.31 Village Surveys

The major purpose of the village surveys was to interact with the locals and understand the conditions and problems faced by the villagers in their region. Around 25 volunteers participated in each of the visits to Chindepalle, Jangalapalle and Rajulapalem on 18th September, 6th November and 8th November respectively. Volunteers explored the village, interacted with the people over there, surveyed and studied the facilities and living conditions there.



10.3.32 MPP School Visit

NSS conducted a school visit in NSS-adopted villages Rajulapalem and Jangalapalle to understand the interests of the children and to impart some knowledge. We allotted volunteers to the students of classes I to V. They taught the children various concepts related to their class. A total of 20 students participated in this activity.



10.3.33 Health Awareness Programs

The UBA team organised a Health Awareness Program for Women in the villages of Panguru and Chindepalle from 4th March to 5th March, 2023. A comic known as Menstrupedia which describes Menstruation, Health tips, and Nutrition was demonstrated to the village women.



10.3.34 Tailoring Workshop

Based on the theme of "Women's Empowerment," NSS-UBA conducted a 6-day Tailoring Workshop (Bridge Course). This initiative was in collaboration with JCI Tirupati Odyssey, and it aimed to teach the female participants some of the basics of Blouse Cutting and Stitching. Around 20 women participated and benefited through these sessions.



10.4 GCU - GUIDANCE AND COUNSELLING UNIT

Sarathi, the Guidance and Counseling Unit (GCU) supports the student community in the betterment of their personality, mental health, and spreads wellness among the IIT Tirupati community. GCU provided counselling sessions and promoted mental health awareness through webinars and other initiatives in the years 2022–2023. GCU arranges counselling sessions for the neighbourhood while guaranteeing the privacy of those who attend. The GCU room is completely furnished with air conditioning. The GCU services are extended to faculty, staff and their families too. YourDOST team (an online platform) is available 24X7 where students can interact with counsellor through texts, voice calls and video calls

10.4.1 Weekly Counselling Sessions

From April 2022-November 2022, GCU was primarily helmed by Prof. Samiullah (Counsellor) while Dr. Neeraja visited the campus once a week and interacted with the students.

Mrs. Bhooma Krishnan (Counsellor) was available from April 2022-November 2022 through voice calls and video calls as needed by the students.

10.4.2 Appointment of Full-Time Counsellor

Dr. Neeraja was appointed as a full-time counsellor in November 2022 who is available five days a week from Tuesday to Saturday. Depending on the comfort levels of any particular student, GCU makes sure that both male and female counsellors remain available. As such, Prof. Samiullah continues to visit the campus once a week.

10.4.3 Anonymous Form

The Instagram page will be a platform for students to ask any kind of questions related to mental health and depression anonymously. Our counsellors will be available to answer these questions directly, and the answers will be posted as either a post or an Instagram story or on the Notice Boards around the campus.

10.4.4 Social Media Presence

A YouTube channel is created to stream webinars and short videos and insights. Weekly Instagram posts supporting wellbeing and raising awareness of mental health were also published during this period. The GCU constitution is uploaded in the official GCU website. Emails are regularly shared with the campus community of IIT Tirupati.

10.4.5 UG Buddies

The UG Buddies programme was started to promote positive interactions between seniors and juniors. In this programme, seniors interacted with the first-year students from the same department to help them with their general concerns about college life, college events, and other campus activities.

10.4.6 Orientation Sessions

New UG, PG, and research scholar students are given orientation seminars by GCU faculty advisors, student heads and counsellors. A talk on “Time Management & Handling Procrastination” was given by Dr. Neeraja for MS, and PhD students. For the first-year students, Dr. Neeraja gave a talk on “Coaching to Campus” in July, 2022.

10.5 STUDENT CLUBS AND ACTIVITIES

The student clubs play a pivotal role in organising events to extend life beyond the boundaries of textbooks and exams to extra-curricular development. Several events have been organised by the different clubs during the year 2022-2023.

10.5.1 Actomania- The Drama Club

The Actomania Club hosted a lot of online events using social media platforms. The club conducted a dialogue delivery competition titled "Lights, Camera, Action!" on Independence Day. Another entertaining event, "Dumb Charades" was also organised by the club. Besides, Actomania successfully completed an online workshop, where participants thoroughly enjoyed the session and learned quite a few skills in acting.

10.5.2 Artista - The Art Club

Events like National Leaders Painting, Logo Making Competition, Halloween Face Painting Session, Diya Painting Session, and Still Life Sketching were organised by this club. During Tirutsava, the club organised competitions like Character Design and Worddoodle.



10.5.3 Sargam - The Music Club

Sargam, the music club, conducted a series of events in the academic year 2022-23, like Radio Nights, Antakshari Only, and Unplugged - Acoustic Night. The club also organised Antara 6 – a musical event exclusively for the freshers. There were other events like Sargam Online Show 2.0, Saturday Night Live with Sargam, and 20+ hours of online sessions, which included discussions, fun and informative musical games, virtual meets with the alumni and impromptu composing.



10.5.4 Photography and Film Club (PFC)

The photography and film club (PFC) hosted a series of photography and video-making competitions like the Shutter Skills 3.0 Photo Contest, Editor's Cut Video Editing Contest, Lorem Ipsum Graphic Design Contest, and Photoverse Photography Contest. The club released the Tirutsava Aftermovie 2022, and a video showing a glimpse of the South campus.

10.5.5 Freshers' Week

The Freshers Week for the 2022 batch students consisted of several events that spanned across all the cultural and sports clubs of the institute. On the last day, multiple stage performances were conducted including a flashmob. The event ended with the announcement of the Mr. and Ms. Fresher and DJ Night.



10.5.6 Fiesta

Fiesta, Intra IIT Cultural and Literary Meet 3.0 was conducted in the campus. With over 32 events, it was a keenly contested competition between five houses formed by the UG branches with the PG students being divided and added into the following five houses: Chaos, Kronos, Apollo, Hades, and Zeus. The theme of the Intra IIT Cultural Meet 3.0 was Greek Gods. Following the intense competition between the houses, the final winner was Chaos House. On the final day of Fiesta, all the stage events were conducted, which were finally closed by the announcement of the Fiesta Cup winners.



10.5.7 Ethnic Night

On the final day of Fiesta, along with the Fiesta Finale, Ethnic Night was also organised. Students dressed up in their ethnic wear which was then followed by a fashion show. An open mic was also conducted as part of the Ethnic Night, followed by DJ night.



10.5.8 Sankranti

Beautiful rangolis were made on the steps of the Open-Air Theatre. Early in the morning, the institute celebrated the warmth of the Bhogi Mantalu. Rasoi, the cooking club of our college, prepared Pongal in the authentic Andhra way. There was a tug of war, right after the Pongal was distributed and the evening saw a multitude of beautiful kites flying in the sky.



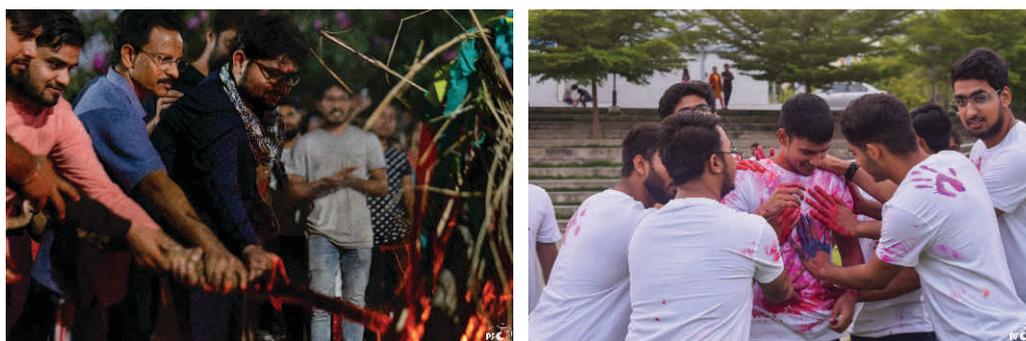
10.5.9 Prom Night

The night started with waltz and slow dance and ended with DJ night. On this occasion Rasoi club distributed donuts and cupcakes.



10.5.10 Holi

On the occasion of Holi, Holikad Dahan was organised. There were other events like hand printing and sweets were distributed. On the day of Holi, all students gathered at the Open-Air Theatre to play with colors and water.



10.5.11 Literati Club

The Literati Club consists of the Literary Affairs Committee, the Debate and Oratory Club, the Quizzing Club, and the Writing Club. The club is planning to expand its reach by making an online presence therefore, the club has set up three Instagram handles; Literati IITT, Scribbles IITT and Film Buffs IITT. The club organised events like Standpoint, and Open Debate Sessions.

The club also organised programs like "Have We Met Before?", Essay Writing Competition, Ease Your Pace, and Poetry Circle. The January 2023 edition of Udaan, a student-run campus magazine, was also published. The club has a dedicated discord server, where students can share their literary work and receive feedback from their fellow writers. The teams from the Debate and Oratory club participated in 11 inter-college events, including the Aristotle Cup, an international intervarsity debate tournament hosted by a university in the Philippines. The club has organised more than twelve parliamentary debate sessions, five casual oratory sessions and several impromptu events.

10.6 SPIC MACAY PROGRAMMES

10.6.1 Koodiyattam

The institute community witnessed a unique Koodiyattam performance by Smt. Kapila Venu accompanied by Kalamandalam Rajeev and Kalamandalam Narayanan Nambiar on Mizhavu and P Rajan on Edaka on 19th January 2023 at 06:00 pm in the Indoor Stadium.

10.6.2 Sitar Concert

On the evening of January 31, 2023, students, faculty, and staff gathered in TC22, CRC building, to listen to sitar maestro Pandit Kushal Das and tabla master Pt. Parimal Chakrabarty. The pure, unadulterated beauty of Pt Kushal Das's deft fingers speeding down the length of the sitar kept the listeners spellbound. Pt. Parimal Chakrabarty also added a lot of energy to the performance on his tabla.



10.6.3 Carnatic Music Concert

On the evening of February 4, 2023, an enthusiastic crowd gathered in the Indoor Stadium for the Carnatic Vocal Concert by Dr. S. Sowmya accompanied by Shri R K Shriramkumar on Violin and Shri Neyveli R Narayanan on Mridangam.

10.7 SPORTS ACTIVITIES

A sports council is central to the coordination and functioning of different sports activities under the supervision of the Sports Officer, Physical Training Instructor, and Faculty Advisor.

10.7.1 Freshers' Sports Meet

The Freshers' Sports Meet witnessed keenly contested matches between the students. Ranging from Basketball to Table Tennis, it was sheer enjoyment, and the winners got a boost for the other tournaments that followed in its wake.



10.7.2 A 3K Run

The Fitness Club of IIT Tirupati conducted a 3K Run on the occasion of National Sports Day.



10.7.3 Run for Unity

As per the guidelines of Higher Education, Ministry of Education guidelines, the Fitness Club of IIT Tirupati organised a Unity Run on the occasion of Sardhar Vallabhbhai Patel's birth anniversary. All our faculties, staff and students participated in this event.



10.7.4 Yoga Workshop

A yoga workshop was conducted on the campus by Ms. Prathiba, a yoga expert from Isha Foundation. The workshop was deeply informative and insightful and helped the participants to know more about yogic practices and the benefits of meditation.

10.7.5 Intra IIT Sports Meet Kridan 2023

Prof. K.N. Satyanarayan, Director IIT Tirupati, inaugurated Kridan 2023. The competitions were amongst the different hostels in the campus. A much anticipated event, Kridan lived up to the expectations as the students participated with utmost zeal and enthusiasm and upheld the spirit of competitiveness and sportsmanship.



11. APPENDICES

APPENDIX-I

RESEARCH PUBLICATIONS

Journals

Chemical Engineering

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11. Raghuramaraju, A. "Unique Position: India's Non-Alignment is rooted in the Non-Binary." *The Telegraph*, 13 February 2023.
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APPENDIX - II

CONFERENCE PROCEEDINGS/ PRESENTATIONS

Chemical Engineering

A. Maheshwari, **Shamik Misra**, R.D. Gudi, S. Subbiah, C. Laspidou, "Stochastic Optimization Model for Short-term Planning of Tanker Water Supply Systems in Urban Areas" *IFAC-PapersOnLine*, 55(7), 464-469, (2022).

Civil and Environmental Engineering

Aswani K. Haridas, Naga Siva Pavani Peraka, and **Krishna Prapoorna Biligiri.** "DOTNET: A Design Overlay Thickness Prediction Model for Asphalt Pavements Using Deep Neural Network Architecture." *National Conference on Resilient Infrastructure*, Trivandrum, Kerala, India, 16-17 September 2022.

Avishreshth Singh, Anush K. Chandrappa, and **Krishna Prapoorna Biligiri.** "Sustainable Pervious Concrete Pavement Technologies: Product Development & Evolution in India", *14th International Conference on Transportation Planning and Implementation*

Methodologies for Developing Countries, Indian Institute of Technology Bombay, India, 19-21 December 2022.

Avishreshth Singh, Anush K. Chandrappa, and **Krishna Prapoorna Biligiri**. "Evolution of Resilient Pervious Concrete Pavement Technologies in India", *National Conference on Resilient Infrastructure*, Trivandrum, Kerala, India, 16-17 September 2022.

Avishreshth Singh, **Krishna Prapoorna Biligiri**, and **Prasanna Venkatesh Sampath**. "Quantification of Effective Flow Resistivity for Parametric Assessment of Pervious Concrete by using Ultrasonic Pulse Velocity Method", *102nd Annual Meeting of the Transportation Research Board of the National Academies*, Washington, DC, USA, 8-12 January 2023.

Bawankule Pradip Damodhar, T. Pushparaj Gandhi, P. Amesh, **Shihabudheen M. Maliyekkal**. "Phosphate Functionalized Granular Iron-Chitosan Composite for the Adsorption of U(VI) from Groundwater", *International Conference on Water for Life*, IIT Madras, 15-17 September 2022.

Chaitanya Gubbala, Vinay H. Nanjegowda, Avishreshth Singh, and **Krishna Prapoorna Biligiri**. "A Cradle-to-Gate Lifecycle Assessment of Modified Asphalt-Rubber", *Rubberized Asphalt-Asphalt Rubber International Conference (RAR2022)*, Spain, 26-29 June 2022.

Chaitanya Gubbala, Vinay H. Nanjegowda, **Krishna Prapoorna Biligiri**, and Jorge B. Sousa. "Microstructural Characterization of Reacted and Activated Rubber", *Rubberized Asphalt-Asphalt Rubber International Conference (RAR2022)*, Malaga, Spain, 26-29 June 2022.

Divakar Raju P.V, **Nithyadharan M, Venkataraman P**. "Stress Concentration Studies in GFRP Considering Shear Non-Linearity: Experiments and Progressive Damage Modelling", *20th European Conference of Composite Materials*, ECCM'20, Switzerland, June 26-30 2022.

G. Vajitha, K.P. Madan, and S.M. Maliyekkal. "Capacitive De-ionisation(CDI): An Eco-friendly and Sustainable Desalination Technology", *35th Kerala Science Congress*, Mar Baselios Christian College of Engineering and Technology, Kerala, India, 12-14 February 2023.

Harmandeep Kaur, and Krishna Prapoorna Biligiri. "Compatibility Assessment of Composite Wastes with Crumb Rubber for Use in Paving Applications: Advanced Material Characterization & Chemical Assessment", *14th International Conference on Transportation Planning and Implementation Methodologies for Developing Countries*, Indian Institute of Technology Bombay, India, 19-21 December 2022.

H. Kasi, M. Bhanuprakash, P.K. Behera. "Relating the degradation of bond due to rebar corrosion using ultrasonic pulse testing," *Symposia in Corrosion in RCC*

structures, 28th International Conference and Expo on Corrosion, Corrosion in RCC Structures, Udaipur, India, 19-22 October 2022.

M. S. V. Naga Jyothi. "Self-granulated ALOOH-Nanocomposite for Enhanced Selenium Removal from Groundwater", *India-Dalhousie Student Research Symposium: Addressing Common Challenges via Research & Amp Innovation*, IIT Tirupati, 27 July 2023.

M. S. V. Naga Jyothi, P. Amesh, B.J. Ramaiah, and S.M. Maliyekkal. "Removal of Se(IV) and Se(VI) from Water by a Chitosan-ALOOH Granular Adsorbent", *International Conference on Water for Life*, IIT Madras, 15th - 17th December 2022.

Mattaparthi Sri Gangadhar, Nikitha Vootkuri, and Krishna Prapoorna Biligiri. "Development of a Zeolite-like Warm-Mix Asphalt Additive: Dosage Optimization and Binder Material Characterization", *102nd Annual Meeting of the Transportation Research Board of the National Academies*, Washington, DC, USA, 8-12 January 2023.

N. R. Madhuri Kashyap, G. Asaithambi, M. Treiber and V. Kanagaraj. "Calibration of Longitudinal Dynamics of Vehicles under Disordered Traffic", *Traffic and Granular Flow 2022*, IIT Delhi, India, October 2022.

Neetu Kumar, Avishreshth Singh, and Krishna Prapoorna Biligiri. "Numerical Simulation of Pavement Subbase Layer Modified with Recycled Concrete Aggregates and Tire Derived Aggregates", *The First International Online Conference on Infrastructures (IOCI 2022)*, Organized by MDPI Journals, 7-9 June 2022.

Neetu Kumar, Avishreshth Singh, and Krishna Prapoorna Biligiri. "Laboratory Investigation of Conventional and Rubber-Modified Asphalt Base / Subbase Course Mixtures: Characterization of Mechanical Performance and Moisture Susceptibility", *102nd Annual Meeting of the Transportation Research Board of the National Academies*, Washington, DC, USA, 8-12 January 2023.

V. Y Palagala, and **M. Nithyadharan**. "Modelling the Progressive Damage Behaviour of the Fibre Cement Boards", *20th European Conference of Composite Materials, ECCM'20*, Switzerland, 26-30 June 2022.

Poornachandra Vaddy, Namitha Sudan, and **Krishna Prapoorna Biligiri**. "Development of a Methodical Framework to Calculate Rational Height of the Riser Strip in Pervious Concrete Pavement Construction", *102nd Annual Meeting of the Transportation Research Board of the National Academies*, Washington DC, USA, 8-12 January 2023.

R. Sreetej, N. R. Madhuri Kashyap, and **G. Asaithambi**. "Vehicle Trajectory Prediction during Lateral Movements in Disordered Traffic Conditions", *102nd Annual Meeting of the Transportation Research Board of*

the National Academies, Washington DC, USA, 8-12 January 2023.

S. Venkateshappa, **G. Asaithambi**, and **V. Kanagaraj**. "An Approach to Identify Lateral Shift and its Duration under Disordered Traffic Conditions", *Recent Advances in Traffic Engineering (RATE 2022)*, SVNIT Surat, 11-12 November 2022.

S. M. Allabakshi, P. Srikar, **R. K. Gangwar**, and **S. M. Maliyekkal**. "Surface Dielectric Barrier Discharge: A Potential Plasma Reactor System in Treating Textile Wastewater" to the *Conference on Desalination, Brine Management and Water Recycling (DeSaltM 23)*, IIT Bombay, 21-22 July 2023.

S. M. Allabakshi, P. Srikar, **R. K. Gangwar**, and **S. M. Maliyekkal**. "Photo-Plasma: A Breakthrough Approach for Nullifying Scavenging Effect and Enhanced Removal of a Textile Dye in Wastewater", *Indo-Canadian Symposium on Water Management: Sustainability & Impact of Climate Change*, IIT Tirupati, 6th March 2023.

S. M. Allabakshi, P. Srikar, **R. K. Gangwar**, and **S. M. Maliyekkal**. "Energy Efficient Degradation of Dye in Wastewater by a Novel Photo-Plasma Reactor" *VII International Conference on Sustainable Energy and Environmental Challenges (VII SEEC)*, IIT BHU, 16-18 December 2022.

Sandhya Makineni, Avishreshth Singh, and **Krishna Prapoorna Biligiri**. "Lifecycle Assessment of Permeable Interlocking Concrete Pavement and Comparison with Conventional Mixes", *The First International Online Conference on Infrastructures (IOCI 2022)*, Organized by MDPI Journals, 7-9 June 2022.

C. S. S. U Srikanth, **B. J. Ramaiah**, A. M. Krishna, and S. K. Vanapalli. "Efficacy of Pond Ash as a Cover Material in Single and Dual Capillary Barriers", 2023.

Syed Arwa A. Balkhi, S. M. Allabakshi, P. Srikar, **R. K. Gangwar**, and **S. M. Maliyekkal**. "Atmospheric Pressure Non-Thermal Plasma: A Chemical-Free Approach for Antibiotics Degradation in Wastewater" *VII International Conference on Sustainable Energy and Environmental Challenges (VII SEEC)*, IIT BHU, 16-18 December 2022.

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Vinay H. Nanjegowda, and **Krishna Prapoorna Biligiri**. "Re-engineered Asphalt-Rubber: Product Development & Characterization", *Rubberized Asphalt-Asphalt Rubber International Conference (RAR2022)*, Spain, 26-29 June 2022.

Computer Science and Engineering

A. Eashaan Rao, and **S. Chimalakonda**. "Apples, Oranges & Fruits - Understanding Similarity of Software Repositories Through the Lens of Dissimilar Artifacts." *38th IEEE International Conference on Software Maintenance and Evolution (ICSME)*, Cyprus, October 2022.

Abhishek Kumar, Deep Ghadiyali, **Sridhar Chimalakonda**, and Akhila Sri Manasa Venigalla. "SOCluster Towards Answering Unanswered Questions on Stack Overflow via Answered Questions." *16th Innovations in Software Engineering Conference*, 2023.

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Kowndinya Boyalakuntla, **Marimuthu Chinnakali**, **Sridhar Chimalakonda** and K Chandrasekharan. "eGEN: An Energy-Saving Modeling Language and Code Generator for Location-Sensing of Mobile Apps." *30th ACM Joint European Software Engineering Conference and Symposium on the Foundations of Software Engineering*, 2022.

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Prabhleen Kukreja, and **V. Mahendran**. "Communication Efficient Synchronous Federated Learning Framework - An RL Perspective." *N2Women '22: ACM SIGCOMM Networking Networking Professional Workshop*, Amsterdam, Aug 2022.

Prantik Parashar Sarmah, and **Sridhar Chimalakonda**. "API+ Code= Better Code Summary? Insights from an Exploratory Study." *18th International Conference on Predictive Models and Data Analytics in Software Engineering*, 2022.

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S. Shanbhag, and **Sridhar Chimalakonda**. "Exploring the Under-Explored Terrain of Non-Open-Source Data for Software Engineering through the Lens of Federated Learning." *30th ACM Joint European Software Engineering Conference and Symposium on the Foundations of Software Engineering*, 2022.

S. Shanbhag, **S. Chimalakonda**, V. S. Sharma, & V. Kaulgud. "eTagger - An Energy Pattern Tagging Tool for GitHub Issues in Android Projects." *38th IEEE International Conference on Software Maintenance and Evolution (ICSME)*, Cyprus, October 2022.

S. Shanbhag, **Sridhar Chimalakonda**, Vibhu Saujanya Sharma, and Vikrant Kaulgud. "Towards a Catalog of Energy Patterns in Deep Learning Development." *International Conference on Evaluation and Assessment in Software Engineering*, 2022.

Samuel Neumann, Sungsu Lim, **Ajin George Joseph**, Yangchen Pan, Adam White, Martha White. "Greedy Actor-Critic: A New Conditional Cross-Entropy Method for Policy Improvement." *International Conference on Learning Representation (ICLR)*, 2023.

Sripranav Mannepalli, **Ravi Venkata Sai Maheswara Reddy Satti**, **Rohit Shakya**, and **Kalidas Yeturu**. "Multiple Object Tracking Based on Temporal Local Slice Representation of Subregions." *7th International Conference on Computer Vision and Image Processing CVIP*, 2022.

Venigalla, Akhila Sri Manasa, Kowndinya Boyalakuntla, and **Sridhar Chimalakonda**. "GitQ-Towards Using Badges as Visual Cues for GitHub Projects." *IEEE/ACM 30th International Conference on Program Comprehension (ICPC)*, 2022.

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A. S. Kartheek Bandi and **P. Vooka**. "A New Measurement Technique to Determine the Amplitude and Phase Shift of a Sinusoidal Voltage Signal Using a Charge Balanced Digitizer," *2022 IEEE International Instrumentation and Measurement Technology Conference (I2MTC)*, Ottawa, ON, Canada, 16-19 May 2022.

A. V. N. Devi, P. N. S. Bhargav, S. Khandelwal, **V. K. Gurugubelli** and S. Karmalkar. "Numerical Simulation and Parameter Extraction of Pure Thermionic Emission Across Schottky Contacts," *2022 IEEE International Conference on Emerging Electronics (ICEE)*, Bangalore, India, 11 Dec - 14 Dec 2022, pp. 1-5, doi: 10.1109/ICEE56203.2022.10117821.

Arun Kumar S, Abhijit P, Konda Reddy Mopuri, and **Rama Krishna Gorthi**. "Adv-Cut Paste: Semantic Adversarial Class-Specific Data Augmentation Technique for Object Detection" *International Conference in Pattern Recognition (ICPR)*, August 2022.

Gorthi Rama Krishna, **K. P. Naveen**, **N. N. Murty**, **Pooja Vyavahare**, **P. S. Sai Krishana**, and **Subramanyam Gorthi**. *1st Indo-Norway Workshop on Emerging Learning Methods & Systems (ELMS)*, 15 – 17 July 2022.

Goutam Ghosh, S. Vyapari and **R. Viju Nair**. "Comparison of Modeling Approaches for LLC Resonant Converter Based on Extended Describing Function," *2023 IEEE 11th International Conference on Power Electronics (ICPE) ECCEAsia*, 2023.

J. D. Kumar, **P. Mohapatra** and N. Pappas. "Short Packet Communication over a Two-user Z-Interference Channel with Rayleigh Fading," *GLOBECOM 2022 - 2022 IEEE Global Communications Conference*, Rio de Janeiro, Brazil, 04 Dec - 08 December, 2022. pp. 4746-4751, doi: 10.1109/GLOBECOM48099.2022.10001007.

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P. Mohapatra. "Incorporating Physical Layer Security in 6G Security Protocols", *2022 IEEE Future Networks World Forum (formerly) 5G World Forum*, Montreal, Canada, 12th October 2022.

M. Murali and **Rama Krishna Gorthi**. "Visual Object Challenge Results 2022", *European Conference on Computer Vision (ECCV)*, October 23-27, 2022.

P. Makireddy and **P. Vooka**. "A Three-Electrode Capacitive Based Sensing System to Determine the Direction of Motion of Humans," *2022 IEEE Sensors Applications Symposium (SAS)*, Sundsvall, Sweden, 01-03 August 2022, pp. 1-6, doi: 10.1109/SAS54819.2022.9881369.

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U. Somalatha, **P. Mohapatra** and N. Pappas. "Performance Analysis of the Wiretap Channel with a Friendly Jammer under Finite Blocklength," *2022 IEEE Globecom Workshops (GC Wkshps)*, Rio de Janeiro, Brazil, 4-8 December, 2022, pp. 239-244, doi: 10.1109/December6602.2022.10008520.

Mechanical Engineering

Abhishek Parida, Sunku Prasad Jenne, and **Muthukumar P.** "A Simple Dynamic Model for Predicting the Absorption and Desorption Behaviour of Metal Hydride System", *World Hydrogen Energy Conference-2022*. Istanbul, Turkey, 26-30 June 2022.

Abiram Gummala, Himanshu Singh, and **Madan Mohan Avulapati.** "A Model for Prediction of Inflight Micro Explosion in Bi-Component Fuel Droplets", *ILASS-Asia 2022*, Indore, 28-30 October 2022.

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Gourav Parmar, Vignesh Kumar D, Jan Jedelsky and **Madan Mohan Avulapati.** "Experimental Studies on Effect of Neighbouring droplets on evaporation of aqueous ammonia and Monoethanolamine (MEA) droplets", *ILASS-Asia 2022*, Indore, October 28-30, 2022.

Juri Sonowal, Dhanraj Kadwal, **Muthukumar P.** and Anandalakshmi R. "Thermo-Economic Study of a Solar Assisted Liquid Desiccant System for Orchid Cultivation", *Energy Summit 2022*, IIT Madras, Dec 8-9, 2022.

L. Suswanth and **G. K. Rajan.** "Estimation of Interfacial Wave Dissipation Rate Using a Viscoelastic Model for the Middle Fluid Layer in a Three Fluid System", *Fifth International Conference on Mathematical Modelling, Applied Analysis and Computation (ICMMAAC)* organized by the Department of Mathematics, JECRC University, Jaipur, India, 4-6 Aug 2022.

M. S. Bhaskaran and **G. K. Rajan.** "On the Non-Newtonian Rheology of Interfacial Films for Use in Wave Dissipation Models", *AIP Conference Proceedings*, volume 2584, 2023.

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Pratibha Maurya, Sunita Deb, **Muthukumar P.** and Anandalakshmi R. "Combustion Characteristics of Methanol Vapour-air in Porous Media Burner for Cooking Application", presented at *Energy Summit 2022*, IIT Madras, 8-9 December 2022.

A. Ramesh, A. Rangamani, and **S. Sundar.** "Influence of Contact Parameters on the Radiated Noise from an Automotive Drum Brake", Institute of Noise Control Engineering, *INTER-NOISE and NOISE-CON Congress and Conference Proceedings* (Vol. 265, No. 6, pp. 1173-1178).

K. M. R. Shripad, **S. Sundar**, and S. S. Suryawanshi. "Development of Experimental Vibro-Acoustic Transfer Function for a System with Impact", Institute of Noise Control Engineering, *INTER-NOISE and NOISE-CON Congress and Conference Proceedings* (Vol. 265, No. 7, pp. 803-808).

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Siddhesh Pujari and **G. K. Rajan.** "Estimation of Coefficient of Damping for Sloshing in Rectangular Tanks using CFD", *Sixty-Seventh Congress of the Indian Society of Theoretical and Applied Mechanics (ISTAM)*, Indian Institute of Technology Mandi, HP, 15 December 2022.

Vignesh Kumar D, Ondrej Cejpek, Jan Jedelsky and **Madan Mohan Avulapati.** "Evaluation of Air Assisted Impinging Jet Atomization for CO₂ capture", *ILASS-Asia 2022*, Indore, October 28-30, 2022.

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S. Achar, A. Kundu, R. Kapri and A. Sharma. "Progress Towards a Cold Atomic Vapor Based Entangled Photon Pair Source for use in Scalable Quantum Networks", *XLV Annual Symposium of OSI Conference on Optics, Photonics, and Quantum Optics COPaQ-2022* (Conference on Optics, Photonics & Quantum Optics), IIT Roorkee, India, November 10-13, 2022.

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D. P. Challa. "Recovering the Index of Refraction by Embedding Small Inclusions", *International Conference on Analysis, Inverse Problems and Applications ICAIPA-2022*, IIT Madras, Chennai, 18-21 July 2022.

D. P. Challa. "Acoustic Wave Propagation by Small Bodies and Applications", *MWSW02-Theory of Wave Scattering in Complex and Random Media as a Part of the Program on Mathematical Theory and Applications of Multiple Wave*, ISAAC NEWTON INSTITUTE(INI), CAMBRIDGE, UK, 20-24 March 2023.

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I. Das. "Introduction to Machine Learning with Applications to Air Pollution Data", *Workshop on Data Science Techniques*, Sri Padmavati Mahila Visvavidyalayam, Tirupati, India, 12th March 2023.

I. Das and D. Thakur. "Statistical Assessment of Spatial-Temporal Impact of Covid-19 Lockdown on Air Pollution Using Different Modelling Approaches in India, 2019-2020", *International Workshop on Integrated Approaches of Stochastic Modelling and Data Science for Sustainable Development*, SVU Tirupati, India, 07-11 September 2022.

K. Kishore, and Anupam Singh. "Matrix Waring Problem", *Workshop on Group Theory 2023*, IISER Pune, India, 13-14 January 2023.

P. Mariappan, and Snehil Srivastava. "Hyperbolic Lattice Boltzmann Method and Multiple Relaxation Time Discrete Boltzmann Method for Solid-Liquid Phase Change Problem", *ESCO Conference 2022*, Pilzen, Czech Republic, 13-17 June 2022.

S. A. Prasad. "Node Insertion in Coalescence Fractal Interpolation Function", *7th Cornell Conference on Analysis, Probability, and Mathematical Physics on Fractals*, Cornell University, Ithaca, USA, 04-08 June 2022.

S. Banerjee, K. Biswas, S. Kumar, and A. Pandey. "Smooth Maximum Unit: Smooth Activation Function for Deep Networks Using Smoothing Maximum Technique", *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, New Orleans, USA, 19-24 June 2022.

S. Bhattacharya, **I. Das**, and M. Kunnummal. "Modified Bivariate Weibull Distribution Allowing Instantaneous and Early Failures", *International Conference on Statistics, Probability, Data Science and Related Areas*, Cochin University of Science and Technology, Cochin, 04-06 January 2023.

S. Rajesh. "Fixed point property of Non-Expansive Mappings", *Trends in Analysis and Topology*, MNIT Jaipur, 8-12 September 2022.

S. A. Prasad. "Node Insertion in Coalescence Hidden-Variable Fractal Interpolation Surface", *ICFG 2022: 16. International Conference on Fractal Geometry*, Vienna, Austria (Virtual), 23-24 June 2022.

S. Banerjee, K. Biswas, S. Kumar, and A. Pandey. "SAU: Smooth Activation Function Using Convolution with Approximate Identities", *European Conference on Computer Vision*, Tel Aviv, Israel, 22-27 October 2022.

Humanities and Social Sciences

A. Raghuramaraju. "Self in Slavery Aspiring Svaraj: Revisiting the Debate between Guru Dev Rabindranath Tagore and Mahatma Gandhi," in an *International Conference on Sociality of Selfhood: Varieties of Life Writing in South Asia*, organised by Government College for Women, Srinagar, 5th June 2022, online.

C. S. Bahinipati, and A.K. Gupta. "Methodological Challenges in Assessing Loss and Damage from Climate-Related Extreme Events and Slow-Onset Disasters: Evidence from India", presented at the International Conference on 'Multi-Hazard Risk and Loss and Damage Assessment Framework Consultative Conference', *International Centre for Integrated Mountain Development (ICIMOD)*, Kathmandu, Nepal, December 8-9, 2022.

C. S. Bahinipati, and A.K. Gupta. "Methodological Challenges in Assessing Loss and Damage from Climate Change: Evidence from India", presented at the *International Conference on 'Water Security and Climate Change Conference (WSCC2022)*', Asian Institute of Technology, Thailand, December 1-3, 2022.

C. S. Bahinipati, and **D. Biswal**. "Risk Aversion, Safety Nets, and Food Security: Empirical Evidence from Crop-Insurance in India", presented at *Multidimensional Poverty, Food Security and the Role of Safety Nets in India*, Indian Institute of Technology Bombay, Mumbai, India, March 20 2023.

C. S. Bahinipati, and S. Das. "Odisha: Environment, Climate change and Natural Disaster" presented at *OEA's Odisha Vision 2036 Conclave*, NISER, Bhubaneswar, India, January 12-14, 2023.

C. S. Bahinipati. "Application of Climate Risk Management Framework: Evidence from Tamil Nadu and Himachal Pradesh" presented at the *Expert Dialogue on Approaches for Mainstreaming Climate Risk Assessments*, National Institute of Disaster Management, New Delhi, India, September 14, 2022.

C. S. Bahinipati. "Speaking from Field Experience: Impact of COVID-19 on Informal Workers in India", presented at the *JSPS-ICSSR Joint Seminar on 'Understanding and Addressing Systemic Risks Behind the Socio-economic Impacts of COVID-19 in India and Japan: Developing a Roadmap for a Resilient and Sustainable Future'*, Tokyo, November 21-22, 2022.

C. S. Bahinipati, P. K. Viswanathan, and A. Singh. "Adoption of Climate-Smart Agricultural Practices in India: Assessing the Role of Institutions, Incentives and Information", presented at the *International Conference on 'System Analysis for Enabling Integrated Policy Making'*, *International Institute for Applied System Analysis (IIASA) and TIFAC*, Government of India, Scope Convention Centre, New Delhi, August 10-12, 2022.

C. S. Bahinipati, P. K. Viswanathan, and A. Singh. "Institutions, Incentives and Information: Adoption of Farm-level Adaptation Measures in India" presented at the *3rd Ostrom Retreat* titled "Resilient Community Irrigation Management in Context of Climate Change and Multifunctional Rural-Urban Water Use Competition in Asia", at Asian Institute of Technology, Bangkok, Thailand, June 24-27, 2022.

C. S. Bahinipati, U. Patnaik and A. Senapati. "Building Resilient States to Climate-related Extreme Events in India: Evidence from Floods" presented at the *Pre-Event of 'Resilience and Sustainability Summit: Vision 2047'* - Selected as Springer Nature Award during 'Resilience and Sustainability Summit: Vision 2047', New Delhi, India, January 17-19, 2023.

D. Biswal, and **C. S. Bahinipati**. "Climate Risk Management through Crop-Insurance in India", presented at the *3rd Ostrom Retreat* titled "Resilient Community Irrigation Management in Context of Climate Change and Multifunctional Rural-Urban Water Use competition in Asia", at Asian Institute of Technology, Bangkok, Thailand, June 24-27, 2022.

D. Biswal, and **C. S. Bahinipati**. "Risk Aversion, Adoption of Safety Nets and Food Security in India: Interlinkages between Crop-Insurance and Crop Diversification" presented at *6th SANEM Annual Economists' Conference (SAEC) 2023* on 'Building Resilience to Shocks: Priorities, Challenges and Prospects', Dhaka, Bangladesh, February 4-5, 2023.

Gouthami Kothakapa, and **Rahul A. Sirohi**. "Capital as Power: An Alternative Reading of India's Post-2011 Economic Slowdown", *26th Annual Conference of the Indian Political Economy Association* hosted by GITAM University, Visakhapatnam 17-18 Feb 2023.

I. Hagen, S. Allen, **C.S. Bahinipati**, H. Frey, C. Huggel, V. Karabaczeck, S. Kienberger, R. Mechler, L. Menk and T. Schinko. "An International Perspective on Comprehensive Climate Risk Management: Experiences from Peru, India and Austria", presented at EGU 2022 Conference, Vienna, Austria, May 23-27, 2022, 10.5194/egusphere-egu22-6038.

P. Halder, and **B. M. Kachhap**. "Prahelika and Vyuha: Warped Spaces and Cartographic Fear in Indian Magical Realist Cinema", presented at *12th Annual Academic Conference* of Dept. of HSS, IIT Madras. March 11-12, 2023.

Malavika, and **B. M. Kachhap**. "Asexual Nationalism and Indian Cinema: A Queer Reading of Nationalistic Narrations", presented at *International Young*

Researchers' Conference: New Research in English Studies, EFLU Hyderabad. April 26-28, 2023.

Malavika, and **B. M. Kachhap**. "Asexuality and Nationalism in Indian Visual Narratives", presented at *PanACEa 2022: Asian Asexual Conference*, October 30, 2022.

Niskala Sekhar, and **Rahul A. Sirohi**. "The Revolution Will Not be Colour Blind: The Enduring Relevance of Anti-Apartheid Voices", *72nd Political Studies Association International Conference* organised by University of York, UK, 11-13 April 2022 (online).

P. K. Verma, and **P. S. Dwivedi**. "Revisiting the Eco-Spiritual Wisdoms of the Rāmāyaṇa: An Aesthetical Exploration", *Inaugural Conference on "Evolution of Spirituality"* organised by Harvard Divinity School, Cambridge, MA, USA, on 27-30 April 2022.

P. S. Dwivedi. "A Phronesthetic Reading of Thirukkural and Śatakātṛaya on the Comparative Scale", *18th World Sanskrit Conference* hosted by the Australian National University, Canberra, Australia (January 9 -13, 2023), January 12, 2023.

P. S. Dwivedi. "Nation, Religion, and Coloniality: Understanding the Role of Hinduism in Shaping India as a Nation," at *ICSSR sponsored National Conference* on 'Nation, Nationhood and Nationalism: A Discourse on Early Indian English Literature 1794 to 1950', Manonmaniam Sundarnar University, Tirunelveli, Tamilnadu, March 27-29, 2023.

Prabhakar, SVRK, Y. Chiba, A.P. Abamo, **C. S. Bahinipati**, Md. A. Islam and S. Shrestha. "Addressing Non-Economic Loss and Damages (NELDs) Associated with Climate Change with a Special Focus on Extreme Events" presented at the *Virtual Contributor Workshop on 'Linking Climate Change Adaptation, Disaster Risk Reduction, and Loss & Damage'*, Asia-Pacific Network for Global Change Research, Japan, August 30, 2022.

Rahul A. Sirohi and Sonya S. Gupta. "Latin American Development Thought in a Comparative Perspective", *8th ALAHPE Conference* organised by University de la Republica, Montevideo, Uruguay, 20-22 April 2022 (online).

M. Singh, and **C. S. Bahinipati**, "Household Appliance Ownership in Urban India: Do Gender and Neighbourhood Effect Matter?" presented at the *11th Congress of the Asian Association of Environmental and Resource Economics (AAERE)*, University of Economics, Ho Chi Minh city, Vietnam, August 19-20, 2022.

APPENDIX- III

INVITED LECTURES DELIVERED BY THE IITT FACULTY MEMBERS

Chemical Engineering

1. **Anil Vir:** **Multiphase Flow and Reactions in Micro Reactors** (Rajalakshmi Engineering College Chennai).
2. **Narendra Singh:** **Social Issues and the Environment** (Sree Vidyanikethan Engineering College, Tirupati).
3. **Thamida Sunil Kumar:** **Moving Boundary Patterns in Various Processes** (Uranium Corporation of India Ltd, Kadapa).
4. **Thamida Sunil Kumar:** **Modeling and Simulation of Multiphysics Processes** (JNTU Pulivendula).
5. **Trivikram Nallamilli:** **Role of Colloid Science in Food Industry History and Future Perspectives** (GMR Institute of Technology, Rajam, Srikakulam, Andhra Pradesh).

Civil and Environmental Engineering

1. **Krishna Prapoorna Biligiri:** "Circularity in Pavement Systems Engineering: Towards Mechanistic Designs and Sustainability in Transportation Infrastructure", Online Webinar: Decarbonization of India's Transportation System, Indian Institute of Technology Kharagpur, India, 22 March 2023.
2. **Krishna Prapoorna Biligiri:** "Integrating Mechanistic Roadway Designs with Lifecycle Assessment: Moving Towards Achieving Sustainability in Pavement Technology", Online Short-Term Training Program, Recent Developments and Advancements in Transportation Engineering (RDATE 2023), National Institute of Technology Calicut, Kerala, India, 13 March 2023.
3. **Krishna Prapoorna Biligiri:** "Asphalt-Rubber Pavement Systems: Advanced Research & Futuristic Designs for Implementation", Meeting with Ministry of Transport, Communications and Information Technology, Sultanate of Oman, Muscat, Oman, 5 March 2023.
4. **Krishna Prapoorna Biligiri:** "Panel Discussion: Advancement in Tyre, Rubber, RCB and Pyrolysis to Achieve Zero Emission", MRAI's 10th International Material Recycling Conference 2023, Grand Hyatt Kochi, Bolgatty Kerala, 2 February 2023.
5. **Krishna Prapoorna Biligiri:** "Quantification of Effective Flow Resistivity for Parametric Assessment of Pervious Concrete by using Ultrasonic Pulse Velocity Method", 102nd Annual Meeting of the Transportation Research Board of the National Academies, Washington, DC, USA, 8-12 January 2023.
6. **Krishna Prapoorna Biligiri:** "Development of a Methodical Framework to Calculate Rational Height of the Riser Strip in Pervious Concrete Pavement Construction", 102nd Annual Meeting of the Transportation Research Board of the National Academies, Washington, DC, USA, 8-12 January 2023.
7. **Krishna Prapoorna Biligiri:** "Laboratory Investigation of Conventional and Rubber-Modified Asphalt Base / Subbase Course Mixtures: Characterization of Mechanical Performance and Moisture Susceptibility", 102nd Annual Meeting of the Transportation Research Board of the National Academies, Washington, DC, USA, 8-12 January 2023.
8. **Krishna Prapoorna Biligiri:** "Development of a Zeolite-like Warm-Mix Asphalt Additive: Dosage Optimization and Binder Material Characterization", 102nd Annual Meeting of the Transportation Research Board of the National Academies, Washington, DC, USA, 8-12 January 2023.
9. **Krishna Prapoorna Biligiri:** "Sustainable Pervious Concrete Pavement Technologies: Product Development & Evolution in India", 14th International Conference on Transportation Planning and Implementation Methodologies for Developing Countries, Indian Institute of Technology Bombay, India, 19-21 December 2022.
10. **Krishna Prapoorna Biligiri:** "Futuristic Advanced Pavement Systems for Sustainable Built Environment", 14th International Conference on Transportation Planning and Implementation Methodologies for Developing Countries, Indian Institute of Technology Bombay, India, 19-21 December 2022.
11. **Krishna Prapoorna Biligiri:** "Asphalt-Rubber Pavement Systems: Advanced Research & Futuristic Designs for Implementation", Board Meeting, Tinnu Rubber and Infrastructure Limited, New Delhi, India, 17 December 2022.
12. **Krishna Prapoorna Biligiri:** "The Art & Science of Publishing: Let THAT be fun!", Workshop on How to Publish Scholarly Books & Open Access, National Sanskrit University Tirupati, Co-Sponsored by Taylor & Francis Group, UK, Tirupati, Andhra Pradesh, India, 24 November 2022.
13. **Krishna Prapoorna Biligiri:** "Sustainable Roadway Technologies in the Pursuit to Create Green Environment", International Conference on Multidisciplinary Research (ICMR 2022), Sharnbasva University in association with IETE Kalaburgi Subcentre, Kalaburagi, Karnataka, India, 22 November 2022.
14. **Krishna Prapoorna Biligiri:** "Best Strategies to Mitigate Waterlogging in Urban Areas", Mumbai Metropolitan Region Global Solution Summit 2022, A Summit Focusing on the Development Plan for Greater Mumbai, Mumbai, Maharashtra, India, 15 October 2022.

15. **Krishna Prapoorna Biligiri:** "Recycled Rubber in Road Pavements: Product Development & Futuristic Designs", International Online Conference on Reuse, Recycling, Upcycling, Sustainable Waste Management and Circular Economy(ICRSC – 2022), 9 September 2022.
16. **Krishna Prapoorna Biligiri:** "Asphalt-Rubber Pavement Systems: Advanced Research & Futuristic Designs", Adani Group of Industries, Sponsored by Tinna Rubber Infrastructure Limited, 18 August 2022.
17. **Krishna Prapoorna Biligiri:** "Microstructural Characterization of Reacted and Activated Rubber", Rubberized Asphalt-Asphalt Rubber International Conference (RAR2022), Malaga, Spain, 26-29 June 2022.
18. **Krishna Prapoorna Biligiri:** "Re-engineered Asphalt-Rubber: Product Development & Characterization", Rubberized Asphalt-Asphalt Rubber International Conference (RAR2022), Spain, 26-29 June 2022.
19. **Krishna Prapoorna Biligiri:** "A Cradle-to-Gate Lifecycle Assessment of Modified Asphalt-Rubber", Rubberized Asphalt-Asphalt Rubber International Conference (RAR2022), Spain, 26-29 June 2022.
20. **Krishna Prapoorna Biligiri:** "Pervious Concrete Pavements: Applications in Low-Volume Roadway Systems", International Conference on New Technologies and Sustainable Materials in Construction of Rural Roads (Low Volume Roads) and Bridges, Organized by National Rural Infrastructure Development Agency, Ministry of Rural Development, Government of India, 24-26 May 2022.
21. **Krishna Prapoorna Biligiri:** "Low-Impact Development Advanced Pavement Systems", 2nd International E-Conference on Novel Innovations and Sustainable Development in Civil Engineering (NISDCE 22), Organized by Vel Tech Rangarajan Dr. Sagunthala R&D Institute of Science and Technology, Chennai, Tamil Nadu, India, 1 April 2022 (Keynote Presentation).
22. **Prasanna Kumar Behera:** "Understanding the Corrosion of Strained Reinforcing Steel Bars: A Step Towards Obtaining an Accurate Estimate of Service Life", RYC South Asia Webinar on Sustainability through Durability, RILEM, May 24, 2022.
23. **Prasanna Kumar Behera:** "Towards Obtaining an Accurate Estimate of Service Life of Concrete Structures Subjected to Rebar Corrosion", Faculty Development Programme (FDP) on Advances in Sustainable Construction Materials and Technologies, July 19, 2022 (Organizers: NIT Warangal and BITS Hyderabad).
24. **Shihabudheen M Maliyekkal:** "Nanotechnology-Enabled Point-of-Use Sustainable Water Treatment Systems", at the 7th Sustainable Energy and Environmental Challenges (VII-SEEC) Conference by the International Society of Energy Environment and Sustainability (ISEES) held on December 16 – 18, 2022, at IIT (BHU), Varanasi.

Computer Science and Engineering

1. **Jaynarayan T Tudu:** "Dependable AI Accelerator", IIT Bombay.
2. **Jaynarayan T Tudu:** "Hardware Accelerator for AI and ML." CMR Institute, Hyderabad, April 2022.
3. **Kalidas Y:** "CRE College - Inaugural of Association of Computer Science and Engineering." Chadalawada Ramanamma Engineering College, 13 Apr 2022.
4. **Mahendran V:** "Machine Learning concepts in RL" Saveetha Engineering College, Chennai, 25 June 2022.
5. **Mahendran V:** "Multi Armed Bandits for IoTs and Sensors Networks." SSN College of Engineering, Chennai, 16 March 2023.
6. **Mahendran V:** "One-Day Hands-on Workshop on Reinforcement Learning." Sri Sai Ram Engineering College, Chennai 25 November 2022.
7. **Mahendran V:** "Reinforcement Learning in Networking." Sri Indu College of Engineering and Technology, Hyderabad, 21 September 2022.
8. **Mahendran V:** "Reinforcement Learning Through Multi Armed Bandits." Sri Indu College of Engineering and Technology, 23 Feb 2023.
9. **Mahendran V:** "The Science Behind Reinforcement Learning." Saveetha Engineering College, Chennai, 2022.
10. **Mahendran V:** "Understanding Optimization Techniques of ML." Vellore Institute of Technology, Chennai, 19 August 2022.
11. **Sridhar Chimalakonda:** "The Crossroads of AI for SE and SE for AI—What's Happening and Where Are We Going?" SVKM Shri Vile Parle Kelavani Mandal (SVKM) Institute of Technology, Dhule, 28 November 2022.
12. **Sridhar Chimalakonda:** "Trends in Artificial Intelligence + Software Engineering." Sri Rama Engineering College, Tirupati 25 November 2022.
13. **Sridhar Chimalakonda:** "Trends in Artificial Intelligence and Software Engineering." Rajiv Gandhi University Of Knowledge Technologies, RK Valley Idupulapaya, 1 December 2022.
14. **Venkata Ramana Badarla:** "Grand Challenges for a Student of Computer Science and Engineering." Annamacharya Institute of Science and Technology, Tirupati 24 November 2022.
15. **Venkata Ramana Badarla:** "Software Defined Networking: An effective way of networking." Sree Rama Engineering College, Tirupati, 28 November 2022.

Electrical Engineering

1. **Parthajit Mohapatra:** "Short Packet Communication: Fundamentals and its Applications to Wireless Communication" Department of EE, IIT Indore, 17-23 March 2022.

- Parthajit Mohapatra:** "Short Packet Communication under Random Arrival of Data" at Centre for Networked Intelligence (CNI) seminar series, IISc Bangalore on 28th March 2023.
- Pooja Vyavahare:** "Analysis of bundling OTT (video) Content with Internet Service in an ISP Market" at Twenty-Ninth National Conference on Communications (NCC)- 2023 at IIT Guwahati on 25th February 2023.
- Pooja Vyavahare:** "Opinion Dynamics in Networks with Trust-Mistrust Interactions" at Centre for Networked Intelligence (CNI) Seminar Series, IISc Bangalore on 27th September 2022.
- Pooja Vyavahare:** "Social and Distributed Learning" in 1st Indo-Norway Workshop on Emerging Learning Methods and Systems (ELMS 2022) organized by IIT Tirupati and University of Agder (UiA), Norway on 17th July 2022.
- Vijaya Kumar Gurugubelli:** "Electrostatics of Bulk versus Nanoscale Junctions," in the 2022 IEEE International Conference on Emerging Electronics (ICEE), Bangalore, India, from 11 Dec - 14 Dec 2022.
- G. Roy:** "Smart Molecules for the Detoxification of Environmental Pollutants" in INDO-GERMAN "International Conference on Sustainable Chemistry - 2023", Organized by the Department of Chemistry, IIT Indore, India, 22 & 23 February 2023.
- G. Roy:** "Synthetic Sulfur and Selenium compounds in Metal Homeostasis & Detoxification" in the "Main Group Chemistry (MGC) International Webinar on Group 16 elements in Chemical Biology", Organizers: Prof. Michio Iwaoka (Tokai University, Japan), Prof. David G. Churchill (Editor-In-Chief at Main Group Chemistry (IOS), 19 May 2022.
- P. Gandeepan:** "Carbonyl Group Directed C-H Activation for Organic Synthesis." *National Level Seminar on Recent Advances in Chemistry*, P. G. and Research Department of Chemistry, K. M. G. College of Arts and Science, Gudiyatham, Vellore, Tamil Nadu, 23 August 2022.
- P. Gandeepan:** "Carbonyl Group Directed C-H Activation for Organic Synthesis." in SERB-DST sponsored Online Two-Day Workshop for Faculty Development Program on Strategies in Organic Synthesis, Department of Chemistry, NIT Warangal, Andhra Pradesh, 6-7 May 2022.

Mechanical Engineering

- G. K. Rajan:** "Understanding and Modeling the Dissipation of Interfacial Waves". Geophysical Fluid Laboratory Seminar Series, Indian Institute of Technology Madras, 15 Dec 2022.
- G. K. Rajan:** "Discussion of a Theoretical Model to Estimate the Damping Rates of Interfacial Waves". Faculty Development Program on Mathematical Modelling in Physical Sciences & Engineering, organized by the Academic Staff College in association with the School of Advanced Sciences, Vellore Institute of Technology, Vellore, Tamil Nadu, 06 Jan 2023.

Chemistry

- A. K Manna:** "Modelling Excited-State Properties in Functional Organic Molecules." *Current Trends in Theoretical Chemistry (CTTC-2022)*, BARC, Mumbai, India, 22-24 September 2022.
- A. K. Manna:** "Photophysical Properties of π -Conjugated Molecules from Range-Separated Hybrid." *Theoretical Chemistry Meeting: Structure and Dynamics (TCMSD-2022)*, IACS, Kolkata, India, 26-29 May 2022.
- G. Roy:** "Biomimetic Studies for the Detoxification of Environmental Pollutants" in "National Conference on Chalcogenide Compounds and Applied Chemistry", Organized by Department of Applied Chemistry, Defence Institute of Advanced Technology (DIAT), Girinagar, Pune, India, 16 & 17 March 2023.
- S. Bera:** "Enantioselective Alkyl-Alkyl Coupling by Nickel Hydride Catalysis." *FORCE-IICS 2023*, Agra, India, 28-31 July 2022.
- S. R. Sanapala:** "FDP on Advanced teaching techniques." Krishna University, Machilipatnam, AP, 16-20 August 2022.
- S. R. Sanapala:** "Science, Technology and Innovation (STI) are the key drivers for self-reliant India." D.R.G Govt. Degree College, Tadepalligudem, A P, 27-28 February 2022.
- S. R. Sanapala:** "Semisynthetic Glycoconjugate Vaccine approach against streptococcus pneumoniae serotype 19A and 19F & Escherichia coli O25B. " Animal Biotechnology Centre, National Dairy Research Institute, Karnal, Haryana, 10 February 2023.
- S. R. Sanapala:** Attended an international conference (CARBO XXXVI) on Emerging Trends in Glycochemistry, Glycobiology & Technology, 5-7 December 2022.

Physics

- A. Sharma:** "Towards Developing the Next Generation Portable Atomic Sensors Based on Two-Photon Transition in Warm Atomic Vapors for Quantum Communication, Sensing and Positioning Applications", IIT Delhi, 6 April 2022.
- A. Sharma:** "Towards Developing the Next Generation Portable, Atomic Sensors using Two-Photon Transitions in Warm Atomic Vapors for Quantum Sensing Applications", ICTS Bengaluru, 11 May 2022.

3. **A. Joglekar:** "Neutron Stars as Dark Matter Detectors", IISER Tirupati, 29 September 2022.
4. **P. C. Deshmukh:** "Entanglement and Teleportation - Celebrating Physics Nobel Prize", Indian Association of Physics Teachers (IAPT), 25 October 2022.
5. **P. C. Deshmukh:** "The Reality, Entanglement & Teleportation Conundrum - Physics Nobel Prize", Special Invited Talk (Swayamprabha) IIT Tirupati, 10 November 2022.
6. **P. C. Deshmukh:** "Entanglement and Teleportation - The Second Quantum Revolution", Indian Association of Physics Teachers (Main Forum), 1 November 2022.
7. **P. C. Deshmukh:** "Teleportation and Quantum Computation - Physics Nobel Prize 2022", Indian Association of Physics Teachers, Bengaluru, 21 December 2022.
8. **P. C. Deshmukh:** "Mystery Behind the Success of Classical Mechanics", Sarvajanik Education Society, Surat, 9-11 March, 2023.
9. **P. C. Deshmukh:** "Faraday-Lenz Experiments and Einstein's Dare", Sarvajanik Education Society, Surat, 9-11 March, 2023.
10. **P. C. Deshmukh:** "Complex Behaviour of Simple Systems", Sarvajanik Education Society, Surat, 9-11 March, 2023.
11. **P. C. Deshmukh:** "Teleportation & Quantum Computing - Physics Nobel Prize 22", Sarvajanik Education Society, Surat, 9-11 March, 2023.
12. **P. C. Deshmukh:** "Life and Works of Professor C V RAMAN" to inaugurate 2-days Symposium for National Science Day, Dayananda Sagar University, Bengaluru, 27 Dec 2023.
13. **P. C. Deshmukh:** "Parallel Processing using Quantum Computing", RN Shetty Institute of Technology, Bengaluru, 09 May 2023.
14. **B. Koteswararao:** "Quantum Magnetism in $S=5/2$ Highly Frustrated Spin Systems", DAE-Solid State Physics Symposium-2022, 21 Dec, 2022.
15. **B. Koteswara Rao:** "Experimental Techniques and Applications of Atomic Force Microscopy and Vibrating Sample Magnetometer" for Synergistic Training program Utilizing the Scientific and Technological Infrastructure (STUTI) program by DST, SV University, Tirupati, 29 Jan 2023.
16. **B. Koteswara Rao:** "Unconventional Quantum States in $S=5/2$ Highly Frustrated Magnets" NCRFM 2023, Vignana University, 25 Mar 2023.
17. **Aravinda S:** "Spacetime Dual-Unitary circuits: Quantum Information Theory to Quantum Many-Body Physics", National Institute of Technology Karnataka (NITK), Surathkal, 15 Dec 2022.
18. **Aravinda S:** "On Foundations of Quantum Theory: (Lecture on Physics Nobel 2022)", National Institute of Technology Karnataka (NITK), Surathkal, 14 Dec 2022.
19. **Aravinda S:** "Foundational Questions of Quantum Theory: It's Philosophical, Physical and Quantum Information Science Perspective (Lecture on Physics Nobel 2022)", School of Advanced Sciences, VIT Vellore, 07 Dec 2022.
20. **R. Modak:** "Observational Entropic Study of Anderson Localization", PCS-IBS, South Korea, 15 Nov 2022.
21. **R. Modak:** "Entanglement Revivals in Finite One-Dimensional System", Q-Mat-2022, IIT Kanpur, 19 Sep 2022.
22. **R. Modak:** "Quasi-Particle Picture and Entanglement Dynamics", meeting on "Statistical Physics and Complex Systems", IIT Kharagpur, 18-20 July 2022.
23. **R. Modak:** "Uncertainty Relations in PT Invariant Non-Hermitian Systems", IMSc, Chennai, 15 July 2022.
24. **R. Modak:** "Role of Integrability in Statistical Mechanics" University of Kashmir, Srinagar, 21 June 2022.

Mathematics and Statistics

1. **A. Lahiri:** "Workshop on Artificial intelligence in Finance", CMI, ISI, NDSU, 28-30 June 2022.
2. **I. Das:** "Introduction to Statistical Modeling-Theory and Applications", Indian Institute of Information Technology Sri City, Chittoor, 25th July 2022.
3. **I. Das:** "Geospatial impact of lockdown on air pollution", IIT Tirupati Navavishkar I-Hub Foundation (IITTNiF), 27th June 2022.
4. **K. Kishore:** "Matrix Waring Problem", IISER Pune, 14th January 2023.
5. **P. Mariappan:** "Basics of Finite Difference Method", VIT Vellore, 2nd March 2023.
6. **P. Mariappan:** "Data Analysis in Research: Sampling and Error Analysis", Vellore Institute of Technology, 23rd May 2022.
7. **P. Mariappan:** "Data Analysis in Research: When? Why? How?", Vellore Institute of Technology, 24th April 2022.
8. **P. Mariappan:** "Data analysis: methods and techniques", Vellore Institute of Technology, 7th May 2022.
9. **P. Mariappan:** "Introduction to Finite Element Method", VIT Chennai, 25th January 2023.
10. **P. Mariappan:** "Mathematical Modeling and Four Big PDEs", ANJA College, 29th November 2022.
11. **P. Mariappan:** "Mathematical Modeling for Radiofrequency Ablative Cancer Treatment", Frontier Symposium 2022, IISER Trivandrum, 9th April 2022.

12. **P. Mariappan:** "Mathematical Modelling for Business Analytics", *National Level FDP Webinar on Mathematical Modeling for Business Analytics, Suguna Arts and Science College, Coimbatore*, 21st May 2022.
13. **P. Mariappan:** "Mathematical Modelling of Bioheat Equation for Cancer Treatments", *NIT Trichy*, 28th July 2022.
14. **P. Mariappan:** "Overview of Mathematical Modeling and its Application in Bioinformatics", *IISER Tirupati*, 27th January 2023.
15. **P. Mariappan:** "Mathematical Modeling of Point Source Model for Cancer Treatment", *VIT Vellore*, 5th January 2023.
16. **S. Rajesh:** "Basics of Functional Analysis", *ANJA College*, 30th November 2022.
17. **S. Banerjee:** "The Approximation by Conjugation Method in Smooth Ergodic Theory", *TIFR-CAM, Bangalore*, 14th June 2022.
18. **S. Banerjee:** "The Approximation by Conjugation Method in Smooth Ergodic Theory", *TIFR, Mumbai(Online)*, 22nd September 2022.
19. **S. Banerjee:** "The Approximation by Conjugation Method in Smooth Ergodic Theory", *IISER Tirupati*, 4th November 2022.

Humanities and Social Sciences

1. **A. Raghuraraju:** Conducted along with Dr Bharath Kumar GIAN course on "The Advaita Vedanta Tradition and the Possibilities for a Hindu Theology of Liberation," from 25-29th April 2022, at the Indian Institute of Technology Tirupati.
2. **A. Raghuraraju:** "Taking the Present Seriously: Visiting the Writings of Indian National Movement Leaders," Online Colloquium organised by Sai University, Chennai, on 3-11-2022.
3. **A. Raghuraraju:** "Unprecedented Nature of the Entry of the East India Company into India and Unique Exit by the Indian National Movement," Institute Colloquium at Indian Institute of Science, Education and Research Tirupati on 24-8-2022.
4. **A. Raghuraraju:** Chaired a session at an International Conference on "Revisiting Social Theory: Challenges and Possibilities," organised by the Department of Sociology, Northeastern Hill University, Shillong from 16th to 17th November 2022.
5. **A. Raghuraraju:** "Mahatma Gandhi on Truth and Non-Violence," online talk to Sarvodaya International Truth (Telangana and Andhra Pradesh) on 19-8-2022.
6. **A. Raghuraraju:** "Other as an Enabler: The Relationship between the Self and the Other in Modern Indian Philosophy," Karl H Potter Memorial Lecture Series in Philosophy On the Problem of the 'Other Minds' II organised by Department of Humanities and Social Science, Indian Institute of Technology, Bombay, on 6-10-2022.
7. **A. Raghuraraju:** "Philosophy of Research: Doing Research in India," in a workshop on *Research Methodology* organised by NALSAR Law University, Hyderabad from 26th February to 6th March 2023.
8. **A. Raghuraraju:** "Relevance of Gandhi today," at the Amaravati Institute of Social Sciences, Guntur, 2-10-2022.
9. **A. Raghuraraju:** "The Predicament and Challenges of Recalling the Past in the Indian National Movement," organised by the Department of Philosophy, Ashoka University, Sonapat, 17-3-2023.
10. **A. Raghuraraju:** "Alternative formula of Nationalism: Lokamanya Bal Gangadhar Tilak and Mahatma Gandhi's interpretation of Bhagavad Gita", an online Inaugural talk in an ICPR-sponsored Study Circle Programme of the Department of Philosophy, University of North Bengal, on the themes *Ethics and Politics*, on 24-9-2022.
11. **B. M. Kachhap:** "Importance of English Communication for Undergraduate Students", Teerthankan Mahavir University, Moradabaad, 10th December 2022.
12. **B. M. Kachhap:** "Conflict Theory, Society and Literature", Presidency University, Bangalore, 8th October 2022.
13. **C. S. Bahinipati:** 'An Introduction to Systematic Literature Review', Faculty Induction Programme, UGC-Human Resource Development Centre, Kannur University, Kerala, March 04, 2023.
14. **C. S. Bahinipati:** 'An Introduction to Systematic Literature Review' & 'An Introduction to Program Evaluation', Short term course Research Methodology – Social Science & Humanities, UGC- Human Resource Development Centre, Kannur University, Kerala, January 21, 2023.
15. **C. S. Bahinipati:** 'Frameworks for Assessing Loss and Damage to Climate Change', Urban Action School 2022, Kerala Institute of Local Administration, Kerala, November 23, 2022.
16. **C. S. Bahinipati:** 'Loss and Damage from Climate Related Extreme Events in India: How Much We Really Estimate', SCS Autonomous College, Puri, Odisha, September 10, 2022.
17. **C. S. Bahinipati:** Invited as a 'Distinguished Expert' for the Colloquy on 'Finance', Organised by National Institute of Disaster Management jointly with Indian Institute of Corporate Affairs and Bankers Institute of Rural Development, Resilience and Sustainability Summit 2047, January 19, 2023.
18. **P. S. Dwivedi:** Delivered a lecture as a resource person on "Emotional Intelligence and Leadership", in an 'FDP

on Developing Leadership and Team Management Skills”, sponsored by ATAL Academy, AICTE, New Delhi, at IIT Tirupati (December 05-16, 2022), on December 15, 2022.

19. **Rahul A. Sirohi:** “Reconstructing Intellectual Histories of the Global South: Liberatory Epistemologies from India

and Latin America”, organized by TISS-Hyderabad, Hyderabad, India.

20. **S. K. Singh:** Delivered a lecture as a resource person on “Bringing Affect, Empathy, and Humour Back to the Classroom: A Post-Pandemic View”, in the Online Faculty

APPENDIX-IV

AWARDS AND ACHIEVEMENTS

- A. Raghuramaraju was appointed as the consultant to Fetzer Institute, Michigan, USA, in their project on “Thirta Yatra: The Pilgrimage, A Hindu Sacred Story.”
- S. M. Allabakshi (PhD scholar) received the “Best paper award” from the International Society of Energy Environment and Sustainability (ISEES) at the 7th sustainable energy and environmental challenges (VII-SEEC) conference held on December 16th-18th, 2022, at IIT (BHU), Varanasi.
- S. M. Allabakshi (PhD scholar) received the first prize in “Best paper award category” from the Indo-Canadian Symposium on “Water Management: Sustainability & Impact of Climate Change” organized by Dalhousie University, Canada and IIT Tirupati, India held on March 6th - 7th, 2023, at IIT Tirupati.
- Annette Mariya Tedy (PhD scholar) received Prime Minister's Research Fellowship (PMRF ID: 3202515) for pursuing her doctoral studies at IIT Tirupati, on November 2022.
- C. S. Bahinipati has been elected as the Executive Committee Member of Indian Society for Ecological Economics: 2022-2024.
- C. S. Bahinipati won Springer Nature Award, 'Resilience and Sustainability Summit: Vision 2047', New Delhi, India, January 17th -19th, 2023.
- G. Vajitha received the “Best Poster award” from the 35th Kerala Science Congress held at Mar Baselios Christian College of Engineering and Technology, Kerala, India, from 12th -14th, February 2023.
- Gowri Asaithambi received the “Best Paper Award” under Road Safety Theme: S. Venkateshappa, G. Asaithambi, V. Kanagaraj, “An Approach to Identify Lateral Shift and its Duration under Disordered Traffic Conditions”, Recent Advances in Traffic Engineering (RATE) Conference, November 2022, NIT Surat.
- Gowri Asaithambi became Independent Director of Tinna Rubber & Infrastructure Limited, India.
- Kalidas Yeturu received Agrithon 2023 runner up prize from IITTNiF TIH Cell for Proof of concept & demonstration related to smart agriculture on 11th February, 2023.
- Krishna Prapoorna Biligiri became Adjunct Professor at School of Sustainable Engineering & the Built Environment, Arizona State University, USA.
- Krishna Prapoorna Biligiri was chosen as the Asphalt Rubber Ambassador for the Republic of India by Rubber Pavements Association and RAR2022 Conference Chairmen, Spain in June 2022.
- Krishna Prapoorna Biligiri became the Director on the Board of the *Rubberized Asphalt Foundation*, USA.
- Krishna Prapoorna Biligiri became the External Faculty Member of the Graduate Research Committee, Purdue University, USA.
- Krishna Prapoorna Biligiri became the Member (R&D Institutions) of Working Group on Transport, Kerala State Planning Board (2022-27).
- Krishna Prapoorna Biligiri has been selected as one of the world's top 2% scientists, Elsevier BV, Stanford University. (<https://elsevier.digitalcommonsdata.com/datasets/btchxktzyw/3>)
- KSMS Raghavarao has been awarded the prestigious Life Time Achievement Award by International Association of Engineering and Food. He will receive the award at ICEF14 to be held at Nantes, France in June 2023.
- S. Bera received the Distinction “Joint Early Career Researcher” by Chemistry: An Asian Journal (Wiley) 2023.
- Shriram Shanbhag (MS Scholar in CSE) received ACM Sigsoft Caps Support for Conference Support to ESEC/FSE 2022 (Core A*) on 17th September, 2022.
- Shriram Shanbhag (MS Scholar in CSE) received Microsoft Research Travel Grant for Conference on Foundations of Software Engineering 2022 (Core A*) on 16th September, 2022.
- Sridhar Chimalakonda received 2022 IBM Academic Award on 20th September, 2022.
- Uday Kumar S received Nanotechnology Alumni Award, IIT Roorkee in 2023.
- V. Sunil (MS Scholar under guidance of Dr. Uday Kumar Sukumar & Dr. K. Anki Reddy, Department of Chemical Engineering) got selected for “Khorana Program of Internships – 2023”, pursuing at Purdue University, USA.

APPENDIX-V

MEMBERSHIP OF PROFESSIONAL BODIES

1. KSMS Raghavarao: UGC Nominee on the Governing Body of BMS College of Engineering, Bangalore, Karnataka.
2. KSMS Raghavarao: Indian Representative IAEF on behalf of AFST India.
3. KSMS Raghavarao: Member of the Institute Confirmation of Appointments Committee.
4. KSMS Raghavarao: Chairmen Institute MOU Committee.
5. S. Gumma: UGC Nominee on the Governing Body of Government College, Rajahmundry, Andhra Pradesh.
6. S. Gumma: UGC Nominee on the Governing Body of Government College, Rajahmundry.
7. S. Gumma: BoS Member, JNTU Hyderabad.
8. C. P. Rao: Fellow of Andhra Pradesh Academy of Sciences (FAPAS, 2015).
9. C. P. Rao: Fellow of Indian Academy of Sciences, Bengaluru (FASc., 2012).
10. C. P. Rao: Fellow of Indian National Science Academy, New Delhi (FNA, 2015).
11. C. P. Rao: Fellow of National Academy of Sciences, Allahabad (FNASc., 2011).
12. C. P. Rao: Life Member, Biological Chemistry Society of India.
13. C. P. Rao: Life Member, Chemical Research Society of India.
14. C. P. Rao: Life Member, Crystallographic Society of India.
15. C. P. Rao: Life Member, Society for Carbohydrate Chemists & Technologists of India.
16. C. S. Bahinipati: Member, Human Development and Capability Association.
17. C. S. Bahinipati: Member, Indian Society for Ecological Economics.
18. C. S. Bahinipati: Member, Orissa Economic Association.
19. G. Roy: Associate Editor in the journal "*Frontiers in Chemistry - Medicinal and Pharmaceutical Chemistry*".
20. G. Roy: Life Member, Chemical Research Society of India.
21. P. Gandeepan: Life Member, Chemical Research Society of India.
22. P. Gandeepan: Professional Member, Institute of Scholars (InSc), Bengaluru, India, March 2020-Present.

23. A. Raghuramaraju: Referee, Journal of Social and Political Philosophy.
24. R. A. Sirohi: Lifetime Member, Indian Political Economy Association.
25. S. Chakraborty: RSC Advances Reviewer Panel membership 2022.
26. S. K. Singh: Member, Indian Association for Commonwealth Literature and Language Studies.
27. S. K. Singh: Referee, *Fat Studies* [Taylor and Francis],
28. S. K. Singh: Referee, *South Asian Popular Culture* [Taylor and Francis],
29. S. K. Singh: Referee, *Journal of Lesbian Studies* [Taylor and Francis].
30. S. K. Singh: Referee, *Men and Masculinities* [Sage].
31. S. K. Thamida: BoS Member, SVUCE, Tirupati.
32. T. S. Kumar: Board of Studies Member, Department of Chemical Engineering, RVR & JC College of Engineering, Guntur, Andhra Pradesh.
33. V. R. Badarla: Editor in *Frontiers in the Internet of Things*.

EXTENSION / EXTRACURRICULAR ACTIVITIES

1. A. K. Manna: Served as research advisory committee (RAC) member for conducting 1st RAC presentation of Ph.D. scholar Ms. Jumana Hasin M (Roll No. 20213207) in Chemistry from IISER Tirupati, 20th December 2022.
2. A. K. Manna: Served as research advisory committee (RAC) member for conducting 2nd RAC presentation of Ph.D. scholar Ms. Sreejani Karmakar (Roll No. 20182407) in Physics from IISER Tirupati, 27th July 2022.
3. A. Raghuramaraju: Visiting Faculty, KREA University, Sri City, Andhra Pradesh, February-May 2023.
4. C. S. Bahinipati: Associate Editor, International Journal of Climate Change Strategies and Management, Emerald Publishing.
5. C. S. Bahinipati: Associate Editor, SN Business and Economics Journal, Springer.
6. C. S. Bahinipati: Member of Doctoral Advisory Committee, Ashoka Trust for Research in Ecology and Environment, Bengaluru.
7. C. S. Bahinipati: Member, Earth System Governance Taskforce on Knowledge Cumulation, Earth System Governance Network, Utrecht University, Netherlands.
8. C. S. Bahinipati: Research Fellow, Earth System Governance Network, Utrecht University, Netherlands.
9. C. S. Bahinipati: Review Editor - Climate and Economics, *Frontiers in Climate Journal*.

10. C. S. Bahinipati: Reviewer for Research Proposal submitted to Wellcome Trust under the theme of 'Heat adaptation: evaluating interventions to help manage the health effects of heat', London, UK.
11. C. S. Bahinipati: Lead Author, "Understanding and Addressing Systemic Risks Behind the Socio-economic Impacts of COVID-19 in Japan and India: Developing a Roadmap for a Resilient and Sustainable Future". Proceedings of the JSPS-ICSSR Seminar, 21-22 November 2022, Tokyo, Japan. Hayama, Japan: Institute for Global Environmental Strategies and Indian Institute of Technology Tirupati. <https://doi.org/10.57405/iges-12647>
12. C. S. Bahinipati: Lead Author, Chapter "India: A subnational climate risk assessment". In UNDRR (2022), 'Technical Guidance on Comprehensive Risk Assessment and Planning in the Context of Climate Change', United Nations Office for Disaster Risk Reduction, Switzerland, pp. 105-106, https://adaptecca.es/sites/default/files/documentos/undrr-technical_guidance_cra_2022.pdf.
13. C. S. Bahinipati: Organized ICSSR-JSPS Joint Seminar on 'Understanding and addressing systemic risks behind the socio-economic impacts of COVID-19 in India and Japan: Developing a roadmap for a resilient and sustainable future' (in collaboration with Institute for Global Environmental Strategies, Japan), Tokyo, Japan, November 21-25, 2022.
14. C. S. Bahinipati: Research Guide, IAS (Indian Administrative Service) Officer Trainees, Lal Bahadur Shastri National Academy of Administration (LBSNAA), Mussoorie, India.
15. C. S. Bahinipati: Reviewer for Indian Economic Journal, International Social Science Journal, International Journal of Disaster Risk Reduction, Water, Third World Quarterly, Australian Journal of Agricultural and Resource Economics, Environment, Development and Sustainability, International Journal of Climate Change Strategies and Management, Environmental Quality Management, Journal of Integrative Environmental Sciences, South African Review of Sociology, Climate and Development, PLOS Sustainability and Transformation, All Life, Journal of international Development, Frontiers in Climate.
16. G. Roy: Evaluated a thesis entitled "*Di- and Tri-Iron Models of the Hydrogenase Active Site as Electrocatalysts for the Hydrogen Evolution Reaction*" from the Department of Chemistry, University of Delhi, Delhi-110007, India (Student Name: Naveen Kumar).
17. G. Roy: Evaluated a thesis entitled "*Photo-Triggered and Metal-Catalyzed Targeted Activation of Prodrugs Within Living Cells*" from the School of Physical Sciences Jawaharlal Nehru University, New Delhi-110067, India (Student Name: NEELU).
18. G. Roy: Evaluated a thesis entitled "*Ru(II)-p-cymene complexes of pyrazolyl-benzimidazole ligands as potential anticancer agents*" from the Department of Chemical Sciences, Indian Institute of Science Education and Research Kolkata, Mohanpur, WB-741246 (Student Name: Ayan Chakraborty (15RS039)).
19. G. Roy: Evaluated a thesis entitled "*Synthesis, Characterization and Electrochemical Investigations of Dinuclear {FeFe} Thiolate Complexes*" from the Department of Chemistry, University of Delhi, Delhi-110007, India (Student Name: Hemlata).
20. G. Roy: Served as an external examiner for the comprehensive Viva-Voce Examination of Mrs. Varsha U.V (19PHD0133), a Ph.D. student in the School of Advanced Sciences, Department of Chemistry, Vellore Institute of Technology (VIT), Vellore (on 6th September 2022).
21. G. Roy: Served as an external examiner for the comprehensive Viva-Voce Examination of Mr. Sathish R (19PHD0248), a Ph.D. student in the School of Advanced Sciences, Department of Chemistry, Vellore Institute of Technology (VIT), Vellore (on 20th July 2022).
22. G. Roy: Served as an External Viva-Voce Examination of Mr. Naveen Kumar, a Ph.D. student in the Department of Chemistry, University of Delhi, Delhi-110007, India (on 7th December 2022).
23. G. Roy: Served as an External Viva-Voce Examination of Ms. Hemlata, a Ph.D. student in the Department of Chemistry, University of Delhi, Delhi-110007, India (on 23rd May 2022).
24. G. Roy: Served as Research Advisory Committee (RAC) member for a Ph.D. student, Mr. Prabhakar Bhardwaj (Roll No: I-PhD-20192203, of Indian Institute of Science Education and Research (IISER), Tirupati (on 14th September 2022).
25. G. Roy: Served as Research Advisory Committee (RAC) member for a Ph.D student, Ms. Ashwini Bodade (Roll No: 20183210), of Indian Institute of Science Education and Research (IISER), Tirupati (on 18th August 2022).
26. KSMS Raghavarao: Advisor for Start-ups at SV Mahila University.
27. KSMS Raghavarao: BoS Chairman, SVUCE, Tirupati.
28. KSMS Raghavarao: Chairman, Institute MoU committee.
29. KSMS Raghavarao: UGC Nominee on the Governing Body of BMS College of Engineering, Bangalore.
30. P. Gandeepan: Doctoral Committee member of Mr. Venkatesan K (22PHD0209), School of Advanced Sciences, VIT Vellore, Date of meeting: 10 March 2023.

31. P. Gandeepan: Doctoral Committee member of Ms. Jyothylakshmi J (20PHD0452), School of Advanced Sciences, VIT Vellore, Date of meeting: 06.07.2021.
32. P. Gandeepan: Doctoral Committee member of Ms. Preethi R (19PHD0101), School of Advanced Sciences, VIT Vellore, Date of meeting: 23 September 2022.
33. P. Gandeepan: Doctoral Committee member of Ms. Talamarlla Deepthi (22PHD0358), School of Advanced Sciences, VIT Vellore, Date of meeting: 13 March 2023.
34. R. A. Sirohi, and C. S. Bahinipati: Organized an International Conference on "Credit Markets and Policies in South Asia: Issues and Challenges", December 7-9, 2022 (in collaboration with YSI South Asia Working group & INET, New York), at IIT Tirupati, India.
35. S. Gumma: Ph.D. student completion (IIT Guwahati), Medikonda Prudhviraj, titled-"*Selective Gas Adsorption on Functionalized Metal Organic Frameworks.*"
36. S. K. Thamida: Patent (application no. 202041016008)- Inventors: Dr. T. Sunil Kumar (IIT-T), Mr. V.R.Srikumar (Opustayz), Dr. Vasudharani (IISER-T), Dr. Harshini (IISER-T). Received the First Examination Report (FER) for "Thermal Air Sterilizer".



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