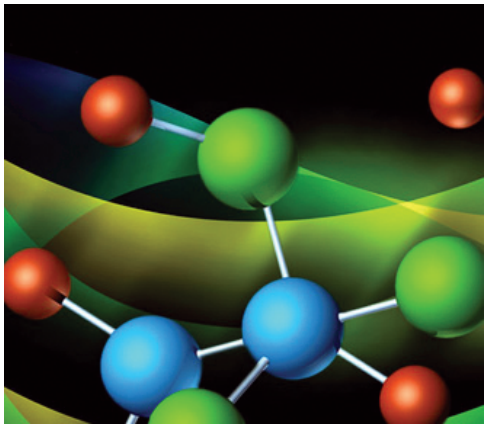
IIT-JEE 2012



COUNSELLING BROCHURE

CONTENTS

1. ADMISSIONS THROUGH IIT - JEE 2012

1.1 INTRODUCTION

The Indian Institutes of Technology (IITs) are institutions of national importance. These institutes, along with Indian School of Mines (ISM), Dhanbad, and Institute of Technology, Banaras Hindu University (IT-BHU), Varanasi, play a leading role in technological manpower development. The admissions to the Undergraduate Programmes for all Indian and Foreign nationals at these institutions are made through the Indian Institutes of Technology Joint Entrance Examination (IIT-JEE).

All these institutions are known for providing quality education in science and technology and for research in frontier areas. The environment at these institutions is highly conducive for

- building a solid foundation of knowledge,
- development of personality, confidence building, instilling self-discipline and pursuit of excellence,
- enhancement of creativity, motivation and drive.

All of the above help to prepare the students admitted to these institutions for successful professional and social lives. Today, alumni of these institutions occupy key positions in industry and academia in India and abroad.

Each Institute has state-of-the art laboratories, computer networks, library and access to digital library resources. Teaching methods rely on direct personal contact between the teacher and the students along with the use of traditional and modern instructional techniques. Students live in a pleasant and intellectually stimulating environment with people having similar goals and aspirations hence providing an exciting and unique experience.

Credit-based academic programmes offer flexibility to students to progress at their own pace. A minimum level of performance is necessary for satisfactory progress. The medium of instruction is English. These institutions offer courses leading to Bachelor's degree in a number of engineering, technological and scientific disciplines.

M. Sc. Integrated courses in pure and applied sciences and M.Tech. Integrated courses in few disciplines are also offered by many of these institutes. In addition, most institutes offer Dual Degree M.Tech. programmes wherein both B.Tech. and M.Tech. degrees are awarded at the end of the programme.

1.2 NUMBER OF SEATS AVAILABLE AND SEAT RESERVATION POLICY

The number of seats available in each institute for various courses through IIT-JEE 2012 and the opening and closing ranks for the courses in 2011 for various categories of students is given in Table-1. Table-2 gives Institute-wise list of the courses offered and total seats. The details of fees at the institutes are given in Table-3.

The following reservation policy is followed for admission to various courses: 27% seats are reserved for OBC (non-creamy layer) which include 4.5% seats reserved for minorities among them, 15% for SC and 7.5% for ST category candidates. Allotment of seats to qualified persons with Physical Disabilities (PD) belonging to different categories, i. e., GE, OBC(NCL), OBC(NCL)-Minority, SC, and ST will be made category-wise in IIT-JEE 2012. Up to 3% of the total seats available in each category in each of the institutes will be made available to the PD candidates. These seats will be allotted to PD candidates according to their categories, ranks in the category-wise PD merit list and the choice sheet of courses submitted. As the allotment of a seat in every course in every institute to PD candidates will lead to more than 3% reservation, the PD seats will be allotted to different categories over the years on a roster basis. This year, the seats available to PD candidates belonging to different categories are also given in Table-1. A similar rostering procedure is also implemented for OBC(NCL)-Minority seats.

Two seats are available for preferential allotment in each institute for children of defence/ paramilitary personnel killed or permanently disabled in action during war or peace time operations (DS). Candidates claiming a DS seat should submit the original certificate issued by the competent authority in the Directorate of Resettlement and Rehabilitation, New Delhi under the Ministry of Defence or Ministry of Home affairs, Government of India.

1.3 COUNSELLING FOR SHORTLISTED CANDIDATES

Candidates shortlisted for counselling to the IITs/ ISM Dhanbad/ IT-BHU, Varanasi, irrespective of the Category/ Subcategory they belong, will undergo online counselling. Please note that no candidate is required to come to any of the IITs in person for counselling. However, the PD candidates have to appear before Medical Board as described in Section 1.8. Only those candidates who would like to appear for the Architecture Aptitude Test need to come to one of the IITs in person as described in Section 1.9. The online Counselling procedure has three stages, namely, (1) Registration on JEE Counselling Online Portal (JCOP) website (2) Submission of photocopies of documents to the zonal IITs, and, (3) Choice filling. Before proceeding further, the candidate is advised to go through the instructions given in the "Help" tab of the online Counselling site thoroughly.

1.4 ONLINE REGISTRATION

The online registration at the JEE Counselling Online Portal (JCOP) http://jeecounselling.iitd.ac.in/JCOP for online choice filling has four steps:

1. Visit the Online Counselling portal and obtain a User-ID by providing the required information

2. Generate and print a challan for making the counselling fee payment

3. Make the fee payment at any State Bank of India branches

4. Complete the registration by logging in to the JCOP portal (with the User-ID and password generated in step 1, twenty four hours after making the payment

The candidate needs to register by using the "Register Here" link and filling the required details as given in the IIT-JEE 2012 Admit Card along with a password. At the completion of this procedure the website shall automatically create a User-ID. The User-ID and Password should be noted down carefully, kept confidential and used for the remaining steps. Detailed instructions for this step are provided in the "Registration Procedure" document available for download in the "Help" tab in JCOP.

1.5 ONLINE CHOICE FILLING

After registration and payment of counselling fee, the candidate needs to login to the JCOP (http://jeecounselling.iitd.ac.in/JCOP) using the User-ID, password and the IIT-JEE 2012 registration number printed on the IIT-JEE 2012 Admit Card. On this web page the candidate enters the choices of courses in the order of his/her preference. This choice-order is very important for the following reasons:

The course allocation for a candidate is done strictly on the basis of the all India rank (AIR) he/she gets based on the performance in IIT-JEE 2012 as well as the courses he/she selects in order of preference during Counselling For example, a candidate with AIR 558 will be allotted a seat after all candidates with AIR less than or equal to 557 have been allotted one. For every candidate, if his/her first choice is available, he/she is allotted that choice. Otherwise further choices, strictly in order of the declared preferences in the choice sheet, are considered. The highest choice available is allotted to the candidate and all subsequent choices are ignored. If the candidate does not fill sufficient number of courses as choices, he/she may not get any course allotment, especially in the case where the candidate has low AIR. **The choices filled by the candidate in JCOP are final and cannot be changed at a later stage. Thus, in their own interest, candidates must fill in a sufficiently large number of choices of courses in the decreasing order of preference.**

Courses in Mining Engineering and Mining Machinery Engineering and related courses (Codes: G4130, S4130, V4130, S4131, G5247, S5247, V5247, G5248 and S5402 in Table 1) have additional prescribed standards of fitness. These candidates should be free from colour blindness and the standard of visual acuity with or without glasses should be as per DGMS Circular 14 of 1972 (the distant vision of eye with or without glasses should be not less than 6/6 for better eye and 6/9 for worse eye). The candidates with one-eyed vision are also not eligible for these courses. In addition, candidates seeking admission in Petroleum Engineering related Courses and M.Sc. Tech. Applied Geology (Codes: S4134, S5252 and S5701) should also be free from colour blindness. Candidates must make sure that they meet these standards if they opt for these courses. The responsibility for ensuring this is entirely the candidate's. In case a candidate does not meet these requirements but opts for these courses and is allotted one of them, his/her admission will be cancelled later on. In all such cases

the candidate will have no claim for any other course of study in any of the institutes. ISM Dhanbad does not admit women candidates in the Mining Engineering, Mining Machinery Engineering and related courses (Codes: S4130, S4131, S5247, and S5402 in Table 1). Women candidates are eligible to opt for Mining Engineering at IIT Kharagpur and IT-BHU (Codes: G4130, V4130, G5247, V5247 and G5248 in Table 1), provided they fulfill the special medical requirements as mentioned above. Women candidates opting for these courses may also note that Section 46(1) of the Mines Act, 1952 states that "No women shall, notwithstanding anything contained in any other law, be employed (a) in any part of a mine which is below ground, (b) in any mine above ground except between the hours 6 AM and 7 PM".

To take care of the possibility that some candidates may not take the admission, the number of candidates considered for online seat allotment is kept more than the number of seats available in the participating institutes. Therefore, shortlisting for online Counselling on qualification in IIT-JEE 2012 does not guarantee admission. There are three rounds of course allocation in IIT-JEE 2012. At the end of every round a candidate should visit the JCOP site to know about the course allotted to him/her. This allotment can change in the subsequent rounds to a choice better than the one allotted in the earlier round depending on the number of candidates declining the seats offered to them in the earlier round. In no case will a candidate be allotted a choice lower in her/his list in a round than what is allotted during the previous rounds. The course allotted at the end of third round of course-allocation is final. There is no provision to freeze the course allotted to the candidate at the end of the first or second rounds.

The JCOP has links to the main websites of all the participating institutions that include the 15 IITs, ISM Dhanbad and IT-BHU, Varanasi. The inside back cover of this brochure also has this information. These websites may be useful to the candidates for deciding on the choice-list of courses. These websites in-turn have links to the individual departments and academic sections. In addition, the JCOP as well as this brochure include details regarding availability of seats in different courses, opening and closing ranks in courses for the year 2011 (Table-1), list of courses and total seats available (Table-2) and Fee structure (Table-3) in the admitting institutes. Please click the "Documents" tab in JCOP to download the above documents.

Detailed instructions for this step are provided in the "Choice filling Procedure" document available for download in the "Help" tab in JCOP.

1.6 PAYMENT OF COUNSELLING FEES

A non-refundable counselling fee of Rs. 500/- need to be paid by all candidates. The counselling fee can be paid at any branch of the State Bank of India with a challan meant for this purpose. This challan is to be printed after obtaining a User-ID at the JCOP portal. The candidate can fill and lock his/her choices only after payment of the counselling fee.

1.7 DOCUMENTS TO BE SENT TO ZONAL IITS

All candidates must send the following documents through SPEED POST so as to reach the JEE chairman of the Zonal IIT (the IIT from which the candidate received the Admit Card) on or before 17:00 hrs on June 08, 2012.

- Duly filled Application Form for Admission: The application form must be filled completely along with a recent color photograph pasted on it. The Application Form for Admission may also be downloaded from the JCOP site by following "Documents" tab.

- Medical Examination Report: The medical examination report form may be downloaded from the JCOP site by following "Documents" tab. The form must be filled and signed by a Registered Medical Practitioner.

- Duly attested photocopy of mark sheet and certificate of passing the qualifying examination. Candidates whose qualifying examination result is awaited shall be admitted provisionally. All such candidates must send a duly signed "Undertaking". The undertaking form may be downloaded from the JCOP site by following "Documents" tab.

- In addition to these documents, the candidates belonging to OBC (NCL), OBC(NCL)-Minority, SC, ST categories or DS subcategory must provide a duly attested photocopy of the

respective category/sub-category certificate issued by the competent authority. The format of the certificates may also be downloaded from JCOP site by following "Documents" tab. Such candidates are required to furnish the photocopy of the certificate afresh irrespective of whether or not such a document was given along with the JEE application form.

- Candidates who are foreign nationals should send the attested photocopy of the page in their passport that contains the name, photo and nationality.

All documents that are not in the format as given in JCOP or those that reach the zonal IITs after 17:00 hrs of June 08, 2012 are liable to be REJECTED. The corresponding reservation benefits (if any) will also not be extended to candidates concerned. The zonal IITs are not responsible for any postal delays.

1.8 MEDICAL BOARD FOR PD CANDIDATES

In the case of PD candidates, a duly constituted Medical Board will certify the degree of physical disability, as well as their fitness to undergo the course of study in which admission is sought. Candidates who qualify under PD subcategory will have to appear before this special Medical Board at one of the selected IITs between June 04 and June 06, 2012. Each IIT will have a specific date, to be informed later, within that range. Candidates are required to register for the Zone where they wish to undergo the medical examination by visiting *http://jee.iitd.ac.in/mbregister between May 18, 2012 and June 2, 2012.* Candidates must bring their IIT-JEE 2012 Admit Card for the Medical Examination. Failure to appear before this Medical Board shall lead to cancellation of reservation benefits under the PD subcategory.

1.9 ARCHITECTURE APTITUDE TEST

Candidates desirous of joining the B.Arch. course (Codes: G5101 and R5101) will be required to qualify in an Architecture Aptitude Test (AAT-2012). The AAT-2012 will be held on *Sunday, June 03, 2012* at the seven IITs (Bombay, Delhi, Guwahati, Kanpur, Kharagpur, Madras and Roorkee). The AAT-2012 will be of three hours duration, from 9.00 AM to 12.00 noon. Candidates must bring their IIT-JEE 2012 Admit Card with them to appear in the AAT-2012. Candidates who fail to qualify in this Aptitude Test will not be eligible for admission to B.Arch. courses. Syllabus for the test is given later in this brochure. Candidates desirous of appearing for this AAT-2012 must register for the test center where they wish to write this tes by visiting *http://jee.iitd.ac.in/aatregister* between May 18, 2012 and June 2, 2012.

1.10 COURSE ALLOTMENT

There will be three rounds of course allotment. The first round of course allotment will be declared on the JCOP on *June 14, 2012*, the second on *June 25, 2012*, and the third on *July 06, 2012*. At the end of each round of allotment the candidates need to login to the JCOP to find the course allotted at that stage. To accept the offer of admission candidates will have to pay a non-refundable Registration Fees of Rs.40,000/- (Rs.20,000/- for SC/ST). Those allotted in the first round must make the payment by 17:00 hrs on June 22, 2012. Fresh allottees in the second round should make the payment by 17:00 hrs on July 02, 2012. The Registration Fees for the first and second round allottees are to be paid at any of the branches of the State Bank of India with a printed challan obtained from the JCOP website. Detailed instructions for this step are provided in the "Payment Guidelines" document available for download in the "Help" tab in JCOP. Third round allottees however will make the payment at the Institute on registration day. The amount paid will be adjusted towards the fee to be paid at the time of admission. Candidates who have not paid the Registration Fees within the stipulated period will not be considered for further rounds of allotment and shall be considerd as they have declined the admission offer and will lose the allotted seat. For candidates who pay the Registration Fees within the stipulated time, the course allotted in the first and second round is provisional. A candidate is ensured that in all subsequent rounds of Counselling he/she shall be allotted a course that is equal or higher in preference than the one allotted in the earlier round, as per the choice-list filled by the candidate. Thus, by paying the Registration Fees the candidate accepts admission to any of the courses that are equal or higher in preference than the one allotted in the previous round as per his/her choice-list. The allotment of courses will be declared on the JCOP on June 25, 2012 for the second allotment and on July 06, 2012 for the third and final allotment. After the final allotment, all candidates must report to the institute to which they have been allotted a seat on the date of registration failing which the offer of admission will stand cancelled.

A candidate who wishes to vacate the seat accepted in the first or second round may do so by writing a letter, counter signed by the guardian, to the Organizing Chairman so as to reach him before July 03, 2012. The Registration Fees of Rs. 40,000/- (20,000/- in case of SC/ST category) will be refunded to such candidates after deducting processing fee Rs.1,000/-. In addition, the candidate will be eligible to write the IIT-JEE 2013 provided other eligiblity criteria are satisfied. Under no other circumstance will the Registration Fees be refunded. Candidates once admitted to a particular institute through JEE cannot be transferred to another admitting institute.

1.11 COUNSELLING FOR PREPARATORY COURSE

All the fifteen IITs, ISM Dhanbad, and IT-BHU, Varanasi run preparatory courses of one year duration for SC, ST and PD candidates. After successful completion of these courses these candidates will be eligible for admission to appropriate courses in the institute where they are undergoing the course in the next academic year (2013-14) against the vacancies of 2012. The preparatory counselling will also be performed on the JCOP site. The preparatory candidates under the PD subcategory should appear before a duly constituted Medical Board (see section 1.8 for details) which will assess their fitness to undergo the course of study in which admission is sought.

1.12 STEP-BY-STEP PROCEDURE FOR THE ONLINE COUNSELLING PROCESS

Step 1:

A candidate shortlisted for counselling for admission to the IITs, ISM, and IT-BHU should visit the IIT-JEE 2012 Online Counselling Portal, JCOP, to get a User ID any time between noon of *May 18, 2012 and 5 PM on June 07, 2012, Thursday* (21 days). The candidate will be required to provide some IIT-JEE related personal information and prompted for a password, which is required for all subsequent visits to the JCOP. After obtaining the User ID, the candidate will print a bank challan for making the counselling fee payment.

Step 2:

A candidate can make the payment of Rs. 525 (Rs. 500 counselling fee and Rs. 25 bank charges) at any of the Indian branches of State Bank of India with the printed challan. The bank will not accept the counselling fee payment without a challan. On receiving the payment the bank official will stamp the challan "PAID", retain one half of it, and return the other part to the candidate. Counselling fee payments are accepted in SBI branches till the branch closing hours on *Friday, June 08, 2012.*

Step 3:

Twenty four hours after making the payment, provided it has been reconciled, a candidate is permitted to enter the JCOP site to fill the course choices. Course choice filling is open till 5 PM on *June 10, 2012*.

If for some reason access to the JCOP is denied, an online request may be submitted to the JEE helpline *(jeehelpline@admin.iitd.ac.in)* for gaining access. The online request should contain the branch details where the payment was made, the date of payment, and the journal number. He/she may also send an email to along with a scanned copy of the PAID stamped challan. The last date for receiving such a request is 5 PM, *June 09, 2012.*

Step 4:

A candidate allotted a course in the first round can see her/his allotment on the JCOP after 9 AM on June 14, 2012. The challan for making the Registration Fees payment to accept the offer of admission may be printed from the JCOP site between *9 AM on June 14, 2012 and noon on June 22, 2012.*

A candidate can pay Rs. 40,000/- (Rs.20,000/- in case of SC/ST category) and Rs. 50/- Bank charges of at any of the Indian branches of SBI with the printed challan between 10 AM on June 14, 2012 till branch closing hours on Friday, June 22, 2012. The bank will not accept the Registration Fees payment without a challan. On receiving the amount the bank official will stamp the challan "PAID", retain one half of it, and return the other part to the candidate. The challan will be signed by the dealing assistant and counter signed by the branch manager.

A candidate will be able to see their paid status on the JCOP 24 hours after the payment if it is successfully reconciled. If a candidate fails to see the successful payment status after 24 hours, he/she should send

an email to jeehelpline@admin.iitd.ac.in giving details of the branch where the payment was made and the journal number.

Step 5:

On visiting the JCOP after 9 AM on June 25, 2012 fresh allottees in the second round and first round allottees can see their course allotment after the second round. A candidate freshly allotted in the second round wishing to accept the offer of admission will print a challan to make the payment. Printing of the challan closes at 12 noon on July 03, 2012. Candidates who accepted the offer of admission in the first round are not required to pay the Registration Fees again.

Candidates can pay their Registration Fees Rs. 40,000/- (Rs. 20,000/- in case of SC/ST category) and Rs. 50/- Bank charges at any Indian branch of SBI after 10 AM on June 25, 2012 till branch closing hours on July 03, 2012 Tuesday. The bank will stamp the challan "PAID" after receiving the amount. It will be signed by the dealing assistant and countersigned by the branch manager. The candidate will be able to see the successful payment status 24 hours after the payment.

A candidate will be able to see their paid status on the JCOP website 24 hours after the payment if it is successfully reconciled. If the candidate fails to see the successful payment status after 24 hours he/she should send an email to jeehelpline@admin.iitd.ac.in giving details of the branch where the payment was made and journal number.

A candidate who wishes to vacate the seat accepted in the first or second round may do so by writing a letter, counter signed by the guardian, to the Organizing Chairman so as to reach him before July 03, 2012. The Registration Fees of Rs.40,000/- (Rs.20,000/- in case of SC/ST category) will be refunded to the candidate after deducting processing fee of Rs.1,000/-. In addition, the candidate will be eligible to write the IIT-JEE 2013 provided other eligiblity criteria are satisfied.

Step 6:

Candidates will be able to see their final course allotment, fresh third round allottees and those allotted in the earlier two rounds, after 5 PM on July 06, 2012. All fresh allottees will pay their Registration Fees at the time of registration at the Institute.

2. ADMITTING INSTITUTES

2.1 INDIAN INSTITUTE OF TECHNOLOGY BHUBANESWAR

Indian Institute of Technology Bhubaneswar is one of the eight new IITs and was set up by the Government of India in 2008. The Institute started functioning from the campus of its mentor institute IIT Kharagpur and shifted operation to Bhubaneswar on July 22, 2009. Currently, the Institute has 437 students in the Bachelor of Technology programme in Civil, Electrical and Mechanical Engineering. For the academic session 2012-2013, the Institute will admit 40 students each in Civil, Electrical and Mechanical Engineering disciplines.

The Institute promotes a borderless interdisciplinary academic environment and encourages its academic staff and students to work together through the concept of Schools rather than Departments. Currently, seven Schools have been set up viz. School of Basic Sciences; School of Humanities, Social Sciences and Management; School of Mechanical Sciences; School of Infrastructure; School of Electrical Sciences; School of Mineral, Metallurgical and Materials Engineering and School of Earth, Ocean and Climate Sciences.

Campus & Facilities

IIT Bhubaneswar is presently operating from the following locations in the city of Bhubaneswar: IIT Kharagpur Extension Centre at Samantapuri and Toshali Bhawan at Satyanagar. The students are able to access the facilities of Central Tool Room and Training Center and Institute of Minerals and Materials Technology for their hands on training. The academic campus is Wi-Fi enabled and equipped with class rooms having audio-visual aid, laboratories, well-stocked library, high bandwidth internet and video conferencing facility.

The upcoming permanent campus of the Institute is located on 936 acres of land in a picturesque surrounding at Argul about 25 Km from the Bhubaneswar City Center and 14 Km from Biju Patnaik Airport. It is expected that in the next two years the Institute would shift to its permanent campus.

Hostel Accommodation

Accommodation with mess and other facilities are available for both girls and boys at the residential campus. The hostels have 24x7 internet facility, hall-library, gymnasium, common room, and other recreational facilities. Medical facility is provided to students both in the campus and in the hostels. A Counselling cell with a psychologist-cum-counselor and student guides also assist the students.

Academic Programmes

The Institute presently offers the following programmes:

- 4 year B. Tech. Degree programme
- Ph. D. Programme

The 4-year B. Tech. programme is offered in Civil, Electrical and Mechanical Engineering disciplines with an intake of 40 in each. The credit based curriculum is spread over 8-semesters and includes summer internship, as well as research projects. For evaluation in a subject, the Institute follows a seven-point grading system with letter grades and the corresponding grade points per credit. The Cumulative Grade Point Average (CGPA) is computed at the end of each semester. The CGPA secured by a student reflects his/her performance up to and including that semester. The Ph.D. programme is being offered by all the Schools.

Rules for Change of Branch

A student admitted to a particular branch of the B.Tech. Course will normally continue studying in that branch till completion. However the Institute may permit a limited number of students to change from one branch to another based on CGPA criteria (Greater than or equal to 8.5, in their first attempt) and sanctioned strength in a School after the completion of first two semesters.

Financial Assistance/Scholarships

Merit-cum-Means scholarship and other financial assistance are available to the students according to the rules and procedure laid down by the senate.

Training and Placement

Career Development Cell maintains active association and excellent contacts with reputed private and public sector organizations. The first batch of the B.Tech. students have been recruited in various organizations of the country and abroad. The Career Development Cell is in an active process to match the needs of the industry with the aspirations of the students.

How to Reach Us

The Samantapuri Campus is about 8 km from Bhubaneswar Railway Station and 12 km from Biju Patnaik Airport. The Toshali Plaza campus is about 1 km from Bhubaneswar Railway Station and 5 km from Biju Patnaik Airport. Private/Pre-paid taxi can be hired to reach the Institute.

Important Contacts

For further information, please contact:

Information Cell :

Phone : +91-674-2306-300
+91-674-2301-337

Academic Section :

Phone : +91-674-2576-009

Registrar's Office :

Phone : +91-674-2306-220/211
Fax : +91-674-2301-983
Email : registrar@iitbbs.ac.in
Web : www.iitbbs.ac.in

2.2 INDIAN INSTITUTE OF TECHNOLOGY BOMBAY

IIT Bombay was established in 1958, with the cooperation and participation of the then Government of USSR under UNESCO's technical assistance programme, and celebrated its Golden Jubilee in the year 2008-09. It is reputed for the quality of its faculty and the outstanding caliber of the students graduating from its undergraduate and postgraduate programmes. Today the Institute is recognized as a centre of academic and research excellence offering engineering, science, management and humanities education on a par with the best in the world.

Located at Powai, in the metropolitan city of Mumbai, the industrial and economic capital of India, the IIT campus extends over 500 acres of verdant land, nestled between hills and flanked by Powai and Vihar lakes. The campus is located on the north-east part of Mumbai, about 30 km from the main railway stations and about 15 km from the airports.

The Institute offers a large number of undergraduate and postgraduate programmes in engineering, science, management and humanities. It has a total of thirteen academic departments, two schools, four centres and four interdisciplinary programmes which together constitute the academic fabric of the Institute.

The institute has well-equipped laboratories and workshops, and also excellent computer facilities in all the departments in addition to a central Computer Centre. It also houses one of the finest technical libraries in the country. About 3129 students are on roll in the undergraduate programmes and 4653 in the postgraduate (including Doctoral) programmes. This includes a number of foreign students. The faculty strength is about 500.

IIT Bombay follows a semester system. An academic year (July-April) consists of two semesters, each of approximately 16 weeks duration. The first semester begins in the last week of July and ends by the last week of November. The second semester starts in the first week of January and ends by the last week of April. In each of the two semesters of the first year, a student is required to register for all the courses listed in the curriculum for that semester. Students belonging to the SC/ST category and students who are identified as academically weak at the end of the first semester may be prescribed a specially worked-out Reduced Load Programme (RLP). Such students may be required to undergo special courses in case they are found to have inadequate background.

The Institute follows a credit system. Credits are allotted to various courses depending on the number of lectures, tutorials and laboratory hours per week. The student's performance in a course is continuously evaluated throughout the semester and culminates in the award of Grade on a 10point scale. Performance in a semester is evaluated in terms of the weighted average of grade points secured in all the courses registered in that semester, which is known as Semester Performance Index (SPI). A Cumulative Performance Index (CPI) is the weighted average of the grade points obtained in all the courses registered by the student since they entered the Institute. The teaching programmes are characterized by their flexibility and informality. The strong faculty-student interaction on the residential campus provides opportunity to students to work on seminars, publication and projects sponsored by the industry and national agencies.

To students admitted through IIT-JEE 2012, IIT Bombay offers the following undergraduate and postgraduate programmes:

- B.Tech.
- Dual Degree (B.Tech. + M.Tech.)
- 5-year Integrated M.Sc.

The B.Tech. programme consists of eight semesters spread over four years, and the Dual Degree M.Tech. and Integrated M.Sc. programmes consist of 10 semesters spread over five years. In the Dual Degree M.Tech. programme, a B.Tech. degree of the parent department and an M.Tech. degree of a specialization within the parent department is given at the end of fifth year. In the undergraduate programmes, a "Minor" is awarded to a student for completing, in addition to the minimum requirement of 250 credits, a prescribed set of courses from departments other than that in which the student is enrolled for his basic B.Tech. programme. Similarly, "Honours" is awarded to students completing a prescribed set of courses and/or project in their own departments. This structure of academic programmes provides flexibility to suit the varied interests of students and helps build multifarious competencies that employers demand besides satisfying the widely varying attitudes, abilities and aspirations of students.

The Institute continues to introduce new areas in its academic programme and innovation in its academic activities. The Shailesh J. Mehta School of Management, the School of Biosciences & Bioengineering and the Department of Energy Science & Engineering are recent initiatives. Student exchange programmes initiated with Universities in Germany, France, USA, and Japan have taken off successfully. Students are encouraged and supported to submit research papers and participate in national and international conferences.

IIT Bombay is a residential campus that has all the students and most of the faculty and staff living on campus. The Institute has 13 students' hostels, which include the recently added two state-of-the-art hostels each having accommodation facilities for about 450 students and two well-secured hostels for women students. Each hostel has modern amenities including a computer room, gym, LAN connection to each room. Students, however, are not permitted to operate and maintain motorized vehicles of any type in the campus except on medical grounds. The Institute also has a good 52-bed hospital with OPD and in-patient facilities that include, a pathology lab, dental care, radiology, sonography, physiotherapy, and an operation theatre.

The Student Activity Centre (SAC) provides excellent facilities for sports and cultural activities. Sports facilities include a swimming pool, tennis, badminton and squash courts and vast playgrounds for field games. Wildlife camps and trekking are popular off campus activities. Cultural activities on the campus are fostered by film clubs, classical music societies, debating and drama clubs and a hobbies club. The Institute also has strong NSS/NSO programmes. The Entrepreneurship Cell guides students and promotes in them the spirit of entrepreneurship by organizing competitions, and lectures and workshops by eminent entrepreneurs. A business incubator also provides opportunities to students to develop products and technologies, and to generate their own business ventures. The Cell for Human Values – a unique feature of IIT Bombay, enriches the minds of students through its various activities.

A Faculty Advisor is specially appointed to look after the academic performance and matters related to SC/ST students. A Foreign Students' Advisor helps and guides the students from abroad in academic and non-academic matters.

Rules for Change of Branch

The Senate of IIT Bombay has approved new rules for change of branch which is effective from the JEE batch of 2011 onwards. Students are eligible to apply for change of Branch / Programme after completing the first two semesters. The following rules/guidelines will be used for considering applications for change.

1. The eligibility criteria to apply for change of Branch / Programme are :

   (a) completion of the course credits prescribed in the first two semesters, and

   (b) no backlog at the end of first year of 4year B.Tech./5year M.Sc./Dual Degree programmes, and

   (c) secured a Cumulative Performance Index (CPI)

   - $\geq$ 8.0 for General and OBC category students
   - $\geq$ 7.0 for SC, ST and PD category students

2. Applications from students who satisfy the eligibility criteria are to be considered in the order as given below.

   - All students who satisfy the norms specified in rule 3 are allocated first.
   - Students who satisfy the norms specified in rule 4 are allocated subsequently.
   - Students who satisfy the norms specified in rule 5 are allocated at the end.

3. A student with CPI $\geq$ 9.0 will be permitted to change from branch A to branch B, strictly in CPI order, provided the strength in branch B, to which the change is being sought, does not exceed its sanctioned strength by more than 10%. There is no restriction on the strength of branch A (may go well below its sanctioned strength) during the application of this rule. The request of this student will be reconsidered again, strictly in CPI order, if she/he does not violate the not exceeding 10% of sanctioned strength in the branch condition, due to another student getting transferred to branch A.

4 A student will be permitted to change from branch A to branch B, strictly in CPI order, if she/he

   (a) was eligible for admission to branch B at the time of entry to IIT Bombay, and

   (b) strength of branch B does not exceed the sanctioned strength by more than 10%, and

   (c) strength of branch A does not fall below 85% of its sanctioned strength (equivalently at most 15% students of sanctioned strength of a branch are permitted to leave it). The request of this student will be reconsidered again, strictly in CPI order, if she/he does not violate rule 4(b) and 4(c) due to another student getting transferred to branch A.

5 For other students, request for change, strictly in CPI order, from a student from branch A to branch B will be considered if the

   (a) Strength of branch B does not exceed the sanctioned strength by more than 10%

   (b) Strength of branch A does not fall below 85% of its sanctioned strength (equivalently at most 15% students of sanctioned strength of a branch are permitted to leave it). The request of this student will be reconsidered again, strictly in CPI order, if she/he does not violate rule 5(b) and 5(c) due to another student getting transferred to branch A.

6. If a student S1 is not permitted to change from branch A to branch B, due to rules 3, 4 or 5, any other student S2 with CPI less than S1 will also not be permitted to change to branch B.

7 (a) The rules 3 to 6 are applicable for all categories with the concession in eligibility criteria mentioned in rule 1 for SC, ST and PD students.

   (b) Every student has a birth category attribute, which is one of GE, OBC, SC, ST or ST.

   (c) A vacant seat that is available for allocation is defined to be one of six different types.

   The types are i) open, ii) reserved for GE, iii) reserved for OBC, iv) reserved for SC, iv) reserved for ST and vi) reserved for PD.

(d) The additional seats in a branch, limited to maximum of 10% of its sanctioned strength, that are made available to students for allocation at the time of change of branch are defined at the start of the allocation process to be of type "open" in nature (do not belong to any category). There may also be a few vacant seats of type "reserved for category X" at this point in time.

(e) A vacant open seat in Branch B, when allocated to a student in branch A belonging to birth category X, creates a vacant seat in branch A of type "reserved for category X".

(f) A vacant seat of type "reserved seat of category X" is available for reallocation only to students of birth category X.

8. All branch transfers can be effected only once at the beginning of the second academic year. No application for change of branch during the subsequent academic years will be entertained.

9. Students will be permitted to change from B.Tech. to Dual Degree Programme in the same department at the end of third and fourth semesters subject to the department's recommendation.

2.3 INDIAN INSTITUTE OF TECHNOLOGY DELHI

Established as a College of Engineering in 1961, this Institute was declared as Institution of National Importance under the "Institutes of Technology (Amendment) Act 1963" and was renamed as "Indian Institute of Technology Delhi". It was then accorded the status of a university with powers to decide its own academic policies, to conduct its examinations, and to award its degrees.

IIT Delhi is situated at Hauz Khas in South Delhi, bounded by Sri Aurobindo Marg on the east, Jawaharlal Nehru University complex on the west, National Council of Educational Research and Training on the south, and the Outer Ring Road on the north. The Institute campus is about 20 km from Indira Gandhi International Airport, 10 km from domestic terminal of the airport, 19 km from Delhi main Railway Station and 14 km from New Delhi Railway Station.

The Institute campus extends over an area of 320 acres with many topographical features, imaginatively laid out with picturesque landscape. With clean and wide roads, the campus presents a spectacle of harmony in architectural and natural beauty. Most of the students, faculty and staff reside on the campus. The main academic building houses various teaching and research facilities. Although each department is a separate entity, all the departments together constitute an integrated complex.

Each academic year consists of two semesters and a summer term. The education system is organized around a credit system, which ensures continuous evaluation of a student's performance and provides flexibility to choose courses so as to facilitate progress at an optimum pace suited to one's ability or convenience. Each course is assigned certain number of credits depending upon the class contact hours. A minimum number of credits are to be completed in order to qualify for the award of degree. IIT Delhi has revised its curriculum with effect from academic session 2003-2004. The revised curriculum emphasizes on self-learning, project activity and laboratory work. It leaves sufficient time for students to take part in other activities like sports and recreation, and encourages them to be creative and innovative.

The Students Activity Centre provides a number of facilities for students' extracurricular and physical development. The central two-storied block with a swimming pool and a gymnasium hall has amenities such as squash courts, hobbies workshop, seminar rooms, music rooms and other multipurpose rooms for reading and indoor games. The amphitheatre constructed in modern style is an added amenity to the Centre. The campus also provides such amenities as staff club, hospital, shopping centre, bank, post office, community centre, stadium and playing fields.

Credit System

The prominent features of the credit system are: the process of continuous evaluation of a student's performance, the absence of pass or fail on annual basis and the flexibility to allow a student to progress

at the pace suited to his/her individual ability and convenience subject to the regulations of the credit requirements.

Each course, except for a few special courses, has a certain number of credits assigned to it depending on its lecture, tutorial and laboratory contact hours in a week. Each course is coordinated by a member of the faculty called the course coordinator. He/she has the full responsibility for coordinating the course, coordinating the work of other members of the faculty involved in the course, holding tests and awarding grades. In case of any difficulty, students are expected to approach the course coordinator for advice and clarification.

A letter grade with a specified number of grade points is awarded in each course for which a student is registered. A student's performance is measured by the number of credits that he/she has earned and by the weighted grade point average maintained by him/her. A minimum number of credits and a minimum cumulative grade point average (CGPA) are necessary in order to qualify for a degree.

Rules for Change of Branch

A student is eligible to apply for change of branch at the end of the first year only, provided he/she satisfies the following criteria.

- CGPA for General category students > 7.50
- CGPA for SC/ST and Person with Disability category students > 6.50
- Earned credits at the end of the first academic session > 40

Change of the branch will be permitted strictly in the order of merit as determined by CGPA at the end of the first year, subject to the limitation that the actual number of students in the third semester in the discipline to which transfer is to be made should not exceed the sanctioned strength, and the strength of the discipline from which transfer is being sought does not fall below 90% of the existing strength.

For a student with CGPA = 9.0, even if a vacancy does not exist, he/she will be permitted to change discipline provided the strength in the discipline to which the change is being sought does not exceed by 5% of the sanctioned strength. Also, in such cases, he/she will be permitted to change discipline even if the strength of the discipline from which change is being sought falls below 90% of the existing strength.

Stipulation of minimum credits and CGPA requirements will not be insisted upon for change of discipline to a branch in which a vacancy exists and the concerned student was eligible for admission to that discipline at the time of entry to IIT Delhi. However, requirements of credits and CGPA will continue to apply in case of both General and SC/ST category students seeking change to a discipline to which the concerned student was not eligible for admission at the time of entry to IIT Delhi.

Change from a 4-year B.Tech. programme to a dual degree programme

A student registered for a 4-year degree programme in a Department can be permitted to change his/her registration from the 4-year to a 5-year programme of the same department provided the B.Tech. part of the dual degree programme into which the student is desirous of registering is the same as the programme for which the student was admitted through JEE subject to fulfilling the following criteria:

(a) The student must have completed at least 120 credits by the end of 6th semester and secured a minimum CGPA of 7.5.

(b) The maximum number of students that can be permitted such a change will be limited to 10 % of sanctioned strength of the intake into the relevant 4-year programme of the department.

Change from any 4-year B.Tech. programme into a PG (M.Tech.) programme with advanced standing

A student registered for a 4-year B.Tech. degree programme can earn an additional M.Tech. degree by opting for a change in his/her registration to that with advanced standing. The option is to be exercised towards the end of the 6th semester. Advanced standing request will be considered only if the student has a CGPA of at least 7.5 at the end of the 6th semester. In the advanced standing scheme, the student can earn an M.Tech. degree in addition to his/her B.Tech. degree by spending an additional year.

Subject to the above conditions, change over from one undergraduate programme to another (viz., B.Tech., 5-year M.Tech. Integrated and 5-year M.Tech. Dual Degree) is permissible.

2.4 INDIAN INSTITUTE OF TECHNOLOGY GANDHINAGAR

Brief History of the Institute

IIT Gandhinagar started operating from its temporary campus located at the premises of Vishwakarma Govt. Engineering College, Ahmedabad on 2nd August, 2008 with the intake of its pioneer batch of undergraduate students. In June 2009, Professor Sudhir K. Jain was appointed as the founding director of the Institute. IIT Gandhinagar aspires to be an Institution of excellence for creating and imparting knowledge at the undergraduate and graduate levels, and contributing to the development of the nation and humanity at large. IIT Gandhinagar seeks to build a unique identity for itself and is enthusiastically spearheading numerous initiatives and efforts to develop an innovative education system and research atmosphere. IIT Gandhinagar is growing quickly and is getting ready to move to its permanent campus soon.

Campus Location & Facilities

IIT Gandhinagar (IITGN) is located at Chandkheda; about 15 minutes drive from both Ahmedabad and Gandhinagar. Ahmedabad is known for its excellent infrastructure with thriving industries, prestigious academic and research institutes and an ambiance which encourages excellence and entrepreneurship. It is expected that the Institute will move to its new campus along the banks of the Sabarmati River in Gandhinagar in about three years time, in the vicinity of the proposed GIFT city. Gandhinagar and Ahmedabad are connected by an excellent multi-lane highway. Ahmedabad International and Domestic airport is a 15-20 minute drive from the campus.

Neighbourhood of IITGN

Ahmedabad is an old city which is vying for the status of UNESCO's World Heritage City. The Ahmedabad/ Gandhinagar area is rapidly expanding and has been recently classified as one of the fastest developing Tier II cities in India and has been listed as the 19th most rapidly growing city in the world. The infrastructure is very good, with uninterrupted water and electricity supply throughout the year. Several supermarkets, vegetable markets, and neighbourhood shops are located in the vicinity of the Institute. The area near Chandkheda where the temporary IITGN campus is located has been undergoing an urban makeover recently with the construction of many high rise condominiums and apartment complexes. Ahmedabad is a safe and peaceful city.

Facilities on Campus

Computer/Internet infrastructure on campus

Computer facilities at IITGN have been developed with high-end hardware, a wide range of software and excellent connectivity so that students, faculty and staff can carry out their work without interruptions. The LAN setup integrates the entire IITGN community into a single unit. The Institute premises and the student hostels are Wi-Fi enabled. Important scientific software such as Mathematica, PSCAD 4.2, STATA 11.1, Matlab, ANSYS Multi-Physics Simulation Software and a variety of CAD, CFD, and Finite Element Softwares are available.

Two computational labs with networked multi-core desktop computers have been set up for teaching computer related courses and for executing computational projects. An initiative to set up a high performance computing (HPC) platform for advancing research and teaching in computational science and engineering with 7 networked workstations has also been set up with partial support from Fujitsu and Nvidia.

Library facilities

The Central Library of IIT Gandhinagar has a rich collection of books on Engineering, Sciences and Humanities & Social Sciences. The collection includes resources relevant to teaching, learning, training, research and consultancy needs of the Institute i.e. reference books, text books, CDs/DVDs etc. IIT-Gandhinagar library has subscription of many research journals in electronic as well as printed formats. Library electronic resources are accessible from anywhere on campus. Moreover, Wi-Fi enabled Library premises add to the comfort level of users.

Library provides the following services to support the teaching and research work:

Circulation of Reading Materials, Reference and Information Service, Document Delivery Service, Inter Library Loan, New Additions of Books, Journal Table of Contents from Publishers Photocopy Service, Subject bibliographies.

Laboratories

Excellent teaching laboratories in numerous areas such as electronics, mechanisms, physics, chemistry, solid mechanics, etc. have been set up. In addition, there are a number of research laboratory facilities to expose students to the latest research in different areas of science and engineering. For example, the roof of the buildings housing the director's office and the administrative blocks have a 20 KW solar power plant installed used for student and faculty research. Other such research facilities include image processing, fiber-optics, biomedical design, VLSI, power systems, soil mechanics, etc.

Sports facilities

A highly qualified physical education instructor is on the staff to train students. Grounds are available for football, cricket, volleyball and basketball. Facilities for indoor games such as badminton and table-tennis have also been made available. A modern multi-purpose gym is available along with gym instructors. Participation in sports activities are encouraged at IITGN, for example, foundation programme, halla bol, etc.

Facilities like Post office and banks

There are several banks within half a kilometer radius from the Institute. The IIT Gandhinagar branch of State Bank of India is also operational now and is just across the street from the Institute. Post office is also located in the nearby vicinity off the campus.

Hostel Facilities

Fully furnished accommodation facilities for all the students are available on campus and in the building complex across the street from the Institute. Accommodation for girl students is in a separate girls' hostel on campus.

Arrangement for food

Food services have been outsourced to a reputed caterer. A highly qualified nutritionist ensures that the students are provided with healthy food.

Living expenditure

The expenditure pattern is similar to that of other big cities. Apart from the Institute fees which are payable every semester, the anticipated expense per month should be about Rs 3500 including messing charges.

Medical facilities

A qualified medical practitioner is available on the Institute premises for several hours on working days to provide medical advice to students, staff and faculty. Hospitalization expenses of all students are covered under a medical insurance policy. A trained male nurse is available full-time to provide emergency first aid and for routine medical services such as checking temperature, blood pressure, blood sugar, oxygen level and dressing of wounds. He also assists in maintaining medical supplies and keeping medical records. An Electrocardiogram (E.C.G) machine has now been added to the other diagnostic facilities for the doctor's use.

Academic Programmes

IIT Gandhinagar currently offers a 4-year B. Tech. programme in Chemical, Electrical and Mechanical Engineering and MTech, D.IIT and Ph.D. programmes in several engineering, science, humanities and social science disciplines. Starting July 2011, the Institute introduced a futuristic undergraduate curriculum keeping in mind the urgent need to develop engineers and problem solvers for the 21st century.

Curricular Initiatives: A brand new curriculum that is a significant departure from any other curriculum in the country is presently being implemented. The new curriculum focuses on the overall development of the students and will prepare them for their last job, rather than for their first job. It has a significant component of humanities and social science, compulsory coursework in life-sciences, significant exposure to design and creativity, and provides flexibility to the students.

For more details visit: http://www.iitgn.ac.in/academic.htm

Credit System

The credit system at IIT Gandhinagar is as per the table below:

Letter Grade	Grade Point
A+	11
A	10
A-	09
B	08
B-	07
C	06
C-	05
D	04
E	02
F	00
S	Satisfactory
U	Unsatisfactory
I	Incomplete

- The SPI/CPI at the end of any semester shall have the maximum limit of 10.
- Grade "P" refers to passing in course and not being counted towards CPI/SPI calculation.
- Minimum passing grade is "D".
- The letter grade E may be considered as grade for sufficient exposure to satisfy the pre- requisites of another course, wherever applicable.
- Grade "I" is a place holder grade and gets converted to an appropriate grade before the commencement of the next semester.

Rules for Change of Branch

To provide an environment where students are free to develop their passions, IITGN follows the most liberal policy for branch changes after the first year. We also have a formal structure to convey the excitement, promise, and relevance of each branch of engineering to our students. This is probably the first time in the history of the IIT system that such a policy has been successfully implemented.

After successful completion of the first two semesters, students may apply for change of programme, subject to the fulfillment of the laid down conditions. Rules / guidelines governing the change of programme are given hereunder:

1. Any student with CPI greater than or equal to 9.50 will be allowed a Change of Programme without any restriction.
2. For others, change will be permitted in the order of their merit determined by their respective CPI. Students with CPI greater than or equal to 6.50 and without any fail grade / backlogs will be eligible to apply.
3. The request for change (in the order of merit) for a student (say S1) from programme A to programme B will be considered if –
   (a) Strength of programme B does not exceed by more than 10% over the sanctioned strength for that programme.
   (b) Strength of students on rolls in the programme A does not fall below 50% of the sanctioned strength.
   (c) The request of S1 will be re-considered (*again in the order of merit*) due to another student getting transfer to branch A, provided this re-consideration does not violate (b) above.
4. All such transfers can be effected only once at the beginning of the second academic year. No application for change of Programme during the subsequent academic years will be entertained.

Training and Placement at IIT GN

In its very first year of placements, IIT Gandhinagar with its core disciplines of Chemical, Mechanical and Electrical was able to attract dominant players of the industry for its multi-talented outgoing batch. Ricoh, BPCL, Grasims, TCE, Finisar, JCB are a few to name among the top recruiters at IITGN. Backed by the training and support of CDC (Career Development Cell), students at IITGN get to regularly interact with the

experts in the industry and IIT alumni, thus staying updated with the needs of the job market. The Placements cell has persevered to bring to campus the companies spanning over the sectors of management, research and IT apart from core engineering, to suit the diverse aspirations of its students. Its graduates are ready to capture the world through their presence in Microsoft, Flipkart, Timetooth, DRDO and other such leading organizations.

Career Development Center

Career Development Centre (CDC) is a part of Student Placement Office, which provides a platform to the students to enhance and groom their outer and inner self to convert themselves into a complete professional. Through various workshops and events with eminent external speakers, the CDC helps students to become aware about various career opportunities and assist them to take informed decisions about their careers. The mission of CDC is to be a catalyst in the development of students to become leaders in a technologically based global ambience.

Financial Assistance

At present the Institute depends on Government grants to offer merit-cum-means scholarships to undergraduate students. The Institute believes in rewarding outstanding achievements of undergraduate students irrespective of their parental income. The Institute is therefore establishing scholarships for outstanding students who distinguish themselves in academics, sports, cultural, social, and leadership activities.

How to Reach the Campus

The campus is easily accessible from both the train station and airport in Ahmedabad. A taxi ride from the airport to the campus would cost about Rs 250/-. The most common transportation is an auto rickshaw, a typical fare from Ahmedabad railway station to Chandkheda by auto rickshaw is about Rs. 100.

Connectivity

Ahmedabad airport has numerous domestic and direct international flight connections to Doha, Dubai, Singapore which are global hubs for other international destinations. It is very well connected by rail and road networks to other cities in India. The World Bank has recently upheld the well-constructed highways in and around Ahmedabad as model road transportation infrastructure for cities to emulate. In the pipeline is the construction of a metro subway rail link between Ahmedabad and Gandhinagar.

Other specific/important information about the Institute

Innovations at IITGN : IITGN aspires to be a leader and a trend-setter in education. In this endeavour, we enthusiastically encourage all novel educational initiatives consistent with the core values, mission and vision of the Institute. Some of our recent initiatives are briefly outlined below.

Foundation Programme for Self Development: IITGN has recently introduced a Foundation Programme that requires all new undergraduate students to undergo an intense five-week programme to develop their life-skills. The idea is to help the students make a smooth transition from the days of single-minded preparation for the JEE to a new phase in life that would ultimately shape them to be well-rounded human beings, outstanding engineers and responsible citizens. This programme focuses on nurturing creativity, communication skills, ethics, teamwork, and includes various games and workshops on theatre, appreciation of architecture, pottery, etc.

International Faculty: The Institute is enthusiastic about bringing international faculty on board, and by now, a good mix of international faculty from various countries such as Germany, US, Switzerland, and Portugal have spent a semester or more at IIT Gandhinagar.

Comprehensive Viva-Voce: The Institute has introduced a comprehensive viva-voce to identify talents and weaknesses of students early. The students are encouraged to pursue their talents vigourously and to address areas of concern without hesitation. This is a mandatory activity conducted every semester for all the undergraduate students by a panel of faculty, enables the Institute to establish one-on-one connections by giving attention and feedback to each individual, and assess our teaching-learning ambience.

Emphasis on Physical Education: With firm belief in the truism that a healthy mind lives in a healthy body, the Institute has introduced a demanding physical

education component in the curriculum. All undergraduate students must engage in formal sports activity at least five days a week during the first two semesters at the Institute. This programme has been very effective in rekindling the passion for sports and outdoor activities in the students.

Short-Courses: IITGN has started a Short-Course Series for the well-rounded growth of the students. Each such Short-Course has a duration of 8-10 hours, and is conducted by a guest on a topic different from the subjects in the regular curriculum. Each course earns the students one credit (mentioned in the grade card) and is voluntary on part of the students. Some of our recent Short-Courses have been on Indian Democracy, Entrepreneurship, Energy Efficiency, Literature, and Cosmology.

Project-Based Learning: The Institute places great emphasis on students undertaking projects of interest to them outside the curriculum. It is heartening to see our students undertaking exciting projects in Fire Engineering, Low-cost Mechanical Gadgets, Biomedical Engineering and the like, under the mentorship of faculty from not only within the Institute but also from top institutions worldwide.

Earn-While-You-Learn Programme: The Institute conducts a programme where undergraduate students help in the library, computer centre, and in grading assignments. The programme provides financial help, instills the value of dignity of labour, and builds self-esteem of the participating students.

Enthusiasm and the Institute:

The students and faculty of IITGN show an extraordinary level of enthusiasm and participation towards the Institute. Some of these efforts are outlined below.

Amalthea: Every October, the students at IITGN organized Amalthea, a two-day conclave on Renewable Energy. The event in the past two years included sessions on solar, wind and bio-energy and a number of panel discussions. The event was supported by almost all major companies associated with renewable energy in India through lectures, sponsorships, or both. Numerous eminent speakers shared their knowledge and vision with the students. The event once again proved the extraordinary level of maturity and leadership capabilities of our young students.

Cognition, Experience, & Creativity: To foster creativity, faculty in Philosophy at IITGN organized an international conference in October 2010 to focus on how experience and creativity are modeled on cognition, and to understand innovative thought-process from an inter-disciplinary perspective. The conference included many distinguished speakers from Bulgaria, England, France, India, Ireland, Japan, Macedonia, Portugal, Turkey, and the US, who talked about cognition from a philosophical, biological, and computer science perspective.

Community Outreach: The Institute is strongly committed to sensitizing students to the needs of the society and motivate them to contribute in small ways from an early age. With this intention, the IITGN community is currently involved in two major initiatives. Since August 2010, a team of our girl students have been spending 3 hours every weekend with 75 girl students from Sakar School, Ahmedabad to enthuse them about Science and Mathematics. In January 2011, members of IITGN community started Nyasa, a programme to address the health and education needs of construction workers and their families on campus. As part of Nyasa, the community has organized community lunch, held clothes collection drives, and distributed woollen clothes in winter. Currently, the Nyasa team hosts 2-hour play-sessions with the children of construction workers every Sunday.

Blithchron: In the very first year, the Institute saw its first batch of students organize the flagship inter-college cultural festival Blithchron with great aplomb. This was when the student body comprised just 90 students! The extremely popular annual event has been growing in terms of stature and size ever since.

NOTE : You can follow the growth trajectory of the Institute from our quarterly newsletter Connections at: **http://iitgn.ac.in/iit-newsletter.htm**.

2.5 INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI

The campus is spread over 700 acres of land on the north bank of the river Brahmaputra with a picturesque surrounding. The campus was planned taking full advantage of the natural features of the terrain, which consists of several hillocks and lakes. The Brahmaputra flows majestically on one side, while the other sides have backdrops of blue hills. The campus is about 20 km from Guwahati railway station and about 18 km from Guwahati airport. To reach the institute from the city, there is the institute bus service that runs regularly to and from the city. This bus service starts from near the railway station. Taxis are also available at the railway station. Pre-paid taxis are available at the airport to get to IIT Guwahati.

With pleasant weather for most of the year, the city has an annual rainfall of about 1000 mm. A high humidity (80 to 95%) is common in the monsoon season. The maximum day temperature in summer is around 350C and the minimum temperature in winter is around 70C. Guwahati, the gateway to the north eastern region of India, is well connected by rail and by air to the rest of India. Direct train services are available from/to all major cities in the country. All major domestic airlines operate regular flights from/to New Delhi, Mumbai, Kolkata, Bangalore and Hyderabad with connectivity to all major cities in the country.

Academic Programmes

Undergraduate programmes offered include B.Tech. in ten disciplines, viz. Biotechnology, Chemical Engineering, Chemical Science & Technology, Civil Engineering, Computer Science & Engineering, Electronics & Communication Engineering, Electronics & Electrical Engineering, Engineering Physics, Mathematics & Computing, and Mechanical Engineering; and B.Des. in Design. Postgraduate programmes offered are : a two-year M.Sc. in Physics, Chemistry, and Mathematics & Computing; a two-year M.A. in Development Studies; a two-year M.Tech. in Biotechnology, Chemical Engineering, Civil Engineering, Computer Science & Engineering, Electronics & Electrical Engineering, and Mechanical Engineering; a two-year M.Des.in Design; and Ph.D. in the fields of Science, Technology, and Humanities & Social Sciences.

Facilities Unique to the Institute

State-of-the-art teaching laboratories established in all the engineering and science disciplines, combined with a Central Workshop and Computer Centre, provide value and strength to the programmes. The Computer Centre with its modern facilities and pleasant atmosphere is a favourite place of the students for cracking software problems or surfing the Internet. The Central Library has an excellent collection of books, current periodicals, back volumes of journals and databases on compact discs. The Central Library has a computerized access facility through its network server. Students can browse books and journals online. In addition to departmental facilities, the Central Instruments Facility (CIF) of the Institute - with provisions of several state-of-the-art equipment, also support students in carrying out their projects and other research work. Besides, to tap the ideas of innovative students and to translate such ideas into commercially significant products, the Institute has a Technology Incubation Centre (TIC). TIC's objective is to extend support to innovators in the form of finance, space and technical guidance.

Boarding and Lodging

There are nine boys' hostels and a girls' hostel for accommodation of the students. Each hostel has a mess, a canteen, a juice shop, a stationary shop, indoor games facilities, cable TV, local area network (LAN) connection, and uninterrupted water and power supplies. All students enjoy the privacy of a single room.

An academic complex, a married scholars' hostel, a guest house with a capacity of 144, an administrative building, lecture theatres, a state-of-the-art auditorium and ample residential quarters are there on campus. These cater to the requirements of classrooms, laboratories and residences for faculty and staff. Branches of Canara Bank and State Bank of India with ATMs, a post office, a computerised railway Passenger Reservation System (PRS) facility, a book shop, a shopping complex and several PCOs serve the needs of campus residents. The Institute has stadiums for football, cricket, hockey and track & field events, and courts for tennis, volley ball and basket ball. It also has a gymnasium, an indoor sports complex, and a

swimming pool. The IIT campus offers plenty of scope for trekking and climbing, so that one can enjoy a challenging and stimulating academic environment blended with a rich outdoor life.

Health Care

The Institute gives great importance to health care. With three regular Medical Officers, supported by a number of outsourced doctors (including specialists), the Institute's medical team has been providing efficient services to all its staff, students and faculty members. The Institute's seventeen-bed hospital has trained nurses on duty round-the–clock. It has modern diagnostic equipment, a pathological laboratory, a pharmacy, and two ambulances. For indoor patients, the Institute also has arrangements with top medical institutions of Guwahati, such as Guwahati Neurological Research Centre (GNRC), International Hospital, Down Town Hospital, Guwahati Medical College Hospital, etc.

Besides, to keep the students mentally and physically healthy, during the first two years of the undergraduate programme, the Institute offers Physical Training (two hours per week) as non-credit but compulsory courses.

Financial Assistance/Scholarships

The Institute offers a number of scholarships to the students, viz, Merit-cum-Means Scholarship is awarded to a maximum of 25% of General and OBC category undergraduate students, and Institute Merit Scholarship is awarded to those undergraduate students of second, third and fourth years, who score the highest Yearly Performance Index (YPI) in their respective disciplines.

Besides, Govt. of India SC and ST scholarships, State Govt. scholarships and various industry sponsored scholarships are also available to the deserving students.

Training and Placement

The 14th batch of B.Tech. and 11th batch of B.Des. students are graduating this year. The graduates of the previous batches have been recruited in reputed private and public sector organizations through campus interviews. A large number of B.Tech. and B.Des. graduates have obtained admission to M.S. and Ph.D. programmes in universities abroad with scholarships.

Credit System

The Institute follows the semester-based credit system. The B.Tech. and B.Des. programmes consist of 8 semesters spread over 4 academic years. A student takes 4 to 5 theory courses in addition to laboratory courses in each semester. A project in the final year provides the student ample scope for independent work. Credits are allotted to various courses depending on the number of lecture/tutorial/laboratory hours per week. A student's performance in a course is continuously evaluated throughout the semester and culminates in the award of a grade on a 10-point scale. Performance in a semester is evaluated in terms of the weighted average of grade points secured in all the courses registered in that semester, known as the Semester Performance Index (SPI). A Cumulative Performance Index (CPI) is given, representing the weighted average of grade points secured by a student in all the semesters.

Minor Programme

1 Students may opt for a Minor in a discipline other than the discipline he/she is registered in. Students completing a minor will have the minor mentioned in the degree certificate and in the final grade card.

2 The credit requirements for a minor discipline will be in the range of 30-36 credits. The minor courses will spread over the third to seventh semesters of a B.Tech/B.Des programme with one course per semester.

3. Only those students who have completed all the credits required in the first two semesters of their studies with a CPI of 6.5 or above, will be eligible for a minor discipline after the end of second semester.

4. The number of seats in each minor discipline will be as per decision of the Senate of IIT Guwahati. However, a minor discipline will not be available if the number of applicants in that discipline is less than five.

5 Selection to minor disciplines shall be made strictly in order of merit of the applicants.

6 Joining the minor disciplines carried out in accordance with the above rules will be effective

from the third semester of the applicants concerned. No change of minor discipline shall be permitted after this.

7. A student with only minor courses remaining as backlogs at the beginning of a semester (other than a Summer semester) will be deemed to have completed the B.Tech/B.Des programme and he/she will be awarded a B.Tech/B.Des. degree without a minor.

Rules for Change of Branch

The Institute may permit a limited number of students to change from one branch of study to another after the end of the second semester, subject to certain conditions, some of which are given below:

1. Only those students will be eligible for a change of branch who have completed all the common credits required in the first two semesters of their studies in their first attempt and without having had to pass any course requirement in the summer term examination.

2. Change of branch is permitted strictly on the basis of merit (CPI at the end of two semesters) subject to the limitation that the strength of a branch does not fall below the existing strength by more than ten percent and does not go above the sanctioned strength by more than ten percent.

3. Change of branch is permitted from a B.Tech./B.Des. programme in any branch to a B.Tech./B.Des. programme in any other branch.

2.6 INDIAN INSTITUTE OF TECHNOLOGY HYDERABAD

IIT Hyderabad started its academic program in 2008. Today it has eleven departments with enrolment of 784 students, comprising of B.Techs., M.Sc. M.Techs. and Ph.Ds. In 2012, IITH will be offering B.Tech. programs in Computer Science and Engineering, Electrical Engineering, Mechanical Engineering, Chemical Engineering, Civil Engineering and Engineering Science. IIT Hyderabad has active collaboration with Japan and MoUs with several leading universities in the USA. At present IITH is located in its temporary campus at Ordnance Factory Estate (ODF), Medak. Though temporary, it is a beautiful campus with greenery, lots of open spaces and playing fields. IITH has very nice hostels with 24 hour hot water using solar water heaters. The campus is about an hour's drive from the swanky Hyderabad airport and about an hour and forty minutes from Nampally railway station. The permanent campus, approximately, 570 acres is close by. The work for the construction of the main campus has begun; the campus buildings are designed by world renowned architects and have an ultramodern aesthetics with world class amenities. The hostels have a very unique architecture making it more of a dwelling rather than a hall of residence.

The institute has 84+ full time young and dynamic faculty. IITH has on its roll, approximately 485 B.Techs., 27 M.Sc,, 126 M.Techs. and 146 Ph.Ds. In 2012, The institute will offer the B.Tech. program in six departments, M.Tech. in seven departments and Ph.D.s in all eleven departments. IITH graduated its first batch of M.Techs. in June 2011 and the first batch of B.Techs. will graduate in May 2012. The placement of the graduating person with B.Tech., M.Sc., and M.Tech. in 2012 is 100%.

The vision of IITH centres around Invention and Innovations; with this in mind several research laboratories have been set up: X-Materials Innovations Lab, Innovations Hub for Cyber Physical Systems, Nano-X Lab, and many more research labs are in the offing. IITH also has state-of-the-art teaching labs and workshops for basic courses as well as labs for high end courses.

IITH follows a semester system. An academic year (July end to April end) consists of two semesters, each of approximately 16 weeks.

IITH follows a credit system for evaluation. Credits are allotted to various courses depending on the number of lectures and tutorials. The student's performance in a course is continuously evaluated throughout the semester and culminates in the award of Grades (A+, A, A-, B, B-, C, C-, D, FS and FR) on a 10point scale. Performance in a semester is evaluated in terms of the weighted average of grade points secured in all the courses registered in that semester. IITH has a unique and highly flexible academic program.

IITH has, for the first time in India, introduced the concept of fractional credit courses which has enabled a strong industry interaction. A typical 3 lecture course has 3 credits leading to 42 lecture hours in a semester. Fractional credits can be 0.5, 1, 1.5, 2.0, 2.5, 3.0 having 7, 14, 21, 28, 35 and 42 lectures hours respectively. All fractional credit courses are formal courses with exams and a grade. Some examples of fractional credit courses that were offered in 2011-2012 academic year are: Trends in Storage Systems, Mobile Applications, Data Management and Computing on the Cloud, Empowering Three Billion (taught by former President Dr. Kalam), Finance and Economy, Sales and Marketing, Smart Communication – all these courses were of 1 credit except Smart Communication which was of 0.5 credits.

At IITH we give a lot emphasis on project work and most courses have a strong project component. In 2012, IITH will be offering a minor in Innovation and Entrepreneurship, besides other minors.

To students admitted through JEE in 2012, IITH offers the following programs in CE (Civil Engineering), CH (Chemical Engineering), CSE (Computer Science and Engineering), EE (Electrical Engineering), ESC (Engineering Science), and ME (Mechanical Engineering):

- B.Tech.
- B.Tech. with Honours option.
- B.Tech. with minor option.

All the above six programs are spread over four years. An Honours degree is given to students completing the basic requirements in the parent department and additional requirements like project and courses in the same department. A minor is given to students completing the basic requirements in the parent department as well as additional course requirement in another department. Moreover, IITH offers fractional credit courses / modules in specialized areas.

IITH has a very liberal branch change option at the end of first semester.

IITH has started a Placement Cell to cater to the needs of graduating students. The placement cell has been very successful resulting in 100% placement in for batches graduating in May-June 2012.

IITH is a residential campus, with very good students' hostels with WiFi, solar water heaters and solar lighting. It has good mess facilities for all students. It has sports fields for all sports. The institute has very convenient access to the ODF hospital, which is equipped with all modern medical facilities.

Students at IITH are involved in numerous sports and cultural activities. There is an annual techno-cultural festival called Elan. There are nearly 10+ clubs for hobbies. Moreover, IITH has an active E-Cell (Entrepreneurship Cell).

For further information on IITH please visit www.iith.ac.in.

2.7 INDIAN INSTITUTE OF TECHNOLOGY INDORE

The Institute

IIT Indore started functioning from July 2009 under the mentorship of IIT Bombay. Continuing with the tradition of the older IITs, IIT Indore aims to play an active role in the task of propelling India on her growth-trajectory by focusing on education, research and development.

Indore City

Indore is the commercial capital of Madhya Pradesh with many industries in the area of mechanical engineering, pharmacy and electronics. It is an educational hub and have institutes of international repute, Raja Ramanna Center for Advanced Technology (RRCAT), IUCA, and IIM Indore. Indore has young and vibrant students' population. The city is well connected by road, rail and air and is strategically located in close proximity to Mumbai, Delhi and Ahmedabad.

Academic Programmes and Collaborations

The institute offers a 4-year B. Tech. programme in (i) Computer Science and Engineering, (ii) Electrical Engineering and (iii) Mechanical Engineering, with an intake of 40 seats in each branch and Ph.D. programmes in the three engineering disciplines, HSS, and Basic Sciences. The institute has developed its own new academic curriculum for UG and Ph.D. students and implemented it from academic year 2010-11 onwards. More information related to academics can be found at http://www.iiti.ac.in. IIT Indore, in its second academic year, has grown manifold since its inception due to admission of 32 Ph.D. students in the various specializations of Engineering, Humanities and Social Sciences, and Basic Sciences. This has given impetus to the research activity at the institute and to the creation of the state-of-the-art teaching and research facilities and laboratories. Such facilities are extremely beneficial to the undergraduate students also as they get exposure to the latest developments in the respective field of study.

As a part its commitment to strengthen collaboration with acclaimed international Institutes, IIT Indore has signed MoU with Saarland University, Saarbrucken, Germany. The partnership allows the two Institutes to exchange students and faculty members and explore new methods of cooperation in instruction and joint research. The key take away is the flexibility offered by the foreign partner to provide avenues for financial support to the students. Several reputed companies such as National Instruments, IBM, Tata Technologies, Texas Instruments have approached the Institute for opening Centres of Excellence in the chosen areas of specializations and efforts are on to concretize such proposals. A course on learning French language is also being offered by the Institute in Association with ALLIANCE FRANÇAISE.

The Faculty

There are total 41 faculty members, which includes 35 regular faculty members and remaining being adjunct faculty from RRCAT Indore, retired visiting faculty from the old IITs and reputed Universities and faculty members on deputation from IIT Bombay. All faculty members of the institute have been selected on the basis of the same high standard criteria as being followed in the older IITs. All faculty members hold Ph.D. degrees from reputed national and international institutions and several have international post-doctoral research experience. The process to recruit more faculty members is under process. Several research projects have been awarded to the faculty members from the sponsoring agencies such as CSIR, DST, etc. while many project proposal are under considerations of other sponsoring agencies. The faculty members actively research publications, paper presenting and attending the International Conferences/Workshops/ Symposium, Invited Talks, Chairing sessions of the conferences, and being members of Editorial Boards of the reputed international and national journals.

Upcoming Campus

IIT Indore's permanent campus will be located at Simrol which is a small village in Mhow Tehsil in district of Indore. The site for IIT Indore is about 20 km from Indore city centre, connected to it by the state highway, Khandawa Road. The state government has identified over 500 acres of land for the institute's development. The pre-construction activities have been completed including contour survey, soil-investigation, water-resistivity survey, etc. and construction of the boundary wall has begun. It is expected that IIT Indore will have its infrastructure sufficiently ready so that the Institute can shift to its permanent campus by 2013. The

upcoming campus of IIT Indore is a case in point where the process towards a more porous and membranous notion of thought has been set in motion.

The Temporary Campus and Institute Facilities

Currently, IIT Indore is functioning from the premises of the Institute of Engineering and Technology (IET) of Devi Ahilya Vishwavidyalaya (DAVV) on Khandwa Road which is 4 km. from the city centre. This campus has complete modern academic facilities including modern classrooms with sophisticated audio-video teaching aids, a modern computer centre, ever-expanding Central Library, well-equipped UG Chemistry and Physics laboratories that were developed last year and probably are amongst the best of the undergraduate laboratories in the country. IITI has also developed one virtual classroom (VCR) under NKN project with state-of-art video-conferring facilities and a dedicated NKN Link of 1 GBPS capacity. IITI was the first IIT to complete creation of VCR and one of the three IITs chosen by its inauguration on 05/02/2011. The core engineering laboratories developed include Experimental engineering lab, Basic Electrical and Electronics engineering lab. IITI has rented another modern and newly constructed building from the Pithacmpur Auto Cluster Limited (PACL) on MHOW road to develop its UG and Research labs of the various engineering disciplines. Most of the UG labs will be developed by July 2011 while all the UG labs will be ready by December 2011.

The institute has also acquired some state-of-art research equipments and facilities to cater to the research interests and needs of the existing faculty members and research scholars and also to attract best of the research scholars and faculty members as part of our endeavour for a world class research institute.

Library

The Central Library of IIT Indore provides students and Faculty Members resources for their varied needs, comfortable and peaceful environment conducive to study, and help in locating and using the resources. Resources of the Central Library include Books, E-Resources, Magazines, and Newspapers. The text book collection in the library provides vital support for on-going UG and PhD teaching programme. The library is also developing a fine collection of books on Literature and English Language, and also on sports, biographies, and general interest titles. At present, the library has more than 5000 books in its collection. The magazines and newspaper section includes all prominent technical and general magazines and local and national dailies. The Library provides access to many e-resources such as collections of journals from reputed publishers such as Elsevier, Taylor & Francis, Sage, Wiley, and Nature Journals, American Chemical Society and Royal Society of Chemistry Journals, American Institute of Physics Journals, American Mathematical Society Journals, ACM Digital Library, and SciFinder. E-books from publishers such as IEEE are also available. The Library regularly organizes Demonstrations and Training Programs for various E-resources to facilitate maximum utilization of these resources.

The Library is in the process of introducing various new services to users in addition to the Lending Facility, Reading Room Facility, Renewals, Reservations, etc. currently available. A Library software will be in place shortly which will enable the users to check the Online Public Access Catalog (OPAC) from anywhere in the institute premises. Library Orientation classes are held for new students where they are informed about the library collection, services, rules and regulations, and library staff members. The Library has its own Blog and wiki and also a Twitter account. The blog is used as a channel of communication with users whereas the wiki provides information such as lists of books, Book Recommendation Form, etc. Twitter is used for announcements of events such as Library Orientation classes. In addition to this, the Library organizes regular Book Displays in the Library where books on a variety of topics are displayed and Faculty Members are invited to browse through the books and recommend them for purchase for the library. 'IITI Booksville', a Book Exhibition, was organized by the Library from February 1-3, 2011, where thousands of latest books on varied topics were displayed.

Medical Facilities

IIT Indore has an MOU with six best hospitals of Indore City, CHL Apollo Hospital, Choithram Hospital & Research Centre, Greater Kailash Hospital, Gokuldas Hospital, Rajshree Hospitals & Research Centre, and Vishesh Hospital & Diagnostic Solutions to cater to the medical requirements of the students, faculty, staff, and their dependents. The Students and Faculty, Staff members and their dependents are issued medical cards

to ensure cashless medical treatment to the patient along with issue of the required medicines. Moreover, Institute doctor is available in the hostel premises on regular basis and for medical emergencies a round-the-clock Ambulance and transportation facility is also available at the hostel premises.

Hostel Accommodation and Transportation

IIT Indore is fully residential with hostel facility provided to the students. The hostels have common rooms for recreational activities of the students. Mess and canteen facilities are also available. Formal bus-transport facility is provided to students to shuttle between hostel and institute at regular intervals throughout the day. A 24-hour Ambulance in case of emergency is also available.

Life at IIT Indore

Sports activities are essential part of IIT Indore life to bring freshness and recreation during busy academic schedule. The Institute has developed sports facilities around its temporary campus to promote sports, such as football, volleyball, badminton, basketball and table-tennis. Athletic tracks at DAVV campus are used for athletic events. Sports facilities in and around Indore are being used for regular practice of sports like cricket, swimming and tennis. The IITI Girl became the Fastest Girl in the Inter-IIT sports meet held at IIT Delhi during December 2010 by winning gold medal in 100 m race. The institute is also building a gymnasium with state of the art facilities for the students.

Rules for Change of Branch

After successful completion of the first two semesters, students can apply for the change of branch subject to the fulfilment of the following rules:

1. Top 1% students of the total admitted students in that year will be eligible for change of branch without any constraints.
2. For others, change will be permitted strictly on merit basis. Students without fail grades and backlogs and with CPI > 6.5 will only be eligible to apply and can give their choices.
3. The request for change (in the order of merit) for student S1 from branch A to branch B will be considered if -
   A. Strength of branch B does not exceed the sanctioned strength for that branch.
   B. Number of students on rolls in the branch A does not fall below 85% of the sanctioned strength.
   C. The request of S1 will be re-considered (again in the order of merit) if S1 does not violate (b) above due to another student getting transfer to branch A.
   D. If student S1 is not permitted to change from branch A to B (due to (b) above), any other student S2 in any branch with CPI less than S1 will also not be permitted to change to branch B.
4. All such transfers can be effected only once at the beginning of the second academic year. No application for change of branch during the subsequent academic years will be entertained, except as in item 5, below.
5. The rules for change of Branch/Programme from students belonging to SC/ST category would be similar to that of other candidates except for the following concessions:
   A. Their CPI must be 6.0 or more (without any kind of backlogs).
   B. Each branch does not exceed its sanctioned strength by more than 2.

2.8 INDIAN INSTITUTE OF TECHNOLOGY KANPUR

History

IIT Kanpur is reputed all over the world for its innovative academic programmes stressing science-based engineering education. Since its inception in 1960, the Institute is engaged in carrying out original research of significance and technology development at the cutting edge. It introduced for the first time in the country computer science in the undergraduate curriculum, semester-based flexible programmes, interdisciplinary programmes in several areas, and a broadband letter grading system. In its initial years, IIT Kanpur benefited from a novel experiment in international cooperation when a consortium of nine leading universities of the USA collaborated with it to launch world-class engineering education in our country.

Location and Accessibility

It is located just outside the major industrial town of Kanpur which is well connected with all other metropolitan cities.

Academic Programmes

IIT Kanpur imparts training to students so that they become competent and motivated engineers and scientists, and awards Bachelors, Masters and Doctoral degrees in various branches of technology and science. The Institute celebrates freedom of thought, cultivates vision, nurtures entrepreneurship and encourages growth, inculcating human values and concern for the environment and society at the same time.

The Institute follows the semester system with two eighteen-week semesters, including a one-week recess in each semester. In addition, an eight-week summer term is also offered to help students make up deficiencies in their course work. This enables students to reduce any delays in completing their programme due to illness or any other reason. Starting July 2011, the Institutes will follow a truly credit based system. The satisfactory academic performance of a student as well as the graduation requirements are based on successful completion of a certain number of credits.

A diagnostic test to ascertain general proficiency in English is conducted for ALL students admitted to IIT Kanpur. Based on their performance in this test, some students are told to take a basic course in English Language.

A slow-paced programme is offered to help those students who are found deficient in Physics, Mathematics and/or English. Such students are advised to take slow-paced courses in any one, two or all of these subjects for easier assimilation of contents and concepts. In the slow-paced courses, the subject matter is covered in a period of two semesters instead of the normal one semester. It may be emphasized that the option to take the slow-paced courses is a privilege and gives the deficient student a chance for better performance. However, it may in some cases lead to delay in completion of the academic programme.

Facilities Unique to the Institute

In keeping with its reputation for academic excellence, the Institute has state-of-the-art facilities with one of the best and openly accessible computing facilities and modern laboratories that include a unique flight laboratory with several powered aircrafts, gliders and a one kilometer runway. The P K Kelkar Library of the Institute is one of the finest scientific and technological libraries with an online information retrieval system over the campus LAN. The curriculum at IIT Kanpur has a strong emphasis on Humanities and Social Sciences (HSS). The HSS department offers courses in Psychology, Sociology, Economics, Philosophy, Fine Arts, English and Sanskrit Languages, among many other areas. A Language Laboratory with computer controlled audio and video components, offers courses in foreign languages like French and German.

About the students

The Institute has a strong counselling service to help students settle down comfortably in the new environment and cope with the stresses of student life. Sincere and dedicated student volunteers, helped by faculty advisers, organize the orientation programme for fresh entrants, provide extra help in course work if needed, conduct language classes, etc. The students are involved in all the decision making processes of the Institute via student representatives in various Institute committees.

Boarding and Lodging

The Institute has a fully residential beautiful picturesque campus, spread over 1055 acres of land, with all modern amenities. It has about 3102 undergraduate and 1818 postgraduate students, around 350 faculty members and 650 supporting staff. A shopping complex, branches of State Bank of India and Union Bank of India, a post office, and other amenities fulfill the needs of the campus community. The students are accommodated in ten boys' hostels and two girls' hostels. In addition, there is housing facility for married students. All rooms in the hostels have provisions for internet connectivity and connection to other computers through Local Area Network.

Health Care

Equipped with pharmacy, clinical laboratory, physiotherapy facility and a 30-bed indoor ward, the Health Centre provides medical help and emergency care to the campus community round-the-clock.

Recreational/Extra-Curricular Facilities

A number of extra-curricular activities, recreational as well as managerial, are an integral part of the educational experience at IIT Kanpur. All such activities are coordinated by the Students Gymkhana. Students are involved in all decision making bodies, including the administration of academic programmes, hostel management and even disciplinary matters. Further, students organize events such as Antaragni—the all India cultural festival, Udghosh—the all India games and sports festival, and Techkriti—the all India science, technology and entrepreneurship festival. These events draw participation from academic institutions all over the country. In addition, students organize a large number of extracurricular events encompassing literary, cultural and sports aspects through a number of clubs and societies. These include Adventure Club, Nature Club, Astronomy Club, Photography Club, Students Film Society, Aero-modelling Club, Gilding Club, Robotics Club, HAM Club, Music Club, Dance Club and Theater Workshop, etc. The Institute has an Olympic-sized swimming pool, excellent indoor and outdoor sports facilities, an open air theatre, and a 1200-seat auditorium with excellent acoustics. A strong NSS programme to inculcate social values in students and their personality development is also conducted.

Financial Assistance/Scholarships

IIT-Kanpur provides a large number of scholarships to its students. At least 25% Under-graduate (UG) students [B.Tech., B.S.] in a batch will receive Merit-cum-Means scholarships from the institute. The details of all such scholarships are available at the website

http://www.iitk.ac.in/dosa/DOSA/scholarship.htm

In order to be considered for any of these scholarships a student must produce a "Parental Income Certificate" at the time of registration to establish the means criterion. The form for this purpose (Format for Parental Income certificate) is also available at the same website.

Apart from Merit-cum-Means scholarships several merit scholarships, sports scholarships, awards and prizes are also awarded to deserving students.

Training and Placement

The Institute has a very active Student Placement Office that coordinates Campus Recruitment. It is housed in the Outreach Building with excellent facilities and support to prepare and train students for placement. A very large number of national as well as international companies visit the Institute to hire the students.

Rules for Change of Branch/Programme

A student may be allowed to change the branch/ programme subject to certain constraints on the number of students in each branch/programme. Some of the guidelines used for branch/programme change are as follows.

1. The strength of any branch/programme should not exceed the larger of its existing and sanctioned strengths, and should not fall below 60% of its sanctioned strength due to change of branch/programme.

2. All cases are decided in decreasing order of Cumulative Performance Index (CPI) of the eligible applicants.

3. A student without any slow-paced course or with a slow-paced course in English only, can apply for a branch/ programme change at the end of

2nd, 3rd and 4th semesters. The eligibility criteria depend on the semester at the end of which the student makes the application. However, these cases are decided on the basis of the CPI up to the first two semesters only.

4. A unique aspect of IIT Kanpur rule is that branch change is allowed not just after second semester but also after 3rd and 4th semester.

5. All students are initially admitted to a programme in Bachelor of Science/Bachelor of Technology. The interested students can apply for conversion to a dual-degree programme. The second degree may be M. Tech./M.S./M.B.A./M. Des. This will normally require an additional year for completion.

6. An interested student, who is doing well in his/her programme, can decide to opt for a second major. This option can be exercised at the end of fifth semester.

7. The Institute runs an interdisciplinary programme: B Tech. in Engineering Science. Interested students can opt for this programme as a branch change. This programme is especially aimed at highly motivated students who feel constrained within the conventional compartmentalization of departments.

8. Relaxed eligibility criteria are adopted for students of SC/ ST categories.

2.9 INDIAN INSTITUTE OF TECHNOLOGY KHARAGPUR

The Indian Institute of Technology Kharagpur was founded in 1951. A forerunner of the other fourteen IITs, and in many ways a role model for them, IIT Kharagpur has been producing scientists and technologists of the highest calibre who continue to provide leadership in education, research, industry, and management. Many of its alumni are illustrious men and women whose achievements command admiration and respect everywhere and evoke a just sense of pride in the IIT community.

Situated 120 km west of Kolkata, Kharagpur can be reached in about two and a half hours by train from the Howrah railway station of Kolkata. Kharagpur is also connected by direct train service to other major cities of the country. The Institute is about 10 minutes' drive (5 km) from Kharagpur railway station. Located in a sylvan landscape, far from the heat and dust of the city, the campus provides a calm and serene environment for dedicated academic pursuits. IIT Kharagpur has two extension centres, one at Calcutta and the other at Bhubaneswar, besides the main campus at Kharagpur, which is the largest in the country.

IIT Kharagpur has the largest number of PG and UG programmes and has a large number of doctoral research scholars. It offers 22 undergraduate (B.Tech., B.Arch., M.Sc.), 87 postgraduate (M.Tech., Dual Degree, M.C.P., M.B.M.) and research (M.S., Ph.D., D.Sc.) programmes.

IIT Kharagpur has been a prime mover in the modernization of technical education in independent India. Excellent research facilities and support in the frontier areas of science and technology are available at IIT Kharagpur, which includes some of the most advanced laboratories and the largest technical library in the country housing a state-of-the-art electronic library. All the departments and centres are equipped with modern instruments. The Central Research Facility caters to the special needs of all including outside organizations. The Institute also houses an Astronomical Observatory set up by the Positional Astronomy Centre, Government of India and the ISRO Satellite Remote Sensing Centre. A well-equipped centre for Education Technology, and Language and Psychology laboratories are additional assets. Many special purpose top rung laboratories have been created in IIT Kharagpur out of the R&D grants received from Industries, Government, Defence and from Alumni Contributors. A large new Computer and Informatics Centre, a new wing for Information Technology, computer network for halls of residence, students' hostels rooms and a capacious lecture hall complex are fully operational. Some of the laboratories are: a world class VLSI Design Laboratory, Communication Empowerment Laboratory, Media Lab Asia, Microsoft Laboratory, Motorola Laboratory, Centre for Excellence in Composite Technology, Ocean Science and Technology Cell, Advanced Technology Centre, Space Technology Cell, etc. Vinod Gupta School of

Management (VGSOM) and G S Sanyal School of Telecommunications (GSST), the first of their kinds in the IIT system, owe their existence to the generous contributions of two of its alumni.

Flexible Curricula

In the new millennium, IIT Kharagpur has switched over to a more flexible academic system aiming at capability-based learning where students would get wider options to exercise and brighter students would be able to achieve more. Over and above receiving a B.Tech. (Hons.) Degree, a B.Arch. (Hons.) Degree, a Dual Degree or an Integrated M.Sc. Degree, for which he/she has registered, a student depending on his/her performance and availability would have the option to earn additional credits across disciplines. On accumulation of sufficient prescribed credits, a student would be able to earn a MINOR in a discipline other than the degree for which he/she has registered. For example, a student in Electrical Engineering (EE), say, would obtain a B.Tech. (Hons.) degree in EE and can earn a MINOR in Computer Science and Engineering (CSE) or Mechanical Engineering (ME), or even a MINOR in a science discipline. Provisions have been kept in the curricula so that a student has the freedom to pursue and sustain multidisciplinary interest.

The Institute follows a seven-point grading system with letter grades and the corresponding grade points per credit. The Cumulative Grade Point Average (CGPA) is computed at the end of each semester. The CGPA secured by a student reflects his/her performance.

Accommodation and Amenities

The institute is fully residential. Students are accommodated in 19 Halls of Residence, 15 for boys and 4 for girls. The halls have 24 hours internet connectivity. All the Halls of Residence have regular catering facilities. Some additional food outlets are located within the campus; a few late evening canteens are available as well in some of the halls of residence. Several restaurants including air-conditioned ones and a Café Coffee Day unit are located in the campus, particularly in the hostel area. For daily necessities and groceries, one can walk down to the Tech Market within the campus. A larger market, Gole Bazaar, is about 5 km from the Campus. Three banks with ATM facility are located inside the Campus. The State Bank of India branch with core banking services is in the campus close to the Institute Main building and it provides foreign exchange facilities as well. An extension counter of Syndicate Bank is situated on the first floor of the Institute main building. A branch of Punjab National Bank is situated in the Tech Market where business transactions are carried out in the afternoon. In addition, an Axis Bank ATM is available as well inside the Gymkhana premises. The Post Office is located close to the State Bank branch. Outlets of a few courier services are also available within the campus.

South Eastern Railway has been operating a counter in the Institute Main Building area extending Railway ticket booking facilities especially to the students and the campus residents.

There are also a few privately run outlets in the campus to cater facilities for railway ticket booking, air ticket booking, car rental, and STD/ISD phone calls.

Recreational/Extra-Curricular activities

IIT Kharagpur aims at the all round development of personality, with emphasis on physical, socio-cultural and value-oriented education. In the rich tapestry of culture that marks this IIT, students play a vital role. They participate in almost all decision-making bodies of the Institute, starting from hostel administration to Senate, and organize cultural and techno-management activities throughout the year, culminating in the Spring Fest and Kshitij.

Technology Students' Gymkhana, the nerve centre for sports, cultural and social activities, puts a premium on creativity and teamwork. It has a number of outdoor and indoor stadia for sports and games, a modern swimming pool and a gymnasium. Photography Club, Fine Arts Club, Publicity Club, Music Club, Yoga Club, Film Society, Dramatics Society, Aquatics Society, Astronomy Club and many more special interest groups are supported by the Gymkhana. Lately a large number of technology and social service focused student societies have been formed, quite often the local chapter of an international body. The halls of residence also offer a few in-house sports facilities in addition to the central facilities. A large expansion on Gymkhana facilities is nearing completion to offer many more choices on facilities in greater numbers.

Health care

The B. C. Roy Technology Hospital is located at the center of the Campus. It provides indoor and outdoor medical facilities for common ailments. However, a few specialized visiting medical practitioners regularly attend the outdoor chambers. The Hospital has its round

the clock emergency medical attendance arrangement, and a 24x7 medicine counter. Complicated cases are referred for treatment to the State Hospital or to the Railway Hospital or to Hospitals in Kolkata. The Institute has Students' Medical Insurance Coverage which is obligatory on the part of the students and which usually covers a part of medical expenses for such referred cases. 24 hours Institute ambulance service is also available for the purpose of shifting the patients to other hospitals for better management. A few specialized medical practitioners are also available around the IIT campus for private consultation; this list of neighbourhood medical facilities is posted at http://noticeboard.iitkgp.ernet.in/hospi.htm

Counselling Centre

The Counselling Centre offers a broad range of services including psychological assessment, individual therapy, group therapy, as well as medication, and management to promote mental health, life skills training, emotional resilience and overall wellbeing of the student community. Full-time clinical psychologists and a visiting psychiatrist are available for consultation.

Financial Assistance/Scholarships

The Institute also offers a very large number of scholarships, medals and prizes which is made possible by the munificence of its well-wishers, providing due recognition and reward for merit.

The Institute award merit-cum-means scholarship to all eligible students of 4-year B. tech, 5-year Dual Degree, 5-year B. Arch., 5-year M.Sc. courses subject to a maximum number of 25% of the total number of registered students of that sessions. Apart from this, various endowment scholarships are also available.

The sponsored research and consultancy projects generate significant amount of fund and provide generous support for undergraduate students doing good projects.

Training and Placement

The Training and Placement Section of the Institute centrally handles campus placement of the graduating students of all Departments, Centres and Schools. The Section provides excellent infrastructure to support every stage of the placement process. Arrangements for Pre-Placement Talks, Written Tests, Interviews, Group Discussions etc. are made as per the requirements of the Organizations. The section also arranges for summer practical training for all pre-final year B.Tech. (Hons.) Students and third year students of 5 Year dual degree M.Tech. courses.

The Science and Technology Entrepreneurs' park (STEP) of IIT Kharagpur has given a fillip to entrepreneurial activities in the region.

Rules for Change of Branch

The Institute may permit a student of B.Tech. or integrated M.Sc. Course (except for B.Arch. students) to change from one branch of studies to another after the first academic year (first two semesters). Only those students will be eligible for consideration for a change of branch who has completed all credit courses in the first two semesters in their first attempt and obtained a CGPA of not lower than a prescribed value at the end of second semester.

Change of branch shall be permitted strictly on the basis of inter-se-merit of the applicants. For this purpose, the CGPA obtained at the end of the second semester shall be considered. If there is any tie, it will be resolved by considering the JEE rank of the applicants.

1. In making the change of branch, those applicants, who have secured a rank within the top one percent, shall be allowed to change the branch to their choice without any constraint.

2. The remaining eligible applicants shall be allowed a change of branch strictly in order of their inter-se merit, subject to fulfillment of both the constraints given in (a) and (b) below.

   (a) The actual number of students in the third (autumn) semester in the branch to which the transfer is to be made, should not exceed 110% of the number of students on roll in that branch in the previous semester.

   (b) A maximum of 10% students registered in a branch can go out from that branch due to branch change.

3. The applicants registered for a Dual Degree Programme will be considered for change of branch to another Dual Degree Programme only, for which the above norms will be applicable.

All changes of branch made in accordance with the above rules will be effective from third (autumn) semester.

2.10 INDIAN INSTITUTE OF TECHNOLOGY MADRAS

The Indian Institute of Technology Madras (IITM) is among the finest, globally reputed higher technological institutions that have been sensitive and constructively responsive to student expectations and national needs. IITM was founded in 1959 as an 'Institute of national Importance" by Government of India with technical and financial assistance from the Federal republic of Germany. The institute offers high quality academic programmes leading to B Tech, M Tech, Dual degree M Tech, Dual degree BS and MS in Physics, MSc, M S, M.A, M B A, and PhD degrees through its technology, engineering, science, management and Humanities and Social Sciences Departments. Young students seeking a wholesome academically rigorous intellectually challenging personally enriching and value laden educational experience have for long found IIT Madras an ideal institute for pursuing their higher studies.

IIT Madras campus is famed for its scenic serene and stimulating natural environment. Comprising 650 acres of lush green forest, including a large lake and variety of flora and fauna, the campus is the pride of its residents and provides an ideal setting for serious academic and other developmental pursuits.

State of the art education, research and general campus infrastructure is provided in tune with the institute's nation-centric vision and to support its inspiring and challenging academic programmes. Our workshops, laboratories, computing infrastructure, library, hostels and other campus facilities provide to the country's best talent, a living, learning and working environment that enables cutting edge work. Leading institutions and organizations across the world actively collaborate with us through a variety of projects, programmes and schemes. Generally, our faculty and students jointly work on all of these, including large scale socially relevant projects for our nation and people.

Academic Programme

The four year B Tech and the five year dual degree (B Tech + M Tech and BS + MS) programmes consist of an amalgamation of core courses in the chosen engineering/science discipline along with courses in basic sciences, humanities and practical engineering skills. Laboratory courses and an industry internship give students a platform to test the fundamentals acquired in the classroom. The institute follows a policy of relative grading and continuous assessment done through numerous class tests, assignments and examinations.

The curriculum of the five year dual degree programme is common with the four year programme for the first three years, after which electives are offered in the chosen M Tech specialization.

Students admitted to IIT Madras in four year B Tech or five year dual degree (B Tech and M Tech) programmes can opt for B Tech (Honours) at the end of the fourth semester of the programme. They should have a CGPA of 8.5 and above, and should have cleared all the courses as prescribed in the curriculum in the first attempt. In addition, B Tech (Honours) students must register for additional courses for the 12 PMT credits and a project work. Dual degree students who meet the above criteria will be awarded B Tech (Honours) and M Tech degree.

The Curriculum

With our focus on research and development, in the complex changing scenario of today's industry, our curriculum constantly reflects key trends and upcoming areas of interest. It is reviewed regularly and changes are incorporated to enable our students to be in dynamic equilibrium with their world and time. The greatest strengths of the IITM curriculum are its flexible rigor and the variety it offers one to pursue one's interest in diverse disciplines ranging from engineering, technology, the pure sciences management and humanities and social sciences including economics, sociology, philosophy and literature. Interdisciplinary learning is stressed and achieved through our policy of giving our students a great deal of freedom in choosing their electives and minor streams. The curriculum, pedagogy and the atmosphere together infuse in our students a strong spirit of inquiry joys of learning and the excitement of knowledge discovery.

Rules for Change of branch

The academic programmes offer ample flexibility. For instance, students can change their branch to a more

preferred one at the end of the first semester depending on their academic performance. Dual degree students are permitted to change to other dual degree programmes. However, change of branch from Engineering design dual degree (M92 and M93) to other branches and from other branches to M92 and M93 is not permitted in view of the specialized nature of the curriculum and course contents of these dual degree programmes. Changeover from a B Tech course to a dual degree course within the same department is permitted at the end of sixth semester. All changes are subject to certain institute rules which are available in the institute website.

Please visit http://www.iitm.ac.in for full information details and clarifications.

Co-curricular and Extra-curricular activities

To foster the spirit of engineering among the students, a number of hobby clubs including Robotics, Astronomy and Rocketry to name a few, function vibrantly. These provide students with opportunities to innovate and implement their own ideas and designs, develop a passion for technology, under the able guidance of faculty. Nowhere is this zest for technology so aptly displayed as in Shaastra, the IIT Madras annual technical festival. Shaastra has the unique distinction of being the first ISO9001 certified technical festival in our country.

The centre for Innovation houses state of the art equipment and instruments that students can use to transform their creative ideas into proof of concept or prototypes of useful products. The Centre for Technology Innovation Development and Entrepreneurial support (CTIDES) kindles the students' entrepreneurial spirit and helps them to form companies and launch their products.

The students also learn a lot from eminent personalities across various fields through the extra mural lectures organized frequently every semester.

Personality development is also an integral part of education and students at IITM are presented with ample opportunities to develop into all round mature responsible individuals. Students can choose to pursue almost any interest being quizzing, music theatre, public speaking, creative writing, photography, trekking or sports. Medleys of clubs organize meetings and workshops throughout the year.

The cultural fever reaches its annual peak in January when Saarang the IIT Madras cultural festival happens. Its keenly contested events and performances by renowned national and international artists make it an unforgettable experience for all the participants.

'A healthy mind resides in a healthy body'. In order to encourage overall development of a student, the institute places emphasis on sports and physical fitness. With enviable facilities it comes as no surprise that our students, year after year, prove their mettle by emerging winners in many meets. The General Championship at inter IIT sports meet has often been won by IITM. The institute has an Olympic size swimming pool, a well equipped fitness centre and Gymnasium, the lush green Chemplast Cricket ground, flood lit tennis, badminton and volleyball courts along with sprawling grounds for football hockey and athletics. There are good facilities for other games and sports such as table tennis, bridge, billiards, skating etc. Various inter hostel sporting events are held round the year and the winner gets to keep the coveted Schroeter rolling trophy. Students must enroll in one of the NCC/NSO/NSS programmes for a year as part of their B Tech programme requirements.

Facilities

The recent renovation of hostels has provided residents with not only extremely comfortable living conditions but also with a 24 hour internet connectivity and clean water supply. The institute has a well run hospital with a 24 hour pharmacy. There are three restaurants that cater to a diverse set of tastes, a power laundry, 24 hour ISD/STD booths, ATM counters of various banks and an expansive open air theatre in which movies are screened every week. In order to make transition to college life as smooth as possible, the institute's Guidance and Counselling unit helps students tackle problems they may face. All students are assigned faculty advisors and student counselors to guide them in addressing issues of concern. As students continue through their year at IITM they are given more and more responsibility giving them an active say in deciding institute policies.

Industry and Alumni Relations

IITM is actively involved with national and international

organizations through its Centre for Industrial Consultancy and Sponsored Research (IC&SR). Set up in 1973, the IC&SR) plays a vital role in bringing together industry professionals and faculty of the institute for gaining insight and solving challenging problems. These joint efforts result in significant contributions to technology design and development, improved efficiencies in industrial performance and increasing care for the integrity of our national environment. Students are actively involved in all these efforts.

IITM enjoys a warm affectionate relationship with its over 30000 alumni located all over the world. The alumni have extended intellectual and financial support that has enabled the institute to build infrastructure for learning and living in its beautiful campus and also establish various advanced facilities.

2.11 INDIAN INSTITUTE OF TECHNOLOGY MANDI (HIMACHAL PRADESH)

Brief history of the Institute

Founded in 2009, IIT Mandi is the only IIT located in the Himalayas. IIT Mandi's Vision is to be leader in science and technology education, knowledge creation and innovation, in an India marching towards a just, inclusive and sustainable society.

The transit campus of IIT Mandi is situated in the premises of the Vallabh Degree College in historic Mandi town of Himachal Pradesh. Mandi is located at a distance of around 475 Km from Delhi and around 200 Km from Chandigarh in Delhi-Manali route. The 538-acre main campus of IIT Mandi is located at Kamand which is about 15 kms from Mandi town. It lies along the river Uhl which is a tributary of the river Beas. From July 2012 to July 2013, the Institute will gradually relocate to its permanent location in Kamand. The fully constructed campus in the serene landscape will offer a world-class academic environment with a high quality of life in a setting of natural splendor.

Academic Programs and Facilities

The Institute offers B.Tech programs in Computer Science & Engineering (CSE), Electrical Engineering (EE) and Mechanical Engineering (ME). The intake is 40 students in each branch. The academic program is being innovatively developed and it is offered by the following four schools: School of Computing and Electrical Engineering, School of Engineering, School of Basic Sciences and School of Humanities and Social Sciences. The organization of the institute in these schools rather than in traditional departments is for enabling the evolution of a flexible curriculum with an emphasis on interdisciplinary capabilities. All these four schools are running PhD program. IIT Mandi has currently 51 research scholars, both MS (by research) and PhD in Engineering and Basic Sciences disciplines.

IIT Mandi follows semester system with two 16-week semesters per academic year. The first semester starts in the last week of July and ends by the last week of November. The second semester runs from the first week of February to the last week of May.

The Academic Building of the transit campus of IIT Mandi has well equipped class rooms with modern facilities and teaching laboratories for Physics, Chemistry, Computer Sciences, Electrical Engineering, basic and analogue Electronics. A well-equipped Mechanical Engineering work shop is operational at the Kamand campus. Design Lab and Thermo Fluids lab will be operational by coming semester.

IIT Mandi has a sophisticated virtual class room that is used for conducting classes remotely from anywhere in the world. A high performance computing facility consists of a 128-core cluster with 128 GB memory and 20 TB disk storage. The campus is equipped with a 1 Gb/s NKN connection and 45 Mb/s Internet connection.

IIT Mandi has a Central Library, with a growing collection of books and journals. Library operations are automated using the KOHA LMS. The Library currently houses over 10,000 books and provides access to more than 2500 e-journals.

IIT Mandi has presently 39 young and 8 senior faculty members with a potent blend of exuberance and experience.

The Institute has research and teaching collaboration with several Institutions around the world, involving exchange visits by faculty and students. These include Blekinge Institute of Technology, Sweden; the IT University, Copenhagen, Denmark; Stuttgart University and the TU9 Institutions, Germany; Dublin City University, Ireland and the India-UK Advanced Technology Centre for research on next generation networks.

In order to serve research activities, fully functional Synthesis and Characterization Labs are already established at IIT Mandi with a full range of basic instruments and facilities. In addition, a Central Instrumentation Facility will be operational later this year, with state-of-the-art Instruments such as a High Resolution Transmission Electron Microscope, a 500 Mhz Nuclear Magnetic Resonance Spectrometer, Single Crystal XRD, Powder XRD etc.

Hostel accommodation and student activities

The Institute is fully residential. Presently, there are four hostels for Boys and one hostel for girls capable of accommodating 372 students. The girls' hostel is located near the Administrative buildings and Faculty Quarters. In addition, two more Hostels are also coming up this year. The hostels are located within a distance of 0.5-3 kms from the Academic Building, with Institute buses for transport. Hostels have a mess serving wholesome food, wi-fi Internet connection, LCD TV, washing machine, table tennis, badminton, etc. A caretaker looks after routine matters. Wardens and resident wardens are available in loco parentis at all times.

In spite of being a new IIT, the Institute has been successful in developing a firm foundation in sports. Training is provided by experienced coaches with adequate facilities. Students are encouraged to participate in various inter-collegiate tournaments. IIT Mandi participated in the Inter-IIT Sports Meets during the last 3 years and distinguished itself in the league of new IITs.

IIT Mandi provides facilities for the following sports: Football, Cricket, Badminton, TableTennis, Volleyball and Basketball.

At IIT Mandi, students are encouraged to develop themselves into well rounded persons. A diverse array of extracurricular opportunities is available for this. Cultural activities include Choreography, Magazine, Music, Dramatics and an English Debating & Literary Society. There are technical groups like Web Development Team, Robotics and Information Management Group (IMG) operative at IIT Mandi. National Service Scheme (NSS) helps students to work for the betterment of the community around them. A Hiking and Trekking Club is for students to take advantage of the unique geography of the surrounding Himalayas.

Health care facilities

IIT Mandi has a medical unit consisting of a doctor and nurse presently. Modern healthcare facilities are available in Mandi town with a number of Govt. and private hospitals. A 500-bed Govt. Hospital cum College is coming up at a distance of 25 km from Kamand.

Credit system

IIT Mandi follows the credit system with continuous internal evaluation throughout the semester. This results in the award of Grade on a 10 point scale for each course. Overall performance is measured by the weighted grade point averages (SGPA and CGPA). A student has to attain a minimum CGPA and earned credits to receive the BTech degree.

Change of Branch

During the first year, students get an introduction of all the branches of engineering. As a result, they may decide that they want to change their branch. Normally, at the end of the 1st year, any student who is in good academic standing, having done the full complement of courses and having no backlog can apply for a change of branch. The change is allowed provided that the strength of a class does not fall below the sanctioned strength by more than 50% and does not exceed the sanctioned strength by more than 25%. In case either of these limits is reached, CGPA will be used for as the criterion for award of change of branch.

There are provisions, for exceptional students, for change of branch up to the end of the 2nd year. See http://www.iitmandi.ac.in/academics/branch_change.html for details.

Training and placement facilities

Placement associated activities are handled by the Career and Placement Cell (CPC). The CPC consists

of faculty, staff and student volunteers working to help students get internships and jobs.

Financial assistance

The Institute provides Merit-cum-Means Scholarships to B.Tech Students and to those with weak financial backgrounds.

For Female Students

Half of society is female and IIT Mandi believes that female students are well suited as engineers. IIT Mandi being located in the peaceful hill state of Himachal provides an especially safe environment for girls to pursue their engineering studies. They are provided all facilities at IIT Mandi for academic and extra-curricular activities. As their hostel is located adjacent to the faculty quarters, they have immediate access to faculty at all times of day and night. IIT Mandi has instituted scholarships for female students to increase the enrollment.

Further information will be posted on http://www.iitmandi.ac.in/undergrad/forgirls/

How to reach Mandi

Mandi is a central town of Himachal Pradesh. It is accessible from Delhi and Chandigarh. The distance between Delhi and Mandi is ~475 km which is covered in 10-12 hrs. The alternative is to travel by train up to Kiratpur Sahib, then 4-5 hours by road to Mandi.

Mandi is 200 kms from Chandigarh, about 6 hrs by bus or 5 hrs by taxi. Delhi–Mandi buses pass through Chandigarh and some buses start from Chandigarh itself to Mandi.

The nearest airport to Mandi is the Kullu Airport at Bhuntar, at a distance of about 60 km from Mandi town. There are daily flights from Delhi.

2.12 INDIAN INSTITUTE OF TECHNOLOGY PATNA

Brief history of the Institute

Indian Institute of Technology Patna is one of the new IITs established by an act of parliament in August 2008. Patna is the capital city of the state of Bihar and is situated on the banks of the river Ganga. The region has rich history dating back to 600 BC. Patna which was known as Patliputra has been a center of knowledge since long which attracted visitors and scholars from many parts of the world such as China, Indonesia, Japan, Korea, Sri Lanka, among others. This has been land of visionaries. Some of the historical legends from this region include Lord Gautam Buddha, Lord Mahavir, Guru Govind Singh, the famous astronomer Aryabhatta and the first President of India, Dr. Rajendra Prasad. With such a rich social and cultural history, Bihar appears to be a developing state and fastest growing economy of India.

Campus location & facilities

The transit campus of IIT Patna is located on the campus of Navin Government Polytechnic in Patliputra Colony Patna. The transit campus has sufficient basic modern infrastructure required to run B.Tech programmes in Computer Science and Engineering, Electrical Engineering and Mechanical Engineering. The permanent campus is expected to come up within the next two years at Bihta, a suburb of Patna. The permanent campus will be spread on huge 500 acres of land. Some of the famous tourist sites near Patna include Nalanda, Bodhgaya and Vaishali. The transit campus has six buildings: a four-storey main building, a double-storey science block, a double-storey STPI building, double-storey extension building and two other buildings housing the Mechanical Engineering Workshop and Electrical Engineering Workshop. IIT Patna has world class research facilities in science and engineering disciplines. This is substantiated with the fact in such new institute about 80 research scholars are enrolled in the institute. Some of the state-of-the-art facilities are Computer Integrated Manufacturing (CIM), Computer controlled Wind tunnel, Universal Testing Machine (UTM), Micro-machining center, laboratories for Robotics, VLSI, Telecommunication, Image Processing, Communication and Solar energy. In addition, some of the other research facilities X-Ray Diffractometer (XRD), Field Emission Scanning Electron Microscopy (FE-SEM), Differential Scanning Calorimeter (DSC), Thermal gravimetric Analysis

(TGA), Differential Thermal Analysis (DTA), Rheometer, Battery Tester, Atomic force microscopy (AFM), Scanning Tunneling Microscopy (STM), Fourier Transform Infra-Red Spectroscopy (FT-IR), Ultraviolet –Visible spectroscopy (UV-Vis), Helium-Closed Cycle Refrigerator (He-CCR), High Frequency Vector Network Analyzer, Thin Film Coating Unit, Ellipsometer and many more. These facilities have been created to boost the education and research in science subjects at par with engineering subjects.

Many international institutes have shown their interest in collaborating with IIT Patna in various areas of research and teaching. Some of them include University of Houston, Louisiana State University, University of North Texas, University of Columbia at Missouri, University of Saskatchewan, University of New South Wales and National University of Singapore.

Hostel accommodation

There are four boys' hostels which can accommodate about 400 students. The hostels are located very close to the Institute main building. The girl students are accommodated in rented flats in a nearby locality. They are provided transport facility for commuting to the Institute building. The hostels are equipped with uninterrupted power and water supply. The hostels rooms are also provided with internet connections. Each hostel has separate mess and canteen facility. For recreation and entertainment of the students, the hostels have facilities for indoor games such as Table Tennis and Carom. It also has a TV room with cable connection. To keep the students fit and healthy, a well equipped gymnasium is also provided in the hostel. The newly constructed gymkhana building has a badminton court, music section, yoga and meditation section and other indoor game facilities. A basket ball court inside the hostel premises has also been constructed. A ground for playing football, cricket and athletics is also available in the STPI building premises of the institute. The hostel wardens reside in rented flats situated near the hostels.

Students of IIT Patna are actively involved in several extra-curricular activities. IIT Patna gymkhana is fully functional. The students have organized their annual function which is called Anwesha. During this techno-cultural extravaganza, they had several events. The other event organized by the students of IIT Patna is the Annual Foundation Day. IIT Patna has also participated in the PanIIT and inter-IIT sports meet.

Health care facilities

The institute has recruited a medical officer to take care of all health related issues of its students and employees. For the outdoor health care, the services of two local hospitals viz. "Mahavir Vatsalya Aspatal" and "Sahyog Hospital" are available to all the students. The Institute Medical Officer is available in the working days and a doctor visits every Saturday from Mahavir Hospital for one hour. In addition, the institute has also hired a psychiatrist and a psychologist. They are available on weekends. A 24-hour ambulance service is also provided by the above hospitals in case of emergencies. Students of IIT Patna are covered under the mediclaim insurance policy. Under this scheme, every student of IIT Patna can avail the cashless medical facility throughout the country up to Rs. 50,000/-. The current location of the institute is such that the facilities of all good hospitals of Patna city can be availed, if need arises.

Academic programmes

IIT Patna is currently offering B.Tech programmes on three disciplines – Computer Science and Engineering, Electrical Engineering and Mechanical Engineering. All the seven departments- Computer Science and Engineering, Electrical Engineering, Mechanical Engineering, Physics, Chemistry, Mathematics and Humanities & Social sciences are running PhD programmes. The institute has decided to start M.Tech. programme in three interdisciplinary disciplines viz. Mechatronics, Mathematics and Computing and Nano science and Technology from July 2012.

All classrooms of the institute are equipped with modern audio-visual electronic gadgets. The main building has state-of-the-art laboratories in Computer Science, Physics and Chemistry. It also houses Computer Centre with total 18 MBPS internet connections and adequate server infrastructure. Laboratories in Basic Electronics, Analog Electronics, Digital Electronics, VSLI, Control, Instrumentation and Communication are also located in this building. The building also has a central library, the administrative office, a dispensary, a cafeteria and faculty chambers. The central library is stocked with sufficient number of text and reference books. Online access to various technical and scientific journals under the INDEST-AICTE Consortium is available. The STPI building of IIT Patna has a conference room, a class room, a Training and Placement Cell and faculty

chambers. Besides this, it has two laboratories namely Hardware Lab of Computer Science and Engineering Department, and Digital and Signal Processing Lab of Electrical Engineering Department. The Mechanical Engineering Workshop building houses all the Mechanical Engineering Laboratories, viz. Basic and Conventional Manufacturing Lab, Advanced Manufacturing Lab, CAD/CAM Lab, Dynamics Lab, Fluid Mechanics Lab, Heat and Mass Transfer Lab, Instruments and Control Lab, IC Engines Lab, Material Testing Lab, Metrology and Metallographic Lab, Robotics Lab and Polymer Engineering Lab. The Electrical Engineering workshop building has an Electrical Machines Laboratory and an Advanced Electrical Engineering Laboratory. The Science block has well equipped classrooms with modern teaching gadgets, faculty chambers and advanced laboratories for Physics, Chemistry and Mathematics departments. This includes Materials Research Lab and Optics Research Lab of the Physics Department; Chemistry Instruments Lab, Chemistry Research Lab and Bioscience Lab of the Chemistry Department and Computational Research Lab of the Mathematics Department. All these Labs are home for numerous State of the Art equipments. IIT Patna has recently developed three highly sophisticated virtual classrooms equipped with ultra modern electronic gadgets funded by National Informatics Centre, Department of Information Technology, Government of India, under the National Knowledge Network project. These classrooms add to the concept of virtual classroom where one can learn something from the teacher who is teaching remotely. IIT Patna has a team of 63 young and dynamic faculty members. Many more are expected to join by this year. These faculty members are actively engaged in teaching, research and developmental activities of the Institute. All of them are accommodated in nearby rented apartments.

Credit system

The B. Tech programmes consist of 8 semesters spread over 4 academic years. A student takes 5 to 6 theory courses in addition to laboratory courses in each semester. Credits are allotted to various courses depending on the number of lecturer/tutorial/laboratory hours per week. A student's performance in a course is continuously evaluated throughout the semester and culminates in the award of a grade on a 10-point scale.

Based on the performance of a student, each student is awarded a final letter grade in each subject at the end of the semester. The letter grades and the corresponding grade points are as follows:

Grade	Grade Point
AA	10
AB	9
BB	8
BC	7
CC	6
CD	5
DD	4
F	0

In addition, there shall be two transitional grades 'I' and 'X' used by the instructors.

The students' Semester Performance Index (SPI) is evaluated by weighted average of grade points secured in all the courses registered by the student in that semester. The Cumulative Performance Index (CPI) representing the weighted average of the grade points secured by the students in all the semesters is also recorded.

Rules for change of branch

The Institute permits a limited number of students to change from one branch of study to another after the end of the second semester, subject to certain conditions, some of which are given below:

1. Only those students will be eligible for a change of branch who have completed all the common credits required in the first two semesters of their studies in their first attempt with a CPI of not less than 8.00 and without having had to pass any course requirement in the summer term examination.

2. Change of branch is permitted strictly on the basis of merit (CPI at the end of two semesters) subject to the limitation that the strength of a branch does not fall below the existing strength by more than ten percent and does not go above the sanctioned strength by more than ten percent.

Training and placement facilities

The Training and Placement Cell of the institute handles all aspects of placements at IIT Patna for the graduating students of all departments. Right from contacting companies to managing all logistics of arranging for tests, pre-placement talks and conducting final interviews the Training and Placement Cell officials and volunteers provide their best possible assistance to the recruiters.

Placement:

Nearly 90 percent students have been placed so far this year. Major recruiters for IIT Patna are Hero Moto Corp,New Delhi, Microsoft, IDC Hyderabad, Caterpillar India, Chennai, Tata Motors, Jamshedpur, Bank Bazaar, Bangalore, TCS, Kolkata, Flipkart, Bangalore, Finisar, Malaysia, Infosys Development Centre, Pune, Spalgo, Kolkata, Bharat Petroleum Corporation , Mumbai, Headstrong, Gurgaon, Tata Technologies, Pune, Zeus Numeric, Pune, Indian Navy, Vishakapatnam, Airvana Networks, Bangalore, Masamb Electronics, Noida, Flytxt, Trivandrum, DRDO, New Delhi, Synopsis, Bangalore, Bank of India, Mumbai, Siemens Ltd, Mumbai, Samsung India, Noida, Amazon, Bangalore, Polaris Software, Chennai, LG, Bangalore and Sicon Tech, Bangalore.

The highest package offered to IIT Patna students is Rs.16 lakhs p.a. by Microsoft followed by Bank Bazar and BPCL, which have offered Rs.12 lakhs p.a. and Rs. 10 lakhs p.a. respectively.

Training

IIT Patna is one of the partner member institutes of MITACS of Canada, INRIA of FRANCE and Sastri Indo-Canadian Institute Internship programmes abroad.

Foreign Universities where students have been sent for training are University of Houston, USA Georgia State University, USA, University of South California, USA, Louisiana State University, USA, University of New South Wales, Australia, University of South Australia, Australia, University of Auckland, New Zealand.

Indian Organizations where students have been sent for training are Alumunus Software Ltd., Kolkata, CDAC, Bangalore, CAIR, DRDO, Bangalore, HP India Software Pvt. Ltd. Bangalore, I-CEE, Kolkata, Interra Systems, Kolkata, IYC World Soft. Infrastructure Pvt. Ltd., New Delhi, Appulse Technologies Pvt. Ltd., Gurgaon, Microsoft India (R&D) Pvt. Ltd. Hyderabad, Nextag Software Service Pvt. Ltd., Gurgaon, TCS, Hyderabad, Thinvent Tech. Pvt. Ltd., Gurgaon, Tata Institute of Fundamental Research (TIFR), Mumbai, Amararaja, Tirupati ,CMERI, Durgapur, COREEL Tech., Bangalore, LG Soft India Pvt. Ltd. Bangalore, MIC Electronics Ltd., Hyderabad, Reliance Communication, Navi Mumbai, Tektronix India Ltd., Bangalore, DRDO, Dehradun, National Instruments, Bangalore, Rajasthan Rajya Vidyut Prasaran Nigam Ltd., Jaipur, AG Measurematics, Roorkee, Atomic Energy Regulatory Board, Mumbai, Bajaj Auto Ltd., Pant Nagar, BOSCH Ltd., Bangalore, COMSOL Multiphysics Pvt. Ltd. Bangalore, Bonfiglioli Transmission Pvt Ltd., Chennai, Hyundai Motors, Chennai, IOCL, Megatherm Group, Kolkata, JCB India Ltd., Ballabgarh, ONGC Panvel, Navi Mumbai, TATA Motor Ltd., Pant Nagar, TATA Motor Ltd., Lucknow

Financial Assistance

The Institute provides Merit-cum-Means Scholarships to B. Tech students on merit basis and to those having financially weak backgrounds.

How to reach the campus

Patna is well connected to other parts of India by road, rail and air. The institute is approximately seven kilometers away from the Patna Junction and eight kilometers from the Loknayak Jai Prakash Narayan International Airport Patna.

2.13 INDIAN INSTITUTE OF TECHNOLOGY RAJASTHAN

History

Indian Institute of Technology Rajasthan is one among the new IITs established in 2008. IIT Rajasthan is currently in its fifth year of establishment. The institute has seen tremendous growth in academic excellence, infrastructure and development of facilities in this short span of time. With the establishment of a number of Centres of Excellence, IIT Rajasthan has grown from being just an academic institution to a renowned centre for research. IIT Rajasthan strives to ensure a multidisciplinary ethos and multicultural work environment in its academic endeavour.

Location

At present, IIT Rajasthan operates from two campuses - academic and residential, separated by a distance of 14 kms. The academic campus is in the heart of the city, while the residential area is at a calm locality, away from the hustle and bustle of the city. The academic campus is operating from the MBM Engineering College Campus in Jodhpur, which is situated on the Old Residency Road, Ratanada, at a distance of about 4 kms from the Railway Station and 3 kms from the airport. The permanent campus of the institute is coming up on about 842 acres of land near Rajasthan Ayurveda University which is 23 kms away from the Jodhpur city center on the National Highway 65.

Academic Programmes

IIT Rajasthan offers four-year B. Tech. programme in four branches: (i) Computer Science and Engineering, (ii) Electrical Engineering, (iii) Mechanical Engineering and (iv) Systems Science. Apart from the traditional streams, the objective of the Systems Science programme is to provide the students a foundation in basic sciences and engineering with necessary tools in mathematics, which will make them competent to solve complex problems in the domain of Systems Science. This includes, but is not limited to, engineered systems, ecological systems, business and financial systems and complex networked systems such as smart communities with an emphasis on the ethical stance towards society, sustainability of the solutions proposed and awareness of the implications to the environment and society. The programme aims at creating systems' thinkers who would develop, construct, operate, redesign, analyse, verify and integrate various systems. These thinkers may become entrepreneurs who would be able to find innovative and sustainable solutions to societal problems. The programme gives due attention to the mathematical foundations that underlie these systems.

The institute also offers Masters and Ph. D. programmes in all its Centres of Excellence.

Facilities Unique to the Institute

IIT Rajasthan provides young minds the opportunity to contribute with the faculty in establishing state-of-the-art laboratories and research centres. Not only do IIT Rajasthan students have the opportunity to learn from national and international faculty, they also play a pivotal role in moulding the vision of the institute. IIT Rajasthan, therefore, promises its students a world-class academic environment which helps them acquire academic brilliance, professional expertise, leadership skills and the acumen for independent thinking.

IIT Rajasthan has close relations with several International Universities, Research Institutions and Corporations, including the University of Waterloo, the University of Western Ontario in Canada, the Universitat Rovira i Virgili, Tarragona, Spain, for students' and faculty exchange programmes.

Laboratories

IIT Rajasthan's state-of-the-art infrastructure includes well equipped, advanced laboratories endowed with the latest machinery and devices of international standard. The laboratories are the nerve centres of the institute with extensive on-going research with our prestigious international partners. The unique areas of research include Renewable Energy, Material Analysis, Communications and Instrumentation, CAD/CAM. Further details can be found on http://www.iitj.ac.in/iitjlab/

Library

The library meets most of the information needs and knowledge pursuits of the IIT Rajasthan community. The library has a vast collection of books comprising of textbooks, research and reference works; subscribes to

various printed periodicals and has a good collection of AV material like CDs and DVDs. The library continues to enrich its collection in books, journals and electronic/ digital resources. IIT Rajasthan library provides access to a wide range of electronic resources, viz., e-journals and full text databases from all national and international publishers; journals archive like JStor; e-books; bibliographic databases like Math SciNet; citation and indexing databases viz., Scopus; research discovery tools like Sci Finder, and to many open access resources. The library is fully automated facilitating the access of web-based Online Public Access Catalogue (Web OPAC) in both, academic and residential, campuses.

Boarding and Lodging

Students of IIT Rajasthan are accommodated in a scenic campus located on Pali Road, Jodhpur. It is situated at a distance of 15 kms from the railway station and 14 kms from the airport. The campus is well guarded and equipped with all basic amenities (including WiFi network access, a library and a computer center) required for a residential colony. It also houses the faculty and staff members of the institute. The institute provides transport to the students for commuting between the residential complex and the institute.

Recreational/Extracurricular Facilities

The Institute has progressed significantly over the past four years. The students have been successfully nurturing a culture filled with energy and initiative.

The students are encouraged to participate in co-curricular activities that will further help in their all-round personality development. Extracurricular activities include participation in the Book Club, the Science and Technology Council, Photography Club, Sports, Music, Astronomy and Films. The Students Gymkhana takes the onus of coordinating various activities organized by the students.

The institute frequently provides opportunities to the students to interact with experts from different fields and imbibe variegated ideas.

Health Care

The Residential Campus has a health centre which provides essential health care to the residents. Apart from this, the institute has tie-up with leading hospitals in Jodhpur for specialized health care needs. All students are covered by medical and accidental insurances.

Financial Assistance/Scholarships

Merit-cum-Means Scholarships are awarded to deserving undergraduate students. However, the Director has a discretionary power to provide financial aid and help to students who deserve special consideration.

Training and Placement

Industry-oriented short term courses are conducted for the students during winter and summer vacations. The students' placement cell provides necessary assistance to the students towards their placement in jobs or internships.

Majority of the students have been successfully placed with leading organizations in core engineering, IT and banking sectors.

Students also do an eight-week summer training in reputed organizations, both in India or abroad. Several students have also actively participated in research projects at universities in USA, Canada, Switzerland, Japan and Ireland, apart from participating in research projects in other premier National institutions.

Branch Change Rules

Change of the branch will be permitted strictly in the order of merit as determined by the Cumulative Performance Index (CPI) at the end of second semester. In case of a tie, the JEE rank of the applicants will be considered.

1. Eligibility Criteria:

(a) The CPI at the end of the second semester should be: (i) Greater than or equal to 7.0 for SC/ST applicants and (ii) Greater than or equal to 8.0 for other applicants

(b) The student should have passed all the courses till second semester (including the courses in which S/X grades are awarded)

2. Strength Constraints:

No branch may exceed 105% or fall below 75% of its sanctioned strength as a result of branch changes.

2.14 INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

IIT Roorkee is an Institute with a long and illustrious history. It started as Roorkee College, the first Engineering College of South Asia, in 1847. The college was renamed as Thomason College of Civil Engineering in 1854 and was rechristened, in 1947, as Thomason College of Engineering. On November 25, 1949 The Thomason College of Engineering was elevated to become, the first engineering university of independent India, namely, the University of Roorkee. Nurtured as the premier institution by the State of Uttar Pradesh, the University was declared as an Institute of national importance and converted into the Indian Institute of Technology Roorkee by an Act of Parliament with effect from September 21, 2001. The Academic activities of the Institute spread over three campuses: i) 365 acres main campus at Roorkee, ii) 25 acres campus at Saharanpur, and iii) 10 acres campus at Greater Noida called Greater Noida Extension Centre.

The Institute has 18 Academic Departments, 1 Academic centre, 3 centre of excellence in the areas of Nanotechnology, Disaster Mitigation and Management and Transportation Systems. The Academic activity of the Institute is supported by 7 Academic service centres and units, such as Institute Computer Centre, Information Superhighway Centre, Instrumentation Centre. The Institute offers 11 undergraduate programmes leading to Bachelor's degree in different disciplines of engineering, technology and architecture. In addition Institute offers 5 Integrated dual degree programmes, 6 integrated masters programmes in different disciplines of engineering and sciences, and 52 postgraduate programmes in specialized areas leading to Master's degree in technology architecture, sciences and management. The Institute is engaged in advance level research at doctoral and post-doctoral levels in the cutting edge areas of technology and sciences.

The Academic programmes in Paper Technology and Polymer Science and Technology are run at the Saharanpur campus of IIT Roorkee. From the session 2012-13, the Institute is launching two new IDD Programmes and two Master of Technology programmes. Because of massive boom in the development of infrastructure in the country, there is greater demand for civil engineers with specialization in Structural Engineering. In view of this Department of Civil Engineering shall be offering 5 years Integrated Dual Degree Programme leading to B. Tech. in Civil Engineering and M. Tech. in Structural Engineering. As new materials are instrumental for realizing new technologies, Department of Metallurgical and Materials Engineering shall be starting a new IDD programme leading to B. Tech. (Metallurgical and Materials Engineering) and M. Tech. (Material Engineering). The Institute shall also be offering two new M. Tech. Programmes in the areas of "Seismic Vulnerability & Risk Assessment" and "Disaster Mitigation and Management" from the session 2012-13. The Institute has entered into MoU with several leading institutions of the world to widen the domain of education. IIT Roorkee has a highly qualified and motivated faculty of about 380 members with strong commitment to teaching and research. It offers its expertise to private and public sector industries, and various Government agencies through consultancy services. The Institute is playing a key role in the development of Uttarakhand State and the Nation at large.

Each Department has modern laboratories, well-equipped with sophisticated instruments. Some of the state-of-the art facilities available include: 500 MHz NMR Spectrometer with cryoprobe, broadband probe, LCNMR MS; Thermal lionization Mass Spectrometer (Triton T1 from Thermo Finnigan, U.K.) for high resolution isotope ratio determination, X-ray diffractrometer (Bruker Germany); Thermal Analysis System for TGA, DTA and DSC studies. The other sophisticated state-of-the-art facilities and laboratories at different Departments are Climatology Laboratories, Protein Biochemistry and Analytical Biotechnological Laboratory, Process Dynamic Control Laboratory, Advanced Manufacturing Process Laboratory, Ultra Clean Laboratory for Geochronology isotope Geology, Corrosion Engineering Laboratory, VLSI Design Laboratory, Wind Tunnel, etc. A fully computerized satellite earth station and an automatic satellite data acquisition system have been installed at the Institute which can acquire data from more than 20 neighboring countries.

The Institute has spacious classrooms with multi-media facilities and a Central Library to cater to the needs of the students. The Central Library stocks about 300000 printed volumes of books, journals, and reports in

various disciplines of engineering, technology, and sciences, and is a member of the Indian National Digital Library in Science and Technology (INDEST) Consortium. This membership provides online access to about 8000 e-journals. The library is accessible through its website http://library.iitr.ernet.in. Besides the Central Library, each Department/centre has its own library.

The Institute prepares its students to meet ever increasing technological and social challenges through its traditions of self-discipline, hard work, all-round personality development and innovative approach to problem solving. Situated on the banks of the Upper Ganga Canal, IIT Roorkee has a very green and peaceful. It is fully residential, with well-designed hostels (Bhawans) for both boys and girls, each having Internet facilities. To promote the effective use of Information Technology, the Institute has established an Information Superhighway Centre in March 1996. The Centre manages a state-of-the-art Institute network with data, voice and video communication facilities. The network covers all Departments, Centres and hostels, thus providing Intranet and Internet connectivity to students, faculty and other staff members. The Centre also maintains the Institute website and various online web based utilities to facilitate the user community on the campus. For all-round personality development, the Institute organizes several co-curricular activities such as THOMSO and RAVE, the annual youth festivals, COGNIZANCE, an all-India technical festival, and JIGYASA, a national-level paper presentation contest. Hobbies club and its annual exhibition SHRISTI are unique features of the Institute that promote creativity among students.

The Institute has sprawling sports grounds, a modern swimming pool, a boat club on Ganga Canal and a host of students clubs with Tennis, Squash, Badminton and Billiards facilities. Societies and Associations, along with activities like NSS, NCC, Rangering and Rovering, Mountaineering and Trekking provide excellent opportunities for self development. There are two banks, namely SBI and PNB with ATM and Internet banking facilities, and a Computerized Railway Reservation counter on campus.

The Institute follows modern methods of continuous evaluation through a credit system in all its UG, 5-year Dual Degree and PG programmes. The system offers flexibility to progress at a pace commensurate with the capabilities of a student, subject to minimum credit requirements. There is no annual/ semester pass or fail. The award system follows letter Grades on a 10- points scale where the performance is measured in terms of weighted grade point average (SGPA and CGPA). A student has to satisfy minimum CGPA and earned credit requirements to be eligible for the award of degree.

Roorkee is 30 km south of the Shivaliks and about 180 km north of Delhi. Roorkee is located on the Amritsar-Howrah main railway line and is linked to Delhi through Shatabdi and Jan Shatabdi trains. It is also well connected by road being located on the Delhi-Hardwar-Mana National Highway (NH 58). Being 268 m above mean sea level, the town has a cold winter. Roorkee is an important centre of engineering activities in Northern India and several National Institutes such as Central Building Research Institute (CBRI), National Institute of Hydrology (NIH), Irrigation Research Institute (IRI), Irrigation Design Organization (IDO) are located at Roorkee. Saharanpur, which hosts the satellite campus, is about 50 km from Roorkee and about 150 km from Delhi. It is situated on Amritsar-Howarah, Delhi-Hardwar-Dehradun and Delhi-Meerut-Ambala-Amritsar main railway lines. It is also well connected by road to Delhi, Chandigarh, Amritsar, Hardwar and Dehradun. Saharanpur is a hub of Pulp and Paper teaching, research and manufacturing.

A student enrolled in any Academic programme except B.Arch. through Joint Entrance Examination (JEE), is eligible for change of branch/programme at the end of spring semester of the first year provided that he/she satisfies the certain criteria laid down by Institute.

2.15 INDIAN INSTITUTE OF TECHNOLOGY ROPAR

Brief History of Institute

The Indian Institute of Technology Ropar is one of the eight new IITs set up by the Ministry of Human Resource Development (MHRD), Government of India in 2009. In true tradition of IIT system, this institute is committed to provide state-of-the-art technical education in a variety of fields and also for facilitating transmission of knowledge in keeping with the latest developments in pedagogy. IIT Delhi was assigned the responsibility of mentoring IIT Ropar. The first academic session (2008–09) of IIT Ropar was conducted at IIT Delhi campus. The institute currently operates from the premises of Government Polytechnic College for Girls (Ropar), which has been fully renovated and furnished. The temporary campus for IIT Ropar is set up with all the required facilities. Class rooms fitted with multimedia, faculty rooms and administrative wing are all in place. There are four hostels; three for boys and one for girls. These hostels, equipped with modern messing units. Faculty recruitment, creation of laboratories and other support facilities are in full swing. The Institute has been operating from the transit campus since 18th August, 2009. In a few years, the institute will be relocated to its own campus, spread over a 500 acre area, along the banks of the river Satluj. Note: IIT Ropar was previously called IIT Punjab.

Campus Location & Facilities

The Institute is located at Ropar, the headquarters of Rupnagar district, Punjab. This institute, with its establishment, joins a string of premier educational institutions in Punjab. The town of Ropar, the district headquarters, is 42 kms from Chandigarh, the capital of Punjab. Rupnagar is well connected by both road (National highway NH-21) and railways (the Delhi-Ambala-Una railway line passes through Rupnagar). The nearest airport is in Chandigarh, about 50 kms from Rupnagar. Mohali, the nearest major city, will soon have its own international airport.

Recreational/ Extra-curricular Activities

At present, the transit campus has excellent facilities for several sports, including a cricket field, three lawn tennis courts, a football field, a hockey field, a gymnasium, a basket ball court, badminton courts, an athletics track, table tennis room and also number of facilities for several athletic events. The institute also encourages its students to participate in inter-IIT sport events and other competitions. Space for recreational and creative activities is also available.

Academic Facilities

MoUs/GRPE: The institute is actively involved in collaboration programmes with international organizations and universities. Under the MOU between IIT Ropar and Universities of UK, IIT Ropar is exploring the partnership with the following Universities:

1. Imperial College
2. Aston University

IIT Ropar has signed GRPE (Glasgow Research Partnership in Engineering) with:

1. University of Glasgow
2. University of Strathclyde

Virtual Classrooms (NKN): Two virtual classrooms have been set up at IIT Ropar. NKN interconnect the institutions engaged in research, higher education and scientific development in the country.

Library: The central library of IIT Ropar is functioning as the primary information resource and repository for all the teaching and research activities at the institute. Apart from textbooks and recommended reading material prescribed for each course offered at the institute, the library houses a growing collection of research monographs, reports, multi volume reference books, dictionaries, encyclopaedias handbooks and so on.

In addition, the library also facilitates access to a number of journals through its participation in consortia such as INDEST-AICTE. At present, users can consult more than 5300 books (available on shelves) and hundreds of journals (though electronic subscription). The library staff members are currently working towards automation of user services using LIBSYS 7 *(Web centric Library Management System) and other aspects of info management and settling up a digital library and e-resource centre.

Hostel Accommodation

The Institute campus houses four hostels with latest and modern facilities: Jupiter, Mercury (Wing A & Wing B), Neptune Hostels for boys and Venus Hostel for girls. The hostels are well equipped for comfortable lodging and boarding of approximately 550 students. All hostels are provided with water coolers and RO systems. Each hostel has a common room that provides facilities for indoor recreation and games. The hostel complex also includes four shops that cater to the basic needs of the residents; washing machine facilities are also available to the students in the hostels.

Health Care

The institute has allocated a separate building, which adjoins the hostel complex, for its medical facility. A doctor (Homeopathic & Allopathic), Pharmacist & Staff nurse have been appointed to attend to medical emergencies of the campus residents. In addition the institute relies on a few super-specialty hospitals in the city of Ropar and Chandigarh for providing medical care to its members.

Academic Programmes

At present, the institute offers a 4-year programme leading to the Bachelor of Technology (B. Tech.) degree in three disciplines, viz., Computer Science and Engineering, Electrical Engineering, and Mechanical Engineering, with a sanctioned intake of 40 students in each. The curriculum followed at IIT Ropar provides a comprehensive technical education, with a view to produce quality engineer-scientists. It facilitates broad-based knowledge acquisition and, simultaneously, nurtures a temper of life-long learning and exploration. Students are encouraged to go beyond the classroom to conduct and carry out independent work by means of research projects, guided reading, and by allowing them to join the research activities undertaken by faculty members. The idea behind such a fashioning of the curriculum is the belief that classroom activities must be supplemented by independent study and also by individual research that broadens one's horizon and provides opportunities to bring one's ideas to fruition.

Credit System

The Institute follows a credit system. Each course, has a certain number of credits assigned to it depending on its lecture, tutorial and laboratory contact hours in a week. Each course is coordinated by a member of the faculty called the course coordinator. He/she has the full responsibility for coordinating the course, coordinating the work of other members of the faculty involved in the course, holding tests and awarding grades. In case of any difficulty, students are expected to approach the course coordinator for advice and clarification.

The student's performance in a course is continuously evaluated throughout the semester and culminates in the award of Grade on a 10# point scale. Performance in a semester is evaluated in terms of the weighted average of grade points secured in all the courses registered in that semester, which is known as Semester grade point average (SGPA). A Cumulative grade point average (CGPA) is the weighted average of the grade points obtained in all the courses registered by the student since they entered the Institute.

The teaching programmes are characterized by their flexibility and informality. The strong faculty-student interaction on the residential campus provides opportunity to students to work on seminars, publication and projects sponsored by the industry and national agencies.

Rules for change of branch

1. A student is eligible to apply for change of discipline at the end of first year only, provided he/she satisfies the following criteria:-

   (a) CGPA for GE/OBC category student is 7.50 or greater.

   (b) CGPA for SC/ST/PH category student is 6.50 or greater.

   (c) Earned credits at the end of first academic session are 40 credits or more.

2. Change of the discipline will be permitted strictly in the order of merit as determined by their CGPA at the end of first year subject to the limitation that the actual number of students in the third semester in the discipline to which the transfer is to be made, should not exceed the sanctioned strength and the strength of the discipline from which transfer is being sought does not fall below 90% of existing strength.

3. For a student with CGPA 9.0 or more, even if a vacancy does not exist, he/she will be permitted to change provided the strength in the discipline to which the change is being sought does not exceed by 5% of the approved strength.

4. A student with CGPA 9.0 or more will be permitted to change discipline even if strength of the discipline from which change is being sought falls below 90% of the existing strength.

5. Stipulation of minimum credits and CGPA requirements will not be insisted upon for change of discipline to a branch in which a vacancy exists and the concerned student was eligible for admission to that discipline at the time of admission to IIT Ropar. However, requirements of credits and CGPA will continue to apply in case of all students seeking change to a discipline to which the concerned student was not eligible for admission at the time of entry to IIT Ropar.

Training and Placement Facilities

Two full-fledged rooms for the training and placement office are in operation. Video Conferencing, Skype Facilities for interviews and interaction with the companies are also made available. Audio and Video facilities with state of art technology are available for the pre placement talks. Interview rooms, Conference room and Computer labs for conducting online tests are also made available.

Team consisting of the following members

a) Training and placement officer.

b) Faculty In Charge.

c) Two staff.

d) Student representatives from all three branches – Computer Science & Engineering, Electrical Engineering and Mechanical Engineering.

Financial Assistance

The institute offers Merit-cum-Means scholarship to about 25% of the students. The recipients of the scholarship are exempted from paying the tuition fee and get a scholarship of Rs.1000/- per month. The criteria for the same are based on the ALL INDIA RANK (AIR) in the JEE and Means (only those students are eligible, whose parental income is below Rs.4.5 lac per annum).

Further as per IIT rules, there is a limit that the total scholarship received from all sources for a student should not exceed Rs.50,000/- per annum.

IIT Ropar also provides Institute Free Studentship to 10% of the students on the basis of means only. The recipients of the free studentship are exempted from paying the tuition fee. The criterion of 10% free studentship is similar to that of MCM Scholarship.

Also all SC and ST category students are given full tuition fee waiver irrespective of their parent's/guardian's income.

Besides these, the institute also offers merit prizes and certificates to the top 7% of the students of each 4-year B.Tech program for 1st and 2nd Semester. The value of the merit prize is Rs.2500/-.

Many other organizations in India and Abroad also offer some assistance to the students of IIT Ropar.

How to reach the Campus

By Air

The nearest airport, is in Chandigarh, about 50 kms from Rupnagar. Any visitor wishing to come to Rupnagar/Ropar could take a flight from his/her respective place to Chandigarh, if available, or a flight from Delhi to Chandigarh and then take a taxi from the airport to reach the campus of Indian Institute of Technology Ropar (IIT Ropar) which is approximately one and a half hour journey.

By Train

There are regular trains running between Delhi and Rupnagar. The Delhi-Ambala-Una railway line passes through Rupnagar. The duration of the journey is around six hours from Delhi. Anyone wishing to visit the campus may also take a train from his/her place to Ambala or Chandigarh and then a taxi ride to the IIT Ropar campus just takes around one and a half hours.

By Road

Rupnagar is well connected by road through National highway NH-21. It is about 290 km from Delhi through highway. For reaching Rupnagar initially can follow NH-1 from Delhi to Ambala city via Panipat, Karnal and Kurukshetra then reach Chandigarh and finally go along NH-21 to reach Rupnagar via Kharar, Kurali.

2.16 INDIAN SCHOOL OF MINES, DHANBAD

Indian School of Mines (ISM) was established by the Government of India in 1926 on the pattern of Royal School of Mines, London to teach Mining Engineering and Applied Geology and thus to provide manpower to the Indian Mineral Industry and the concerned departments of the Government. Subsequently in 1957, Petroleum Engineering and Applied Geophysics disciplines were also added. In due recognition of its vital role in the service of the mineral exploration and mining sectors of the national economy, ISM was granted autonomy by the Government of India in 1967; and has been functioning as a Deemed University under the University Grants Commission Act, 1956. In 1996, it came under financial and administrative control of MHRD, Government of India. It has 218 acres of fully residential campus of its own consisting of graceful blend of old and new style buildings. The serene campus comprises academic buildings, separate hostels for boys and girls, faculty & staff quarters, health centre, workshop, canteen and other infrastructural facilities for its cosmopolitan community.

The school is situated about 3 km north of Dhanbad Railway Station on the Grand Chord of Eastern Railway. ISM being situated at the core of the industrial base of the region covering mines, steel plants, fertilizer plants, refractories, heavy machine building plants etc derives locational advantage in learning and teaching process in terms of keeping abreast with changing technology in the industry.

Departments and Academic Programmes

ISM offers B.Tech programmes in 10 disciplines, viz. Mining Engineering, Petroleum Engineering, Mining Machinery Engineering, Mineral Engineering, Computer Science & Engineering, Electronics Engineering, Mechanical Engineering, Electrical Engineering, Environmental Engineering and Chemical engineering; five year integrated dual degree programmes in Mining Engineering, Mining Engineering with MBA, Petroleum Engineering, Mineral Engineering and Mineral Engineering with MBA.

It also offers five year integrated M,Tech in Mathematics & Computing and five year integrated MSc Tech programmes in Applied Geology and Applied Geophysics.

ISM has been offering, since 1972, a number of industry-oriented M.Tech. and M. Phil. Programmes. The Ph.D. Programmes in Engineering and Sciences also attract many postgraduate students from across the country.

The School also offers 3 year M.Sc. Tech Programmes in Applied Geology and Applied Geophysics, 2 year M.Sc. Programmes in Applied Geology, Applied Physics, Chemistry and Mathematics & Computing, through a separate All India Competitive Examination. A 2 year M.B.A. Programme is also offered where the admission is based on combined scores of CAT and personal interview/ group discussion of candidates.

Department of Mining Engineering has been granted the status of Centre for Advance Studies (CAS) in Mine Safety and Management and also a Quality Improvement Programme (QIP) Centre for higher studies (M.Tech. and Ph.D) by University Grant Commission.

Laboratories

ISM can boast of a large number of well equipped state-of-the-art laboratories in various departments such as Rock Mechanics, Rock Excavation, Mine Surveying, Mine Environment and Safety Engineering, Computer Aided Mine Planning & Design Laboratories in the Department of Mining Engineering; Thermal, Steam Power, Theory of Machines, CAD, Oil Hydraulics, Strength of Material, Fluid Power, Fluid Mechanics, Material Handling, Mining Machninery, Drilling Engineering Laboratories in the Department of Mechanical Engineering and Mining Machinery Engineering; Paleomagnetism, Gravity and Field Testing, Electromagnetic Models, Seismic, D.C Resistivity, Instrumentation Laboratories in the Department of Applied Geophysics; Rock Cutting, Ore Geology, Engineering Geology, Photo Geology, Geochemistry, Coal Geology and Sedimentology, Petrology, Geohydrology Laboratories in the Department of Applied Geology; Mineral Characterisation, Communition & Classification, Gravity Separation, Magnetic & Electrostatic Separation, Pyroprocessing, Fuel Technology, Bio-mineral Processing Laboratories in the Department of Fuel and Mineral Engineering; Perophysics, Drilling Fluids,

Reservoir Fluids, Reservoir Engineering, Crude Oil and Product Testing and Petroleum Engineering Laboratories in the Department of Petroleum Engineering to name a few.

An extensive Geological Museum, a Seismological Observatory, an Experimental-cum-Training mine at No. 26 incline Godhur Colliery of BCCL, and Longwall Training Gallery are unique instructional facilities in Asia.

Computing and Internet facility

ISM has a state-of-the-art Computer Centre which supports campus wide Fibre Optic Network comprising of 3000 nodes that connect all the academic departments, central library, administrative departments, each room of hostels, residences of faculties and officers. Internet access is provided to all the users through dedicated internet links of 100 Mbps and its augmentation to 500 Mbps is underway.

Computer Centre has a number of state-of-the-art servers, LINUX and WINDOWS Labs and application softwares.

Central Library

The Central Library of the School has rich collection of books, journals, conference proceedings, standards, reports, theses and dissertations on all branches of engineering, applied sciences, earth science, social science, environmental science and management. The library provides access to nearly 105,000 books, 415 current and 40, 000 bound volumes of journals, more than 8000 theses and dissertations and many conference proceedings, 14 national newspapers and 35 current magazines.

Different sections and services of library are automated with help of an Integrated Library Management Software called “LIBSYS”. All records of the library are accessible on Web based Online Public Access Catalogue (WEBOPAC) popularly known as internet catalogue, on the ISM campus wide network as well as through internet. It provides access to more than 14000 electronic journals.

The library has 4 servers, 32 PCs and other accessories adequate to cater to the needs of users. Four information KIOSK are meant for users to access OPAC data bases, e-books, e-journals and other e-resources.

The official website of the Central Library (http://www.ismlib.ac.in) provides access to different data bases and e-journals viz Science Direct, AIP, APS, ACS, One Petro, ASME, ASCE,, IEL online, EBSCO, ACM Digital Library, Nature, JCCC –INDEST and Springer Link.

A new Centrally Air-conditioned 8 storied library building is under construction.

Alumni Association

ISM is proud of its alumni. Traditionally, ISM alumni are holding top positions in industries and government offices. Graduates of this school are heading public and private sectors and also holding key positions in the area of academic and research both in India and abroad (USA, Canada, Australia etc). ISMAA is extremely active and vibrant in meeting its objective of enabling the alumni to keep in touch with the Alma mater, to promote and foster spirit-de-corps amongst the past and present students and the teachers of the School and to contribute towards furtherance of science and technology through its seven national and one international chapters located respectively in Bhubaneshwar, Dhanbad, Delhi, Ranchi, Kolkata, Mumbai, Nagpur, and North America.

Training and Placement

The training and placement cell of the School, headed by a Professor, maintains active association and excellent contacts with industries and the corporate sectors to secure jobs in various organizations of the country and abroad. The placement cell coordinates the placement activities to match the needs of the industry with the aspirations of the students.

R&D Activities and Technical Collaboration

ISM, in its various departments, is currently doing R&D projects worth more than rupees hundred millions sponsored by various Government Organisations namely, UGC, CIL, AICTE, MHRD, DST, SAC (ISRO), CSIR etc. The School has signed MOU for technical collaboration with CSIR laboratory, McNally Bharat Engineering. Co. Ltd, MTI (SAIL), Dept. of Atomic Energy, GOI, BHP Billiton (Australia), Bosch Rexroth AG Germany, Politecnico Torino, Italy etc.

The School enjoys seven posts of Chair Professors in different departments instituted by National Mineral

Development Corporation, Steel Authority of India Limited, Tata Steel, Coal India Limited, (two) Uranium Corporation India Limited and Oil and Natural Gas Corporation.

Medical Facility

Medical facilities as available at health centre of the School are provided to all students during their period of study at ISM. The Health Centre is well staffed and equipped with facilities for treatment of outdoor patients. The services of specialized visiting doctors are also available on regular basis. Important hospitals in the country have been tied up for providing medical assistance and treatment in emergency.

Games and Sports

The School has unique infrastructural facilities on campus for indoor/ outdoor games and sports. The upper and lower grounds constitute beautiful arena for outdoor games and annual sports. The Sports Complex comprises infrastructure for tennis, basketball, volleyball, and badminton. A central gymnasium equipped with modern apparatus and Yoga Centre provide ample facility for building and toning up of physical and mental health. Srijan, the biggest techno-cultural-management festival of Eastern India is organized by ISS body of students every year which draws nationwide participation from different institutes. A number of student societies and hobby clubs functioning on ISM campus are the potential avenues to unleash students' creativity and imagination in constructive events.

Financial Assistance/Scholarships

ISM provides financial assistance/ scholarships to a large number of students covering almost 40% of the student strength. Under ISM merit-cum-means scholarship, the institute provides scholarships to 25% of the students on role that includes tuition fee reimbursement in full apart from financial assistance @ Rs 800/- per month. Ten percent of the students on role are provided with only tuition fee reimbursement in full. All 5-Year Integrated M.Sc/M.Sc Tech students selected through IIT JEE are given DST Inspire Scholarships @ Rs.80,000 per annum. All M.Sc Tech students of Applied Geology and Applied Geophysics are given scholarship @ Rs 1000/- per month in their III year.

Under New Central Sector Scholarship Scheme 10 students are provided every year free boarding and lodging apart from grant-in-aid of Rs 45000/- for purchase of computer.

Besides, there are a host of scholarships sponsored by different State Governments and public and private corporate sectors.

Rules for Change of Branch

Change of branch will be considered at the end of second semester, based on the performance in the first and second semester examinations. Interested students may submit such applications within three days after the start of new academic session.

Change of branch shall be permitted subject to the following terms and conditions:

1. Students must not have passed any semester through special examination or by repeating the semester.
2. Students must have obtained at least 7.5 GPA out of 10.0 considering both first and second semesters. However, SC/ST and PD candidates with a minimum of 6.5 GPA out of 10 can apply for change of branch in their respective categories. Change of branch will be made strictly as per merit. In case of tie, it will be resolved by considering the JEE Rank of the applicants.
3. While permitting change of branch, the strength of a class should not fall below the existing strength by more than 10% and should not go above the sanctioned strength.
4. It should be ensured that the strength of the class, post change, should not fall below 50% of the sanctioned strength.
5. Students who complete both first and second semesters in all respects and secure rank within top one percent of the successful students (without special examination or repeating 1st or 2nd semester) of the batch shall be allowed to change to the branch of their choice irrespective of conditions stipulated at serial 3 & 4 provided that by this change no branch should exceed the sanctioned strength by five percent. The eligibility criteria as stipulated at serial 1 & 2 will, however, apply.

2.17 INSTITUTE OF TECHNOLOGY, BANARAS HINDU UNIVERSITY, VARANASI

The Institute of Technology is an integral part of the Banaras Hindu University – which has been an internationally established renowned seat of learning.

The University

Banaras Hindu University was founded in the year 1916 by the great visionary and patriot, Mahamana Pandit Madan Mohan Malaviya Ji. The University is situated in a magnificent campus spread over nearly 1300 acres at the southern end of the ancient city of Varanasi on the banks of the holy river Ganga.

The University has "within the same campus" three pioneering Institutes, viz. the Institute of Technology, the Institute of Medical Sciences and the Institute of Agricultural Sciences, and fifteen Faculties. This residential University has teaching and research facilities in over 135 diverse disciplines including Ancient History, Oriental Learning, Performing and Fine Arts, Management, Science, Social Sciences, etc.

Engineering Education

Engineering Education in Banaras Hindu University commenced as early as in 1919 with the establishment of Banaras Engineering College (BENCO). The University has also pioneered engineering education by being the first in the country to start degree courses in Mining, Metallurgy, Ceramic Engineering and Pharmaceutics with the establishment of the College of Mining and Metallurgy and the College of Technology in the years 1923 and 1932 respectively. In 1969 these three colleges were amalgamated to form the Institute of Technology.

The Institutes of Technology (Amendment) Bill 2012 for conversion of IT-BHU into IIT (BHU), Varanasi has been PASSED BY LOK SABHA on MARCH 24, 2011 and subsequently PASSED BY RAJYASABHA on APRIL 30, 2012.

It is built in the Amendment Bill that the students admitted in 2006-07 session and thereafter, and graduating in 2009-10 and thereafter, will be awarded the IIT Degree; provided that such candidates have not been awarded the degree. BHU has kindly agreed and consequentially postponed the conferment of the degree by deferring the convocation of IT-BHU for the 2009-10 and 2010-11 session, to benefit such students.

The Institute of Technology offers 4-Years B.Tech./ B.Pharm. degree programme(UGD), 2-Years M.Tech./ M.Pharm. degree programme(PGD), 5-Years Integrated B.Tech.-M.Tech./B.Pharm.-M.Pharm. dual degree programme(IDD), 5-Years Integrated M.Tech. degree programmes (IMD) and Ph.D. programmes. The Institute has a highly qualified and motivated faculty of over 265 teachers. Besides teaching, the faculty members are also engaged in research and consultancy. The students are also encouraged to do projects under the able guidance of the faculty members. The research and development activities are supported by different National Agencies, viz. University Grants Commission, All India Council for Technical Education, Department of Science and Technology, Council of Scientific and Industrial Research, Defence Research and Development Organization, through programmes such as SAP, COSIST and FIST, and sponsored research projects, etc. The Institute of Technology consists of nine Engineering Departments (Ceramic Engineering, Chemical Engineering, Civil Engineering, Computer Engineering, Electrical Engineering, Electronics Engineering, Mechanical Engineering, Metallurgical Engineering, and Mining Engineering), a Department of Pharmaceutics, three Applied Sciences Departments (Applied Chemistry, Applied Mathematics and Applied Physics), and three Interdisciplinary Schools (Biochemical Engineering, Biomedical Engineering and Materials Science and Technology).

Academic Programmes

The Institute has well equipped laboratories and workshops, excellent computer facilities in all departments/schools in addition to a Central Computer Centre. The Institute has one Main Library along with many Departmental Libraries. These libraries house more than 200,000 books and subscribe to a large number of scientific and technical journals. Online access of these journals is also possible. All the students are provided with textbook bank facilities where a certain number of books are issued to them for full semester.

IT-BHU follows the semester system. An academic year (July-May) consists of two semesters each of

approximately 20 weeks duration. The odd semester begins in the third week of July and ends in the first week of December. The even semester starts in the third week of December and ends in the first week of May.

Each theory and laboratory course has a certain number of credits assigned to it depending on its lecture and laboratory contact hours in a week. Each course is coordinated by a Coordination Committee, which has full responsibility for coordinating the course, holding the tests and awarding grades. A seven-point letter grade (with specified number of grade points) is awarded in each course for which a student is registered. A student's performance is measured by the number of credits that he/she has earned and also by the weighted grade point average earned by him/her for a semester/year/course.

Financial Assistance/Scholarships

Large numbers of scholarships are awarded to the undergraduate students. Merit-cum-Means Scholarship is awarded to 25% of the students in each class of each branch. There are a large number of Endowment Scholarships which are awarded to specified categories of students in different branches. The Institute of Technology, BHU is also one of the recognized institutions for award of scholarship to SC/ST students under Central Section Scholarship Scheme of top class education scheme of Ministry of Social Justice and Empowerment and Ministry of Tribal Offices.

Training and Placement

Training and Placement Cell of the Institute is actively involved in arranging in-campus placement of students in various industries and organizations and also arranges summer practical training which is an essential component of academic curricula. This cell also organizes soft skill development programme and gives pre placement training on various aspects.

The placement record of the Institute has been excellent and the job offers are approx 180% for each students. These job offers mostly comes from organizations like Microsoft, Hindustan Unilever, De Shaw, NTPC, Deloitte, Morgan Stanley, BHEL, GAIL, Goldman Sachs, Indian Oil, Bharat Petroleum, DRDO, Tata Motors, etc.

The alumni of the Institute are in the apex seat of esteemed organizations/institutions in India and abroad. Large number of students are also opting for higher studies in reputed universities all over the world. The students who have aptitude for management are qualifying for management programmes in IIMs.

The industry oriented summer internship programme is aimed at inculcating professional culture amongst the students and familiarizing them to the work environment in the industry. The students are also encouraged to opt for summer internship in industrial/ R&D/reputed educational institutions in foreign countries.

Hostels and Health Care

The Institute has nine hostels for boys and two for girls. All the hostels are equipped with modern amenities. The messes are very well managed by students and wardens. The students of the Institute are normally provided with single seated accommodation from second year onwards. There is an Institute Cafeteria, which runs during working hours. The health problems of the students are looked after by Students Health Care Complex. For specialized treatments, the consultation of senior specialists is available from the renowned Sir Sunder Lal Hospital attached to the Institute of Medical Sciences of the University.

Personality Development

The analytical, creative and managerial skills of the students get a chance to flourish through activities of the vibrant Institute Gymkhana, which has cultural, sports & games, and co-curricular wings. The Institute has full-fledged cricket and football grounds, and also volleyball, basketball and lawn tennis courts. All the hostels have facilities for indoor games and entertainment. Apart from these, all students of the Institute enjoy the privilege of a swimming pool, a gymnasium with lateral facilities and indoor stadiums. Gymkhana activities, mainly managed by the students, encourage artistic and creative talents in dramatics, elocution, music and visual arts. Gymkhana has various active clubs, viz. HAM, Audio, Photography, Automobile and Aeromodelling, Cine, Computer, Astronomy, etc. Students actively take part in managing three national level events every year, viz. All India Cultural Festival "KASHI-YATRA", All India Sports Competition "SPARDHA", and All India Exhibition of Engineering and Technology Models "TECHNEX".

Rules for Change of Branch

1. A student enrolled in an UG Degree/IDD/IMD programme through JEE, shall be eligible for change of branch/programme at the end of Part-I (First Year) provided he/she has scored YGPA > 8.0 & satisfies the following criteria:

2. While making the change of branch of a student, the number of students in a class should not fall below the existing number of students by more than 10% and should not exceed the sanctioned number of students by more than 10%. For this purpose the existing number of students refers to the total number of students in the class of a given branch registered in the beginning of the third semester excluding the failures and re-admission cases.

3. The change of branch of UGD, IDD or IMD students will be within their respective programmes only.

4. A student admitted to UGD/IDD programmes in Pharmaceutics shall not be permitted change of branch.

3. SCOPE AND DESCRIPTION OF COURSES

Excellent opportunities exist for preparation of a successful professional career in design, construction, manufacture, management, teaching and research in several branches of engineering and sciences at all the Institutes. Candidates should, however, carefully select the courses, taking into account their aptitude, talent and interest. Brief information on various courses available at these Institutes, arranged according to the course numbers given in Table-1 is given below.

3.1 FOUR-YEAR B.TECH. COURSES

1. AEROSPACE ENGINEERING
(Codes : B4101, G4101, K4101, M4101)

The aerospace engineers are concerned with the design, analysis, construction, testing and operation of flight vehicles, including aircrafts, helicopters, rockets and spacecrafts. The course is based on the fundamentals of fluid dynamics, materials science, structural analysis, propulsion, aerospace design, automatic control and guidance, and development of computer software.

2. AGRICULTURAL AND FOOD ENGINEERING
(Code : G4102)

With increase in growth and associated industrial potential, Indian agriculture has now been accorded the status of an industry. The course on Agricultural and Food Engineering aims at producing engineering graduates to meet the requirement of technical manpower in development of farm machines, land and water resources management, agricultural production and manufacture of processed food. In order to meet the present demand of agricultural and food industries, the course has been suitably modified to include specialized training in design, development, testing and selection of tractors and farm implements, irrigation, drainage and watershed management using Remote Sensing and GIS; information technology, processing of food, fodder and fibre, utilization of biomass, byproducts and wastes in the production of biochemicals, fuels, manure and non-conventional energy. The course provides ample flexibility to the students for acquiring expertise in any of the three major areas of specialization, namely, Farm Power and Machinery, Soil and Water Conservation Engineering, and Food Process Engineering.

3. BIOLOGICAL SCIENCES AND BIOENGINEERING
(Code : K4103)

A new B.Tech. program in biological sciences and bioengineering (BSBE) at IIT Kanpur was started in 2004. The program provides a unique fusion of biology with other basic and engineering sciences. There is no prerequisite of biology at school level for admission in this program. The goal of this program is to prepare the students, both in theory and practice, for leadership in the globally competitive fields of Life Science, Pharmaceutical, Biotechnology industry, academia and research. The program has been developed to meet the increasing demand in these fields of industry and research. Students of this program would find unique opportunities of employment and research in the areas of biomedical engineering, drug design, bioinformatics, biotechnology, nano-biotechnology, genomics etc. The course is designed to introduce biology as an experimental science, in contrast to its commonly perceived notion as a descriptive subject. The students will also find the application of a wide range of techniques in physical, chemical and mathematical sciences for designing, executing and interpreting experiments in biology.

The students of BSBE will take courses common with all other branches of science and engineering in the first year. During their second year, they will take foundation and elective courses in basic biology and bioengineering topics, besides developing their interest and excitement in biological experimentations and discoveries. Concepts in biology will be developed to provide a holistic view and to facilitate integration of these concepts with the fundamental principles of physics, chemistry, mathematics and engineering.

The final two years of the program will be dedicated to the development of the professional competence of the students on a broad spectrum of topics. These include structural and computational biology, biomaterials, downstream processing, bioengineering and genomics etc.

Major emphasis during the final semesters will be on research and development and focus will be on development of entrepreneurial skill. Students would also compete for 'Joy Gill Endowment" scholarship for R&D internship in Biopharma and Biotech industries besides participating in Bio-business plan competitions.

4. BIOTECHNOLOGY

(Code : R4104, W4104)

The Department of Biotechnology at IIT Guwahati offers a wide range of elective courses on various specialized topics such as Gene therapy, Food Biotechnology, Functional Genomics, Metabolic Engineering and so on. Students can also opt for relevant elective courses from other departments. The laboratories in the department are equipped with state of the art facilities for teaching and research in Biochemistry, Microbiology, Plant Biotechnology, Molecular Biology, Biochemical Engineering and Computational Biology.

The Department of Biotechnology at IIT Roorkee has well equipped laboratories for teaching and research in various areas of Biotechnology. The curriculum has been designed with Core Courses in Biological Sciences and Engineering and a number of Elective courses in broad areas of Microbial Biotechnology, Animal Biotechnology, Plant Biotechnology, Environment Biotechnology, Biochemical Engineering, Biomedical Engineering to prepare the students for career in Bioengineering.

5. BIOTECHNOLOGY AND BIOCHEMICAL ENGINEERING

(Code : G4105)

This four-year B.Tech. programme in engineering (based on Modern Biology/Bioprocess Engineering) provides training in Natural, Biological, and Engineering sciences including relevant computer and management subjects. First year courses are common as in other engineering disciplines. A unique feature of the programme is the blending between life sciences and engineering.

Students get in-depth theoretical background/practical training in various disciplines such as Genetics, Microbial Biotechnology, Plant Cell Culture, Agricultural Biotechnology, Cell Biology, Molecular Biology, Environmental Biotechnology, Immunology, Downstream Processing, Metabolic Engineering, Enzyme Technology, Protein Engineering, Bioinformatics, Intellectual Property Rights, etc. along with adequate laboratory classes. Basic process engineering subjects include Fluid Flow, Mass Transfer, Transport Processes, Biochemical Reaction Engineering, Instrumentation and Process Control, etc. Design of bioreactor and other bioprocess equipment is an integral part of the course.

Industrial training is compulsory for strengthening practical exposure of the students. Experimental/design projects in the final year, on frontier areas of Biotechnology, help students to conceive industrial R&D related problems.

Students are encouraged to undertake industry oriented projects in order to win an assistantship of Rs. 50,000 in their 6th to 8th semesters. Currently, projects under the Institute Mission Mode Programme on Molecular Biotechnology are given priority.

6. CERAMIC ENGINEERING

(Code : V4106)

Ceramic Engineering is traditionally the oldest branch of Engineering practiced for thousands of years. It involves processing and manufacturing of all inorganic solid materials. Traditional ceramic areas are (1) Pottery and Heavy Clay ware, which include table wares, sanitary wares, decorative wares and tiles, (2) Cement, concrete and building materials,

(3) Refractories, in the form of bricks, blocks, monolithicsand castables, (4) Abrasives, for grinding and polishing operations, and (5) Glasses such as window, architectural and decorative glasses, laboratory and kitchen wares, bottles for industrial and pharmaceutical packaging, lenses for equipment and ophthalmic uses and fibers as reinforcement materials. During 20th century many new glass and ceramic materials, known as advanced ceramics, have been developed for a large number of engineering applications. The advanced ceramic materials processed by the use of synthetic raw materials are required for making large number of electronics devices; e.g. capacitors, magnets and magnetic recording materials, computer binary chips, piezoelectric and pyroelectric sensors, solid state lasers, optical fibers for communication, electro-optic devices, humidity and gas sensors, and solid state batteries. High strength toughened ceramics are used

in aerospace, turbine, auto-mobile, and cutting tool applications. The field of bio-ceramics has picked up immensely in the last two decades due to its applications as implant materials and as bonding materials to soft as well as hard tissues. Similarly nanoceramic technology is another area for future generation devices with novel properties.

The four-year B.Tech course structure is designed to train the students for developing expertise in the processing, manufacturing and applications of different class of ceramic materials and products. The graduates are in great demand for various ceramic and glass industries besides Steel, Non ferrous metallurgy (e.g. Aluminum, Copper, Zinc etc), Cement and Fertilizer Industries. The graduates are also selected as software engineers and management trainees. Some of the graduates proceed for higher studies to Institutions in India and abroad.

7. CHEMICAL ENGINEERING

(Codes : B4107, D4107, G4107, H4107, K4107, M4107, N4107, R4107, S4107, V4107, W4107)

Chemical engineers work in diverse fields like petroleum refining, fertilizer technology, processing of food and agricultural products, synthetic food, petrochemicals, synthetic fibres, coal and mineral based industries, and prevention and control of environmental pollution. Chemical engineering is concerned with the development and improvement of processes, design, construction, operation, management and safety of the plants for these processes and research in these areas.

Chemical Engineering at IIT Gandhinagar is a mix of traditional as well as the upcoming areas such as nanotechnology, biomedical engineering, pharmaceutical processing, molecular dynamic simulations of polymeric systems, and biochemical & biomolecular engineering. The students undergo extensive course work and laboratory experience in all these conventional and emergin areas. The department faculty have a mix of considerable teaching and research experience and youth. There is also a significant Industry interaction with the Department, such as with Reliance Industries, UPL, IFFCO, Anup Engineering, NFL, HPCL, Fluidyne, Amul, etc. Students also gain international exposure with internship opportunities at various foreign universities.

8. CHEMICAL SCIENCE AND TECHNOLOGY

(Code :W4108)

A four year B.Tech programme in Chemical Science and Technology, the first of its kind in the IIT system, is being offered by the Department of Chemistry at IIT Guwahati from the year 2009. This programme will prepare the students for the emerging need of qualified persons with adequate knowledge in both Chemistry and its technology related issues, in both academics and industry. It will also provide students practical training in basic science and engineering. The technological course components include applied catalysis, drug design, medicinal chemistry, nanomaterials and nanoscience, fine and bulk chemicals, green chemical and technological practices. During the course, the students will be trained to do frontline research in interdisciplinary areas, which include materials science, environmental science and molecular biology. Graduates will have diverse job opportunities in the chemical industry, in pharma companies, in Biotech companies, in environment related businesses, and in R&D organisations.

9. CIVIL ENGINEERING

(Codes : A4109, B4109, D4109, G4109, H4109, K4109, M4109, R4109, V4109, W4107)

A civil engineer is concerned with planning, analysis, design, construction and maintenance of a variety of facilities such as buildings, highways and railways, airports, waterways and canals, dams and power houses, water treatment and waste water disposal systems, environmental quality control, docks and harbours, bridges and tunnels. A civil engineer is also required to deal with critical problems of today such as disaster mitigation and management, constructing offshore structures for oil production, flood forecasting and flood control, traffic congestion, transportation planning, use of non-conventional energy resources, for example, wind, tides, waves, etc. The breadth and diversity of the civil engineering profession make it particularly attractive. Computer Aided Design (CAD) and software development for various civil engineering facilities have become integral parts of civil engineering profession.

10. COMPUTER SCIENCE AND ENGINEERING

(Codes : B4110, C4110, D4110, E4110, G4110, H4110, J4110, K4110, M4110, P4110, R4110, S4110, U4110, V4110, W4110)

The course is concerned with theoretical and engineering aspects of Computer Architecture, System

and Application Software, Computer Networks, VLSI, Internet Technology and Applications. Adequate emphasis is also given to Programming, Algorithm Design and Analysis, Formal Languages and Automata Theory, and Theoretical Computer Science.

The Department of Computer Science and Engineering at IIT Ropar offers a highly competitive four year program leading to a B. Tech degree. The curriculum builds strong foundations in all traditional areas of Computer Science and Engineering. In addition the choice of electives offers the freedom for one to specialize in one or more areas of Computer Science and Engineering. The state of art curriculum promotes independent thinking and learning at an individual's pace. There is great emphasis on hands-on training and design as part of course projects. The department strives to provide state of art infrastructure and facilities to our undergraduate students where they bring their project and research ideas to fruition. The department has taken up the challenge to attract world class faculty in all areas of Computer Science and Engineering. This year six of our third year students will undertake paid internships abroad. We would also like to congratulate the first graduating batch that received an extremely welcome response from the industry, with an average salary of over twelve lakh. We hope to continue building on the initial momentum and to attract the best students and the faculty over the coming years.

11. ELECTRICAL ENGINEERING

(Codes : A4111, B4111, C4111, D4111, E4111, G4111, H4111, J4111, K4111, M4111, N4111, P4111, R4111, S4111, U4111, V4111)

These courses pertain to the broad disciplines of electrical power engineering and electronics engineering. An electrical engineer is concerned with the generation, distribution and use of electrical power, power control and instrumentation applications. An electronics engineer deals with the application of electronics in the processing of information in the fields of communication and control systems, electronic computers, industrial electronics and instrumentation. The specializations at six IITs, IT-BHU, Varanasi and ISM Dhanbad offering this course are listed below.

IIT Bombay

Electronic Systems, Control and computing, Communication and Signal Processing, Microelectronics, Power Electronics and Power Systems.

IIT Delhi

Computer Technology, Control Systems, Electronics and Communications, Power Machines.

IIT Kanpur

Electives in 3rd and 4th years can be chosen from Power and Control Systems, Information Systems, Microwaves, and Photonics, Microelectronics, VLSI and Display Technology.

IIT Kharagpur

Electives in 3rd and 4th years can be chosen from areas like Machine Drives and Power Electronics, Control System Engineering, Power and Energy Systems, Instrumentation and Signal Processing, Computer Technology, Electronics, Data Communication, Biomedical Engineering, VLSI Design, Image Processing, Programmable and Embedded Systems, Statistical Signal Processing, Mixed Signal Circuits and Systems on Chip, Renewable and Distributed Generation Systems.

IIT Madras

Communication and Signal Processing, Microelectronics and VLSI Design, Power Systems and Power Electronics

IIT Roorkee

Electives in 3rd and 4th years can be chosen from areas like Power Systems, Control Systems, Electrical Machines, Power Electronics and Drives, Power Quality, Instrumentation, Systems Engineering, Microprocessors and Interfacing, Electronics, Digital Signal Processing, Computer Applications, Robotics, etc.

IT BHU

Electrical Machines, Power Systems, Control Systems, Instrumentation, Power Electronics and Systems Engineering

ISM Dhanbad

Elective in the 4th year can be chosen from areas like Power systems, Electrical Machines, Control Systems,

Power Electronics, Communication Engineering, Instrumentation, and Computer Science

The B. Tech. programme in Electrical Engineering at IIT Ropar attempts to provide the students with a balanced exposure in the four major areas of the discipline:

1. Electronics engineering & computer technology
2. Analog & digital communication engineering
3. Control engineering & instrumentation
4. Electric machines & power engineering

The core curriculum of the undergraduate programme includes at least two core theory courses and two core laboratory courses in each area. This is subsequently augmented with suitable electives in the third and fourth year. Currently popular electives include VLSI, embedded systems, digital signal processing, medical electronics, digital communication and optical communication.

Undergraduate projects included as part of the final year curriculum emphasis experimental work and exposure to hardware in all four areas.

Electrical Engineering at IIT Gandhinagar is a blend of teaching and research activities pertaining to both Electronics and Electrical Engineering. A diverse range of theoretical and laboratory courses are offered. The Department firmly believes in imparting a strong hands-on flavor to the courses that a student takes, and therefore places emphasis on the laboratory component, internships and projects. The Department has a healthy mixture of young and experienced faculty members, all of whom display high levels of enthusiasm and dedication. Students carry out summer internships at reputed academic institutes and industries. More than 20% of these internships are at foreign universities.

12. ELECTRICAL ENGINEERING (POWER)

(Code : D4112)

The course pertains to the broad areas of generation, transmission, distribution and utilization of electrical energy. Apart from the relevant basic and engineering science courses, students are taught the fundamental courses of electrical, electronics, communication and computer engineering with orientation towards electrical power and energy systems. This is achieved through compulsory and elective courses in relevant areas which cater to the needs of power industry. The courses in these areas include Electrical Machines, Power Systems, Power Electronics, Drives, Computer Applications, Energy Efficiency and Conversion, Renewable Energy, Control and Instrumentation, HVDC, Signal Processing, etc.

13. ELECTRONICS ENGINEERING

(Code : V4113)

The course provides a sound foundation in Electronic Devices, Circuits and Systems, Microelectronics and CAD, Electrical and Optical Communications, Signal/ Image Processing, Control, Microwaves, Fibre Optics, Computer Hardware, Software and CAD. Vision. The programme is based on essential core and elective subjects which provide the flexibility necessary for a student to choose his/her field of interest.

Students are required to take up projects relevant to their specialization in the final year. The course is well designed for the students who intend to pursue higher studies in any branch of electronics, communication and computer engineering. Excellent employment opportunities exist in public and private enterprises and also in R&D organizations.

14. ELECTRONICS AND COMMUNICATION ENGINEERING

(Codes : R4114, S4114, W4114)

The course provides a sound foundation in Electronic Devices, Circuits and Systems, Microelectronics and CAD, Electrical and Optical Communications, Signal/ Image Processing, Control, Microwaves, Fibre Optics, Computer Hardware, Software Design and Computer Vision. This programme is based on essential core and elective subjects which provide the flexibility necessary for a student to concentrate on his/her particular interests, as well as for the department to introduce new topics as the subject expands. A substantial part of final year is devoted to a project of topical interest. The course is well designed for the students who intend to pursue higher studies in any branch of electronics and communication engineering.

15. ELECTRONICS AND ELECTRICAL COMMUNICATION ENGINEERING

(Code : G4115)

The course is a judicious combination of core subjects and professional electives. The core subjects provide

a sound foundation in areas like electronic devices, circuits, control, signals and networks, computers and communications, and electromagnetics. The foundation is strengthened by depth subjects in microelectronics, microwaves, communication, computers, digital signal processing, etc. The breadth subjects in Mathematics, Sciences, Humanities, Management, etc. widen the scope of the course. The course lays considerable emphasis on the laboratory classes. The course accommodates students' special interests through professional elective subjects in the areas of microelectronics and VLSI engineering, visual information processing and embedded systems, telecommunication systems engineering, RF and microwave engineering, Fibre Optics and light-wave engineering. New elective subjects are added from time to time to cater to the future technological needs. The curriculum also includes industrial training and intensive project work of topical interest. The curriculum makes a balance between excellent industrial prospects as well as higher studies in any branch of electronics and communication engineering.

16. ELECTRONICS AND ELECTRIAL ENGINEERING

(Code : W4116)

A B.Tech. Programme in Electronics and Electrical Engineering (EEE) has wide scope with growing application of electronics in electrical power generation, transmission, and distribution and drive systems. The programme aims at producing engineers with sound knowledge in Electrical Engineering and a strong background in Electronics. The pass-out graduate engineers will have scope to orient themselves to take up challenging jobs in the industries and engage themselves in research and development activities in the fields of Electronics and Electrical Engineering.

The EEE curriculum has a number of core Electronics course. These courses are aimed at developing adequate background in digital and analog electronics, microprocessors, embedded systems, communication and signal processing. The Electrical Engineering courses focus on electrical machines, measurement and instrumentation, control systems, power electronics and power systems analysis, operation and control. The laboratory courses are aimed at giving hands-on experience in electronic circuits, microprocessors and embedded systems, digital signal processors, control and instrumentation, electrical machines and power systems. The electives are designed keeping in view the important developments in Electronics and Electrical Engineering.

17. ENGINEERING PHYSICS

(Codes : B4117, D4117, M4117, W4117)

Ideas and discoveries in Physics have not only enhanced our understanding of the physical world but also provided the main driving force behind many of the recent technological advances. In order to understand and keep pace with these changes, and also to initiate and press through further advancements, an individual must have a strong grasp of the underlying fundamental principles. The Engineering Physics programme is challenging, with a curriculum designed to stretch the mind. It is intended for students with strong aptitude in science and mathematics, who wish to apply these fundamental subjects to technological problems without regard for the historical divisions among the disciplines. The programme helps in conceptual visualization of new frontiers in engineering and technology and their attainment for the benefit of mankind. It prepares the students for challenging careers in industry, R&D institutions, advanced studies in engineering, science and technology, as well as entrepreneurship in future developments.

The Engineering Physics programme at IIT Bombay provides a broad education in theoretical and experimental aspects of modern physics with an orientation towards some of the skills that will be useful to technological applications. In addition to several core courses in physics, special topics will be covered by electives such as solid state electronics, materials science, and applied nuclear science.

The B.Tech. Programme in Engineering Physics at IIT Delhi stresses on the basic physics that underlies the most developments in engineering, and on the mathematical tools that are important to all engineers and scientists. This emphasis, combined with hands-on experience with modern computers, electronics, lasers and state-of-the-art equipment and technologies, and a practical training in industry, leads to an excellent preparation for a broad range of careers. The opportunities are available in the key areas of VLSI, Photonics, Data Storage and Recording media, Communication, Holography, Quantum Electronics and Optical Devices, Optical Computing, Information

Technology, Lasers, Plasma Processing, Particle Beams, MHD, Fusion Devices, Space Science and Engineering, Environment Technologies, Biomedicine, Neural Networks, Nanotechnology, MEMS and so on.

The B.Tech. programme in Engineering Physics at IIT Guwahati provides a strong theoretical and experimental foundation in physics as well as in key areas of applied physics and engineering. The programme has a fair distribution of courses in pure sciences, applied physics, humanities and social sciences, and engineering streams. Biophysics, analog and digital electronics, materials science, nano technology, computational techniques, measurement techniques, and photonics are some of the core courses taught in the programme. Elective courses would be chosen from a wide range of advanced topics in pure and applied physics, engineering and technology. Laboratory courses and a two-semester project work are designed to impart practical skills and hands-on experience on variety of experimental techniques.

This programme at IIT Madras encourages students to learn the fundamental aspects of frontier areas in Physics and Electrical Engineering. In addition to several core courses in Physics, Electrical Engineering and other engineering branches, special topics will be covered by elective courses such as Solid State Devices, Cryogenic Engineering, Materials Technology, Communications Engineering and Photonics. The academic curriculum provides excellent academic/ laboratory training in Digital Electronics, VLSI, Communication Systems, and experiments based on advanced principles of physics.

These programmes will be suitable for those students who intend to pursue higher studies in physics, or would like to take up advanced studies in engineering requiring a good grasp of physical principles or wish to branch out after graduation in industrial research and development programmes. Good employment opportunities for Engineering Physics graduates exist in universities and in research and development sections of national laboratories and industries.

18. ENGINEERING SCIENCE

(Code : H4118)

B.Tech. in Engineering Science, at IIT Hyderabad, is unique program offered in India for the first time. It completely opens the doors to different specializations and provides a holistic engineering education. The basic structure is as follows: For the first 2.5 years (5 semesters) the student does basics courses in Mathematics, Physics, Chemistry, and different fields of engineering. In the last 1.5 years (3 semesters) the student then specializes in any field of his / her choice. Specialization is completely open: it could be any branch of engineering — Computer Science and Engineering, Electrical, Mechanical, Chemical, Civil, Material Science, Bio Tech., Biomedical, Physics, Mathematics, Chemistry, Economics, Psychology, Design, etc. The final degree will read: B.Tech. in Engineering Science with Specialization in X, where X denotes the specialization.

This is the first program that caters to what is often referred to as the “T Education”; the horizontal line in ‘T’ corresponds to an education giving breadth, while the vertical line in ‘T’ corresponds to an education giving depth. The new Engineering Science Program achieves breadth as well as depth.

19. ENVIRONMENTAL ENGINEERING

(Code : S4119)

Industry worldwide is on the throes of tumultuous change contending with hydra-headed environment issues and norms. In order to cater skilled and trained Environmental Engineering graduates to the industry, ISM Dhanbad has conceptualized a four year B. Tech. Course in Environmental Engineering.

During the first two semesters, the students will undergo the core courses in basic sciences and engineering subjects. From third semester onwards, the course will cover important subjects like Environmental Chemistry, Atmospheric Physics and Meteorology, Environmental Microbiology, Air and Noise Pollution, Industrial Waste Management, Geology for Environmental Engineering, Solid waste Management, Principles of Unit Operations and Process in Water and Wastewater Treatment, Instrumentation Methods for Environmental Analysis, Principles of Structural Engineering, Hazardous and Biomedical Waste Management, Hydrology and Geotechnology, Municipal Wastewater Engineering, Environmental Impact Assessment, Environmental Economics and Socio-economics and Rehabilitation Planning, Environmental Aspects of Mines, Advances Soil Mechanics, Environmental Audit and EMS, Risk Assessment and Disaster Management, Environmental

Policies, Legislation, Issues, Treaties, Protocols and Conventions, Remote Sensing and GIS. A large number of elective subjects will also be taught as per the choice of the students to cater the industries like Petroleum, Chemicals, Metallurgy, Mining and allied Industries.

20. INDUSTRIAL ENGINEERING

(Code : G4120)

Industrial Engineering is the branch of engineering that deals with the design and optimization of complex processes or systems involving people, materials, and energy in a productive way. Industrial Engineers are the solution providers to the corporate world both for manufacturing as well as service organizations. They design and develop work systems, production systems, management systems, service systems, and information systems. They help the industry in achieving higher productivity and competitive advantage. They have a great role to play in the conservation of natural resources and enhancing the quality of life.

The department of Industrial Engineering and Management at IIT Kharagpur has the distinct credential to be the first department of its kind in India. The Department has continually restructured itself to cater to the needs of the Indian Industries. Over the years, the scope of industrial engineering has expanded. The state-of-the-art of industrial engineering and management encompasses fields of study such as: production and product system design, systems engineering, quality control and engineering, software engineering/e-commerce, ergonomics/human factors engineering, supply chain management, and technology management.

This four-year B Tech programme in Industrial Engineering focuses on developing efficient and cost effective work systems and business processes leveraging on industry-focused technology and management and blending theory with prevailing best practices and real-life problem solving. For problem-solving, the course stresses on analytical modeling, simulation and computer applications.

Over the years, the disciplines of Industrial Engineering, as being practiced at IIT Kharagpur, has attracted several reputed and well-established private and public sector companies for sponsored research and industrial consultancy where bright and enterprising B Tech students get an opportunity for nourishing their immense potential for career development. Moreover, the department takes pride in having a highly dedicated, student-friendly group of faculty members with constantly updating international academic support base.

21. INSTRUMENTATION ENGINEERING

(Code : G4121)

Instrumentation ensures better quality and increased productivity in industries. It is also used for diagnostics in health care, environmental pollution measurement and in all fields of advanced research and development. Instrumentation Engineering is a multidisciplinary program drawing on several disciplines: electrical, electronics, computer, chemical and mechanical engineering, material science and biomedical engineering. Flexibility in curriculum is provided through electives enabling the student to choose subjects to their own fascination and career objective. The main emphasis is on process instrumentation and control. Advanced tools and techniques like VLSI design, MEMS, signal and image processing, optoelectronics and intelligent instrumentation are also included.

22. MANUFACTURING SCIENCE AND ENGINEERING

(Code : G4122)

The Manufacturing Science and Engineering Programme is designed to create a specialized breed of engineers-cum-managers, who are expected to evolve, build and manage with global outlook, a new class of physically distributed enterprises. The programme first builds a solid background of manufacturing systems and processes, with exposure to basic courses in engineering design and thermal sciences. It covers subjects like quality control, CAD, CAM, AI, CIM, Robotics, etc. The students are also exposed to state-of-the-art developments in micro-mechanical systems and intelligent systems driven by continuous innovation in product and process technologies. The programme, with its fine blend of advanced manufacturing technologies and broad based IT and management skills, is ideal for students who wish to take up challenging careers in engineering management and innovative system entrepreneurship

23. MATERIALS SCIENCE AND ENGINEERING

(Code : K4123)

Advances in technology depend on the availability of high performance materials. The field of engineering

materials has expanded enormously in the recent past and has encompassed a variety of materials such as ceramics, polymers, electrical and magnetic materials, glasses and composites, along with the traditionally important metals and alloys. Critical selection of such materials for advanced engineering applications in high technology areas such as space, energy, and communications, is of utmost importance. B.Tech. programme in material science and engineering has been designed to train engineering graduates, who would be highly competent in meeting the emerging needs of India in advanced materials. A wide variety of electives available during the third and fourth years of study give an opportunity to the student to concentrate in an area of his/her choice.

24. MATHEMATICS AND COMPUTING

(Code : W4124)

Modern scientific investigations and technological developments require sophisticated tools from mathematics. The B.Tech. programme in Mathematics and Computing at IIT Guwahati, the first of its kind in the IIT system, provides a fusion of mathematics with Computer Science and Financial Engineering. The curriculum is designed to provide the students with in-depth theoretical background/practical training in computer science, numerical computing, and mathematical finance. Graduates of this programme are prepared for careers in software industries, financial institutions, investment banks, and government organizations or to pursue higher studies.

25. MECHANICAL ENGINEERING

(Codes : A4125, B4125, C4125, D4125, E4125, G4125, H4125, J4125, K4125, M4125, N4125, P4125, R4125, S4125, U4125, V4125, W4125)

Mechanical Engineering is concerned with the design, operation and maintenance of machines and their components, mechanisms, machine tools, manufacturing systems and processes, components of thermal power systems including internal combustion engines and turbo machinery, solar energy, heat transfer, air-conditioning, refrigeration and industrial engineering including production planning and control. The students of mechanical engineering have an opportunity to study both the fundamentals and applied aspects of these areas.

Mechanical Engineering at IIT Gandhinagar aims to produce graduates ready to work in diverse multidisciplinary areas. A mix of young and experienced energetic faculty provide excellent education in core areas of dynamics, vibrations, structural analysis, thermodynamics, fluid mechanics, heat transfer, control theory, design, manufacturing, and also provides strong training in modern developments in mechatronics, nano-mechanics, robotics, product design, advanced materials, CAD/CAM, modern manufacturing systems and computational analysis. Specializations in Automobile, Renewable Energy, Biomedical Devices, and Systems Engineering are being introduced. Students are exposed to extensive project work and laboratory experience and undergo summer internships in reputed international universities and industry.

Established with the inception of IIT Ropar in 2008, the Department of Mechanical Engineering was re-organized as the School of Mechanical, Materials and Energy Engineering in 2010 to encourage interdisciplinary research. The school currently offers UG and Ph. D programs in Mechanical Engineering. The school has a dedicated faculty in all the major areas of mechanical engineering such as, design and analysis, fluids and thermal engineering, materials, and manufacturing. In addition to the conventional core courses, the school offers state-of-the-art courses such as product design and realization, sustainability for engineers, continuum mechanics, medical devices and equipments, biomechanics, control engineering, noise and vibration, finite element analysis, energy science and technology, robotics and mechatronics, micro-manufacturing, and tribology. The laboratories have been set up with modern facilities for strengthening teaching and research.

26. METALLURGICAL ENGINEERING

(Code : B4126)

A metallurgical engineer is concerned with the extraction of metals from ores, their refining and purification, and their fabrication into useful shapes by casting, joining and mechanical working. He/she is also concerned with the study of the physical and chemical properties of metals and their structure in relation to their properties, principles of formation of alloys and methods of improving their properties.

27. METALLURGICAL AND MATERIALS ENGINEERING

(Codes : G4127, M4127, R4127)

Advances in technology depend on the availability of high performance materials. The field of engineering

materials has expanded enormously in the recent past and has encompassed a variety of materials such as ceramics, polymers, electrical and magnetic materials, glasses and composites, along with the traditionally important metals and alloys. Critical selection of such materials for advanced engineering applications in high technology areas such as space, energy, and communications, is of utmost importance. B.Tech. programme encompassing metallurgical engineering and materials science/engineering have been designed to train engineering graduates, who would be highly competent in meeting the emerging needs of India in advanced materials as well as in conventional metallurgical engineering. Comprehensive programmes of studies allow the student to grasp the fundamentals of metal extraction, characterization, processing and selection of engineering materials. A wide variety of electives available during the third and fourth years of study give an opportunity to the student to concentrate in an area of his/her choice.

28. METALLURGICAL ENGINEERING AND MATERIALS SCIENCE

(Code : B4128)

The field of engineering materials has expanded enormously in the recent past and has encompassed a variety of materials such as ceramics, polymers, electrical and magnetic materials, glasses and composites, along with the traditionally important metals and alloys. Critical selection of such materials for advanced engineering applications in high technology areas such as space, energy, and semiconductors, is of utmost importance. B. Tech. programme encompassing metallurgical engineering and materials science has been designed to train engineering graduates, who would be highly competent in meeting the emerging needs of India in advanced materials as well as in conventional metallurgical engineering. The programme allows the students to grasp the fundamentals of extraction, characterization, processing, selection, and life assessment of engineering materials. A wide variety of elective courses available during the third and fourth years of study give an opportunity to the students to concentrate in area of their choice relevant to the emerging challenges and excitement to link with the technological needs of their disciplines.

29. MINERAL ENGINEERING

(Code : S4129)

A four-year B.Tech. Programme in Mineral Engineering, the first of its kind in India, is being offered by ISM Dhanbad since 1984. This programme has a multi-faceted orientation with a fine blend of core subjects, professional courses and allied courses relevant to the discipline of Mineral Engineering.

During the first two years, the students undergo the core courses in basic sciences and basic engineering subjects including Engineering Drawing, Workshop Practice, etc. followed by professional courses in Mineral Processing, Coal Preparation and Fuel Technology. Besides these, important allied subjects like Ferrous and Non-ferrous Extractive Metallurgy, Agglomeration Modelling and Simulation, Computational Techniques, Materials Handling, Maintenance Engineering, Environmental aspects, Geology & Mining, are also offered. The students are familiarized with the application of classroom concepts in industrial circuits through visits to local washeries and various processing plants, intensive industrial training and all India educational tours.

30. MINING ENGINEERING

(Codes : G4130, S4130, V4130)

Mining Engineering, a 4-year B.Tech. programme at IIT Kharagpur, IT BHU Varanasi and ISM Dhanbad, is concerned with the production of minerals. The field of study exposes the students to aspects of planning, design, construction, mineral excavation, transportation, maintenance, safety, and management of mines. Courses in the first two years provide the students with essentials of science, basic engineering, computing, and information technology. In the subsequent years, a group of core and elective subjects including methods of mining, geomechanics, numerical methods, environmental engineering, industrial management, computer-aided mine planning, remote sensing and geographic information system (GIS) are taught to keep pace with the latest developments in mining technology and to meet the present demands of the industry.

31. MINING MACHINERY ENGINEERING

(Code : S4131)

Engineering graduates in Mining Machinery are concerned with the selection, operation, maintenance and design of all types of the machinery used in the exploration and exploitation of minerals including heavy earth moving equipment. ISM Dhanbad is the only Institute in the country that produces mining machinery engineers.

During the first two years, the inputs are given in different areas of basic engineering like mechanical, electrical, electronics and computers. The next two years are utilized for in-depth practice-oriented studies of mining and allied equipment.

32. NAVAL ARCHITECTURE AND OCEAN ENGINEERING

(Code : M4132)

Ocean Engineering is an interdisciplinary field that is concerned with all aspects of exploration and exploitation of the resources of the oceans. Naval Architecture deals with design, construction and maintenance of ships. The programme also deals with other water borne vessels. Apart from the core programme in science and mathematics, well structured courses in fluid and solid mechanics, wave hydrodynamics, offshore structures, foundation and coastal engineering are taught. The programme also imparts good design and experimental skills. The courses in the advanced semesters lay emphasis on numerical modeling and CAD, with electives from many postgraduate courses. Excellent facilities exist for carrying out the final year project work on advanced design, and experimental as well as numerical analysis of ocean engineering systems including marine vehicles.

A wide variety of job opportunities are available to the graduates in companies dealing with offshore engineering, ship building and ship repair, Coastal and Port Engineering, shipping companies, classification societies, statutory bodies, Port Trusts, Coast Guard, the Indian Navy and consulting organizations. Because of the multidisciplinary nature of the programme, a large number of graduates find employment in allied engineering professions and management area also.

33. OCEAN ENGINEERING AND NAVAL ARCHITECTURE

(Code : G4133)

Ocean Engineering provides solutions to needs of the society for exploration and utilization of the ocean, its coastlines, and its vast natural resources such as extraction of oil from offshore wells, minerals from the sea bed, biological resources like fish and other sea food. The subject of ocean engineering is concerned with various industrial activities of design and construction, building and maintenance, production, operation, and transportation of marine structures. Naval architecture is a major branch of ocean engineering, which deals with design, construction, and maintenance of ships and other water borne vessels. The discipline of ocean engineering not only includes insights from all branches of engineering but it also incorporates unique marine features. Marine Hydrodynamics, Water Wave Mechanics, Computer Aided Design and Manufacturing (CAD-CAM), Computational Methods in Marine Hydrodynamics and Structural Mechanics, Design of Ships and Marine Structures, Marine Construction and Welding, Coastal Engineering, Hydroelasticity, Port and Harbour Engineering, Coastal Zone Management, etc. have become an integral part of this engineering profession.

The employers of ocean engineers and naval architects are the various offshore industries, ship building and ship repair yards, shipping companies, classification societies, statutory bodies under the Ministry of Surface Transport, offshore consulting firms, coastal and dredging consulting firms, instrumentation and data analysis firms and institutions, drilling companies, seismic and hydrographic surveying companies, Indian Navy, DRDO laboratories, coast guards, port trust, environmental protection agencies, pollution control boards, and academic institutions. Due to multidisciplinary nature of Ocean Engineering & Naval Architecture, a large number of graduates find employment in allied engineering professions, management and information technology areas.

34. PETROLEUM ENGINEERING

(Code : S4134)

ISM Dhanbad is the only recognized institute offering B.Tech. degree in Petroleum Engineering in India. Course structure was initially developed by representatives of ONGC, ISM, IOC and Ministry of Education, Government of India. The course is regularly updated to keep pace with developments in Petroleum Engineering the world over by a body comprising of industry representatives, academicians and research institutes.

A rich selection of scientific challenges awaits students in Petroleum Engineering. All students receive rigorous training in the basics of Petroleum Engineering, Petroleum Geology, Reservoir Engineering, Well Testing, Production Engineering, Drilling Engineering, Refining Engineering, Petrochemical Engineering, EOR

Simulation, etc. Students benefit from courses, seminars and interaction with fellow students and faculty of the associated department of Geophysical and Geological Sciences, and other Institutes, e.g. CMRI, CFRI, PDIL, ONGC, OIL, IOC & PCRA. Academic training imparted to the students is supplemented by appropriate oil field training of fourteen weeks during their degree programme.

35. POLYMER SCIENCE AND TECHNOLOGY

(Code : R4135)

The ever-increasing industrial demand for polymers and their products have generated a rapidly growing demand for qualified manpower in the area of polymer science and engineering. The academic institutions, R&D organizations, and user industry dealing with polymers/plastics and composites need a large number of quality scientists and engineers specializing in polymer science and technology.

To fill-in this need, a B.Tech. programme in Polymer Science and Technology is offered at the Saharanpur campus of IIT Roorkee. This programme is a blend of basic sciences, engineering and polymer science and technology. The students will be exposed to various aspects of science and technology of polymers, their synthesis, characterization, testing, processing, and applications in nanotechnology, aerospace, electronics, etc.

The second year of the programme is devoted to basic sciences, viz. physics, chemistry, mathematics, and engineering sciences. In the last two years the programme covers the courses on polymer science, technology, engineering, and elective courses from different departments of the Institute. The strong flavour of chemical engineering, mathematics, and engineering sciences makes this programme unique in its structure and utilitarian in its employment potential.

36. PRODUCTION AND INDUSTRIAL ENGINEERING

(Codes : D4136, R4136)

Production and Industrial Engineering aim at higher productivity by integrating design and planning of operative systems. These engineers deal with planning, measuring and controlling all activities within the organization, besides optimum use of resources. Production and Industrial Engineering program forms a knowledge bridge between production activities and the management goals. The program covers major areas like manufacturing processes and automation, robotics, computer integrated manufacturing, cellular manufacturing, production planning, scheduling and inventory control, material requirement planning systems, operations research, quality management, man– machine systems and facilities design. Equipped with broad-base knowledge of the employment in all types of engineering and manufacturing systems, production and industrial engineers find their employment in all types of engineering and manufacturing industries both in the private and public sector.

37. PULP AND PAPER ENGINEERING

(Code : R4137)

Pulp and Paper Engineering deals with the Science, Technology and Engineering used for the manufacture of pulp and paper products from fibrous and non-fibrous raw materials. The course is concerned with the characteristics of raw materials and pulp fibers, raw material storage, handling and preparation, various pulping and bleaching methodologies, processing of pulps, recovery of chemicals, preparation of stock waste, paper recycling and deinking, paper manufacturing including pressing, drying, calendaring, reeling, winding and roll finishing, sizing, coating and super calendaring, surface treatments, paper properties, testing and end-uses of pulp & paper, instrumentation and process control, energy, and environment. Pulp and Paper Engineering is also concerned with the design and development of processes, operation, maintenance and management of plants, basic economic consideration and cost control, research and development and other technical and marketing services related with the pulp and paper industry. The employment opportunities for engineers in this area have been excellent in previous years.

Pulp and Paper Engineering course is offered at Saharanpur Campus (50 km from Roorkee) of IIT Roorkee.

38. SYSTEMS SCIENCE

(Code : J4138)

B.Tech. in Systems Science provides the students with a foundation in basic sciences and engineering with

necessary tools in mathematics, which will make them competent to solve complex problems in the domain of Systems Science. This includes, but is not limited to, engineered systems, ecological systems, business and financial systems and complex networked systems such as smart communities with an emphasis on the ethical stance towards society, sustainability of the solutions proposed and awareness of the implications to the environment and society. By giving due attention to the mathematical foundations that underlie these systems, the programme aims at creating systems' thinkers who would develop, construct, operate, redesign, analyse, verify and integrate various systems. These thinkers may become entrepreneurs who would be able to find innovative and sustainable solutions to societal problems. In addition, they will be ready for careers in a wide range of industries and R&D organizations and pursue higher studies leading to qualitative and quantitative research in systems dynamics and engineering at world class international institutes.

39. TEXTILE TECHNOLOGY
(Code : D4139)

The UG program in Textile technology is primarily focused on the methods of developing textile products from natural fibres or from fibre forming polymers and on issues related to the management of the production facilities. Core textile courses cover topics on fibre science, yarn manufacture, fabric manufacture, textile chemical processing, textile testing and design of textile products and processes. Special courses are offered on thrust areas such as technical textiles encompassing topics on medical textiles, geotextiles, filter fabrics etc., flexible and rigid composites, smart textiles, nanoprocessing, apparel engineering and comfort as also environment management. From fifth semester onwards the students choose electives from a wide variety of textile courses and can specialize in a particular area of textile technology. In the final year they are required to work on a project on one of the thrust areas.They also undergo a practical training in a textile production facility as part of their engineering education.

3.2 FOUR-YEAR B.S. COURSE

40. CHEMISTRY
(Code : K4201)

This programme prepares the students for modern day research in chemical sciences by providing them, besides an in-depth education in chemistry, adequate training in mathematics, physics, computers and engineering sciences. In the first two semesters of their stay in the programme, they take the same courses as their fellow engineering students. During the course, they are trained to do frontline research in interdisciplinary areas, which include materials science, environmental science and molecular biology, in addition to traditional topics in chemistry.

41. ECONOMICS
(Code : K4202)

IIT Kanpur offers a unique B. S. program in Economics. It was conceptualized with a need to combine training in technology related issues with economics. Currently many students with engineering degrees seek additional training in economics to make them more efficient professionals. Similarly many engineering and management consultancy firms find it necessary to attract professionals that are well versed in both technological and economical skills.

Contemporary developments in materials research, telecommunications, information technology, biotechnology as well as the sustainable development of nonrenewable resources necessitate an interaction between economics and technology. Even, conventional service areas, such as banking and finance, have also undergone rapid and fundamental changes, both in terms of products and processes, due to the development of information technology and computational skills. Similarly commercialization of modern technology (from laboratory to the market) involves a whole gamut of patents, intellectual property rights, investment planning pricing contracts and so on. Therefore, a synthetic understanding of technology and economics will provide the students with an enduring expertise.

The program provides courses in basic science, engineering, and computational methods in the first two years. The rest of the program offers extensive training in economic theory, econometric and quantitative techniques, industrial economics, development trade, and infrastructure economics, environmental economics. The student will be able to take specialized courses in areas that interface with technology. For example, the areas covered will be economics of information technology, economics of biotechnology, economics of research and development, multinational

enterprises, transport economics, water resources economics, health economics and health care policy, computational finance, environmental impact assessment, economics of regulation, economics of intellectual property rights, and law, technology and public policy. Every student who gets a M.Sc degree in Economics will have capabilities to identify real world problems as they emerge, articulate an appropriate mix of economic and technological solutions, and design policies to implement them instead of depending exclusively on known solutions.

Such students will be in great demand in international and national business and consultancy organizations, multinational corporations, firms dealing with information technology, banking and financial sectors, conventional government departments, and administrative services. They will also be in a position to compete with students from the best known foreign and Indian institutions in pursuing further research work.

42. MATHEMATICS AND SCIENTIFIC COMPUTING

(Code : K4203)

The development of mathematics has always affected all human endeavours, including the computing technology. Today, the nature of mathematics and the way mathematicians think are also being affected significantly because of the fast changing trends in computing technology. Modern Mathematics has a significant computing component that is essential in vast areas of scientific and industrial activities.

This programme provides a rigorous training in mathematical thinking and the analytical capability needed in present-day scientific computing. Through a carefully designed sequence of compulsory and elective courses, the programme enables a student to specialize in the area of his/her choice, be it pure mathematics, applied mathematics, statistics, or computing and development of mathematical software.

A graduate of this programme would have a broad based training in computational techniques, mathematical modelling, simulation, probabilistic and statistical tools, and will be equipped to make significant contributions in academic research/teaching, or to pursue a meaningful career in public/ private sector undertakings or in R&D organizations.

43. PHYSICS

(Code : K4204)

This course is designed to produce students capable of pursuing advanced studies in theoretical and experimental physics as well as handling problems related to applications of physics in engineering, technology, industry and medicine. This is achieved by making use of a well-balanced course structure consisting of undergraduate core courses in basic sciences, engineering sciences, technical arts, and workshop practice. In addition, students are required to study courses in computer science, humanities and social sciences, etc. In the final years of the programme, the students can opt for specialized courses in advanced physics and they have to work for projects related to current problems in experimental and theoretical physics.

3.3 FOUR-YEAR B.PHARM. COURSE

44. PHARMACEUTICS

(Code : B4301)

The Department of pharmaceutics, IT-BHU is the first Department to offer B.Pharm. degree course first time in India since 1932. It is a unique course of its kind imparting knowledge on various aspects of design, development, testing, safe and effective uses of drugs and medicines including drug delivery systems. The program provides a unique fusion of biology with engineering and technological concepts to develop skilful process(es)/techniques for designing, procuring, and evaluating various kinds of drugs, drug delivery systems, and consumer products. The course thus provides a unique opportunity to pharmacy qualified professionals to serve the humanity by alleviating the discomfort, pain and sufferings (caused by various diseases) through discovery and development of safe and effective drugs and medicines.

In addition to the study of basic Sciences, Computer programming and Communication skills etc. at first year level, the course of other three years includes an in-depth study of both theory and practical aspects of various subjects like – Pharmaceutics, Pharmaceutical Technology, Pharmaceutical Engineering, Pharmacokinetics, Pharmaceutical Management, Microbiology, and Biotechnology, Pharmaceutical and Medicinal Chemistry, Pharmaceutical Biochemistry,

Pharmacognosy and Tissue Culture, Pharmacology, and analysis/Assay of Drugs and Pharmaceuticals, etc. Educational Tour, Training in Pharmaceutical Industry, Seminars and Projects are also part of the curriculum.

Considering the fact that India is the fifth largest country in the world in terms of maximum consumption of pharmaceutical products, the pharmacy qualified professionals have tremendous opportunities to get jobs as managers and Executives in rapidly growing Bulk Drug and Pharmaceutical(more than 15 % annual growth worldwide every year), Biotechnological, Herbal, Neutraceutical, Cosmetic, Fast Moving, Consumer Goods(FMCG) and pharmacy need based Software Industries. Pharmacy Graduates and Postgraduates, also get employed in Analytical Testing Services Laboratories, Drug Control Administration(as Drug Controller/Assistant Drug Controller/ Drug Inspector), Drugs and Formulations Development and research & Development Laboratories of CSIR as well as privately funded Laboratories, Hospitals (As Clinical and Community Pharmacy Services), Drug Distribution through wholesale and retail chains of Pharmacy stores, Entrepreneurship in pharmacy and also in research and Teaching in Universities and Institutes offering such courses worldwide. The competent, skilled and knowledgeable pharmacy qualified graduates and postgraduates can get the above jobs not only in India but also abroad, (USA, Europe and other developed and developing countries).

3.4 FOUR-YEAR B. DES. COURSE

45. DESIGN

(Code : W4401)

IIT Guwahati offers for the first time in the country a four-year undergraduate program in Design leading to B.Des. degree. This integrated design programme focuses on enhancing analytical and methodical approaches in creative problem solving covering the fields of Industrial Design – which includes products and product systems, and Communication Design – which includes all written, symbolic and visual information and materials.

The curriculum covers the subject domains influencing Design, including Technology, Human Factors Engineering, Aesthetics and Social Sciences.

The industrial designer is concerned with the design and innovation of new products through an understanding of how people use products, how industry manufactures them, and with their appearance, functionality, usability and safety.

Designers are trained to work in the areas of Graphic Design, Information Design, New Media, Interaction Design, Instruction Design, Exhibition Design, etc.

In the emerging competitive business environment, this new profession offers tremendous opportunities for professional work in various industries in the country and abroad. This program is recommended for candidates with flair for creative work and possessing aesthetics sensibilities.

During the first year of the four-year B.Des. Programme, the students develop their visualization and conceptualization skills and master the basics of design and model building. In the next two years, the program focuses on user-centric considerations in design where they further develop their knowledge of the various aspects of technology, materials, human factors, and methods of problem solving. Computer application in design is an important thrust area in the program. Various projects that are undertaken by student provide hands-on experience of 'learning by doing'. During the final year, students undertake courses in the professional practice and management of design, alongside a major design project. To give them real life experience of working in a professional environment, the students are encouraged to take projects that meet requirements of industry or design firms. At the end of every academic year they are encouraged to undertake industrial training at different industries and design firms.

Design Graduates today have ample opportunities to work amongst leading industries that have their own design departments or to pursue higher studies in the fields of Design, Usability, Human Factors and Design Management. Product designers are placed in design departments amongst the leading companies that include automobile manufactures, the computer industry, the furniture industry, and consumer product industries. In the field of Communication Design, opportunities exist for designers to work in IT related areas of web design, information design, interaction design, and also in Consulting Design Firms engaged in the areas of packaging design, corporate identity design, exhibition design and print media design.

A majority of students who have graduated from the program in the previous years have opted for higher

studies in design in leading universities abroad while the others have joined leading Indian industries.

The importance of the profession got recognition in the country when Corporate India instituted the first national design award, 'Business World-NID Award for Design Excellence' in June 2004.

3.5 FIVE-YEAR B. ARCH. COURSE

46. ARCHITECTURE

(Codes : G5101, R5101)

An Architect is a professional who designs buildings and built environments, and acts as the leading coordinator for the entire construction project from conception to completion. Architecture is the "art and science of building" – hence an Architect's education needs to be a perfect balance between art, science and technology. As an architecture student, one is encouraged to develop one's creative talents and artistic skills, as well as hone one's analytical aptitude for building science and technological innovation. The role and importance of an architect in society has been acknowledged since time immemorial, and assumes special significance in today's world when buildings and spaces serve complex and diverse functions and need expert monitoring and coordination during planning and construction.

Architectural education equips a student with basic design and visual arts skills, as well as a thorough knowledge of building materials, methods of construction, structural principles and innovations and other related technological aspects of building (like air conditioning, acoustics, illumination and intelligent systems). The student is also exposed to hard-core construction issues such as construction project management, professional practices, specification, estimation and arbitration. There is a strong emphasis on practical training, whereby the student works as a professional apprentice in an established architectural firm for almost the entire ninth semester. The final semester consists of a complete real-life architectural project handled single-handedly by the student which is a true simulation of entire scope of works, responsibilities and liabilities of a practicing architect. On completion of five years of education, the Council of Architecture (India) offers a professional license to the architect for independent practice in the profession.

The professional opportunities for a graduate architect are diverse. Apart from the option of independent practice or expert consultancy, an architect may gain employment in professional consulting or construction firms, private, public or government organizations, as well as pursue higher research and teaching careers. The avenues of higher studies and research open to a graduate architect are also wide ranging. The related research areas include urban design, interior design, landscape design, industrial product design, city and regional planning, transportation planning, environmental planning, heritage and conservation studies, sociological aspects of the human-built environment interface, digital art and visual communication, and computer applications (design software programming, decision support systems and artificial intelligence).

Candidates desirous of joining the B.Arch. course (Codes: G5101 and R5101) will be required to qualify in an Architecture Aptitude Test (AAT-2012), as given in section 1.9 (Page-4). Syllabus for the Architecture Aptitude Test is given below:

Freehand drawing: Simple drawing depicting the total object in its right form and proportion, surface texture, relative location and details of its component parts in appropriate scale. Common domestic or day-to-day life usable objects like furniture, equipment, etc., from memory.
Geometrical drawing: Exercises in geometrical drawing containing lines, angles, triangles, quadrilaterals, polygons, circles etc. Study of plan (top view), elevation (front or side views) of simple solid objects like prisms, cones, cylinders, cubes, splayed surface holders etc.
Three-dimensional perception: Understanding and appreciation of three-dimensional forms with building elements, colour, volume and orientation. Visualization through structuring objects in memory.
Imagination and aesthetic sensitivity: Composition exercise with given elements. Context mapping. Creativity check through innovative uncommon test with familiar objects. Sense of colour grouping or application.
Architectural awareness: General interest and awareness of famous architectural creations - both national and international, places and personalities (architects, designers etc.) in the related domain.

3.6 FIVE-YEAR M.TECH. DUAL DEGREE COURSES

In addition to the 4-year B.Tech. degree programmes, some dual degree (B.Tech. & M.Tech.) programmes are also available. The salient features of the dual degree programmes are:

Two degrees (B.Tech. & M.Tech.) will be given at the end of 5 years, but the requirements for B.Tech. degree will not be completed at the end of the 4th year.

Up to second year, the courses will be common with the corresponding 4-year B.Tech. programme. Third year onwards electives for dual degree students will be in the area of their M.Tech. specialization.

Project work will start in summer of 4th year and extend through the 5th year (14 months).

47. AEROSPACE ENGINEERING

(Codes : G5201, M5201)

Aerospace engineers are concerned with the design, analysis, construction, testing and operation of flight vehicles. The basic courses are based on the fundamentals of Fluid Dynamics, Materials Science, Structural Analysis and Development of Computer Software. The M.Tech. programme has common core in the areas of Aerodynamics, Aerospace Technology, Design, Propulsion and Structures. A number of electives are available for specialization in areas related to Aerospace Engineering. Project work of fourteen months duration will be in one of the areas of Design, Analysis and Control of modern aircrafts, space vehicles, engines and flight machines. Modern experimental facilities are available for project work.

48. AEROSPACE ENGINEERING WITH M.TECH. IN APPLIED MECHANICS WITH SPECIALIZATIONS IN BIOMEDICAL ENGINEERING

(Code : M5202)

As we head into the new millennium, the ability to gather and apply new scientific knowledge from diverse areas will constitute skills critical for the students. With this foresight, and by virtue of its interdisciplinary composition, the Department of Applied Mechanics, IIT Madras, has introduced a unique interdisciplinary Dual Degree programme with various Departments. The program with Aerospace Department is expected to cater to the exponential demand of biomedical engineers in Indian and International aerospace industries.

At the end of successful completion of 5 years, the student will be offered a B.Tech degree in Aerospace Engineering and an M.Tech. degree in Applied Mechanics with specialization in Biomedical Engineering. With basic knowledge in Aerospace Engineering and a specialized knowledge in the area of biomedical instrumentation, biomechanics, quantitative physiology and biomedical imaging would provide a unique set of skills and the students can take challenging tasks in interdisciplinary areas.

The Department of Applied Mechanics has been offering M.Tech. degree for the last 40 years. Students from various Engineering colleges with background in Aerospace Engineering, Civil Engineering, Mechanical Engineering, Naval Architecture and Electrical Engineering are admitted to the programme. Due to the interdisciplinary character of the Applied Mechanics Department, the student who graduates with the M.Tech. degree in Applied Mechanics are much sought after in core jobs by organizations like GE, Philips, Siemens, Johnson and Johnson, IBM, GM, TATA etc. A similar trend is also expected for the graduates from the Dual Degree programme of Applied Mechanics. Applied Mechanics department also provides an excellent environment that nurtures the students who wish to pursue a research career.

49. AGRICULTURAL AND FOOD ENGINEERING WITH M.TECH. IN ANY OF THE LISTED SPECIALIZATIONS

(Code : G5203)

The department offers seven specializations under the Dual degree programme. A comprehensive coverage of all essential aspects of Agricultural & Food Engineering will be provided in the first three years. A dual degree student has the flexibility to opt for anyone of the following M.Tech. specializations based on his/her own choice and performance at the end of the third year:

(i) Farm Machinery & Power
(ii) Soil and Water Conservation Engineering
(iii) Dairy and Food Engineering
(iv) Water Resources Development and Management
(v) Aquacultural Engineering
(vi) Agricultural Systems and Management
(vii) Post Harvest Engineering

The course in Farm Machinery & Power aims at developing and disseminating engineering knowledge and skills for the mechanization of farm operations, utilization of farm power and alternative energy resources in sustainable agricultural production and environmental management. It also focuses on design and automation of farm machines and operations for precision agriculture with emphasis on ergonomics, safety and health.

The course in Soil and Water Conservation Engineering aims at developing and disseminating knowledge and

skills for the conservation and management of soil and water resources to attain sustainable agricultural production by applying engineering principles of hydrology and design of soil and water conservation, irrigation and drainage structures. An extensive exposure is given on techniques of remote sensing for land and water resources and numerical methods in water resource engineering.

The course in Dairy and Food Engineering aims at developing knowledge and technical know-how in food science and engineering for industrial production of dairy and food products. To meet the technological demands of dairy and food industries, the major emphasis is given on mathematical modeling and simulation of food processing operations for the design of machines and optimization of processes.

The course in Water Resources Development and Management has been designed to develop and disseminate knowledge and skills for the development and management of water resources in regions of varying geology, topography, and climate by applying the engineering principles and techniques of hydrology, remote sensing, GIS, irrigation water management, system analysis, and mathematical modeling.

The course in Aquacultural Engineering aims at imparting knowledge and skills for the development of aquacultural facilities and production of fish by applying the engineering principles and practices to aquaculture. To meet the demand of fisheries and several other organizations dealing with the engineering aspects of aquaculture, the students are trained in fishery biology, Open channel hydraulics and coastal engineering, planning and design of aquacultural projects, aquacultural facilities and equipment, aquacultural systems analysis, fish processing and fishing crafts and gears.

The course in Agricultural Systems and Management aims at imparting knowledge and technical know-how for augmenting and sustaining agricultural productivity in the perspectives of limiting resources, degrading environment, and increasing demand for agricultural produce by applying the principles and practices of the systems approach to agricultural management. The programme has an optimum mix of agricultural science, engineering and management courses with built-in flexibility through a large number of elective subjects.

The course in Post Harvest Engineering is designed to impart knowledge and technical know-how to Agricultural / Mechanical /Chemical / Biochemical engineers for developing high value agricultural produce and products by applying the engineering principles and practices of post-harvest processing and preservation of grains, fruits, vegetables and products of plantation crops. The areas include all operations from harvesting to consumption of food products and utilization of the resultant by-products.

50. BIOCHEMICAL ENGINEERING

(Code : V5204)

The dual degree course in Biochemical Engineering emphasizes mainly on the emerging input to engineering aspects of biotechnology. It relies heavily on Enzyme Engineering, Bioreactor Design, Chemical Engineering, Down Stream Processing and Bioseparation Engineering. Due importance is given to Microbiology, Biochemistry, Molecular Biology, Genetic Engineering and Microbial/Plant/Animal Biotechnology. The importance will also be given to new areas viz. Bioinformatics, Immunology, Nano-biotechnology, IPR in biotechnology and the like.

The main objective of the programme is to generate new brand of students with the knowledge of both biology and engineering who can deal with the problems related to the biotechnological industries, R&D organizations and they may also be outstanding input to the academic institutions.

51. BIOCHEMICAL ENGINEERING AND BIOTECHNOLOGY

(Code : D5205)

The course as offered by IIT Delhi is designed to provide the students a balanced education in various science and engineering subjects that covers a wide range of disciplines. It relies heavily on bioprocess engineering, chemical engineering and downstream processing. Due emphasis is given to biochemistry, microbiology, molecular biology and genetic engineering. The main objective of the programme is to equip the students with the capability of innovation, analysis, design and optimal operation of the processes in which biochemical catalysis has a fundamental and irreplaceable role.

Main features of this programme include the study of biological sciences with a unified cell concept in a

quantitative manner-a shift in the learning concepts of chemical engineering from classical unit operations to transport phenomena.

Practice School (optional) in the last semester is designed to develop student's ability to apply the knowledge of biochemical engineering to the problems of industry that would accelerate one's professional development. Projects may include solution of various problems concerning sterility, bioreactor productivity, recombinant cell's stability, wastewater treatment, etc. Solution of such problems may result in emergence of alternate designs and integration of technology.

The broad based education and integrated study of the biological sciences with engineering arts and sciences prepare the students for variety professional careers like Planning, production and management of bioprocess industries such as foods, pharmaceuticals, organic chemicals and pollution control; industrial R&D; Academic research in applied biological sciences and biochemical engineering; Science and technology planning.

52. BIOENGINEERING WITH M.TECH. IN BIOMEDICAL TECHNOLOGY

(Code : V5206)

The dual degree programme aims at integrating the engineering principles and technology to analyze and solve biological and medical problems. The course also bridges the gap between the Biomedical Sciences and Engineering & Technology. The program is designed to nurture the students' inherent curiosity and to provide them strong scientific and technical base, to develop skills to upgrade and apply their knowledge to serve the ever expanding requirement of Bioengineers and Biomedical Technologists in Industry, Hospitals and R&D organizations.

The students admitted to the dual degree programme, will get theoretical and practical training in the subjects like Basic Sciences, Computer Applications, Engineering Drawing, Biology with special emphasis on Human Anatomy/ Physiology, Microbiology, Biochemistry, Electronic Devices and Circuits, Microcontroller and Microprocessor, Polymer Technology, Biomaterials, Composite and Nano-materials, Biomechanics, Control Biomedical Instrumentation. The students will be also exposed to the research environment through the project and dissertation work in the frontier areas of Bioengineering & Biomedical Technology.

53. BIOLOGICAL ENGINEERING

(Code : M5207)

The Department of Biotechnology at IIT Madras has a large faculty body having expertise in diverse areas such as bioprocess engineering, chemical biology, computational biology, cellular & molecular biology and structural biology.

The Dual Degree B.Tech. & M.Tech. course on Biological Engineering brings together engineering principles and molecular life sciences to develop and operate biology-based technologies in diversified fields such as energy, environment, bioprocesses, biomaterials, diagnostics, biopharmaceuticals and food processing. Hence, the curriculum in biological engineering is designed to be a broad-based one. The programme will impart knowledge on different areas of the biology-engineering interface. It emphasizes core courses in basic sciences, biological sciences and provides a solid foundation in application of engineering principles to biological systems, through courses in different areas such as bioprocess engineering, biomedical engineering, biomolecular engineering and computational biology. This will allow the students to have a wider appreciation of the biology-engineering interface and allow them to evolve interdisciplinary approaches to problem solving, research and technology development. In addition to core theory and practical courses, a basket of elective courses will be offered in bioprocess engineering, biomedical engineering and computational biology. The curriculum also aims to impart a more research-based training than what is available in traditional M.Tech. Biotechnology programmes. Each student will undertake an extensive research project spread over the last three semesters of the curriculum. The programme will also allow the students sufficient time and courses to familiarize themselves with different areas of the biology-engineering interface before embarking on a specialization. It will open-up different avenues for taking up doctoral-level research; and also expands the scope of the industry-job market. The students graduating from this dual degree programme will be well-positioned to take up academic research at Ph.D. level, or explore the job market in bioprocess industries. The programme trains students to be employed as process engineers and R&D scientists in industries.

Biology at school level is not a prerequisite for admission to this programme.

54. BIOTECHNOLOGY AND BIOCHEMICAL ENGINEERING

(Code : G5208)

This course is an extension of the 4-year B.Tech. Programme. The course gives special emphasis on professional subjects, such as Recombinant DNA Technology, Immunotechnology, Immobilization Technology, Biotechnology of Plant Metabolites, Bioseparation, Bioprocess Plant and Equipment Design, etc., in addition to the subjects covered in 4-year B.Tech. programme. It also includes special laboratory classes in the above areas.

The Courses offered in the 5th year instill confidence and competence in areas of recombinant therapeutics, diagnostics, Bio processed food, new generation drug development etc. The project work enables hand-on exposure and research planning necessary for a modern bio-industries or related R&D.

Both B.Tech. and M.Tech. degrees will be given in the same area.

55. CERAMIC ENGINEERING

(Code : V5209)

The theory and practical subjects for Four-Year B.Tech. Program and Five-Year B.Tech.-M.Tech. dual degree program in Ceramic Engineering are identical up to the 3rd year. It lays down the foundation of knowledge for processing, manufacturing and characterization of whole range of ceramic materials and products. During 4th and 5th years of the dual degree programme, the candidates will have option of selecting elective courses in the specialized branches of Ceramic Engineering as well as the topic of the Post graduate dissertation work. These specialized areas are pottery, porcelain and heavy clay ware, cement technology, refractory technology, glass and glass ceramic technology, electronic ceramics, engineering ceramics, ceramic coatings, bio ceramics etc. The graduates with this dual degree will have potential for working in industrial organizations. There will be ample opportunities for higher studies and employment in Research and Development Organizations and Academic Institutions in India and abroad.

56. CHEMICAL ENGINEERING

(Code : B5210, D5210, G5210, M5210)

The major thrust of this dual degree course in Chemical Engineering at IIT Bombay, Delhi, Kanpur, Kharagpur, and Madras is to prepare an incumbent for advanced applications in industry, R&D, and academics. The course imparts advanced concepts in specialized areas such as, computer-aided process engineering, intelligent automation and control, advanced separation processes, interfacial science, high temperature technology and combustion, multiphase systems, biosystems engineering, nanosciences etc. A student with this degree is adequately equipped for taking up challenges in the newer areas in chemical engineering.

57. CHEMICAL ENGINEERING WITH M.TECH. IN HYDROCARBON ENGINEERING

(Code : R5211)

This dual degree 5-year integrated B.Tech. (Chemical Engineering) and M.Tech. (Hydrocarbon Engineering) programme at IIT Roorkee caters to the needs of the hydrocarbon sector - petroleum and natural gas - as also the petrochemical, chemical and allied industries. With the new oil and gas finds in the country and the availability of large reserves of natural gas hydrates in the off-shore sea bed regions, the importance of hydrocarbon (petroleum and natural gas) as an energy source and raw material for the production of chemicals has raised manifold.

The students admitted to this programme will be taught all the chemical engineering courses of normal B.Tech. (Chemical Engineering) programme and the additional courses on the upstream (exploration, reservoir engineering, pretreatment and transport of hydrocarbons) and the downstream (treatment, storage, refining, secondary and tertiary processing) processes and operations including blending and transport. There will be common teaching and examination scheme for B.Tech. (Chemical Engineering) and the dual degree programmes. The students will be exposed to petroleum geology, oil and gas exploration techniques, reservoir engineering, oil and gas processing during the first seven semesters. They will undergo eight week training at one of the refineries/gas and oil processing facilities. From seventh semester, the students will be exposed to courses on hydrocarbon processing, analysis, modeling and simulation, operation processes, catalytic

processes, process integration, oil and gas transportation, etc. The dissertation work during the tenth semester will involve detailed project work on an important topic related to hydrocarbon engineering. There will be enough electives to provide flexibility and choice of courses to the students.

This programme will expose the students to the exploration of natural gas and its hydrates, exploitation and transport of the gas, their processing and design. The programme offers extensive exposure of CAD and simulation software for the advanced training of the students. Environmental protection and energy efficient processing shall form an integral part of the curriculum. The programme will have intensive collaborative instructional and laboratory arrangements with the National Research Laboratories and the user hydrocarbon industries/organizations. The student undergoing this programme shall have enough opportunities for placement.

58. CIVIL ENGINEERING WITH M.TECH. IN APPLIED MECHANICS IN ANY OF THE LISTED SPECIALIZATION

(Code : M5212)

As we head into the new millennium, the ability to gather and apply new scientific knowledge from diverse areas will constitute skills critical for the students. With this foresight and by virtue of interdisciplinary nature, the Department of Applied Mechanics, IIT Madras, has introduced a unique interdisciplinary Dual Degree programme with various Departments.

At the end of successful completion of 5 years, the student will be offered a B.Tech degree in Civil Engineering and an M.Tech. degree in Applied Mechanics. As of now the Civil Engineering students are expected to specialize in Applied Mechanics in the area of Solid Mechanics / Fluid Mechanics / Biomedical Engineering. Based on the students' choice and performance records as well as availability of seats for each of the specializations, the students can choose the M.Tech. specialization at the end of 7th semester.

Basic knowledge in Civil Engineering and specialized knowledge in the area of Solid Mechanics / Fluid Mechanics / Biomedical Engineering would provide a unique combination and hence the students can take challenging tasks in interdisciplinary areas. The Department of Applied Mechanics has been offering M.Tech. degree for the last 40 years. Students from various Engineering colleges with background in Aerospace Engineering, Civil Engineering, Mechanical Engineering, Naval Architecture and Electrical Engineering are admitted to the programme. Due to the interdisciplinary character of the Applied Mechanics Department, the student who graduates with the M.Tech. degree in Applied Mechanics are much sought after in core jobs by organizations like GE, GM, TATA and also in software jobs such as TCS, Infosys, Cognizant etc. A similar trend is also expected for the graduates from the Dual Degree programme of Applied Mechanics. Applied Mechanics department also provides an excellent environment that nurtures the students who wish to pursue a research career.

59. CIVIL ENGINEERING WITH M.TECH. IN INFRASTRUCTURAL CIVIL ENGINEERING

(Code : M5213)

Infrastructure is seen as one of the key drivers for economic growth the world over. In India, a large portion of the budget and a significant portion of the GDP (nearly 6%) is invested in the infrastructure sector today. In the next six years, India will be investing Rs. 3,20,000 crores for the development of infrastructure projects viz., roads, ports and harbours, airports, pipe line etc. The boom in infrastructure investment has widened the gap between demand and supply of qualified and trained graduate engineers specialized in the area of Infrastructural Civil Engineering. Engineers specialized in infrastructural engineering are therefore in great demand and they have a key role to play in planning, design, construction, maintenance and asset management of the various infrastructure projects in the country in the years to come.

The dual degree programme in Infrastructural Civil Engineering at IIT Madras is an inter-disciplinary programme which provides the students an opportunity to gain knowledge and expertise to plan, design and manage various infrastructure projects. The students will learn basics of Civil Engineering with additional exposure to advanced topics in planning and design of infrastructure projects in the areas of transportation engineering, water resources, environmental engineering apart from construction, planning and management. In addition, the students will also be exposed to courses in finance and management viz., infrastructure finance, infrastructure planning and management. The students will be facilitated

to take up internships with reputed national and multi-national infrastructure firms to obtain hands on experience in infrastructure planning and management. The current and future demand for infrastructure specialists is such that students specialized in Infrastructural Civil Engineering programme are likely to be presented with very lucrative and challenging job offers and also opportunities to pursue higher education at reputed institutions in India and abroad, upon completion of this programme.

60. CIVIL ENGINEERING WITH M.TECH. IN STRUCTURAL ENGINEERING

(Codes : R5214, V5214)

M.Tech. (Dual Degree Programme) in Structural Engineering has been started due to its high demand in the market. With the basic knowledge of civil engineering and specialized training in structural engineering, students will have in-depth knowledge of materials of construction, numerical techniques and IT applications to different types of problems such as Structures under random excitation, Fluid-structures under interaction, Shell structures, Composite structures, Biomechanics, Reinforced concrete members, Bridge structures, and Restoration of structures. The programme is well designed to choose either experimental or theoretical investigations including applications of computer in computer aided designs.

After completing the programme, the students will feel confident both as a research scientist and professional civil engineer.

It is expected that the next 3-4 decades will see a massive boom in infrastructure in the country. There is greater demand for Engineers with M.Tech. in Structural Engineering. The department has proposed a 5 year Integrated Dual Degree Programme leading to B. Tech. in Civil Engineering and M. Tech. in Structural Engineering.

61. CIVIL ENGINEERING WITH M.TECH. IN ANY OF THE LISTED SPECIALIZATIONS

(Codes : G5215, M5215)

The following specializations are available at Dual Degree level. The students will be able to exercise options for specialization after completing sixth semester. By then, they will have a better perspective of the specializations and will be in a position to make a right choice depending on their performance and preference of the subjects.

- Building Technology and Construction Management (available only at IITM)
- Environment Engineering (available only at IITM)
- Environmental Engineering and Management (available only at IITKgp)
- Geotechnical Engineering
- Hydraulic and Water Resources Engineering
- Structural Engineering
- Transportation Engineering

The programme is well designed to specialize a civil engineering graduate in any of the above areas through experimental and theoretical knowledge including applications of computer aided design. Past experience shows that the students who have an in-depth knowledge are more capable and confident to take up the challenging assignments of a specialized professional civil engineer.

62. COMPUTER SCIENCE AND ENGINEERING

(Codes : D5216, G5216, M5216, V5216)

This course at IIT Bombay, Delhi, Kanpur, Madras, and IT, BHU is concerned with the theoretical foundations of Computer Science, Programming, Engineering aspects of the Design of Computers (both hardware and software) and Application, Computer Communication and Networking, Aspects of Information Technology, and Design of Computer based Control Systems. At the M.Tech. level the areas of specialization are Computer Design, Software Engineering, VLSI Design, Expert Systems, Parallel Processing, and Sophisticated Computer Applications. General electives are offered in all the above areas. Final project of fourteen months duration will be on a problem of relevance to Industry.

The dual degree programme at IIT Delhi allows students to specialize in one or more areas of their interest developed during the first three years of the

common undergraduate programme and delve deeper into concepts and ideas that are of interest to industry and academic research, culminating in a Master's dissertation which may be publishable, whose ideas may be patentable or even produce a product of interest to industry.

The dual degree course at IIT Kharagpur aims at providing strong foundation on different aspects of Computer Science and Engineering with emphasis on Computer Architecture, Compiler Design, Operating System, Computer Networks, Design and Analysis of Algorithms, Automata and Formal language Theory, Artificial Intelligence emerging trends and its applications in different fields.

The dual degree programme at IIT Madras prepare the students in all aspects of computer Science and Engineering with emphasis on programming, Engineering aspects of the design of Computers (both hardware and software) and applications, Computer Communications and Networking, aspects of Information Technology, and Design of Computer based Control Systems. Advanced electives are offered in all the above areas. Final project of fourteen months duration on a specific topic has to be carried out.

Both B.Tech. and M.Tech. degrees will be given in Computer Science and Engineering.

63. ELECTRICAL ENGINEERING

(Code : M5217)

The Dual Degree program in Electrical Engineering at IIT Madras has been structured to make it highly flexible. During the first five semesters a strong foundation is laid by courses such as Signals and Systems, Digital Signal Processing, Electrical Machines, Electromagnetic Fields, Control Engineering, Analog and Digital Circuits, Solid State Devices. etc. From the sixth semester onwards, courses from a basket of restricted electives enable a student to specialize in a particular area. For example, a student can specialize in Communications and Signal Processing, Microelectronics and VLSI Design, Power Systems and Power Electronics, or Photonics. It is also possible to take courses that span across the above specializations, e.g., a student can take courses in Microelectronics & VLSI and also in Photonics. In addition to the Restricted Electives, a student can choose electives from an array of advanced courses in various specializations. The final year is largely devoted to a high quality project, which has the potential to result in research publications, patents, and/or product design.

A sample list of advanced level courses are: Probability Foundations for Signal Processing, Introduction to Wireless and Cellular Communication, Image Signal Processing, Communication Networks, VLSI Technology, Analog & Digital IC Design, Synthesis of Control Systems, Robust and Optimal Control, Power Converter Analysis and Design, High Voltage Technology, Introduction to Photonics, Optical Engineering, Foundations of Optical Networking.

64. ELECTRICAL ENGINEERING WITH M.TECH. IN APPLIED MECHANICS WITH SPECIALIZATION IN BIOMEDICAL ENGINEERING

(Code : M5218)

As we head into the new millennium, the ability to gather and apply new scientific knowledge from diverse areas will constitute skills critical for the students. With this foresight, and by virtue of its interdisciplinary composition, the Department of Applied Mechanics, IIT Madras, has introduced a unique interdisciplinary Dual Degree programme with various Departments. The programme with the Electrical Engineering Department is expected to provide biomedical engineers for the rapidly growing health care sector both Nationally and Internationally.

At the end of successful completion of 5 years, the student will be offered a B.Tech degree in Electrical Engineering and an M.Tech. degree in Applied Mechanic with specialization in Biomedical Engineering. Basic knowledge in Electrical Engineering and specialized knowledge in the areas of biomedical instrumentation, biofeedback control systems, biomechanics, quantitative physiology and biomedical imaging would provide the student a unique combination and hence the students can take challenging tasks in interdisciplinary areas.

The Department of Applied Mechanics has been offering M.Tech. degree for the last 40 years. Students from various Engineering colleges with background in Aerospace Engineering, Civil Engineering, Mechanical Engineering, Naval Architecture and Electrical Engineering are admitted to the programme. Due to the interdisciplinary character of the Applied Mechanics Department, students who graduate with the M.Tech.

degree in Applied Mechanics are much sought after in core jobs by organizations like GE, Philips, Siemens, Johnson and Johnson, IBM, GM, TATA etc. A similar trend is also expected for the graduates from the Dual Degree programme of Applied Mechanics. Applied Mechanics department also provides an excellent environment that nurtures the students who wish to pursue a research career.

65. ELECTRICAL ENGINEERING WITH M.TECH. IN COMMUNICATIONS AND SIGNAL PROCESSING

(Code : B5219)

Communication and signal processing is an area which has a tremendous impact on day-to-day life. Cellular telephones, personal communication systems, and communication on the internet are examples.

In this programme a student will take advance level courses like Computer Communication Networks, Telematics, Adaptive Signal Processing, Computer Vision, Fibre Optic Communication, Artificial Neural Networks, and Wavelets. Many of these courses will have an associated laboratory component. The students will also have an advanced level project.

66. ELECTRICAL ENGINEERING WITH M.TECH. IN INFORMATION AND COMMUNICATION TECHNOLOGY

(Code : D5220)

The programme is focused on creating expertise with a broad base in Electrical Engineering and application in Information and Communication Technology. The students would be exposed to areas, like computer networks, multimedia, digital communications with emphasis on state-of-the-art project work. The graduates would be employed by major telecommunications and IT-enabled industries.

67. ELECTRICAL ENGINEERING WITH M.TECH. IN MICROELECTRONICS

(Code : B5221)

Microelectronics deals with the science and technology of making integrated circuits. In this programme students get a good foundation in basic electrical engineering and electronics and go on to advanced courses and laboratories in microelectronics.

A sample of the courses offered are: Bipolar and MOS Devices, Integrated Circuit Technology and Design, Computer Aided Design of ICs, Modern Electronic Design, Digital System Design, Device Characterization, Nano Devices, Device Simulation, Integrated Sensors and Circuit Simulation. Many of these courses have an associated laboratory component.

68. ELECTRICAL ENGINEERING WITH M.TECH. IN ANY OF THE LISTED SPECIALIZATIONS

(Code : G5222)

This integrated dual degree program offers both the B.Tech.(Hons) and the M.Tech. degrees on successful completion at the end of the 6th semester, based on students choice and performance records as well as availability of seats for each of the disciplines. The academic curriculum is the same as that of the 4-year B.Tech. (Hons) programme in Electrical Engineering for the first six semesters. From the 7th semester, the students begin to undertake postgraduate level courses in their respective areas of specialization. Considerable flexibility exists in choosing electives. Project work begins at the B.Tech. level and gets carried over to the M.Tech. level.

69. ELECTRICAL ENGINEERING WITH M.TECH. IN POWER ELECTRONICS

(Codes : R5223, V5223)

There has been tremendous growth during the last two decades in the area of Power Electronics and use of power electronic converters in industrial and domestic applications. This dual degree programme addresses the important area of Electrical Engineering at the undergraduate level which includes core subject in Electrical Engineering: Electrical Machines, Power Systems, Control Systems, Instrumentation, Power Electronics, with the flexibility of choosing electives in communication, Digital Signal Processing, Artificial Intelligence. At the postgraduate level, the course is focused in Power Electronics Applications employing modern digital control tools including, fuzzy logic, ANN and expert systems control.

This course covers applications in Modern Drive Systems, Flexible AC Transmission Systems,

HVDC, Active Power Filters, Switched Mode Power Supplies, UPS, etc. with projects, design, simulation and dissertation work.

70. ELECTRONICS AND COMMUNICATION ENGINEERING WITH M. TECH. IN WIRELESS COMMUNICATION

(Code : R5224)

There has been an explosive growth in the wireless areas of cellular and digital personal communication services (PCS) over the past few years. According to telecommunication equipment manufacturers, there were an estimated 500 million wireless subscribers worldwide at the end of 2001, and it is projected that the total number of wireless users (of all wireless applications) by the end of the year 2011 will exceed one billion.

Wireless communications encompasses many device types and technologies, including cellular, specialized mobile radio services (SMR and ESMR), PCS, cordless, paging, microwave, satellite, wireless cable (LMDS and MMDS), packet data radio, and devices not yet in the market. In recent years, it has become more and more obvious that a convergence of the computer, telephone and wireless markets is taking place. The future of medical organizations, automotive companies, computer equipment manufacturers, software design companies, and utility companies, among others, is becoming dependent upon wireless device integration.

This course, offered by IIT Roorkee, has been designed to provide a sound foundation in Electronics and Communication Engineering followed by specialized courses in the area of wireless communication. The first six semesters are common with B.Tech. (Electronics and Communication) programme of the department. In the remaining part of the programme, a number of core and elective courses have been introduced to give an in-depth knowledge of the topics relevant to wireless engineering. Besides, the students have to complete a project seminar and dissertation as part of their curriculum

71. ELECTRONICS AND ELECTRICAL COMMUNICATION ENGINEERING WITH M.TECH. IN ANY OF THE LISTED SPECIALIZATIONS

(Code : G5225)

The course provides a sound foundation in Electronics and Electrical Communication Engineering as laid out in course 15 (page 28), followed by a specialized two-semester programme in Automation and Computer Vision Engineering. This includes a number of advanced subjects in the areas of Image Processing, Artificial Intelligence, Neural Networks, Pattern Recognition, Automation and Robotics Vision, Advanced Computer Architecture, Computer Networks, Multimedia Systems, etc. The students are required to complete two major projects. The course is designed to prepare the students to undertake research, development or teaching as a career.

72. ENERGY ENGINEERING WITH M.TECH. IN ENERGY SYSTEMS ENGINEERING

(Code : B5226)

The Department of Energy Science and Engineering at IIT Bombay has designed this Dual degree programme to provide specialist engineers to meet the challenges of the energy sector with cross cutting analytical skills. The development of energy systems is constrained by the depletion of fossil fuel, local environmental impacts (for example adverse health impacts) and the problem of global warming and associated climate change. Energy security concerns also dictate the search for alternative transport fuels to reduce the dependence on imported oil. There is significant need for engineering, design, research and development inputs in building efficient conventional energy systems, cost effective renewables, new energy sources and conversion devices.

The course has been designed for the energy sector with courses related to mechanical engineering (thermodynamics, heat transfer, fluid mechanics), electrical engineering (power electronics, electrical machines, power systems) and chemical engineering (combustion, transport processes). In addition to this are the core energy courses (energy management, renewable energy, nuclear energy, modeling, energy economics) providing the required background for analysing and designing energy systems. The course has an energy innovation laboratory and an energy design project apart from the Dual degree project. A variety of energy related electives are available for the student to choose based on their interests.

The energy sector provides tremendous opportunities for analysis, design of energy efficient equipment and systems, innovative financing and project management,

technology development and fundamental research. Engineers with interdisciplinary skills and an understanding of energy systems will be in demand in energy supply companies, energy consulting and financing companies, energy equipment manufacturers, energy intensive manufacturing and process industries. The background provided in this course will equip students with the tools and techniques required to analyse and improve conventional energy systems and design the sustainable energy systems of the future. There is significant scope for entrepreneurship and new start-up companies in this area. Recent advances in nano-science and nanotechnology have already resulted in potential applications for new materials in photovoltaics, hydrogen energy storage, improved batteries, super capacitors, fuel cells and provide several opportunities for technology and system development.

73. ENGINEERING DESIGN WITH M.TECH. IN AUTOMOTIVE ENGINEERING

(Code : M5227)

Engineering Design is an exciting dual degree programme recently introduced at IIT Madras. The programme consists of B.Tech. and M.Tech. degrees in Engineering Design with a post graduate specialization in Automotive Engineering. Specializations in Robotics and Biomedical Design may be offered subsequently and the students may have the option for switch over to these fields.

The objective of the programme is to produce engineering graduates well versed in the process of design. This involves designing products to meet customer requirements, for the required quality standards, taking into account manufacturability, serviceability, reliability, human factors, efficiency of operation and economics.

The programme represents a shift in emphasis from analysis to skill sets appropriate for design, development and prototyping and will encompass best design practices followed world-over. Emphasis on creativity, efficient use of materials, sensitivity to environment and managerial skill development are some of the aspects of the program.

The curriculum focuses on the aspects of learning to learn and teaching of concepts through case studies especially in unstructured design situations.

The mission of the programme is to make IIT Madras a Global centre of Excellence in Engineering Design. We are looking at students with exceptional abilities to provide leadership to the Indian industry in the area of design and manufacture of new products in the increasingly globalised economy.

74. ENGINEERING DESIGN WITH M.TECH. IN BIOMEDICAL DESIGN

(Code : M5228)

The course will be a dual degree program with a B.Tech in Engineering Design and a M.Tech. in Biomedical Design. A medical equipment is any instrument, apparatus, or material that is used in diagnosing, treating, and/or preventing diseases in humans. Medical devices constitute one of the fastest growing industries. German medical devices industry is one of the largest with an estimated 100,000 employees working in more than 500 companies. Lead by giants in the field like Siemens, there are twenty or more companies with a turnover of more than 35 million Euros. An analysis of the costing of medical devices reveals that the highest component is the intellectual content and development costs of the invention and the actual product cost is very much less by comparison.

The major objective of this course is to develop biomedical designers who have the background to design, manufacture, test and market such products. The biomedical instrumentation as the course is called in many Indian universities, is usually tuned towards maintenance of medical instrumentation and is heavily biased towards electrical engineering. Though such courses are no doubt important, there is a need to develop biomedical designers, who have an interdisciplinary background in mechanical design, controls, mechatronics and manufacturing science. Apart from this they should be well versed in human anatomy and physiology, mechanics as applied to physiology and biology (there is a recent book titled “Cardiovascular Solid Mechanics”), biosensors, protocol and procedures for animal models, signal processing and so on. In our opinion, no such course which systematically builds a designer exists.

75. ENGINEERING PHYSICS WITH M.TECH. IN ENGINEERING PHYSICS WITH SPECIALIZATION IN NANOSCIENCE

(Code : B5229)

The rapid shrinking sizes of artificially fabricated structures and devices into the nanometer range is

leading to a whole new world of nanostructured devices based on quantum phenomena making use of various kind of electronic, optical, magnetic superconducting and molecular materials. Many future applications in telecommunications, computing, information systems, biomaterials, and medicine will be based on research and development in nanoscale technologies. In this perspective, Nano-physics and technology in a wider sense will be the focus of the proposed dual degree programme offered at the Department of Physics.

The program targets students with deep interest in physics and the aptitude to apply it to technological issues, without regard to formal boundaries of science and technology. The vibrant interdisciplinary atmosphere of the IITs provides a uniquely stimulating atmosphere for such an initiative.

The programme aims to promote advanced learning and applications with due emphasis on fundamentals. The graduating students should aim at careers in research and development in Universities, Research Organizations and Industrial environments. Nano-scale Physics and Advanced Materials Physics are expected to be the future building blocks for Nanotechnology and hence these uniquely trained students are expected to find unlimited challenges and opportunities to develop a rewarding R & D career.

76. INDUSTRIAL ENGINEERING WITH M.TECH. IN INDUSTRIAL ENGINEERING AND MANAGEMENT

(Code : G5230)

This dual degree course, offered by IIT Kharagpur, provides an in-depth background on various areas of Industrial Engineering during its B Tech phase. Thereafter, the students are exposed to the integrative concepts of Industrial Engineering and Management by selecting electives from a list of advanced courses on production planning and control, systems modeling and analysis, intelligent manufacturing, financial management and accounting, facility layout and design, service operations management, safety and risk management, six sigma fundamentals and applications, applied multivariate modeling, and others. During the course of study, the students need to carry out project work for one full year that should ideally involve design and optimization of a real-life industrial problem.

77. MANUFACTURING SCIENCE AND ENGINEERING WITH M.TECH. IN INDUSTRIAL ENGINEERING AND MANAGEMENT

(Code : G5231)

This dual degree course is offered jointly by the Department of Mechanical Engineering and the Department of Industrial Engineering and Management at IIT Kharagpur. The programme prepares the students to implement modern concepts of industrial and systems engineering in manufacturing and service organizations.

Initially, the programme provides an in-depth background in the area of Manufacturing Sciences and Engineering with exposure to basic courses in Engineering Design and Thermal Sciences. Thereafter, the students are exposed to the tools and techniques of Industrial Engineering and Management. The programme focuses on the efficient design and operation of production systems, and includes subjects in the areas of work systems design, production planning and inventory control, supply chain management, software engineering/e-business, financial management and accounting, quality engineering, project management, advanced decision modeling, and related elective courses. simulation. During the course of study, the students need to carry out project work for one full year that should ideally involve design and optimization of a real-life industrial problem.

78. MATERIALS SCIENCE AND TECHNOLOGY

(Code : V5232)

The last few decades have witnessed large scale technological applications of a plethora of novel and complex materials ranging from ceramics to polymers and their composites. Several of these materials possess functional and intelligent characteristics making them useful for designing smart devices and structures. The emergence of biomaterials, high temperature superconductors, carbon cluster compounds, and nanomaterials has further extended the horizons of the field of Materials Science and Technology. The subject areas of Materials Science and Technology has become truly interdisciplinary in nature. The more familiar an engineer or technologist is with the structure, properties and processing of these advanced materials, the more proficient and

confident he/she would be in making a judicious selection of materials or even in designing a new material with desired characteristics for particular application. Keeping in view the ever expanding requirement of the Materials Technology Industry and R & D organizations, a dual degree 5 year programme leading to B.Tech. and M.Tech. degrees at the end of the course has been launched at IT, BHU. The courses are so designed that the students develop a comprehensive understanding of the structure, properties, processing and applications of various advanced technology materials and at the same time also acquire specialized skills and understanding in selected areas of materials technology through the various electives. The dissertation work starting from the summer semester of the fourth year through the fifth year will provide the students to develop a flavour of research in frontier areas of advanced materials in a stimulating environment.

79. MECHANICAL ENGINEERING

(Code : V5233)

A comprehensive coverage of all aspects of Mechanical Engineering will be provided in the first three years of this dual degree course. Subsequently, students will specialize in one of the following four streams, Solid Mechanics and Design, Fluid and Thermal Sciences, Manufacturing Sciences, and Robotics. The area of specialization is allocated at the end of the third year on the basis of availability of seats and the preference and performance of the students. Both B.Tech. and M.Tech. degrees will be awarded in Mechanical Engineering.

80. MECHANICAL ENGINEERING WITH M.TECH. IN COMPUTER AIDED DESIGN AND AUTOMATION

(Code : V5234)

Designing machines is one of the principal activities of a mechanical engineer. Easy availability of computers has added speed, accuracy and reliability and has made the overall integration of design easier. CAD has become an important element in modern industry to perfect design, optimize material utilization, minimize cost, reduce design cycle time, and customize the activity.

This dual degree programme will focus on the fundamental issues of CAD and automation, and their applications. It will cover computer-aided stress and mechanical modeling, graphics, finite element and dynamic element packages, automatic and computer controls, microprocessors, robotics, etc.

81. MECHANICAL ENGINEERING WITH M.TECH. IN COMPUTER INTEGRATED MANUFACTURING (CIM)

(Code : B5235)

Computers have revolutionized manufacturing activity by automating and integrating various stages in product design and production. One can design, visualize, analyze and simulate these activities on a computer to create a virtual manufacturing environment.

The objective of the programme is to cover in depth the fundamentals of manufacturing engineering with an emphasis on CIM. Backed up by the basic courses in Mechanical Engineering the programme will provide special courses in the areas like Computer Graphics, Computer Numerical Control, Robotics, Database, Manufacturing Automation, etc. Special elective courses on Management, Computer Science, etc. will also be available. The programme also envisages active interaction with industries in terms of sponsored M.Tech. projects.

82. MECHANICAL ENGINEERING WITH M.TECH. IN THERMAL ENGINEERING

(Code : M5236)

After studying the general mechanical engineering courses in the first six semesters, the students of this stream study courses and also do a two-semester project work on a specialized topic in thermal engineering. The core courses during the M.Tech. study phase include Applied Thermodynamics, Design and Optimization of Energy Systems, Incompressible Fluid Flow, Numerical Methods in Thermal Engineering, Advanced Energy Conversion and Measurements in Thermal Engineering. The students also pursue four electives of their choice in the area of Thermal Engineering.

The courses are aimed to provide the specialized knowledge expected of a thermal engineer, and give the background necessary to do a project on a specialized topic in Thermal Engineering.

83. MECHANICAL ENGINEERING WITH M.TECH. IN INTELLIGENT MANUFACTURING

(Code : M5237)

Intelligent Manufacturing under dual degree programme will cover various related topics in addition to the basic mechanical engineering areas. Present day manufacturing requires precision, repeatability and quality to satisfy the customer needs at an affordable cost. A thorough knowledge update on the computer-based technologies is needed to achieve the above goal. With this in view, CAD/CAM, Advanced Material-removal Techniques, Microprocessors, Controllers, Sensors for Intelligent Manufacturing Systems, Networking Procedures, Expert Systems and Artificial Intelligence, Flexible Manufacturing Systems, Mechatronics, Computer Aided Quality Evaluation, Management Information Systems, etc. are the areas that will be covered under various courses in Intelligent Manufacturing.

84. MECHANICAL ENGINEERING WITH M.TECH. IN PRODUCT DESIGN

(Code : M5238)

This specialization is aimed at enabling the student to imbibe the essence of a holistic approach to the design of a product so that there is integrity in form, function and use. The courses cover Product Engineering, Design Synthesis, Design of Mechanical Systems, Stress and Compliance in Machine Elements, Ergonomics and Aesthetics, Mechatronics, CAD/ CAM for Product Design, etc. The project can be taken up in the following areas: Design and Development of Mechanisms, Machines/Mechanical Systems, New Products, Development of CAD software for Equipment and System Design.

85. MECHANICAL ENGINEERING WITH M.TECH. IN ANY OF THE LISTED SPECIALIZATIONS

(Code : G5239)

The Dual Degree courses of the Department are designed to develop manpower with basic background in Mechanical Engineering with specialized knowledge in any of the major specific areas of Mechanical Engineering. Accordingly, the Department offers three Dual Degree programmes which are as follows:

- *Mechanical Engineering with M.Tech. in Manufacturing Science and Engineering*

This programme essentially covers the relevant topics like CAD, CAM, Robotics, Mechatronics, Flexible Manufacturing, to provide awareness of the state-of-the-art and future trends in manufacturing.

- *Mechanical Engineering with M.Tech. in Thermal Science Engineering*

In this course the students are given an opportunity to specialize in one or more areas of thermal engineering with special emphasis on computational fluid dynamics, simulation, modelling and optimisation of complex thermal systems.

- *Mechanical Engineering with M.Tech. in Mechanical Systems Design*

The course encompasses all the basic subjects of Mechanical engineering and specialized subjects on solid mechanics, machine vibrations, design optimisation, fluid power control and material handling equipment needed to become an efficient professional in the specialization of mechanical system design. Some of the subject areas are vibration and noise control, modelling and simulation of dynamics systems, dynamics & control of robots, machine tools & other complex mechanical systems, dynamics & control of smart structures, composite materials, signal processing, mechatronics, rotor dynamics and machinery condition monitoring.

86. METALLURGICAL ENGINEERING

(Code : V5240)

It is a five year program with first three years of studies common with B.Tech. programme. Major emphasis of the remaining period will be on training in advanced areas through specialization and independent research. The student has the option to specialize, through a large number of postgraduate electives, in the fields of design and development of advanced metals and alloys for

structural and functional applications, Process modeling and simulation, Nanoscience and nanotechnology, Phase transformations, Deformation and fracture behavior of metals, Particulate technology, Solidification Processing and Foundry Technology, Extractive Metallurgy, Environmental degradation, Surface Engineering.

87. METALLURGICAL AND MATERIALS ENGINEERING

(Code : M5241)

Over the past decades, considerable efforts have been devoted towards an integrated understanding of the nature of processes involved in extraction and refining downstream processing, evolution of micro and macrostructure, various evaluation and characterization techniques of materials. A process engineer should not only have a sound understanding of the scientific principles of metallurgy, but should also have sufficient expertise in engineering areas like heat and mass transfer, equipment and process design, plant engineering, instrumentation and process control, etc.

The present-day competitive environment demands modern metallurgical plants to operate at high levels of productivity and efficiency. The course is designed to produce engineers having an integrated understanding, who can contribute to process optimization and control, and design and development. There are ample job opportunities for graduates with specialization in the areas of production, design, development and research.

88. METALLURGICAL AND MATERIALS ENGINEERING WITH M. TECH. IN MATERIALS ENGINEERING

(Code : R5242)

The twenty first century Materials Engineers demand more than just the fundamental knowledge of the production, shaping and treatment of alloys. They have to achieve the balance between material properties such as cost, weight, strength, toughness, hardness, corrosion, fatigue resistance and performance under extreme conditions of stress and temperatures. Moreover, new materials are the vehicle for realizing new technologies which is central to the growth, prosperity, security and quality of life since recorded history.

Properties of a material are intimately related to its structure at all length scales down to the atomic dimensions and novel materials need to be engineered at appropriate length scales. Micro-Electro-Mechanical Systems (MEMS) Technology is about miniaturized mechanical and electro-mechanical sensors and devices that are made using Micro-fabrication techniques. Moreover, modern synthesis and characterization tools have enabled us to both probe and manipulate the arrangement of atoms in materials making. The curriculum aims to equip one with the fundamentals of understanding materials and their properties in order to embark on an exciting journey to engineer materials from millimeter to nanometer scales during the M. Tech. segment of the dual degree program.

89. METALLURGICAL AND MATERIALS ENGINEERING WITH M. TECH. IN METALLURGICAL AND MATERIALS ENGINEERING

(Code : M5243)

It is a five-year programme with the first three and half years of studies common with the B.Tech. programme. Major emphasis of the remaining period will be on education in advanced areas through specialization courses and research. The student has the option to specialize, through a large number of postgraduate electives, in the fields of Design and development of advanced materials for structural and functional applications, Process modeling and simulation, Nanoscience and nanotechnology, Phase transformation in materials, Deformation and fracture behaviour of materials, Particulate technology, Solidification processing and foundry technology, Extractive metallurgy, Environmental degradation of materials, and Surface Engineering.

90. METALLURGICAL ENGINEERING AND MATERIALS SCIENCE WITH M.TECH. IN CERAMICS AND COMPOSITES

(Code : M5244)

The introduction of new technologies has always depended to a large extent on the availability of newer, inexpensive and better materials. The development of new materials has resulted in a revolution in areas such as information technologies, telecommunications, micro-electronics, lasers, fibre optics, biotechnology, etc. Continuous development of advanced ceramics and composites with novel and unique characteristics has clearly necessitated having a specialization in this area.

The metallurgical and materials engineer of 21st century will need a thorough knowledge of the fundamentals of materials science in order to be able to participate in research, development, design and production of advanced materials. The objective of the specialization is an in-depth coverage of Thermodynamics and Kinetics, Transport Phenomena, Mechanical Behaviour of Materials, Phase Transformations and a thorough treatment of topics such as Ceramics Processing, Electronic and Magnetic Ceramics, Semiconducting and Superconducting Materials, Structure and Properties of Engineering Polymers, Composite Materials and Glasses, and Glass-based Products. Substantial exposure to design and selection of materials is envisaged.

With rapid growth of Ceramics, Polymers and Composites as structural materials, this specialization is expected to provide exciting career opportunities.

91. METALLURGICAL ENGINEERING AND MATERIALS SCIENCE WITH M.TECH. IN METALLURGICAL PROCESS ENGINEERING

(Code : M5245)

Over the past decades, considerable efforts have been devoted towards an integrated understanding of the nature of processes involved in extraction and refining downstream processing, evolution of micro and macrostructure, various evaluation and characterization techniques of materials. A process engineer should not only have a sound understanding of the scientific principles of metallurgy, but should also have sufficient expertise in engineering areas like heat and mass transfer, equipment and process design, plant engineering, instrumentation and process control, etc.

The present-day competitive environment demands modern metallurgical plants to operate at high levels of productivity and efficiency. The course is designed to produce engineers having an integrated understanding, who can contribute to process optimization and control, and design and development. There are ample job opportunities for graduates with specialization in the areas of production, design, development and research.

92. MINERAL ENGINEERING WITH M.TECH. IN MINERAL ENGINEERING

(Code : M5246)

The M.Tech. Programme in Mineral Engineering will have a few specialized subjects from IX semester onwards such as processing of industrial minerals, iron and steel making, processing plant processes, refractory materials and furnaces, waste processing and utilization etc. with sufficient number of electives as per the students' choice. The X semester has been made available exclusively for projects such that students can take up industry oriented challenging and real life problems. The course curriculum ensures that all advances and practical aspects of Mineral Engineering are covered.

93. MINING ENGINEERING/MINING ENGINEERING WITH M.TECH. IN MINING ENGINEERING

(Codes : G5247, V5247, S5247)

This five-year dual degree course as offered by IIT Kharagpur lays greater emphasis on acquiring deeper knowledge, widens the scope of understanding of interdisciplinary subjects such as economics, management and advanced treatment of undergraduate subjects and on design and problem solving using computational techniques. The students would be able to enjoy wider choice of electives. The extensive project work provides opportunity for the students to analyze, to synthesize, and to creatively apply fundamental engineering principles to new problems and make useful and original contributions to this branch of engineering.

The dual degree programme at IT-BHU Varanasi and ISM Dhanbad has a multi-faceted orientation with blend of core mining engineering subjects, professional courses and allied courses relevant to the mining engineers in present global scenario. The mining engineers are concerned with mine planning, design, exploitation and processing of ore/coal. Salient course structure gives coverage on the fundamentals of basic science and engineering, mining geology, mine surveying, mine development, mine ventilation, rock mechanics, underground and surface coal & metal mining methods, environmental management, mining methods, mining machinery, mineral processing and other allied subjects. This

course will be followed by PG seminar and research-based dissertation work.

94. MINING SAFETY ENGINEERING

(Code : G5248)

Considering the importance of occupational health and safety, The Department of Mining Engineering has introduced this Dual Degree course with B.Tech, (Honors) in Mining Engineering. First of its kind in India, this course prepares the students with in-depth knowledge and hands on training in various aspects of the present and emerging fields of Safety Engineering and Disaster management.

In addition to the core courses on Safety Systems in Engineering, Rescue and Disaster Management, Legislation and Environmental Laws, this course provides opportunity to the students to acquire knowledge in emerging fields such as Human Factors Engineering, Geo-Technical Earthquake Engineering, Reliability and Quality Engineering, Application of Remote Sensing, GIS, GPS, Virtual Reality and Artificial Intelligence, Injury Epidemiology and Natural Hazards Mitigation.

The multi-disciplinary nature of the course enables the students to undertake their project work and vocation in various mining, oil and natural gas industries, and national and international organizations with which the Department is interacting through sponsored research and academic collaborations.

95. NAVAL ARCHITECTURE AND OCEAN ENGINEERING

(Code : M5249)

The discipline of Ocean Engineering and Naval Architecture is one of the oldest of the IIT System. It started in 1952. Ocean Engineering provides solutions to basic needs of the society by exploration and exploitation of the resources from the ocean : mineral oil from offshore oil fields, high protein food (fish of various varieties and see weeds), minerals e.g. cobalt, nickel etc. and energy (thermal, wind and tidal waves). The subject of Ocean Engineering is concerned with various industrial activities of design, construction, building, transportations, installation and maintenance at site of the marine structure floating or fixed at a place. Naval Architecture is a major branch of Engineering, which deals with design, classification approval, construction and maintenance of merchant ships, defense ships and other floating or submerged moveable vehicles. The discipline of Ocean Engineering and Naval Architecture is unique and balanced blend of different engineering, management and science streams which gives it a unique characteristic. The curriculum includes subjects dealing with Marine Hydrodynamics, Wave Mechanics, Solid Mechanics, Computational Methods in Marine Hydrodynamic and Structural Mechanics, Structural Vibration, Computer Aided Design and Manufacture, Design of Ships and Marine Structures, Coastal Engineering, Coastal Zone Management, Port and Harbour Engineering, Green Technology, etc.

The employers of Ocean Engineering and Naval Architecture Graduates (B.Tech) and postgraduates (Dual Degree M.Tech and 2 year M.Tech) are shipbuilding and repair yards, classification societies, offshore industries, shipping companies, statutory bodies of Central Government and State Government Ministries, consulting firms, ministry of Defense and Home Ministry, software industries, engineering and economic data analysis firms, research organizations, academic institutions and many more.

96. NAVAL ARCHITECTURE AND OCEAN ENGINEERING WITH M.TECH. IN APPLIED MECHANICS IN ANY OF THE LISTED SPECIALIZATIONS

(Code : M5250)

As we head into the new millennium, the ability to gather and apply new scientific knowledge from diverse areas will constitute skills critical for the students. With this foresight, and by virtue of its interdisciplinary composition, the Department of Applied Mechanics, IIT Madras, has introduced a unique interdisciplinary Dual Degree programme with various Departments.

At the end of successful completion of 5 years, the student will be offered a B.Tech degree in Naval Architecture and an M.Tech. degree in Applied Mechanics. As of now, the Naval Architecture Engineering students are expected to specialize in Applied Mechanics in the area of Solid Mechanics (or) Fluid Mechanics. Based on the students' choice, performance records as well as availability of seats for each of the specializations, the students can choose the M.Tech. specialization at the end of the 7th semester.

Basic knowledge in Naval Architecture with a specialized knowledge in the area of Solid Mechanics (or) Fluid Mechanics provides a unique combination for the students to take challenging tasks in interdisciplinary areas of mechanics. The Department of Applied Mechanics has been offering M.Tech. degree for the last 40 years. Students from various Engineering colleges with background in Aerospace Engineering, Civil Engineering, Mechanical Engineering, Naval Architecture and Electrical Engineering are admitted to the programme. Due to the interdisciplinary character of the Applied Mechanics Department, the student who graduates with the M.Tech. degree in Applied Mechanics are much sought after in core jobs by organizations like GE, GM, TATA and also in software companies such as TCS, Infosys, Cognizant etc. A similar trend is also expected for the graduates from the Dual Degree programme of Applied Mechanics. Applied Mechanics department also provides an excellent environment that nurtures the students who wish to pursue a research career.

97. OCEAN ENGINEERING AND NAVAL ARCHITECTURE

(Code : G5251)

Ocean Engineering in its broadest sense is concerned with all engineering systems in the ocean. This includes systems for exploration and exploitation of the vast oceanic resources such as offshore oil and gas, sea-bed minerals, biological resources like marine and sea food, etc. Ocean Engineering also involves systems that utilize the ocean for transportation and recreational purpose like ships and marine vehicles of different variety, submarine and underwater vehicles, pleasure crafts, floating resorts, etc. Yet another important component of ocean engineering is related to sea-coasts and its protection, and marine hazards and its mitigation through engineering solutions. In short, any system that uses the ocean, operates in the ocean or related to the ocean in some sense falls under the purview of an Ocean Engineer. Naval Architecture, an important branch of Ocean Engineering, deals primarily with ocean transportation systems such as ships. Due to its historic importance, Naval Architecture stands out as a separate entity, and a Naval Architect is primarily engaged in the process of ship design in the widest sense of the word 'design'. Ocean Engineering and Naval Architecture encompasses subjects such as marine hydrodynamics, water wave mechanics, design of marine structures, structural mechanics related to marine structures, marine construction and welding, coastal engineering, etc.

In the five years of this dual degree M.Tech. course, the students can specialize in any of the broad area of Ocean Engineering and Naval Architecture such as marine and ocean hydrodynamics, marine structures, design and construction of marine vehicles etc. through project and specialized courses. The prolonged period of project work provides an opportunity to the student to gain expertise in one of these broad areas.

Employment opportunities of Ocean Engineers and Naval Architects exist in various offshore industry, shipbuilding and ship repairing yards, marine classification societies and other government regulatory bodies dealing with marine systems, Navy and Coast Guard, coastal engineering companies, Naval Defense R&D, environmental protection agencies for coastal protection, etc. Being multidisciplinary in nature, students from this program generally receive a broad engineering background, and this helps finding employment in other allied engineering fields as well including management and IT industry.

98. PETROLEUM ENGINEERING WITH M.TECH. IN PETROLEUM ENGINEERING

(Code : S5252)

With the fast depletion of the natural resources and the simultaneous increase in demand of energy specially Petroleum and its products, the need for a better resource management has been felt and this is the present day requirement expected by the employers from petroleum engineers who can manage optimally and economically the petroleum asset available at their disposal.

By undergoing this programme students will be in an advantageous position after they join any Petroleum Industry. Moreover job opportunities will be manifold in diversified as well as in specialized fields.

99. QUALITY ENGINEERING DESIGN AND MANUFACTURING

(Code : G5253)

In the background of globalization, with the consumer and industrial products needing superior performance and economic value, there has been renewed

realization in Indian Industry for highly qualified analytical, developmental and design engineering professionals. With an aim to fulfil this need, a new interdisciplinary dual degree programme is introduced at IIT Kharagpur with B.Tech. (Hons) in Engineering Product Design and Manufacturing and M.Tech in Design and Quality Engineering. The interdisciplinary programme is offered in two verticals – Mechanical Engineering and Industrial Electronics by the departments of Mechanical Engineering, Electrical Engineering, and Industrial Engineering and Management (Coordinating Department). A student opting for this dual degree programme will be allocated one of the verticals based on his/her choice and his/her cumulative grade-point average at the end of first year.

The programme will inculcate in students an enhanced awareness of Engineering Design, Manufacturing and Quality issues related either to Mechanical Engineering Products such Automotive Systems or to Electronic Products such as Real-time Embedded Systems. The academic content of the program is accordingly designed to expose the students to most major engineering aspects related to such products including Product Modelling and Development, Design for Quality, Manufacturability and Assembly, and engineering courses on mechanical/industrial electronics discipline. The programme includes six-month dedicated Internship in leading organizations in product design and development.

The programme is aimed at imparting its students the required skill sets, knowledge, competence and sufficient hands-on experience to successfully perform in careers that involve determining customer requirements, conceiving the solution, designing the product, maturing it to a prototype, optimizing its performance and designing the process to manufacture it while ensuring superior quality and cost competitiveness of the final product.

3.7 FIVE-YEAR M.TECH. INTEGRATED COURSES

100. ENGINEERING PHYSICS
(Code : M5301)

The Five Year Integrated M.Tech. in Engineering Physics will train young students in the areas of Space Physics, Plasma Physics, and Fibre Optics. Courses in Solid State Physics, Quantum Mechanics, Thermodynamics, Statistical Mechanics, Materials Physics, MHD, Applied Nuclear Science, and Remote sensing will be included. In addition the courses from other Engineering Departments e.g. Electronics Engineering, Electrical Engineering, Computer Science & Engineering, Materials Science & Technology will also be included. Thus the training imparted to the students will be broad based, employment-oriented and will cover the frontline areas.

We are looking at students with exceptional abilities who will ultimately provide sustainable competitive advantage to the Indian industry in the area of design and manufacturing of new products in the increasingly globalised economic environment in modern science and technology. Students will have employment opportunities with ISRO laboratories, VSSC, PRL, NPL, Defence Science, Telecom Service, Industries apart from teaching institutions.

101. GEOLOGICAL TECHNOLOGY
(Code : R5302)

This course is intended to train the students in different aspects of the pure and applied aspects of Geology in an integrated manner. The emphasis of the course will be on Applied Geology. The main objective is to impart the latest technological advancements in the filed of Applied Geology. The training will focus on developing the capability to apply the knowledge in the exploration of natural resources. Following branches of Applied Geology will be given special attention: Petroleum Exploration, Remote Sensing and Geographic Information System, Ground Water Exploration, Mineral Exploration, Engineering Geology, Natural Disaster Mitigation and Environmental Geology. A special feature of the course will be the training of the students in Geophysical Exploration and Well Logging. Some new courses being introduced for the first time are: Brittle Tectonics, Fluid Inclusion, Petroleum Prospect Evaluation, Environmental Geochemistry, Instrumentation in Geochemical Analysis and Cross Section Balancing.

There has been a spurt of activity in the county in Petroleum Exploration. A number of companies in the private sector as well as in public sector have been actively engaged in oil exploration, both onshore and offshore. Besides, in the next decade it seems there will be a tremendous growth in IT related geosciences

sector. India is well poised to become an international hub for global geological database generation, processing and interpretation, and a centre for geoscientific manpower outsourcing. The M.Tech. course aims to focus on all these aspects and gear up to the challenges to provide adequate training to the students. All this require a large resource of trained manpower. The five-year integrated M.Tech. programme, with its high level of quality training, will go a long way in meeting the needs of trained geologists in the future.

102. GEOPHYSICAL TECHNOLOGY

(Code : R5303)

The Five year Integrated M.Tech. Programme in Applied Geophysics is aimed at training the students in different aspects of Geophysical Technology in an integrated manner. The emphasis of the course will be on Applied Geophysics. The aim is to train the students in the latest technological advancements in the field of Applied Geophysics. The training will focus on developing the capability to acquire, process and interpret geophysical data. The course will aim at training the students in seismology, petroleum geophysics, mineral exploration, groundwater exploration, geotechnical investigation, environmental geophysics and borehole geophysics. A special feature of the course will be the training of the students in Geophysical Inversion, and Geophysical Data Processing and Interpretation.

Due to increase in the exploration activity in oil sector, a number of companies in the public and private sector have been actively engaged in oil exploration, both onshore and offshore. The activity in exploration is expected to intensify further resulting in increased demand of trained personnel. A number of other companies in the IT sector are also taking up work related to processing and interpretation of Geophysical data, related mainly to oil sector. All this require a large resource of trained manpower. The five-year integrated M.Tech. programme in Applied Geophysics, with its high level of quality training, will go a long way in meeting the needs of trained geophysicists in the future.

103. INDUSTRIAL CHEMISTRY

(Code : G5304)

Modern chemical industries make synergistic use of chemistry, chemical technology, and chemical information technology. This programme focuses on training students for such national and international industrial manpower requirements. Keeping this in view, in the first two years of the programme the students will study courses in graduate level Physics, Chemistry, Mathematics, and applications of computer and information technology to chemical and engineering problems. Concurrently they will also be required to study basic chemical, electronics and electrical engineering courses. In the third year, the students will take applied chemistry courses emphasizing different areas of Industrial Chemistry. Subsequently in the fourth year, the students get basic inputs in frontier areas of Chemistry such as Drug design, Bio and Chemi-informatics, Corrosion and Environmental sciences, High tech materials etc. and will also be required to work for projects related to one of these areas. Based on this, in the last two semesters of the programme, students will study elective courses and work for their M.Tech. Dissertations. Students of this programme would thus have a broad training over different related areas of modern Industrial Chemistry while developing expertise in some areas of their choice.

104. MATHEMATICS AND COMPUTING

(Codes : D5305, S5305, V5305)

This is a new programme which replaces and upgrades five-year integrated M.Tech. in Mathematics and Computer Applications. The objectives of the programme are to train students to handle problems in industries and government organizations through the combined use of mathematical and computer techniques. The programme imparts the necessary knowledge of numerical and computational techniques, various topics in computer science, mathematical modeling, simulation, probabilistic and statistical tools and trains them to develop their own computer software for several applications which they may come across in their professional career. Some of the typical courses in the programme are computer architecture, computer graphics, image processing, DBMS, programming languages, theory of automata, parallel algorithms, optimization methods and applications, statistical methods and algorithms, neural computing, fuzzy sets and applications, scientific visualization, etc.

3.8 FIVE-YEAR B.TECH. AND MBA DUAL DEGREE COURSES

105. MINERAL ENGINEERING WITH MBA
(Code : S5401)

This course has been framed to imbibe the managerial skill to the Mineral Engineering graduates after acquiring their B.Tech in Mineral Engineering. From IX semester onwards the courses pertaining to management studies such as Entrepreneurship management, Strategic management, Accounting for managers, Productivity management, Human resource development, Sales and distribution management, Personnel management and industrial relations with sufficient number of electives, which students can opt. The X semester is essentially a project based, but three important subjects like management of self in organization, Project management and Marketing management are offered as theory subjects to further strengthen their capabilities.

106. MINING ENGINEERING WITH MBA
(Code : S5402)

This five-year program leading to a B.Tech. in Mining Engineering and an MBA builds on the combined strengths of the Department of Mining Engineering and Department of Management Studies of ISM. The program is designed to groom future leaders in business and technology, equipping them with both technical knowledge and managerial skills. To succeed in technology and knowledge based society, a thorough understanding of engineering and technology along with a sound knowledge of management skills are essential. Thus, this program will offer management education to selected mining engineering students by extending their stay in ISM Campus for an additional year which will be exclusively devoted to management subjects. At the successful completion of the program, the student will get B.Tech. degree in Mining Engineering as well as the degree of MBA.

107. PROCESS ENGINEERING WITH MBA
(Code : R5403)

In the present day globally competitive economic environment, the industry needs to be innovative and willing to keep pace with the technological developments. Present day process plants operate at a very high capacity and constantly endeavour to improve their production efficiency with minimal energy consumption while meeting the environmental and industrial safety concerns. The operation and management of such mega plants/ industries demands the best of the talents to man them. The introduction of the elements of system engineering, optimization, process synthesis and integration to minimize energy, and mass consumption, and effluent/ emission reduction, and operations management along with the knowledge of financial and economic aspects and marketing strategies, in the engineering curriculum will enhance an engineer's versatility, innovative and leadership skills and effectiveness in his career profile.

To facilitate the above process, a 5-year integrated dual degree programme offering B. Tech. (Process Engineering) and M.B.A. has been designed. This programme will run at the Saharanpur Campus of IIT Roorkee. The composite programme is an integration of the best in process system engineering and management. This composite programme will provide the students opportunities to imbibe in them the knowledge and skills in the area of basic chemical and bioprocess engineering and process system engineering such as process synthesis, process integration, modeling and simulation, computer aided design, system analysis and control, environmental management, industrial safety, process and plant optimization, energy management, and innovative management techniques including enterprise resource planning, operations management, strategic management for financial resource conservation and market leadership.

The graduating students will have excellent employment opportunities in corporates, and industrial organizations, bioprocess / chemical process industries, pharma companies and service/ infrastructural sector. The graduates may also opt for design and consultancy organizations as also for entrepreneurial development.

3.9 FIVE-YEAR INTEGRATED M.Sc. COURSES

108. APPLIED GEOLOGY
(Code : G5501)

Ever since the Earth System originated, it has been evolving through a series of complex dynamic processes. Understanding and modeling these processes is quite challenging and exciting. These complex processes lead to picturesque landscapes; more importantly, they also

result in local scale enrichment of various metallic, non-metallic, water and fuel resources that have been the backbone of the human civilization. On the flip side, Catastrophic events like earthquakes, volcanic eruptions, landslides represent the sinister side of these processes. Geology and Geophysics, the two sub-disciplines of Earth Science, have the common goals of understanding the origin of Earth vis-à-vis the solar system, of quantifying the Earth's evolutionary processes, searching for Earth Resources and predicting and mitigating natural and anthropogenic disasters and hazards. Geology primarily involves studying the Earth processes through direct sampling of earth materials like rocks, soils, water and vegetation in the field and devising sophisticated laboratory methods and tools for interpretation of results. The primary objective of Geophysics is to probe the inaccessible depths of the Earth for understanding its 'anatomy' on the basis of bulk physical (electrical, magnetic, electromagnetic, gravitational, elastic and visco-elastic) properties and phenomena, such as electrical, magnetic, electromagnetic and gravitational properties, and propagation of elastic waves through its interior. All this requires sophisticated instrumentation and rigorous mathematical tools.

The Department of Geology and Geophysics of IIT Kharagpur offers five-year integrated M.Sc. programs (unique in the country) in both the disciplines, imparting training on applied aspects of Earth Science.

Core courses in Applied Geology enable students to develop expertise in the study of minerals, rocks, fossils and ores. Students are imparted laboratory and field training (a total of 18 weeks of field work) under this program. Apart from disseminating information, emphasis is given to acquisition of basic tools for quantification of processes. Modern courses focusing on crust-mantle interaction, mountain building processes, global climatic changes, basin analysis, low-temperature Geochemistry, water-rock interaction, isotope Geology, mineralogical spectroscopy are devised to expose the students to frontier areas of research. Rigorous training on techniques and tools for exploration of earth resources is imparted through adequate exposure to courses such as Engineering Geology, Ground Water Geology, Remote Sensing & GIS, Environmental Geology and Micropaleontology, that have immediate industrial and environmental importance. The teaching in Applied Geology is backed up by excellent computational and laboratory facilities e.g. X-ray Fluorescence Spectrometer, Laser– Raman Probe, Total Organic Carbon Analyzer, a Gas source stable-isotope Mass Spectrometer, to name a few.

The curricula of M. Sc. in Applied Geology provide the opportunity of becoming specialized in the field of interest by taking appropriate courses in the fourth and final years. Students get ample opportunities to get them acquainted with modern research methodologies while working for their Masters' dissertation during the last two semesters. Exposures to industries and R & D activities are provided through summer training.

Students get excellent job opportunity in the Cement, Oil and Natural Gas and Mining sectors, and also Research Laboratories. Our graduates excel in higher studies abroad, most of them being well placed in R&D sectors and Universities in the US, UK and other developed countries.

109. APPLIED MATHEMATICS

(Code : R5502)

This programme has been designed to provide the students a rigorous training in Mathematical thinking through carefully designed curriculum structure and courses, the students will get to study various topics of Pure and Applied Mathematics along with getting the training in software tools which will equip them better to take research as a career. The programme will also enable the students to compete better in the job market in the software industry.

110. CHEMISTRY

(Codes : B5503, G5503, R5503)

This programme prepares the students for modern day research in chemical sciences by providing them, besides an in-depth education in chemistry, adequate training in mathematics, physics, computers and engineering sciences. In the first two semesters of their stay in the programme, they take the same courses as their fellow engineering students. During the course, they are trained to do frontline research in interdisciplinary areas, which include materials science, environmental science and molecular biology, in addition to traditional topics in chemistry.

111. ECONOMICS

(Code : G5504)

IIT Kharagpur offers an excellent opportunity for exceptionally bright students to get admitted to a five year integrated M.Sc. programme in economics, a

unique programme in IIT system. This holistic programme is being offered by the Department of Humanities and Social Sciences, which has a multidisciplinary character, with the involvement of sister departments like Mathematics, Industrial Engineering and Management, Computer Science and Engineering, Architecture and Regional Planning, and Vinod Gupta School of Management. The common programme in the first two semesters would make the students efficient in developing verbal and quantitative abilities with a scientific approach. Thereafter, students would be given a thorough and intense exposure to economic theory, analytical tools, mathematical techniques and applied econometric models with adequate stress on interpretations of the results along with their socioeconomic implications. Theory classes will be supplemented by lab practices, projects, industrial training and seminars. The course would succeed in establishing a synergy between technology and economics to understand the real world situation more accurately and intensely.

Through a suitable choice of professional electives, students can specialize in selected streams like environmental economics, quantitative economics, business economics with provisions for super specialization in certain chosen fields under the streams. At the same time, ambitious and hard working students can earn a minor in areas like mathematics and computing, statistics, industrial engineering and management. The new breed of economists specially trained for problem solving purposes are expected to be in high demand in industry, institutions of higher learning and research, both at home and abroad, in the increasingly globalized world of tomorrow.

112. EXPLORATION GEOPHYSICS

(Code : G5505)

The primary objective of Geophysics is to probe the inaccessible depths of the Earth for understanding its anatomy on the basis of bulk physical (electrical, magnetic, electromagnetic, gravitational, elastic and visco-elastic) properties and phenomena, and the propagation of elastic waves through its interior. All this requires sophisticated instrumentation and the application of rigorous mathematical techniques.

The Department of Geology and Geophysics at I.I.T. Kharagpur offers a 5-year integrated M.Sc. programme in Exploration Geophysics. This programme covers fundamental courses on Solid Earth Geophysics, Geophysical field Theory and Exploration Techniques with special emphasis on mathematical and computational tools. Electrical, Electromagnetic, Gravity and Seismic methods of exploration are covered in great details. Rigorous training in earthquake Seismology and Seismic Tomography, Geophysical Signal Processing, Nuclear Geophysics is an integral part of the curriculum in this programme. Students and Exploration Geophysics undergo rigorous field training that involves use of various equipments and acquisition of data in the field. State-of-the-art equipment in Geophysics include 48-Channel Reflection, Refraction and Engineering Seismograph, Broad Band Seismograph, Strong Motion Accelerographs, VLFEM, Gravimeter, Magnetometer Resistively Meter and radiation measurement equipment. A Global Seismological Observatory is commissioned in the department.

Students get ample opportunities to get themselves acquainted with modern research methodologies while working for their Masters' dissertation during the last two semesters. Exposures to Industries and R&D activities are provided through summer training.

Students get excellent job opportunities in the Cement, Oil & Natural Gas and Mining sectors, and also Research Laboratories. Our graduates excel in higher studies abroad, most of them being well placed in R&D sectors and Universities in US, UK and other developed countries.

113. MATHEMATICS AND COMPUTING

(Code : G5506)

The 5-year Integrated M.Sc.course in Mathematics and Computing is designed to provide strong foundation in both Mathematics and Theoretical Computer Science. It gives exposure to basic courses like Real Analysis, Linear Algebra, Functional Analysis, Complex Analysis, Topology, Numerical Analysis, Graph Theory, Algorithms, Probability, Stochastic Process and Simulation, Operational Research etc. Also several advanced courses like Artificial Intelligence, Database Systems, Computer Networks, Parallel Algorithms, Dynamical Systems, Computational Statistics, Computational Fluid Mechanics, Cryptography, Theory of Operators, Sequence Spaces, Decision Theory etc. are covered. Some of the subjects are supported by computer labs.

The students on completing this course get lucrative placements in topnotch finance/business/software/ companies as design/development engineers/research consultants. Several students also get scholarships abroad to pursue M.S./Ph.D programmes in the areas of Mathematics, Statistics, Operating Research and Computer Science. Subsequently, many of them also join teaching/research positions in reputed National/ International Universities/ Institutes/ Companies.

114. PHYSICS
(Codes : G5507, R5507)

This course is designed to produce students capable of pursuing advanced studies in theoretical and experimental physics as well as handling problems related to applications of physics in engineering, technology, industry and medicine. This is achieved by making use of a well-balanced course structure consisting of undergraduate core courses in basic sciences, engineering sciences, technical arts, and workshop practice. In addition, students are required to study courses in computer science, humanities and social sciences, etc. In the final years of the programme, the students can opt for specialized courses in advanced physics and they have to work for projects related to current problems in experimental and theoretical physics.

3.10 FIVE-YEAR B.S. AND M.S. DUAL DEGREE COURSES

115. BIOLOGICAL SCIENCES
(Code : M5601)

The Department of Biotechnology at IIT Madras has a large faculty body having expertise in diverse areas such as bioprocess engineering, chemical biology, computational biology, cellular & molecular biology and structural biology.

The Dual Degree Course on Biological Sciences offers a strong foundation in biology. It encompasses the study of living organisms and life processes at all levels, including individual organisms, tissues, cells, subcellular structures, and molecules. The application of biological sciences to improve health, agriculture and environment is unlimited. Currently, there is a dearth of well-trained manpower in interdisciplinary areas in biological sciences. Apart from the fundamental courses in biological sciences, the curriculum will emphasize on other areas such as chemical biology and computational biology. In addition to a few core theory and laboratory courses, a basket of elective courses will be offered in each of these areas. Each student will undertake an extensive research project, spread over the last four semesters of the curriculum. Therefore, this programme provides intense research-based training, which is lacking in traditional M.Sc. Biology programmes. The curriculum imparts specific skills on interfacing cellular and molecular biology, trains students to undertake academic research in frontier areas including medical and computational biology, and equips students with skills to be employed in R&D laboratories of pharmaceutical and biotechnology industries. Biology at school level is not a prerequisite for admission to this programme.

116. PHYSICS
(Code : M5602)

A new five-year integrated Dual Degree, B.S. plus M.S. in Physics, has been introduced by IIT Madras. This special course is designed impart an exciting curriculum in the foundations and applications of Physics to students who would become distinguished scientists and/or leaders in the academic world or play a lead role in pure and applied research and development in interdisciplinary areas which requires a strong background in Physics. Students would get accelerated exposure to advanced principles and applications in a curriculum format that is carefully paced to make comprehensive learning an exciting and fulfilling experience. A strong research component in the final year will be a stimulating component of this program.

3.11 FIVE-YEAR M.Sc. TECH COURSES

117. APPLIED GEOLOGY
(Code : S5701)

The Department of Applied Geology of ISM, Dhanbad is the pioneering centre of teaching and advanced research in “Applied Geology” in India. Established in 1926 with the fundamental objective, of education and training for professional careers in the field of Applied Geology, the trained graduates of the Department, by virtue of their high professional ability and skill, have always been in the mainstream of the Nation’s mineral exploration and development programmes. The Department hosts well-equipped laboratories and the state-of-art analytical

facilities for training and advanced research in the field of Applied Geology. The laboratories of the other sister Departments (Applied Geophysics, Mining Engineering and Petroleum Engineering and Mineral Engineering) complement the facilities that make the courses of study in Applied Geology unique at ISM. (In addition to the specialized course of study, the Department is also engaged in providing industry based executive development programmes and consultancy services).

Considering the increasing demand of trained manpower in the field of Geology, the Department is reintroducing its 5year integrated M.Sc. Programme in Applied Geology.

118. APPLIED GEOPHYSICS

(Code : S5702)

This is a multi-disciplinary programme with inputs from Geology, Physics, Mathematics, Electronics and Computer Sciences. Basic and advanced papers on Exploration Geophysics with special emphasis on hydrocarbon exploration including exploration for gas hydrates and coal bed methane are taught. A significant part of the programme is devoted to Solid Earth Geophysics and Earthquake Seismology. The programme gives equal emphasis on each unit of exploration activity, viz, acquisition, processing and interpretation. Training in the filed constitutes an integral programme arranged by the Department with leading Oil and Mineral Industries besides its rigorous in-campus and field training activity organized by the Department.

The Department is actively engaged in R&D activities with major areas of research such as Exploration for Gas Hydrates and Coal Bed Methane, Magneto Telluric Studies, Geophysical Signal Processing, Earthquake Seismology, Petrophysics, Remote Sensing and Gravity Magnetic Studies.

Presently students with Applied Geophysics degree have excellent job opportunity with leading oil companies in India and abroad.

3.12 FIVE-YEAR M.PHARM. DUAL DEGREE COURSE

119. PHARMACEUTICS

(Code : V5801)

The M.Pharm. Dual Degree Course framed with a view to prepare the incumbent to cater to the current and future needs of advanced level aspects of pharmaceutical production, drug development, computer-aided production of various types of newer and targeted drug delivery systems, the design of process and product development techniques. This programme will expose the students to research methods currently being studied worldwide, with an emphasis on smooth transition from basic principles to actual handling of production design/production/quality assessment and feedback from the market. In the first six semesters the students will be studying basic courses in Pharmaceutical Chemistry, Physical Pharmaceutics, Pharmaceutical Technology, Pharmaceutical Analysis, Pharmaceutics Jurisprudence, Pharmaceutical Engineering, Pharmaceutical Biochemistry, Drug Activity in Biological Systems and Microbial aspects of genetically engineered drug molecules. Additionally, they will also be given elective courses (any one) in History of Science and Technology, IPR, Ethics, Energy Management, Industrial Psychology and Entrepreneurship Development. The semesters VII and VIII will be a combination of UG and PG courses in Formulation Design, Advanced Pharmaceutical Analysis, Advanced Pharmaceutical Medicinal Chemistry, Advanced Drug Delivery Systems, Pharmaceutics and Pharmacognosy. Semesters IX and X will be entirely devoted to PG courses, comprising advanced courses in Biopharmaceutics, Pharmacokinetics, Molecular and Clinical Pharmacology, Evaluation of Drugs, General Pharmacology, PG Seminars and Dissertation on selected topic. The courses have been designed with basic subjects in Pharmaceutical Sciences for the first six semesters, and the last four semesters are designed with a view to prepare the students for wide variety of research-oriented studies, which have a bearing to ongoing and futuristic programmes. The students, thus, will have an exposure to masters' courses, since such an exposure will eventually become necessary for an advanced level understanding of Pharmaceutical Sciences and Technology, leading to optimised user friendly therapeutic systems, and will prepare the students for excellent placement in the ever developing Pharmaceutical industry.

4.1 TABLES

Table 1 : AVAILABILITY OF SEATS FOR IIT-JEE 2012 AND OPENING & CLOSING RANKS FOR JEE 2011

Course Code	GENERAL	OBC (NCL)	OBC (NCL)-M	SC	ST	GE_PD	OBC (NCL)_PD	OBC (NCL)-M _PD	SC_PD	ST_PD	TOTAL	☜ CATEGORIES
B 4 1 1 0	43	19	4	12	7	1	0	0	1	0	**87**	☜ No. of seats for each category
	2-93	19-106	-	1-35	1-36	1-1	5-5	-	-	-		☜ opening and closing ranks in JEE 2011

- Discipline serial number
- Type of course
- Duration of the course (4 years or 5 years)
- Admitting Institute code

In FOUR years courses : 1 for B.Tech.; 2 for B.S.; 3 for B.Pharm.; 4 for B.Des.
In FIVE years courses : 1 for B.Arch.; 2 for Dual degrees B.Tech. and M.Tech.; 3 for Integrated M.Tech.; 4 for Dual degrees B.Tech. and MBA; 5 for Integrated M.Sc.; 6 for Dual degrees B.S. and M.S.; 7 for M.Sc. Tech. and 8. for M.Pharm.

NUMBER OF SEATS AVAILABLE

	COURSE TITLE	ADMITTING INSTITUTE	COURSE CODE	GENERAL	OBC (NCL)	OBC (NCL)-M	SC	ST	GE_PD	OBC_ PD	OBC_M _PD	SC_ PD	ST_PD	TOTAL
FOUR-YEAR B. TECH. COURSES														
1	**Aerospace Engineering**	IIT Bombay	**B4101**	32	12	3	9	4	0	2	0	0	0	**62**
				92-1295	375-837	-	45-192	93-171	-	-	-	-	-	
	...do...	IIT Kharagpur	**G4101**	15	8	1	5	2	1	0	0	0	0	**32**
				2022-2302	757-1105		283-430	205-274	57-57	-	-	-	-	
	...do...	IIT Kanpur	**K4101**	24	11	2	6	4	0	0	0	1	0	**48**
				1333-2012	519-913		254-416	92-286	-	-	-	-	-	
	...do...	IIT Madras	**M4101**	19	8	2	5	3	0	0	0	0	0	**37**
				830-1992	263-948		117-340	177-250	-	-	-	-	-	
2	**Agricultural and Food Engineering**	IIT Kharagpur	**G4102**	17	7	2	4	3	0	0	0	1	0	**34**
				3443-4462	1975-2536	-	952-1211	555-580	-	-	-	-	-	
3	**Biological Sciences and Bioengineering**	IIT Kanpur	**K4103**	20	8	2	6	3	0	1	0	0	0	**40**
				1991-3623	1541-2535		721-1136	566-645	-	-		-	-	
4	**Biotechnology**	IIT Roorkee	**R4104**	24	11	2	7	4	1	1	0	0	0	**50**
				3735-4343	1454-2543		1108-1245	557-642	-	-	-	-	-	
	...do...	IIT Guwahati	**W4104**	27	12	3	8	4	1	0	0	0	0	**55**
				3832-4900	2338-2538	-	1147-1265	537-636	-	-	-	-	-	
5	**Biotechnology and Biochemical Engineering**	IIT Kharagpur	**G4105**	14	5	1	4	2	0	1	0	0	0	**27**
				3200-3847	1769-2458		1099-1237	607-612		-		-	-	
6	**Ceramic Engineering**	IT-BHU Varanasi	**V4106**	30	12	3	9	3	0	1	0	0	1	**59**
				5085-6082	2277-2427		1310-1447	534-633	-	-		-	-	
7	**Chemical Engineering**	IIT Bombay	**B4107**	42	20	4	13	7	2	0	0	0	0	**88**
				532-937	420-728	-	113-362	146-256	41-41	-	-	-	-	
	...do...	IIT Delhi	**D4107**	35	16	3	10	5	1	0	0	1	0	**71**
				81-1104	581-882		216-467	179-260	-	-	-	-	-	
	...do...	IIT Kharagpur	**G4107**	25	12	2	8	4	1	0	0	0	0	**52**
				1723-2026	732-1256	-	331-598	302-333	-	-	-	-	-	
	...do...	IIT Hyderabad	**H4107**	14	7	1	5	2	1	0	0	0	0	**30**
				3156-3675	1478-1750	-	664-923	511-511	-	-	-	-	-	
	...do...	IIT Kanpur	**K4107**	38	16	3	11	6	1	1	0	0	0	**76**
				845-1620	617-1178	-	334-569	180-314	75-75	-	-	-	-	

	COURSE TITLE	ADMITTING INSTITUTE	COURSE CODE	GENERAL	OBC (NCL)	OBC (NCL)-M	SC	ST	GE_PD	OBC_ PD	OBC_M _PD	SC_ PD	ST_PD	TOTAL
	…do…	IIT Madras	M4107	36	17	3	10	5	1	0	0	1	0	73
				782-1782	369-1198	-	468-601	260-329	95-95	-	-	-	-	
	…do…	IIT Gandhinagar	N4107	19	9	2	6	3	1	0	0	0	0	40
				2956-4071	1894-2400	-	873-1139	441-507	-	-	-	-	-	
	…do…	IIT Roorkee	R4107	39	18	4	11	6	1	0	0	1	0	80
				1827-2454	1299-1473	-	577-635	296-345	-	-	-	-	-	
	…do…	ISM Dhanbad	S4107	10	5	1	3	2	1	0	0	0	0	22
				4552-5526	2465-2509	-	1078-1225	505-548	-	-	-	-	-	
	…do…	IT-BHU Varanasi	V4107	58	27	4	17	9	2	0	1	1	0	119
				3285-3996	1645-2213	-	829-1071	396-495	-	-	-	-	-	
	…do…	IIT Guwahati	W4107	34	15	3	11	5	1	1	0	0	0	70
				2805-3321	1394-1738		676-785	377-412	-	-	-	-	-	
8	Chemical Science and Technology	IIT Guwahati	W4108	22	10	2	7	3	1	0	0	0	0	45
				2880-3845	1272-2125	-	811-1000	486-541	-	-	-	-	-	
9	Civil Engineering	IIT Bhubaneswar	A4109	19	9	2	6	3	1	0	0	0	0	40
				4195-4682	1625-2281	-	584-1082	299-316	-	-	-	-	-	
	…do…	IIT Bombay	B4109	58	26	5	17	8	1	0	0	1	1	117
				698-1359	403-903	-	131-361	20-111	53-83	-	-	-	-	
	…do…	IIT Delhi	D4109	54	24	5	15	8	1	1	0	1	0	109
				544-1525	443-943	-	84-347	6-81	66-81	136-136	-	-	-	
	…do…	IIT Kharagpur	G4109	30	14	3	8	5	1	0	0	1	0	62
				1283-2214	816-1169	-	181-549	126-182	84-84	-	-	-	-	
	…do…	IIT Hyderabad	H4109	11	6	1	4	2	1	0	0	0	0	25
				New Course										
	…do…	IIT Kanpur	K4109	51	22	5	16	8	2	1	0	0	0	105
				1214-2009	575-1053	-	383-496	115-148	88-88	-	-	-	-	
	…do…	IIT Madras	M4109	31	15	2	10	5	0	0	0	0	0	63
				1332-2120	474-1074	-	232-459	110-157			-	-	-	
	…do…	IIT Roorkee	R4109	59	27	4	17	9	2	0	1	1	0	120
				1455-2490	754-1251	-	285-548	87-168	92-92		-	-	-	
	…do…	IT-BHU Varanasi	V4109	40	17	4	11	6	0	1	0	1	0	80
				3014-3664	1396-1816	-	597-864	243-331	-	-	-	-	-	
	…do…	IIT Guwahati	W4109	39	17	4	11	6	1	1	0	1	0	80
				2517-3265	1103-1502	-	582-672	186-216	119-119	-	-	-	-	
10	Computer Science and Engineering	IIT Bombay	B4110	43	19	4	12	7	1	0	0	1	0	87
				2-93	19-106	-	1-35	1-36	1-1	-	-	-	-	
	…do…	IIT Mandi	C4110	20	8	2	6	2	0	1	0	0	1	40
				3218-4280	1590-2266	-	1001-1138	418-487	-	-	-	-	-	
	…do…	IIT Delhi	D4110	31	14	2	9	5	1	0	1	0	0	63
				6-116	13-140	-	8-81	22-46	-	-	-	-	-	
	…do…	IIT Indore	E4110	19	8	2	6	3	1	1	0	0	0	40
				2644-3635	1316-1777	-	784-946	451-472	48-48	-	-	-	-	
	…do…	IIT Kharagpur	G4110	27	11	3	8	4	1	1	0	0	0	55
				136-562	175-353	-	41-168	60-106	12-17	-	-	-	-	
	…do…	IIT Hyderabad	H4110	20	8	2	6	3	0	1	0	0	0	40
				1813-2562	895-1286	-	106-617	169-335	-	-	-	-	-	
	…do…	IIT Rajasthan	J4110	19	8	2	6	3	1	1	0	0	0	40
				3055-3787	1379-2013	-	693-955	391-403	-	-	-	-	-	

	COURSE TITLE	ADMITTING INSTITUTE	COURSE CODE	GENERAL	OBC (NCL)	OBC (NCL)-M	SC	ST	GE_PD	OBC_ PD	OBC_M _PD	SC_ PD	ST_PD	TOTAL
	…do…	IIT Kanpur	K4110	44	21	4	13	7	2	0	0	1	0	92
				46-317	145-284	-	39-152	50-101	4-4	-	-	-	-	
	…do…	IIT Madras	M4110	15	7	1	5	2	0	0	0	0	0	30
				70-263	31-129	-	49-75	30-30	-	-	-	-	-	
	…do…	IIT Patna	P4110	19	9	2	6	3	1	0	0	0	0	40
				3471-4340	1839-2157	-	974-1176	503-516	-	-	-	-	-	
	…do…	IIT Roorkee	R4110	37	17	3	11	5	1	0	0	0	1	75
				606-1032	288-540	-	211-265	123-184	-	-	-	-	-	
	…do…	ISM Dhanbad	S4110	46	21	4	13	7	1	1	0	1	0	94
				3582-5086	1422-2195	-	760-1168	482-543	144-144	-	-	-	-	
	…do…	IIT Ropar	U4110	20	8	2	6	3	0	1	0	0	0	40
				1339-3433	1126-2052	-	762-979	339-461	-	-	-	-	-	
	…do…	IT-BHU Varanasi	V4110	29	12	3	9	4	1	1	0	0	0	59
				1548-2509	897-1274	-	523-668	284-365	109-109	-	-	-	-	
	…do…	IIT Guwahati	W4110	39	17	4	11	6	1	1	0	1	0	80
				776-1686	494-886	-	311-472	213-279	30-30	65-65	-	-	-	
11	Electrical Engineering	IIT Bhubaneswar	A4111	20	9	2	5	3	0	0	0	1	0	40
				3134-3822	1466-1892	-	789-1024	320-356	-	-	-	-	-	
	…do…	IIT Bombay	B4111	30	12	3	9	4	0	2	0	0	0	60
				1-106	16-75	-	2-31	3-16	-	-	-	-	-	
	…do…	IIT Mandi	C4111	19	9	2	6	3	1	0	0	0	0	40
				3786-4415	1573-2329	-	1084-1116	358-424	-	-	-	-	-	
	…do…	IIT Delhi	D4111	31	13	3	9	5	1	1	0	0	0	63
				43-207	62-185	-	6-88	5-14	-	25-39	-	-	79-79	
	…do…	IIT Indore	E4111	19	9	2	6	3	1	0	0	0	0	40
				3473-3921	1545-2022	-	776-962	206-311	-	-	-	-	-	
	…do…	IIT Kharagpur	G4111	27	13	2	8	3	1	0	0	0	1	55
				585-894	180-509		239-280	63-114	-			-	-	
	…do…	IIT Hyderabad	H4111	20	9	2	6	2	0	0	0	0	1	40
				1943-2843	731-1309		544-728	212-325	-	-		-	-	
	…do…	IIT Rajasthan	J4111	20	9	2	5	3	0	0	0	1	0	40
				3530-4123	1531-2170		433-1015	218-242	-	-		-	-	
	…do…	IIT Kanpur	K4111	64	29	6	19	9	2	1	0	1	0	131
				45-556	167-394		18-243	17-78	16-21	50-50		-	-	
	…do…	IIT Madras	M4111	33	15	3	10	5	0	0	0	0	0	66
				131-380	38-159		3-122	23-62	-	-		-	-	
	…do…	IIT Gandhinagar	N4111	20	8	2	5	3	0	1	0	1	0	40
				2369-3164	1187-1626		738-849	277-290	-	-		-	-	
	…do…	IIT Patna	P4111	20	8	2	6	3	0	1	0	0	0	40
				3659-4477	1947-2404		1102-1158	376-433	-	-		-	-	
	…do…	IIT Roorkee	R4111	61	27	6	18	9	2	1	0	1	0	125
				814-1709	245-840		205-425	84-153	40-40	51-51		-	-	
	…do…	ISM Dhanbad	S4111	45	20	4	13	7	1	1	0	1	0	92
				3850-5444	1647-2454		913-1190	366-476	-	-		-	-	
	…do…	IIT Ropar	U4111	20	9	2	5	3	0	0	0	1	0	40
				3446-3879	1693-2278		688-1076	304-413	-	-		-	-	
	…do…	IT-BHU Varanasi	V4111	39	18	4	12	5	1	0	0	0	1	80
				1844-2949	1048-1516		440-741	161-298	-	-		-	-	

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12	**Electrical Engineering (Power)**	IIT Delhi	**D4112**	16	7	2	5	1	0	0	0	0	1	**32**
				496-757	235-435		153-248	41-56	32-60	-		-	-	
13	**Electronics Engineering**	IT-BHU Varanasi	**V4113**	40	17	4	11	6	0	1	0	1	0	**80**
				2166-2917	1062-1544		516-794	305-407	137-137	-		-	-	
14	**Electronics and Communication Engineering**	IIT Roorkee	**R4114**	27	11	3	8	4	1	1	0	0	0	**55**
				963-1399	269-700		247-381	145-209	27-27	-		-	-	
	…do…	ISM Dhanbad	**S4114**	46	21	4	13	7	1	1	0	1	0	**94**
				3590-5439	1364-2406		826-1216	357-510	125-125	-		-	-	
	…do…	IIT Guwahati	**W4114**	36	17	2	11	5	1	0	1	0	0	**73**
				1353-2040	707-1114	-	348-586	70-275	63-63	-	-	-	-	
15	**Electronics and Electrical Communication Engineering**	IIT Kharagpur	**G4115**	30	14	3	9	4	1	0	0	0	1	**62**
				172-679	112-515	-	57-193	31-112	29-29	-	-	-	-	
16	**Electronics and Electrical Engineering**	IIT Guwahati	**W4116**	21	9	2	6	3	0	1	0	0	0	**42**
				1512-2194	698-1185	-	564-604	253-269	77-77	-	-	-	-	
17	**Engineering Physics**	IIT Bombay	**B4117**	15	7	1	5	1	0	0	0	0	1	**30**
				139-994	458-714	-	135-543	360-416	-		-	-	-	
	…do…	IIT Delhi	**D4117**	31	13	3	9	5	1	1	0	0	0	**63**
				1006-2071	1075-1423	-	571-700	398-478	-	-	-	-	-	
	…do…	IIT Madras	**M4117**	15	6	1	5	2	0	1	0	0	0	**30**
				275-1962	955-1375	-	264-718	411-470	-	-	-	-	-	
	…do…	IIT Guwahati	**W4117**	22	9	2	7	3	1	1	0	0	0	**45**
				2674-3521	1438-1832	-	722-994	432-568	-	-	-	-	-	
18	**Engineering Science**	IIT Hyderabad	**H4118**	12	6	1	3	2	1	0	0	0	0	**25**
				New Course										
19	**Environmental Engineering**	ISM Dhanbad	**S4119**	30	13	3	9	5	1	1	0	0	0	**62**
				5482-6765	-	-	1329-1474	293-293	-	-	-	-	-	
20	**Industrial Engineering**	IIT Kharagpur	**G4120**	15	7	1	3	2	0	0	0	1	0	**29**
				1719-2590	580-1493	-	632-807	289-399	-	-	-	-	-	
21	**Instrumentation Engineering**	IIT Kharagpur	**G4121**	16	6	2	5	2	0	1	0	0	0	**32**
				1153-1676	704-1203	-	462-626	442-450	-	-	-	-	-	
22	**Manufacturing Science and Engineering**	IIT Kharagpur	**G4122**	14	6	1	4	2	1	1	0	0	0	**29**
				1927-2525	1027-1535	-	670-846	295-481	-	-	-	-	-	
23	**Materials Science and Engineering**	IIT Kanpur	**K4123**	46	20	4	14	6	1	1	0	0	1	**93**
				2102-3003	1460-1905	-	608-947	439-574	-	-	-	-	-	
24	**Mathematics and Computing**	IIT Guwahati	**W4124**	22	10	2	7	3	1	0	0	0	0	**45**
				2002-2844	1401-1757	-	654-1037	347-581	-	-	-	-	-	
25	**Mechanical Engineering**	IIT Bhubaneswar	**A4125**	20	8	2	6	3	0	1	0	0	0	**40**
				3347-4135	1481-1982	-	237-859	203-417	-	-	-	-	-	
	…do…	IIT Bombay	**B4125**	45	20	4	14	7	2	1	0	0	0	**93**
				74-385	52-293	-	20-64	19-59	18-18	72-76	-	-	-	
	…do…	IIT Mandi	**C4125**	20	9	2	5	3	0	0	0	1	0	**40**
				4147-4610	1981-2352	-	621-1165	428-466	118-118	-	-	-	-	
	…do…	IIT Delhi	**D4125**	51	22	5	14	8	1	1	0	1	0	**103**
				228-574	60-406		36-173	11-69	7-23	-	-	-		
	…do…	IIT Indore	**E4125**	20	9	2	6	3	0	0	0	0	0	**40**
				3441-4069	1684-2084		928-1015	367-423	-	-	-	-	-	
	…do…	IIT Kharagpur	**G4125**	33	15	3	10	4	1	0	0	0	1	**67**
				848-1083	311-564		12-276	15-125	46-47	-	-	-	-	

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	…do…	IIT Hyderabad	H4125	20	9	2	5	3	0	0	0	1	0	40
				2274-3073	1170-1414		449-683	221-336	93-93	-	-	-	-	
	…do…	IIT Rajasthan	J4125	20	8	2	6	3	0	1	0	0	0	40
				3545-4262	1824-2244		761-997	237-371	-	-	-	-	-	
	…do…	IIT Kanpur	K4125	48	21	5	15	7	2	1	0	0	0	99
				246-840	195-505		100-267	43-120	28-28	90-90	-	-	-	
	…do…	IIT Madras	M4125	37	16	2	11	6	1	1	1	0	0	75
				327-771	76-363	-	108-201	71-105	3-3	-	-	-	-	
	…do…	IIT Gandhinagar	N4125	19	9	2	6	3	1	0	0	0	0	40
				2122-3455	1112-1678	-	426-804	369-384	-	-	-	-	-	
	…do…	IIT Patna	P4125	20	9	2	5	3	0	0	0	1	0	40
				3324-4586	2136-2411	-	1013-1132	457-468	-	-	-	-	-	
	…do…	IIT Roorkee	R4125	39	17	4	12	6	1	1	0	0	0	80
				1209-1806	571-852	-	242-358	129-173	55-55	103-103	-	-	-	
	…do…	ISM Dhanbad	S4125	51	23	4	15	7	1	0	1	0	1	103
				3542-5293	1576-2430	-	639-1110	323-479	-	-	-	-	-	
	…do…	IIT Ropar	U4125	19	9	2	6	3	1	0	0	0	0	40
				3366-4092	1951-2260	-	911-1047	232-421	-	-	-	-	-	
	…do…	IT-BHU Varanasi	V4125	48	22	4	15	8	2	1	0	0	0	100
				2514-3222	880-1475	-	537-752	307-394	-	-	-	-	-	
	…do…	IIT Guwahati	W4125	39	18	4	11	5	1	0	0	1	1	80
				1725-2470	300-1095	-	219-581	52-226	91-91	-	-	-	-	
26	Metallurgical Engineering	IT-BHU Varanasi	V4126	34	15	3	10	5	1	1	0	0	0	69
				3417-4534	2336-2532	-	1128-1253	515-579	-	-	-	-	-	
27	Metallurgical and Materials Engineering	IIT Kharagpur	G4127	21	10	2	7	3	1	0	0	0	0	44
				2075-3041	1562-1914	-	711-933	469-553	-	-	-	-	-	
	…do…	IIT Madras	M4127	18	8	2	5	3	0	0	0	0	0	36
				2228-2650	1432-1772	-	681-775	351-551	-	-	-	-	-	
	…do…	IIT Roorkee	R4127	44	20	4	13	6	1	0	0	1	1	90
				2579-3691	1614-2264	-	904-1109	565-613	-	-	-	-	-	
28	Metallurgical Engineering and Materials Science	IIT Bombay	B4128	33	15	3	9	5	1	0	0	1	0	67
				1368-2047	793-1424	-	515-708	271-388	131-131	-	-	-	-	
29	Mineral Engineering	ISM Dhanbad	S4129	30	12	3	9	4	1	1	0	0	0	60
				5904-6857	2520-2520	-	1230-1449	-	-	-	-	-	-	
30	Mining Engineering	IIT Kharagpur	G4130	20	9	2	6	3	0	0	0	0	0	40
				2744-3947	1728-2290	-	1089-1201	427-492	-	-	-	-	-	
	…do…	ISM Dhanbad	S4130	61	26	6	18	9	0	0	0	0	0	120
				4255-6539	1768-2542	-	1068-1321	437-634	-	-	-	-	-	
	…do…	IT-BHU Varanasi	V4130	48	23	4	14	8	2	0	0	1	0	100
				3234-6231		-	1224-1440	632-643	-	-	-	-	-	
31	Mining Machinery Engineering	ISM Dhanbad	S4131	20	9	2	6	3	0	0	0	0	0	40
				5800-6631	-	-	1344-1413	-	-	-	-	-	-	
32	Naval Architecture and Ocean Engineering	IIT Madras	M4132	18	8	2	5	3	0	0	0	0	0	36
				2179-2936	1070-1666	-	622-862	175-309	-	-	-	-	-	
33	Ocean Engineering and Naval Architecture	IIT Kharagpur	G4133	16	8	1	5	2	1	0	0	0	0	33
				2923-3352	1650-1972	-	878-981	315-319	-	-	-	-	-	
34	Petroleum Engineering	ISM Dhanbad	S4134	52	23	5	15	8	0	0	0	0	0	103
				3427-4962	1629-2486	-	616-122	499-617	-	-	-	-	-	

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35	**Polymer Science and Technology**	IIT Roorkee	**R4135**	19	9	2	6	3	1	0	0	0	0	**40**
				New Course										
36	**Production and Industrial Engineering**	IIT Delhi	**D4136**	24	11	2	7	3	0	0	0	0	1	**48**
				852-1183	528-1113	-	405-572	247-342		-	-	-	-	
	...do...	IIT Roorkee	**R4136**	29	13	3	8	5	1	0	0	1	0	**60**
				1906-2780	1129-1758	-	579-899	350-422	-	-	-	-	-	
37	**Pulp and Paper Engineering**	IIT Roorkee	**R4137**	24	11	2	7	4	1	1	0	0	0	**50**
				4837-6482	2282-2375	-	1212-1503		-	-	-	-	-	
38	**Systems Science**	IIT Rajasthan	**J4138**	19	10	1	6	3	1	0	0	0	0	**40**
				4292-5759	2344-2526	-	1144-1408	569-595	-	-	-	-	-	
39	**Textile Technology**	IIT Delhi	**D4139**	45	20	4	14	7	2	1	0	0	0	**93**
				1996-3283	1719-2235	-	788-1137	402-573	-	-	-	-	-	
FOUR-YEAR B. S. COURSES														
40	**Chemistry**	IIT Kanpur	**K4201**	14	7	1	3	2	0	0	0	1	0	**28**
				3670-5711	-	-	1537-1616	-	-	-	-	-	-	
41	**Economics**	IIT Kanpur	**K4202**	19	8	2	6	2	0	0	0	0	1	**38**
				2230-3895	1931-2479	-	1433-1643	385-385	-	-	-	-	-	
42	**Mathematics and Scientific Computing**	IIT Kanpur	**K4203**	24	10	2	7	4	1	1	0	0	0	**49**
				1454-2914	1449-2215	-	918-1149	611-621	82-82	-	-	-	-	
43	**Physics**	IIT Kanpur	**K4204**	13	7	1	4	2	1	0	0	0	0	**28**
				86-2737	1459-2441	-	80-1276	-	-	-	-	-	-	
FOUR-YEAR B. PHARM. COURSE														
44	**Pharmaceutics**	IT-BHU Varanasi	**V4301**	17	8	2	5	3	1	0	0	0	0	**36**
				5752-7349	-	-	1506-1651	-	-	-	-	-	-	
FOUR-YEAR B. DES. COURSE														
45	**Design**	IIT Guwahati	**W4401**	22	10	2	7	3	1	0	0	0	0	**45**
				3925-6608	-	-	1085-1744	-	-	-	-	-	-	
FIVE-YEAR B. ARCH. COURSES														
46	**Architecture**	IIT Kharagpur	**G5101**	24	11	2	8	4	1	0	0	0	0	**50**
				3447-7800	2039-2039	-	1455-1897	-	-	-	-	-	-	
	...do...	IIT Roorkee	**R5101**	24	12	2	7	3	1	0	0	0	1	**50**
				5695-8743	-	-	1188-1687	-	-	-	-	-	-	
FIVE-YEAR B.TECH. AND M. TECH. DUAL DEGREE COURSES														
47	**Aerospace Engineering**	IIT Kharagpur	**G5201**	10	4	1	3	1	0	0	0	0	0	**19**
				2357-2642	1108-1139	-	363-489	266-266	-	-	-	-	-	
	...do...	IIT Madras	**M5201**	6	3	1	1	1	1	0	0	0	0	**13**
				2105-2428	833-1022	-	281-281	317-317	-	-	-	-	-	
48	**Aerospace Engineering with M.Tech. in Applied Mechanics with specialization in Biomedical Engineering**	IIT Madras	**M5202**	3	2	0	1	1	1	0	0	0	0	**8**
				1385-2478	1302-1324	-	490-490	425-425	-	-	-	-	-	
49	**Agricultural and Food Engineering with M.Tech. in any of the listed specializations**	IIT Kharagpur	**G5203**	17	7	1	5	3	0	1	0	0	0	**34**
				4603-5395		-	1036-1324	601-601	-	-	-	-	-	
50	**Biochemical Engineering**	IT-BHU Varanasi	**V5204**	9	4	1	3	2	1	0	0	0	0	**20**
				5070-5746	-	-	1240-1479	-	-	-	-	-	-	
51	**Biochemical Engineering and Biotechnology**	IIT Delhi	**D5205**	23	11	2	7	4	1	0	0	0	0	**48**
				1792-3469	1488-2298	-	705-1126	504-625	-	-	-	-	-	

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52	**Bioengineering with M.Tech in Biomedical Technology**	IT-BHU Varanasi	**V5206**	10	4	1	3	2	0	0	0	0	0	**20**
				5267-6072	-	-	1348-1459	-	-	-	-	-	-	
53	**Biological Engineering**	IIT Madras	**M5207**	16	7	2	5	3	1	0	0	0	0	**34**
				3212-3944	2330-2533	-	726-1179		-	-	-	-	-	
54	**Biotechnology and Biochemical Engineering**	IIT Kharagpur	**G5208**	12	6	1	4	2	1	0	0	0	0	**26**
				3604-4553	2315-2315	-	1243-1288	640-640	-	-	-	-	-	
55	**Ceramic Engineering**	IT-BHU Varanasi	**V5209**	9	4	1	3	2	1	0	0	0	0	**20**
				4864-6375	-	-	1463-1509	-	-	-	-	-	-	
56	**Chemical Engineering**	IIT Bombay	**B5210**	17	8	2	5	3	1	0	0	0	0	**36**
				955-1257	951-1133	-	310-576	327-355	61-61	-	-	-	-	
	…do…	IIT Delhi	**D5210**	25	12	2	7	4	1	0	0	1	0	**52**
				1239-1718	958-1292	-	452-600	285-373	115-115	-	-	-	-	
	…do…	IIT Kharagpur	**G5210**	13	6	1	4	2	1	0	0	0	0	**27**
				2093-2503	1300-1486	-	612-655	220-381	-	-	-	-	-	
	…do…	IIT Madras	**M5210**	9	3	1	3	1	0	1	0	0	0	**18**
				1784-2157	1273-1429	-	611-680	362-362	-	-	-	-	-	
57	**Chemical Engineering with M.Tech. in Hydrocarbon Engineering**	IIT Roorkee	**R5211**	14	7	1	5	2	1	0	0	0	0	**30**
				2588-2852	1506-1669	-	678-792	408-452	-	-	-	-	-	
58	**Civil Engineering with M.Tech. in Applied Mechanics in any of the listed specializations**	IIT Madras	**M5212**	3	2	0	1	0	1	0	0	0	0	**7**
				2291-2440	1092-1324	-	488-488	-	-	-	-	-	-	
59	**Civil Engineering (Infrastructural Civil Engineering)**	IIT Madras	**M5213**	7	3	1	2	1	0	0	0	0	0	**14**
				2167-2381	1135-1277	-	419-475	240-240	-	-	-	-	-	
60	**Civil Engineering with M.Tech. in Structural Engineering**	IIT Roorkee	**R5214**	8	3	1	2	1	0	0	0	0	0	**15**
				New Course										
	…do…	IT-BHU Varanasi	**V5214**	10	4	1	3	1	0	0	0	0	1	**20**
				3330-3951	1597-1959	-	864-906	405-462	-	-	-	-	-	
61	**Civil Engineering with any of the listed specialization**	IIT Kharagpur	**G5215**	10	5	1	3	2	1	0	0	0	0	**22**
				1830-2598	1268-1370	-	494-559	196-200	-	-	-	-	-	
	…do…	IIT Madras	**M5215**	6	3	1	2	1	1	0	0	0	0	**14**
				2343-2507	1230-1365	-	514-535	248-248	-	-	-	-	-	
62	**Computer Science and Engineering**	IIT Delhi	**D5216**	15	7	2	5	2	1	0	0	0	0	**32**
				120-298	142-294	-	94-170	130-130	-	-	-	-	-	
	…do…	IIT Kharagpur	**G5216**	19	9	2	6	3	1	0	0	0	0	**40**
				602-887	390-628	-	123-312	167-181	-	-	-	-	-	
	…do…	IIT Madras	**M5216**	13	6	1	4	2	0	0	0	0	0	**26**
				342-623	163-397	-	155-249	117-149	-	-	-	-	-	
	…do…	IT-BHU Varanasi	**V5216**	7	3	1	2	1	1	0	0	0	0	**15**
				2527-2967	945-1279	-	575-748	426-426	-	-	-	-	-	
63	**Electrical Engineering**	IIT Madras	**M5217**	23	9	2	7	2	0	1	0	0	1	**45**
				New Course										
64	**Electrical Engineering with M.Tech in Applied Mechanics with specialization in Biomedical Engineering**	IIT Madras	**M5218**	3	2	0	2	0	1	0	0	0	0	**8**
				946-1225	469-648	-	389-427	-	-	-	-	-	-	
65	**Electrical Engineering with M.Tech. in Communications and Signal Processing**	IIT Bombay	**B5219**	16	7	1	5	2	0	0	1	0	0	**32**
				126-356	214-419	-	91-112	90-138	-	-	-	-	-	

	COURSE TITLE	ADMITTING INSTITUTE	COURSE CODE	GENERAL	OBC (NCL)	OBC (NCL)-M	SC	ST	GE_PD	OBC_ PD	OBC_M _PD	SC_ PD	ST_PD	TOTAL
66	**Electrical Engineering with M.Tech. in Information and Communication Technology**	IIT Delhi	**D5220**	12	6	1	4	2	1	0	0	0	0	**26**
				303-488	327-482	-	217-234	86-88	-	-	-	-	-	
67	**Electrical Engineering with M.Tech. in Microelectronics**	IIT Bombay	**B5221**	15	7	2	5	2	1	0	0	0	0	**32**
				143-262	138-265	-	54-89	94-134	9-9	-	-	-	-	
68	**Electrical Engineering with M.Tech. in any of the listed specializations**	IIT Kharagpur	**G5222**	10	4	1	3	2	1	1	0	0	0	**22**
				1009-1245	601-725	-	333-401	188-194	69-69	-	-	-	-	
69	**Electrical Engineering with M.Tech. in Power Electronics**	IIT Roorkee	**R5223**	8	2	1	2	1	0	1	0	0	0	**15**
				1730-1807	901-962	-	256-465	195-195		-	-	-	-	
	…do…	IT-BHU Varanasi	**V5223**	10	3	1	3	2	0	1	0	0	0	**20**
				3036-3239	1393-1570	-	781-872	393-473	-	-	-	-	-	
70	**Electronics and Communication Engineering with M.Tech. in Wireless Communication**	IIT Roorkee	**R5224**	10	4	1	3	2	0	0	0	0	0	**20**
				1444-1701	689-930	-	402-458	225-225	-	-	-	-	-	
71	**Electronics and Electrical Communication Engineering with M.Tech. in any of the listed specializations**	IIT Kharagpur	**G5225**	19	9	2	6	3	1	0	0	0	0	**40**
				749-1139	550-678	-	342-403	178-239	-	-	-	-	-	
72	**Energy Engineering with M.Tech. in Energy Systems Engineering**	IIT Bombay	**B5226**	14	7	1	5	2	1	0	0	0	0	**30**
				400-1320	662-936	-	294-501	166-264	-	-	-	-	-	
73	**Engineering Design (Automotive Engineering)**	IIT Madras	**M5227**	22	9	2	6	3	0	0	0	1	0	**43**
				1502-2422	891-1463	-	454-797	368-454	-	-	-	-	-	
74	**Engineering Design (Biomedical Design)**	IIT Madras	**M5228**	6	3	1	2	1	1	0	0	0	0	**14**
				2521-2922	1504-1736	-	901-902	538-538	-	-	-	-	-	
75	**Engineering Physics with M.Tech. in Engineering Physics with specialization in Nano Science**	IIT Bombay	**B5229**	6	3	0	2	1	0	0	0	0	0	**12**
				489-1493	532-1013	-	262-451	321-321	-	-	-	-	-	
76	**Industrial Engineering with M.Tech. in Industrial Engineering and Management**	IIT Kharagpur	**G5230**	12	3	1	4	1	0	1	0	0	0	**22**
				2596-2868	1638-1895	-	847-897	525-529	-	-	-	-	-	
77	**Manufacturing Science and Engineering with M.Tech. in Industrial Engineering and Management**	IIT Kharagpur	**G5231**	7	3	1	2	1	0	0	0	0	0	**14**
				2629-2892	1508-1696	-	938-964	449-449	-	-	-	-	-	
78	**Material Science and Technology**	IT-BHU Varanasi	**V5232**	9	4	1	3	2	1	0	0	0	0	**20**
				4083-5170	-	-	1203-1268	609-639	-	-	-	-	-	
79	**Mechanical Engineering**	IT-BHU Varanasi	**V5233**	10	4	1	2	2	0	0	0	1	0	**20**
				3237-3357	1337-1610	-	751-808	410-434	-	-	-	-	-	
80	**Mechanical Engineering with M.Tech. in Computer Aided Design and Automation**	IIT Bombay	**B5234**	11	5	1	3	2	1	0	0	0	0	**23**
				396-578	434-459	-	97-142	141-176	-		-	-	-	
81	**Mechanical Engineering with M.Tech. in Computer Integrated Manufacturing**	IIT Bombay	**B5235**	10	5	1	3	2	1	0	0	0	0	**22**
				439-667	472-536	-	162-197	162-192	104-104	-	-	-	-	
82	**Mechanical Engineering (Thermal Engineering)**	IIT Madras	**M5236**	12	6	1	3	2	0	0	0	0	0	**24**
				854-1365	643-791	-	301-422	139-208	-	-	-	-	-	
83	**Mechanical Engineering (Intelligent Manufacturing)**	IIT Madras	**M5237**	12	5	1	4	2	0	0	0	0	0	**24**
				842-1206	531-730	-	337-385	219-235	36-36	-	-	-	-	
84	**Mechanical Engineering (Product design)**	IIT Madras	**M5238**	11	4	1	4	2	1	1	0	0	0	**24**
				847-1266	683-792	-	141-417	187-241	-	-	-	-	-	
85	**Mechanical Engineering with M.Tech. in any of the listed specializations**	IIT Kharagpur	**G5239**	24	11	1	6	4	0	0	1	1	0	**48**
				1092-1582	604-881	-	323-448	229-255	-	-	-	-	-	

	COURSE TITLE	ADMITTING INSTITUTE	COURSE CODE	GENERAL	OBC (NCL)	OBC (NCL)-M	SC	ST	GE_PD	OBC_ PD	OBC_M _PD	SC_ PD	ST_PD	TOTAL
86	**Metallurgical Engineering**	IT-BHU Varanasi	**V5240**	10	4	1	3	2	0	0	0	0	0	**20**
				4557-5080	-	-	1286-1302	644-644	-	-	-	-	-	
87	**Metallurgical and Materials Engineering**	IIT Madras	**M5241**	7	2	1	2	1	0	0	0	0	0	**13**
				2669-2996	1887-2037	-	922-1011	409-409	-	-	-	-	-	
88	**Metallurgical and Materials Engineering with M.Tech. in Materials Engineering**	IIT Roorkee	**R5242**	10	5	1	3	1	0	0	0	0	0	**20**
				New Course										
89	**Metallurgical and Materials Engineering with M.Tech. in Metallurgical and Materials Engineering**	IIT Kharagpur	**G5243**	10	4	1	2	1	0	0	0	1	0	**19**
				3084-3314	1775-2098	-	967-1026	623-623	-	-	-	-	-	
90	**Metallurgical Engineering and Materials Science with M.Tech. in Ceramics and Composites**	IIT Bombay	**B5244**	15	7	1	4	2	0	0	0	1	0	**30**
				2050-2208	1447-1674	-	742-810	488-512	-	-	-	-	-	
91	**Metallurgical Engineering and Materials Science with M.Tech. in Metallurgical Process Engineering**	IIT Bombay	**B5245**	14	5	1	4	2	0	1	0	0	0	**27**
				2220-2380	1430-1709	-	765-835	436-436	-	-	-	-	-	
92	**Mineral Engineering with M.Tech in Mineral Engineering**	ISM Dhanbad	**S5246**	9	4	1	3	1	0	0	0	0	0	**18**
				5879-6907	-	-	1489-1519	-	-	-	-	-	-	
93	**Mining Engineering**	IIT Kharagpur	**G5247**	10	4	1	3	1	0	0	0	0	0	**19**
				3970-4495	2316-2447	-	1208-1300	570-570	-	-	-	-	-	
	…do…	IT-BHU Varanasi	**V5247**	10	4	1	3	2	0	0	0	0	0	**19**
				5262-5955	-	-	1413-1443	-	-	-	-	-	-	
	Mining Engineering with M.Tech. in Mining Engineering	ISM Dhanbad	**S5247**	9	4	1	3	1	0	0	0	0	0	**18**
				5328-6764	-	-	1336-1411	-	-	-	-	-	-	
94	**Mining Safety Engineering**	IIT Kharagpur	**G5248**	9	4	1	3	1	0	0	0	0	0	**18**
				4507-4823	2463-2463	-	1317-1343	-	-	-	-	-	-	
95	**Naval Architecture and Ocean Engineering**	IIT Madras	**M5249**	4	2	1	2	0	1	0	0	0	0	**10**
				2962-3131	1822-2024	-	1025-1025	337-337	-	-	-	-	-	
96	**Naval Architecture and Ocean Engineering with M.Tech in Applied Mechanics in any of the listed specializations**	IIT Madras	**M5250**	3	2	0	1	1	1	0	0	0	0	**8**
				3162-3221	1804-1840	-	790-995	-	-	-	-	-	-	
97	**Ocean Engineering and Naval Architecture**	IIT Kharagpur	**G5251**	10	4	1	4	2	1	0	0	0	0	**22**
				3394-3541	2025-2237	-	852-1048	519-521	-	-	-	-	-	
98	**Petroleum Engineering with M.Tech in Petroleum Management**	ISM Dhanbad	**S5252**	9	4	1	3	1	0	0	0	0	0	**18**
				4205-5338	2179-2471	-	1145-1284	-	-	-	-	-	-	
99	**Quality Engineering Design and Manufacturing**	IIT Kharagpur	**G5253**	7	3	1	1	1	0	0	0	1	0	**14**
				1846-2924	1359-1859	-	737-973	578-578	-	-	-	-	-	
Five-Year Integrated M. Tech. Courses														
100	**Engineering Physics**	IT-BHU Varanasi	**V5301**	9	4	1	3	2	1	0	0	0	0	**20**
				4304-4781	1694-2503	-	1323-1420	646-646	-	-	-	-	-	
101	**Geological Technology**	IIT Roorkee	**R5302**	16	6	1	5	2	0	1	0	0	0	**31**
				3986-5180	1607-2519	-	1298-1339	-	-	-	-	-	-	
102	**Geophysical Technology**	IIT Roorkee	**R5303**	15	7	1	5	2	1	0	0	0	0	**31**
				4021-4692	2283-2453	-	1241-1326	-	-	-	-	-	-	
103	**Industrial Chemistry**	IT-BHU Varanasi	**V5304**	10	4	1	3	2	1	0	0	0	0	**20**
				4961-6159	2531-2531		1369-1482	-	-	-		-	-	
104	**Mathematics and Computing**	IIT Delhi	**D5305**	23	10	2	7	4	1	1	0	0	0	**48**
				352-824	631-1183	-	349-443	330-392	-	-	-	-	-	

	COURSE TITLE	ADMITTING INSTITUTE	COURSE CODE	GENERAL	OBC (NCL)	OBC (NCL)-M	SC	ST	GE_PD	OBC_ PD	OBC_M _PD	SC_ PD	ST_PD	TOTAL
	…do…	ISM Dhanbad	S5305	15	7	1	4	2	1	0	0	0	0	30
				New Course										
	…do…	IT-BHU Varanasi	V5305	9	4	1	3	2	1	0	0	0	0	20
				3012-3976	1978-2528	-	1239-1283	-	-	-	-	-	-	
Five-year B.Tech. and MBA Degree Courses														
105	Mineral Engineering with MBA	ISM Dhanbad	S5401	9	4	1	3	1	0	0	0	0	0	18
				5460-6945	-	-	1238-1453	-	-	-	-	-	-	
106	Mining Engineering with MBA	ISM Dhanbad	S5402	9	4	1	3	1	0	0	0	0	0	18
				6254-6476	-	-	1443-1471	-	-	-	-	-	-	
107	Process Engineering with MBA	IIT Roorkee	R5403	19	9	2	6	3	1	0	0	0	0	40
				3779-5240	2240-2469	-	1096-1325	-	-	-	-	-	-	
Five-Year Integrated M.Sc. Courses														
108	Applied Geology	IIT Kharagpur	G5501	18	8	2	5	3	0	0	0	0	0	36
				5326-5781	-	-	1311-1538	-	-	-	-	-	-	
109	Applied Mathematics	IIT Roorkee	R5502	16	6	1	5	2	0	1	0	0	0	31
				3279-5762	2241-2241	-	1407-1613	-	-	-	-	-	-	
110	Chemistry	IIT Bombay	B5503	15	7	2	5	2	1	0	0	0	0	32
				2558-4182	1833-2462	-	306-1357	535-535	-	-	-	-	-	
	…do…	IIT Kharagpur	G5503	16	8	1	5	3	1	0	0	0	0	34
				2092-6191	2416-2416	-	233-1555	-	-	-	-	-	-	
	…do…	IIT Roorkee	R5503	10	5	0	3	2	0	0	0	0	0	20
				5901-6538	-	-	1626-1631	-	-	-	-	-	-	
111	Economics	IIT Kharagpur	G5504	21	10	2	7	3	1	0	0	0	0	44
				3367-4839	2495-2495	-	925-1573	-	-	-	-	-	-	
112	Exploration Geophysics	IIT Kharagpur	G5505	17	7	2	5	3	0	0	0	0	0	34
				3500-5318	1778-2250	-	1374-1527	-	-	-	-	-	-	
113	Mathematics and Computing	IIT Kharagpur	G5506	24	10	2	7	4	0	1	-	-	-	48
				2118-3181	1572-2116	-	372-1232	494-589	-	-	-	-	-	
114	Physics	IIT Kharagpur	G5507	18	7	1	5	3	0	1	1	0	0	36
				773-4975	-	-	645-1487	-	-	-	-	-	-	
	…do…	IIT Roorkee	R5507	15	7	1	5	2	1	0	0	0	0	31
				4744-6004	-	-	1505-1586	-	-	-	-	-	-	
Five-Year B.S. and M.S. Dual Degree Courses														
115	Biological Sciences	IIT Madras	M5601	18	7	1	5	3	0	1	0	0	0	35
				New Course										
116	Physics	IIT Madras	M5602	4	2	1	1	1	1	0	0	0	0	10
				2725-3098	845-2041	-	695-695		-	-	-	-	-	
Five-Year Integrated M.Sc. Tech. Degree Courses														
117	Applied Geology	ISM Dhanbad	S5701	10	5	1	3	2	1	0	0	0	0	22
				5679-7233	-	-	1575-1668	-	-	-	-	-	-	
118	Applied Geophysics	ISM Dhanbad	S5702	10	5	1	3	2	1	0	0	0	0	22
				5636-6662	-	-	1432-1599	-	-	-	-	-	-	
Five-Year M.Pharm. Degree Course														
119	Pharmaceutics	IIT-BHU Varanasi	V5801	10	4	1	3	2	0	0	0	0	0	20
				5169-7385	-	-	1488-1561	-	-	-	-	-	-	
				4722	**2101**	**434**	**1403**	**708**	**139**	**68**	**9**	**43**	**20**	**9647**

Table 2 : INSTITUTE-WISE LIST OF COURSES OFFERED AND TOTAL NUMBER OF SEATS

	Course Title	Course Code
	Indian Institute of Technology Bhubaneswar	
1	Civil Engineering	A4109
2	Electrical Engineering	A4111
3	Mechanical Engineering	A4125
	Indian Institute of Technology Bombay	
4	Aerospace Engineering	B4101
5	Chemical Engineering	B4107
6	Civil Engineering	B4109
7	Computer Science and Engineering	B4110
8	Electrical Engineering	B4111
9	Engineering Physics	B4117
10	Mechanical Engineering	B4125
11	Metallurgical Engineering and Materials Science	B4128
12	Chemical Engineering	B5210
13	Electrical Engineering with M.Tech. in Communications and Signal Processing	B5219
14	Electrical Engineering with M.Tech. in Microelectronics	B5221
15	Energy Engineering with M.Tech. in Energy Systems Engineering	B5226
16	Engineering Physics with M.Tech. in Engineering Physics with specialization in Nano Science	B5229
17	Mechanical Engineering with M.Tech. in Computer Aided Design and Automation	B5234
18	Mechanical Engineering with M.Tech. in Computer Integrated Manufacturing	B5235
19	Metallurgical Engineering and Materials Science with M.Tech. in Ceramics and Composites	B5244
20	Metallurgical Engineering and Materials Science with M.Tech. in Metallurgical Process Engineering	B5245
21	Chemistry	B5503
	Indian Institute of Technology Delhi	
22	Chemical Engineering	D4107
23	Civil Engineering	D4109
24	Computer Science and Engineering	D4110
25	Electrical Engineering	D4111
26	Electrical Engineering (Power)	D4112
27	Engineering Physics	D4117
28	Mechanical Engineering	D4125
29	Production and Industrial Engineering	D4136
30	Textile Technology	D4139
31	Biochemical Engineering and Biotechnology	D5205
32	Chemical Engineering	D5210
33	Computer Science and Engineering	D5216
34	Electrical Engineering with M.Tech. in Information and Communication Technology	D5220
35	Mathematics and Computing	D5305
	Indian Institute of Technology Gandhinagar	
36	Chemical Engineering	N4107
37	Electrical Engineering	N4111
38	Mechanical Engineering	N4125

	Course Title	Course Code
	Indian Institute of Technology Guwahati	
39	Biotechnology	W4104
40	Chemical Engineering	W4107
41	Chemical Science and Technology	W4108
42	Civil Engineering	W4109
43	Computer Science and Engineering	W4110
44	Electronics and Communication Engineering	W4114
45	Electronics and Electrical Engineering	W4116
46	Engineering Physics	W4117
47	Mathematics and Computing	W4124
48	Mechanical Engineering	W4125
49	Design	W4401
	Indian Institute of Technology Hyderabad	
50	Chemical Engineering	H4107
51	Civil Engineering	H4109
52	Computer Science and Engineering	H4110
53	Electrical Engineering	H4111
54	Engineering Science	H4118
55	Mechanical Engineering	H4125
	Indian Institute of Technology Indore	
56	Computer Science and Engineering	E4110
57	Electrical Engineering	E4111
58	Mechanical Engineering	E4125
	Indian Institute of Technology Kanpur	
59	Aerospace Engineering	K4101
60	Biological Sciences and Bioengineering	K4103
61	Chemical Engineering	K4107
62	Civil Engineering	K4109
63	Computer Science and Engineering	K4110
64	Electrical Engineering	K4111
65	Materials Science and Engineering	K4123
66	Mechanical Engineering	K4125
67	Chemistry	K4201
68	Economics	K4202
69	Mathematics and Scientific Computing	K4203
70	Physics	K4204
	Indian Institute of Technology Kharagpur	
71	Aerospace Engineering	G4101
72	Agricultural and Food Engineering	G4102
73	Biotechnology and Biochemical Engineering	G4105
74	Chemical Engineering	G4107
75	Civil Engineering	G4109
76	Computer Science and Engineering	G4110
77	Electrical Engineering	G4111
78	Electronics and Electrical Communication Engineering	G4115
79	Industrial Engineering	G4120
80	Instrumentation Engineering	G4121
81	Manufacturing Science and Engineering	G4122

	Course Title	Course Code
82	Mechanical Engineering	G4125
83	Metallurgical and Materials Engineering	G4127
84	Mining Engineering	G4130
85	Ocean Engineering and Naval Architecture	G4133
86	Architecture	G5101
87	Aerospace Engineering	D5201
88	Agricultural and Food Engineering with M.Tech. in any of the listed specializations	G5203
89	Biotechnology and Biochemical Engineering	G5208
90	Chemical Engineering	G5210
91	Civil Engineering with any of the listed specialization	G5215
92	Computer Science and Engineering	G5216
93	Electrical Engineering with M.Tech. in any of the listed specializations	G5222
94	Electronics and Electrical Communication Engineering with M.Tech. in any of the listed specializations	G5225
95	Industrial Engineering with M.Tech. in Industrial Engineering and Management	G5230
96	Manufacturing Science and Engineering with M.Tech. in Industrial Engineering and Management	G5231
97	Mechanical Engineering with M.Tech. in any of the listed specializations	G5239
98	Metallurgical and Materials Engineering with M.Tech. in Metallurgical and Materials Engineering	G5243
99	Mining Engineering	G5247
100	Mining Safety Engineering	G5248
101	Ocean Engineering and Naval Architecture	G5251
102	Quality Engineering Design and Manufacturing	G5253
103		
104	Applied Geology	G5501
105	Chemistry	G5503
106	Economics	G5504
107	Exploration Geophysics	G5505
108	Mathematics and Computing	G5506
108	Physics	G5507
	Indian Institute of Technology Madras	
109	Aerospace Engineering	M4101
110	Chemical Engineering	M4107
111	Civil Engineering	M4109
112	Computer Science and Engineering	M4110
113	Electrical Engineering	M4111
114	Engineering Physics	M4117
115	Mechanical Engineering	M4125
116	Metallurgical and Materials Engineering	M4127
117	Naval Architecture and Ocean Engineering	M4132
118	Aerospace Engineering	M5201
119	Aerospace Engineering with M.Tech. in Applied Mechanics with specialization in Biomedical Engineering	M5202
120	Biological Engineering	M5207
121	Chemical Engineering	M5210

	Course Title	Course Code
122	Civil Engineering with M.Tech. in Applied Mechanics in any of the listed specializations	M5212
123	Civil Engineering (Infrastructural Civil Engineering)	M5213
124	Civil Engineering with any of the listed specialization	M5215
125	Computer Science and Engineering	M5216
126	Electrical Engineering	M5217
127	Electrical Engineering with M.Tech in Applied Mechanics with specialization in Biomedical Engineering	M5218
128	Engineering Design (Automotive Engineering)	M5227
129	Engineering Design (Biomedical Design)	M5228
130	Mechanical Engineering (Thermal Engineering)	M5236
131	Mechanical Engineering (Intelligent Manufacturing)	M5237
132	Mechanical Engineering (Product design)	M5238
133	Metallurgical and Materials Engineering	M5241
134	Naval Architecture and Ocean Engineering	M5249
135	Naval Architecture and Ocean Engineering with M.Tech in Applied Mechanics in any of the listed specializations	M5250
136	Biological Sciences	M5601
137	Physics	M5602
	Indian Institute of Technology Mandi	
138	Computer Science and Engineering	C4110
139	Electrical Engineering	C4111
140	Mechanical Engineering	C4125
	Indian Institute of Technology Patna	
141	Computer Science and Engineering	P4110
142	Electrical Engineering	P4111
143	Mechanical Engineering	P4125
	Indian Institute of Technology Rajasthan	
144	Computer Science and Engineering	J4110
145	Electrical Engineering	J4111
146	Mechanical Engineering	J4125
147	Systems Science	J4138
	Indian Institute of Technology Roorkee	
148	Biotechnology	R4104
149	Chemical Engineering	R4107
150	Civil Engineering	R4109
151	Computer Science and Engineering	R4110
152	Electrical Engineering	R4111
153	Electronics and Communication Engineering	R4114
154	Mechanical Engineering	R4125
155	Metallurgical and Materials Engineering	R4127
156	Polymer Science and Technology	R4135
157	Production and Industrial Engineering	R4136
158	Pulp and Paper Engineering	R4137
159	Architecture	R5101
160	Chemical Engineering with M.Tech. in Hydrocarbon Engineering	R5211
161	Civil Engineering with M.Tech. in Structural Engineering	R5214
162	Electrical Engineering with M.Tech. in Power Electronics	R5223

	Course Title	Course Code
163	Electronics and Communication Engineering with M.Tech. in Wireless Communication	R5224
164	Metallurgical and Materials Engineering with M.Tech. in Materials Engineering	R5242
165	Geological Technology	R5302
166	Geophysical Technology	R5303
167	Process Engineering with MBA	R5403
168	Applied Mathematics	R5502
169	Chemistry	R5503
170	Physics	R5507
	Indian Institute of Technology Ropar	
171	Computer Science and Engineering	U4110
172	Electrical Engineering	U4111
173	Mechanical Engineering	U4125
	Indian School of Mines, Dhanbad	
174	Chemical Engineering	S4107
175	Computer Science and Engineering	S4110
176	Electrical Engineering	S4111
177	Electronics and Communication Engineering	S4114
178	Environmental Engineering	S4119
179	Mechanical Engineering	S4125
180	Mineral Engineering	S4129
181	Mining Engineering	S4130
182	Mining Machinery Engineering	S4131
183	Petroleum Engineering	S4134
184	Mineral Engineering with M.Tech in Mineral Engineering	S5246
185	Mining Engineering with M.Tech. in Mining Engineering	S5247
186	Petroleum Engineering with M.Tech in Petroleum Management	S5252
187	Mathematics and Computing	S5305
189	Mineral Engineering with MBA	S5401

	Course Title	Course Code
190	Mining Engineering with MBA	S5402
191	Applied Geology	S5701
192	Applied Geophysics	S5702
	Institute of Technology, Banaras Hindu University, Varanasi	
193	Ceramic Engineering	V4106
194	Chemical Engineering	V4107
195	Civil Engineering	V4109
196	Computer Science and Engineering	V4110
197	Electrical Engineering	V4111
198	Electronics Engineering	V4113
199	Mechanical Engineering	V4125
200	Metallurgical Engineering	V4126
201	Mining Engineering	V4130
202	Pharmaceutics	V4301
203	Biochemical Engineering	V5204
204	Bioengineering with M.Tech in Biomedical Technology	V5206
205	Ceramic Engineering	V5209
206	Civil Engineering with M.Tech. in Structural Engineering	V5214
207	Computer Science and Engineering	V5216
208	Electrical Engineering with M.Tech. in Power Electronics	V5223
209	Material Science and Technology	V5232
210	Mechanical Engineering	V5233
211	Metallurgical Engineering	V5240
212	Mining Engineering	V5247
213	Engineering Physics	V5301
214	Industrial Chemistry	V5304
215	Mathematics and Computing	V5305
216	Pharmaceutics	V5801

Serial No. 103 not used. Total Number of Courses are : 215.

INSTITUTE	CODE	GENERAL	OBC(NCL)	OBC(NCL)-M	SC	ST	GE_PD	OBC(NCL)_PD	OBC(NCL)-M_PD	SC_PD	ST_PD	Total
IIT Bhubaneswar	A	59	26	6	17	9	1	1	0	1	0	**120**
IIT Bombay	B	431	192	39	129	63	13	6	1	4	2	**880**
IIT Mandi	C	59	26	6	17	8	1	1	0	1	1	**120**
IIT Delhi	D	416	186	38	122	63	13	6	1	4	2	**851**
IIT Indore	E	58	26	6	18	9	2	1	0	0	0	**120**
IIT Kharagpur	G	657	292	59	195	98	20	9	2	6	3	**1341**
IIT Hyderabad	H	97	45	9	29	14	3	1	0	1	1	**200**
IIT Rajasthan	J	78	35	7	23	12	2	2	0	1	0	**160**
IIT Kanpur	K	405	180	37	120	60	12	7	0	4	2	**827**
IIT Madras	M	410	182	37	124	62	13	6	1	2	1	838
IIT Gandhinagar	N	58	26	6	17	9	2	1	0	1	0	**120**
IIT Patna	P	59	26	6	17	9	1	1	0	1	0	**120**
IIT Roorkee	R	567	253	51	169	84	18	8	1	5	3	**1159**
ISM Dhanbad	S	471	210	44	139	70	10	5	1	3	1	**954**
IIT Ropar	U	59	26	6	17	9	1	1	0	1	0	**120**
IT-BHU Varanasi	V	515	225	49	153	83	16	7	1	5	3	**1057**
IIT Guwahati	W	323	144	30	97	46	10	5	1	3	1	660
		4722	**2100**	**436**	**1403**	**708**	**138**	**68**	**9**	**43**	**20**	**9647**

Table 3 : DETAILS OF FEES (in Rupees)
The Fee structure for the Institutes given below is indicative only

Fees in Institutes	One Time Payment	Payable Each Semester	Refundable Caution Deposit	Medical Insurance Premium Per Annum	Total Fees Payable at the time of Admission
IIT Bhubaneswar	**3800**	28800 (3800)	**6000**	650	39250 (14250)
IIT Bombay	**5000**	39750 (14750)	**3000**	126	47876 (22876)
IIT Delhi	**2500**	27035 (2035)	**4000**	450	33985 (8985)
IIT Gandhinagar	**3500**	34100 (9100)	**5000**	-	42600 (17600)
IIT Guwahati	**2150**	28980 (3980)	**4930**	-	36060 (11060)
IIT Hyderabad	**1900**	30000 (5000)	**5500**	600	37400 (12400)
IIT Indore	**3400**	33550 (8550)	**3000**	126	40076 (15076)
IIT Kanpur	**2750**	34692 (9692)	**7000**	-	44442 (19442)
IIT Kharagpur	**3100**	28650 (3650)	**6000**	650	38400 (13400)
IIT Madras	**1750**	27850 (2850)	**2000**	742	32342 (7342)
IIT Mandi	**3790**	32850 (7750)	**4000**	750	41390 (16390)
IIT Patna	**2150**	28550 (3550)	**4500**	521	35721 (10721)
IIT Rajasthan	**2150**	32850 (7850)	**4000**	1000	40000 (15000)
IIT Ropar	**2500**	27035 (2035)	**4000**	450	33985 (8985)
IIT Roorkee	**4890**	32750 (7750)	**4000**	280	41920 (14920)
IT BHU Varanasi	**3325**	13765 (13765)	**4000**	350	21440 (21440)
ISM Dhanbad	**6000**	19492 (5192) (Odd) 17000(2700) (Even)	**5000**	-	30492 (16192)

Fees payable by SC/ST students, where different from those payable by others, are shown in parentheses.

Annual Fee for foreign students : US $ 2000 + other charges in Indian Rupees (for SAARC countries)
US $ 4000 + other charges in Indian Rupees (for other countries)

In addition to these, mess admission fee/mess deposit and medical insurance premium may have to be paid.

IIT-JEE 2012
APPLICATION FORM FOR ADMISSION
INDIAN INSTITUTES OF TECHNOLOGY

Bhubaneswar, Bombay, Delhi, Gandhinagar, Guwahati, Hyderabad, Indore, Kanpur, Kharagpur, Madras, Mandi, Patna, Rajasthan, Roorkee, Ropar, IT-BHU Varanasi and ISM Dhanbad

1. IIT-JEE 2012 Registration No. _____

2. a) All India Rank _____
   b) Category Rank _____

3. IIT-JEE 2012 Application No. _____

4. Nationality (Indian/Foreign) _____

Paste your recent photograph here

5. Category (Tick whichever is applicable)

GE	OBC(NCL)	OBC(NCL)-Minority	SC	ST	PD	DS

6. Applicant's Name ……

7. Date of birth (DD/MM/YYYY):…… 8. Sex:……

9. Parent's/Guardian's Name……

10. Permanent Address
……
……
……
Pin Code……...
Mobile No……..

11. Address for Communication
……..
……..
……
Pin Code……...……
Email id……...

12. Academic Qualifications

Examination	School/College	Board/University	Year of Passing	Percentage of marks
10th Class				
10+2 Class/Intermediate				
Any other Public Examination				

13. Are you colour blind or uniocular? Yes/No

14. Declaration:

I hereby declare that the particulars stated above are true to the best of my knowledge and belief. In the event of suppression or distortion of any fact, I understand that my admission/degree acquired is liable to cancellation. I also understand that the decision of the Joint Admission Board regarding my admission to any of the IITs/IT-BHU Varanasi/ISM Dhanbad is final and I shall abide by the rules and norms of the discipline of the Institute which I join.

Left thumb impression of the Candidate…….....……. Signature of the Candidate

Place:…….....…….

Date:…….....……...

Countersigned by Parent/Guardian

IIT-JEE 2012
INDIAN INSTITUTES OF TECHNOLOGY

Bhubaneswar, Bombay, Delhi, Gandhinagar, Guwahati, Hyderabad, Indore, Kanpur, Kharagpur, Madras, Mandi, Patna,Rajasthan, Roorkee, Ropar, IT-BHU Varanasi and ISM Dhanbad

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UNDERTAKING

(to be given by a candidate whose qualifying examination result is awaited and hence provisionally admitted)

1. Name…….

2. IIT-JEE 2012 Registration No……..

3. All India Rank:…….

4. Category: [GE/OBC (NCL)/OBC(NCL)-Minority/SC/ST] ……... .PD: YES/NO DS: YES/NO

I understand that my admission to any of the IITs/IT-BHU, Varanasi/ISM Dhanbad is **provisional** since I have not submitted the original and two attested copies of the Qualifying Examination certificate and/or mark sheet as per the eligibililty criteria stated in **Section III of the Information Brochure for IIT-JEE 2012.**

I will produce the original certificate of the qualifying examination at the time of Registration or on or before September 30, 2012 to the respective Institutes.

……. ……..

Left Thumb impression of the candidate Signature of the candidate

Place:…….. ……

Date:…….. Countersigned by Parent/Guardian

IIT-JEE 2012
MEDICAL EXAMINATION REPORT
(to be issued by a Registered Medical Practitioner)

General Expectations

Candidates should have good general physique. In particular,

a) *Chest Measurement should not be less than 70cm, with satisfactory limits of expansion and contraction.*

b) *Vision should be normal. In case of defective vision, it should be corrected to 6/9 in both eyes or 6/6 in the better eye. Colour blind or uniocular persons are ineligible for admission in Mining Engineering and Mining Machinery Engineering courses.*

c) *Hearing should be normal. Defective hearing should be corrected.*

d) *Heart and lungs should not have any abnormality and there should be no history of mental illness or epileptic fits.*

PERSONAL HISTORY

1. Name……

2. IIT-JEE 2012 Registration No…… 3. All India Rank …….

4. Parent/Guardian's Name……

5. Age…….Years……..Months 6. Sex…….

7. Identification mark on the body, if any (This can be a mole, scar or birthmark)

……

8. Major illness / operation, if any (specify nature of illness / operation)

……

Signature of the candidate

MEDICAL CERTIFICATE

(the following are to be filled by the Medical Officer conducting the medical examination)

1. Height …….. cm. 2. Weight …….. kg.

3. Past History : (a) Mental Disease……

(b) Epileptic Fit……..

4. Chest : (a) Inspiration ……. cm (b) Expiration …… cm.

5. Blood Group …… 6. Hearing ……

7. Vision with or without glasses

(a) Right Eye ……………………………….. (b) Left Eye …………..……………………….

(c) Colour Blindness……………………….. (d) Uniocular Vision …………………………..

8. Respiratory system ………………………… 9. Nervous system ..…………………………

10. Heart: (a) Sounds……………………… (b) Murmur …………………………………….

11. Abdomen (a) Liver………………………… (b) Spleen ………………..…………………….

12. (a) Hernia ………………………………. (b) Hydrocele ………………….…………………

13. Any other defects……………………………………………………………………………………

… .

CERTIFIED that ……………………………………………… Son / daughter of ……………………. ……….

(a) fulfills the prescribed standard physical fitness and is FIT for admission to Engineering / Architecture / Pharmaceutics / Science Course

(b) does not fulfill the prescribed standard of physical fitness and is unfit / temporarily unfit for admission due to following defects ……………………………………………………………………………………………..

(c) ………

Signature of the Medical Officer

Date:……………………………

Full Name……………………………

Medical Registration No…………………….

Official Seal

FORM OF CERTIFICATE TO BE PRODUCED BY SCHEDULED CASTES AND SCHEDULED TRIBES CANDIDATES

1. This is to certify that Shri/ Shrimati/ Kumari* _____ son/daughter* of _____ of Village/Town* _____ District/Division* _____ of State/Union Territory*_____belongs to the _____ Scheduled Caste / Scheduled Tribe* under :-

* The Constitution (Scheduled Castes) Order, 1950
* The Constitution (Scheduled Tribes) Order, 1950
* The Constitution (Scheduled Castes) (Union Territories) Order, 1951
* The Constitution (Scheduled Tribes) (Union Territories) Order, 1951

[As amended by the Scheduled Castes and Scheduled Tribes Lists (Modification Order) 1956, the Bombay Reorganisation Act, 1960, the Punjab Reorganisation Act, 1966, the State of Himachal Pradesh Act, 1970, the North Eastern Areas (Reorganisation) Act, 1971, the Scheduled Castes and Scheduled Tribes Orders (Amendment) Act, 1976 and the Scheduled Castes and Scheduled Tribes Orders (Amendment) Act, 2002]

* The Constitution (Jammu and Kashmir) Scheduled Castes Order, 1956;
* The Constitution (Andaman and Nicobar Islands) Scheduled Tribes Order, 1959, as amended by the Scheduled Castes and Scheduled Tribes Order (Amendment) Act, 1976;
* The Constitution (Dadara and Nagar Haveli) Scheduled Castes Order, 1962;
* The Constitution (Dadara and Nagar Haveli) Scheduled Tribes Order, 1962;
* The Constitution (Pondicherry) Scheduled Castes Order, 1964;
* The Constitution (Uttar Pradesh) Scheduled Tribes Order, 1967;
* The Constitution (Goa, Daman and Diu) Scheduled Castes Order, 1968;
* The Constitution (Goa, Daman and Diu) Scheduled Tribes Order, 1968;
* The Constitution (Nagaland) Scheduled Tribes Order, 1970;
* The Constitution (Sikkim) Scheduled Castes Order, 1978;
* The Constitution (Sikkim) Scheduled Tribes Order, 1978;
* The Constitution (Jammu and Kashmir) Scheduled Tribes Order, 1989;
* The Constitution (Scheduled Castes) Order (Amendment) Act, 1990;
* The Constitution (Scheduled Tribes) Order (Amendment) Act, 1991;
* The Constitution (Scheduled Tribes) Order (Second Amendment) Act, 1991;

2. # This certificate is issued on the basis of the Scheduled Castes / Scheduled Tribes* Certificate issued to Shri /Shrimati* _____ father/mother* of Shri /Shrimati /Kumari* _____ of Village/ Town* _____ in District/Division* _____ of the State State/Union Territory* _____ who belong to the Caste / Tribe* which is recognised as a Scheduled Caste / Scheduled Tribe* in the State / Union Territory* _____ issued by the _____ dated_____.

3. Shri/ Shrimati/ Kumari * _____ and / or* his / her* family ordinarily reside(s)** in Village/ Town* _____ of _____ District/Division* of the State Union Territory* of _____.

Signature: _____

Designation _____
(with seal of the Office)

Place: _____ State/Union Territory* _____
Date: _____

* Please delete the word(s) which are not applicable.
# Applicable in the case of SC/ST Persons who have migrated from another State/UT.

IMPORTANT NOTES :

1. The term "ordinarily reside(s)**" used here will have the same meaning as in Section 20 of the Representation of the People Act, 1950.

2. Officers competent to issue Caste/Tribe certificates:

   (i) District Magistrate / Additional District Magistrate / Collector / Deputy Commissioner / Additional Deputy Commissioner / Deputy Collector / Ist Class Stipendiary Magistrate / City Magistrate / Sub-Divisional Magistrate / Taluka Magistrate / Executive Magistrate / Extra Assistant Commissioner.

   (ii) Chief Presidency Magistrate / Additional Chief Presidency Magistrate / Presidency Magistrate.

   (iii) Revenue Officers not below the rank of Tehsildar.

   (iv) Sub-divisional Officer of the area where the candidate and/ or his family normally reside(s).

   (v) Administrator / Secretary to Administrator / Development Officer (Lakshdweep Island).

3. Certificate issued by any other authority will be rejected.

FORM OF CERTIFICATE TO BE PRODUCED BY OTHER BACKWARD CLASSES APPLYING FOR ADMISSION TO CENTRAL EDUCATIONAL INSTITUTIONS (CEIs), UNDER THE GOVERNMENT OF INDIA

This is to certify that Shri / Smt. / Kum*._____ Son / Daughter* of Shri / Smt.* _____ of Village/Town* _____ District/Division* _____ in the _____ State belongs to the _____ Community which is recognized as a backward class under:

(i) Resolution No. 12011/68/93-BCC(C) dated 10/09/93 published in the Gazette of India Extraordinary Part I Section I No. 186 dated 13/09/93.

(ii) Resolution No. 12011/9/94-BCC dated 19/10/94 published in the Gazette of India Extraordinary Part I Section I No. 163 dated 20/10/94.

(iii) Resolution No. 12011/7/95-BCC dated 24/05/95 published in the Gazette of India Extraordinary Part I Section I No. 88 dated 25/05/95.

(iv) Resolution No. 12011/96/94-BCC dated 9/03/96.

(v) Resolution No. 12011/44/96-BCC dated 6/12/96 published in the Gazette of India Extraordinary Part I Section I No. 210 dated 11/12/96.

(vi) Resolution No. 12011/13/97-BCC dated 03/12/97.

(vii) Resolution No. 12011/99/94-BCC dated 11/12/97.

(viii) Resolution No. 12011/68/98-BCC dated 27/10/99.

(ix) Resolution No. 12011/88/98-BCC dated 6/12/99 published in the Gazette of India Extraordinary Part I Section I No. 270 dated 06/12/99.

(x) Resolution No. 12011/36/99-BCC dated 04/04/2000 published in the Gazette of India Extraordinary Part I Section I No. 71 dated 04/04/2000.

(xi) Resolution No. 12011/44/99-BCC dated 21/09/2000 published in the Gazette of India Extraordinary Part I Section I No. 210 dated 21/09/2000.

(xii) Resolution No. 12015/9/2000-BCC dated 06/09/2001.

(xiii) Resolution No. 12011/1/2001-BCC dated 19/06/2003.

(xiv) Resolution No. 12011/4/2002-BCC dated 13/01/2004.

(xv) Resolution No. 12011/9/2004-BCC dated 16/01/2006 published in the Gazette of India Extraordinary Part I Section I No. 210 dated 16/01/2006.

Shri / Smt. / Kum. _____ and / or his family ordinarily reside(s) in the _____ District / Division of _____ State. This is also to certify that he/she does not belong to the persons/sections (Creamy Layer) mentioned in Column 3 of the Schedule to the Government of India, Department of Personnel & Training O.M. No. 36012/22/93-Estt.(SCT) dated 08/09/93 which is modified vide OM No. 36033/3/2004 Estt.(Res.) dated 09/03/2004, and further modified vide OM No. 36033/3/2004-Estt. (Res.) dated 14/10/2008 or the latest notification of the Government of India..

Dated:

District Magistrate / Deputy Commissioner / Competent Authority

Seal

* Please delete the word(s) which are not applicable.

NOTE:

(a) The term 'Ordinarily' used here will have the same meaning as in Section 20 of the Representation of the People Act, 1950.

(b) The authorities competent to issue Caste Certificates are indicated below:

(i) District Magistrate / Additional Magistrate / Collector / Deputy Commissioner / Additional Deputy Commissioner / Deputy Collector / Ist Class Stipendiary Magistrate / Sub-Divisional magistrate / Taluka Magistrate / Executive Magistrate / Extra Assistant Commissioner (not below the rank of Ist Class Stipendiary Magistrate).

(ii) Chief Presidency Magistrate / Additional Chief Presidency Magistrate / Presidency Magistrate.

(iii) Revenue Officer not below the rank of Tehsildar' and

(iv) Sub-Divisional Officer of the area where the candidate and / or his family resides.

DECLARATION / UNDERTAKING - FOR OBC CANDIDATES ONLY

I, _____ son / daughter of Shri _____ resident of village/town/city _____ district _____ State _____ hereby declare that I belong to the _____ community which is recognised as a backward class by the Government of India for the purpose of reservation in services as per orders contained in Department of Personnel and Training Office Memorandum No.36012/22/93- Estt. (SCT), dated 8/9/1993. It is also declared that I do not belong to persons/sections (Creamy Layer) mentioned in Column 3 of the Schedule to the above referred Office Memorandum, dated 8/9/1993, which is modified vide Department of Personnel and Training Office Memorandum No.36033/3/2004 Estt.(Res.) dated 9/3/2004 and further modified vide OM No. 36033/3/2004-Estt. (Res.) dated 14/10/2008 or the latest notification of the Government of India..

I also declare that the condition of status / annual income for 'Creamy Layer' of my parents is within prescribed limits as on financial year ending on March 31, 2011.

Signature of the Candidate

Place:
Date:

Declaration / undertaking not signed by Candidate will be rejected

NOTE:

"The admission is provisional and is subject to the community certificate being verified through the proper channels. If the verification reveals that the claim of the candidate to belong to Other Backward Classes or not to belong to the creamy layer is false, his/her admission will be terminated forthwith without assigning any further reasons and without prejudice to such further action as may be taken under the provisions of the Indian Penal Code for production of false certificates."

Websites of Institutes and Telephone Numbers of JEE Offices

	Website	Telephone	IVRS	FAX
IIT Bhubaneswar	http://www.iitbbs.ac.in	0674-230 1292		0674-230 1983
IIT Bombay	http://www.iitb.ac.in	022-2576 4063	022-2576 7062	022-2572 0305
IIT Delhi	http://www.iitd.ac.in	011-2659 1785	011-2658 1064, 2658 2002	011-2658 1067
IIT Gandhinagar	http://www.iitgn.ac.in	0792-3972583		0792-3972324
IIT Guwahati	http://www.iitg.ac.in	0361-2692795	0361-2692788	0361-2582180
IIT Hyderabad	http://www.iith.ac.in	050-2301 6033		050-2301 6003
IIT Indore	http://www.iiti.ac.in	022-2576 4801		022-2576 4802
IIT Kanpur	http://www.iitk.ac.in	0512-2597335, 3927335, 6797335		
IIT Kharagpur	http://www.iitkgp.ac.in	03222-282101,282102	03222-278241	03222-278242
IIT Madras	http://www.iitm.ac.in	044-22578220	044-22578223	044-22578224
IIT Mandi (HP)	http://www.iitmandi.ac.in	0133-2285223		01332-285223
IIT Patna	http://www.iitp.ac.in	0612-2552067		0612-2277383
IIT Ropar	http://www.iitrpr.ac.in	1881-227083		1881-223393
IIT Roorkee	http://www.iitr.ac.in	01332-284272	01332-279806	01332-285346
IIT Rajasthan	http://www.iitj.ac.in	0512 259 6245		0512 259 6244
ISM Dhanbad	http://www.ismdhanbad.ac.in	0326 – 2235296		0326-2296612
IT-BHU Varanasi	http://itbhu.ac.in	0542 – 6702067/ 71 0542 – 2307039		0542 - 2368428

Reporting Dates for Admitted Candidates

Institute	Registration/ Payment of fees	Classes Begin	Institute	Registration/ Payment of fees	Classes Begin
IIT Bhubaneswar	July 27, 2012	July 30, 2012	IIT Kharagpur	July 20, 2012	July 23, 2012
IIT Bombay	July 19, 2012	July 23, 2012	IIT Madras	July 24, 2012	July 30, 2012
IIT Delhi	July 16, 2012	July 23, 2012	IIT Mandi (HP)	July 30, 2012	Aug. 01, 2012
IIT Gandhinagar	July 18, 2012	July 31, 2012	IIT Patna	July 23, 2012	July 25, 2012
IIT Guwahati	July 21, 2012	July 24, 2012	IIT Ropar	July 24, 2012	July 26, 2012
IIT Hyderabad	July 26, 2012	July 30, 2012	IIT Roorkee	July 21, 2012	July 24, 2012
IIT Indore	July 23, 2012	July 25, 2012	IIT Rajasthan	July 24, 2012	July 27, 2012
IIT Kanpur	July 27, 2012	July 30, 2012	IT-BHU Varanasi	July 27, 2012	July 30, 2012
			ISM Dhanbad	July 22, 2012	July 25, 2012

COUNSELLING SCHEDULE

Opening of the JEE Counselling On-line Portal	12:00 hrs Friday, 18th May 2012
Course choice filling start *	10:00 hrs Sunday, 20th May 2012
Last date of receiving required documents at respective zonal IITs	17:00 hrs Friday, 8th June 2012
Closing of printing of counselling fee challan	17:00 hrs Thursday, 7th June 2012
Closing of counselling fee payment at Banks	Bank working hours Friday, 8th June 2012
Closing of on-line choice filling	17:00 hrs Sunday, 10th June 2012

*On-line filling of choices can be done only after the payment is made.

Medical Examination for PD candidates

Registration for medical board venue	18th May 2012 to 2nd June 2012
At Selected IITs	Monday, 4th June 2012 to Wednesday, 6th June 2012

Architecture Aptitude Test (for admission to B. Arch. Programme

Registration for architecture aptitude test	18th May 2012 to 2nd June 2012
Architecture aptitude test	09:00 hrs Sunday, 3rd June 2012

SEAT ALLOTMENT SCHEDULE

Web Release of First Allotment	Thursday, 14th June, 2012
Last date for payment of fees to accept the offer of admission made in the first allotment	Banking hours on Friday, 22nd June, 2012
Web Release of Second Allotment	Monday, 25th June, 2012
Last date for payment of fees to accept the offer of admission made in the second allotment	Banking hours on Tuesday, 3rd July, 2012
Web Release of Third Allotment	Friday, 6th July, 2012

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B-220, Phase II, Noida (UP)