

If you are ingenious and innovative with a passion for machines and instruments, then engineering is your calling. The wide array of branches offered by over 35,000 colleges in the country provide a perfect platform to nurture and showcase your talent

# Engineer Your Dreams

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**E**NGINEERING is both exciting and demanding. It is a challenge as great as any major geographical exploration into the unknown. At the same time, it offers at least as great an opportunity to improve the lot of humans on earth as does any other single profession" says Eric Laithwaite in Invitation to Engineering.

Who are these people who make things happen? An engineer has a keen power of observation, is full of curiosity, is always ready to learn, enjoys working hard and is interested in science and maths. An engineer solves the problem when others fail; he tries to make things simpler and cheaper through constant innovation. Remember it is this continuous innovation that has made you have a new modified version of your mobile phone. But one thing should be clear in the beginning that just a degree in engineering from any institution is not a passport to do all these things.

## How it began

As Indian economy was liberated in the early 1990s and India started catching up with the software industry, the need for more engineering graduates was felt by the government. It ushered in a new era of engineering education. Motivated by personal economic growth, a number of entrepreneurs have entered into the field of engineering education, providing ample opportunities to even mediocre students. The growth of engineering institutes in the last decade shows that education coupled with skills can be helpful for personal economic development. The number of engineers passing out of 3,500 odd colleges in the country is, however, much more than the number of jobs available every year.

## Road to engineering – To do or not to do

The road to engineering in our country starts when the child is in Class X as after Class X a student has to decide the stream he wants to opt for. Thus it is extremely important to know if you really want to do engineering. Figure out exactly what courses you will be taking for the bachelor's degree, what kind of colleges there are, what kind of job opportunities there will be and hence where does your true interest lie? The best way to do this is to read about this on the internet, get in touch with people from various backgrounds and talk about their experience.

Once you decide that you want to do engineering, the next two years of study are extremely important as they serve as a foundation for performance in the entrance exams for different colleges.

## Right college

How to zero in on a good college out of the over 3,500 colleges in the country is another major concern for students and parents. Apart from Tier I and Tier II colleges certain Tier III private colleges and universities are also serious about the quality of education and help students in getting placements in good companies. Broadly the institutes can be divided into three tiers — first for generating knowledge, second for educating and generating knowledge, third for educating for employability in the age of knowledge. The Indian Institute of Technology (IIT) remains the flag-bearers of technical education in our country. Next to the IITs — PEC, DEC, Thapar University and NITs — are the second-tier institutes. The third-tier institutes constitute newly set up engineering colleges, which are pro-



ROAD TO INNOVATION AND ENTREPRENEURSHIP

## Journey after admission

The real journey of an engineering graduate starts not before but after getting admission in an engineering college. So once you enter an engineering college keep in mind the following points:

**Concepts:** Try to learn the concepts and basics of your branch. There are multiple websites with online courses which can help you gain a better understanding of the subject material (and perhaps even in a more interesting manner than the classroom teaching in most colleges.) You can make use of the NPTEL courses developed by IIT Faculty.

**Computer languages:** As most of the jobs available these days are in software field, so irrespective of your branch train yourself in some computer language.

**Soft skills:** Learn English Communication and human relations by participating in various group activities in your institution.

**Hardwork:** Once Kalpana Chawla said that motto her family was that "You cannot lose by doing hard work" so work hard.



ducing more than 90 per cent of the graduate engineers.

Here are some pointers that will help you decide about the right college:

**Accreditation:** Try to find out the accreditation of the college. Though many private institutes hire image-building consultants who help them in showcasing their strengths, still this is one good measure of the level of the college.

**Faculty:** Try to find out about the quality of faculty. Qualified, regular and motivated faculty is a prerequisite.

**Whom they admit:** If they admit anyone who comes to them, and not on the basis of any competitive examination, and then take admission based on your own confidence of working hard and making a way for yourself.

**Placement:** Try to find out the placement data, though many websites will give vague information listing a number of companies

and claiming that hundreds or thousands of students have been suitably placed. Beware of such catchy phrases. Try to get the contacts of the students who have got placement through college, contact the college, don't feel shy because it is your life and career.

**Best source of information:** Find friends, seniors, neighbours or online communities with people from that college and speak to them about their experience.

## Right branch

Engineering is broadly divided into two fields: **Circuit Branches** These consist of branches like Electrical, Electronics and Communication, Computer Engineering, Information Technology, Instrumentation, Instrumentation and control Engineering and any other branches which are not mechanical in nature.

**Non-circuit or Mechanical Branches** These are basically Mechanical, Civil, Met-

allurgy, Aero, Production, Industrial Engineering, Chemical Engineering.

Though both streams require a sound background in maths and physics, circuit branches need more of mathematical skills, while non-circuit branches need an aptitude for physics. Here are some factors that you should keep in mind while choosing a branch:

**Personal Interest:** If you have very strong interest in a particular field supported by some concrete evidence of research and study in that field, then you should give importance to personal interest while choosing the branch.

**Eligibility for master's degree:** As sooner or later you may have to go in for a master's degree in some good college try to find out whether your branch will allow you to get admission in master's course.

**Be careful about the IT appeal:** A few years back, IT was started as a separate branch by colleges in order to increase the intake in computer-related engineering as AICTE had a bar on the number of seats in a particular branch. But, it was an Indian innovation which slowly lost some popularity and computer engineering is eventually given more weightage than IT. So, given a choice between computer engineering and IT branch prefer computers.

## Integrated courses

Engineering +MBA: Another query that most freshers have while selecting an engineering course is that whether they should one go in for a simple four-year BE or B.Tech degree or a five-year integrated engineering plus MBA course which will save one year and give a dual degree in engineering and management? With a majority of engineering graduates going in for an MBA degree after engineering, the choice of an integrated course seems to be an intelligent one. But according to experts it is better if one gets work experience of at least two years after graduation degree before going in for an MBA. So choose your integrated course very carefully as this can be used as a road to get admission in a good college but to get a good management job one has to do MBA from a good college in future.

— The writer is Associate Professor and former Dean, Student Welfare, Training and Placement Officer, PEC University, Chandigarh

## TOP Engineering colleges

### Indian Institute of Technology, Delhi

www.iitd.ac.in

**Seats:** 857 at UG level

**USP:** Highly reputed BE and B.Tech. courses. QS World University Ranking of 500 institutions across globe places IIT Delhi at 202nd position

### Delhi Technological University

www.dce.edu

**Seats:** 910 at UG level

**USP:** Courses in new and offbeat engineering branches like reduction and industrial engineering, polymer science and chemical technology are much in demand.

### PEC University of Technology Chandigarh

www.pec.ac.in

**Seats:** 385 for B.Tech.

**USP:** Rated among the top ten engineering institutes other than IITs. The college is a pioneer in research work in engineering arena.

### Thapar University, Patiala

www.thapar.edu

**Seats:** 760 for B.E./B. Tech.

**USP:** One of the oldest private universities in the country. The institute is accredited by NAAC and administration and academic set-up is like that of IITs. As many as 515 research papers were published during the academic year 2012-13.

### Lovely Professional University, Jalandhar

www.lpu.in

**Seats:** 2,000

**USP:** Innovative courses and a state-of-the-art campus with more than 1100 Wi-Fi access points, one of the largest installation in Asia, to which nearly 40,000 students can log in at a given point of time.

### UIET, Chandigarh

www.uit.ac.in

**Seats:** 373 for BE/B Tech

**USP:** Scores a point in industry academia tie ups. A member of Campus Connect programme of Infosys Technologies Ltd., Bangalore, that supports faculty training, project guidance, curricula inputs, industry perspective of teaching-learning and expert lecture inputs etc.

### J P University of Information Technology, Wanknaghat, Solan

www.juit.ac.in

**Seats:** E&C 120, Com Sc 60, biotechnology 30, Civil 60, bioinformatics 30

**USP:** All India ranking of universities ranked it at 82nd place. The university has filed 10 patents out of which three have been published and one granted. Projects worth Rs 10 crore are underway in the university.

### National Institute of Technology, Hamirpur, HP

www.nith.ac.in

**Seats:** 509 for UG

**USP:** It is a premier technology institute of the state and is ranked as 14th among the top 50 engineering colleges of the country.

### GND Engineering College, Ludhiana

www.gndec.ac.in

**Seats:** 720 for BE and B Tech

**USP:** The Training and the Placement Cell is dynamic and several MNCs and Indian corporate giants visit the campus for placements and tie-ups.

### National Institute of Technology, Kurukshetra

www.nitkkr.ac.in

**Seats:** 540

**USP:** A 300-acre campus with facilities for advanced research in science and technology, with hostel facility it enjoys the status of an Institution of National Importance as granted by the MHRD, Govt. of India.

### B R Ambedkar NIT, Jalandhar

www.nitj.ac.in

**Seats:** 93 seats each

**USP:** An IT park is set up to facilitate industry-institute interface. Institute of Technology and Management (ITM)

### Indian Institute of Technology (IIT) Mandi (Kamand)

www.iitmandi.ac.in

**Cut off:** Based on JEE ranks

**Seats:** 120 each in B Tech courses

**USP:** Claim to fame: Ninety per cent passouts got placements in Google, Microsoft and other reputed companies.

JEE ranking-based admissions in all the colleges listed here.

(Based on selected lists from India Today, Outlook and other surveys)

## Material Men



## MATERIALS ENGINEERING

**A**BRIDGE between science and engineering materials engineering branch basically involves the study of the materials that are used in different things used in our day-to-day life. Materials engineers select a particular grade of material like metal and alloy, polymers, ceramics and composites etc based on its properties such as malleability or tensile strength. Materials from which the item is to be manufactured are noted on the engineering drawing using standard material and grade codes. They develop new materials for new applications, improve existing

materials to give improved performance and look at ways in which different materials can be used together.

Materials experts need a thorough understanding of how materials work. This means they are able to control the structure of a material, often on an atomic level, so that its properties can be tailored to suit a particular application. One primary activity is the development of new or improved materials for example the microchip found in computers or a stronger metal or a high-temperature composite or a lighter plastic. The new or improved engineered material can spark an entirely new invention or industry.

## Instrument of Success



## INSTRUMENTATION ENGINEERING

**I**F developing and innovating with new types of instruments is your passion then instrumentation engineering is the ideal choice for you. Basically an offshoot of electrical and electronic engineering branches, instrumentation engineering deals with measurement, control and automation of processes. The nature of work of an instrumentation engineer ranges from designing, developing, installing, managing equipment used to monitor and control machinery and processes.

All manufacturing industries and sectors be it steel, oil, power, defence, petroleum

etc have instrumentation departments offering ample job opportunities for instrumentation engineers. Apart from covering core subjects like system dynamics, industrial instrumentation and process control, analytical and bio-medical instrumentation and robotics, the students deal with software and hardware topics such as microprocessor and micro controller based instrumentation, VLSI and embedded system designs, computer architecture and organisation and computer control of processes. Thus instrumentation engineers can fit in software as well as hardware sectors.