



**INVITATION**

# **POST GRADUATE PLACEMENT BROCHURE 2021-2022**

**Department of Training and Placement**

**National Institute of Technology, Tiruchirappalli**



Regional Engineering College Tiruchirappalli (RECT) was started in the academic year 1964-65 and has been imparting excellent technical education ever since. It has been granted the status of Deemed University and upgraded to National Institute of Technology (NIT) in the year 2003. NIT Trichy stands as the most sought after NIT for aspirants who clear one of the most rigorous nationwide tests of our country. With the cream of the engineering talent encompassing both students and faculty coupled with state-of-the-art facilities, it is of little wonder that NIT Trichy stands as one of the stalwarts of engineering education in the country. Our illustrious alumni, working at the forefront of technology around the world stand proof to the excellence of our institution. NIT Trichy teaches not just the science and technology of engineering, but much more than that, it inculcates in each one of its students the virtues and skills needed to make a difference in tomorrow's world.

## WHY Recruit @ NIT TRICHY?

### INSTITUTE OF NATIONAL IMPORTANCE

Institute of National Importance (INI) is a status that is conferred to a public higher education institution in India by an act of parliament. It has been over 51 years since NIT Trichy was established, and it is the endearing spirit of the Institute which motivates its students to aspire to be the best.

### STUDENTS

As a student of NIT Trichy, one is encouraged to become a competent technologist, an emergent leader and a proactive citizen.

### TOP ENGINEERING COLLEGE

NIT Trichy has been consistently ranked among the top 10 Engineering Colleges in the country. It was ranked as the 8th Best Technical School in India, 7th best in Placements and the best among NITs by Outlook Magazine (2019).

### RESEARCH AND CONSULTANCY

**11,498-** Number of Research Publications

**41-** Number of Patents

**32471-** Number of Journals

**1,28,809-** Number of Citations

**Rs.1.12 Billion-** Total Funding for R&C(approx)

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- NIT Tiruchirappalli moved to 9th Rank in Engineering in the “India Rankings 2020” released by NIRF, MHRD Government of India.
- Winner of the National Award for Best Innovation Club of the country by the Hon’ble President of India Shri Ram Nath Kovind in the Festival of innovation and Entrepreneurship (FINE), 2018.
- Winner of National Award for Excellence in Employability 12th FICCI Higher Education Summit 2016.
- The QS World University Rankings ranked NIT Trichy 27 in India in the 2020 ranking.





- Ranked First among NITS in the National Institutional Ranking Framework (NIRF) 2020 released by the Union Ministry of Human Resource Development.
- In 2017, it was named as the “University of the Year” in the Federation of Indian Chambers of Commerce and Industry awards.
- CII presented HULL Award for the Best Industry NIT/IT/UIT to NIT Trichy in 2015
- FICCI Higher Education Excellence Award presented to NIT Trichy for Social Excellence in 2015
- Outlook Magazine ranked NIT Trichy in Top Ten Colleges of India in 2019.



# INFRASTRUCTURE



Clock Tower



Training & Placement Department



Library



Lyceum



Octagon



Ojas



Siemens Centre Of Excellence



Orion Lecture Hall





CCD



Convention Centre



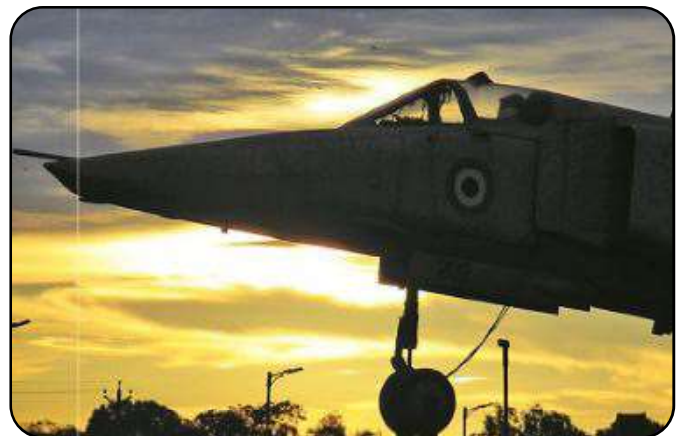
Sports Centre



Hospital



Lecture Hall Complex



MIG 23



Helipad



Swimming Pool



# M.Arch

## Energy Efficient And Sustainable Architecture

### Department Profile

The Department of Architecture in National Institute of Technology Tiruchirappalli was started in the academic year 1980-81. Over the course of 4 decades, it stands today among top 10 architecture schools in India with specific focus on Energy Efficiency and Green Building Design and Sustainability. The Department functions in all three segments: UG, PG and PHD. It is dedicated to the mission of creating professionally competent architects with human values.

### Course Profile

This program is crafted to create competent architects with deep understanding of Energy Efficiency, Occupant Comfort, Building Performance and Energy Simulations. It is a two year program with first two semesters composed of theoretical understanding and extensive simulations and final two semesters focused on research and dissertation. The course has its highlights in creating technical understanding of thermal comfort, building performance and crafting innovative methods to save energy and reduce carbon footprint.

### Curriculum

- Building Energy Audit and Management
- Building Science and Sustainability
- Building Modelling and Simulation
- Visual Comfort Assessment
- Lighting Design
- Energy Environment and Buildings
- Energy Efficient Landscape Design
- Post Occupancy Evaluation
- Environment and Behaviour
- Solar Passive Architecture
- Statistics for Environmental Design
- Natural Ventilation



### Lab Facilities

- Climate Lab
- Strength of Materials Lab
- Building Science Laboratory
- Acoustics Lab
- Lighting Lab
- Model Making Lab
- Software: Envimet, TRNSYS, ANSYS, Diva, Dailux, IES, Rhino

### Student Projects

- Design optimization of transparent photovoltaic facades for daylight and energy performance in high rise buildings.
- A Study to optimize the Thermal Performance of Pradhan Mantri Awas Yozana -Gramin houses in hot and humid climate.
- Effect of shading and Reflection of Sunlight from nearby Building, and its impact on building performance (Gurugram, India)
- Impact of built morphology on the ventilation availability in residential buildings.

### Ongoing Projects

- Guidelines on Climate Responsive Design Strategies for Residences in India to achieve Thermal Comfort at reduced Energy & Cost.
- Investigation into Cultural and Behavioural dimensions of Thermal comfort in naturally ventilated buildings under Hot and Humid thermal conditions, Sponsored by MHRD.
- Spatial Planning of Gram Panchayats, Sponsored by Ministry of Panchayati Raj, GOI.

# M.Sc. COMPUTER SCIENCE

## Department Profile

The Department of Computer Applications is one of the pioneering departments of the institution that offers Information Technology courses such as MCA, M.Sc Computer Science and M.Tech Data Analytics. It is committed to impart quality education in the subfields of IT and Analytics, a field growing in leaps and bounds. It is dedicated to the mission of developing highly skilled professionals who can adapt to the dynamic changes of the IT industry.

## Course Profile

This program is specifically aimed to impart quality education in the field of Computer Science. M.Sc. Computer Science is a four semesters full-time Post – Graduate program spread over two years with the first three semesters concentrating on the theoretical foundation with high-quality teaching complemented with extensive practical training and the final year concentrating on project work phase I and Phase II. The course is developed to inculcate value-based, socially committed professionalism for the overall development of research attitude and life-long learning.

## Curriculum

- Mathematical Foundations of Computer Science
- Data Structures and Algorithms
- Database Technologies
- Multimedia Communications
- Advanced Operating Systems
- Data Mining and Analytics
- Problem Solving Using Python and R
- Computational Intelligence
- High-Performance Computing
- Web Computing
- Artificial Intelligence
- Pattern Recognition



- Object-Oriented Software Engineering
- Advanced Statistical Techniques for Data Science
- Internet of Things

## Lab Facilities

- State of art computing facility at octagon computer center with core i7 systems.
- Servers (Dell Power Edge Server R1950 rack Mount Server) which support the LAN providing a Linux/Windows environment.
- Platforms such as Linux, Solaris based SUN Machines.
- HP DEC Alpha Ultra Sparc, IBM System Storage DS3500 and IBM System 2U Server Rack.
- Lab facilities with the latest configuration of DELL OptiPlex 9020 systems.
- Dedicated lab for carrying out research in information security, system security and network security.



## Ongoing Projects

- Extreme Low Light Image Enhancement using Deep Learning.
- Human Behavior Analysis from Video Sequences using Deep Learning approach.
- Cyber Threat Intelligence Generation using Deep Learning models.
- Emergency Response Support System Development.
- Digital Health Records Storage and Analysis.



# MBA

## DEPARTMENT OF MANAGEMENT STUDIES

### Department Profile

Department of Management Studies, National Institute of Technology Tiruchirappalli (DoMS-NIT Trichy) is among the oldest B-Schools in India, started in 1978. DoMS-NIT Trichy teaches not just the art and science of management, but instills in its students, virtues and skills needed to make a positive impact on tomorrow's world and transform it into a better future. Since its inception, DoMS-NIT Trichy's mission has been focused on contributing to growth and development efforts in India with an emphasis on research. The institution has a strong industry relationship and the vast source of alumni is the biggest asset that DoMS-NIT Trichy can boast off. The concept of mentorship between the students and the alumni provides a lifeline for immense growth for the DoMSians. DoMS-NIT Trichy offers a stimulating environment to faculty and students alike.

### Course Profile

This course at DoMS-NIT Trichy is a veritable treasure of learning and erudition. It emphasizes more on application of management principles and techniques in modern business through continuous industrial interactions and highlights decision making for controlling and applying management concepts. With a matured lineage of consultancy and research behind them, this exclusive group of academicians is responsible for grooming raw talents into performing prodigies. DoMS has a higher level of tutelage, focusing its resources exclusively on the promising managers of tomorrow.

### Internship Projects

- Inventory optimization for parts with intermittent and lumpy demand through zero inflated forecasting.
- Intricacies of Forex Trade.
- Brand engagement - Build online entity.



### Curriculum

- Investment Banking
- Investment Security Analysis and Portfolio Management
- Strategic Brand Management
- Marketing Metrics
- Logistics Management
- Innovation and R & D Management
- Talent Management
- Strategic Human Resource Development
- Machine Learning Techniques
- Big Data Analytics & Data Science
- Systems Analysis & Design and CASE
- Software Quality Management



### Conclaves

- PRABANDHAN'19 on Management 4.0, The Guest Lecture Series.
- INACON'19 (Industry Academia Connect), Two-day General Management Conclave.
- NISADYA'19 – The Annual Management Fest.



# MASTER OF COMPUTER APPLICATIONS

## Department Profile

The Department of Computer Applications offers the Information Technology courses which include MCA, M.Sc. Computer Science and M.Tech Data Analytics. The Department aims to provide various computer-based knowledge and solutions to simplify the complex hurdles in the real-world scenarios. It is also committed to inculcate the IT professional skills in the students and prepare them for the corporate world ahead. The Department courses cover all the aspects of computer-based industries and thus is dedicated to developing high professionals in the field of computer applications.

## Course Profile

The Master of Computer Applications program offered at NITT is considered to be the best in the country. The course starts with deep knowledge sessions on computer programming languages and includes advanced subjects like data analysis and cloud computing. It also has the software industry based subjects to develop soft skills as well as professional skills. The last semester is dedicated exclusively for project work. Thus, the curriculum covers diverse streams such as

## Curriculum

- C/C++/Java/Python Programming
- Design and Analysis of Algorithm
- Database Management System
- Data Structures
- Object Oriented Analysis and Design
- Operating Systems
- Information Security
- Computer Networks
- Data Mining Techniques.



- Artificial Intelligence
- Computer Organization and Architecture
- Software Engineering
- Distributed Technology
- UNIX Shell Programming
- Organizational Behaviour

## Lab Facilities

- NIT Local Area Network (OCTAGON Computer Center)
- Dell Power Edge Server R1950
- Platforms such as Linux, Solaris based SUN machines
- HP DEC Alpha Ultra Sparc, IBM System Storage DS3500 and IBM System 2U Server Rack
- DELL Optiplex 9020 MT PCs connected to NITT LAN



## Ongoing Projects

- Extreme Low Light Image Enhancement using Deep Learning.
- Human Behaviour Analysis from Video Sequences using Deep Learning approach.
- Cyber Threat Intelligence Generation using Deep Learning models.
- Emergency Response Support System Development.
- Digital Health Records Storage and Analysis.

# M.Tech DATA ANALYTICS

## Department Profile

The Department of computer applications is one of the pioneering departments of the institute that offers postgraduate courses in the related fields of computer science and analytics. The M. Tech Data Analytics program offered at NIT Trichy is a new addition to the institute that equips students with the analytics skills to cater to the latest demand in industry and research.

## Course Profile

M. Tech in Data Analytics is an inter-disciplinary course started at NIT Trichy in the academic year 2017-18 offered by the Department of Computer Applications in association with the Department of Management Studies (DoMS) and Department of Computer Science. The course is structured around the broad contours of analytics and computer science to equip students with knowledge and familiarity of various tools for a data scientist.

## Curriculum

- Machine Learning Techniques
- Natural Language Computing
- Principles of Deep Learning
- Statistical Computing
- Next Generation Database
- Image and video analytics
- Big data analytics
- Cybersecurity and Information assurance
- Real-Time System
- High-Performance Computing
- Financial risk analytics and management
- Customer Relationship and Management



## Lab Facilities

- State of art computing facility at octagon computer center with core i7 systems.
- Servers (Dell Power Edge Server R1950 rack Mount Server) which support the LAN providing a Linux/Windows environment.
- Platforms such as Linux, Solaris based SUN Machines.
- HP DEC Alpha Ultra Sparc, IBM System Storage DS3500 and IBM System 2U Server Rack.
- High-Performance Computing lab.
- Natural Language Processing and text analytics lab.
- Parallel Processing and Machine Learning Lab.
- Image and Video Analytics.
- CUDA and E-Leaning.



## Ongoing Projects

- Machine Learning IOT based Prediction and classification of stress using wearable sensor.
- Machine Learning approach for feature interpretation and classification of genetic mutation leading to tumor and cancer.
- Number Plate recognition of vehicles.
- Corpus Generation.
- Credit card risk detection.
- Fashion Discovery Engine.



# M.Tech COMPUTER SCIENCE AND ENGINEERING

## Course Profile

The Department of Computer Science and Engineering with its cohesive set of faculty members offers a sound program at UG and PG level. The department has 21 faculty members and all are doctorates. The curriculum is a blend of the conventional and theoretical aiming to infuse the culture of learning and exploration among students. It is updated regularly to keep up with the growing demands and the changing trends of the software industry and research laboratories. Research Areas in the department include Programming Languages, Computer Architecture, System Software, Networking Technologies, Artificial Intelligence, Data Analytics, and Image Processing. Department has almost 50 full time and part time research scholars pursuing their degree.

## Curriculum

- Mathematical Concepts of Computer Science
- Advanced Data Structures and Algorithms
- High Performance Computer Architecture
- Advanced Network Principles and Protocols
- Advanced Cryptography
- Design and Analysis of Parallel Algorithms
- Big Data Analytics and Mining
- Advances in Operating Systems
- Service Oriented Architecture & Web Security
- Advanced Databases
- Cloud Computing Principles
- Internet of Things
- Principles of Machine Learning & Deep Learning
- Advanced Digital Design



## Lab Facilities

- State-of-the-art computing facility at octagon with core i7 systems.
- Servers (Dell Power Edge R910 Rack Mount Servers) which provides a LAN providing a Unix/Linux environment.
- LAB facilities dedicated to students with latest configurable DELL Optiplex 9020 systems.
- A dedicated lab for carrying out Information Security, Research Security and network security.
- Dedicated lab with multicore for Research.
- Dedicated Design Lab- RISE (Reconfigurable Intelligent System Engineering) Lab.



## Ongoing Projects

- Interdisciplinary Research Group has been established.
- Studies on issues in Multi Core Architecture.
- Studies on Cyber Space Security.
- Studies on Big Data Analytics and Hadoop Technologies.
- Studies on Cloud Computing and Cloud Security.



## M.Tech CIVIL ENGINEERING

### Department Profile

The Department of Civil Engineering has been one of the oldest and finest departments of the Institute Established in 1964, it has been involved in making professional Civil Engineers. The highly qualified and experienced faculty along with its engineering consultancy centre has been instrumental in bringing the institute to the forefront of academic and consulting activities.



## M.Tech CONSTRUCTION TECHNOLOGY & MANAGEMENT

This is a L&T sponsored Master degree programme on "Construction Technology and Management (CTM)" under the Build India Scholarship (BIS) Programme of L&T Constructions; a pioneering and successful programme involving Industry-Academia co-operation. This was initiated by L&T to technically strengthen their employees and also to attract young talents in the field construction technology and management.



# M.Tech GEOTECHNICAL ENGINEERING

## Course Profile

The Master of Technology course in Geotechnical Engineering was started in the year 2020. This course provides in-depth knowledge in Geotechnical Engineering to understand, evaluate and analyze existing techniques to give a solution for the Geotechnical Engineering problems critically and apply independent judgment to come up with advanced and reliable solutions. The curriculum was designed to use computer-based modeling and numerical analysis of Geotechnical Engineering problems in various platforms. Also, to acquire professional and intellectual integrity, professional ethics and code of conduct, consideration of the impact of research outcomes on professional practices, and an understanding of responsibility to contribute to the society for sustainable development.

## Curriculum

- Geomechanics - Theory and Applications
- Soil Properties and Behaviour
- Foundation analysis and Design
- Dynamics of Soils and Foundations
- Applied Soil Mechanics
- Ground Improvement Techniques
- Soil Exploration and Field Testing
- Geoenvironmental Engineering
- Geosynthetic Engineering
- Geotechnics in Practice
- Analysis of Deep Foundations
- Soil Structure Interaction
- Slope Stability and Earth Dams
- Geotechnical Earthquake Engineering
- Forensic Geotechnical Engineering
- Ports and Harbour Structures Engineering
- Geotechnical Design Studio



## Lab Facilities

- Cyclic Triaxial Apparatus
- Bender Element Apparatus
- Ground Penetration Radar
- Dynamic Cone Penetration Test
- Digiconsolidometer
- Earth Resistivity Apparatus
- Hydraulic Actuator –Dynamic Loading
- Plate Load & Field Vane Shear Apparatus
- Large Scale Direct Shear Apparatus
- Light Weight Deflectometer
- SASW
- Dynamic Soil-Structure Interaction Facilities
- Digital Direct Shear Apparatus

## Ongoing Projects

- Characterization of Lunar Soil Simulant for Chandrayaan Missions – ISRO Respond Project, Sponsored by URSC - ISRO, Bangalore.
- Ground Penetration Radar Study for Surface Cracks on the Runway at Chennai Airport – AAI, Chennai.
- Comprehensive Scientific Study for the Stability of Structures – IREL (India) Limited.
- Effect of Soil Water Retention Behaviour on the land use pattern for Drought Mitigation, Sponsored by SERB
- Optimization of Sustainable Polymeric Materials for a Composite Ground Modification System to Support Buildings and Road Embankments, Sponsored by SERB
- Development of 1g Laboratory Model to Study the Behavior



# M.Tech ENVIRONMENTAL ENGINEERING

## Course Profile

Post Graduate Programme in Environmental Engineering was started as an Inter Disciplinary (Civil, Biotechnical, Chemical & Mechanical Engineering) Programme under TEQIP in 2006. The course is aimed to develop professional engineers with leadership qualities in engineering aspects of Land & Water Management, Environmental Impact Assessment, Skills in Water Supply, Wastewater Treatment, Land Reclamation and Solute Transportation. In addition, it will enable engineers to converse scientifically with biologists, geologists and resource managers. With these skills, Graduates will be able to play a leading role in developing engineering solutions to a wide range of problems and opportunities within an ecologically sustainable context.

## Curriculum

- Physico-Chemical Process for Water and Wastewater Treatment
- Biological Process design for Wastewater treatment
- Modelling of Natural Systems
- Analytical methods for Environmental Monitoring
- Transport of Water and Wastewater
- Solid and Hazardous Waste Management
- Environmental Impact Assessment
- Water and Air Quality Models
- Environmental process Chemistry and Microbiology
- Air pollution and Control Engineering
- Groundwater flow and contaminant transport through porous media
- Remote Sensing and GIS for Environmental Applications
- Geoenvironmental Engineering



## Lab Facilities

- UV Visible Spectrophotometer
- Environmental Particulate Air Monitor
- Automated Cell Counter
- Muffle Furnace with microprocessor controller
- Ultra-Pure Water Unit.
- Atomic Absorption Spectrophotometer.
- TOC Analyser.
- Orbital Shaking Incubator.
- Gas Chromatography.
- TN Analysis module for TOC Analyzer
- Haz dust Particulate Monitor.
- Flue Gas Analyser.
- Ion Chromatography.
- Stack Monitoring Kit.
- Ambient Air Sampler.
- Airborne Particle Counter
- Handheld Particle counter
- Projection microscope with digital camera
- Ozone Analyser.
- **Key software including** - Auto CAD, Visual MODFLOW, Arc GIS, Atc View, Arc Info. ENVI, RIAM, and QUAL2E.



## Ongoing Projects

- Scientific closure of Municipal solid waste (Capping) dumpsite and development of sanitary landfill, Salem City Corporation
- Bio-Mining of the existing Municipal solid waste at Vairapalayam and Vendipalayam Dump Site, Erode City Municipal Corporation
- Revamping of existing dumped Garbage (Legacy waste) in compost yard by biomining process, Tiruchirappalli City Corporation



# M.Tech TRANSPORTATION ENGINEERING AND MANAGEMENT

## Course Profile

The Master of Technology course in Transportation was started in 1971 with MHRD funding under the University of Madras. One month In-plant training program is arranged for students at the end of the second semester in various Government organizations and companies to get industrial exposure which helps to groom them into competent professionals.

## Curriculum

- Highway Traffic Analysis and Design
- Pavement Materials and Design
- Urban Transportation Systems
- Transportation Planning
- Pavement Construction and Management
- Intelligent Transportation Systems
- Transportation Economics
- Geospatial Techniques
- Water Transportation
- Computational Techniques in Transportation Engineering
- Bridge Engineering
- Traffic Flow Theory
- Ground Improvement Techniques

## Lab Facilities

### Pavement Engineering Lab

- Centrifuge Extractor
- Bitumen Testing Kits
- Roughometer
- Marshall Stability Testing Apparatus
- Geogauge
- Field CBR tests
- Plate Load Setup
- Benkelman Beam Deflection Apparatus
- Corelok
- Film Stripping Device
- Ductility Testing Machine
- Rotational Viscometer (Brookfield)
- Pensky Martens Flash Point Apparatus
- Marshall Stability Apparatus
- Dynamic Shear Rheometer
- NCAT Asphalt Content Ignition Oven



### Intelligent Transport System Lab

- Mx Road Software.
- Induction Loop Detector
- ANPR Camera
- VISSIM Software
- HDM4 Software
- Transyt-15 Software.
- N-LOGIT 5.0 Software.
- ESRI's Arc GIS Software.
- CUBE Software.



## Ongoing Projects

- Life Cycle and Performance Assessment of Waste Plastic Roads, NRRDA, Government of India
- State Technical Agency (STA) for the Pradhan Mantri Gram Sadak Yojana (PMGSY) Scheme, NRRDA, Government of India
- Centre of Excellence in Transportation Engineering (CETransE) - sponsored by MHRD.
- Pavement Performance Studies on Coir Geotextile reinforced rural roads in Tamil Nadu - Coir Board.

# M.Tech STRUCTURAL ENGINEERING

## Course Profile

The aim of this course is to fulfill the growing demand for specialists in Structural Engineering. Practising Engineers will find this course very useful as it enables them to update their knowledge in the field of Structural Engineering and Design as well as assists them to solve complicated structural engineering problems. The curriculum is designed so as to get an exposure on areas of Structural Analysis, Design, Detailing and Construction. The course also familiarises the use of general purpose and application oriented software in the field of structural engineering, finite element analysis and optimisation.

## Curriculum

- Theory of Elasticity and Plasticity
- Matrix Method of Structural Analysis
- Structural Dynamics
- Advanced Concrete Technology
- Advanced Design of Metal Structures
- Finite Element methods
- Stability of structures
- Seismic Design of Structures
- Bridge Engineering
- Forensic Engineering and Rehabilitation of Structures
- Theory of Plates and Shells
- Prestressed Concrete
- Stochastic Processes in Structural Mechanics

## Lab Facilities

### Structural Engineering Lab

- Column Testing Frame – 100 Tonnes Capacity
- Lateral Load Testing Frame - 20 Tonnes Capacity, Vertical Load - 50 Tonnes Capacity
- Loading Frame – 30 Tonnes Capacity
- Table Vibrator
- Pelletizer
- Concrete Mixer 80 L
- Column Testing Frame
- Electrical Furnace
- Computerized UTM

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### NDT & Dynamics Lab

- Horizontal Shake Table Eccentric CAM
- Vertical Shake Table 30kg Capacity
- Horizontal Shake Table Cylindrical CAM
- Vibrating Beam
- Rapid Chloride Penetration Test Apparatus
- Tuned Mass Damper
- Ultrasonic Pulse Velocity Instrument
- Profometer
- Rebound Hammer
- Corrosion Analysis Instrument
- Vibration of Simple and Continuous Supports



## Ongoing Projects

- Centre of Excellence in Transportation Engineering (CETransE) - sponsored by MHRD.
- Urban speed management using ITS - sponsored by Ministry of Urban Development.
- Urban Pavement Maintenance Management system - sponsored by Ministry of Urban Development.
- Pavement Performance Studies on Coir Geotextile reinforced rural roads in Tamil Nadu - Coir Board.
- Rural Road Pavement studies - sponsored by NRRDA.



# M.Tech ELECTRICAL AND ELECTRONICS ENGINEERING

## Department Profile

The Department of Electrical and Electronics Engineering, NIT Tiruchirappalli has grown from a modest beginning in 1964 into a large fully equipped teaching and research department. The department has highly qualified faculties and is equipped with a state of laboratories and library. The department shares its research experience through technical symposia.





# M.Tech POWER ELECTRONICS

## Course Profile

This course emphasizes on the foundation and technologies of modern Power Electronics and automation of Power Systems. It deals with the state of art techniques in the design and development of power modules and power conversion. It also covers subjects on Power Electronic Drives, Flexible AC Transmission, High Voltage DC Transmission, Industrial Control Electronics and advanced topics in microprocessor and microcontroller application in power converters which are very much needed to meet the growing challenges in the field of Electrical Engineering.

## Curriculum

- Power Converters
- Power Electronic Drives
- Linear & Non-Linear Systems Theory
- Switched Mode Power Conversion
- Electric and Hybrid Vehicles
- PWM Converters & Applications
- Power System Automation
- Industrial Control Electronics
- Principles of VLSI Design
- Flexible AC Transmission Systems
- Renewable Power Generation Techniques

## Lab Facilities

### Power Converter Laboratory:

- Microprocessor and Microcontrollers Laboratory
- Power Electronic and Drives Laboratory
- Electrical Machines Laboratory
- Simulation software like MATLAB/SIMULINK 7.5, PSCAD 4.2, ETAP 4.0, Mipower 4.0, Power World Simulator
- FPGA kit from Xilinx.



### Research Laboratory for M.Tech. & PhD. Project Works:

- Control System Research Lab
- Hybrid Electrical Systems Lab
- Networking Research Lab
- Power Converters Research Lab (partly funded by NaMpet)
- Power Electronics Research Lab
- Power System Automation and Control Research Lab
- Solar PV Energy Conversion Research Lab
- VLSI Systems Research lab



## Ongoing Projects

- Electronification of Ground Water Control and Conveyor Systems in Mines – Funded by Ministry of Coal, GoI.
- Development of modular multilevel converter for enhancing power quality and PV output power under partial shading conditions in Grid-connected PV system – Funded by SERB.
- Development of wireless sensor network for online monitoring & control in a smart micro grid application – DST sponsored.
- Wireless sensor node for online data transfer of parameters from electrical machines and drives – Meity, GoI sponsored.
- Design implementation and analysis of wireless power transfer and PV system for battery charging of passenger e-Bus – Funded by CPRI, GoI.



# M.Tech POWER SYSTEMS

## Course Profile

The course is designed to provide sound knowledge on various aspects of modern Power Systems with more thrust given on the key concepts of Power Electronics and automation of Power Systems. It deals with sophisticated techniques in Power System Restructuring, Forecasting and Analysis, Planning, Reliability, Security & Stability Evaluation to keep up with the ever-increasing demand in electrical power. The course also covers subjects on Flexible AC Transmission, Renewable Energy Electric Conversion Systems and advanced topics in Power System Protection which are very much needed for today's Power System engineer.

## Curriculum

- Power System Operation and Control
- Power System Stability
- Advanced Power System Protection
- Electric and Hybrid Vehicles
- Power Quality
- Advanced Power System Analysis
- Power Conversion Techniques
- Principles of VLSI Design
- Smart Grid Technologies
- Renewable Power Generation Technologies
- Computer Relaying and Wide Area Measurement Systems.

## Lab Facilities

### Power Converter Laboratory:

- Major equipment including HVDC Transmission line simulator, Microprocessor based Numerical Relays, FACTS Devices, Short/Long Transmission lines
- Simulation software like MATLAB/SIMULINK, PSCAD 4.2, ETAP 4.0, Mipower 4.0, Power World Simulator
- Electrical Machines Laboratory
- Power Electronics Laboratory



### Research Laboratory for M.Tech. & PhD. Project Works:

- Power Systems and Smart Grid Lab.
- Power System Automation and Control Research Lab.
- Power Converters Research Lab (partly funded by NaMpet)
- Hybrid Electrical Systems Lab
- Power Electronics Research Lab
- Solar PV Energy Conversion Research Lab
- VLSI Systems Research lab



## Ongoing Projects

- Realization and Implementation of Wide-Area Disturbance Monitoring and Protection Methodology for Future Grids using PMUs – Sponsored by SERB- DST.
- Potential Peer to Peer Transactive Energy Markets in Indian Power Distribution Systems – Funded by SPARC-MHRD
- Implementation and Analysis of coupled coils at different Structures with misalignments for WPT EV battery charging - Sponsored by SERB-DST.
- Investigation on Data-Driven Event Detection using Indian Power Grid's Synchrophasor Data - Sponsored by SERB-DST.
- A Pilot Project on Economic Demand response management through online Monitoring- Funded by SERB.

# M.Tech CHEMICAL ENGINEERING

## Department Profile

Established in 1967, the Department of Chemical Engineering, NIT Trichy is regarded as one of the premier centers for Chemical Engineering in India by industries as well as academia. It also has the distinction of being ranked as one of the top ten Chemical Engineering Institutions in India. The department is backed by highly qualified and experienced faculty, most of who have been involved in various industrial projects and consultancy services.

## Course Profile

The Department strives to meet the growing demand of design engineers in private and public sector companies by bridging the gap between a theoretically sound student and a practically qualified technocrat. Students are imparted with knowledge in Chemical Process Equipment Design along with Chemical Reaction Engineering, Advanced Process Control and Process Modeling & Simulation. Students are also acquainted with purely industry oriented subjects like Advanced Separation Techniques and Computational Fluid Dynamics. This NBA accredited course is designed to groom students so that they extract the best talents and excel in their discipline.

## Curriculum

- Chemical Reactor Analysis & Design
- Advances in Fluidization Engineering
- Advanced Process Control
- Industrial Safety and Risk Management
- Chemical Process Design
- Advanced Separation Techniques
- Pinch Analysis and Heat Exchange Network Design
- Computational Fluid Dynamics
- Process Optimization
- Chemical Process Modeling and simulation laboratory



## Lab Facilities

- Transfer Operations lab
- Process Control laboratory with multi-process trainer and several DDC systems
- Simulation packages: Fluent, Aspen Plus, MATLAB, G Proms, GPS-X, HYSYS
- Mechanical Unit Operations lab
- Chemical reaction, technical analysis, momentum transfer



## Ongoing Projects

- Reduction in greenhouse gas emission with synergistic mixed matrix membrane for CO<sub>2</sub> separation.
- Environmental and Energy Impacts of Higher Alcohol and Biofuel Synthesis by Thermo-chemical Process (SPARC)
- Ultrasonically synthesized microspheres for biomedical and food industries. (SPARC)
- Training of trainers towards capacity buildings in skill and education (ToT-CBSE) under MSDE-UKIERI skills thematic institutional partnership.
- Development of new approach in waste-water treatment with self cleaning membrane technology and regeneration of membranes via natural source for restoring water ecosystem.
- Biohydrogen Production from Industrial Wastewater Using Microbial Electrolysis Cell
- Design of a controller for enhancing the hydrogen production in microbial electrolysis cell.



## M.Tech ELECTRONICS AND COMMUNICATION ENGINEERING

### Department Profile

The Department of Electronics and Communication Engineering was established in 1968. Since its establishment, the Department strives to maintain its high standard by revising its academic syllabi to suit the industrial standards. The alumni consistently feed inputs for improvement on the curriculum and research facilities. The Department has inaugurated a Centre of Excellence in Electronic Packaging & Manufacturing.



# M.Tech COMMUNICATION SYSTEMS

## Course Profile

Recognizing the need for specialist engineers in the Curriculum field of Communications, the Department introduced Communication Systems as a post-graduate course. The course work has been designed with curriculum laying strong emphasis on rigorous mathematical foundation. With in-depth analysis on the principles of Communication and their applications with advanced concepts and recent trends in the fields of Communication and Signal Processing. The students also undergo laboratory programs on the design and implementation of DSP modules and fiber optic devices, besides devoting their entire final year to project work.

## Curriculum

- High Speed Communication Networks
- Advanced Digital Communication
- Broadband Wireless Technologies
- Pattern Recognition and Computational Intelligence
- Optical Communication Systems
- Design of Cognitive Radio
- Microwave Integrated Circuits
- DSP Structures for VLSI
- Probability and Stochastic Processes
- Advanced Digital Signal Processing
- Photonic Integrated Circuits
- Verilog HDL
- Electromagnetic Meta-Materials
- Design of ASICs

## Lab Facilities

- The course has been framed with the right blend of both hardware and software laboratories
- The modern Microwave laboratory is equipped with microwave network analyzers, a digital spectrum analyzer and software-based MIC filter design tools
- The Fiber Optics laboratory contains application specific software packages like PHOTONICS — CAD, OPTSIM etc



- In addition, a CAD center for MIC and RF MEMS has been established with application software such as IN3D, CST MS, FIDELITY and COMSOL
- Besides all these, COMMSIM, COVENTOR, INTELLISUITE, EMPIRE, ADS and ANSOFT HFSS are available for use. Also, WARP V3 KIT Test Bed for Wireless Systems is available.



## Lab Courses

- Microwave and MIC Laboratory
- Fiber Optic Communication Laboratory
- Digital Signal and Image Processing Laboratory

## Ongoing Projects

- Development of Efficient Traffic Monitoring Analytics and Under Vehicle Scanning Inspection System, sponsored by Vandi Technologies, Singapore.
- Development of Dense Deployable Massive MIMO antenna system for 5G Wireless Communications with reduced correlation or Mutual Coupling sponsored by DST, New Delhi.
- Self-Energized UAV-assisted Communications for 5G Wireless Networks sponsored by SPARC and MHRD, India.
- Highly –Compact very large Mode-Area Hybrid Multi-Trench Optical Fiber for High-Power Industrial Lasing Applications sponsored by SERB.
- Management of entities in a distributed NFV Market place using Blockchain sponsored by Intel.
- Automatic prediction of Alzheimer's disease from Optical Coherence Tomography images of Retina using Artificial Intelligence.



# M.Tech VLSI SYSTEM

## Course Profile

Recognizing the need for specialist engineers in the field of VLSI, the department has introduced the VLSI System as a post-graduate course. The course work has been designed with curriculum laying strong emphasis on the rigorous mathematical foundation. With in-depth analysis of the principles of VLSI and their applications with advanced concepts and recent trends in the fields of VLSI and Signal Processing. The students also undergo laboratory programs on the design and implementation of DSP modules, besides devoting their entire final year to project work.

## Curriculum

- Basics of VLSI
- Analog IC Design
- Digital System Design
- Low Power VLSI Circuits
- Electronic Design and Automation Tools
- VLSI System Testing
- High Speed System Design
- Graph Theory and Optimization Techniques
- Architecture of DSPs
- DSP Structures for VLSI
- Verilog HDL
- Design of ASICs

## Lab Facilities

- WARP V3 KIT Test Bed for Wireless Systems.
- Cadence Tools (Virtuoso, Encounter, Spectre, Assura).
- Synopsys Tools (VCS, Design Compiler, Formality, Prime Power, Astro, Jupiter XT, Hercules, StarRCXT).
- Mentor Graphics Tools (IC - Station, Leonardo Spectrum, Calibre, Physical Verification Tools, Parasitic Extraction Tools).
- FPGA Tools from XILINX and ALTERA (Maxplus II & Quartus II), HDL Designer Tool kit, ModelSim & ASIC design tools from Mentor Graphics consisting of Analog & Mixed-Signal ADMS.



## Lab Courses

- ASIC-CAD Laboratory
- Analog IC Design Laboratory
- HDL Programming Laboratory

## Ongoing Projects

- Energy efficient implementation of Multi-modular Exponential techniques for Public-key cryptosystems sponsored by DST, New Delhi.
- In-depth investigation on corrosion and tribological studies on expandable engine sponsored by DRDO.
- Full Duplex and Cognitive Radio Architectures for Spectrally efficient Communications sponsored by UGC and UKIERI
- Adaptive Telemetry System for Launch vehicles-demonstration of Proof of Concept sponsored by ISRO.
- Special Manpower Development Program for Chips to System Design sponsored by MeitY, GoI.
- Design and Implementation of Digital modules of on-Chip Speech Recognition System sponsored by MeitY, GoI.

# M.Tech PROCESS CONTROL AND INSTRUMENTATION

## Department Profile

This course is jointly offered by the Departments of Chemical Engineering (established in 1967) and Instrumentation and Control Engineering (established in 1993). The departments have been the premier centers of excellence, with several prestigious sponsored research projects and consultancy works in the fields of Chemical Engineering and Instrumentation & Control, backed by highly qualified and experienced faculty. The students have been actively participating and presenting technical papers in various conferences across India. As part of the curriculum industrial experts and academicians from prestigious institutes across the country have been delivering lectures and conducting workshops.

## Course Profile

This course was started in 1996 with a specific focus on process instrumentation and control systems. It has acquired significant importance in the process industry. The program strives to train manpower for the ever increasing demands of the industry and academics in this area. Young and dynamic faculty together with state-of-the-art lab facilities makes this program one of its kind in the country.

## Curriculum

- PLC and its Programming
- Real time and Embedded system
- Controller tuning
- Logic and Distributed Control systems
- System Identification and Adaptive control
- Advanced Process Control
- Industrial Instrumentation
- Computational Techniques in Control Engineering
- Process Control And Instrumentation Laboratory



## Lab Facilities

- Biomedical Engineering lab
- Control Engineering Lab
- Embedded Systems Lab
- Industrial Automation Lab
- MEMS Design Centre
- Modeling and Simulation Lab
- Process Control Lab
- Smart Structures Lab
- Virtual Instrumentation Lab



## Ongoing Projects

- Development of nanocomposite coating on MMAW electrodes for reduction of hazardous constituents in welding fumes (Sponsored by DST-TDT-AMT).
- Development and Thermal Analysis of Non-Azide Gas Generating Compositions for automotive Airbag Systems (DST-SERB).
- Experimental Investigation of Impact Initiation of Sound/Light emitting Pyrotechnic.(Sponsored by ARMREB,DRDO)
- Specific Electrical Conductivity of Kerosene Based Fuels (LPSC-ISRO)
- Safety Audit of Powermech project sites,Tamilnadu (POWERMECH PROJECTS Ltd)



# M.Tech INDUSTRIAL AUTOMATION

## Department Profile

Established in the year 1993 to cater the needs of control and instrumentation engineers in industry, R&D organization and for other service sectors in the country. The department activities are focused into three major areas namely, Instrumentation & Sensor Technology, Control & Industrial Automation and Biomedical Engineering. Students have exposed to both academia and industry through courses, industrial lecture, internship and course project at outside organizations. They have been exposed to various facilities in the department and institute through online mode and also given hands on training in embedded systems, cyber security, AI programming, PLC and other required expertise. Hence, even during this pandemic, students will be capable of delivering to the expectations.



## Lab Facilities

- Industrial Automation
- Control Engineering
- Process Control
- Embedded system
- Instrumentation & Sensor Design
- Modelling and Simulation

## Facilities

- Industrial water distribution network simulator
- Industrial process trainers
- PLC and Distributed control system
- Sensor Technology for industry 4.0
- DGX1 Server & GPU Workstations
- 3D Printer and Probe station
- V-Amp 16 channel EEG DAS
- Digital Video EEG
- COMSOL Multi Physics

## Ongoing Projects

- Energy Efficient Water Distribution Management System, Ministry of Electronics and Information Technology.
- Development of an Integrated Health Monitoring System for Large Engineering Structures.
- Development of post-harvest handling and sensor-based smart packaging methods for the export of traditional banana varieties.

## Curriculum

- Measurements in Manufacturing & Process Industries
- Industrial Automation Systems
- AI in Industrial Automation
- Cyber Security in Industrial Automation
- Embedded Systems
- Industrial and Data Communications
- Electric Drives and Control
- Robotics in Industrial Automation
- Industrial Internet of Things
- Intelligent Transportation Systems
- Computer Vision and Image Processing
- Network Control System
- Process Instrumentation and Automation Lab
- AI and Robotics Lab

# M.Tech MECHANICAL ENGINEERING

## Department Profile

The Mechanical Engineering Department has the reputation of being amongst the finest in the country since its inception. The department strives to be at par with the latest developments in the field. With dedicated, highly qualified and experienced faculty members in all streams of Mechanical Engineering, the department aims at providing world-class facilities for education and research. An interactive relationship is maintained between the students and staff which ensures effective learning.





# M.Tech INDUSTRIAL SAFETY ENGINEERING

## Course Profile

A postgraduate program in Industrial Safety Engineering was started in 1985, with the support of BHEL-Trichy, as a multidisciplinary program. The course is aimed at developing managerial and engineering skills to administer Health, Safety & Environmental functions. Continually updated curriculum addressing the current and future needs and faculty team consisting of practicing HSE professionals facilitate in transforming the students to competent professionals.

## Curriculum

- Fire Engineering and Explosion control
- Safety Management
- Occupational Health and Hygiene
- Human Factors and Ergonomics
- Regulation for Health, Safety, and Environment
- Computer Aided Risk Analysis
- Material Handling and PPE
- Safety in the Engineering Industry
- Electrical Safety
- Safety in the Chemical Industry
- Environmental Pollution Control
- Probability and Statistics
- Industrial Safety Lab
- Industrial Hygiene and Ergonomics Laboratory

## Lab Facilities

- PPE (Personal Protective Equipment) Lab
- Safety Helmets, Safety Shields, Safety Shoes, Safety Belts, Safety Gloves, Leather Hand Sleeve, Leather Leg Guard, Ear Muff, Earplug, Safety Apron, Safety Goggles, Safety Respirators, Dust Mask
- BAM Friction Tester
- Impact Sensitivity Tester
- DSC (Differential scanning Calorimetry).
- Fume Test Chamber
- Personal Air Sampler
- High Volume Sampler
- National Model Centre for Occupational Health Services (OHS) an ILO/UNDP Project of BHEL-Trichy



- Sound Level meters, Noise dosi Meters, Air samplers, WBGT Index meters & KATA thermometer, LUX Meter, Treadmill & ECG for measuring work capacity



## Ongoing Projects

- Development of nanocomposite coating on MMAW electrodes for reduction of hazardous constituents in welding fumes (Sponsored by DST-TDT-AMT).
- Development and Thermal Analysis of Non-Azide Gas Generating Compositions for Automotive Airbag Systems (DST-SERB).
- Experimental Investigation of Impact Initiation of Sound/Light emitting Pyrotechnic(Sponsored by ARMREB, DRDO ).
- Specific Electrical Conductivity of Kerosene Based Fuels (LPSC-ISRO).
- Safety Audit of Powermech project sites, Tamil nadu (POWERMECH PROJECTS Ltd).

# M.Tech THERMAL POWER ENGINEERING

## Course Profile

This programme is designed to provide a sound and in-depth knowledge in various aspects of design, manufacture, test, control and evaluation of thermal equipment. Thermal power plants have been increasingly dominant in the power generation sector. The course content aims at developing the necessary analytical and technical competence among engineers in this area

## Curriculum

- Fuels, Combustion and Emission Control
- Advanced Fluid Mechanics
- Advanced Heat Transfer
- Analysis of Thermal Power Cycles
- Analysis and Design of Pressure Vessels
- Power Plant Instrumentation
- Finite Element Method in Heat Transfer Analysis
- Boiler Auxiliaries and Performance Evaluation
- Design and Optimization of Thermal Energy Systems
- Computational Fluid Dynamics
- Advanced IC Engines
- Heat Transfer Equipment Design
- Advanced Engineering Simulation Laboratory
- Advanced Thermal Engineering Laboratory

## Lab Facilities

- Thermal Lab: Advanced instruments like integrated thermal analyzer, Temperature calibration bath and infrared thermometer.
- Metrology Lab, Turbo Machines lab, Dynamics Lab, Heat and mass transfer Lab, Refrigeration and Air Conditioning Lab, Automobile Lab
- CAD Centre : Advanced Modeling and Analysis Packages , Auto CAD 2000 , Ansys, Unigraphics, Pro/ENGINEER , IDEAS and Catia



- CFD packages like Fluent/Gambit , Pheonix ,Online Hue Gas Analyzer and Hightech calorimeter



## Ongoing Projects

- Experimental investigation of thermal cracking due to rewetting phenomena during metal quenching process (DST-SERB)
- Study on the heat transfer characteristics of low melt alloy encapsulated PCM for satellite avionics thermal management (ISRO RESPOND).
- Experimental Investigation on Dual Fuel Engine Using Compressed Natural Gas and Pyrolysis waste engine oil (DST-SERB).
- Methanol Fed High Energy Density Fuel Cell System with Novel Catalyst and Flow Field Design (DST-UKIERI)
- In depth investigations on corrosion and tribological characteristics on expendable engine (GTRE-DRDO).
- Environmental and Energy Impacts of Higher Alcohol and Biofuel Synthesis by Thermochemical Process (MHRD-SPARC)
- BARC - DAE Technologies Display and Dissemination Facility (DTDDF) – installation and research (BARC).
- Design and development of solar photo-voltaic powered cold (DST-IPHEE).



# M.Tech ENERGY ENGINEERING

## Department Profile

CEESAT- Centre for Energy and Environmental Science and Technology or DEE - Department of Energy and Environment formed under the protocol signed by the Government of India and the United Kingdom. The department has been incepted as an interdisciplinary nodal Centre to enhance the excellence in training, research and consultancy in Energy and Environmental Science. Main emphasis will be given to the identification of appropriate technologies for the efficient production, distribution and use of energy.

## Course Profile

The two year M.Tech. course on Energy Engineering aims at offering a competency based education to emphasize an Energy Engineer to perform tasks such as choosing an energy source evaluating its economic viability, choosing an energy option with reference to environmental benefits, setting up energy management as a regular feature, selecting appliances and designing suitable devices and energy auditing and devising conservation schemes.

## Curriculum

- Energy Audit and Management
- Computational Fluid Dynamics
- Design of Heat Transfer Equipments
- Energy Systems Modelling and Analysis
- Solar Energy Utilisation
- Wind Energy and Hydro Power Systems
- Smart Grid Systems
- Advanced Fossil Fuel Technologies
- E-vehicle Technology and Mobility
- Bio-energy Technologies
- Batteries and Fuel cells
- Fuel Cells for Stationary and Automotive Applications
- Environmental Engineering and Pollution Control



## Lab Facilities

- **Computational Fluid Dynamics Lab**  
Ansys 16.2, 1 workstation-Dell precision with 2 Intel Xeon CPUs, 16 cores, 64GB RAM
- **Solar Energy Lab**  
Solar flat plate collectors, solar parabolic concentrator test Rig, Solar stand alone PV system SKW, Solar pyranometer, UV Radio meter, Online data logger
- **Energy Audit Lab**  
Power Quality Analyser, Thermal Imaging Camera
- **Calibration Lab**  
Pressure, Temperature, Electrical calibrators
- **Testing and Analysis Lab (ISO 9001:2008)**  
Bomb Calorimeter, Moisture Analyser, TOC Analyser, TGA Analyser, CHNSO Analyser, UV/Visible NIR & FTIR Spectrophotometer
- **Bioenergy - Algae and Biotechnological research lab (ISO 9001:2008)**
- **E NABL accredited calibration lab ISO/IEC 17025:2017**
- **Environmental Engineering lab**  
BOD incubator & Analyser, COD thermo reactor, Flue gas Analyser, High volume sampler

## Ongoing Projects

- DST Project : "Switchable polarity solvents, magnetic nanocomposites and metabolic engineering approach for enhancing Triacylglycerol content in marine microalgae towards economic biodiesel production".
- Safe disposal of missile cannister after missile firing.
- DST Project: New electrode materials for potassium ion based energy storage technologies.
- DST project under the scheme of Science for Equity Empowerment and Development division titled - "Biomass driven trigeneration system for improving the livelihood of Scheduled Tribes at Athanavur Village, Yellagiri Hills, Tamil Nadu"

# M.Tech METALLURGICAL AND MATERIALS ENGINEERING

## Department Profile

The Department of Metallurgical and Materials Engineering was established in 1967. Since its inception, It is one of the premier centers of excellence in the field of Metallurgical and Materials Sciences. It offers three PG programs with specialization in Welding Engineering, Materials Science & Engineering, and Industrial Metallurgy. All three courses have been attracting candidates with varied engineering backgrounds. Highly qualified faculty handles the lectures and in addition, guest lectures are delivered by eminent professionals from premier organizations such as WRI-BHEL, DRDO, and IGCAR. The department also played a key role in the launching of CECASE. The department is accredited for 5 years by the National Board of Accreditation (NBA).





# M.Tech INDUSTRIAL METALLURGY

## Course Profile

This unique course ensures that the student achieves the necessary technical expertise as a practicing metallurgist in the field of manufacturing and service industries. The course includes microscopic analysis of metals, corrosion, the study of these metals, and their use in fabrication industries. Students undergo summer training in industries like TATA Steel, Saint Gobain, Ultra Tech Cement, Cummins India, Jindal Stainless Ltd., Defence Metallurgical Research Laboratory (DMRL), and ISRO to gain practical knowledge. The unique students of this course used to work and participate in multidisciplinary environments as well as to develop entrepreneur skills.

## Curriculum

- Ferrous Foundry Metallurgy
- Physical Metallurgy
- Metal Joining
- Corrosion Engineering
- Surface Engineering
- NDT
- Industrial Heat Treatment
- Welding Technology
- Foundry Technology
- Mechanical Behavior of Materials
- Testing, Inspection and Characterization
- Metal Forming
- Particulate Technology
- Design and Selection of Materials
- Developments in Iron Making and Steel Making
- Manufacturing Technology
- Additive Manufacturing
- Nano-Materials & Technology



## Lab Facilities

- Vacuum Arc Melting, Atmosphere Controlled High Temperature Furnaces.
- UTM (60T & 100T), Rockwell Hardness Tester, Brinell Hardness Tester, Micro Hardness 'Tester, Impact Testing Machine, Torsion Testing Machine, Jominy Hardenability Setup
- Scanning Electron Microscope
- Abrasion Wear Tester, High Temperature Wear Tester.
- Spark Plasma Sintering, Micro Sintering furnace

## Ongoing Projects

- **ISRO:** Structure and mechanical properties of ultrafine grained Cu-Cr/Cu-Cr-Zr-Ti alloy processed by equal channel angular processing.
- **CSIR:** Mechano-chemical Synthesis of Nanostructured Magnesium Silicide Thermo-electric materials by Spark Plasma Sintering.
- **DST-EMEO:** Development of Nano-Oxide Dispersion Strengthened Ferritic / Martensitic Steels by Spark Plasma Sintering and Study their High Temperature Properties.
- **DST:** Development Nano-structured Magnesium Silicide Thermo-electric materials by Spark Plasma Sintering and Evaluation of Electric Power Generation from Thermal Systems
- **NRB:** Development of High Strength Cast Al-Si Alloy Based Composite Reinforced with High Entropy Alloy Particles for Naval Torpedo Applications

# M.Tech WELDING ENGINEERING

## Course Profile

The Post Graduate program in Welding Engineering was started in 1978 in collaboration with Welding Research Institute (WRI) BHEL, Tiruchirappalli. This unique course meets the growing demands of technological expertise in the field of welding. The students go through two semesters of course work learning various subjects related to Metallurgy / Welding both from the regular faculty of the Metallurgical and Materials Engineering Department and the experts from WRI handle theory and practical classes. They share their technical expertise and research knowledge. Students visit fabrication industries like BHEL and GB industry to gain practical knowledge. The students are particularly encouraged to get a feel for various welding techniques and also get exposed to Failure Analysis.

## Curriculum

- Welding Metallurgy
- Welding Codes and Standards
- Welding Processes
- Welding Application Technology
- Design of Weldments
- Physical Metallurgy
- Testing, Inspection and Characterization
- Repair Welding and Reclamation
- Non Destructive Testing
- Corrosion Engineering
- Mechanical Behaviour of Materials
- Design and Selection of Materials
- Additive Manufacturing

## Lab Facilities

- Inverter with CMT facility, Multipurpose Welding Inverter, MicroPlasma Welding unit, FSW Machine, SMAW, GLAW with AC & DC pulsing, GMAW, Diffusion Bonding Machine, Automated GTAW facility.



- Scanning Electron Microscope, High Resolution Optical Microscope with Photographic Attachment, Image Analyzer, In-situ Metallography Facility.

## Ongoing Projects

- **UGC-DAE-CSR sponsored project:**

Welding of Titanium tube to Steel tube plate/tube by using an improved FWTIPET process.

- **VSSC/ISRO Project:**

Friction Stir Welding of Aluminium Alloys for Aerospace Applications.

- **Royal Academy UK:**

Application of multiscale modelling for dissimilar welding and improving graduate employability in India. A study on the properties of dissimilar weldments between P92 - S304H materials.





# M.Tech

## MATERIALS SCIENCE AND ENGINEERING

### Course Profile

This unique course ensures that the student achieves the necessary technological expertise required in metal fabrication. This unique course ensures that the student achieves the necessary technological expertise required in the fields of manufacturing, material development, and materials research. The students go through two semesters of course work learning various subjects related to Metallurgy / Material Science. The course includes microscopic analysis of metals, the study of electrical, optical, magnetic properties of metals, ceramics, polymers, biomaterials, and their use in industries. Students undergo summer training in industries like TATA Steel, Saint Gobain, Ultra Tech Cement, Cummins India, Jindal Stainless Ltd., Defence Metallurgical Research Laboratory (DMRL), and ISRO to gain practical knowledge. The students are particularly encouraged to get a feel for the latest developments in Engineering Materials.



### Lab Facilities

- Sieve Analyzer, Mineral Crusher, Simultaneous Thermal Analyzer, Viscosity Measurement System, Diamond Cutter, Metallography Specimen Preparation Equipment, 3D Cutter, Electrolytic Etching Unit
- Abrasion Wear Tester, High Temperature Wear Tester
- Scanning Electron Microscope, High Resolution Optical Microscope with Photographic Attachment, Image Analyzer,

### Curriculum

- Physical Metallurgy
- Thermodynamics and Kinetics
- Electrical, Magnetic and Optical Properties of Materials
- Ceramic Science & Technology
- Additive Manufacturing
- Polymers and Composites
- Non-Destructive Testing
- Metallic Materials
- Testing Inspection and Characterization
- Design and Selection of Materials
- Particulate Technology
- Developments in Iron Making and Steel Making
- Mechanical Behaviour of Materials
- Surface Engineering
- Manufacturing Technology
- Metallurgical Failure Analysis
- Corrosion Engineering
- Nano-Materials & Technology

### Ongoing Projects

- **DRDO/GTRE:** In depth Investigations on Corrosion and Tribological properties of Expendable Engine.
- **DST:** Development of Black zinc Nickel Coating as Replacement to Cadmium Coating used in Aerospace and Defence Applications.
- **DST:** Development of Nanostructured Titanium Implants with Bioactive and Antibacterial Composite Coatings for Dental and Maxillofacial Application.
- **DRDO:** Fabrication of Corrosion and Wear Resistant Ceramic Composite Coatings on Al Alloys by Plasma Electrolytic Oxidation for Defense Applications.
- **DST (Indo Russian Joint Project):** Corrosion and Wear Resistant Ceramic Composite Coatings on Reactor Grade Zircalloys by Plasma Electrolytic Oxidation for Nuclear Fuel Cladding Applications.
- **SERB:** Development of High Surface Area, Micro Porous Plasma Electrolytic Oxide Layers on Commercially Pure Titanium as Promising Systems for Photocatalytic Applications.
- **ISRO:** Strength Enhancement of AA2219 Aluminium Alloy Sheets/Plates by Cryo Rolling for Usage in Tankage Applications

# M.Tech PRODUCTION ENGINEERING

## Department Profile

Production engineering is a professional practice of manufacturing technology with management science. The goal is to accomplish the manufacturing processes effectively and efficiently. The curriculum of Production engineering encompasses the contents with engineering materials, casting technology, machining technology, physical and mechanical joining processes, tool engineering, metrology, manufacturing systems, automation and Rapid manufacturing





# M.Tech INDUSTRIAL ENGINEERING AND MANAGEMENT

## Course Profile

This course intends to shape the students in tune with the advanced Industrial Engineering tools by imparting essential imports both on theoretical and practical exposures by the inputs in advanced topics like TQM, Computer simulation, Modelling and analysis of Modern Manufacturing Systems and Planning and Control of Manufacturing Systems.

## Curriculum

- Data analytics
- Industrial Engineering and Productivity Management
- Analysis and control of manufacturing systems
- Advanced operations and research
- Intelligent Manufacturing Systems=
- Quality and reliability engineering
- Supply chain management
- Modeling, Simulation and Analysis
- Financial Management
- Design of Experiments
- Total Quality Management & Six Sigma
- Project Management
- Lean & Agile Manufacturing
- Advanced Optimization Techniques

## Lab Facilities

- Simulation Lab — SimQuick, ARENA, WITNESS, flexsim
- Intelligent System Laboratory
- Operations Management —TORA, GAMS, CPLEX, OM Expert
- Data analytics Lab — SYSTAT., GaBi, SPSS
- CAD/CAM packages — Pro/ENGINEER Wildfire, Ideas, Unigraphics, ANSYS 14.5
- Supply Chain Management Laboratory
- Ergonomics Laboratory



## Ongoing Projects

- Development of tailor made spur gears for light weight and heavy duty power transmission systems - sponsored by SERB
- Research work to establish HPTR brazing at GTRE - sponsored by Defence Res and Dev organisation
- Research work for laser micro cladding of titanium and nickel based alloy shafts - sponsored by Defence Res and Dev organisation
- Investigations on Modeling and implementation of Sustainable Manufacturing strategies in an automotive component manufacturing organization.
- Investigation of Wire Electrical Discharge and Abrasive Water Jet Machining of Inconel 617.
- Machinability studies on Incoloy 800H using carbide tools.
- Experimental investigation on micro/nanolaser patterning for Anti-Reflectance of Silicon.



# M.Tech MANUFACTURING TECHNOLOGY

## Course Profile

This course intends to shape the students in tune with advanced methods of manufacturing technology by imparting essential inputs on practical and theoretical exposures vogue in present day industries with proper assistance of computer during 2 years tenure of the study, by imparting inputs by way of revising conventional topics of manufacture like CAD/CAM/CIM and FMS, inputs in allied topics like Management, Maintenance, TQM, TPM & communication.

## Curriculum

- Advanced Tooling and Automation Inspection
- CNC Technology
- Manufacturing Management
- Heat Treatment
- Modeling for Manufacturing Process
- Laser in Manufacturing
- Manufacturing of Non-Metallic Products
- Manufacturing Automation and Mechatronics
- Advanced Machining Technology
- Advanced Forming Technology
- Advanced Welding Technology
- Tribology
- Additive Manufacturing
- Advanced Optimization Techniques

## Lab Facilities

- CAD/CAM packages — Pro/ENGINEER Wildfire, Ideas, Unig CAD/CAM/CIM Lab : Pro/ENGINEER 2000i, Unigraphics15.0, IDEAS master series 5.0, AutoCAD 2002, AutoCAD 2000, AutoCAD R14, MATLAB 7.8, Abaqus 6.09, ANSYS 14.5.
- Trainer & Advanced CNC Lab : Emco PC Turn 55, Emco PC Mill 55, Triac-3-Axis Milling Machine, EMCO Compact-CNC, HMT STC-15 Turning Centre, Hardford VMC, Leadwell CNC-Turning centre
- Robotics Lab

- Composite Processing Lab
- Micro/Nano Engineering Lab : FIST
- Mechatronics Lab
- Rapid Prototype Lab
- Surface engineering, Tribology and Machinability
- Studies lab
- Advanced welding lab
- Machinability studies lab
- Graphics, ANSYS 14.5



## Ongoing Projects

- Development of tailor made spur gears for light weight and heavy duty power transmission systems - sponsored by SERB
- Research work to establish HPTR brazing at GTRE - sponsored by Defence Res and Dev organisation
- Research work for laser micro cladding of titanium and nickel based alloy shafts - sponsored by Defence Res and Dev organisation
- Investigations on Modeling and implementation of Sustainable Manufacturing strategies in an automotive component manufacturing organization.
- Investigation of Wire Electrical Discharge and Abrasive Water Jet Machining of Inconel 617.
- Machinability studies on Incoloy 800H using carbide tools.
- Experimental investigation on micro/nanolaser patterning for Anti-Reflectance of Silicon.



# M.Tech NON-DESTRUCTIVE TESTING

## Course Profile

The course spans over a period of four semesters with equal emphasis on theory and hands on experience. The first two semesters are dedicated to theory, practicals and field work. The field work, where the students visit various laboratories and workshops of BHEL, exposes them to advanced NDT techniques. The final two semesters are dedicated for project work at prestigious industries and research institutions like CNDE IIT Madras, NAL - Bangalore, IGCAR - Kalpakkam, NML - Jamshedpur, BARC Mumbai, ISRO Trivandrum, WRI- BHEL and NDTL- BHEL. Students concurrently get qualified for ASNT Level 2, from ISNT chapter and get registered to ISNT as student members.



## Lab Facilities

- Phased Array Ultrasonic Testing
- Time of Flight Diffraction Testing
- Thermography Inspection
- Pulsed Echo Ultrasonic Technique (Analog and Digital).
- C-scan Immersion Testing Machine.
- Eddy Current Testing
- Advanced Optical Inspection
- Liquid penetrant Testing
- Magnetic Particle Testing
- Table Top Magnetic Particle Testing
- X-ray Diffractometer
- Friction Stir Welding
- X-Ray Radiographic Testing

## Curriculum

- Visual Testing
- Liquid Penetrant Testing
- Magnetic Particle Testing
- Eddy Current Testing
- Ultrasonic Testing
- Radiographic Testing, Radiation Safety
- Industrial Computed Tomography
- Phased Array Techniques
- Time of Flight Diffraction
- Ultrasonic Guided Waves
- Laser Ultrasonics
- Non-linear Ultrasonic
- Structural Health Monitoring
- Acoustic Emission Inspection
- Leak Testing
- Thermographic NDE
- Digital Signal and Image Processing
- Basics of Engineering Materials
- Materials Characterization Techniques
- Composite Technology
- Fabrication Technology
- Fracture Mechanics and Failure of Materials
- Corrosion
- Computational Techniques

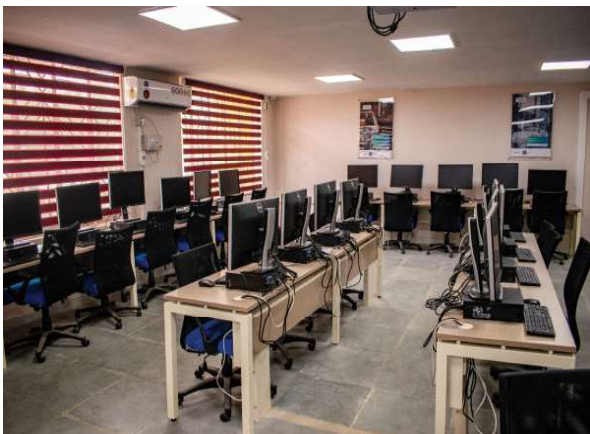
## Ongoing Projects

- Development of High Surface Area, Microporous Plasma Electrolytic Oxide Layers on Commercially Pure Titanium as Promising Systems for Photocatalytic Applications.
- Development of nanostructured Titanium implants with bioactive antibacterial composite for dental and maxillofacial application.
- Deposition of earth abundant ternary CuZnS thin films and Fabrication of Cadmium free solar cells.
- Multiple Exciton Harvesting at Zero-Dimensional/Two-Dimensional (ZnO/MoS<sub>2</sub>) – Polymer Heterostructures.
- Conversion of Waste Energy into Useful Electricity for Wireless Sensor Nodes.

# SIEMENS CENTRE OF EXCELLENCE IN MANUFACTURING

## About Centre

The Siemens CoE in Manufacturing, established in 2018 at National Institute of Technology, Tiruchirappalli, operates with a primary focus of creating a robust technical education eco-system through its experience in industrial products and services. There are 12 sophisticated Laboratories for Design and Validation, Advanced Manufacturing, Test and Optimization, Automation, Electrical and Energy savings, Process Instrumentation, Mechatronics, CNC Machines, CNC Controller, Robotics, Rapid Prototyping and Internet of Things which provides opportunity for promising innovations. This multi-faceted unique centre offers skill development courses, Internships, Research and Development assistance and Industrial consultancy services across various sectors.





## OTHER SIDE



Festember is the annual cultural festival of NIT Trichy. Every year, students of not only our Institute but those of other colleges also await in pleasure for fest that is a platform to showcase their talent and also to have fun. Festember 2019 managed to pull a crowd of 15000 students from over 500 colleges across India. With the blessing of the Administration, it had its humble origins in 1975 when a small group of students wanted to provide some other form of entertainment to their peers. It has grown exponentially since then and has ever looked back. Till today, Festember has been a completely student run fest and shall continue to do so. Alumni always remember Festember as the pinnacle of their college days and reminisce fondly about it. Apart from being the joyous distraction that it is, Festember also manages to impart important life skills like leadership, time management, and organizational skills to its members who make up the different teams of the fest.







Pragyan is the ISO 9001:2008 & 20121:2012 certified International Techno management Organization of the National Institute of Technology Tiruchirappalli. Since its inception in 2005, the completely student run festival has been held in the beginning months of the even semester. Pragyan witnesses participants from over 400 colleges across the country, leading to a footfall in the thousands over the three days of fest. With a 700 plus student volunteer force, Pragyan is the first student-run organization in the world and the third overall next only to London Olympics and Manchester United to get an ISO 20121:2012 Certification for Sustainable Event Management. In keeping with the tagline. "Let's Celebrate Technology", everything from sponsorships to associations with other institutions and the organization of the fest are done by the students with the gracious help of the Institute administration. Pragyan at its core strives to show that technology is every one's cup of tea. It is in this belief that Pragyan is throughout



PGion is a confluence of culture and entertainment where students get the perfect opportunity to express their creative side. There are a wide range of activities that students can participate in, like singing along with the melodic performance of the Music band or listening to the soothing instrumental session or even watching the various immaculately choreographed dance events planned for the day. The highlight of PGion is the Traditional Walk where models take to the ramp and flaunt diverse ethnic dresses from different states and cultures. There are also Rangoli making events for students to put their design skills to the test and spot events for spectators to keep themselves engaged and active throughout the day. PGion provides a perfect platform for the PG students to display their artistic talents and improve their managerial skills while having a good time.



## CLUBS & STUDENT GROUP



Office of Alumni Relations is an official body of the Institute comprising faculty, RECAL office bearers and students, it aims to bridge the gap between NIT Trichy Alumni fraternity and the Institute and maintains it. It hosts several Alumni meets throughout the year. Alumni Guest Lectures, Workshops and Mentorship programs are also arranged to tap the full potential of the Alumni and to ensure strong student- alumni interaction.



PPC (Pupil for Pupil Committee) was founded by PG students of NIT Trichy in 2005. The main aim of this student run organization is to help poor and needy children get access to educational materials such as books, bags, pens, etc. PPC is a non-profit organization. It organizes various sports tournaments which are evenly distributed throughout the academic year. Sale of old newspapers available in the PG hostels is a major source of funds for PPC.

We have clubs such as Apekshaa, Rotaract, Leo and Spirit-Ed that take part in various social activities in our locality.



Dance, Music, Drama and Visual Arts are all mediums of expression of feelings of the inner self. They consist of gifted people who display their talents from time to time. These groups conduct various events at regular intervals to propagate the spirit of expression. They have won accolades in several events conducted in different colleges around the country. Anything that captivates the eye or that comes across as a pleasing sight, is a source of positive energy for the soul and calms the mind. The various clubs dedicated to Fine Arts in the Institute do just that.

## TRAINING & PLACEMENT



The Department of Training and Placement is the marketing division of the institute. Over the years, the department, acting as an interface between Institute and companies has maintained symbiotic, vibrant and purposeful relationship with industries across the country. As a result, it has built up an impressive placement record both in terms of percentage of students placed as well as number of companies visiting the campus. The department hosts companies on campus and ensures that every aspirant is assured of a bright career of their choice.



## HOSTING COMPANIES ON CAMPUS

The department provides facilities for the visiting companies to conduct pre-placement talks, written tests, group discussions and interviews. Audio visual aids like laptops, LCD projectors for pre-placement talks and internet facilities for online tests will be arranged upon prior intimation. Conveyance from/to airport or railway station is arranged by the department. Accommodation and food is provided at the institute guest house for the company on prior intimation and the cost of these are borne by the institute. In case the company executives wish to stay outside the campus, all arrangements for their accommodation will be made, but costs are to be borne by the company.

## FUNCTIONS AND RESPONSIBILITIES

Nurtures industry-institute interaction, by organizing and coordinating frequent industrial visits, In-plant training and Projects of industrial relevance for the students, with the sole aim of zeroing down the hiatus between the industry and the academia.

Organises & coordinates campus placement program to fulfil its commitment of a career to every aspirant. Helps every student define their career interest through individual expert counselling.

Makes available updated database and job profile of the companies and thus helps each student analyse and choose a company of his/her interest. The department has in its active file database of nearly 500 companies. Works toward continuing education for the employees.

Receives and forwards the feedback pertinent to curriculum improvement from the visiting companies to the faculty to ensure that the curriculum follows the latest industrial trend.





## PLACEMENT PROCESS

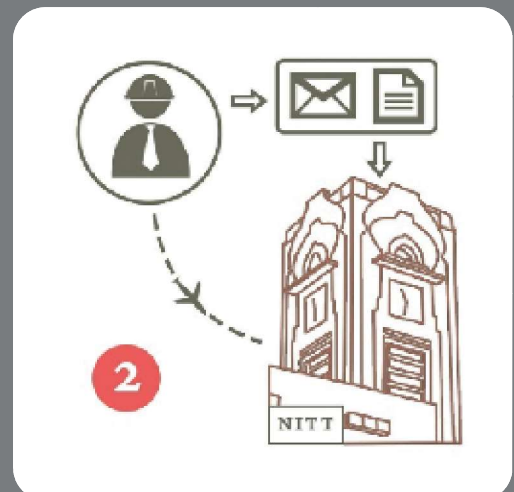


### INVITATION

The Placement Office sends invitations to companies/organisations along with UG and PG brochures and Pre Visit Response (PVR) sheet through mail.

### REVERT WITH PRE VISIT RESPONSE

Interested companies will revert with filled-in Pre Visit Response (PVR) sheet which contains details such as job description, streams, eligibility criteria, compensation details and selection procedure.



### STUDENTS ARE NOTIFIED

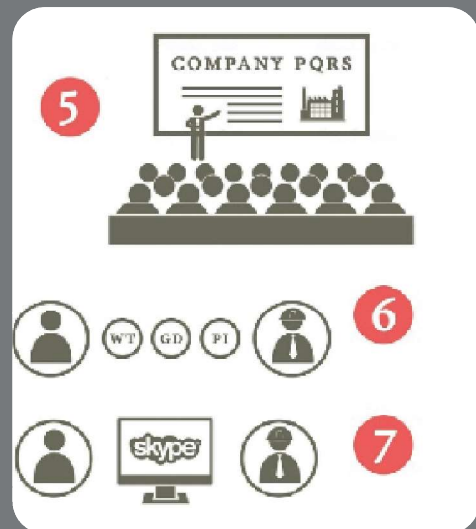
Students are notified about the company requirements and the list of the interested candidates will be collected and forwarded to the company.

Dates will be allotted for the selection process on campus.

## PPT AND PLACEMENT PROCESS

The Training and Placement Department will provide audio visual requirements such as laptops and LCD projectors for Pre- Placement talk before the placement procedure begins.

Pre-Placement talk is followed by the placement process as per the company's requirements.



## RESULTS & OFFER LETTERS

After the completion of the placement process, the company is required to give the list of the selected candidates to the Training and Placement Department on the same day itself.

Offer letters can be sent to Training and Placement Department to the address mentioned in the last page of the brochure through courier.

Training and Placement Department conducts several activities for the benefit of students throughout the year.

### Campus Placement Coaching (CPC)

An intensive coaching is given to the students in pre-final year which will help in improving their interpersonal and technical skills.

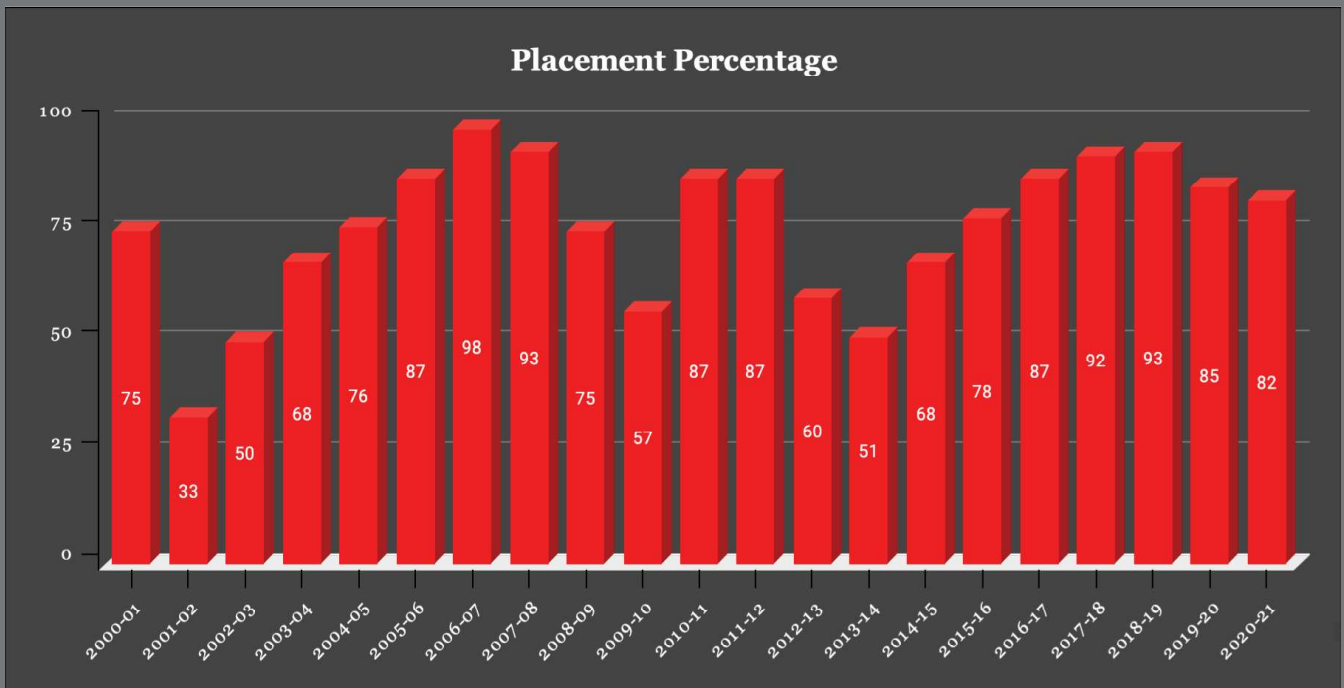
### Resume verification

All the resumes will be verified for the authenticity by the Training and Placement Department.

As a part of placement coaching the Training and Placement Department conducts aptitude, verbal and technical test; Group discussions and Personal Interviews.



## PLACEMENT STATISTICS



Overall Placement



Companies Visiting

## OUR ESTEEMED RECRUITERS



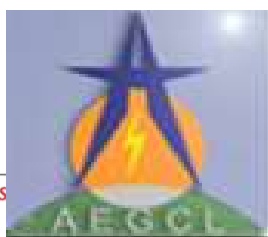




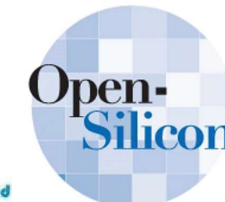




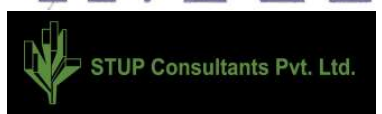




PASSION AT WORK



Pranav Vikas (India) Limited



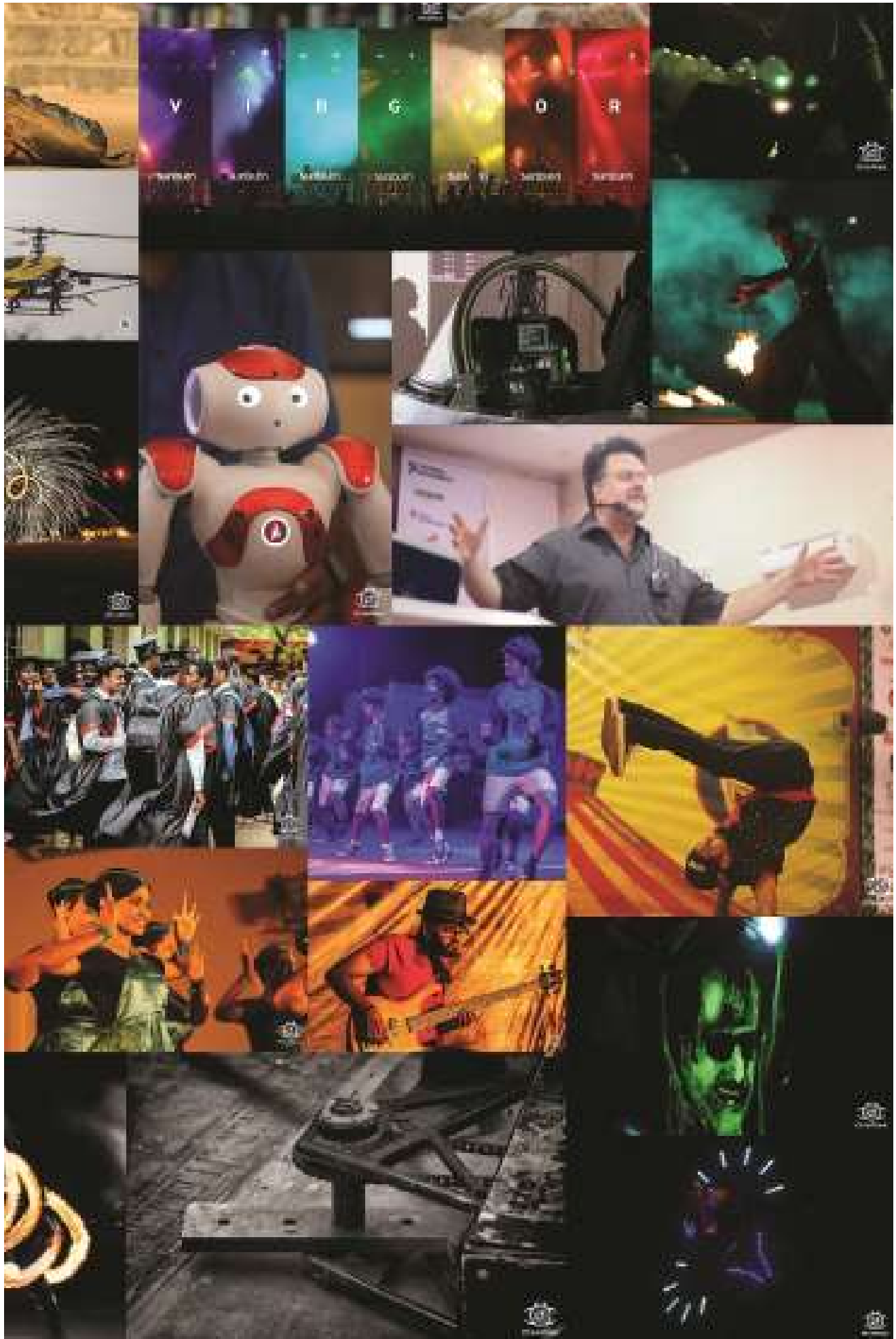






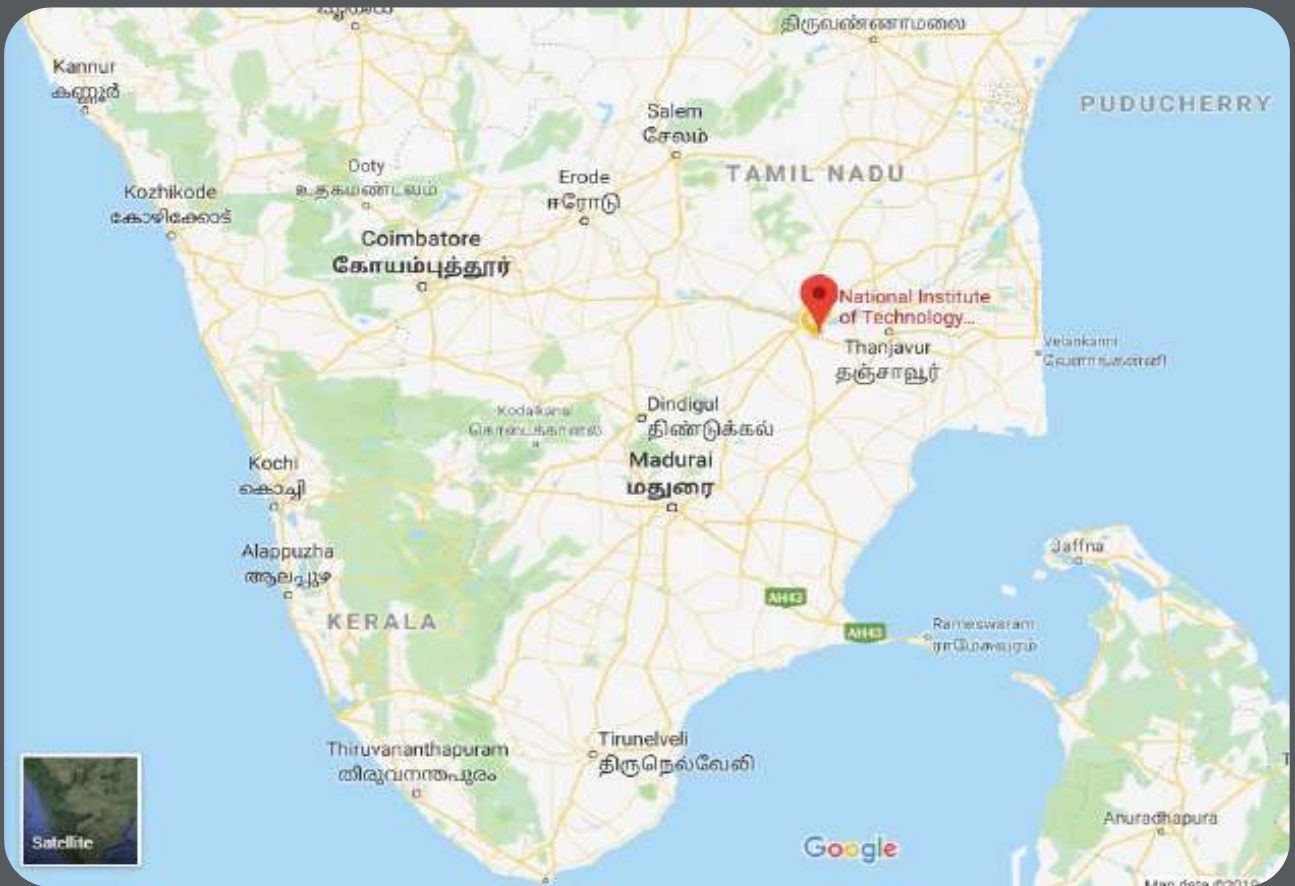
# STUDENT LIFE







## Institute Location



CAPSTONE

From	To	Flight Name	Departure	Arrival
Chennai	Trichy	Indigo 7143	04:56	06:25
Chennai	Trichy	Indigo 7143	08:00	09:10
Chennai	Trichy	Indigo 7145	09:30	11:00
Chennai	Trichy	Indigo 7147	13:15	14:15
Hyderabad	Trichy	Indigo 7127	10:00	13:50
Hyderabad	Trichy	Indigo 7236	04:55	08:50
Hyderabad	Trichy	Indigo 7127	08:50	13:50
Bangalore	Trichy	Indigo 7236	07:40	08:50
Bangalore	Trichy	Indigo 7738	19:40	21:00
Bangalore	Trichy	Indigo 7162	10:30	11:50

Scan QR Code for Location



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Professor & Head  
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