

Every year in India, student enrollment falls by nearly 50 percent at the post-graduation level. Triparna Ray provides an overview of academically and industrially trending courses.

By Triparna Ray

Students appearing for JEE or GATE are not only showered by society's constant advice, but are also overwhelmed by their own expectations about the future prospects of that particular discipline.

All India Survey on Higher Education (AISHE) 2016-17, conducted by MHRD points out that 4.39 lakh students graduate each year with B.Tech degrees. However, the total number of students who enroll in postgraduate degree has shrunk to 7.2% from 14% of undergraduate enrollments. This stands for 76,694 and 27,091 students in M.Tech and M.E degrees respectively. Professor Hanu Bhardwaj, Head of the Department of Computer Science & Technology, Manav Rachna University, speaking about the challenges faced by students says, "As a fresher, students are not able to decide amongst the plethora of offerings based on their potential and interests. They have a great concern about the kind of placement opportunities they will get after undergoing the programs. As they

approach towards the completion of course, the dilemma of what to do next follows. The alternative left with them is either to choose the path of higher studies or grab a job in the industry."

TRENDING UNDERGRADUATE DEGREES

Mechanical Engineering

In recent years numerous developments in computer-aided design technologies have transformed the face of mechanical engineering with several automation softwares coming to the fore such as CAD, CAM, and CATIA thereby empowering mechanical engineers to develop complex designs. In addition to this, the evolving layout of nanotechnology is drawing mechanical engineers to design ultra-miniature machines and tiny implantable medical devices that steer in the human body searching for disease and abnormalities. Amrita Sengupta, PhD in Mechanical Engineering 1st year at IIT Kharagpur states, "Job prospects after higher education in India does not appear that bright. But since mechanical engineering is considered a cream among all engineering branches, good opportunities are available for people with in-depth knowledge. Apart from joining academic institutes as assistant professors, chances of getting hired in organisations like CMERI, CGCRI, DRDO, BHEL, Tata Motors etc as building systems engineer, cryogenics engineer, fluid mechanics engineer,



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cryogenics engineer etc is also available to them."

Civil Engineering

Civil engineering is an umbrella stream which consists of many inter-connected disciplines. This branch of engineering deals with the design, plan, construction, maintenance, and improvement of the present infrastructure. It also intends to protect the public and ecological habitat. Urbanization and

demand for modernized structures have accentuated the demand of this discipline. Paschal Meehan, Head of Faculty of Applied Science, Engineering and Technology and VP International, Limerick Institute of Technology opines, "Civil Engineers have to acquire more and more awareness of the material technology that is being developed. Material science is now going to be engaged with civil engineering in a way that they have never been in the past. I would say that the future for civil engineers would be converging with the discipline of material science." Graduates in this discipline usually get recruited by firms such as Hindustan Construction Company, Larsen & Toubro, Gammon India, Punj Llyod Group, Jaiprakash Associate Ltd., IVRCL Infrastructures & Projects Ltd.



Computer Science Engineering

Computer Science and Engineering (CSE) is an inter-disciplinary stream combining concepts of computer science and computer engineering. It involves both digital facets of electronics engineering, and several aspects of computer architecture, processor design and parallel computing. This stream focuses on areas like algorithms, artificial intelligence, cryptography, security, graphics, visualization, numerical and symbolic computing. Talking about prospects of research in Computer Science Engineering, Dr. Sunil Khanna, VP of NIIT University reclaims, "General data shows that research/PhD in Computer Science is very less as compared to biotechnology, where the demand for PhD is much more than an undergraduate. Whereas, in the CS/ IT sector it is more focused on the undergraduate program where many of these companies who hire CS graduates are willing to do more project research than long academic research. Major organisations like Qualcomm, Cisco, Samsung, Ericsson, and NLC all

have their research divisions."

Aerospace/Aeronautical Engineering

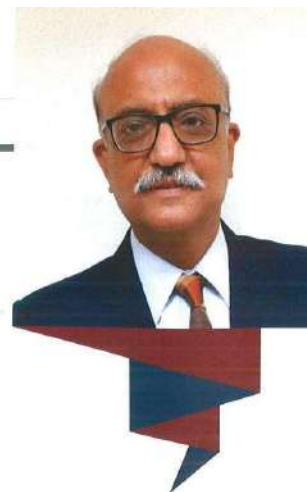
Aerospace engineering is a science of aircraft and spacecraft. It has two branches namely Aeronautical and Astronautical Engineering. Aeronautics emphasizes on the study, designing, and manufacturing of flying machines, and the techniques to operate aircraft and rockets within the atmosphere. Astronautics on the other hand, focuses on the larger applications of technology for better functionality of satellites, manned spacecrafts and ballistic missiles. Both the branches have a scope of lucrative careers in reputed public and private sector firms like Bombardier, GE, DRDO, HAL, Boeing Airbus, BAE Systems, Honeywell and Lockheed Martin. Harsh Dhingra, Chief Country Representative, Bombardier Transportation, India suggests, "As we transform and move forward to achieve sustainable profitable growth at Bombardier, eco-efficiency and innovation will continue to remain at the center of

our business approach. Each year, we contribute to resources, including the time and talents of our people, to meet a range of local needs, focusing primarily on furthering innovation, environmental sustainability and education."

Electronics and Communication Engineering

Electronics & Communication Engineering imparts profound knowledge in topics such as electronic devices; communication equipments like transmitter, receiver, integrated circuits, and basic electronics; analog and digital transmission; and reception of data. The discipline is also related to basic concepts and theories involving analysis, systems implementation, operation, production, and maintenance of the various applications in a work area.

Dr. M.R. Tyagi, Dean-Engineering of Manav Rachna University asserts, "A typical electronic assembly design team include electrical/ electronics engineer; mechanical engineer with specialization in structural design, thermal



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design, and multilayered circuit card design; materials engineering specialist; and manufacturing process design engineer. On the other hand, there is no system, device or a machine today which do not have electronic component and therefore Electronics & Communication engineering is important." The major organisations that hire in this stream are Tata Communications, Cisco, Hewlett Packard, and Intel.

POPULAR POSTGRADUATE COURSES

Industrial Engineering

From the onset of Industrial Revolution in the late 18th century, the eminence of industrial engineering is witnessed. In its initial days, this field was driven mostly by the purpose to escalate the productivity and viability of manufacturing processes. Commencing in the 1940s, the notion of Total Quality

Disciplines and Vacancies

Discipline	Institutes	Number of seats
Mechanical Engineering	IIT Bombay	116
	IIT Madras	75
	IIT Kharagpur	67
	IIT Kanpur	100
	IIT Roorkee	100
	IIT Delhi	68
Civil Engineering	IIT Guwahati	80
	IIT Bombay	117
	IIT Madras	63
	IIT Kharagpur	62
	IIT Kanpur	105
	IIT Roorkee	135
	IIT Delhi	105
IIT Guwahati	80	
Computer Science	Delhi Technological University	103 (Delhi Region) 19 (Outer Delhi Region)
	IIT Bombay	110
	IIT Madras	42
	IIT Kharagpur	55
	IIT Kanpur	85
	IIT Roorkee	75
Aerospace/ Aeronautical	IIT Guwahati	80
	IIT Delhi	68
	IIT Bombay	62
	IIT Madras	45
	IIT Kharagpur	33
	IIT Kanpur	50
Electronics and Communication	Indian Institute of Space Science and Technology	60
	PEC University of Technology, Chandigarh	30
	Indian Institute of Engineering Science and Technology, Shibpur	36
	IIT Kharagpur	62
Electronics and Communication	IIT Roorkee	80
	IIT Guwahati	73
	Delhi Technological University	156 (Delhi Region) 29 (Outer Delhi region)
	NIT Tiruchirappalli	46
	NIT Surathkal	47

Management (TQM) became an indispensable element of industrial engineering. Industrial engineers are now involved in every phase of construction, manufacturing, and processing. Meehan states, "Industrial engineering focuses on reducing time, energy and cost of manufacturing, simultaneously ensuring the consistency in the quality of products. The key aspect here about both these branches is the communication between the manufacturing machineries and the manufacturing designers." The firms which recruit industrial engineers are Hindustan Petroleum, Corporation Limited, Mahindra & Mahindra, National Hydroelectric, Power Corporation and Steel Authority of India.

Biomedical engineering

Almost 200 years ago the unpleasant situation of a French doctor leaning on a woman's chest to check her heartbeat led to a solution of using a rolled-up paper to magnify the sound of the heartbeat, thus in turn leading to the invention of the first stethoscope. Another such important development was the discovery of X-Ray in the 19th century and soon after the world war, academic institutions started teaching courses on biomedical engineering. Dr. M.R. Tyagi, Dean-Engineering, Manav Rachna University defines, "Biomedical Engineering is one of the preferred engineering discipline in the Indian context. Various domains such as cellular and tissue engineering, clinical engineering, drug delivery systems, rehabilitation engineering, clinical engineering etc. offer great challenges and opportunities for young professionals in this field." The leading industry firms for this field are Biocon Ltd, Abbot India Ltd, ABL Bio-Technologies Ltd, Addlife Pharma Ltd.

Material Science Engineering

The material science stream emerged from metallurgy in the 1950s almost simultaneously at GE research



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laboratories in USA, at the University of California Los Angeles and Northwestern University respectively. The COSMAT report of 1974 was written to convince the scientific panel about the existence of this discipline. They defined material science as being 'concerned with the generation and application of knowledge relating the composition, structure and processing of materials to their properties and uses.'

This discipline is associated with the design and discovery of new element, mainly solids. It also includes use of systematic study of chemistry and physics to comprehend old phenomenological observations in metallurgy as well as in mineralogy. "Material

Science has a lot of scope as it is not just confined to automobiles, space, and defense. Its industry demands is less since it is much more research driven, equipment and laboratory intense. The Government of India has started to look for centralized facilities for manpower in Material Science across the nation and DSE played a major role in this," adds Dr. Sunil Khanna, Vice-President of NIIT University.

Nuclear engineering

In 1934, an Italian scientist named Fermi and his co-workers bombarded uranium with slow moving neutrons and observed that it produced much higher radioactivity than any other element. They argued the potential of a self-sustaining chain reaction which later on came to be known as nuclear energy and that could be used for peaceful purposes. Nuclear engineering is concerned with the applications of nuclear physics related to fission and fusion. The nuclear fission principally includes the maintenance of systems and mechanisms like nuclear reactors, power plants, or nuclear weapons.

Currently, it is also used in medical equipments for emission of radiations, nuclear safety, heat or thermodynamics transport, nuclear fuel and even in the problems related to nuclear proliferation. Dr. M.R. Tyagi, Dean-Engineering of Manav Rachna University says, "Nuclear power for peaceful purposes is well established in India. Around 3% of electricity is produced by Nuclear Power plants which is planned to be increase to 20% of total needs of the country by 2050." Nuclear engineers can be recruited by firms like Bhabha Atomic Research Centre, Tata Institute of Fundamental Research, Larsen & Toubro and Bharat Electronics Limited. While the above listed courses remain the preferred choices of students and employers, assessment of a student should be based on his or her intent to pursue that particular undergraduate or postgraduate programme.■