Department of Architecture

Birla Institute of Technology, Mesra, Ranchi established the Department of Architecture in 1993. It is the only institute in Jharkhand offering Council of Architecture (COA) approved undergraduate course in architecture (B Arch), Institution of Planners, India (ITPI) recognized post-graduate course in urban planning (MUP) and PhD program in both Architecture and Urban Planning.

Programmes offered	Course Duration	Sanctioned intake
Bachelor of Architecture (BArch)	5 Years (10 Semesters)	40
Master of Urban Planning (MUP)	2 Years (4 Semesters)	12
Doctoral program in architecture and planning (Ph.D.)	-	-

What is Urban Planning?

'A dynamic profession that works to improve the welfare of the people and their communities by creating a convenient, equitable, healthy, sustainable and attractive places for present and future generations.'

Studying in the Masters in Urban Planning Programme

Department of Architecture, BIT Mesra, offering Masters in Urban Planning Programme is a leading center for research and teaching in urban planning, urban design, and sustainable design. The department is noted for its meticulous teaching leading to fundamental, applied research and collaboration with leading experts from practice and industry. Since the inception of the course in 2007, the Department has made substantial contribution in national and international arena by rendering academic and professional services.

Vision

The underlying vision of the Department for the Masters in Urban Planning programme is to equip the students with academic knowledge in coherence with industry demand so that they actively contribute in the contemporary domain, by

- Providing professional services that are rooted to the basics thereby contributing wholesomely to nation building.
- Providing individuals who can make significant contribution to the advancement of the society and make it a congenial place to live
- Preparing students for leadership roles in the fields of Urban Planning and Management.

Mission

The mission of the Department of Architecture for Masters in Urban Planning Programme is to foster a student-centered educational program in urban planning. The programme through its pedagogy which is heuristic and responsive to technological, cultural, and social environments, seeks to offer a diverse, interdisciplinary and rigorous curriculum that will promote personal development and professional excellence.

Approval of the course

The MUP programme of the Department of Architecture is approved by All India Council for Technical Education (AICTE) and Institute of Town Planners India (ITPI). The programme is offered at BIT Mesra since 2007.

Faculties

The laurels for upbringing the department to its present stature is shared by a host of faculty members having expertise in various fields of architecture namely Regional Planning, Urban Planning, Transportation Planning, Historic Area Conservation, Urban Design, Housing, Sustainable design, Infrastructure planning and the likes.

Facilities

The Department is a seat of learning powered by state of art laboratories. Architecture students spend time in laboratories and design studios working on a wide variety of projects. The department houses within its laboratories various software including:

- AUTOCAD
- NVMET 4.0
- ARCGIS 10.4.1
- Bentley Building Information Modeling
- IBM SPSS Statistics 24

❖ The department also houses a Building Science Laboratory which accommodates within it state of art instruments namely

- Total weather station
- Surface temperature measuring gun
- Data logger
- Light meter
- Indoor Air Quality Handled meter

❖ 3 D printing facility, a central facility of the Institute, gives students an unique opportunity to manifest imaginations.

❖ The department is also facilitated by A0 printing and scanning facility.

Field study trips

Some of the essential components of Urban Planning education aresurvey, techniques of data collection and communication with stakeholders. Conducting field study trips facilitates the students to have a direct interaction with the aforementioned and increases exposure and experience. The department, to promote this culture, organizes two week field study trips as own expenses. The trips are organized in some urban center of India housing a proportionate mix of problems and prospects.

The curriculum

First Year (Sem 1 & 2)

The commencing year is structured around introducing urban planning and its allied fields of study, concepts and basics so as to develop key understanding and application skills. The subjects cover specialized aspectsand concepts related to planning at ward level, small urban area level and related urban design. The students in the second semester are exposed to development plan exercises which are key to urban planning.

Second year (Sem 3 & 4)

This year advances student's knowledge in the field of planning and planning technologies through theories and practical training. This final year is designed to equip the students further for the industry. Independent research skills are nurtured through completion of a dissertation, which allows a student to develop final year dissertation project in a relevant area of their choice. At the end of this year, a student is expected to be storehouse of knowledge and expertise in their selected domain.

Training and placements

At the end of the 2nd semester, students are required to go for 6 weeks Industrial / office training to have significant exposure to industry and based on their performances most of them are placed in that organization. Our alumni from the department are placed in various national and global organizations and are contributing to national development.

Department of Bio-Engineering

The Department of Bioengineering, renamed in 2014, was established in 2002 as Department of Biotechnology with financial support from the Department of Agriculture, Government of Jharkhand, with objectives like providing education and training facilities, carrying out application oriented research, developing in-house technologies and promoting consultancy services in various areas of Biotechnology.

Programmes Offered	Course Duration	Sanctioned Intakes
B.Tech. Biotechnology	4 Years (8 Semesters)	60
M.Tech. Biotechnology	2 Years (4 Semesters)	18
M.Sc. Biotechnology	2 Years (4 Semesters)	30
Ph. D. Programme	-	-

The Vision & Mission of the Department are:

Vision of the Department:

- The Department of Bioengineering has a vision to impart international standard quality education in the field of Bioscience, Biotechnology and Bioengineering.

Mission of the Department:

- To create state-of-the-art infrastructure for Research and Training in Biotechnology and Bioengineering.
- To provide globally acceptable technical education in Bioscience, Biotechnology and Bioengineering.
- To nurture graduates for innovation and creativity in the field of Bioscience, Biotechnology and Bioengineering having ethical and social concern.
- To promote collaboration with Academia, Industries and Research Organizations at National and International level.
- To contribute to socioeconomic development through education and bio-entrepreneurship

All the programs are approved by All India council for technical education (AICTE) and BE and M.Tech. Biotechnology programs are accredited by National Board of Accreditation (NBA)

The different programmes seek to provide students with education and training in:

- Scientific principles and knowledge underlying advances in bioengineering
- Basic laboratory techniques in research and development
- Legal and intellectual property issues
- Tools involved in bioinformatics, imaging and signal processing
- Skill and attributes important in business and bio-entrepreneurship

Further the learning approach encourages team spirit and leadership quality among students to prepare them for challenging careers, including:

- Research positions in laboratories
- Biotech industries including biopharmaceuticals, medical devices
- Careers in biotechnology applications
- Management positions in bioengineering sector
- Careers with Law firms in biotechnology
- Software development and management

Department at a Glance:

- Independent building about 35000 sq. ft.
- 12 well equipped high end research laboratories dedicated to carry out basic and advanced research in the field of Molecular Biology, Genetic Engineering and Cell Biology, Plant and Animal Biotechnology, Microbiology, Biochemistry, Proteomics, Bioinformatics, Bioprocess Engineering, Chemical Engineering, Environmental Biotechnology, Biomedical Instrumentation and Imaging.
- A Center of Excellence (CoE) under TEQIP, Phase II sponsored by World Bank, BTISnet SubDIC Bioinformatics centre for Jharkhand.
- More than 50 externally funded projects from funding agencies like DST, DBT, DST-SERB, UGC, AICTE, ICMR, CSIR, NAIP, MoFPI etc.
- A mixed and balanced well recognized faculty members with rich academic and research profile.
- All academic faculty members hold PhD degree and vary in their field of specialisation. Department provides high end computational software / platform for students.

Department of Chemical Engineering

The Department of Chemical Engineering with well qualified faculty provides high standard of education in the diversified fields of Chemical Engineering and Chemical Technology. The Department received national recognition by winning the Gold Trophy for Plasticon Award 2012 in the category of Best Educational Institution Contributing to Plastics. The Plasticon Award was conferred on 1st February 2012, at 8th International Plastics Exhibition and conference. The programme was supported by Ministry of Chemicals and Fertilizers, Department of Chemicals and Petrochemicals, Government of India. Faculty members are working on sponsored projects and collaborative research with various organizations. The Department is also recognized under DST-FIST. Department is recipient of a major grant from Ministry of Food Processing Technology, Govt. of India, for infrastructure development for programmes in Food Technology.

Programmes Offered	Course Duration	Sanctioned Intake
B.Tech. in Chemical Engineering	4 Years (8 Semesters)	60
M.Tech. in Chemical Engineering	2 Years (4 Semesters)	18
Integrated M.Sc. (Food Technology)	5 Years (10 Semesters)	30
Ph.D. Programme		

Vision of the Department:

To be a centre of excellence for the provision of effective teaching/learning, skill development and research in the areas of Chemical Engineering and allied areas through the application of Chemical Engineering principles.

Mission of the Department:

- To educate and prepare graduate engineers with critical thinking skills in the areas of chemical engineering & polymer science and engineering, who will be the leaders in industry, academia and administrative services both at national and international levels.
- To inculcate a fundamental knowledge base in undergraduate students which enable them to carry out post-graduate study, do innovative interdisciplinary doctoral research and to be engaged in long-life learning.
- To train students in addressing the challenges in chemical, petrochemical, polymer and allied industries by developing sustainable and eco-friendly technologies.

The undergraduate programme B.Tech. (Chemical Engineering) imparts high standard training, emphasizing on Chemical Engineering fundamentals - Heat Transfer, Mass Transfer, Fluid Flow, Process Control, Reaction Engineering, Computer Aided Engineering etc to groom them to carry out economic and environment friendly design, technology development and operation of a wide range of chemical plants – Industrial chemicals, petroleum, polymers, pharmaceuticals, cement, fertilizer, fuel, processed food etc. The core curriculum is complemented by electives in the important emerging areas like Nanotechnology, Biotechnology, Food Technology, Polymer Engineering, Energy Engineering etc.

The M.Tech.(Chemical Engineering) programme deals with topics on advanced Transport Phenomena, Reaction Engineering, Thermodynamics along with elective courses on Polymer Processing, Specialty Polymers, Nano-science and Nanotechnology, Plant Design, Surface Engineering

Food Processing Industry in India is growing at a very fast pace. Envisaging a great demand for qualified food technologists in our country, from 2014 academic year with support from Ministry of Food Processing Industries 5 year Integrated M.Sc. (Food Technology), with exit option as well as lateral entry after three years, has been introduced. The courses include training in the area of Food Composition and Chemistry, Food Biochemistry and Human Nutrition, Food Microbiology, Food Plant sanitation, Food Analysis and Quality Control, Food Preservation and Processing Technology, Chemical Engineering unit operations in Food Processing Industries, Food Packaging, Post-Harvest Technology etc.

The Department also offers facilities for Ph. D. programme in fields of

a. Chemical Engineering,
b. Polymer Science and Technology and
c. Food processing and Technology

Apart from standard Chemical Engineering laboratories like Fluid Flow, Heat Transfer, Mass Transfer, Reaction Engineering, Process Control etc. the Department of Chemical Engineering has state of the art facilities for Post Graduate and Doctoral Research in Reaction Engineering, Instrumental Analysis of chemicals and Polymer, Polymer Processing, Product Development Laboratory etc. The major facilities include computer controlled reactors, Haake Minilab Micro Compounder and Haake Minilab micro injection Moulding, Air Bearing Rotational Rheometer, Malvern, HAAKE Torque Rheometer with Mixer and Extruder, Oscillating Disc Rheometer, Instron Tensile Testing machine, ATLAS accelerated weathering system, Dynamic Mechanical Thermal analyzer (TA), Gas Chromatograph. The Polymer Processing and Product development facilities include Injection Moulding machines - 80 ton L&T Ergotech and 25 ton Windsor, Extrusion Blow moulding machine with parison programming, Kolsite Single screw extruder, Kolsite Film blowing plant and PVC pipe Extrusion plant, Two roll mixing mills, Thermoforming, Compression moulding, Welding facilities – Ultrasonic and Hot air, Fused Deposition Modeling system, Stratasys, for rapid prototyping, MCP-HEK vacuum casting machine for prototyping, 3 axis CNC EDM machine etc.

The students are trained in various CAE applications ASPEN Plus, Accelerys -Material Studio for molecular simulation, MATLAB, PROENGINEER, ANSYS, CATIA, FLUENT, POLYFLOW, MOLDFLOW etc. E-learning facility has been created with Paulsons Training Basic Injection Moulding, Simtech, Single Screw Extrusion, and Compounding with Twin Screw Extruder.

Laboratories in the area of Food Technology include Food Processing Laboratory, Food Microbiology Laboratory, and Food Analysis Laboratory. The Food Processing Laboratory includes Pulper machine, vegetable dicing machine, Juice Extraction, Homogenizer, Twin Screw Extrusion cooker, Homogenizer, Colloidal Mill, Grinders, Can Body Reformer, Canning Retort, Steam generator, Steam jacketed cooker, Tray dryer, fluidized bed dryer, Vacuum bottle Filling machine, Form Fill and Seal packaging etc. Food Microbiology lab with Autoclave, Laminar flow clean air workstation, BOD incubator has the expertise of microbiological tests of water and food. The Food Analysis and quality Control facilities included Flame photometer, HPLC, Digital colorimeter, NIR Spectral Analyzer, UV-VIS Spectrophotometer etc. The other required equipment are available in Central Instrumentation Facility are also available. The facilities are being augmented with capability for determination of protein by Kjeldahl method, dietary and crude fibre determination, Fat determination, Food Texture Analysis, Atomic Absorption Spectrophotometry, Spray drying, etc.

RESEARCH AREA:

Nanoparticle synthesis, Catalysts, Advanced Polymer Composites, Alternative Energy, Pollution Control, Water Treatment Technologies, Polymer Blends and Interpenetrating Polymer Networks, Nano filtration Membrane, Recycling of Polymer Waste, Specialty Polymer, Colloids and Interfacial Science, Tissue Engineering, Sensors, Fuel Cell Membrane etc.

Department of Chemistry

The Department of Chemistry was established in 1956 and is dedicated to providing a high quality chemistry education at both undergraduate & postgraduate level. The department supports the institute's undergraduate, postgraduate and Ph.D. programmes in pure and applied chemistry.

The department has a strong pool of well qualified, motivated and student friendly faculty members. The department is well supported financially through "Fund for Improvement in Science & Technology Infrastructure" (FIST) and research project through DST, DBT, AICTE, UGC, CSIR etc.

Programmes Offered	Course Duration	Sanctioned Intake
M.Sc. in Chemistry	2 Year (4-Semesters)	15
Integrated M.Sc. in Chemistry	5 years (10- Semesters)	40
Ph.D. programme		

Vision of the Department:

- **To become a recognized centre of excellence for teaching and research in Chemical Sciences through producing excellent academicians, professionals, entrepreneur and innovators**

Mission of the Department:

- **Inoculate fundamental concepts of Chemical Sciences to students & scholars through our state of art laboratory, teaching, research facilities and building a scientific environment towards innovation with quality research.**

Salient Features of Integrated M.Sc. programme in Chemistry:

- **Strong industry-academia interactions to facilitate curriculum development and to enhance and broaden job prospects.**
- **Ample opportunities for the interested students to carry out research project work in the various basic and interdisciplinary areas of organic/inorganic/physical/medicinal/computational/material/polymer/nanochemistry etc.**
- **Exit option with a B.Sc. degree is available after completion of three years, which enables students to take admission in M.Sc. and Integrated Ph.D. programs of various prestigious academic and research organizations.**

Alumni :

- **Availing exit options, some of our students have been admitted to Integrated Ph.D. programs of IITs, IISERs etc.**
- **Some students are pursuing doctoral studies in US & European universities on full scholarship having excelled in their academics, GRE and TOEFL exams.**

Department of Civil and Environmental Engineering

The Department of Civil Engineering was established in 1957. It was renamed as Department of Civil and Environmental Engineering in 2014. There are well established laboratories in the department. The faculty members are well qualified and are having degrees from reputed Institutes. They are actively involved in research and consultancy. The department had contributed a lot in the infrastructural and industrial growth in Jharkhand by providing technical expertise and consultancy.

Programmes Offered		Course Duration	Sanctioned Intake
B.E. in Civil Engineering		4 Years (8 Semesters)	60
M.Tech. in Civil - in two specializations	a) Soil Mechanics & Foundation Engineering	2 Years (4 Semesters)	12
	b) Structural Engineering	2 Years (4 Semesters)	12
M.Tech. in Environmental Science & Engineering		2 Years (4 Semesters)	18
Ph.D. Programme		-	--

The following are the important research areas in which faculty members and research scholars are working.

Air Pollution, Applied Hydrology, Bioremediation, Composite Materials, Concrete Structures, Durability of Concrete, Geo-environmental Engineering, Groundwater Flow Modelling, Groundwater Quality Management, Heavy Metal Pollution, Intelligent Modelling in Geotechnical Engineering, Mine Slope Stability Analysis, Open Channel Hydraulics, Pavement Materials, Soil Stablisation, Solid Waste Management, Structural Dynamics, Wastewater Treatment, Water Quality Assessment.

Vision of the Department:

- To develop quality intellectuals through education, research and motivation so that they could bring a positive contribution to society in the area of civil and environmental engineering.

Mission of the Department:

- To develop professional skills through quality education and research.
- To outreach various sectors of society through interdisciplinary programmes and practical oriented approach.
- To create dynamic, logical, and effective leaders with inspiring mind sets.

About the Programmes:

M.Tech. Soil Mechanics & Foundation Engineering

Programme Educational Objectives

1. To impart students with strong knowledge base through theory courses & sessionals in Soil Mechanics & Foundation Engineering that makes them suitable for industries, academics, research & consultancy.
2. To enrich research and practices, by inspiring the leaders of tomorrow to take on the challenge with ease and confidence.
3. To train the students on developing practical, efficient & cost effective solutions on problems & challenges on Soil Mechanics & Foundation Engineering.
4. Implant sensitivity towards ethics, public policies and their responsibilities towards the society.

Programme Outcomes

The Students will develop ability

1. An ability to independently carry out research /investigation and development work to solve practical problems.
2. An ability to write and present a substantial technical report/document.
3. Students should be able to demonstrate a degree of mastery over the area as per the specialization of the program. The mastery should be at a level higher than the requirements in the appropriate bachelor program.
4. To apply in-depth knowledge gained during the PG Soil Mechanics and Foundation Engineering program in analysing and interpreting real life problems for providing the optimal and achievable solutions considering its technical, professional, and ethical aspects.
5. To enable him/ her in identifying &understanding the impact of Geotechnical Engineering problems and their solutions in global, economic, environmental, and social context.
6. To learn and unlearn throughout his professional career, and be willing to learn new techniques, methods and processes related to Geotechnical Engineering from simple to complex, with an understanding of the associated limitations.

M.Tech. in Structural Engineering

Programme Educational Objectives

1. To impart students with strong knowledge base through theory courses and sessional that makes them suitable for industries, academics, research and consultancies.
2. To develop students analytical, computational and research skills through assignments, weekly presentations and modelling software.
3. To train the students on developing practical, efficient and cost-effective solutions on problems and challenges on structural engineering.
4. To inculcate among student's sensitivity towards social and corporate responsibilities.

Programme Outcomes

1. An ability to independently carry out research /investigation and development work to solve practical problems.
2. An ability to write and present a substantial technical report/document.
3. Students should be able to demonstrate a degree of mastery for designing and solving structural engineering problems.
4. An ability to use appropriate modern tools in structural engineering. In doing so he should demonstrate sufficient knowledge of competing tools and their relative merits and demerits.
5. An ability to demonstrate the traits of learning and unlearning throughout his professional career, and be willing to learn new techniques, methods and processes.
6. Tune his knowledge to be a responsible engineer adhering to all established practices of his profession.

M.Tech. in Environmental Science & Engineering

Programme Educational Objectives

1. To impart students with strong knowledge base through theory courses and sessional that makes them suitable for industries, academics, research and consultancies.
2. To develop students analytical, computational and research skills through assignments, weekly presentations and modeling software.
3. To train the students on developing practical, efficient and cost effective solutions on problems and challenges on environmental sciences and engineering.
4. To inculcate among students sensitivity towards social and corporate responsibilities.

Programme Outcomes

1. Develop an ability to independently carry out research /investigation and development work to solve practical problems.
2. Develop an ability to write and present a substantial technical report/document.
3. Acquire a degree of mastery over the area as per the specialization of the program. The mastery should be at a level higher than the requirements in the appropriate bachelor program.
4. Acquire in-depth knowledge about various environmental processes, analyze and design solutions for complex problems related to environmental and public health.
5. Be able to critically evaluate environmental sustainability and sensitize communities through effective communications and assess alternative solutions for adequate decision making for overall environmental management.
6. Acquire professional and intellectual integrity and ethics to produce socially responsible and competent environmental scientists and engineers.

Department of Computer Science & Engineering

The Department of Computer Science & Engineering was established in the year 1983 and is now recognized as one of the leading departments with infrastructure and facilities to match the very best in the country. The department remains committed towards its mission, which is twofold. One is to provide students with the fundamental knowledge and problem solving skills in Computer Science required for a fulfilling career. The other goal is to create and disseminate knowledge to improve Computer Science research, education and practice.

The department has academic collaborations with University of New Brunswick, Canada, University of Melbourne, Australia and University of Manitoba, Canada.
Link : https://www.bitmesra.ac.in/Show_Department_Section?cid=1&deptid=70

The department currently offers the following programmes, all of which are approved by the All India Council for Technical Education (AICTE).

Programmes Offered	Course Duration	Sanctioned Intake
B.Tech. in Computer Science & Engineering	4 Years (8 Semesters)	120
B.Tech. in Information Technology	4 Years (8 Semesters)	60
Master of Computer Applications (MCA)	3 Years (6 Semesters)	60
M.Tech. in Computer Science & Engineering	2 Years (4 Semesters)	16
M.Tech. in Information Technology	2 Years (4 Semesters)	18
M.Tech. in Information Security	2 Years (4 Semesters)	18
Ph.D. Programme	-	-

Vision of the Department:

The department strives to be recognized for outstanding education and research, leading to excellent professionals and innovators in the field of Computer Science and Engineering, who can positively contribute to the society.

Mission of the Department:

- To impart quality education and equip the students with strong foundation that could make them capable of handling challenges of the new century.
- To maintain state of the art research facilities and facilitate interaction with world's leading universities, industries and research organization for constant improvement in the quality of education and research.

Research Areas(Not limited to)

- Digital Image Processing
- Parallel Computing
- Soft Computing (Rough Sets & Near Sets, Fuzzy Sets, Neural Network)
- Machine Learning
- Natural Language Processing
- Information Retrieval
- Software Engineering
- Pattern Recognition
- Bigdata Analysis
- Network & Security

Facilities available:

The department is equipped with seven laboratories with over 450 computers available for conducting laboratory sessions in diverse topics like –

1. Programming languages: C, C++, Java, and Oracle
2. Matlab for Soft Computing and Image Processing
3. Rational Rose for Software Engineering
4. Laboratories for Networking, Multimedia, Simulation, Parallel Computing etc.

All the Laboratories are internally networked allowing students to remotely access resources at any point in time. The department has a **HPC Server** (**Master Node**- 2 no of Intel Xeon E5-2630 v3 2.4GHz processors with 8 core and 64 GB memory, 2*1 TB HDD, **CPU Compute Node**- 2 no of Intel Xeon processor E5 2630 V3@ 2.4 GHz with 8 core in each processor and 64 GB memory, 500 GB Disk capacity FDR infiniband, **GPU Compute Node-** 1 no of GPU node with 2 no of Nvidia K20 GPU with node specifications of 2 processor(Each 8 core) and 64 GB memory. 2 Nos 500 GB HDD, FDR InfiniBand, **Cloud Node**- 1 processors E5-2620 V3@2.4 GHz,6 core and 64 GB Memory, 1 TB HDD, Dual Port FC HBA, **Storage(for HPC and Cloud**)- 48 TB of RAW capacity to be shared via NFS over infiniBand for the entire cluster from Master node. The same storage in partition mode is be used for cloud also), **HP Proliant ML 370 Server, Dell Poweredge Sever** which provides support to numerous departmental and inter departmental research activities.

Faculty Strength

Highly experienced faculties with PhD from premier institutes of India & Abroad in various disciplines.

Placement Record

- In 2017-18, 120 recruiters across the campus visited and offered 915 positions.
- The average salary was INR 9.11 lakhs per annum and the highest national offer was 34.00 lakhs per annum. Most of the CSE students got 2 jobs through campus.

Department of Electronics & Communication Engineering

The Department of Electronics and Communication Engineering was established in the year 1960. The Department of Electronics and Communication Engineering is one of the largest departments of the institute having largest student and faculty strength. Due to its modern infrastructure and exposure given to the students, it is one of the elite departments in India.

Programmes Offered		Course Duration	Sanctioned Intake
B.Tech. in Electronics & Communication Engineering		4 Years (8 Semesters)	120
M.Tech. in Electronics & Communication- in 3 specializations	a) Instrumentation	2 Years (4 Semesters)	12
	b) Microwave	2 Years (4 Semesters)	12
	c) Wireless Communications	2 Years (4 Semesters)	18
Ph.D. Programme		-	-

Vision of the Department:

Become a centre of excellence in teaching and research for creating technical manpower to meet the technological need of the country in the field of Electronics and Communications Engineering. Department exposes the undergraduate students to all fundamental and advanced technology in the field of Electronics and Communication.

Mission of the Department:

- To facilitate state of the art Education and Research at Undergraduate, Post Graduate and Doctoral levels to enable to perform challenging engineering and managerial jobs in the field of Electronics and Communication Engineering.
- To build national capabilities in Technology, Education and Research in emerging areas in the field of Electronics and Communication Engineering.
- To create an environment to provide excellent Research and Development facilities to strengthen Ph.D. programmes and Research Projects.
- To provide excellent Technological Services to bridge the gap between Academics and Industry in order to fulfil the overall academic needs of the society.
- To provide high quality Course Structure in order to turn out qualified professionals to meet the engineering needs of the country.
- To develop effective Teaching Skills and the Research Potentials of the faculty members.
- To ensure All Round Development of the students and to create a platform for turning out engineering professionals who can assume leadership position in society.

Bachelor of Technology:

The Department exposes the undergraduate students to all fundamental and advanced technology in the field of Electronics and Communication. Some of the advanced papers offered in the curriculum are Fibre Optic Communication, Data and Computer Communication, Satellite Communication Systems, Mobile and Cellular Communications, Telecommunication Switching Circuits, Antenna and Wave Propagation, Optical Fibre Network, Intelligent Instrumentation, Bio-electronic Instrumentation, Advanced Microprocessor, Microelectronic Engineering, VLSI Design, Digital Signal Processing Architecture, Digital Image Processing, Random and Stochastic Processes, Information and Coding Theory etc. Besides these the students also learn various computer related papers. The syllabi are frequently updated to incorporate recent developments considering advancements achieved in the national and international scenario.

The Department has several well-equipped laboratories such as Fibre Optics Communication Lab, Microprocessor Lab, Advanced Communication Lab, Microwave Lab, VLSI Design Lab, Intelligent Instrumentation Lab, Antenna Lab, Circuit Simulation Lab, Wireless Networking Lab & DSP Lab, where students are given rigorous practical sessions. The students are also exposed to virtual laboratory simulation packages like MultiSim, CommSim, Ultiboard, MATLAB, LABView, Mdspice, Fidelity, NS-2, Cadence Design Tools, Active HDL and Synplify as well as to hardware assembly and testing practices.

This serves to help the students in gaining practical exposure to these developing technologies. Undergraduate students have to successfully complete a departmental project spanning 3 semesters. Seminars are presented by the students, which give them an opportunity to develop their communication skills. The culmination of these efforts has been the achievement of nearly 100% campus placement in various leading industries and organizations for the last many years.

Master of Technology:

The Department is currently running three postgraduate programmes with specializations in (a) Instrumentation (b) Microwave (c) Wireless Communications.
The students are exposed to some of the specialized software tools such as Cadence design tools, IE3D, Microwave Office, Sonnet, Fidelity, Beampro, SystemView and NS-2 etc apart from various other software tools like LABView and MATLAB.

The department has devoted and qualified expert team of faculty members, who are continuously, involved in various research activities. The department is recipient of UGC assistance of 52.5 Lacs in the form of “Departmental Research Support” under the “Special Assistance Programme (SAP II)” of UGC. Several R & D projects are also being taken up by the faculty members of the department from various agencies like UGC, DST, AICTE, ISRO etc.

Around fifty full time/part-time scholars are registered in the department for Ph. D. programme.

Department of Electrical & Electronics Engineering

The Department of Electrical Engineering was started in 1955. The B.E. curriculum was redesigned in 1986 to accommodate several Electronics and Computer subjects in order to tune its programmes according to changing requirements and since then it has been renamed as Electrical & Electronics Engineering. The Department is dedicated to the current needs of industry primarily focusing on application of new technology in various fields. As recognition of the activities of faculty members, different agencies like UGC, DST, AICTE, CDAC, TEQIP, etc have sanctioned funds to support the on-going research work.

Programmes Offered		Course Duration	Sanctioned Intake
B.Tech. in Electrical & Electronics Engineering		4 Years (8 Semesters)	60
M.Tech. in Electrical Engineering in 3 specializations	(i) Control System	2 Years (4 Semesters)	12
	(ii) Power System	2 Years (4 Semesters)	12
	(iii) Power Electronics	2 Years (4 Semesters)	18
Ph.D. Programme : At present 35 scholars are registered in Ph.D. Programme of the Department			

Vision of the Department:

- To become an internationally recognized center of excellence in academics, research and technological services in the area of Electrical and Electronics Engineering and related inter-disciplinary field.

Mission of the Department:

- Imparting strong fundamental concepts to students and motivate them to find innovative solutions to engineering problems independently
- Developing engineers with managerial attributes capable of applying latest technology with responsibility
- Creation of congenial atmosphere and excellent facilities for undertaking quality research by faculty and students
- To strive for more internationally recognized publication of research papers, books and to obtain patent and copyrights
- To provide excellent technological services to industry for the benefit of society

Programmes Accredited:

All the above courses are approved by AICTE. B.E. (EEE), M.E. (Control System) and M.E. (Power System) and ME (Power Electronics) programmes are accredited by NBA.

Undergraduate Programme:

The emphasis is given on fundamentals of science, mathematics and their application to the solution of contemporary problems. The programme provides ample flexibility to the students to undertake various elective and breadth courses that provide exposure to various disciplines of EEE. The detail information about the course structure and syllabus is given in the website.

Electives offered:

Computer Aided Power System Analysis, Bio Electronics Instrumentation, Artificial Neural Network (ANN), Advanced Power Electronics, Robotics, High Voltage Engg., EHV Power Transmission, Artificial Intelligence, Soft Computing Techniques, Renewable Sources of Electrical Energy, Testing & Commissioning of Electrical Equipment, Embedded System & its Applications.

List of Breadth Papers:

Environment Psychology, Organisation Behaviour, Industrial Organisation & Management, Financial Management, Business Ethics, Intellectual Property Rights, Entrepreneurship & Small Business Management, etc.

Postgraduate Programmes:

M.Tech. in Control System:

In M.Tech. Control Systems Programme focuses on cutting edge control techniques like modern control system, nonlinear control analysis, discrete control techniques, optimal control, robotics, ANN based adaptive control methods, fuzzy logic controllers with advanced model reference learning and stability analysis, etc.

M.Tech. in Power System:

M.Tech. Power systems aims at imparting knowledge on advanced analysis techniques, modern tools in power system operation and control, techniques to improve the performance of EHV AC and HVDC transmission, advanced power system protection systems, planning and reliability analysis, technologies involved with renewable energy sources, DSP applications, etc.

M.Tech. in Power Electronics:

M.Tech. Power Electronics emphasizes on imparting skilled knowledge of advanced semiconductor devices, power electronic converters, their design and control methodology, dynamics of Electrical Machines, Power Electronics applications, Control of electrical drives etc.

Ph. D. Programme:

Currently a number of research scholars are working in the areas of non-stationary signal analysis, intelligent control techniques applied to Phasor Measurement Unit (PMU), Reliability analysis for power system and its components like PMU, Protection Systems, etc., Multi-Agent System (MAS) modelling, Wide Area Monitoring System (WAMS), Distribution System Planning, Automatic Generation Control and non-linear dynamic systems, Real-time Image processing for robotic application, development of new architecture for neural networks, soft computing based intelligent controller design, Fault diagnosis of 3 – φ Induction motor, bi-directional dc-to-dc converters, matrix converter, resonant converter, current source inverter for hybrid electric vehicles, control of induction motor drive, three-phase and multi-phase PM BLDC drive, estimation and identification of plants.

Research Activity:

The faculty members of the department (with different specializations) actively pursue research with funding from various national agencies like UGC, AICTE, DST. The current areas of research include Laboratory Prototype of Smart Grid, digital relaying of transmission using DSP techniques, reliability analysis, generation scheduling, distribution systems planning, voltage stability analysis, Fault tolerant permanent magnet drives, Energy Storage and Management, Grid Interactive Solar Photovoltaic System, Microgrid, bi-directional converters for contactless energy exchange, Image processing applied to vehicular traffic surveillance system, etc.

The research outputs are published in reputed journals like IEEE transactions, IET Proceedings, Elseveir, Taylor & Francis, Polish Academy of Science & Tech., IE (I), etc.

The department has also got two patents in the area of power systems.

Collaboration with Industries and Universities:

The department has collaborated with the Texas Instruments, NI, Research and Development Center for Iron and Steel (RDCIS), SAIL, Metallurgical Consultants Limited (MECON), Meditron (Ranchi), etc.

Conventions/Seminars/Conferences/Short-term Training Programmes:

The Department regularly organizes conventions, seminars, conferences short term training programmes/courses under aegis of AICTE- ISTE, TEQIP, UGC (FIST), NaMPET. Specialized courses for industry (SAIL, Indian Railways) have also been organized.
Keeping in view the development of nearby villages, the Department is also involved in conducting short term training programmes in electrical technical skills to youth.

Facility:

The department has following well-equipped laboratories; Basic Electrical Engineering lab., Measurement Lab., Electrical Machines lab., Power Electronics lab., Electrical Drives lab., Control Systems lab., Process Control Lab., Power Systems lab., Smart Grid lab., Digital Signal Processing lab., Simulation lab., Electrical Workshop.

The main equipment in measurement lab are - Optical transducer, thermal transducer, Kelvin double bridge, LVDT setup, strain gauge setup, setup to determine breakdown voltage of transformer oil.
Electrical Machines lab. houses all static and rotating machines like transformer, induction motor, DC motor, DC generator, synchronous generator (alternator) and motor.

The major equipment in power Electronics lab are - device characterization system, AC - DC, DC-DC, DC - AC conversion systems, Programmable signal generators, signal analyzer, etc.

The department is in the process of establishing a drive lab for enhancing research facility in the field of Power Electronics. The main equipment in Electric Drives Lab which is in the process of upgradation consist of single phase and three phase inverter, rectifier, BLDC Motor, DC Motor, three phase induction motor, etc.

Department of Mathematics

The Department of Mathematics was founded in 1956, under the name Department of Applied Mathematics. It started with only undergraduate program offering to engineering students. Mathematics play an important role in engineering and it is clearly reflected from the fact that it conducts all the mathematics courses offered in different branches of engineering, management, pharmaceutical sciences, architecture and the University polytechnic.

Programmes Offered	Course Duration	Sanctioned Intake
M.Sc. in Mathematics -	2 Years (4 Semesters)	15
Integrated M.Sc. in Mathematics & Computing	5 Years (10 Semesters)	80
Ph.D. Programme	-	-

Vision of the Department:

- To become a globally recognized centre of excellence in teaching and research, producing excellent academicians, professionals and innovators who can positively contribute towards the society.

Mission of the Department:

- Imparting strong fundamental concepts to students in the field of Mathematical Sciences and motivate them towards innovative and emerging areas of research.
- Creation of compatible environment and provide sufficient research facilities for undertaking quality research to achieve global recognition.

Currently, department of mathematics consists of 10 regular faculty members with expertise in both pure and applied mathematics. In addition to the regular faculty members, the department has 11 other faculty members who have joined through TEQIP. They are all well qualified, highly motivated towards teaching and always attempt to cooperate students inside and outside the classroom. Faculties are also involved in research activities and have published their articles in highly impact journals. They are also skilled in writing books on Optimization, Mathematical Modeling, Differential Equations, Operations Research, Vedic Mathematics, Discrete Mathematics, Music and Mathematics and Algorithmic Complexity.

The department runs Ph.D programme, 2-year M.Sc. programme in Mathematics and 5-year Integrated M.Sc. programme (Mathematics and Computing). It has also been actively engaged in organizing conferences, workshops, summer and winter schools, invited lecture series. It also has initiated organizing seminars (two seminars in each month) aiming at distribution of knowledge about research areas among graduate and Ph.D students.

The department is equipped with a modern computer laboratory with latest scientific software such as Matlab, Mathematica, Mathcad, Minitab, SPSS, LINGO etc.

Many of the graduate students have gone for higher studies in reputed academic institution within India and abroad. Our students are getting selected for internship and in-campus / off-campus placement at IIT Bombay, infosys, Wipro, Capital Float, Intutent Incl., Pricewaterhouse coopers, Mu Sigma, Deloitte, TCS, Azim Premji foundation, SAP Labs, Blackberry, Tredence, Hangout Store.

Department of Mechanical Engineering

Since its inception in 1955, the Department of Mechanical Engineering has a wide reputation for the quality of teaching and research it offers. It has been awarded top grades for both teaching and research activities from independent and government bodies. The excellent laboratory facilities, modern computer clusters, systematically designed curriculum, and dedicated faculty members make this Department a dynamic place to study.

Programmes Offered		Course Duration	Sanctioned Intake
B.Tech. in Mechanical Engineering		4 Years (8 Semester)	90
M.Tech. in Mechanical Engineering in following specializations	Heat Power	2 Years (4 Semesters)	12
	Design of Mechanical Equipment	2 Years (4 Semesters)	12
M.Tech. Computer Aided Analysis & Design		2 Years (4 Semesters)	18
M.Tech in Energy Technology		2 Years (4 Semesters)	18
Ph. D. Programmes: Ph.D. degrees are offered by the Department in Mechanical Engineering as well as in multi-disciplinary areas.			

Mechanical Engineering Graduates of BIT Mesra are sought after by many prestigious companies. There is also an excellent career center in campus, which helps the students to get entry into multinational companies.

All degree schemes offered are modular and structured to allow a gradual development of knowledge and skills. During the first two semesters of B.E. Programme, students follow a syllabus of core engineering modules, which are common to all branches of engineering, plus some modules that are specific to the degree scheme. The courses also have a wide practical element based on the lecture modules, including laboratory work assignments, team projects and industrial tours and seminars.

In addition, every student carries out a professional project in their final year. The professional project gives students a chance to apply their engineering skills to real engineering problems. Many professional projects are industrially driven or linked, giving students direct exposure to industry as part of their studies. There is also a strong tutorial system, which provides students with a point of contact with a member of staff who can advise on welfare issues as well. Final year students are getting financial assistance of Rs. 50,000/- to convert their innovative ideas in the form of projects.

Vision of the Department:

The Mechanical Engineering Department of Birla Institute of Technology, Mesra, Ranchi strives to be globally recognized for quality engineering education and research leading to well qualified engineers, academicians and researchers who are innovative, entrepreneurial and successful in achieving excellence in their field of study.

Mission of the Department:

1. *To impart quality education to the students and enhancing their knowledge and skills to be globally competitive Mechanical Engineers.*
2. *To maintain state of the art research facilities to provide its students and faculty to create, interpret, apply and disseminate knowledge with an understanding of the limitations.*
3. *To develop linkages and interaction with industry, R & D organisation and educational institution for excellence in consultancy practices, research and teaching.*
4. *To provide conducive environment for learning, creativity and problem solving skill.*

The department has following well equipped laboratories:

Heat Transfer Lab., Strength of Materials Lab., CAD Lab., Hydraulics and Hydraulic Machines Lab., Theory of Machines Lab., Renewable Energy Lab., Automotive/Adv. Fluid Mechanics Lab., I.C. Engine/Thermal Engg. Lab., Computational Lab., Refrigeration & Air-conditioning Lab. and Autonomous Systems Lab.

Department of Pharmaceutical Science & Technology

The Department of Pharmaceutical Sciences & Technology was established in 1972. It offers the following programmes:

S. No.	Programmes Offered	Sanctioned Intake
1	B. Pharm. - 4-years (8-semesters) programme	60
2	M. Pharm. - 2-years (4-semesters) programme in five specializations a. Pharmaceutics b. Pharmaceutical Chemistry c. Pharmacology d. Pharmaceutical Quality Assurance e. Pharmacognosy	 15 15 15 15 15
3	M. Pharm. - 2-years (4-semester) programme under QIP	08
4	Ph.D. Programmes (including 8 under QIP)	Flexible

The above programmes are recognized by the Pharmacy Council of India (PCI) and the All India Council for Technical Education (AICTE). **The B. Pharm. Programme is accredited by NBA for Five Years (2017-2022).** The Department is recipient of assistance under the Special Assistance Programme (SAP) of the UGC and FIST of the DST. The Department is also recognized and approved by AICTE as one of the Centres for Quality Improvement Programmes (QIP) for postgraduate and Ph.D. programmes.

The course syllabi are updated frequently to incorporate newer developments in Pharmaceutical Sciences & Technology and also to cater the need of Pharmaceutical Industries, Academic Research and Drug Regulatory agencies. Department has facilities for doctoral research in different areas of Pharmaceutical Sciences. A number of Ph.D. degrees have been awarded besides a large number of scholars, registered for Ph.D. in different disciplines of Pharmaceutical Sciences. The Department has highly qualified and competent academic staff.

The faculties of the Department have been handling several R&D projects sponsored by National (UGC, AICTE, CSIR, DST, ICAR, TRIFED, ICMR, etc.) and International (BMBF/New Indigo/UKIERI) funding agencies.

The Department has sophisticated state of the art laboratories besides a computational & molecular modeling laboratory for teaching and research. Some important facilities and instruments available are:

Field Emission Scanning Electron Microscopy (FESEM), ELISA Reader, GelDoc, Differential Scanning Calorimeter (Shimadzu DSC50 & DSC60), ELISA Reader (Perkin-Elmer), Automatic Video Tracking System (Ethovision), Fluorescence Spectrophotometer (Hitachi), Gas Chromatograph (Chemito Ceres 800 Plus), Gel Electrophoresis System, High Performance Liquid Chromatography (Waters and Knauer), Preparative HPLC (Agilent), High Performance Thin Layer Chromatography with WINCAT software (Camag), High Speed Refrigerated Centrifuge, FTIR 8400S (Shimadzu), Research Microscope with photomicrography (Carl-Zeiss) & High Resolution Research Microscope with Digital Camera with PC based screen (Leica), UV-VIS Spectrophotometers 1800 and 2450 (Shimadzu & Systronics), Rotational Viscometer (Wells Brookfield Cone/Plate), Nitrogen and Hydrogen Gas Generator (Claind), Milli Q Water Purification Unit (Millipore), Non – invasive B.P. Instruments (IITC Life Sciences), Plethysmograph (IITC Life Sciences), Microwave Synthesis System (Catalyst 4RI), Lyophillizer (Operon), Rotary Evaporator (Buchi), Probe sonicator, Dissolution Apparatus, Ultracentrifuge, Texture Analyzer, Malvern Viscometer, Nano spray dryer, Humidity chamber (as per ICH), Electromagnetic sieve shaker, Ball mill, Ultra turrax digital homogenizer, etc.

An overview of different areas of research at the Department is as follows:

Pharmaceutics group

New drug delivery system: Controlled release formulations, Transdermal drug delivery systems; Development of nasal delivery system; Colon targeted drug delivery system, self-emulsifying drug delivery system. Thermodynamic approach to drug excipient interactions, Cosmeceuticals (cost-effective skin care poly-herbal formulations), Nanotechnology based formulation development, Exploration of Natural Gum as Pharmaceutical Adjuvants and Standardization of Ayurvedic Drug/Polyherbal Formulations.

Pharmaceutical Chemistry group

In-silico design, synthesis (microwave, combinatorial solution phase synthetic techniques) and evaluation of novel candidate compounds with special reference to antimicrobial, antiprotozoal, antiviral, antiHIV, anticancer, analgesic, antihistaminic, anticonvulsant, cardiovascular, antidiabetic and other activities. Isolation and characterization of natural products using spectroscopic methods (UV-VIS/IR/NMR/MS etc.) besides studies on synthetic nutraceuticals, Molecular modeling, docking, QSAR and solution phase ADME studies using CADD based software like Maestro Glide, BioSolveIT FlexX, Sybyl 7.1, and Scigress Explorer.

Pharmacognosy group

Validation of traditional systems of medicine, validated methodologies for development of new herbal formulations, microcomputerized identification of indigenous drugs & development of standards, development of drug molecules from natural sources and their enhancement by biotechnological approaches, exploring natural resources for novel drug delivery systems.

Pharmacology group

Anti tumor & immunomodulatory studies of compounds from synthetic and natural sources, general pharmacological screening of new moieties from synthetic and natural sources, toxicological studies of bioactive molecules (natural and synthetic sources), neuropharmacological studies of bioactive molecules, studies of bioactive molecules on experimentally induced urolithiasis, nephropathy, neuropathy and diabetes in animal models, biochemical and molecular pharmacological studies of bioactive molecules.

The Department maintains a well-equipped animal house, which is accredited by the Committee for the Purpose of Control and Supervision of Experiments on Animals (CPCSEA). The Department also has a Medicinal Plant Garden spread over 10 acres of land within the Institute Campus. More than 200 plants of medical and aromatic importance have been cultivated and are being maintained in the Herbal Garden. A few aromatic oils such as Citronella (Java), *Cymbopogon martinii*, *Mentha arvensis*, *Mentha piperita*, *Eucalyptus citriodora*, Lemon Grass, are extracted from time to time.

The Department also extends support to other Departments like- Bio-Engineering, Chemical Engineering & Technology, Applied Chemistry, Environmental Science & Engineering, Medical Lab Technology at the University Polytechnic, Hotel Management & Catering Technology and other engineering departments.

Department of Physics

The Department of Physics since its inception in 1955 has played a pivotal role in the institute. A gamut of very motivated, well qualified and talented faculty is actively engaged in teaching as well as research in areas of theoretical and experimental physics and technology. They have, to their credit, numerous research publications and several R&D projects. Some faculty members have been awarded international fellowships from universities abroad and some have received BOYSCAST fellowship awarded by DST, Government of India. The department has also completed Indo Russian, Indo-German and Indo-Israel projects.

Programmes Offered	Course Duration	Sanctioned Intake
Integrated M.Sc. in Physics	5 Years (10 Semesters)	60
M.Sc. in Physics	2 Years (4 Semesters)	15
Ph.D. Programme	-	-

Vision of the Department:

The vision of the department is to achieve excellence in undergraduate, postgraduate education and research for scholarly inquiry and development of new knowledge.

Mission of the Department:

- To train the students to be lifelong learners who will contribute to the creation of new knowledge, new technology, and innovation through excellence in research in emerging areas. To educate students to be the future leaders in science, technology, industry, education and other professions and succeed in a globally competitive environment
- To create national and international collaborations for research engagement in strategic areas of research
- To provide beneficial service to local, state, national and international communities

The prime objectives of the offered programmes are as follows:

- Impart high quality education in a vibrant academic ambience.
- Prepare students to take up challenges as researchers in academic and R & D organizations.
- To train students for participation in multidimensional academic activities.
- To impart scientific knowledge and enhance human values.

The department has well equipped laboratories having several research facilities viz., RF magnetron sputtering, Plasma Enhanced Chemical Vapour Deposition (PECVD), thermal CVD, RF/DC magnetron co-sputtering, plasma nitriding, anodic vacuum arc deposition, plasma arc generator, Raman spectrometer, nanoindenter, solar simulator, D33 meter, PE loop-tracer, UV Visible Spectrometer, 10 K cryostat etc.

At present the department has 17 faculty members and 14 research scholars. The department has been pursuing several sponsored projects funded by the UGC, DST, AICTE, BRNS, ISRO, ARDB, DRDO, NRB and CSIR as well as different bilateral projects of international category. The department has twice received "Fund for Improvement in Science & Technology Infrastructure (FIST)" from DST, New Delhi, as well as Special Assistance Programme (SAP) from UGC.

The current broad areas of research in the department include quantum optics, nonlinear optics, condensed matter physics, nanotechnology, plasma physics, etc. Specific sub-areas are plasma processing of materials, surface engineering with plasma coating, surface modification, anodic vacuum arc deposition of thin films, carbon nanotubes, nitriding coating unit, diamond-like carbon (DLC) films, nano and ultrananocrystalline diamond films, carbon nanotubes, solar cells, nanocrystalline superhard coatings, high temperature superconductivity, colossal magnetoresistive materials, dilute magnetic semiconductors, piezoelectric materials, electronic composite materials, magnetic composites, soliton and light propagation, optical communication, photonic crystal fibres, optoelectronics, etc.

The department has organized various seminars and symposia, recent ones include:

- SERC School on Science and Technology of Plasmas, from 15th-27th December, 2008
- DST-INSPIRE Camp on Basic Sciences from 27th-31st January, 2010
- Recent Developments in Engineering Materials, from 12th - 14th May 2011
- CMDAYS – 2012, from 29th – 31st August 2012
- One Day Workshop on Solar Cell, on 15th May 2014
- National Conference on Nanoscience, Nanotechnology and Advanced Materials (NCNNAM-2016), September, 26-27, 2016

Department of Production Engineering

Since its inception in 1964, The Department of Production Engineering has been imparting quality education to under graduate and post graduate students by training them to meet the demands of the manufacturing industry. The department has established links with the industry, R&D organizations, consultancy organizations and academic institutes in the nearby area in furtherance of the cause of manufacturing engineering. The department sees itself as the pathfinder of emerging technologies and techniques in production engineering, develops students to be technologically and managerially sound to meet the challenges of the rapidly changing manufacturing scenario.

Programmes Offered	Course Duration	Sanctioned Intake
B.E. in Production Engineering	4 Years (8 Semesters)	60
M.Tech. in Automated Manufacturing System	2 Years (4 Semesters)	25
Ph.D. Programme - Manufacturing and Industrial Engineering		

The major long- range goal of the Department is to develop itself as a center of excellence in teaching, consultancy and research in various aspects of Production Engineering. An increasing number of institute-industry collaborations are shaping through sandwich training programs, short term courses, workshops, and live projects for UG, PG and Doctor Level. In this respect, the Department has established well-equipped laboratories, upgrades the syllabi on a regular basis and carries out its teaching and academic programs through its qualified and experienced faculty and visiting professors. Both our graduates and post-graduates have been doing well in the industry and other Universities of higher learning in India and abroad.

Vision of the Department:

- To become a center of repute striving continuously towards providing quality education, research and innovation in the field of production engineering.

Mission of the Department:

- To provide quality education at both undergraduate and postgraduate levels.
- To provide opportunities and facilities for research and innovation.
- To produce engineering graduates to meet the demands of manufacturing industries and R&D organizations.
- To emphasis on integrating manufacturing technology with management.
- To impart latest technological knowledge to students by continuous development of curricula and faculty.

Department of Remote Sensing

Department of Remote Sensing was established in 1997 with an aim to meet the increasing demand for qualified manpower in this rapidly developing field. Application of Remote Sensing / Geoinformatics techniques using tools such as Geographic Information System (GIS) and Global Positioning System (GPS) in various activities including resources evaluation, environmental monitoring and land use/land cover mapping etc, has grown considerably during the last few decades and RS data products are increasingly being used for plan formulation at all levels. An essential pre-requisite to partaking in these opportunities is the building of various indigenous capacities for the development and utilization of space science and technology.

Programmes Offered	Course Duration	Sanctioned Intake
M.Tech in Remote Sensing	2 Years (4 semesters)	18
M.Sc. in Geoinformatics	2 Years (4 semesters)	20
Ph.D. in all branches of Remote Sensing, GIS, Earth Sciences		

Vision of the Department:

- Be a centre of excellence in the field of Remote Sensing and Geoinformatics Technology education and research to match the needs of ever increasing requirement of human resources in these fields and to cater to the larger interest of the Society and Nation.

Mission of the Department:

- Impart quality education and equip the students with strong foundation that could make them capable of handling challenges of the ever advancing technologies.
- Maintain state-of-the-art in research facilities in phase with the world's leading universities and research organisations for constant improvement in the quality of education and research.

THE SIGNIFICANCE OF REMOTE SENSING:

The world is being scanned constantly by highly sophisticated Earth Resources Satellites like IRS
(India), LANDSAT (USA), SPOT (FRANCE), RADARSAT (Canada), IKONOS and Quickbird etc. to study and understand Earth's processes. Recent technological advancements like GPS,UAV, Web & Mobile GIS has accelerated the applications of Geospatial domain in various activities including resources evaluation, environment monitoring and landuse / landcover mapping etc. An essential pre-requisite to avail these opportunities is the building of various indigenous capacities especially qualified manpower.

Keeping this in view the department of Remote Sensing is striving to keep updated with technological development and has expanded with the help of fund from DST-FIST, UGC-SAP, TEQIP. The department offers Post Graduate courses and Ph.D. programme in inter-disciplinary mode. The Department has state-of-art laboratories equipped with latest software, hardware to provide hands-on training to its postgraduate students.
A multi-disciplinary team of faculty members is the strength of the department and they are also engaged in various R&D project & consultancy jobs from various government and international oraganizations. The department also participates in the Distance learning Programmes (EDUSAT) conducted by IIRS, ISRO, Dehradun.

FACILITIES:

The Department has seven dedicated labs catering to DIP, GIS, Digital Photogrammetry, Satellite Navigation & GPS, Remote Sensing Research & Project, and departmental library for Satellite Data and Maps.

ABOUT THE COURSE:

M.Sc. Geoinformatics and M.Tech. Remote Sensing courses are 2 year degree programme. These Degree Programs generally starts each year in the month of July, but the application and advertisement process will start from February onwards. All the courses are conducted in English language.

In M.Tech. course, First year focuses on Theoretical and Practical Aspects of Remote Sensing, GIS, GPS, Photogrammetry, Programming, Geostatistics and various geo-spatial applications. Second year focuses mainly on developing Independent Research Skill.

In the first semester, the basic concepts, know-how procedures related to Geospatial Technology are taught to the students. The second semester delves deep into advanced concepts, modelling in GI domain along with modern photogrammetry using Satellite and UAV along with various Elective Modules. In due course the students are also provided with an opportunity to select OPEN ELECTIVE courses provided across the university. Students are also taught additional skills such as project management, research methods, data acquisition etc. The Third and Fourth semesters focus only on the RESEARCH THESIS. In the Research duration the student is supervised or co-supervised by the faculty.

Option for summer internship at various leading research centres in India is also provided time to time to encourage Academia-Industry Partnership. Students are also taken to field and other National Mapping organisations to expose them with actual process and activities in GI domain.

For MSC, the period of theoretical study is spread over 3 semesters with examination requirements at the end of each semester. Fourth Semester will be allocated only for Research Project. Also in the 3rd semester there will be a mini Project which helps the student to orient towards research over a period of 1 year (i.e., 3rd and 4th semester project together) when they complete their degree course. The Masters program requires 80 credit points. The detailed credit information is provided in the Course Structure.

The Masters program (both M.Tech. and M.Sc.) will help the student to take their future career path in the direction of Natural Resources planning/management, regional planning, GIS Analyst in private growing market and various application domain. At present the qualified Geoinformatics personnel is lacking in most of the Government departments and hence our degree will provide an excellent career enhancement opportunity. Graduates from geography, agriculture, forestry, geology, physics, maths and Engineers in Civil, ECE, EEE and Computer Science can apply for our programmes. For M.Sc. programme one need to have a simple Bachelors degree but for M.Tech. programme the candidate need to have either Masters degree or 4 years Bachelors degree.

PLACEMENT:

M.Tech. Remote Sensing and MSc Geoinformatics degrees from BIT are highly recognised, reputed and well accepted in India and Abroad. Our students are placed at Various Leading Institutions in India such as ISRO, IITs, ICAR, NITs, NGOs and Various Government Departments. Our students have good scope of getting admission in International Universities and many of our alumni are currently carrying out higher education in Beijing, Delft-Netherlands, New York etc. Our students also work as Scientist, GIS Analyst/expert, JRF, SRF, consultant, Lecturer and other positions requiring geoinformatics skills. State Remote Sensing centres, IMD (Indian Meteorological Department), SAC, NRSC, and many governmental organizations, and diverse private sectors are the places our students gets often placed.

FELLOWSHIP/SCHOLARSHIP OPPORTUNITIES:

There are numerous scholarships provided by Indian Government for pursuing Ph.D. degree after these courses such as Rajiv Gandhi Fellowship for SC/ST candidates, Maulana Azad fellowship for Minority Communities, Prime Minister Fellowship, National Fellowship for OBC Candidate, Post-Graduate Indira Gandhi Scholarship for Single Girl Child, Post-Graduate Merit Scholarship for University Rank Holder, "Ishan Uday" for North Eastern Region, UGC-JRF, CSIR-JRF etc.

Department of Space Engineering and Rocketry

The Department of Space Engineering and Rocketry – the first of its kind in the country was established in 1964 to train scientists and engineers in the important areas of Aerospace Engineering and Rocket Technologies. Since 1968 it has been offering a post- graduate degree course leading to M. E. and recently converted to M. Tech., based on newly adopted CBCS curriculum, in Space Engineering and Rocketry with in-depth specialization in two specific areas: Aerodynamics and Rocket Propulsion. The Department aims to provide state of art education and training to its students to enable them to contribute efficiently in the National efforts being made in the fields of Space & Defence related technologies and challenging future missions.

Programmes Offered	Course Duration	Sanctioned Intake
M.Tech. in Space Engineering & Rocketry in two specializations a) Aerodynamics b) Rocket Propulsion	2 Years (4 Semesters)	 12 12
Ph.D. Programme	-	-

Vision of the Department:

- To effectively integrate teaching, research and innovation for significant contribution towards National Aerospace Programmes and related activities.

Mission of the Department:

- To impart quality education and advanced research training leading to postgraduate and doctoral degree.
- To generate modern infrastructure and conducive research atmosphere for carrying out innovative sponsored research projects.
- To nurture spirit of excellence and professional leadership in students and faculty members through exposure to leading academic/ research organisations and external experts.
- To create attractive opportunities for sustained interaction and collaboration with academia and industry.

The Department also provides research facilities at doctoral and postdoctoral levels in the fields of Aerodynamics and Flow Studies, Propellant Technology, Rocket Propulsion and Combustion.

The Rocket Propulsion Laboratory has static test set-ups equipped with a computer controlled firing facility and data acquisition and analysis system for solid, liquid and hybrid rocket motors. Basic infrastructure for design and fabrication of rocket motors is also available in the Department. The Department has developed and flight tested its own rockets of different calibers.

In the area of Propellant Technology, complete processing and characterization facilities are available for rocket propellants and igniters. Advanced techniques and equipments for carrying out research in the areas of high-energy materials, igniters, inhibitors and insulators, and high performance metalized gelled propellants are also available in the Department. High pressure and sub-atmospheric pressure combustion facility also exists for solid propellants.

Modern equipments like simultaneous thermal analyser, thermo-gravimetric analyser, differential scanning calorimeter, viscometers, rheometers, bomb calorimeters, spectrophotometers, Double Planetary Mixure, Micronizer, flame propagation and stability unit etc. are also available for training and research.

In the Aerodynamics Laboratory, 4 wind tunnels, free jet, water tunnel are available to train students and carry out research work in the fields High speed/ Low speed Aerodynamics, and unsteady Aerodynamics. Different types of pressure sensors and flow visualization techniques are available to study the flow field on scaled models of aerospace vehicles. Commercial software ANSYS to carry out CFD related activities is available with high end research licenses. Apart from this, open source CFD Software open FOAM is extensively used for research activities. In-house CFD code developmental activities are also undertaken and is the current research interest of the group.