• To contribute to India and the world through Excellence in Scientific and technical education and research;
• To serve as a valuable source for industry and Society; and
• To remain a source of pride for all Indians.
MISSION

- To generate new knowledge by engaging in cutting edge research and to promote academic growth by offering state-of-art undergraduate, postgraduate and doctoral programmes.
- To Identify, based on an informed perception of Indian, regional and global needs, areas of specialization upon which the institute can concentrate.
- To undertake collaborative projects which offer opportunities for long-term interaction with academia and industry.
- To develop human potential to its fullest extent so that intellectually capable and imaginatively gifted leaders can emerge in a range of professions.
VALUES

- Academic integrity and accountability.
- Respect and tolerance for the view of every individual.
- Attention to issues of national relevance as well as of global concern.
- Breadth of understanding, including knowledge of human science.
- Appreciation of intellectual excellence and creativity.
- A unfettered spirit of exploration, rationality and enterprises.
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1. INTRODUCTION

Indian Institute of Technology Delhi is one of the Nineteen IITs created to be Centres of Excellence for training, research and development in science, engineering and technology in India.

Established as College of Engineering in 1961, the Institute was later declared as an 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 Deemed University with powers to decide its own academic policy, to conduct its own examinations, and to award its own degrees.
Since its inception, over 40096 have graduated from IIT Delhi in various disciplines including Engineering, Physical Sciences, Management and Humanities & Social Sciences. Of these, nearly 4101 received Ph.D. degrees. The number of students who graduated with B.Tech. degree is over 13326. The rest obtained Master’s Degree in Engineering, Sciences and Business Administration. These alumni today work as scientists, technologists, business managers and entrepreneurs. There are several alumni who have moved away from their original disciplines and have taken to administrative services, active politics or are with NGOs. In doing so, they have contributed significantly to building of this nation, and to industrialization around the world.
IIT Delhi is situated in Hauz Khas in South Delhi, which is a landmark place in the colourful and chequered history of Delhi. Bounded by the Sri Aurobindo Marg on the east, the Jawaharlal Nehru University Complex on the west, the National Council of Educational Research and Training on the south, and the Outer Ring Road on the north, the Institute campus is flanked by Qutub Minar and the Hauz Khas monuments.

Well connected to the major city centres by open and wide roads, the Institute campus is about 19 km. away from the Delhi Main Railway Station, 14 km. from the New Delhi Railway Station, 21 km. from the Inter-State Bus Terminal (Kashmere Gate) and 10 km. from Delhi Airport. The nearest Metro Rail Station is Hauz Khas.
The campus of the Institute extends to an area of 320 acres. With many topographical features, imaginatively laid out with picturesque landscape, numerous buildings of various nature and stature, and clean and wide roads, the campus presents a spectacle of harmony in architecture and natural beauty.

The campus area has been divided into four functional zones: (i) Residential zone for students; (ii) Residential zone for the faculty and other supporting staff; (iii) Academic zone for academic buildings and workshops; and (iv) Cultural-cum-social and recreational zone for students.

The campus also offers amenities like Staff Clubs, Hospital, Shopping Centre, Banks, Post Office, Telecom Centre, Community Centre, Stadium, Playing Fields, etc. The Students Activities Centre provides all facilities for students’ extra-curricular activities and physical development. The central double-storied recreation block with a swimming pool and a gymnasium hall offers amenities such as squash courts, hobbies workshops/seminar rooms, music rooms and other multipurpose rooms for reading and indoor games. The amphitheater with large capacity constructed in modern style is an added amenity to the centre.
ADMINISTRATION

I.I.T. Delhi is an autonomous statutory organization functioning within the “Institutes of Technology Act” as amended by “The Institutes of Technology (Amendment) Act, 1963”.

The Indian Institutes of Technology are administered centrally by the IIT Council, an apex body established by the Government of India to co-ordinate the activities of these Institutes.

The Hon’ble Minister for Human Resource Development of the Government of India is the Chairman of the IIT Council. Each Indian Institute of Technology has a Board of Governors responsible for its overall administration and control.

CHAIRMAN, BOG

Dr. Vijay P. Bhatkar is the Chairman, Board of Governors of IIT Delhi.

Dr. Bhatkar, a most acclaimed and internationally acknowledged scientists of India, is best known as the architect of India’s national initiative in supercomputing where he led the development of Param supercomputers. His major path-breaking initiatives in bringing ICT to the masses include GIST multilingual technology and Education to Home (ETH). He has received many national and international honours, awards and fellowships which include Padma Bhushan and Padmashri Awards by the Government of India and Maharashtra Bhushan Award by the Government of Maharashtra.

DIRECTOR

Prof. K. Gupta is the Director of IIT Delhi.

Dr. K. Gupta received his education at IIT Kharagpur, and his Ph.D. degree in 1979 from IIT Delhi. He has more than 35 years of teaching experience at IIT Roorkee and IIT Delhi. His teaching and research interests are in Vibrations, Acoustics, Rotor Dynamics and Mechanical Design. He has co-authored a book on “Mechanical Vibrations”. He is a fellow of Indian National Academy of Engineering (INAE), and member of IFToMM Technical Committee on Rotor Dynamics (TCRD).

THE SENATE

The Senate decides the academic policy of the Institute, and approves curriculum, courses and examination results. It appoints committees to look into specific academic matters arising from time to time. The teaching, training and research activities of various departments at the Institute are constantly under review to improve both facilities and standard. The Director of the Institute is the Chairman of the Senate.

Financial advice to the Institute is rendered by the Finance Committee. Similarly, there is a Buildings and Works Committee to advise on matters relating to buildings and works activity. These committees are appointed by the Board of Governors. In addition, there are a number of other committees like the Board of Academic Programmes, Board of Educational Research and Planning are appointed by the Senate to help the administration in the efficient running of the Institute.
2. ACADEMICS

I.I.T. Delhi provides science-based engineering education with a view to produce quality engineer-scientists. The curriculum provides broad based knowledge and simultaneously builds a temper for the life long process of learning and exploring.

2.1 ACADEMIC SYSTEM

At the undergraduate level, a student needs to do compulsory foundation courses in the areas of basic sciences, humanities and social sciences and engineering sciences apart from departmental requirements. At postgraduate level, several specializations, in the form of various M.S., M.Tech., M.B.A., M.Des. D.I.I.T., and M.Sc., are available and the students get an exposure and training in research in their chosen fields. The Institute has a strong Ph.D. programmes and the students carry out advanced research under the guidance of the members of the Institute faculty.

The Institute undertakes a major revision of its curriculum periodically. From the academic session 2013-14, a new undergraduate curriculum has been in place and the new postgraduate curriculum has been implemented from the academic session 2015-16.

The Institute follows the semester system. An academic year runs from July through June next year and comprises two semesters. Typically, the 1st semester starts in the last week of July and ends in the 1st week of December; and the 2nd semester starts in the first week of January and ends in the 2nd week of May. Additionally, the summer semester which starts in the 3rd week of May and ends in the 2nd week of July, is utilised in some exceptional cases. Detailed activities are given in the Semester Schedule that is available before the start of every semester.
2.2 ACADEMIC STRUCTURE

The major academic units of the Institute are the Departments, Centres and the Schools. Interdisciplinary research is organized in programmes. The various academic units are listed below, and details are given latter in this document. The activities of Departments include teaching at all levels and research. The Centres focus on interdisciplinary research and some teaching mostly at the postgraduate level.

**Departments**
- Department of Applied Mechanics
- Department of Biochemical Engineering and Biotechnology
- Department of Chemical Engineering
- Department of Chemistry
- Department of Civil Engineering
- Department of Computer Science and Engineering
- Department of Electrical Engineering
- Department of Humanities and Social Sciences
- Department of Management Studies
- Department of Mathematics
- Department of Mechanical Engineering
- Department of Physics
- Department of Textile Technology

**Schools**
- Amar Nath and Shashi Khosla School of Information Technology
- Bharti School of Telecommunication Technology and Management
- School of Biological Sciences

**Centres**
- Centre for Applied Research in Electronics
- Centre for Atmospheric Sciences
- Centre for Biomedical Engineering
- Centre for Energy Studies
- Industrial Tribology Machine Dynamics Maintenance Centre
- Instrument Design and Development Centre
- Centre for Polymer Science and Engineering
- Centre for Rural Development and Technology
- National Resource Centre for Value Education in Engineering

**Interdisciplinary Research Programmes**
- Transportation Research and Injury Prevention Programme
- Opto-Electronics and Optical Communication Research Programme
2.3 RESEARCH AND INNOVATION

IIT Delhi places strong emphasis on research and development, and innovation. Faculty members undertake research in the fields of their interest. Many postgraduate students and some undergraduate students are also involved in these activities, as the curriculum provides facilities for the same. While some research is funded by the Institute, majority of research activities/projects are funded by sponsoring agencies and/or industries. All projects funded by government agencies and some industry funded projects are managed through the Institute’s Industrial Research and Development (IRD) Unit. Innovative technology development and industrial outreach are also facilitated by the Foundation for Innovation and Technology Transfer (FITT), a non-profit society associated with IIT Delhi and located on the campus.
2.4 COLLABORATIONS

I.I.T. Delhi is actively involved in collaborative programmes with industry, academia and governments at national and international level to remain at the forefront of scientific and technological developments and also to share knowledge for mutual benefit. The Institute has more than hundred Memoranda of Understanding established with different organizations/ institutions from countries all over the world which include Australia, Canada, China, Ethiopia, France, Germany, Japan, Korea, Switzerland, UK and USA. A large number of collaborative projects and student exchange programmes are active under these agreements.

At national level, the Institute has agreements with about fifty organizations/ institutions which include Bharti Enterprises, C-DAC, Media Lab (Asia), TCS, DMRC, DAE, MHRD etc. Besides, the Institute has been undertaking Consultancy Assignments with International Organisations including Japan Automobile Research Institute, Japan; LG Electronics Inc, Korea; Common Fund for Commodities, Netherlands; INFRAS, Switzerland; Thai Acrylic Fibre Company Limited, Thailand; Marvel Chemicals Ltd, UK; PPG Industries Inc., USA; United Technologies Corp./Pratt & Whitney, USA; Solidcore Systems Inc., USA; Gulf Coast Technical Service, USA; Corning Inc., USA; Biomorphic VLSI Inc., USA; and Universities/ Institutions abroad.
2.5 STUDENT EXCHANGE PROGRAMMES

IIT Delhi promotes exchange of students with premier institutions in India and abroad at UG, PG and Ph.D. levels. At the international level, the exchange programme has been established with institutions like IMT France, INSA Toulouse France, INSA Lyon France, KTH Sweden, City University Hong Kong, EPFL Switzerland, Ecole Centrale Paris France, TU9 Institutes Germany, NTHU Taiwan and UBC Canada. Apart from these, I.I.T. Delhi is also one of the partner institutions under India4EU programme of the ERASMUS MUNDUS project of European Commission under which active student exchange is undertaken with European partner institutions.
2.6 ACADEMIC PROGRAMMES

IIT Delhi offers a variety of academic programmes for students with a wide range of backgrounds leading to the degrees listed below.

**Doctor of Philosophy: (Ph.D.)**
All Departments, Centres and Schools offer Ph.D. programmes.

**Master of Technology: (M.Tech.)**

- M.Tech. in Engineering Mechanics
- M.Tech. in Design Engineering
- M.Tech. in Chemical Engineering
- M.Tech. in Molecular Engineering: Chemical Synthesis & Analysis
- M.Tech. in Geotechnical and Geoenvironmental Engineering
- M.Tech. in Rock Engineering and Underground Structures
- M.Tech. in Structural Engineering
- M.Tech. in Water Resources Engineering
- M.Tech. in Construction Engineering and Management
- M.Tech. in Environmental Engineering and Management
- M.Tech. in Transportation Engineering
- M.Tech. in Computer Science and Engineering
- M.Tech. in Communications Engineering
- M.Tech. in Computer Technology
- M.Tech. in Control and Automation
- M.Tech. in Integrated Electronics and Circuits
- M.Tech. in Power Electronics, Electrical Machines and Drives
- M.Tech. in Power Systems
- M.Tech. in Design of Mechanical Equipment
- M.Tech. in Industrial Engineering
- M.Tech. in Production Engineering
- M.Tech. in Thermal Engineering
- M.Tech. in Applied Optics
- M.Tech. in Solid State Materials
- M.Tech. in Fibre Science & Technology
- M.Tech. in Textile Engineering
- M.Tech. in Radio Frequency Design and Technology
- M.Tech. in Atmospheric-Oceanic Science and Technology
- M.Tech. in Energy Studies
- M.Tech. in Industrial Tribology and Maintenance Engineering
- M.Tech. in Instrument Technology
- M.Tech. in Optoelectronics and Optical Communication
- M.Tech. in Polymer Science and Engineering
- M.Tech. in Telecommunication Technology and Management
- M.Tech. in VLSI Design Tools and Technology
Master of Science (Research):
M.S. (R) in Applied Mechanics
M.S. (R) in Bharti School of Telecommunication Technology and Management
M.S. (R) in Biochemical Engineering and Biotechnology
M.S. (R) in Chemical Engineering
M.S. (R) in Civil Engineering
M.S. (R) in Computer Science and Engineering
M.S. (R) in Electrical Engineering
M.S. (R) in Mechanical Engineering
M.S. (R) in Amar Nath and Shashi Khosla School of Information Technology
M.S. (R) in School of Biological Sciences

Masters of Business Administration (M.B.A):
M.B.A.
M.B.A. (with focus on Telecommunication Systems Management)
M.B.A. (with focus on Technology Management), (part-time evening programme)

Master of Design in Industrial Design (M.Des.)

Masters of Science (M.Sc.)
M.Sc. in Chemistry
M.Sc. in Mathematics
M.Sc. in Physics

Postgraduate Diploma:
D.I.I.T (Naval Construction) (for candidates sponsored by the Indian Navy)
Dual Degree: B.Tech. and M.Tech.:
B.Tech. & M.Tech. in Biochemical Engineering and Biotechnology
B.Tech. & M.Tech in Chemical Engineering
B.Tech. & M.Tech in Computer Science and Engineering
B.Tech. & M.Tech. in Mathematics and Computing

Bachelor of Technology (B.Tech)
B.Tech. in Biochemical Engineering and Biotechnology
B.Tech. in Chemical Engineering
B.Tech. in Computer Science and Engineering
B.Tech. in Civil Engineering
B.Tech. in Electrical Engineering
B.Tech. in Electrical Engineering (Power and Automation)
B.Tech. in Mathematics and Computing
B.Tech. in Mechanical Engineering
B.Tech. in Production and Industrial Engineering
B.Tech. in Engineering Physics
B.Tech. in Textile Engineering

The details of these programmes are given under specific Departments, Centers and Schools in this Prospectus as well as in the Courses of Study 2015-2016.
3. ADMISSIONS

Admission to IIT Delhi is possible through various entrance examinations, like the Joint Entrance Examination (JEE), Graduate Aptitude Test in Engineering (GATE), Common Entrance Examination for Design (CEED), Common Admission Test (CAT) and Joint Admission Test in M.Sc. (JAM), for its various degrees and programmes.

3.1 UNDERGRADUATE PROGRAMMES

Admission to all Undergraduate Programmes listed in Chapter 2 are made through the Joint Entrance Examination (JEE) (Main and Advanced). For further information please visit JEE website: http://jee.iitd.ac.in/

Visiting Studentship

A student, who is registered for an Engineering/Technology degree in a recognized Institute/University in India or abroad, is eligible for being considered as a visiting student at IIT Delhi, for a maximum period of 6 months/one semester. More details can be obtained from the Undergraduate (UG) Section of the Institute.

Summer Research Fellowship

In order to expose students from other Engineering Colleges/Institutes to the ongoing research activities at IIT Delhi, Institute has introduced Summer Research Fellowship programme for undergraduate students from other engineering Institutes. IIT Delhi will offer fellowship or interns can also be supported from budget of sponsored/consultancy projects, through an outside fellowship (eg. KVPY, INSA, INAE, etc.) or institutional MoUs. Further details can be obtained from the Undergraduate (UG) Section of the Institute.
Admission of UG students to PG programmes with advance standing

UG students of IIT Delhi with advance standing are eligible for admission to PG programmes at IIT Delhi. Details are given in the Courses of Study booklet.

3.2 POSTGRADUATE PROGRAMMES

Procedure for admission: Applications are invited from candidates by advertising the programmes in the Employment News, leading Newspapers as well as on the Institute Website in March/October every year. Subsequently, the candidates have to apply online as specified in the advertisements.

Admission are done through the Graduate Aptitude Test in Engineering (GATE) for M.Tech. Programmes, Common Entrance Examination for Design (CEED) for M.Des., CAT for M.B.A. and, JAM for M.Sc. programmes.

Admission to Ph.D./M.S.(Research) programme is also possible any time during the year through Department Research Committee (DRC) / Centre’s Research Committee (CRC) / Research Committee of School with the approval of Dean, Academics. For further information / details, please visit: the institute website - www.iitd.ac.in

IIT DELHI FOLLOWS RESERVATIONS IN ADMISSIONS (BOTH UG AND PG) AND CHARGES FEES AS PRESCRIBED BY GOVERNMENT OF INDIA FROM TIME TO TIME.

Migration from one PG Programme to another PG Programme of the Institute

Provision exists for the PG students of the Institute to move from (i) M.Tech./ M.S.(R) to Ph.D., (ii) M.Tech. to M.S.(R), and (iii) M.S. (R) to M.Tech. The details of the provisions are available on the Institute website.

ADMISSION OF FOREIGN NATIONALS

• Applicants under Cultural Exchange Fellowship Programme: The foreign nationals desiring admission to a post-graduate programme (M.Sc./ M.Des./M.Tech./M.S. (Research)/Ph.D.) at IIT Delhi under this Fellowship programme, are required to apply to the Indian High Commissions/Embassies, in their respective countries. After examining the case of the applicants, they will recommend/sponsor the names to the Indian Council for Cultural Relations (ICCR), New Delhi, which in turn, will recommend the applicants to this Institute.

• Self-Financing Foreign Nationals: Applications from foreign nationals for admission to the various postgraduate programmes (M.Sc./M.Tech./M.S. (Research)/M.Des./M.B.A./Ph.D.) at the Institute are received directly by the Institute. The desirous foreign nationals will submit their complete curriculum vitae with particulars of their academic qualifications etc. The details of such admissions are available on the Institute Website.

• Students under Memorandum of Understanding: Admission of foreign nationals to the various postgraduate programmes (M.Sc./M.Tech./M.S. (Research)/M.Des./M.B.A./Ph.D.) at the Institute will be made in accordance with the terms and conditions of the MoU agreed to between IIT Delhi and the Country/ University/Institution concerned.
3.3 SCHOLARSHIPS

UNDERGRADUATE PROGRAMMES

Institute Merit-cum-Means (MCM) Scholarships
The Institute offers Merit-cum-Means scholarships to under-graduate students in engineering and technology. These scholarships are offered to about 25% of the students. The present value of Merit-cum-Means scholarship is ₹1000/- per month for General/OBC students and the recipient is exempted from paying tuition fee.

Institute Merit Prizes and Certificates
The Institute offers Merit prizes and Certificates to the top 7% of the students of each 4-year B.Tech., and 5-year Dual Degree programmes each semester up to the 8th/10th Semester. The value of merit prize is ₹2500/-. 

Institute Free Studentship-U.G.
The Institute offers free studentship to 10% of the students on the basis of means alone.

Scholarship provision for SC/ST students: Tuition fee exemption is admissible to all SC/ST students irrespective of their parents'/guardians' income, Institute offers several other benefits to students from these categories.

IIT Delhi Alumni Sponsored Scholarships—“Loan Scholarships”: IIT Delhi alumni sponsored “Loan Scholarship Scheme” makes it more affordable for students at IIT Delhi to take an educational loan from banks.

Donor Scholarships: There are several other scholarships in operation at the Institute. These scholarships have been established by grants from individuals, trusts and organizations.

SCHOLARSHIPS FOR POST GRADUATE PROGRAMMES

M.Sc. Programmes
Merit-cum-Means scholarship of ₹1000/- per month and tuition fee waiver are permissible to M.Sc. students to the extent of 25% of the sanctioned strength as per Institute rules. Only those students are eligible whose parents' gross income is less than ₹ 4.5 lac per annum for all categories of students/as per govt. orders as applicable.

M.Tech., M.S. (Research) and M.Des. Students: The Institute does not award any scholarship to the students of M.Tech., M.S. (Research), and M.Des. programmes. However, a scheme for financial assistance is in operation. Apart from the teaching/research assistantships, there are a number of fellowships and scholarships Instituted by industries and individuals for such students.

Ph.D. Students: Although the Institute does not award any scholarship, a scheme for the award of Teaching/Research Assistantship for providing financial assistance to the students exists, under this scheme, those students, who are admitted on full-time basis, are offered Teaching/Research Assistantship, provided they are not getting any other equivalent fellowship.
### 3.4 ADMISSION TO POST GRADUATE PROGRAMME

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<th>Degree</th>
<th>Status</th>
<th>Minimum Eligibility for Admission</th>
<th>Selection basis</th>
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| M.Sc.    | Full Time               | At least 55% aggregate marks (taking into account all subjects including languages and subsidiaries, all years combined) for General category candidates and at least 50% aggregate marks (taking into account all subjects, including languages and subsidiaries, all years combined) for SC/ST and PD category candidates in the qualifying degree.  
For Candidates with letter grades/CGPA (instead of percentage of marks), the equivalence in percentage of marks is decided by the Admitting Institute(s).  
For M.Sc. (Chemistry) Bachelor's degree with Chemistry as a subject for three years/six semesters and Mathematics at (10+2) level. For M.Sc. (Mathematics) Bachelor's degree with Mathematics as a subject for at least two years/four semesters. For M.Sc. (Physics) Bachelor's degree with Physics as a subject for three years/six semesters and Mathematics for at least one year/two semesters. |
| M.Tech.  | Full Time               | B.Tech./ M.Sc. or equivalent with a CGPA 6.75 on a 10 point scale or 60% marks in aggregate for General Category with (a) GATE score of 300 or qualifying score (b) GATE score of 200 or qualifying score whichever is higher for SC/ST/PD category.  
*B.Tech. from IITs with CGPA of 8.00 without GATE are also eligible for admission. AMIE/Grad.IETE are eligible, subject to condition at Note 7.  
| GATE and Written test and/or interview |
| M.Tech.  | Full Time Direct Admission | B.Tech./ M.Sc. or equivalent with a CGPA of 8.5 or 75% marks in aggregate for General/OBC Category, and CGPA of 7.5 or 70% marks in aggregate for SC/ST/PD category. GATE Score > 300 or qualifying score whichever is higher for General/OBC and 200 or qualifying score whichever is higher for SC/ST/PD.  
| GATE and interview if required |
| M.Tech.  | Part Time Evening Programme | B.Tech./ M.Sc. or equivalent in relevant field with (a) CGPA 6.75 on a 10 point scale or 60% marks in aggregate for general Category and minimum 1 year experience. Must submit No. Objection Certificate from employer (as per Note 4) Organisation should be located within 50km. of IIT Delhi. Also see Note 6.  
| Written test and/or interview |
| M.Tech.  | Sponsored PT/FT         | Same as for M.Tech. part time requirements and Sponsoring Certificate from the employer as per Notes 4 and 5 respectively.  
| -Do- |
| M.Des.   | Full Time               | B.Tech./M.Sc. or equivalent in relevant field with CGPA 6.75 on 10 point scale or 60% marks in aggregate for general/OBC category and CEED score>(a) 75 percentile for general category/OBC, or (b) 50 percentile for SC/ST/PD category.  
| Written Test and/or interview |
| M.B.A.   | Full Time               | Bachelor’s degree in Engineering /Technology /Architecture/ Phamacy/ B.Sc. Agri.Engg. (Minimum 4 year after 10+2) or Master’s degree in any branch of Physical/ Chemical/ Mathematical Sciences like Physics/Chemistry/ Mathematics/ Statistics/Computer Application/ Electronics Sciences/ Environmental Science or Computational/ Information science/ Agriculture OR Master degree in Commerce/ Economics with CGPA of 6.75 on 10 point scale or 60% marks in aggregate for general category.  
| CAT and Group Discussion and/or interview |
| M.B.A.   | Part Time (evening)     | Same as M.B.A. full-time requirements and two-years experience.  
<p>| Written test and interview |</p>
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<tr>
<th>Degree</th>
<th>Status</th>
<th>Minimum Eligibility for Admission</th>
<th>Selection basis</th>
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<tr>
<td>M.S.</td>
<td>Full Time/</td>
<td>Full Time/ Same as the corresponding M.Tech. requirements.</td>
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<tr>
<td>Ph.D.</td>
<td>Full Time</td>
<td>Master degree in Engineering/Technology or master degree in Science/ Humanities or equivalent in relevant discipline with CGPA 6.75 on 10 point scale or 60% marks in aggregate for general/OBC category. Full time students who do not possess M.Tech. or equivalent degree are required to have a valid GATE Score (300 or qualifying score whichever is higher for GE/OBC &amp; 200 or qualifying score whichever is higher for SC/ST/PD) or UGC/CSIR/DBT/ICMR/INSPIRE fellowship examination for Sciences/ Humanities and Social Sciences disciplines. OR B.Tech or equivalent with CGPA of 7.5 on a 10 point scale or 70% aggregate marks and qualified GATE or UGC/CSIR/DBT/ICMR/INSPIRE fellowship examination for Biomedical Engg., candidates having M.B.B.S. with 60% marks or more are eligible provided they have qualified ICMR. The Candidates having Postgraduate degree of doctor of medicine (MD)/ Master in Surgery (MS) with 60% marks or more after MBBS will also be eligible for admission to Ph.D. Programme in CBME. In respect of M.A., M.Sc. and/or B.Techs. from IITs graduating with a CGPA of 8.0 or above, the requirement of qualification through a national examination. In respect of students from CFTIs (Centrally Funded Technical Institutions (IIT’s, NIT’s, IIIT’s etc.) having CPI/CGPA 7.00 (at 10.00 scale) at the end of 3rd year, the requirement of qualification through a national examination is waived off.</td>
<td>Written test</td>
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<td></td>
<td>and/ or interview</td>
</tr>
<tr>
<td>Part Time</td>
<td>Same as for Ph.D. full time and minimum 2 years experience and No Objection from the employer</td>
<td>Written test</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>and/or interview</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sponsored</td>
<td>Certificate from employer (as per Note 8.) No GATE required (Note.12)</td>
<td>-Do-</td>
</tr>
<tr>
<td></td>
<td>Full Time or</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Part Time</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Part Time</td>
<td>Same as for full-time Subject to conditions stipulated in Note 13.</td>
<td>-Do-</td>
</tr>
<tr>
<td></td>
<td>Foreign</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>National</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Posted in</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Delhi</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NOTES:**

1. 15% seats are reserved for SC candidates, 7.5% for ST candidates and 27% for OBC (non-creamy layer) candidates.
2. The minimum eligibility for SC, ST and PD candidates is a CGPA of 6.25 on a 10 point scale or 55% in aggregate marks. Relaxation in CGPA to 6.25 or in marks to 55% in the minimum qualifying criteria may be permitted to those general/OBC candidates who possess M.A. degree in English for admission to Ph.D. programme in English in the Department of Humanities & Social Sciences.
3. 3% of the seats allocated for full-time students, excluding sponsored students, students drawing assistantship from other sources and foreign students are reserved for Persons with Disability (PD) for admission to various Postgraduate Programmes. The candidates selected against the quota for PD be placed in the appropriate category viz. SC / ST / OBC / General Candidates depending upon the category to which they belong.

4. No Objection Certificate should state that the candidate is permitted to pursue studies on part time basis and he/she will not be transferred to any other place during the period of study.

5. Sponsorship letter (on letterhead of the sponsoring organization) should state that period of study will be treated as on duty with usual salary/allowances and he/she would be fully relieved and granted study leave for the period of studies.

6. For part-time M.Tech. in Energy & Environment Management Lectures are held on week days in the evening from 6.30 p.m. to 8.30 p.m. and laboratory classes are held on Saturdays and Sundays. For part-time MBA programme, the classes are held in the evening.

7. Candidates with AMIE/grad. IETE fulfilling the minimum eligibility criteria can be considered for admission as visiting students for completing 24 earned credits of undergraduate courses as prescribed by the respective programme after which they have to appear for GATE and apply afresh for admission to M.Tech. programme.

8. The letter should state that he/she is permitted to pursue studies on part time basis and that
   (i) his/her official duties will permit sufficient time for research,
   (ii) facilities for research are available at the place of work,
   (iii) he/she will be permitted to reside at the Institute for at least 6 months* during his/her registration for the degree (not applicable if organization is within 50 km of IIT Delhi).

   *If the course credit requirement recommended by a Deptt./Centre is more than 12, then the residency requirement for part time Ph.D. Candidates holding degrees from other Institutes/Universities and working in organisations outside Delhi will be 12 months.

9. Full-time applicants coming on study leave must show proof of at least 3 years (2 years in the case of M.Tech. degree holders) study leave when appearing for the interview.

10. CGPA is Cumulative Grade Point Average. For the purpose of admission at IIT Delhi, the following conversion table will be used to convert percentage of marks into GPA.

12. Sponsored (Full-time) / Part-time candidates are not required to possess GATE/CEED score for admission to postgraduate/ Ph.D. programmes.
### Equivalent GPA

<table>
<thead>
<tr>
<th>% Marks</th>
<th>10-point Scale</th>
<th>9-point Scale</th>
<th>6-point Scale</th>
<th>4-point Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>55</td>
<td>6.25</td>
<td>4.78</td>
<td>3.19</td>
<td>2.13</td>
</tr>
<tr>
<td>60</td>
<td>6.75</td>
<td>5.34</td>
<td>3.56</td>
<td>2.38</td>
</tr>
<tr>
<td>70</td>
<td>7.50</td>
<td>6.19</td>
<td>4.13</td>
<td>2.75</td>
</tr>
</tbody>
</table>

The minimum prescribed 60/55/50% marks in aggregate (of all the years/ Semesters of the qualifying examinations) is calculated by IIT Delhi as per the following example:-

<table>
<thead>
<tr>
<th>1st semester</th>
<th>%</th>
<th>2nd semester</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st year</td>
<td>250/400</td>
<td>62.50</td>
<td>290/400</td>
</tr>
<tr>
<td>2nd year</td>
<td>205/400</td>
<td>51.25</td>
<td>280/400</td>
</tr>
<tr>
<td>3rd year</td>
<td>210/400</td>
<td>52.50</td>
<td>350/400</td>
</tr>
<tr>
<td>4th year</td>
<td>240/400</td>
<td>60.00</td>
<td>150/400</td>
</tr>
<tr>
<td>Total</td>
<td>905/1600</td>
<td></td>
<td>1070/1400</td>
</tr>
</tbody>
</table>

- Aggregate (%) (of all the years/semesters) 1975/3000 = 65.83%

13. The registration of foreign nationals, posted in Delhi, to Ph.D. Programme on part-time basis can be made on the terms and conditions as under:-

(i) The admission will be subject to production of Research Visa for study at IIT Delhi.

(ii) The candidate should satisfy all the requirement as applicable to part-time scholars.

(iii) The candidate will be charged fees as applicable to foreign nationals.
3.5 MEDALS AND PRIZES

IIT Delhi also awards numerous medals and prizes to the students on the basis of examination/project and all-round performance in sports, co-curricular activities, etc. At present there are around eighty such medals and prizes in operation (a list of these is available on the Institute website.)
4. FEES

The fees payable by 2015 entry year students are given in Table below

### 4.1 FEES PAYABLE BY STUDENTS OF THE ENTRY YEAR 2015

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>SEMESTER FEES (to be paid every semester)</td>
<td>Institute Fees</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.1</td>
<td></td>
<td>(i) Tuition fees</td>
<td>45,000</td>
<td>2,500</td>
<td>5,000</td>
<td>25,000</td>
<td>2,500</td>
<td>100,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(ii) Examination fees</td>
<td>350</td>
<td>350</td>
<td>300</td>
<td>300</td>
<td>300</td>
<td>300</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(iii) Registration / Enrolment fees</td>
<td>200</td>
<td>200</td>
<td>300</td>
<td>300</td>
<td>300</td>
<td>300</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(iv) Gymkhana</td>
<td>500</td>
<td>500</td>
<td>500</td>
<td>500</td>
<td>500</td>
<td>500</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(v) Medical fees</td>
<td>50</td>
<td>50</td>
<td>50</td>
<td>0</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(vi) Internet and computer access fee</td>
<td>500</td>
<td>500</td>
<td>500</td>
<td>500</td>
<td>500</td>
<td>500</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(vii) Transport charges (campus bus service)</td>
<td>35</td>
<td>35</td>
<td>35</td>
<td>35</td>
<td>35</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(viii) Student Distress Fund Scheme</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Total</strong></td>
<td><strong>46,735</strong></td>
<td><strong>4,235</strong></td>
<td><strong>6,785</strong></td>
<td><strong>26,785</strong></td>
<td><strong>4,285</strong></td>
<td><strong>101,785</strong></td>
</tr>
</tbody>
</table>

1.2 Hostel Fees (TO BE PAID EVERY SEMESTER)

| ITEM | | Hostel seat rent | 4,000 | 4,000 | 4,000 | 4,000 | 4,000 | 4,000 | 0 | 4,000 | 4,000 |
|      | | Fan, Electricity and Water charges** | 300 | 300 | 300 | 300 | 300 | 300 | 0 | 300 | 300 |
|      | | **Total** | **4,300** | **4,300** | **4,300** | **4,300** | **4,300** | **4,300** | 0 | **4,300** | **4,300** |
## ONE-TIME PAYMENTS (Non-refundable) To be paid at the time of admission

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>200</th>
<th>150</th>
<th>150</th>
<th>150</th>
<th>150</th>
<th>150</th>
<th>150</th>
<th>150</th>
<th>150</th>
</tr>
</thead>
<tbody>
<tr>
<td>(i)</td>
<td>Admission fees</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(ii)</td>
<td>Thesis fees@</td>
<td>0</td>
<td>0</td>
<td>450</td>
<td>450</td>
<td>950</td>
<td>0</td>
<td>0</td>
<td>950</td>
<td>950</td>
</tr>
<tr>
<td>(iii)</td>
<td>Grade card</td>
<td>200</td>
<td>150</td>
<td>150</td>
<td>150</td>
<td>0</td>
<td>300</td>
<td>300</td>
<td>300</td>
<td>300</td>
</tr>
<tr>
<td>(iv)</td>
<td>Provisional certificate</td>
<td>200</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>(v)</td>
<td>Student welfare fund</td>
<td>300</td>
<td>200</td>
<td>200</td>
<td>200</td>
<td>200</td>
<td>200</td>
<td>200</td>
<td>200</td>
<td>200</td>
</tr>
<tr>
<td>(vi)</td>
<td>Modernization fees</td>
<td>400</td>
<td>300</td>
<td>500</td>
<td>500</td>
<td>500</td>
<td>500</td>
<td>500</td>
<td>500</td>
<td>500</td>
</tr>
<tr>
<td>(vii)</td>
<td>Identity card</td>
<td>100</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>(viii)</td>
<td>Benevolent fund</td>
<td>200</td>
<td>200</td>
<td>200</td>
<td>200</td>
<td>200</td>
<td>200</td>
<td>200</td>
<td>200</td>
<td>200</td>
</tr>
<tr>
<td>(ix)</td>
<td>Alumni fees</td>
<td>1,000</td>
<td>1,000</td>
<td>1,000</td>
<td>1,000</td>
<td>1,000</td>
<td>1,000</td>
<td>1,000</td>
<td>1,000</td>
<td>1,000</td>
</tr>
<tr>
<td>(x)</td>
<td>Training &amp; placement Charges</td>
<td>500</td>
<td>500</td>
<td>500</td>
<td>0</td>
<td>0</td>
<td>500</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total (2)</strong></td>
<td></td>
<td>3,100</td>
<td>2,600</td>
<td>3,250</td>
<td>2,750</td>
<td>3,100</td>
<td>2,800</td>
<td>2,300</td>
<td>3,250</td>
<td>3,250</td>
</tr>
</tbody>
</table>

### OTHER PAYMENTS

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>500</th>
<th>500</th>
<th>500</th>
<th>500</th>
<th>500</th>
<th>500</th>
<th>500</th>
<th>500</th>
<th>500</th>
</tr>
</thead>
<tbody>
<tr>
<td>(i)</td>
<td>Insurance Scheme to be paid every year in 1st semester</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### DEPOSITS (Refundable)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>2,000</th>
<th>1,000</th>
<th>1,000</th>
<th>1,000</th>
<th>1,000</th>
<th>1,000</th>
<th>1,000</th>
<th>1,000</th>
<th>1,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>(i)</td>
<td>Institution security deposit</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(ii)</td>
<td>Library security deposit</td>
<td>2,000</td>
<td>1,000</td>
<td>1,000</td>
<td>1,000</td>
<td>1,000</td>
<td>1,000</td>
<td>1,000</td>
<td>1,000</td>
<td>1,000</td>
</tr>
<tr>
<td><strong>Total fees payable at the time of admission</strong></td>
<td>58,635</td>
<td>13,635</td>
<td>16,835</td>
<td>36,335</td>
<td>14,185</td>
<td>1,11,385</td>
<td>73,252</td>
<td>US$ 1000 &amp; US$ 2000 &amp;</td>
<td>₹ 11,835/- &amp; ₹ 11,835/-</td>
<td></td>
</tr>
</tbody>
</table>

### NOTE:

1. The tuition fee in 9th semesters and later will be ₹ 5,000/- per semester for Dual-degree programmes.
2. @ Thesis Fees Paid only by M.S. (R) students.
3. + Messing charges will be notified separately.
4. * All SC and ST students will get 100 % tuition fee exemption.
5. ** Actual Electricity Charges will be calculated on completion of each semester.
4.2 FOREIGN NATIONAL STUDENTS (SELF-FINANCING)

Following are the fees per semester, chargeable from Self-Financing foreign National Students including those seeking admission as visiting students: 2014-2015

i) US $ 1,000 and ₹ 11,835 for SAARC Countries.

ii) US $ 2,000 and ₹ 11,835 for Other Countries.
4.3 MODE OF PAYMENT

(a) Institute dues

All Institute dues are to be paid through State Bank of India Internet Banking only.

Payment by challan slip is allowed only to the following:

(i) students who have taken loan from a bank (for educational purposes), or

(ii) students who are holders of a scholarship from outside sources who directly send cheque(s) for fees in the name of the Institute, or

(iii) new students who are joining the Institute for the first time.

(b) Mess dues: Mess dues are to be paid by demand draft at State Bank of India, IIT Delhi branch, into the account of the respective hostel. Maintaining an account with State Bank of India, IIT Delhi is mandatory. Every student should obtain the account ID and password from SBI, IIT Delhi branch. SBI, IIT Delhi is a Core Banking Branch. All assistantship and scholarship payments will be made directly into the student’s account.

4.4 DEADLINES FOR PAYMENT

(a) Institute dues

(i) All Institute dues are to be paid in full before the last date for Late Registration (this is typically one week after the first day of classes)

(ii) Students who do not pay the required amount by this date, or those who make partial payments, shall have their registration cancelled. Registration will be restored on payment of fees and a fine as stipulated in the Institute rules.

(iii) In case of new entrants, the fees have to paid by demand draft on the day of registration at the time of joining the Institute.

(b) Mess dues: All Mess dues are to be paid on or before the date for Registration Validation, i.e. before the first day of classes.

4.5 REFUND OF FEES

The whole amount of fees/other charges deposited by the students will be refundable after deduction of Rs. 1,000/-, if the students do not join the programme after paying the dues and leave the Institute by applying for refund on or before the date of registration. No refund of fees will be permissible to students who have registered for the programme but leave immediately thereafter. In such cases, only caution money will be refunded.
5. STUDENT LIFE ON CAMPUS

The ambience of student life and activities on the campus is to provide an invigorating and creative environment which promotes independent thinking and introspection and leads the young students to become more aware of the consequence of their own actions.

Excellent facilities for accommodation to a large number of students, co-curricular activities, sports and games recreation, shopping, etc., are provided to the students on campus. Special efforts are also made to promote and strengthen student-teacher interaction. Students Counselling Service has been set up to assist and morally support students in their initial adjustment, and also to deal with any difficulties, they may have during their stay at the Institute.

5.1 HALLS OF RESIDENCE

There are eleven boys’ hostels and two girls’ hostels. The boys’ hostels are Nilgiri, Karakoram, Aravali, Jwalamukhi, Satpura, Zanskar, Kumaon, Vindyachal, Shivalik, Girnar and Udaigiri. Kailiash and Himadri Hostels are for girls. Each Hostel is self-contained with amenities such as a reading room, an indoor games room, a lounge and a dining hall with mess, a computer room and TV in common room. All rooms have been provided with Internet facilities.

5.2 STUDENT AFFAIRS COUNCIL (SAC)

The Student Affairs Council is a joint student-faculty Senate committee to deal with overall policy formulation, coordination and review of student affairs, which are of non-academic nature.

The SAC co-ordinates the activities of the various student organizations, viz., Boards for Recreational and Creative Activities, Sports, Hostel Management, Students Publications and Student Welfare. It also works to promote the student interests and endeavors to create healthy traditions in campus life.

5.3 CO-CURRICULAR AND ACADEMIC INTERACTION COUNCIL (CAIC)

The council is a joint committee of undergraduate students, postgraduate students and faculty that provides feedback to the Board of Undergraduate Studies on all academic and allied matters. By means of suitable dialogues with appropriate authorities, it also tries to solve local as well as general problems of students that are co-curricular and academic in nature.

5.4 CO-CURRICULAR ACTIVITIES

IIT Delhi provides a full measure of opportunity to its students for co-curricular pursuits. Through several students directed activities a student participates actively in the many-sided life of the Institute community. He/She pursues his/her intellectual and aesthetic horizons far beyond the realm of the classroom experience, and he/she expands his/her interests and forms new relationships.
5.5 THE STUDENTS’ ACTIVITY CENTRE

The Students’ Activity Centre is the nerve centre of all student activities on the Campus. With a moat on one side and a high stone wall on the other, the Students’ Activity Centre recalls to the visitors memories of an ancient fort. The Centre comprising a Club Building, Gymnasium Hall, Swimming Pool, Amphitheater, Music Rooms, Robotics Room, and Hobbies Workshop, caters to various hobbies of the Students. They have a place to paint, to sculpt or to tinker with the radio.

There are committee rooms where they can hold formal or informal meetings and a large marble-floored hall for exhibitions. On the first floor of the Centre, students have facility to play billiards, table tennis etc.

5.6 STUDENTS’ CANTEENS

There are canteens for the students in the Hostel area just opposite to Aravali Hostel, in Himadri Hostel and adjacent Kumaon Hostel and the others located in front of Library across the road. The Hostel area canteen is open normally from 4 p.m. till midnight. The other canteens run during the Institute working hours. Working of these canteens is looked after by the Canteen Cell of the Board of Hostel Management. There are Coffee and Cold drinks kiosks also in the Institute.

5.7 STATIONERY SHOP AND TELEPHONE BOOTHs

For the benefit of the student community, there is a stationery shop situated in the academic area. A number of Xeroxing facilities and STD/ISD/PCO facilities are available in all the Hostels.

5.8 BOARD FOR RECREATIONAL AND CREATIVE ACTIVITIES (BRCA)

The Institute offers excellent opportunities to the students to participate in a wide range of recreational and creative activities, under different Clubs and Samities of BRCA under the leadership of elected Secretaries and representatives from different hostels. Students interested in drama, music, paintings or indoor games can join the Dance & Dramatics Club, Music Club, Fine Arts Club and Indoor Sport Club, respectively. Students who wish to pursue different hobbies can find creative expression for their interests in the Photography and Hobbies Society. The English Debating and Literary Club, Hindi Samiti and Quizzing Club offer ample opportunities for literary expression. The Film Series Committee organizes regular shows of feature films from different countries.

SPIC-MACAY promotes Indian Classical Programmes in collaboration with its national body. The activities organized include inter-hostel and inter-college competitions as well as non-competitive events. An annual inter-college cultural festival “Rendezvous” is organized in the first semester to encourage interaction between IIT and various colleges and to promote competition of high standard. In the second semester, BRCA organizes cultural events during the student week along with a festival ‘Virasat’ organized by SPICMACAY. During this festival, professionals hold Lec-Dems in order to expose the students to various forms of Indian classical music, dance, drama and other arts and crafts.
Dance Club

With the philosophy "Love the art in yourself and not yourself in the art," the Dance Club is one of the most glamorous clubs in the BRCA. The audience participation in this club is overwhelming, and the Duo Dance and the Group Dance events are among the most eagerly awaited events of the year. The Institute Dance Production, organized towards the end of the year is the magnum opus of the club, and it also provides aspiring students a platform to improve their skills. V-Defyn, IIT Delhi's dance troupe, has grown into a professional group of dancers who have brought many laurels to the college in recent years.

Fine Arts and Crafts Club

FACC is the perfect platform for you to showcase your artistic capabilities and also learn a lot of new things at the same time. With events like Oil Painting, Charcoal Painting, Mask Painting and workshops on artistic activities like Origami, there is a lot to fulfill your creative appetite. The club also organizes various events such as Street Painting, Graffiti, Face Painting etc. during Rendezvous. The FAC junta is renowned for its untiring efforts, and is one of the closest knit communities on campus. The club plans to have a permanent exhibition room at the Student Activities Centre from this year.

Debating Club

The Literary Club aims to take your imagination and creativity to a higher level. The Club organises a Reader's Circle to promote a reading culture among the students. To keep the fun quotient high, events like word Games (Scrabble), Pot Pourri, Cryptic Crosswords are planned. A trip to the famous Jaipur Literary Fest and other trips organized by Literary Club have been the most memorable literary adventures the club has seen.

Literary Club

One of the most respected clubs in IIT Delhi, the Debating Club has a long standing tradition of excellence. With events like Extempore, Parliamentary Debates, and MUNS. This club presents a plethora of opportunities for students. They also get to polish their communication skills, and gain self-confidence. The events are also known for their fun filled atmosphere. Though it may sound hard to believe, all you need to be a part of this club is a sincere interest.

Hindi Samiti

A sad side effect of globalization is the diminishing importance for local languages, especially in urban areas like Delhi. It then becomes more and more important to hold onto one’s culture. The Hindi Samiti celebrates all things Indian and then some. Indeed, most Hindi Samiti debates show remarkable maturity and brilliant thinking on the part of the participants. With other entertaining events like Sopan (the Indian Quiz), Word Games etc, the Hindi Samiti has made a special place for itself in IIT.
STUDENT LIFE

Music Club

Gone are the days when you heard the famous "drama mat kar" from Mom and Dad when you got a Little Light headed and started play-acting for fun. You now are at a place where the bigger a drama baaz you are, the more you're appreciated. The Dramatics Club presents a bunch of amazing events round the year, from stage and street performances to mimes and comedy acts that entertain the junta thoroughly.

Photography and Films Club

Know for uniting the music fraternity of IIT Delhi, the club promotes the music culture among the students and faculty alike, giving a stage to willing performers and a platform to beginners to cultivate their skills. It organises an array of events encompassing many genres, both Western and Eastern. Most of the events are organized at the Institute level with independent participation, while some events also comprise hostels and departments competing against each other. Events like 'Mehfil' combine ghazals, qawwals and Indian folk into a seamless and unforgettable experience. Towards the end of the year, the club organizes a music festival called 'Malhaar', which is highly popular in the IIT fraternity.

Drama Club

PFC, or Photography and Film Club is one of the most integral and popular clubs of the BRCA. A heaven for the creative, the Film section of the club organizes events like Movie Making, Trailer Making, Ad-film Making etc. This club also conducts various workshops and learning sessions on software like Adobe After-Effects, Premier-Pro, and Photoshop. As far as Photography is concerned, with events such as Poster Making, Photography and Graphics Designing and workshops on various photography and editing techniques, whether you have a knack for taking pics or you just want to explore this field, take out your cameras and get clicking!!

Quizzing Club

The traditional notion of a quizzzer is a person without a social life who mugs up fact books day in and out. IITD's Quizzing Club is here to dispel this crude ideology and make quizzing a social hobby. The wide variety of questions will ensure that your knowledge, however outlandish, is respected. You will learn how to think laterally, and when everything fails, a guess might turn out to be good enough cause of agony for your competitors. This year, the Quizzing Club is going all out, not only to promote your passion, but also inculcate the same in case you are a newbie. For the rest of the time, teams will fight it out for the ultimate glory and history has been a frequent witness to quizzes going down the wire. Happy Quizzing!

SPIC MACAY

Society for the Promotion of Indian Classical Music and Culture amongst Youth or SPIC MACAY is a voluntary youth movement which promotes Indian Classical Music, Dance and other aspects of Indian culture. VIRASAT- the annual fest of SPIC-MACAY sprawls over 3 weeks and comprises of performances and workshops in arts and crafts, talk, theatre, films and yoga. Highly esteemed classical performers like Pt. Hariprasad Chaurasia, Ustad Amjad Ali Khan regularly perform during Virasat. As a BRCA club, SPIC MACAY organizes many workshops, concerts and events to keep the students in touch with their heritage.
5.9 BOARD FOR SPORTS ACTIVITIES (BSA)

Board for Sports Activities (BSA) is a constituent body of the Student Affairs Council. It is responsible for the coordination of the various sports activities in the institute. It ensures that adequate facilities are given to the community and provides a forum for the students and staff to discuss and formulate policy towards the betterment of sports activities in the campus.

Well laid out fields are available on the campus. A cricket field with three turf wickets, four cricket practice pitches, floodlighted hockey and football ground, three floodlighted volleyball and two basketball courts one of which is ultra cushioned, eight floodlighted tennis courts having four synthetic and four clay courts, tennis practice wall, three squash courts, one badminton hall, table tennis hall with synthetic flooring, one weight lifting hall, a swimming pool, two multi-gyms, a floodlighted stadium with 400 meters athletics track, jogging track and ancillary arrangements for all the games are available to the students. Construction of new swimming pool with kid’s pool is in progress and will be available very shortly. Construction of one badminton hall which will be having five wooden badminton courts and floodlighting of cricket practice pitches is also under consideration. A team of sports officer, physical training instructors, ground staff and part-time coaches help the students in their pursuit to greater sporting performances.
The Institute lays considerable emphasis on student’s participation in various outdoor and indoor games. The students take part in the Fresher’s events for incoming first year students, Friendly matches with the local colleges, Inter Hostel events, the annual IIT Delhi Inter Collegiate Event Sportech and the annual Inter IIT Sports Meet. Students also participate in sporting activities organized by institutes outside Delhi.
5.10 BOARD FOR STUDENT PUBLICATIONS (BSP)

Board for Student Publications, a body managed almost entirely by the students, is involved in bringing out various publications and organizing events for nurturing the literary and journalistic talent of the student community. The Boards’ annual campus magazine, Muse provides an excellent forum for expression of the creative skills of young minds on campus. The board’s biannual technical publication, Sync is a technical compendium of all ongoing research activities at this premier institute of technology as well as around the world.

Apart from its creative publications, the board’s key area of focus remains its journalistic activities and monthly newsletter Insight. With interviews and surveys pertaining to issues relevant to the IIT community, the board with its determined team of journalists keeps track of all ongoing activities on Campus and provides an interactive forum and information source through its social media presence and recently launched Website.

The Board also organizes an annual festival – Literati which is recognized and appreciated as one of the best literary college festivals in North India. With regular workshops and competitive events, during the festival as well as through the year, the board aims at developing and honing the creative and media skills of the student community.
5.11 BOARD FOR STUDENTS WELFARE (BSW)

The Board for Students Welfare, IIT Delhi is a student body set up with an intention to look after the welfare of the student community. The BSW has always been dedicated towards helping the student community in every aspect of life in IIT Delhi. The board adheres to a principle of making itself an organisation of the students, for the students, by the students. The constituent bodies of BSW have three permanent committees viz., Finance committee, Public Relationship committee and Mentorship committee.

Financial Committee is responsible to take care of all issues pertaining to financial aid, its payment and its recovery. It assists the deserving and bona fide student in securing summer/winter jobs during vacations as well as part-time jobs. It looks after loans, scholarships and grants which are provided by BSW to the needy and the deserving students.

Public Relationship Committee handles all aspects of the Board related to welfare activities, publicity and grievance-redressal. It is directly responsible to come up with new schemes from time to time in the benefit of the student community.

Mentorship Committee (MRC) monitors the student mentorship committee which intends to help the freshers in IIT to make informed decisions and grow positively when facing the college life for the first time. Every fresher is assigned a mentor and the mentor is evaluated and monitored to see to it that life in IIT for freshers is smooth and constructive.

BSW also runs a student cooperative society (SCOOPS) which runs on a no profit-loss philosophy. Located near Block I, its duty is to
provide students access to buy good-quality subsidised stationary items, note books and related services.

BSW organises the very popular, socio-welfare youth fest of IIT Delhi, Speranza. Each year Speranza welcomes huge crowd of students with great enthusiasm and is the first college fest to be organized in a new academic year. From MUN, workshops, talk shows to fun games and competitive events, Speranza has a wide spectrum of events taking place making them few of the most memorable days of IITD life.

Student Teacher Interaction (STIC) is another welfare activity carried on by BSW, to strengthen the student-teacher bond, the foundation pillar of any educational institution.

Student Counselling Service (SCS) under BSW provides a confidential environment where a student can explore and express aspects of one’s self that may be painful or uncomfortable. Counsellor helps the students in gaining their own insights, and making and acting on their own choices, thereby enabling them to resolve the issues.

5.12 NATIONAL SERVICE SCHEME (NSS)

Launched in the Mahatma Gandhi Birth Centenary year 1969, as a student youth service programme, National Service Scheme (NSS) aims at arousing social consciousness of the youth with an overall objective of personality development of students through community service. The motto of NSS is “NOT ME, BUT YOU”.

5.13 NATIONAL CADET CORPS (NCC)

The National Cadet Corps is an organization aiming at the development of leadership, character, comradeship, spirit of sportsmanship and the ideal of service, among the youth in educational institutions. The motto of NCC is “Unity and Discipline”.

5.14 NATIONAL SPORTS ORGANIZATION (NSO)

The National Sports organisation is a classification in the scheme of education formulated in furtherance of setting a climate of sports consciousness and improvement of physique among the youth during their period of education. Sports is included in the curriculum at IITD.

5.15 STUDENT COUNSELING SERVICE (SCS)

The Student Counseling Service under the aegis of Board for Student Welfare at the Institute aims at assisting students in sorting out their difficulties and dilemmas in an environment where they can talk freely in confidence about any matter which is troubling them. Students seek counseling for a variety of reasons, such as difficulties in adjusting to campus life, problems in relationship, being shy, feeling lonely, anxious, depressed, confused, demotivated, low self-esteem, difficulties in coping with academic pressures and competition, worries about the future and low self-confidence.
5.16 DEPARTMENTAL PROFESSIONAL SOCIETIES

Most of the Departments/Centres/Schools have professional societies managed by the faculty and students to promote academic and professional interests. These societies also facilitate student-teacher interaction outside the classroom.
5.17 MEDICAL FACILITIES

The Institute has a computerized hospital centrally situated in the campus, headed by the Head Hospital Services with a team of 9 full-time Medical Officers and 2 medical officer (on Contract). The Hospital is also visited by part-time specialists from All India Institute of Medical Sciences in the fields of Orthopaedics, ENT, Ophthalmology, Skin disease, Radio Diagnosis, Psychiatry, Endocrinology, Cardiology and Neurology. It provides facilities for OPD and limited In-Patient treatment. The Hospital is well equipped to take care of primary emergencies. It has a Dental Unit, a Pathology Lab, and a Radio diagnosis unit which undertakes routine radiography and ultrasonography.

There is also a Physiotherapy Unit with modern equipment. The Electrocardiogram (ECG) facility is available in the OPD and Emergency. The emergency medical facilities are available round the clock with doctor on call, beyond OPD hours.
5.18 STUDENT-TEACHER INTERACTION

The Institute encourages students to come in close contact with teacher. The Student-Teachers Interaction Committee (STIC) facilitates and promotes contact between teachers and students.

STUDENT–TEACHER INTERACTION COMMITTEE (STIC)

STIC encourages healthy and informal interaction of students with their teachers outside the boundaries of classrooms environment. Teacher can take their students to trip, for get-together and can have informal interaction. Dinners are organized in the hostel every semester where students can invite their teachers in their hostels. STIC also organizes dinners exclusively for all freshers with their teachers who were teaching in 1st semester of academic year and also with their teachers of the department. Departmental professional societies are encouraged to organize informal activities in their departments and STIC Partially supports monetarily.

CLASS COMMITTEES AND COURSE COMMITTEES

In order to bring about greater contact between students and teachers, Course Committees and Class Committees are constituted, comprising of both, students and faculty. These committees discuss academic matters relating to the course or class concerned.
STUDENT ADVISORS
A student advisor is appointed by the Department for a group of 10-12 students in the B.Tech., and dual-degree (B.Tech. and M.Tech.) programmes. Students are encouraged to keep in constant touch with his/her advisor regarding all academic affairs. The advisor, in turn, will provide the student with suitable advice regarding courses, academic load, and rules and regulations, etc. governing his/her academic programme. Student’s registration each semester is carried out through the office of his/her advisor. The student advisor is also expected to keep in touch with the student’s general performance and welfare both formally, as well as through informal channels.

PROGRAMME COORDINATORS
The administration of all postgraduate programmes is facilitated by a faculty member designated as the Programme Coordinator. The Programme Coordinator helps students regarding all registration and course related matters.

5.19 ALUMNI ASSOCIATION
IIT Delhi has its Alumni working across various fields as scientists, technologists, business managers and entrepreneurs. There are several who have moved away from their original disciplines and have taken to administrative services, active politics or are with NGOs. In doing so, they have contributed significantly to
building of this nation, and to industrialization around the world. Almost 40096 alumni have come together to form IIT Delhi Alumni Association with the objective of providing a platform for networking between themselves, and between the alumni and its alma mater, IIT Delhi. They do so by organizing various professional, social and cultural activities each year. Other than organizing the Annual General Body meeting, the Association also conducts reunions, sports events and picnics periodically. Every person who receives a degree or a diploma from the Institute automatically becomes a life member of the Association. In addition to participating in activities of the Association, members can access the Institute facilities, including library, sports facilities and guest house at nominal charges through the Association's office located at IIT Delhi. For more information one can visit the IITD Alumni Association website: www.iitdalumni.com.

**CHAPTERS OF IITD ALUMNI ASSOCIATION IN INDIA/ABROAD**

**Chapters India**

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5.20 CONDUCT AND DISCIPLINE
A student shall conform to a high standard of discipline and shall conduct himself, within and outside the precincts of the Institute, in a manner befitting the students of an Institution of national importance. He/she shall have the seriousness of purpose and shall in every way, train himself to lead a life of earnest endeavor and co-operation. He/she must follow strict ethical standards. Under no circumstances he/she will adopt unfair means for completing any component of evaluation in a course. He shall show due courtesy and consideration to the employees of the Institute and Halls of Residence, good neighborliness to his fellow students, respect to the Wardens of the Halls of Residence and the teachers of the Institute and pay due attention and courtesy to visitors.

5.21 HONOUR CODE
In order to promote ethical behaviour, the Institute requires every student to agree to abide by the Honour Code. At the time of admission, every student has to sign the Honour Code and submit a copy to the respective academic section. Violations of this Code are taken very seriously and may result in suspension or expulsion. The Honour Code is given on the inside back cover of this document.

5.22 INSTITUTE POLICY ON RAGGING
Ragging is banned in the Institute. If a student is found to have indulged in ragging in the past, or if it is noticed later that he/she has indulged in ragging, then he/she may be expelled from the Institute.

5.23 POLICY AGAINST SEXUAL HARASSMENT
Institute has a policy against sexual harassment and is committed to providing an environment free from sexual harassment of women at the workplace.
Head of the Department

Puneet Mahajan, Ph.D. (Montana State Univ.)
Professor
Homogenization and Mechanical Properties of Composites, Low and High Velocity Impact of Composites, Precision Glass Moulding, Helmets, Snow Mechanics, Finite Element Applications.

Suhail Ahmed, Ph.D. (IIT, Delhi)
Professor
Structural Dynamics, Off-shore Structures, Reliability Engineering, Computational Mechanics, Low and high velocity impact, Composites, Probabilistic Mechanics, Finite Element Applications.

Murali R. Cholemari, Ph.D (IISc, Bangalore)
Assistant Professor

Anupam Dewan, Ph.D. (IISc, Bangalore)
Professor

Sriram Hegde, Ph.D. (IIT, Delhi)
Senior Systems Programmer/Manager
System Programming, Finite Element Analysis, FE Mesh Generation, CAD and CAM, Heat Transfer.

Jayant Jain, Ph.D. (Univ. British Columbia)
Assistant Professor
Mechanical behavior materials, texture anisotropy, Microstructure property correlation, alloy design, phase transformation

Santosh Kapuria, Ph.D. (IIT, Delhi)
Professor
Smart Composite and Sandwich Structure, Structures Health Monitoring, Active Vibration Control, Functionally grade and Structures, Elasticity.

Ajeet Kumar, Ph.D. (Cornell Univ.)
Assistant Professor
Theory of rods, plates and shells, Crystal elasticity, Computational materials science, Multi-objective optimization Nano-mechanics, Numerical Analysis.

B. P. Patel, Ph.D. (MNNIT, Allahabad)
Professor

Pradyumna S., Ph.D. (IIT, Kharagpur)
Assistant Professor
Functionally Graded Materials, Structural Dynamics, Stability, Composite Structures, Smart Structures, Plates and Shells.

Anamika Prasad, Ph.D. (MIT)
Assistant Professor
Rajesh Prasad, Ph.D. (Cambridge Univ.)
Professor
Physical metallurgy, metal foams, nanocomposites, friction stir welding.

Sitikantha Roy, Ph.D. (Utah State Univ.)
Assistant Professor
Soft materials, mechanobiology, structural mechanics.

Sanjeev Sanghi, Ph.D. (City Univ.)
Professor
Numerical and Analytical Studies of Turbulent Flows, Chaos and Dynamical Systems, Computational Fluid Dynamics, Educational Software.

S. N. Singh, Ph.D. (IIT, Delhi)
Professor

M. K. Singha, Ph.D. (IIT, Kharagpur)
Associate Professor
Finite Element Modeling of Composite, Sandwich and FGM structures, Stability and Nonlinear Dynamics of Plates and Shells under aero-thermo-mechanical loads, High Strain Rate Behavior of Materials, Impact mechanics

Sawan Suman, Ph.D. (Texas A & M)
Assistant Professor
Turbulence Theory and Modeling, Hypersonic flows, Bridging method of turbulence, Boltzmann equation-based solvers.

Balaji Srinivasan, Ph.D. (Stanford)
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Vikrant Tiwari, Ph.D. (South Carolina Univ.)
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Balaji Srinivasan, Ph.D. (Stanford)
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Ashish Garg, Ph. D. (Univ. of Cambridge, U.K.)
Visiting Faculty
Thin film nanostructures of multifunctional compounds, Device integration, Structure property correlation in ferroic oxides

Arghya Samanta, Ph. D. (UPMC, France)
Visiting Faculty
Fluid Mechanics.

Cdr. R. Vijay Kumar, Ph. D. (IIT, Delhi)
Adjunct Faculty
Computational Fluid Dynamics, Ship Hydrodynamics, Warship Design.
Lt. Cdr. Ishaq S. Makkar, M.Tech. (IIT, Kharagpur), DIIT (IIT, Delhi)
Adjunct Faculty
Submarine Hydrodynamics, Submarine Design, Computational Fluid Dynamics (CFD), Underwater Technology

Adjunct Faculty
Naval Architecture, Structural Design of Warships.

R. K. Pandey, Ph.D. (IIT, Bombay)
Professor (Emeritus)

D.K. Sehgal, Ph.D (IIT, Kharagpur)
Professor (Emeritus)
Numerical and Experimental Stress Analysis, Finite Element Methods in Solid Mechanics, Optimum Shape Design.

P. K. Sen, Ph.D. (IIT, Delhi)
Professor (Emeritus)
Hydrodynamic Stability, Laminar turbulent Transition, Turbulence, Thermo-fluid Mechanics, Computational Fluid Dynamics.
INTRODUCTION
The Departmental activities in teaching and research can be broadly classified under the headings of Solid Mechanics, Fluid Mechanics, Materials Science and Design Engineering.

ACADEMIC PROGRAMMES

UNDERGRADUATE
The department offers basic courses in Mechanics, Experimental Methods and Analysis, Design Engineering, and Materials Science that are part of the undergraduate core curriculum. Students can also obtain minor degree in Applied Mechanics with specialization in Computational Mechanics. Faculties are also involved in guiding undergraduate students of various programs in their mini and major projects.

POSTGRADUATE
The department offers Masters of Technology programmes with two specializations – (i) Engineering Mechanics, and (ii) Design Engineering. Students admitted to the M.Tech programme in Engineering Mechanics can opt for specialization in either (a) Stress Analysis (b) Fluid Engineering. A masters of Science (Research) programme is also offered with specialization in Applied Mechanics. A Postgraduate Diploma course in Naval Construction is also offered, in collaboration with the Indian Navy, to officers sponsored by Indian Navy. The course is of one and a half years duration.

RESEARCH AREAS
The department has been involved in the following broad areas of research:


- Pipeline Engineering including Slurry transportation, Hydrodynamic Stability Theory and Turbulence, Low Dimensional Modelling, Computational Fluid Dynamics; Compressible flows; Industrial Aerodynamics and Pollution Dispersion, wind effects on structures, Flow through Turbomachinary Components like Diffusers, Impellers, Combustors etc., Internal and External Flows, Hypersonic Flows.
• Computer Aided Design, Design Engineering, Reliability Engineering, Availability and Maintainability Engineering.


Besides, the Department also organizes seminars, symposia, short-term courses and advanced summer schools for faculty of engineering institutes and engineers from industry. It also undertakes industrial consultancy work and has in hand both short and long-term projects sponsored by the government agencies and private industrial organizations.

**Doctoral research is currently being carried out in the following areas:**


**LABORATORY FACILITIES**

The Department has well-equipped laboratories, workshop and library facilities. The laboratories and their major facilities are as follows:

**Computation Laboratory:** Graphics Workstations with engineering software such as ANSYS, ABAQUS, COMSOL

High performance computing facility: 48 node cluster with each node housing dual quad-core AMD 2376 processor.

**Design Optimization Laboratory:** Workstations, Dual Processor – Softwares such as IDEAS, ABAQUAS, FLUENT, MATLAB, MATHCAD

**Fluid Mechanics Laboratory:** Pilot plant test loop for slurry transportation, pilot plant for flow rate measurement up to 8 cusecs, Bohlin viscometer, Weissenberg Rheogoniometer.
**Gas Dynamics Laboratory:** Industrial wind tunnel (1.6m x 1.6m x 10m test section closed loop), Environmental wind tunnel (2mx 2mx10m suction type; is currently being renovated and may qualify for a central facility to be used by Civil Engg. Dept., Mechanical Engg. Dept. and Atmospheric Sciences) and low turbulence wind tunnels, Wide angle diffuser rigs. Instruments: PIV (2D/3D), LDV, Hot wire Ancomometry, Pressure and Strain Scanners.

**Impact Mechanics Laboratory:** Split Hopkinson Bar apparatus (tension and compression), High velocity projectile launch system, Dynamic three point bend test facility, Ultra high speed cameras, High speed data acq. System.


**Materials Characterization Lab:** Optical microscope, Hitachi TM3000 scanning electron microscope (SEM) with Bruker energy dispersive spectroscopy (EDS), Spectroscopic Alloy Analyzer, Shimadzu Micro hardness tester, Buelher automet polisher, Duel polishing machine.

**Materials Science UG Teaching Lab:** Models of crystal structure and defects, Microscope, Tensometer, Creep set up, Electrical sensitivity measurement, Band gap measurement.

**MTS Laboratory:** 250 kN MTS machine with facilities for mechanical testing, fracture mechanics testing and fatigue testing.
**Strength of Materials Laboratory:** 25 T Computerized Universal Testing machine (Zwick), 50 T Instron m/c, 10T and 100T hydraulically operated Universal Testing m/c, Avery machines for hardness, impact, torsion and fatigue testing, Drop hammer facility (Instron 9250 HV) modified for Helmets.

Biomechanics/Soft Material Lab: 5kN UTM, AFM, Inverted Microscope Optical Bench, Sample preparation facility.

**Stress Analysis Laboratory:** Photo-elastic bench, Moiré fringe equipment, Digital strain meters, Super data loggers, Stress freezing ovens, etc.

**Workshop:** The departmental workshop has a number of machines that include Lathe machines, vertical milling machines, shaping machine, drilling machines, bench grinders, high temperature furnace, welding sets etc.
Prashant Mishra, Ph.D. (JNU)
Professor

G. P. Agarwal, Ph.D. (Rice Univ.)
Professor
Bioprocess Engineering, Membrane Based Protein Separation, Bioinformatics, Membranes for Heavy Metal Ions Removal and Waste Treatment.

Shaikh Ziauddin Ahammad, Ph.D. (IIT, Delhi)
Assistant Professor
Wastewater Treatment -Physico-chemical and Biological, Anaerobic Wastewater Treatment.

V. S. Bisaria, Ph.D. (IIT, Delhi)
Professor
Bioprocess technology; Metabolic regulation and engineering; Bioconversions; Plant cell biotechnology

Ravikrishnan Elangovan, Ph.D. (Florence Univ.)
Assistant Professor
Single Molecule Biophysics, Fluorescence Spectroscopy, Molecular Motors, Skeletal Muscle Mechanics.

Ritu Kulshreshtha, Ph.D. (Delhi Univ.)
Assistant Professor
RNAi Technology, MicroRNAs in Cancer Biology, Cancer/Disease Biomarkers, Hypoxia Research.

Head of the Department

Saroj Mishra, Ph.D. (New York City Univ.)
Professor
Molecular Enzymology and Applications of Hydrolytic Enzymes, Yeast Expression Systems, Enzyme Mediated Bioremediation.

Atul Narang, Ph.D. (Purdue Univ.)
Professor
Systems Biology of Microbial Gene Regulation.

Sunil Nath, Dr. Ing. (Braunschweig Univ.)
Professor
Bioseparation, Mechanism and Thermodynamics of ATP-based Molecular Machines, Molecular Systems Biology/Engineering

P. K. Roychoudhury, Ph.D. (IIT, Delhi)
Professor
Bioprocess Engineering, Cell Culture Engineering.

Shilpi Sharma, Ph.D. (L M Univ.)
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Functional microbial ecology in terrestrial and waste water treatment systems
T. R. Sreekrishnan, Ph.D. (IIT, Delhi)
Professor
Waste Engineering, Environmental Biotechnology.

Preeti Srivastava, Ph.D. (IIT, Delhi)
Assistant Professor
Microbial Genetics.

A. K. Srivastava, Ph.D. (McGill Univ.)
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D. Sundar, Ph.D. (Pondicherry Univ.)
Associate Professor
Bioinformatics and Computational Biology, Protein-DNA recognition, Metabolic Engineering.

Subhash Chand, Ph.D. (IIT, Delhi)
Emeritus Professor
Bioprocess Engineering, Enzyme Science & Engineering, Biosensors, Environmental Biotechnology.

Gupta, M.N., Ph.D. (IISC, Bangalore)
Emeritus Professor
Chemical modification and chemical crosslinking of proteins; Production and Separation of Proteins/Enzymes.
INTRODUCTION

The Department offers a unique blend of scientific expertise in applied biological sciences, chemical and biochemical engineering. It strives for application of this expertise to evolve various biotechnological products, processes and services through:

- Generation of highly trained human resource capable of quantitative analysis of biological systems to facilitate their role in manning modern bioprocess industries and provide an integrated approach to research and development in biotechnology.
- Evolving research and development programmes to develop products and provide services in bio energy, environment and therapeutics.
- Leading global innovations in Bioprocess Technology and Applied Biological Sciences, and facilitate participation in industrial consulting and sponsored research.
- Dissemination of knowledge generated through short term courses, workshops and conferences.

ACADEMIC PROGRAMMES

UNDERGRADUATE

The Department offers a four year B.Tech. Programme and a five year Dual Degree Programme in Biochemical Engineering & Bio-technology. Under the five year dual degree Programme both B.Tech. and M.Tech. degrees are awarded after 5 years.

POSTGRADUATE

At postgraduate level the department offers a M.S. (Research) Programme.

RESEARCH

Some of the focal areas of research of the department are:

- Bioprocess Engineering
- Cell and Molecular Biotechnology
- Downstream Processing
- Systems and Computational Biology.
Doctoral research is being carried out in the following areas:
Microbial physiology and biochemistry; Metabolic regulation and engineering; Recombinant DNA technology; Development of expression systems in *Corynebacterium* and *Pichia*, Molecular biology and applications of industrial enzymes, Microbial engineering & technology; Enzyme science and engineering; Animal and plant cell fermentations; Bioreactor design and analysis; Bioseparation and downstream processing systems; Biological waste treatment, Bioenergetics, Biological molecular machines, Biosensors, Protein engineering and structure-function relationship of industrially important proteins. Drug delivery systems, Protein-DNA recognition and Bionanotechnology.

LABORATORY FACILITIES
The Department is well equipped for the teaching and research programs and the equipment and facilities are regularly modernized as per requirements. Major equipment and facilities are: several bioreactors with capacities ranging from 2 to 300 litres, complete with monitoring and control instruments of different parameters such as pH, temperature, dissolved oxygen, redox; Elemental analyzer, HPLC, IC, GC and other chromatography systems; ultra-filtration unit, visible and UV spectrophotometer, CD Spectropolarimeter, Spectrofluorimeter; Flourescne microscope ultracentrifuge, ultrasonic disintegrator, laminar flow chamber, anaerobic work cabinet, viscometer, lyophilizer, microbial mutation facility, isoelectric focussing unit, scanning laser densitometer, scintillation counter, UF system, FPLC, PCR, RT-PCR electroporation-electrofusion system and facility for working with radioisotopes. Manual nucleic acid sequencing facility, Kodak auto developer. Other infrastructural facilities include a 250 kVA diesel generating set, a 5 kVA uninterrupted power supply system for micro computer and peripherals, boiler, automatic steam sterilizer, constant temperature rooms (37 and 4°C), air compressor and chilled water units. A separate computation lab with several PCs is also available. For transferring laboratory scale data to industrial scale, A pilot plant facility is available. A Bioinformatics Centre sponsored by the Department of Biotechnology, Government of India, under the Biotechnology Information System Network (BTISnet) is also housed in the Department.
Rajesh Khanna, Ph.D. (IIT, Kanpur)
Professor

Suddhasatwa Basu, Ph.D. (IISc, Bangalore)
Professor & Head
Interfacial & electrochemical engineering, fuel cells, enhanced oil recovery

Vivek V. Buwa, Ph.D. (IIT, Bombay)
Associate Professor
Computational Fluid Dynamics, Multiphase Flows, Reactor Engineering.

Divesh Bhatia, Ph.D. (Univ. of Houston)
Assistant Professor
Automotive Catalysis, NOx Emissions, Monolith Reactors, Kinetics of Fast Reactions

Paresh Chokshi, Ph.D. (IISc, Bangalore)
Assistant Professor
Hydrodynamic stability, Polymer Processing, Theoretical and computational polymer physics Dynamics of Complex Fluids.

Shalini Gupta, Ph.D. (NC State Univ.)
Assistant Professor
Colloidal Interactions & Nanoscale Engineering, Biosensing Devices.

Mohammad Ali Haider, Ph.D. (Univ. of Virginia)
Assistant Professor
Heterogeneous Catalysis, Solid Oxide Fuel Cells, Biorenewable Chemicals and Biofuels.

Sharad K. Gupta, Ph.D. (Brooklyn Univ.)
Professor
Transport Phenomena, Membrane Separation Processes.

Gaurav Goel, Ph.D. (Univ. of Texas, Austin)
Assistant Professor
soft-condensed matter, Protein aggregation, Directed self-assembly in external fields.

Ratan Mohan, Ph.D. (IIT, Kanpur)
Professor
Computational Fluid Dynamics, Process Engineering and Thermodynamics.
Kamal K. Pant, Ph.D. (IIT, Kanpur)
Professor
Heterogeneous green Catalysis, Hydrocarbon treatment and H₂ production, Water Treatment.

Sudip K. Pattanayek, Ph.D. (IIT, Bombay)
Associate Professor
Thermodynamics & Self Assembly of soft matter, Biopolymers and Nano-Composites.

Jyoti Phirani, Ph.D. (Univ. of Huston)
Assistant Professor
Flow through porous media, Reservoir simulation, Enhanced oil recovery, Unconventional energy resources.

Manoj Ramteke, Ph.D. (IIT Kanpur)
Assistant Professor
Process System Engineering, Evolutionary Computation, Polymer Reaction Engineering and Control

Anurag S. Rathore, Ph.D. (Yale Univ.)
Professor
Biosimilars, Bioprocessing, Quality by Design (QbD), Process Analytical Technology (PAT), Multivariate Data Analysis (MVDA).

Shantanu Roy, Ph.D. (Washington Univ.)
Professor
Multiphase reaction engineering, radioactive trace particle tracking

Jayati Sarkar, Ph.D. (IIT, Kanpur)
Assistant Professor
Instabilities and pattering formation in thin films, granular materials, computational fluid dynamics

Anil K. Saroha, Ph.D. (IIT, Delhi)
Professor
Multiphase Reactors, Environmental Engineering.

Munawar A. Shaik, Ph.D. (IIT, Bombay)
Associate Professor

Anupam Shukla, Ph.D. (IIT, Kanpur)
Assistant Professor
Membrane Synthesis & Separation, Electrochemical Systems Engineering

Vikram Singh, Ph.D. (Cornell)
Assistant Professor
Low Re number fluid mechanics, suspensions, emulsions, colloids, aerosols and geothermal energy

Sreedevi U., Ph.D. (IIT, Kharagpur)
Associate Professor
Heterogeneous Catalysis, Green Industrial Processes, Modelling of Fluid Reactions in Composite Manufacturing.

Anil Verma, Ph.D. (IIT, Delhi)
Associate Professor
Batteries, Graphene, Microbial & PEM/DM fuel cells, Electrochemical CO₂ reduction, C/C composites

K. D. P. Nigam, Ph.D. (UDCT, Mumbai)
Emeritus fellow/Professor
Modeling of Flow Systems, Inline Mixing and Multiphase Reactors.
INTRODUCTION

The department of Chemical Engineering (ChE) at IIT Delhi, one of the finest in India, is dedicated to providing the best education, research practices and ecosystem to all its associated members. The undergraduate and postgraduate students can choose a wide range of courses and research projects from the department’s meticulously designed academic program. The courses span from fundamental sciences to complex mathematical relationships and engineering design aspects of chemical and biological process technology.

The students are rigorously trained and evaluated on a continuous basis so that they are well prepared to be leaders in whichever field they choose to pursue may it be academia, industry, technology management, entrepreneurship or working for a social cause. The course curriculum is upgraded every ten years to keep up with the changing scenario, requirements and technological advancements around the world.

The department maintains a vibrant research profile and currently boasts of having one of the best group of faculty members who are not only experts in the their respective fields of research but are also engaged in multidisciplinary projects that cater to the broader economic, societal and environmental development and growth of the country. The department maintains a close liaison with a large number of chemical, biotech companies and design organizations because we believe it is essential to perform basic fundamental scientific research alongside the applied one. The faculty regularly undertakes consultancy assignments in which postgraduate students can make great contributions and students at the undergraduate level are constantly encouraged to identify industrial organizations for summer internships.

Every faculty member has a well equipped lab in which advanced instruments are available for usage to all the students. Some of these instrumentation facilities include liquid-liquid extraction columns, autoclaves, large capacity blowers, compressors, gasifiers, combustors, pyrolysis systems, bubble and packed columns, circulating fluidized beds, batch and continuous flow reactors, heat exchangers, carbon-dioxide absorption system, bench-top optical and electron microscopes, centrifuges, GCMS, TGA, DTA, TPD/TPR, sub-micron particle size analyzer, powdered particle shape analyzer, high speed photographic equipment, data loggers, high speed multipoint recorders, XRF, HPLC, Ion chromatograph, CHN analyzer, Haake viscometer, GC with mass spectrometer, atomic absorption spectrometer, automatic contact angle goniometer and tensiometer, radioactive particle tracking (RPT) system, spin coater and surface plasmon resonance (SPR) spectroscope. The department also has two pilot plants and a newly furbished central characterization lab that currently houses an XRD and rheometer. More instruments are planned to be added soon.

In addition to the analytical instrumentation facilities, there are also extensive computing facilities and softwares like Aspn Plus, SimSci, Fluent, CFX and Promax that are made available to the undergraduate and research students for carrying out their project work. The department has also set up a state-of-the-art pollution control and testing laboratory and a process research laboratory provided with 40 intel core 2 duo personal computers.
and a state-of-the-art Tata-Honey Well Automation Laboratory. Every Thursday the department organizes a research seminar in which external speakers or Ph.D. students from our own ChE department present their research work. This helps the students to stay abreast with the latest developments in Chemical Engineering and also gives them a perspective about their own research work from a global view standpoint. Summer and winter schools under quality improved program (QIP) are also organized every year. With so much happening in the department, we strongly urge you to join us as a student, staff or faculty, or at least pay us a visit when you are in the neighborhood.

VISION

The Department’s long term vision is to become a world leader in the technologies related to energy, environmental protection, novel materials and healthcare. The Department has been prolific in the areas of materials development for energy generation and storage, catalysis and multiphase reactor engineering, process intensification in non-renewable and renewable energy sectors, modeling and simulation from molecular to process scales, and bioprocessing related to the pharmaceutical industry. We would like to build on our strengths and strive for national and international presence in these areas by continuing our fundamental research and technology development initiatives, and further strengthening our bachelors, masters and doctoral programs. We expect that these endeavors will not only attract superior faculty, but will provide and create an enabling ecosystem for students to explore, innovate and smoothly transition into the professional arena. The Department would like to build focused research programs networked with industry, institutions, universities and government agencies. We would like to develop/co-develop effective and affordable technologies scripting joint IPR in partnership with industry, or through consortia leading to spin-offs. The Department strives to promote a technology temperament in society at large, especially to young minds through extensional activities via technology enhanced video and web based distance learning courses, creation of virtual laboratory and resource centres and participating in policy making and public debates.

ACADEMIC PROGRAMMES

The department offers two undergraduate degrees, one leading to a 4 year B.Tech. and the other to an integrated B.Tech. plus M.Tech. 5 year Dual Degree. At the postgraduate level, the department offers M.Tech., M.S. (Research) and Ph.D. degrees. The instruction at the undergraduate level aims at providing the students a broad-based education in theory and practice of Chemical Engineering keeping in view the current and future requirements of the country. At the postgraduate level, students are trained to assume independent responsibilities laying emphasis again on the country’s current and future requirements in industry, R&D organization, design firms and academic institutions. Opportunities are provided to the students at all levels to get acquainted with the latest
developments in the various areas of Chemical Engineering. Our department also offers an M.Tech. programme, through a video-link, for Ethiopian students at Addis Ababa.

**UNDERGRADUATE**

In the 4 year B.Tech degree, theory courses are well supported by a large number of experiments. Some of the special features of this program are: (i) Engineering science education rather than technology-oriented education; and (ii) extensive courses on Process Plant Design including mechanical design of process equipment technology and other important subjects are covered in the form of additional elective courses some of which are: Computer aided design, environmental engineering, bioprocessing and boseparations, introduction to soft matter, plant safety, petroleum refinery engineering, process engineering, powder processing, polymer science and engineering. During the final two semesters, students are required to take up research and design projects with the ChE faculty members. A limited number of innovative, open-ended experimental projects are also offered to students by choice, either to help them in setting up small-scale industry or to prepare them for higher education.

**POSTGRADUATE**

The 5 year dual degree program (integrated B.Tech. + M.Tech.) in Chemical Engineering is viewed as a high-value added course fit for students who wish to enhance the scope of their B.Tech. degree with one additional year of research experience. The students can take additional elective courses which opens avenues for better placements both in academia and in the industry. The masters of technology (M.Tech.) is a standard two year programme after B.Tech. comprising of one year of rigorous coursework followed by an year of research training under the guidance of a ChE faculty supervisor. The Department also offers M.S. (Research) programme in Chemical Engineering. During the first semester the students complete their course work. The following three semesters are devoted to the research project. There is a provision for joining the M.Tech./MS Programs on part-time basis for persons already employed.

The highly motivated individuals choose to obtain a Doctor of Philosophy (Ph.D.) degree in Chemical Engineering as this is an intensively research-driven program. The students are also expected to qualify the advanced chemical engineering courses in thermodynamics, chemical reaction engineering and transport phenomenon in their first year while maintaining a minimum CGPA requirement. The various areas of Ph.D. research include adsorption, biomass conversion, catalysis, development of biotech processes, multivariate data analysis, colloid science and its applications in biosensing, catalysis, computation of insulin folding, hydrocarbon processing, chemical reaction engineering, dynamics and control of batch & CSTRs & fixed bed reactors, computer aided design, computational fluid dynamics applications, dye removal from waste water, environmental engineering,
expert systems, fluidization, fuel cell technology, gas absorptions with chemical reaction in packed columns, interfacial engineering, enhanced oil recovery, sulphonation of crude, ion-exchange, membrane processes, mixing, modeling, particle technology, hydrogen production, polymers, nanoparticle synthesis, residence time distribution studies, thin film phenomena, retrofitting of silos from flow characterization of powders, nonlinear and mixed integer optimization, modeling and simulation, process operations, planning and scheduling of batch and continuous processes, advanced process engineering, heat and water network synthesis, waste management, foam-bed reactors, pollution preventing inks, paints and fuels, applications of nanotechnology in energy, environment and healthcare, carbon-capture Technologies, XTL.

**RESEARCH**

The ChE faculty is actively engaged in basic and applied research leading to the award of many Masters and Ph.D. degrees. These projects are sponsored by industries, user organizations and other funding agencies such as DST, DBT CSIR, DRDO etc. The projects are directed towards development of innovative and indigenous technology for processes related to efficient heat transfer, quality by design of biosimilars, biomass thermo-chemical conversion, safety and control of runaway reactors, hydrodynamics and cold flow studies in trickle beds, packed beds and bubble columns, membrane transport studies, recovery of metals from spent catalysts, oil recovery from emulsion effluents, IS process for hydrogen production. The research activities of the department can be broadly classified in the following sub-disciplines.

**Agro Technology:** Coating of urea prills with neem oil, oil extraction from jojoba, design of silos and cyclones, application of CO2 for storage of grains, use of fluidized beds for drying, supercritical extraction of neem oil, crop-protection strategies.
**Bioseparations and Bioprocessing:** Quality by design, biosimilars, process analytical technology, multivariate data analysis, development of novel bioseparations technologies, process modeling.

**Colloids and Nanoscale Engineering:** Colloidal assembly in external fields, bioresponsive nanomaterials, low-cost bioassays and biomedical devices, drug delivery systems, soft lithography

**Energy Engineering:** Hydrogen generation by PEM water electrolyzer, PEM fuel cell, direct alcohol fuel cell, glucose fuel cell, micro fuel cell, solid oxide fuel cell, utilized regenerative fuel cell, alkaline fuel cell, electrocatalyst, membrane electrode assembly development, development of sustainable technology for hydrogen production, non-conventional energy resources, alternative fuels – biomass to liquid and coal to liquid.

**Environmental Engineering:** Biological effluent treatment and integrated effluent treatment for water reuse, dispersion of particulates, development of mini cyclones for fine particulates removal, low pressure drop cyclone to reduce specific energy consumption of systems, environmental effect of chemical pesticides, metal ion removal from industrial effluents by bio-sorption, selective dye removal from water by reverse micelles and reuse of dye, performance and evaluation of anaerobic GAC expanded bed reactors, recovery of oil from emulsion effluents of steel rolling mills and process industries, development of new pollution preventing writing and printing inks, paints, fuels sustainable carbon-capture technologies, NOx reduction technologies such as lean NOx traps and selective catalytic reduction.

**Fluid and Particle Mechanics:** Characterization of particles, comminution and gas-solid separation, flows through silos, pneumatic conveying of solids and flow through porous media, flow over deformable solids, hydrodynamic stability.
Heterogeneous Catalysis: Preparation, characterization and catalytic studies of various supported transition metal catalysts, metal oxides and zeolites.

Interfacial Engineering: Micro-fluid mechanics in manufacturing of fine chemicals, food processing, enhanced oil recovery, paint technology and polymer coating, applications of interfacial engineering to effluent treatment, agglomeration in re-refining of used engine oils, role of interfacial phenomena in wetting of reactor packings, incorporation of fundamentals of interfacial science into crop protection strategies.

Molecular Dynamics Simulations: Structure-property relationships in soft-condensed matter, protein aggregation, directed self-assembly in external fields.

Petro Technology: Design, performance and scale-up studies on major equipment used in petroleum and petrochemical industries such as trickle bed reactors, coil flow inverter, motionless mixers and continuous film contactors, sulphonation of crude and surfactant synthesis, enhanced oil recovery, re-refining of used engine oils, flow through porous media, reservoir simulation.

Polymer Physics and Engineering: Structure-property of polymeric materials, polymer chain simulations, polymer crystallization, rheology and flow of polymer melt and solution, polymer nano-composites, polymer at interfaces

Process Systems Engineering: Planning and scheduling of batch and continuous process operations, process optimization, advanced process synthesis, process plant simulation and control, scheduling and planning, heat-exchanger network synthesis, water allocation network synthesis, modeling and simulation of polymer reactors, optimization and optimizing control of polymer reactors, stochastic optimization techniques: genetic algorithm, simulated annealing and other advanced computing techniques.
Reactor and Reaction Engineering: Intrinsic kinetics of various industrially important reactions including both homogeneous and heterogeneous (gas-liquid, gas-solid, both catalytic and non-catalytic), hydrodynamics, mixing, heat and mass transfer, steady state multiplicity, chaos and control, limit cycles, design, performance and scale-up strategies for packed columns, bubble columns, mechanically agitated contactors, trickle bed reactors, foam bed reactors, film reactors, monolith reactors, continuous film contactors, standardization of the use of radioisotopes as nondestructive methods of measurements of reactor hydrodynamics, wetting characteristics of reactor packing, photochemical and photo-electrochemical reactors, IS process technology development, and XTL.

Separation Science and Technology: Membrane separation, ion exchange and adsorption processes, development of design equations for reverse osmosis, modeling of protein transmission in ultrafiltration membranes, estimation of mass transfer coefficient from the measurements of the membrane separation systems. Removal of dye from water using colloidal gas apheres and reverse micellar extraction, de-bittering of fruit juices for improved shelf life and taste.
Ravi Shankar, Ph.D. (Punjab Univ.)
Professor
Inorganic Polymers, Organometallic Chemistry/ Coordination chemistry of silicon, germanium and tin.

Head of the Department

D. K. Bandyopadhyay, Ph.D. (I.A.C.S)
Professor
Metalloporphyrin catalyzed oxidation reactions of organic and organometallic compounds: Kinetics & Mechanistic studies.

C. Chakravarty, Ph.D. (Univ. of Cambridge)
Professor
Theoretical Chemistry and Chemical Physics, Classical and Quantum Monte Carlo, Molecular Dynamics, Structure and Dynamics of Liquids, Water and Hydration, Nucleation, Self-assembly.

Pramit K. Chowdhury, Ph.D. (Iowa State Univ.)
Associate Professor
Physical and Biophysical Chemistry, Protein Folding using Single Molecule Confocal Microscopy.

Datta Tanmay, Ph.D. (Calcutta University)
Assistant Professor
Biochemistry, Enzymology, Molecular RNA Biology, Genetics

Anil J. Elias, Ph.D. (IIT Madras)
Professor
Synthetic main group and organometallic chemistry.

A. K. Ganguli, Ph.D. (IISc, Bangalore)
Professor
Chemistry of novel materials (dielectric oxides, Superconductors and nanomaterials).

Shashank Deep, Ph.D. (IIT Delhi)
Associate Professor
Physicochemical characterization of macromolecule interaction and Biophysical studies of protein folding and protein aggregation surface using multinuclear NMR spectroscopy, fluorescence, microscopy and different calorimetric techniques.

Shivajirao L. Gholap, Ph.D. (IISc Bangalore)
Assistant Professor
V. Haridas, Ph.D. (NIST, Trivandrum)
Associate Professor

Pravin P. Ingole, Ph.D. (University of Pune)
Assistant Professor
Electrochemical techniques, electroanalysis, nanomaterials.

Nidhi Jain, Ph.D. (Delhi Univ.)
Assistant Professor
Nanocatalysis in organic synthesis, ionic liquids, structural studies of DNA-carcinogen adducts.

B. Jayaram, Ph.D. (City Univ. New York)
Professor
Biomolecular modeling and simulation, physicochemical model for DNA sequence analysis, ab initio protein structure prediction, active site directed drug design.

Hemant Kumar Kashyap, Ph.D. (Jadavpur University)
Assistant Professor
Statistical mechanics of soft-matter, molecular dynamics simulations, ionic liquids, lipid-membranes.

Sunil Kumar Khare, Ph.D. (IIT Delhi)
Professor
Biochemistry, Enzyme Technology, Applied Microbiology synthesis.

N. D. Kurur, Ph.D. (Caltech Univ.)
Professor
NMR Methodology.

S. Nagendran, Ph.D. (IIT Kanpur)
Associate Professor
Chemistry of Group 13 and 14 Elements with Special Emphasis to the Low-valent Compounds of Silicon.

Siddharth Pandey, Ph.D. (North Texas Univ.)
Professor
Optical spectroscopy, advanced fluorescence techniques, molecularly organized media, environmentally friendly solvent systems, chemosensors, photophysical processes.

N. Pant, Ph.D. (Princeton Univ.)
Professor
Theoretical and Experimental studies on molecular conformation, Molecular Recognition.

N.G. Ramesh, Ph.D. (IIT Madras)
Professor
Synthetic Organic Chemistry, Carbohydrate Chemistry, Asymmetric Synthesis.

Arunachalam Ramanan, Ph.D. (IISc, Bangalore)
Professor
A. K. Singh, Ph.D. (Delhi Univ.)
Professor

Sameer Sapra, Ph.D. (IISc, Bangalore)
Associate Professor
Nanomaterials, semiconductor nanocrystals, quantum dots, light emitting devices, charge transfer and photovoltaics.

Ravi P. Singh, Ph.D. (IIT Kanpur)
Assistant Professor
Asymmetric Catalysis, C-H and C-F activation, Total Synthesis of small molecules.

J. D. Singh, Ph.D. (Lucknow Univ.)
Professor
Chemistry of Chalcogens/Organo-Chalcogens and their Applications in Organic Synthesis & Catalysis, Organic metals and Superconductors.
INTRODUCTION

The Department offers M.Sc., M.Tech. and Ph.D. programmes in Chemistry and caters to chemistry courses for B.Tech. students in engineering disciplines. It provides good opportunities for research at doctoral and post-doctoral research on a variety of topics in conventional and interdisciplinary areas of Chemistry. As a part of its academic activities, the Department organises seminars, symposia, summer schools, winter workshops etc. It also undertakes industrial consultancy projects and has ongoing collaborative research projects in frontier areas with institutions in India and abroad.

ACADEMIC PROGRAMMES

POSTGRADUATE

M.SC.

The Four-Semester Master of Science in Chemistry is designed to provide a broad-based training in physical, inorganic and organic chemistry. Courses in biochemistry and analytical chemistry are also included in the core programme. Students are offered choice of electives in various specialized areas like solid state chemistry, organometallic chemistry, statistical mechanics, bioorganic chemistry and immunochemistry. Students are required to also take two electives from outside the department. The project in second year initiates the students into research work in various branches of Chemistry.

M. TECH.

The M. Tech. Programme in Molecular Engineering: Chemical Synthesis and Analysis is one-of-a-kind programme in the country and provides advanced training in the design, synthesis, separation, and characterization of molecules while preparing students for careers in industry or academia. In addition, students are offered choice of electives in various specialized areas of chemistry, chemical and polymer engineering, and management. It culminates in a year-long project where the foundation for scientific research is laid.

RESEARCH AREAS

The department is actively engaged in research including doctoral research, in all contemporary areas of chemistry. Major disciplines include analytical, inorganic, organic, physical chemistry and biochemistry.


- Biochemistry: Enzyme Stability and Stabilization, Nonaqueous Enzymology, Bioseparation, Peptide
Synthesis for Molecular Device Construction, Computer Aided Molecular Design, Enzyme Immobilization and Bioconversions, Microbial Biochemistry, Extremozymes and Extremopiles, Nanobiotechnology, Structural biology, inhibition of amyloid formation, ligand receptor interaction.

- **Inorganic Chemistry:** Organometallic Chemistry of Main Group/Transition Elements, Inorganic Polymers Supramolecular Chemistry. Metallo porphyrins as Catalysts, Intermetallic Compounds, Chemistry of Materials, Nanocrystalline Solids, Coordination Polymers, Crystal Engineering, Catalysis through Organometallic Compounds.


LABORATORY FACILITIES

The following equipments are available in the laboratories of the department. 
Manoj Datta, Ph.D. (IIT, Delhi)
Professor
Geotechnical Engineering, Geoenvironment, Landfills, Ash Ponds, Tailings, Ground Improvement, Slope Stability, Dams, Offshore Geotechnology.

B. J. Alappat, Ph.D. (IIT, Bombay)
Professor

R. Ayothiraman, Ph.D. (IIT, Madras)
Associate Professor

Gurmail S. Benipal, Ph.D. (IIT, Delhi)
Associate Professor
Structural Engineering, Nonlinear Dynamics and Stability, Constitutive Modelling, Concrete Mechanics: Creep, Elastoplasticity, Damage, Cable Dynamics.

Suresh Bhalla, Ph.D. (Nanyang Tech. Univ.)
Associate Professor

B. Bhattacharjee, Ph.D. (IIT, Delhi)
Professor
Durability of Concrete, Rebar Corrosion, Cement based Composites, Construction Technology, Building Science, Green Building, Sustainability.

Shashank Bishnoi, Ph.D. (EPFL, Switzerland)
Assistant Professor
Experimental and Numerical Studies into Hydration of Cements and Supplementary Cementitious Materials, Sustainability, Durability and Life Cycle Costs of Concrete Structures.

B. R. Chahar, Ph.D. (IIT, Roorkee)
Professor

Sumedha Chakma, Ph.D (IIT, Delhi)
Assistant Professor

T. Chakraborty, Ph.D. (Purdue Univ.)
Assistant Professor

S. K. Deb, Ph.D. (IIT, Delhi)
Associate Professor
Transportation Engineering, Urban Engineering, Fuzzy System Modelling, Airways, Academic Programmes.
CIVIL ENGINEERING

Abhijit Ganguli, Ph.D. (ULB, Belgium)
Assistant Professor

K. C. Iyer, Ph.D. (IIT, Madras)
Professor
Construction Engineering and Management, Contracts and Arbitration, Structural Engineering, VDC and Building Information Model, Project Risk.

N. K. Garg, Ph.D. (Wales Univ.)
Professor
Water Resources System, Finite Element, Watershed Modelling, Irrigation Management, CAD.

A. K. Gosain, Ph.D. (IIT, Delhi)
Professor

Ashok Gupta, Ph.D. (IIT, Delhi)
Professor

Supratic Gupta, Ph.D. (Nagoya Univ.)
Assistant Professor
Structural Engineering, FEM Analysis, Constitutive Modelling of Material and Structures, Concrete Mechanics, Self Compacting and High Performance Concrete.

Gazala Habib, Ph.D. (IIT, Bombay)
Assistant Professor
Source and Atmospheric Aerosol Characterization, Regional Air Quality, Health, Source Apportionment Modelling, Climate Effect and Climate Modelling.

A. K. Jain, Ph.D. (IIT, Delhi)
Professor
Design of RCC and Steel Structures, Earthquake Engineering, Wind Engineering, Offshore Structures, Dynamic Testing of Structures.

K. N. Jha, Ph.D. (IIT, Delhi)
Associate Professor

D. R. Kaushal, Ph.D. (IIT, Delhi)
Associate Professor

A. K. Keshari, Ph.D. (IIT, Kanpur)
Professor
Groundwater Flow and Pollution Modelling, Remote Sensing and GIS, Hydrology, Optimization and FEM, EIA and Hydrogeological Hazard.
Mukesh Khare, Ph.D. (New Castle Univ.)
Professor
Air and Vehicular Pollution Modelling, Indoor Air Pollution, Urban Air Quality Management.

Rakesh Khosa, Ph.D. (IIT, Delhi)
Professor

Arun Kumar, Ph.D. (Drexel Univ.)
Assistant Professor
Human Health Risk Assessment, Nanoparticles, Water Treatment, Decision-making, Emerging Contaminants.

Alok Madan, Ph.D. (Univ. at SUNY/Buffalo)
Professor
Earthquake Engineering, Nonlinear Structural Dynamics, Concrete Structures, Computing in Structural Engineering, Structural Masonry.

J. Uma Maheswari, Ph.D. (IIT, Madras)
Assistant Professor

B. Manna, Ph.D. (IIT, Kharagpur)
Assistant Professor
Foundations for Industrial Machines, Dynamic Soil-Pile Interaction, Soil Dynamics, Foundation Engineering, Geotechnical Earthquake Engineering.

Shashi Mathur, Ph.D. (Delaware Univ.)
Professor

Vasant Matsagar, Ph.D. (IIT, Bombay)
Associate Professor

A. K. Mittal, Ph.D. (IIT, Bombay)
Professor

A. K. Nema, Ph.D. (IIT, Bombay)
Professor

G. V. Ramana, Ph.D. (Rensselaer)
Professor
Geotechnical Earthquake Engineering, Dynamic Site Characterization, Machine Foundations, Environmental Geotechnology, Geosynthetics.

M. M. Rao, Ph.D. (IIT, Delhi)
Senior Programmer
ANN Control of Building Frames, MIS, System Administration, Development of Application Software.

Mukesh Khare, Ph.D. (New Castle Univ.)
Professor
Air and Vehicular Pollution Modelling, Indoor Air Pollution, Urban Air Quality Management.

Rakesh Khosa, Ph.D. (IIT, Delhi)
Professor

Arun Kumar, Ph.D. (Drexel Univ.)
Assistant Professor
Human Health Risk Assessment, Nanoparticles, Water Treatment, Decision-making, Emerging Contaminants.

Alok Madan, Ph.D. (Univ. at SUNY/Buffalo)
Professor
Earthquake Engineering, Nonlinear Structural Dynamics, Concrete Structures, Computing in Structural Engineering, Structural Masonry.

J. Uma Maheswari, Ph.D. (IIT, Madras)
Assistant Professor

B. Manna, Ph.D. (IIT, Kharagpur)
Assistant Professor
Foundations for Industrial Machines, Dynamic Soil-Pile Interaction, Soil Dynamics, Foundation Engineering, Geotechnical Earthquake Engineering.

Shashi Mathur, Ph.D. (Delaware Univ.)
Professor

Vasant Matsagar, Ph.D. (IIT, Bombay)
Associate Professor

A. K. Mittal, Ph.D. (IIT, Bombay)
Professor

A. K. Nema, Ph.D. (IIT, Bombay)
Professor

G. V. Ramana, Ph.D. (Rensselaer)
Professor
Geotechnical Earthquake Engineering, Dynamic Site Characterization, Machine Foundations, Environmental Geotechnology, Geosynthetics.

M. M. Rao, Ph.D. (IIT, Delhi)
Senior Programmer
ANN Control of Building Frames, MIS, System Administration, Development of Application Software.
K. S. Rao, Ph.D. (IIT, Delhi)
Professor

Kalaga R. Rao, Ph.D. (IIT, Kharagpur)
Associate Professor
Mass Transit Planning, Traffic Flow Modelling and Travel Demand Modelling, Road Safety.

Aravind K. Swamy, Ph.D. (New Hampshire Univ.)
Assistant Professor

Dipti Ranjan Sahoo, Ph.D. (IIT, Kanpur)
Assistant Professor
Supplemental Damping and Energy Dissipation, Earthquake Engineering, Performance Based Seismic Design, Strengthening, Retrofitting, Steel & Concrete Structure, Large-Scale Seismic Testing, Dampers.

Geetam Tewari, Ph.D. (Univ. of Illinois)
Professor

J. T. Shahu, Ph.D. (IIT, Kanpur)
Professor
Geotechnology for Tracks and Pavements, Constitutive Modelling of Soils, Ground Improvement, Geosynthetics.

K. G. Sharma, Ph.D. (Wales Univ.)
Professor
Constitutive Modelling, Dams Underground Structures, Slope Stability, Computational Methods.

A. K. Nagpal, Ph.D. (IIT, Delhi)
Emeritus Professor
Structural Engineering, Tall Buildings, Bridges, Earthquake Engineering.
INTRODUCTION
The Civil Engineering Department at IIT Delhi was established along with the inception of the Institute in 1961. It now offers a regular four year bachelor’s degree in Civil Engineering, and eight different M.Tech. Programs along with M.S. (Research) and Ph.D. Programs in the different frontier areas of research in Civil Engineering. The Department has faculty of international reputation and possess laboratories / research/ computational facilities comparable to any lead university of the world. It promotes industry-academia interaction through consultancy services and undertakes cutting-edge research through sponsored research projects. The department also takes a lead role in ensuring that the advancements in Civil Engineering and Technology reach in the service professionals through the training and continuing education programs. The Department undertakes curriculum development activities by updating the existing course, development new courses and preparing resources materials for teaching.

ACADEMIC PROGRAMME

UNDERGRADUATE
The undergraduate curriculum is broad-based and is designed to introduce the students to the wide range of problems encountered by civil engineers. The major components of the curriculum are Geotechnical Engineering, Structural Engineering, Water Resources Engineering, Environmental Engineering, and Transportation Engineering.

POSTGRADUATE
The postgraduate courses of the Department cover a wide range and enable students to specialize in one of the programmes listed below and also to study courses in other fields of interest in the department. In addition, each M.Tech. student is required to do a major project which involves introduction to the methodology of research or design and development and submit a dissertation. The specialization in M.Tech. Programmes are:

- Construction Engineering and Management
- Environmental Engineering and Management
- Geotechnical and Geoenvironmental Engineering
- Rock Engineering and Underground Structures
- Structural Engineering
- Water Resources Engineering
- Transportation Engineering
- Construction Technology and Management (Industry Sponsored)
RESEARCH AREAS

The Department offers doctoral and post-doctoral research programmes in the following areas:


**Offshore Structure:** Fixed and Floating Offshore Oil Production Platforms-Steel Jackets, Concrete Gravity Platforms-Guyed Towers, Tension Leg Platforms, Articulated Towers, Modelling of the Sea Environment: Soil-Structure-Fluid Interaction; Model Analysis for Linear and Non-linear Systems; Submarine Pipeline; Dynamics of Floating Bodies.


**Soil Engineering:** Shear Strength Behavior under Generalised Stress and Strain, under Partial Saturation, under High Stresses, under Cyclic Load; Shallow and Deep Foundations; Constitutive Relationships of Soils, Application
of Finite Element, Boundary Element and Finite Difference Methods to Analysis of Problems of Flow, Stability, Substructures, Earth and Earth Retaining Structures and Soil-Structure Interaction; Reinforced Soil Structures; Geosynthetics; Marine Geotechnology, Environmental Geotechnology, Ground Improvement, Geotechnical Earthquake Engineering, Seismic Microzonation, Geotechnology related to Roads and Railway Tracks.


**Transportation Engineering:** Traffic Engineering and Management; Traffic Flow Modeling; Public Transport Planning; Transportation System Analysis; Urban and Regional Transportation Systems Planning; Bus Rapid Transit System Design and Planning; Planning of Bicycle Network; Traffic Safety; Accident Prediction Modeling; Highway Safety Analysis; Evaluation of Pavements Materials; Pavement Performance Modeling; Highway and Airfield Pavements; Pavement Drainage; Economic Analysis and Evaluation of Highway Schemes; Airport Engineering.


**Doctoral research is being carried out in the following areas:**
LABORATORY FACILITIES

Structural Engineering Laboratories is a cluster of ten laboratories, namely Concrete Structures Laboratory, Heavy Structures Laboratory, Materials Research Laboratory, Smart Structures and Dynamics Laboratory, Structural Analysis Laboratory, Structural Simulation Laboratory, Advanced Dynamics Laboratory, Construction Technology Laboratory, and Construction Simulation Laboratory and Multi-Hazard Protective Structures Laboratory. This laboratory cluster has facilities to test material strength and prototype structures. Some of the key equipment includes strain controlled dynamic compression testing machine (4000 kN), MTS actuator, mercury intrusion porosimeter, atomic force microscope, corrosion testing facilities, portable dynamic shaver, high tech data logging systems and special interrogation systems for structural health monitoring based on smart piezoelectric sensors. It houses fire furnace (1300° C) with universal testing machines. In addition, it has state-of-the-art shake table and large strong floor for conducting destructive tests on large specimens.

Computational Laboratory is equipped with two Xenon Servers with Windows 2003 server Edition, for domain control and as license server, 50 core 2 Duo/Quad systems with 4GB of RAM and Windows 7 Enterprise Operating System. All the systems are connected to IITD LAN through Gigabit switches. The laboratory is equipped with some of the latest software viz. Microsoft Office 2010, Microsoft Office projects 2007, ArcGIS V10.0, Bentley Civil Engineering Software including STAAD pro V8i, Microstation, MX Road, WaterGEMS, SewerGems, StormCAD etc. Matlab V2012a, Abaqus V11.0, Ansys V14.0, Plaxis 2D, RocScience, GeoStudio V2007, SAP2000 V15, Etabs V9.0, SAFE V14.0 SAFIR etc.. The laboratory is also equipped with a 3000 ANSI Limens LED Projector mounted on the ceiling for conducting computer-aided tutorial classes and presentations. The laboratory has been equipped with PA system comprising of wired and wireless microphones and 6 speakers connected through a Digital Amplifier and a 12 Channel Mixer.

Soil Mechanics Laboratory has facilities for testing soils under generalised stress-strain conditions (universal triaxial cell), under high confining pressures (up to 1400 kg/cm²), in large size specimens (100 mm diameter), and under partially saturated conditions. Computer controlled GDS triaxial test system is available. It has equipment for measurement of electric resistivity, thermal conductivity, testing soils under dynamic conditions, etc. and for model tests. Equipment to carry out field investigations by drilling boreholes, standard penetration tests, collection of undisturbed samples, plate load tests, dynamic cone and static cone penetration tests are available. A specially built tank 7x3x3 m. with a reaction frame of 40 ton. capacity to test prototype models of retaining walls (active and passive conditions), bridge abutments, geotextile reinforced walls, pile foundations, and footings; to study the thermal conductivity of soils, stability of model submarine pipelines, pullout behaviour of model anchors and skin friction behaviour of model piles. Facilities have been developed for the assessment of strength and friction behaviour, hydraulic behaviour, construction serviceability of geosynthetics (both natural and polymeric). Soil dynamics testing facilities include SASW for soil profiling, block vibration test, dynamic pile load test etc.
Rock Mechanics Laboratory has facilities to test intact rocks and jointed rock masses; to model and test the modelled materials. The laboratory has the following equipment: a loading frame (500 ton vertical load, 100 ton lateral load) to test up to 70x70x70 cm. Specimens, with system for monitoring cell pressures and volume changes, loading and unloading sequences, biaxial and triaxial testing unit (up to 1400 kg/cm²), triaxial (200 kg/cm²), oblique shear and double shear equipment, strain indicators, sonic wave velocity apparatus, borehole extensometer, core drill cutting and lapping machines. Laboratory extensions exist to study the foundations of dams, tunnels and strata control problems with 100 channel data logger.

Transportation Engineering Laboratory has facilities to test aggregates, bituminous materials, bituminous mixes as well as soils. Digital Master Loader with the ability to test marshal and CBR specimens, connected with the data logger: Video Image processing system, Digital Video Camera: Software MX-ROADS, CUBE. The laboratory is also equipped with accelerated polishing equipment, skid resistance tester, automatic vehicle counting devices, etc. Pavement evaluation by Profilograph, Roughometer and Benkelmann beam apparatus.

Environmental Engineering Laboratory is equipped to examine water and wastewater chemically, physically, bacteriologically and biologically. Filtration columns, pilot scale rotating biological contactors, mini ion exchange plant, Simulated landfills, cold model recirculating fluidized bed reactor, etc. are available for conducting research. It has the facilities of a constant temperature room and a dark room with a microbiological camera. An advanced instrumentation room houses modern equipments e.g. GCMS, AAS, HPLC, microprocessor based UV 2000 spectrophotometer, TOC Analyzer, digital gas liquid chromatograph, Dedicated microbial quality facility, digital electronic ion analyser, flame photometer, Digital Balance, Microbalance, digital microprocessor based DO and Ion meter, digital pH controller, indoor air quality monitor, air velocity meter, handy air samplers, respirable dust monitors, Bio-aerosol Sampler, Stack monitoring kit, Indoor air quality chamber, Bomb calorimeter and many other allied analytical equipments for the analysis of water / wastewater / air / organics / inorganics / metals.
Besides, flue gas analyzer, RSPM Monitor for monitoring PM10 and Impactor based PM 2.5 monitor, multi-stream cyclon based monitor, Ozonator and Weather station are available.

**Surveying and Remote Sensing Laboratory** is equipped with precise survey instruments for field surveying like Total, Station, GPS, Digital & Auto Level, etc. Precise angle measuring equipment measuring upto 1” and electronic distance measuring equipment of accuracy 1:50,000 are also available.

**Engineering Geology Laboratory** is equipped for research work in the field of geochemistry, geophysics and industrial mineralogy, qualitative assessment of minerals for hydroelectric projects can be carried out. Data base is available for preparing landuse map of any area in India. PCs with large variety of softwares are available to process the geological data. There is a good geological museum with large collection of minerals, rocks, fossils and models.

**Water Resources Simulation Laboratory** has two components. The laboratory is equipped with latest computational tools available in the area of Water Resources. The laboratory is equipped with 35 core2 Duo and i7 processors. All the equipments are on LAN facilities for satellite image processing digitization and scanning. Application software dealing with ARCGIS and Expert System (LEVEL 5 OBJECT). Experimental facilities include the advanced Hydrologic System, Hydraulic work Bench, Spectrophotometer: Ion Meter and other instruments for carrying out a detailed water quality analysis. River Hydraulics Facility in the form of two flumes enables model studies; sediment transport analysis, dam break and flood wave propagation studies. Bench scale test facility for slurry transportation pipeline systems is also available.
Saroj Kaushik, Ph.D. (IIT, Delhi)
Professor
Artificial Intelligence, Location Based Services.

Amitabha Bagchi, Ph.D. (Johns Hopkins Univ.)
Associate Professor
Structural properties of networks, Algorithms, Data Structure

M. Balakrishnan, Ph.D. (IIT Delhi)
Professor
CAD of VLSI, Computer Architecture.

Subhashis Banerjee, Ph.D. (IISc, Bangalore)
Professor
Computer Vision, Real Time Systems, Robotics.

Sorav Bansal, Ph.D. (Stanford Univ.)
Assistant Professor
Operating System, Compilers.

Naveen Garg, Ph.D. (IIT Delhi)
Professor
Algorithms, Optimization.

Rahul Garg, Ph.D. (IIT Delhi)
Professor
Machine Learning, Big Data Analytics, Neuroimaging, High Performance Computing

Shyam Gupta, Ph.D. (IIT Delhi)
Professor
Graph Theory, Databases.

Ragesh Jaiswal, Ph.D. (Univ. of California, San Diego)
Assistant Professor
Algorithms, Complexity Analysis.

Prem Kalra, Ph.D. (EPFL, Switzerland)
Professor
Computer Graphics, 3D Animation.

Amit Kumar, Ph.D. (Cornell Univ.)
Professor
Algorithms, Computer Networks.
Anshul Kumar, Ph.D. (IIT, Delhi)
Professor
CAD for VLSI, Computer Architecture.

S. Arun Kumar, Ph.D. (TIFR, Bombay)
Professor
Semantics and Verification.

Subodh Kumar, Ph.D. (Univ. of North California)
Associate Professor
Computer Graphics, Visualization, Geometry.

Mausam, Ph.D. (Washington, Seattle)
Associate Professor
Artificial Intelligence, Natural Language Processing.

Preeti Ranjan Panda, Ph.D. (Univ. of California, Irvine)
Professor
Embedded Systems, CAD for VLSI.

Amit Pande, Ph.D.
Assistant Professor
Mobile health, Big Data and applied machine learning, Mobile multimedia, Wireless networks, Security and privacy

Kolin Paul, Ph.D. (BEC, Kolkata)
Associate Professor

Sanjiva Prasad, Ph.D. (Stony Brook Univ.)
Professor
Programming Languages, Concurrent Systems.

Vinay Joseph Ribeiro, Ph.D. (Rice Univ.)
Associate Professor
Computer Networks.

Maya Ramanath, Ph.D. (IISc, Bangalore)
Assistant Professor
Databases and Information Retrieval.

Huzur Saran, Ph.D. (Univ. of California, Berkeley)
Professor
High Speed Networks, Graph Theory & Algorithms.

Smruti Ranjan Sarangi, Ph.D. (Univ. of Illinois)
Assistant Professor
Computer Architecture, Operating Systems.
Parag Singla, Ph.D. (Washington Seattle Univ.)
Assistant Professor
Machine Learning, Social Network Analysis.

Sandeep Sen, Ph.D. (Duke Univ.)
Professor
Computational Geometry, Algorithms.

Subodh Sharma, Ph.D. (University of Utah)
Assistant Professor
High Performance Computing, Concurrency, Formal Verification

S. N. Maheshwari, Ph.D. (Northwestern Univ.)
Emeritus Professor
Algorithms, Parallel Processing, Information Systems.

Aaditeshwar Seth, Ph.D. (Waterloo Univ.)
Assistant Professor
Computer networks, Social network analysis.

K. K. Biswas, Ph.D. (IIT, Delhi)
Emeritus Professor
Computer Vision, AI.

Shweta Agrawal, Ph.D. (Texas, Austin)
Inspire Faculty
Cryptography, Information Theory.

S.C. Gupta
Visiting Faculty
Software Engineering, Databases, Cloud Computing, Software Defined Storage and Networks.

Anupam Joshi, Ph.D. (Purdue University)
Adjunct Professor
Intelligent Networked Systems and Mobile Computing.

Manik Verma, D.phil. (Oxford)
Adjunct Professor
Machine Learning and Computer Vision.

Subhash Bhalla
Visiting Faculty
New Query Languages for Web-users, Distributed Information Systems, Management of voluminous data.
INTRODUCTION

IIT Delhi has been active in Computer Science education and research since the early 1970s and the Department of Computer Science and Engineering was established in 1982. The department currently has 27 faculty members (all Ph.D. from leading institutions). This number is expected to grow in the coming years. Apart from full-time faculty, the Department currently has several visiting faculty members from leading academic institutions. In the recent past, researchers from IBM, IRL also have been participating in the teaching programmes regularly.

ACADEMIC PROGRAMME

It currently offers B.Tech., 5 year Integrated Dual Degree, M.Tech., M.S.(Research) and Ph.D. programmes in Computer Science & Engineering and participates in interdisciplinary M.Tech. programmes in VLSI Design, Tools & Technology and Computer Applications. The curricula are in line with current international trends and are also used as model curricula by other Indian universities and colleges. The current student population in the department is about 500 (250 in Undergraduate, 150 in dual degree, 70 in Masters and 30 in Doctoral programmes). Admission to the programmes is highly competitive; for the undergraduate and dual degree programmes, there is a nation-wide Joint Entrance Examination (JEE) Advanced where approximately top 150,000 students (Senior Secondary School) who cleared JEE Main appear annually and candidates only from the top 300 are offered admission to the CS programmes. Similarly, at the Masters/Ph.D. level, students with a score of 99 percentile or better in the nation-wide GATE exam are offered admission. A significant number of currently employed computer professionals and college teachers are also enrolled in our postgraduate programmes as sponsored candidates.

The emphasis of the curricula is on system architecture, algorithms, networking, machine learning, performance issues, and tools for applications development. The stress is more on design, methodology, analysis, and good software practices. As part of graduation requirements, undergraduate student is expected to complete a two-semester project which may involve developing a subsystem that typically contributes to fulfilling the objectives of some research project. For the dual degree and M.Tech. programme, the students are expected to undertake a project which has significant research component.

DOCTORAL RESEARCH AREAS

Parallel and Distributed computing, operating systems, Virtualization, Application specific processor synthesis, Hardware-software codesign, High Level Synthesis of Asics, Semantics, Verification, Computer Vision, Image Processing and Pattern Recognition, Machine Learning, Location Based Services, Artificial Intelligence, Natural Language Processing, Approximation Algorithms, Databases And Data-Mining, Information Security, Graph

LABORATORY FACILITIES

Computing resources in the department include several high end servers, server clusters, data storage systems and all of these are networked and connected to more than 150 PCs and workstations. Every faculty member, staff and Ph.D. student has a fully networked work-station with full access to the Internet and more than adequate long term storage space in the central repository. Every undergraduate and postgraduate student is also given full access to the Internet and the Department servers. Besides, all the laboratories in the Department also provide full access to the internet and to the central repository. Other major equipment includes EDA software, multi-million gate FPGA based prototyping and validation system, several Robot platforms etc. The PCs and workstations are connected through 10/100 mbp/slinks. The departmental network is connected to the Institute-wide network through a 1Gbps switched fiber optic line. There is 100Mbps link to the outside world.

The major laboratories are:

**General Computing Lab:** This laboratory supports the general purpose computing needs of most students. It houses more than 70 workstations and provides full email and internet access. The servers provide the software required for laboratories in most of the Department courses.

**Digital Hardware Design Lab:** This laboratory supports the training and project needs of the students in the area of digital hardware design. Facilities include microprocessor based system design and FPGA based design.

**Advanced Networking Lab:** Besides providing access to ERNET and internet services, the laboratory supports development of multimedia communications and applications, ATM protocol stack, wireless and mobile communications, network, security and simulation studies in high-speed networks.

**Vision & Graphics Lab:** The laboratory supports development efforts in two areas, namely real-time vision and graphics. The facilities include latest graphics workstations, robot manipulators, computing clusters, virtual reality and other state of the art equipment.

**Philips VLSI Design Lab:** The Laboratory, established in 1996 with support from Philips Semiconductors as part of VLSI Design, Tools and Technology programme houses a state-of-the-art CAD facility consisting of several servers and workstations. P4 clients, X-terminals, plotter and VLSI design software. The CAD facility features in-house, commercial and public domain software (including Cadence and Synposys) for VLSI synthesis and simulation.
FPGA Lab: This lab was created in 1997 to house the FPGA based design activity which started in Digital Hardware Design Lab, and grew substantially. Facilities to work with reconfigurable hardware in hardware software co-design environment have been added subsequently. The laboratory has specialized coprocessor boards for implementing designs upto the complexity of six million gates.

AI & Database Lab: This Laboratory features a server supporting ORACLE and several access machines.

Verification Lab: This laboratory hosts several workstations supporting various specialized model-checking and verification tools.

Architecture, Embedded & energy Sensitive Computing Lab: This lab state of the art workstations, and a Dell storage server for supporting research activities in high performance computer architecture and modern embedded systems.

Cyber Security Research Lab: The mandate of the cyber security lab is to carry out fundamental research in the areas of Cryptography, Computer System & Network Security and Advanced Information Systems Security. We are particularly focused on developing provably secure algorithms to meet the efficiency and security demands of emerging technology trends such as cloud computing.

Data Analytics Lab: Data analytics as a field of computer science is comparatively new and is an amalgamation of other fields such as data management, information retrieval, machine learning, natural language processing, data mining and statistics. It is concerned with consuming and processing large amounts of diverse data, including, text (HTML web pages, online books, scientific publications, etc.), structured data (for example, data residing in database systems), video, audio, etc. to derive useful insights. The current focus of lab would be on processing large scale text-data and processing large scale graphs. Open Information Extraction, Coherent Large-Scale Multi-Document Summarization, AI Applications to Crowd-sourcing, Commonsense Knowledge Extraction & Natural Language Processing over Microblogs.

Cloud Computing Lab (HIPC Lab): The lab contains infrastructure facilities for research in high-performance computing, operating system and compiler design, distributed and cloud computing.

RESEARCH
The faculty is engaged in quality research in diverse areas including Algorithms, CAD for Digital Systems, Computer Networks & Distributed Systems, Robotics, Vision and Graphics, Semantics of Programming Languages and Data Mining. In the last year itself, the department has attracted research grants in excess of Rs.25 million in diverse areas. Sponsored research projects have been carried out in many areas in the last five years. These include:
- Sensor Networks
- Computer Graphics
- Computer Vision
- Parallel Computation
- Application Specific multi-processor SOC Design
- Design Methodology for Embedded Realtime Systems
- Network and OS support for Multimedia Communications
- Network and Enterprise Security
- QoS issues in High-speed Networks
- Artificial Intelligence, NLP & Location Based Services
- Data Mining
- Information Security
- Wireless Network Architecture
- Dynamic and Static approaches for Software Checking
- Software Oriented Architecture and Web Services
- Software Verification
- Information Retrieval

**Doctoral research is being carried out in:**

**CAD of Digital Systems:** Design automation tools for VLSI, application specific instruction processor synthesis, hardware software co-design, high-level synthesis, and hardware specification and verification (associated faculty: M. Balakrishnan, Anshul Kumar, Preeti Ranjan Panda, Kolin Paul and Smruti Sarangi). (Website: http://www.cse.IITDelhi.ac.in/esproject)

**Artificial Intelligence:** Blackboard architecture, expert systems, natural language processing, machine learning, parallel heuristic search (associated faculty: Saroj Kaushik, K.K. Biswas, S. Banerjee, Parag Singla and Mausam).

**Vision and Graphics:** 2D and 3D object recognition, real-time motion tracking, image compression, image based geometric modeling, 3D graphics and animation (associated faculty: Subhashis Banerjee, Prem Kalra and Subodh Kumar).
**Computer Networks:** Multimedia information representation, synchronization and retrieval, and interactive communications, network security, high-speed networks, sensor networks, congestion control, wireless & mobile communications (associated faculty: Huzur Saran, Vinay Ribeiro, Aaditeshwar Seth and Amit Pande).

**Theoretical Computer Science:** Algorithmic graph theory, computational geometry, complexity theory, logic, semantics and algebraic theories of concurrency, randomized algorithms and approximate algorithms (associated faculty: S.Arun-Kumar, Naveen Garg, S.N. Maheshwari, Sanjiva Prasad, Sandeep Sen, Amitabha Bagchi, Amit Kumar and Ragesh Jaiswal).

**Software Systems:** Operating Systems, Virtualization and Cloud Computing, Parallel Computation, Concurrency, Databases, Information retrieval and extraction, Security (associated faculty: S.K.Gupta, Subodh Kumar, Sorav Bansal and Maya Ramanath)

**Programming Languages and Formal Methods:** Design and implementation of programming languages, program analysis, Verification of Systems and pro---Process calculi and concurrency theory, Mobile Computation models, Logics--modal, temporal Theorem Programming & type systems, Fundamentals of distributed Computing (associated faculty: S.ArunKumar, Sanjiva Prasad, Sorav Bansal and Subodh Sharma).

**Data Analytics:** Semantic web data management, opinion mining, machine learning techniques for data analysis, efficient ranked retrieval of structured data, information extraction from unstructured data, news analytics, Structure and content of online social networks, analysis of user behavior in social networks, transient social networks (associated faculty: Amitabha Bagchi, Maya Ramanath, Aaditeshwar Seth, Parag Singla and Mausam).

**Information and Communication Technologies for Development:** Rural network measurements and content distribution, ICT for health services, community radio (associated faculty: Aaditeshwar Seth, Vinay Ribeiro, Huzur Saran, Sanjiva Prasad).

**Security** (associated faculty: Huzur Saran, Ragesh Jaiswal, Amit Pande and Shweta Agrawal)
**Head of the Department**

**Bhim Singh, Ph.D. (IIT, Delhi)**  
Professor, (CEA Chair)  
Power Electronics, Electrical Machines and Drives,  
Smart Grid Power Quality, Renewable Energy, DSP  
based Control of Power Converter and Drive.

**Abhijit R. Abhyankar, Ph.D. (IIT, Bombay)**  
Associate Professor  
Power System Restructuring Issues -Transmission Pricing, Congestion Management, Market Models;  
Power System Analysis and Optimization, Smart Grids.

**Sumeet Agarwal, D.Phil. (Oxford Univ., U.K.)**  
Assistant Professor  
Pattern Recognition, Complex Networks,  
Systems Biology.

**Shubhendu Bhasin, Ph.D. (Univ. of Florida)**  
Assistant Professor  
Nonlinear Control, Adaptive Control of Uncertain Nonlinear Systems, Robotics, Autonomous Systems,  
Reinforcement Learning Control, Approximate Dynamic Programming, Differential Games.

**Manav Bhatnagar, Ph.D. (Oslo Univ.)**  
Associate Professor  
Signal Processing for MIMO Communication Systems,  
Cooperative Communications, Ultra Wideband (UWB) Communications, Non-Coherent Decoders, Cognitive Networks, Coding Theory of MIMO Communication Systems,  
Power Line Communication, Satellite Communications.

**B. Bhaumik, Ph.D. (IIT, Kanpur)**  
Professor  
Biological Neural Networks, Analog and Mixed Signal VLSI Circuits.

**G. Bhuvaneshwari, Ph.D. (IIT, Madras)**  
Professor  
Power Electronics, Electrical Machines & Drives,  
Power Quality.

**R. Bose, Ph.D. (Pennsylvania Univ.)**  
Professor, (Microsoft Chair)  
Wireless Communication, Information Theory,  
Error Control Coding.

**V. Chandra, Ph.D. (IIT, Delhi)**  
Professor  

**Shouribrata Chatterjee, Ph.D. (Columbia Univ.)**  
Associate Professor  
Analog, Mixed - Signal and RF Integrated Circuits.

**S. Chaudhury, Ph.D. (IIT, Kharagpur)**  
Professor (Dhananjay Chair)  
Computer Vision, Multimedia Systems,  
Computational Intelligence.
Anandarup Das, Ph.D. (Indian Institute of Science, Bangalore)
Assistant Professor
Power Electronics, High Power multilevel converters, Electric Drives, Modular Converters, Power Quality.

Swades De, Ph.D. (State Univ. of New York)
Associate Professor
Communication Networks and Systems, Broadband Access and mesh networks, Performance Modeling and Analysis.

Anuj Dhawan, Ph.D. (State Univ. North Carolina)
Assistant Professor

Abhisek Dixit, Ph.D. (K U Leuven Belgium)
Assistant Professor
Sub-10nm logic CMOS Device Design and Characterization, CMOS variability/reliability/thermal-effects, Aggressively Scaled CMOS embedded DRAM (eDRAM) and SRAM cells, Compact Device Modeling and Process Design Kits (PDK), Modeling and Characterization of Si Solar-cells and Modules.

Tapan Kumar Gandhi, Ph.D. (IIT, Delhi)
Assistant Professor
Computational Neuroscience, Neuro-Inspired Engineering, Biomedical Signal and Image Processing, Machine Learning, Assistive Technology.

H. M. Gupta, Ph.D. (IIT, Kanpur)
Emeritus Professor

V. K. Jain, Ph.D. (IIT, Delhi)
Professor
Digital Communication, Optical Communication & Networks.

Amit Kumar Jain, Ph.D. (IISc, Bangalore)
Assistant Professor

S. Janardhanan, Ph.D. (IIT, Bombay)
Assistant Professor
Discrete-time Systems, Sliding Mode Control, Robust Control.

S. D. Joshi, Ph.D. (IIT, Delhi)
Professor
Statistical Signal Processing, Image Processing, Multiresolution Signal/Image Analysis

Jayadeva, Ph.D. (IIT, Delhi)
Professor
Machine Learning, Neuromorphic Engineering, VLSI Design, Optimization, Data Analysis, Bioinformatics.

I. N. Kar, Ph.D. (IIT, Kanpur)
Professor
Robust Control, System Identification, Non-linear Systems, Event-triggered Control, Robotics.
<table>
<thead>
<tr>
<th>Name</th>
<th>Institution</th>
<th>Position</th>
<th>Research Areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uday K. Khankhoje</td>
<td>Ph.D. (California Institute of Technology)</td>
<td>Assistant Professor</td>
<td>Computational Electromagnetics, Remote Sensing, Computational Microwave Imaging.</td>
</tr>
<tr>
<td>Ramkrishan Maheshwari</td>
<td>Ph.D. (Aalborg University, Denmark)</td>
<td>Assistant Professor</td>
<td>Power Electronics, Power converters, Electric Drives, Grid-connected converters, DC-DC converters.</td>
</tr>
<tr>
<td>Turbo Majumder</td>
<td>Ph.D. (Washington State University)</td>
<td>Assistant Professor</td>
<td>Network-on-chip (NoC), Multicore, VLSI.</td>
</tr>
<tr>
<td>R. K. Mallik</td>
<td>Ph.D. (Univ. of Southern California)</td>
<td>Professor, Brigadier Bhopinder Singh Chair</td>
<td>Communication Theory &amp; Systems, Difference Equations, Linear Algebra.</td>
</tr>
<tr>
<td>Bhaskar Mitra</td>
<td>Ph.D. (University of Michigan)</td>
<td>Assistant Professor</td>
<td>All aspects of Design and Fabrication of MEMS, Systems and Sensors.</td>
</tr>
<tr>
<td>Saif Khan Mohammed</td>
<td>Ph.D. (IISc, Bangalore)</td>
<td>Assistant Professor</td>
<td>Communication Theory, Information Theory, Statistical Signal Processing, Wireless Communication, Large MIMO Systems.</td>
</tr>
<tr>
<td>B. K. Panigrahi</td>
<td>Ph.D. (Sambalpur Univ.)</td>
<td>Associate Professor</td>
<td>Power Quality, FACTS Device, Power System Protection, AI Application to Power System.</td>
</tr>
</tbody>
</table>
S. Prakriya, Ph.D. (Toronto)
Professor (Jai Gupta Chair)
Signal Processing for Communications, Cooperative links, Cognitive Radio.

R. K. P. Bhatt, Ph.D. (IIT, Delhi)
Emeritus Professor
Adaptive Control, Nonlinear Dynamics, Image Processing.

Shaunak Sen, Ph.D. (Caltech)
Assistant Professor
Control Systems, Dynamical Systems.

Jun Bae Seo, Ph.D. (University of British Columbia, Canada)
Assistant Professor
Wireless mobile communication networks, Computer communication networks, computational probability, stochastic processes, queueing theory and optimizing network of queues.

K. R. Rajagopal, Ph.D. (IIT, Delhi)
Professor
Electrical Machines, Electronic Vehicles, Domestic Appliances, Drives, Motor Controllers, PM Brushless DC, Switched Reluctance and Stepper Motors, High Efficiency Induction Motors, FE Analysis & CAD, Magnetic Bearing, Power Electronics, AC-CD Homes, Smart Grid Technology.

Kushal Shah, Ph.D. (IIT, Madras)
Assistant Professor
Plasma Science, NonLinear Dynamics.

S. Prakriya, Ph.D. (Toronto)
Professor (Jai Gupta Chair)
Signal Processing for Communications, Cooperative links, Cognitive Radio.

Nilanjan Senroy, Ph.D. (Arizona State Univ.)
Associate Professor

Mukul Sarkar, Ph.D. (Technical University of DELFT)
Assistant Professor
Solid State Imaging, CMOS image sensors, Bio-inspired vision systems, Neuromorphic Imaging, Analog/Digital circuit design, Optoelectronics and Photonics.

Madhusudan Singh, Ph.D. (University of Michigan)
Associate Professor

Seshan Srirangarajan, Ph.D. (University of Minnesota, USA)
Assistant Professor
Signal processing, wireless communications, wireless sensor networks, optimisation, machine learning.

M. Veerachary, Dr. Eng. (Japan Univ.)
Professor

R. K. P. Bhatt, Ph.D. (IIT, Delhi)
Emeritus Professor
Adaptive Control, Nonlinear Dynamics, Image Processing.
P. R. Bijwe, Ph.D. (IIT, Delhi)
Emeritus Professor

J. Nanda, Ph.D. (Moscow Univ.)
Emeritus Fellows/INSA Honorary Scientist

D. Chadha, Ph.D. (IIT, Delhi)
Emeritus Professor
Optical Communication and Networks, Photonics, Microwave, Electromagnetics.

R. K. Patney, Ph.D. (IIT, Delhi)
Emeritus Professor
Digital Signal Processing

M. Hanmandlu, Ph.D. (IIT, Delhi)
Emeritus Professor

S. Prasad, Ph.D. (IIT, Delhi)
Emeritus Professor
Signal Processing and Communication, Radar, Sonar, Speech and Image Processing.

U. Kumar, Ph.D. (IIT, Delhi)
Emeritus Professor
Chaotic Dynamics.

G. S. Visweswaran, Ph.D. (IIT, Kanpur)
Emeritus Professor
CAD of VLSI, Design of Digital, Analog and Mixed Signal VLSI Circuits.
INTRODUCTION

The department faculty are involved in teaching and research in a wide variety of areas in electrical engineering. The department offers three under-graduate programmes and nine post-graduate programmes and Ph.D. programmes.

The department offers instruction at the undergraduate and postgraduate levels with the aim of providing a sound background in the areas of electrical, electronics and computer engineering. The courses are tailored to the needs of technical manpower in the fast expanding fields of communications, computers, control, electronics and power engineering.

Apart from teaching, the department is actively engaged in research, development, technology transfer, industrial consultancy, continuing education programmes, curriculum and laboratory development, software development and organization of seminars, workshops, and conferences in related areas. The department has active interaction with industries, alumni, governmental agencies and utilities.

The department faculty actively participate with a number of interdisciplinary centres and programmes in the Institute through research, instructional activities, and human resource development projects. In particular, the department has a close interaction with Centre for Applied Research in Electronics, Bharti School of Telecom Technology and Management, the Industrial Design and Development Centre, the Centre for Energy Studies, the Centre for Biomedical Engineering, the Computer Science and Engineering Department, and the Department of Physics.

ACADEMIC PROGRAMMES

UNDERGRADUATE

The department offers B.Tech. in Electrical Engineering and B. Tech. in Electrical Engineering (Power and Automation). These two programmes with different focii provide the desired breadth and inter-disciplinary exposure to the students so that they can pursue any of the diverse areas of Electrical Engineering (e.g. Computer and embedded systems, design and fabrication of VLSI, intelligent robotic systems, cognitive and bio-inspired technologies, control systems, telecommunications and computer networking, wireless communication systems, signal and information processing, micro and nano-electronics, electromagnetic and electrochemical systems, power engineering, renewable energy, electrical transportation systems, green technologies etc.) either in an industry-based or research-based career.

The B. Tech. programme in Electrical Engineering (Power and Automation) concentrates on automation technologies and power engineering catering to the current needs of intelligent and effective energy management. Students of this B.Tech. Programme also have an option of specializing in specific areas by doing additional courses.
POSTGRADUATE

The department offers M.Tech., M.S. (Research) and Ph.D. programmes in Electrical Engineering.

(I) M.Tech.

The department offers six specialized postgraduate programmes leading to an M.Tech. degree:

- Communication Engineering.
- Computer Technology.
- Control and Automation.
- Integrated Electronics and Circuits.
- Power Systems.
- Power Electronics, Machines and Drives.

In addition, the department jointly conducts industry sponsored interdisciplinary M.Tech. programmes specializing in:

- Opto-electronics and Optical Communications (jointly with Physics Department).
- VLSI Design, Tools and Technology (VDTT) (jointly with the Centre for Applied Research in Electronics and the Department of Computer Science and Engineering).
- Construction Technology and Management (jointly with the Civil & Mechanical Engineering Departments).
- Telecom Technology and Management through the Bharti School of Telecommunication Technology and Management (jointly with the Department of Management).

The full-time M.Tech. programmes are normally of four semesters duration. The department has recently introduced a six semester (three year) M.Tech programme, with enhanced scholarship. The students enrolled in this three year programme help in the development and maintenance of existing and upcoming laboratories. This gives them an opportunity to develop hands-on experience with state-of-the-art facilities.

(II) M.S. (Research) Programme

The M.S. (Research) programme is appropriate for those wishing to pursue a career in research and development in the industry or for those pursuing a career in teaching. Unlike the students in the M.Tech. programme, the M.S. students are required to do a more exhaustive research project, and credit fewer number of courses.

RESEARCH AREAS

The department offers a Doctoral programme with a view to push the frontiers of knowledge and to explore new and emerging areas. Teachers in engineering colleges are particularly encouraged to enroll for the Ph.D. programme. The various research activities are coordinated by different research groups within the department.
These groups also represent a broad classification of the research interests of the faculty. The different research areas covered by these groups are given below.

**Communication Engineering Group**

**Computer Technology Group**

**Control Engineering Group**

**Integrated Electronics & Circuits Group**

**Power Engineering Group**
LABORATORY FACILITIES

The Department maintains a library, a departmental workshop, and an ergonomically designed committee room equipped with video conferencing facility. The department has well equipped laboratories with extensive hardware and software facilities for teaching and research in the areas of basic Electrical Engineering, Measurement, Communications, Microwaves, Integrated Optics, Signal and Information Processing, Optical Communications and Optical Signal Processing, Computer Technology, Computation, Multimedia and Distributed Computing, Robotics and Distributed Control, Microprocessor Development Systems, Microprocessor Applications, Control and System Engineering, Process Control, Electronic Circuits and Networks, Electrical Machines and Drives, Power Systems, Power Electronics, VLSI Design, Electrical Energy Audit and Energy Conservation, Electrical Machines, and Energy Instrumentation. Most electronic experiments within a frequency limit of 40GHz, can easily be conducted in the laboratory facilities of the department.
Ravinder Kaur, Ph.D. (Delhi Univ.)
Professor
Social Change, Sociology of Development,
Gender, Kinship, Anthropological Demography,
Environment, Sociology of India.

Ankush Agrawal, Ph.D. (IGIDR, Mumbai)
Assistant Professor
Development Economics, Applied Econometrics.

Vibha Arora, Ph.D. (Oxford Univ.)
Associate Professor
Political Sociology, Environmental Sociology, Sociology of Development, Globalization and Transnationalism, Visual Anthropology, Medical Anthropology, Gender and Development, Social research Methods, Sociological Theory, Sociology of South Asia, the Himalayan Region and their Diaspora.

Arudra Burra, Ph.D. (Princeton University, USA)
Associate Professor
Moral, political, and legal philosophy.

Pritha Chandra, Ph.D. (Univ. of Maryland)
Associate Professor
Linguistics, Theoretical Syntax, Language Acquisition (1/2nd), Politics of Language.

Divya Dwivedi, Ph.D. (IIT Delhi)
Assistant Professor
Philosophy of Literature, Aesthetics, Narrative Theory, Literary Theory, Gandhi Studies, Political Cartooning.

Arjun Ghosh, Ph.D. (Jawaharlal Nehru Univ.)
Assistant Professor

Samar Husain, Ph.D. (IIT, Hyderabad)
Assistant Professor
Human Science Processing, National Language Parsing, Natural Language Modeling, Dependency Grammars.

Farhana Ibrahim, Ph.D. (Cornell Univ.)
Associate Professor
Sociology of India, Nationalism and the Nation, State, Sociology of Religion, Historial Anthropology, Medical Anthropology, Migration, Kinship, Qualitative Research Methods.

Stuti Khanna, D. Phil. (Oxford Univ.)
Assistant Professor
Modernism, Postcolonialism Twentieth-Century Literature, Indian Writing in English, Cities and Gender.
Reetika Khera, Ph.D. (Delhi School of Economics)
Associate Professor

Richa Kumar, Ph.D. (Massachusetts Institute of Technology)
Assistant Professor
Sociology of Agriculture, Sociology of Development, Science and Technology Studies (STS), Science and Technology Policy, Agriculture and Rural Development Policy, ICTs and Development.

Debasis Mondal, Ph.D. (ISI, Kolkata)
Assistant Professor
International Trade, Economic Growth, Public Economics.

Angelie Multani, Ph.D. (Jawaharlal Nehru Univ.)
Associate Professor
Indian Theatre in English, Culture Studies, Gender/Studies, Contemporary Fiction.

Rukmini Bhaya Nair, Ph.D. (Cambridge Univ.)
Professor
Linguistics, Philosophy of Language, Cognitive Science and Cultural Studies, Critical Theory, Postcolonialism, Gender, Creative Writing, Narratology.

Sourabh B. Paul, Ph.D. (University of British Columbia)
Assistant Professor

Bharati Puri, Ph.D. (Jawaharlal Nehru Univ.)
Associate Professor
Buddhism Tibetan/Himalayan Studies, Philosophy of Culture, Social & Political Thought, Anthropology and Philosophy, Applied Ethics Literature and Philosophy, Peace Studies, Philosophy and Literature, Sufi Thought.

Rajakrishnan Rajkumar, Ph.D. (Ohio State Univ., USA)
Assistant Professor
Natural Language Generation (NLG), Syntactic theory and Psycholinguistics.

Ambuj D. Sagar, (Massachusetts Institute of Technology)
Professor

Sanil V., Ph.D. (IIT, Kanpur)
Professor
Philosophical investigations into Art, Science, Technology, Literature and Social Sciences, Reason and Revolt, Violence, Hate and Revenge, Contemporary Indian thought, Intellectual traditions of Kerala, Philosophy of Biology.

Sarbeswar Sahoo, Ph.D. (National Univ. Singapore)
Assistant Professor

Paroma Sanyal, Ph.D. (English and Foreign Languages University, Hyderabad)
Assistant Professor
Phonology and Syntax, Theoretical Frameworks: Optimality Theory, Lexical Phonology, Distributive Morphology, Minimalism, Minor Research area Language teaching: English Language teaching, Task-based language teaching.
Naveen Thayyil, Ph.D. (Tilburg University)
Assistant Professor
Law, Techno-science and Democratisation, Regulatory issues in new and radical technologies, Democratisation of regulation of technology, Risk regulation, Use of ethics in technology regulation, Development of Technologies and Public contestations, Public participation in regulation.

Upasna Sharma, Ph.D. (IIT Bombay)
Assistant Professor
Climate Change, Disaster Management, Hazard Early warning Systems, Index-Based Agricultural Insurance, Traditional Knowledge Systems for Weather Prediction, International Negotiations on Climate Change.

Kamlesh Singh, Ph.D. (Univ.of Raj.)
Associate Professor

Purnima Singh, Ph.D. (Allahabad Univ.)
Professor

Varsha Singh, Ph.D. (IIT Bombay)
Assistant Professor
Behavioural Decision Making and Choice Behaviour, Dual process theories of decision making, Heterogeneity and constraints in decision making.

Saptarshi Mukherjee, Ph.D. (ISI, Delhi)
Assistant Professor
Mechanism Design, Social Choice and Game Theory.
INTRODUCTION

The Department offers courses in major areas of Humanities and Social Sciences. The department also supports the first year, students who need help in English. Such students are given instruction in the disciplines with a focus on English language learning. The Department also runs classes in French, German, Japanese, Spanish languages for the benefit of the Institute community.

ACADEMIC PROGRAMMES

UNDERGRADUATE

The department offers courses for undergraduate students in Sociology, Psychology, Economics, Philosophy, Literature, Linguistics, Communication Skills and Policy Studies. Six new faculty have been recruited and the Department is in a state of expansion.

POSTGRADUATE

At the Postgraduate level, the Department offers open elective courses in Humanities and Social Sciences. These courses are designed to provide students with specialized disciplinary perspectives as well as broad-based interdisciplinary orientation. The Department also participates in the teaching of courses in collaboration with other Departments and Centers in the Institute.

RESEARCH

LABORATORY FACILITY

The Department has a Digital Language Laboratory provides back-up facilities for language teaching and research. It also houses a Cognitive and Behaviour Sciences Laboratory which is used as a teching aid for psychology Courses. The Department Library stocks a specialist collection reflecting the main teaching and research interests of the Department.
Head of the Department

Kanika T. Bhal, Ph.D. (IIT, Kanpur)
(Modi Foundation Professor & Head, Department of Management Studies)

Harish Chaudhary, Ph.D. (IIT, Delhi)
Assistant Professor
Marketing Management, Strategic Marketing, Education Management, Product Planning & Management, and Brand Management.

Sanjay Dhir, FPM (IIM, Lucknow)
Assistant Professor

M. P. Gupta, Ph.D. (IIT, Delhi)
Professor
ICloud Information Systems and Information System Management, E-Commerce and E-governance.

P. Vigneswarar Ilavarasan, Ph.D. (IIT/K)
Associate Professor
Information and Communication Technologies & Development (ICTD) [Use of mobiles & other ICTs by Women microentrepreneurs in India], Information Technology Industry in India [Labour, R&D Centers of MNCs, Inter-firm linkages, Clusters & Sub-national Policy], ICTs & Government [Electronic Governance]

P. K. Jain, Ph.D. (Delhi Univ.)
Professor

Sudhir K. Jain, Ph.D. (IIT, Kanpur)
Professor

Arpan Kumar Kar, (Fellow, XLRI)
Assistant Professor

Smita Kashiramka, Ph.D. (BITS, Pilani)
Assistant Professor

Jitendra Kumar Madaan, Ph.D. (IIT Delhi)
Assistant Professor
Mahim Sagar, Ph.D. (IIITM, Gwalior)
Associate Professor

Ravi Shankar, Ph.D. (IIT, Delhi)
Professor
Supply Chain Management, Operations Management, Project Management, Total Quality Management & Six Sigma, Strategic Technology Management, Quantitative modeling, Knowledge Management.

Seema Sharma, Ph.D. (IIT, Delhi)
Associate Professor
Marketing Research, Statistical Analysis, Economics and Productivity Analysis.

Surya Prakash Singh, Ph.D. (IIT, Kanpur; PDF, NUS Singapore-MIT USA Alliance)
Assistant Professor
Operations Management, Manufacturing Systems, Optimization Techniques, Operation Research and Supply Chain Management.

Shveta Singh, Ph.D. (Allahabad Univ.)
Assistant Professor
Financial Management.

Shuchi Sinha, Ph.D. (Univ. of London)
Assistant Professor
Human Resource Management, Identity work, contemporary organizational controls.

Sushil, Ph.D. (IIT, Delhi)
Professor

Surendra S. Yadav, Ph.D. (Paris Univ.)
Professor

Vandana Chak
Visiting Faculty
Education, Corporate Law and Governance, Community Development and Revitalization.

Manoj K. Sharma, Ph.D. (IIT, Delhi)
Visiting Faculty

D. K. Banwet, Ph.D. (IIT, Delhi), FIE
Emeritus Fellow

Jaijit Bhattacharya, Ph.D. (IIT, Delhi)
Adjunct Faculty
GUEST FACULTY

Dr. Sharda S Nandram,
Associate Professor,
Nyenrode Business Universiteit, Netherlands

Prof. S. G. Deshmukh,
Director, IITM Gwalior

Prof. V. Upadhyaya,
Humanities & Social Sciences, IIT Delhi

Dr. A. Khurana,
Humanities & Social Sciences, IIT Delhi

Prof. M.Y. Khan,
Ex. Dean, Faculty of Business (Delhi University)

Prof. Abid Haleem,
Jamia Millia University, Delhi

Prof. Suman Modwel,
School of International Business ENPC France

Prof. Arvind Mahajan,
University of Texas, USA

Dr. Vinay Bharat Ram,
CEO, DCM Group

Vasant Dhar
Adjunct Faculty
Information Systems.

Sanjay Patro, Ph.D. (Paris Univ.)
Adjunct Faculty
Marketing.

Mr. Umeshwar Srivastava,
M.D., Ei-In (Pvt.) Ltd.

Dr. Vinay Kumar,
Ex-Advisor, DSIR

Mr. Ashok Wahi,
Director, Convergys

Prof. Stan Kachnowaski,
Columbia University

Dr. Shyam S. Sethi,
Life Time Associate, Whirlpool

Mr. Priyank Narayan,
Founder, India Preneurship and People Dynamic

Dr. K.V. Damodaran,
Joint Directo, TRAI

Dr. D. Vijayrao,
DRDO

Dr. Kamlesh K. Bajaj,
CEO, Data Security Council of India

ADMINISTRATIVE RESPONSIBILITY

Prof. Kanika T. Bhal,
Head of Department

Dr. Shveta Singh,
Coordinator, MBA Full Time

Prof. Ravi Shankar,
Coordinator, MBA Full Time (Telecom)

Dr. Sanjay Dhir,
Coordinator, Executive MBA

Dr. P. Vigneswara Ilavarasan,
Coordinator, Ph.D.

Dr. Surya Prakash Singh,
Coordinator, MBA Admission

Dr. Smita Kashiramka,
Time Table Incharge
INTRODUCTION
The Department of Management Studies conducts research on several areas of management sciences, and offers courses to UG, PG and doctoral students. Faculty actively works with industry on current and future challenges.

The department conducts several short term programmes; some of the topics are:

ACADEMIC PROGRAMME

UNDERGRADUATE
The department offers several courses to undergraduate students as electives, and also offers a Minor Area in Management Studies.

POSTGRADUATE
The Post-graduate Program in Management at IIT Delhi has existed for nearly three decades and has carved a niche for itself. DMS, in collaboration with the other departments of IIT Delhi, offers specialized electives to students so as to enrich their learning experience. DMS offers three variants of its MBA program.

PEDAGOGY
The Department places heavy emphasis on experiential and process-oriented learning. The pedagogical tools include extensive use of Harvard case studies (HBS), simulation exercises, industry-oriented project work, eight weeks of summer projects, and the like, to facilitate the same. The process-oriented learning is further enhanced by Global Field Studies (GFS) which students undertake for their projects. Besides honing up the skills of individual decision-making, enough emphasis is laid on developing team skills and value-focused decision making. The compulsory audit courses are designed for this purpose. Extensive research and consultancy that have gained wide peer level recognition back the teaching.

MBA Full Time
With the unique features of systems orientation and a blend of creativity and analytical problem-solving skills, MBA Full Time is aimed to develop holistic managers who internalize a synthesis of conventional and modern
management - thinking and who can comfortably adapt to changing business requirements. The program provides the students with various routes to the industry, matching its requirements with their skills and predispositions. Every student gets the opportunity to take courses in major streams: Information Systems, Finance, Marketing, Strategic Management, Human Resource Management and Operations Management. Along with the functional areas of specialization, the students also get a cross functional perspective.

**MBA Full-Time (Telecom)**

The MBA Full Time program with focus in Telecommunication Systems is a hallmark of techno-managerial excellence imparted to the scholars at DMS. This programme is comprehensive in nature, involving all the business functions – Information Systems, Finance, Marketing, Strategic Management, Human Resource Management and Operations Management, with an emphasis on Telecommunications Systems Management, which provides a strong foundation in Telecom Technology, Business and Regulation. This programme draws Telecom technology inputs from Bharti School of Telecom Technology and Management of IIT Delhi. The inclusive nature of the program fosters creation of effective managers across different domains, equipping them with holistic skills and a strategic advantage when it comes to leading business in the Telecom sector.

**Executive MBA – 3 Year Intensive MBA in Technology Management**

For the Indian industry to gain global competitiveness, effective management of technology is crucial. This would mean using technology as a strategic variable to gain competitive advantage and would require an organization to critically understand processes of technology planning and strategy, management of technology transfer and absorption, and more. The Executive MBA programme with focus on ‘Technology Management’ is aimed at fulfilling these requirements so as to enable the managers to effectively contribute in evolving core competencies in Indian industry. This program is designed to impart management education to working executives.

**RESEARCH**

The department of Management Studies has a full-fledged PhD programme in Management. With its liberal multidisciplinary approach, the department provides excellent ambience for research amidst the world class infrastructure at IIT Delhi. In a recent Stanford study on Indian Universities doing research in social science, the Department of Management Studies, IIT Delhi has been ranked Second in the Business and Management category. Surpassed only by IIM Bangalore, DMS is ahead of all other IIMs, IITs and ISB.

The research areas are broadly classified into the following areas: Economics; Finance & Accounting;
Information Technology & Systems; Marketing; Operations, and Supply Chain Management; and Strategy, and Technology Management.

Specific research and teaching interests of the department include:

Global strategy & strategic alliance; Knowledge management; Flexible systems Management & planning of service systems; Technology Management; Systems approach to waste management & productivity; Business forecasting; Strategic business management; Managerial economics International economics; Economic feasibility & Techno economic analysis; Productivity & efficiency analysis; Business ethics & Innovation; R & D management; Intellectual Property Rights; Financial analysis & control; Corporate Finance; International Financial Management Derivatives; Mergers & Acquisition; Risk management; Financial analytics; Financial management of manufacturing & service sectors; Marketing management; Industrial and Hi-Tech marketing; International marketing; Industrial marketing & service marketing management; Strategic marketing; Market research; Consumer behavior; Customer Relationship Management; E-Marketing; Human resource management; Organization management; Organization behavior & Development; Leadership; Entrepreneurship management; Corporate Entrepreneurship; Logistics & Supply chain management; Operations Research; Manufacturing systems management; Project management; Product management; Enterprise resource planning; Total Quality Management; JIT operations; Business Process Re-engineering; Management of IT; System analysis & computer applications; Management Information system & Decision Support System; Business Analytics; E-Commerce; E-Governance; Information Communication Technology & Development; Social Media; Telecom Management.

LABORATORY FACILITIES

The Department of Management Studies has five fully air conditioned Wi-Fi enabled lecture theatres equipped with LCD projectors to ensure the best possible environment for learning. The auditorium has a seating capacity of over 120 and hosts numerous guest lectures, seminars and other programmes. There is also an exclusive library in addition to the central library of the institute. The following laboratories facilitate learning and research:


A large collection of software packages such as SPSS, AMOS, Vensim, I-Think, STATA, Hummingbird Knowledge Management Suite, Prowess, LINGO, ARENA etc.) are available in the laboratories. Further, the Behavioral Laboratory has in-house camera, TV, VCR and specialized software to help the students hone their behavioral skills.
S. Dharmaraja, Ph.D. (IIT, Madras)
Professor

Rupam Barman, Ph.D. (IIT Guwahati)
Assistant Professor
Iwasawa Theory, p-Adic Measures, Elliptic Curves, Hypergeometric series, and Modular Forms.

B. Chandra, Ph.D. (Delhi Univ.)
Professor
Neural Networks for Pattern Classification, Statistical Clustering of Gene Expression Data, Data Mining, Databases, Adaptive Forecasting.

N. Chatterjee, Ph.D. (Univ. of London)
Professor
Natural Language Processing, Statistical Modeling, Semantic Web.

Harish Kumar, Ph.D. (ETH Zurich)
Assistant Professor
Computational Methods for Partial Differential Equations.

Shravan Kumar, Ph.D. (Madras Univ.)
Assistant Professor
Abstract Harmonic Analysis.

V. V. K. Srinivas Kumar, Ph.D. (IIT, Kanpur)
Assistant Professor
Computational Partial Differential Equations.

Subiman Kundu, Ph.D. (Virginia Tech. Univ.)
Professor
Topology, Measure Theory.

Aparna Mehra, Ph.D. (Delhi Univ.)
Associate Professor

Mani Mehra, Ph.D. (IIT, Kanpur)
Associate Professor
Application of Wavelets to Numerical Analysis and PDEs.

Anima Nagar, Ph.D. (Gujrat Univ.)
Associate Professor
Topological Dynamics.
B. S. Panda, Ph.D. (IIT, Kanpur)
Professor
Algorithmic Graph Theory, Graph Theory, Algorithms, Parallel and Distributed Computing.

Amit Priyadarshi, Ph.D. (Rutgers Univ.)
Assistant Professor
Fractal Dimensions, Positive Operators.

S. C. Sekhara Rao, Ph.D. (IIT, Kanpur)
Professor
Parallel Computing, Numerical Analysis.

Sivananthan Sampath, Ph.D. (IIT, Madras)
Assistant Professor

Ritumoni Sarma, Ph.D. (TIFR, Bombay)
Assistant Professor
Algebraic Groups.

Anuradha Sharma, Ph.D. (Panjab Univ.)
Assistant Professor
Algebraic Coding Theory.

R. K. Sharma, Ph.D. (IIT, Delhi)
Professor
Algebra, Cryptography.

K. Sreenadh, Ph.D. (IIT, Kanpur)
Associate Professor
Differential Equations and Analysis.

A. Tripathi, Ph.D. (Univ. at SUNY, Buffalo)
Professor
Number Theory, Combinatorics and Graph Theory.
INTRODUCTION
The Department offers courses at both undergraduate and postgraduate levels. It runs a five year dual degree programme (B. Tech. + M. Tech.) in Mathematics and Computing (in place of five year Int. M. Tech. in Mathematics and Computing from 2013 onwards), a four year B. Tech. programme in Mathematics and Computing, and a two year M.Sc. programme in Mathematics. The Department also has a very active Ph.D. programme.

ACADEMIC PROGRAMMES

UNDERGRADUATE
Department offers a five year dual degree programme (B. Tech. + M. Tech.) in Mathematics and Computing and a four year B. Tech. programme in Mathematics and Computing at undergraduate level. The dual degree programme has replaced former five year integrating M. Tech. in Mathematics and Computing programme from 2013 onward. The aim of these programmes is to build a broad based theoretical background of Mathematical Sciences and practical training in Computing, Numerical Methods, and Mathematical and Statistical Modeling. Graduate of these programmes will be ready for a career in research and development in software industries, financial institutes and for a research-based career.

POSTGRADUATE
The Department offers a two-year post B.Sc. course leading to the degree of Master of Science in Mathematics. The main feature of this programme is that during the first year it makes the student familiar with basic theory in all the streams of Mathematics—Pure Mathematics, Applied Mathematics, Statistics, Operations Research, Computer Science. In the second year, the student has option of choosing modern advanced courses in some specialized area(s).

RESEARCH

LABORATORY FACILITIES
The Department has three well-equipped Computing Laboratories with workstations, PCs and supporting software. These Laboratories are available to students for training and implementation of their computer programmes on assignments during courses or project work.
Subir K. Saha, Ph.D. (McGill Univ.)  
Professor, (Naren Gupta Chair)  
Robotics, Mechatronics and multi-body dynamics.

S. Aravindan, Ph.D. (IIT Madras)  
Associate Professor  
Ceramics, Composites, Welding, Nano-manufacturing.

Supreet S. Bagha, Ph.D. (Stanord Univ.)  
Assistant Professor  
Theoretical and experimental micro/nano-fluidics, Electrokinetics and electrophorodynamics, Lab-on-a-Chip devices, Chemical and biological analysis.

Naresh Bhatnagar, Ph.D. (IIT Bombay)  
Professor  
Processing and manufacturing of FRP materials, Machining of traditional and non-traditional materials, Bio-materials, Medical implants.

Nomesh Bolia, Ph.D. (Univ. of North Carolina)  
Associate Professor  
Operations research, Scheduling, Modelling in wireless networks, Logistics improvisation.

Anoop Chawla, Ph.D. (IIT Kanpur)  
Professor, (Henry Ford Chair)  
CAD, CAE, Dynamics, Bio-mechanics, AI and expert systems for design and manufacturing.

Ashish K. Darpe, Ph.D. (IIT Delhi)  
Associate Professor  
Condition monitoring, Rotor dynamics, Vibration.

Naresh Varma Datla, Ph.D. (University of Toronto)  
Assistant Professor  
Experimental mechanics, failure analysis, design of medical devices, adhesion and adhesives.

Subhra Datta, Ph.D. (Northwestern Univ.)  
Assistant Professor  
Transport phenomena in micro- and nano-fluidic devices for bio-separations.

S. G. Deshmukh  
Professor  
Supply chain management, Quality management, Information systems

Devendra Dubey, Ph.D. (Purdue University)  
Assistant Professor  
Computational materials science, Biomaterials, Nanomechanics of nanocomposite systems, Molecular dynamics, Design for biomedical applications, Biomimetics.
J. K. Dutt, Ph.D. (IIT Delhi)
Professor
Rotor dynamics, Vibration and control.

Sudarsan Ghosh, Ph.D. (IIT Kharagpur)
Associate Professor
Machining and Grinding.

Amit Gupta, Ph.D. (Univ. of Central Florida)
Assistant Professor
Micro-fluidics, Multiphase flows, Lithium-ion batteries modeling and optimization.

Kshitij Gupta, Ph.D. (IIT Delhi)
Professor
Vibrations, Mechanical design, Rotor dynamics, Composite materials.

K. Hariharan, Ph.D. (IIT Madras)
Assistant Professor
Sheet metalforming, Plasticity and Mechanical behaviour of materials

Harish Hirani, Ph.D. (IIT Delhi)
Professor
Bearings of all types, Synthesis and application of smart fluids, Seals.

Sanjeev Jain, Ph.D. (IIT Delhi)
Professor

Sunil Jha, Ph.D. (IIT Kanpur)
Associate Professor
Machining and finishing processes, Micro and nano-finishing, Mechatronics, Robotics, Manufacturing automation, Smart fluids.

S. R. Kale, Ph.D. (Stanford Univ.)
Professor
Heat transfer, Combustion, Fire dynamics, Fluid dynamics, Particle-laden flows.

Jitendra P. Khatait, Ph.D. (University of Twente)
Assistant Professor
Precision machine design, medical devices, Robotics.

Sangeeta Kohli, Ph.D. (IISc, Bangalore)
Professor
Heat transfer, Fluid mechanics, Renewable energy technology.

M. S. Kulkarni, Ph.D. (IIT Bombay)
Associate Professor
Quality and Reliability engineering.
D. Ravi Kumar, Ph.D. (IIT Madras)  
Professor  
Metal forming, Plasticity, Formability of sheet metals, Mechanical metallurgy.

S. V. Modak, Ph.D. (IIT Delhi)  
Associate Professor  
Vibration engineering, Finite element model updating, Experimental modal analysis.

Sudipto Mukherjee, Ph.D. (Ohio State Univ.)  
Professor, (Mehra Chair)  
Mechanisms, Robotics, Mechanical systems design, Impact biomechanics.

Pulak Mohan Pandey, Ph.D. (IIT Kanpur)  
Associate Professor  
Rapid prototyping, Unconventional machining, Finite elements applications to manufacturing, CAD/CAM.

R. K. Pandey, Ph.D. (Banaras Hindu Univ.)  
Associate Professor  
Bearing lubrication, Design of tribological elements, Engine tribology.

Sunil Pandey, Ph.D. (IIT Delhi)  
Professor  
Production engineering, Welding technology, Process engineering, Manufacturing process.

B. Premachandran, Ph.D. (IIT Madras)  
Associate Professor  
Heat transfer, Computational fluid dynamics.

P. V. Madhusudhan Rao, Ph.D. (IIT Kanpur)  
Professor  
Product design and manufacturing, CAD-CAM.

P. Venkateswara Rao, Ph.D. (IIT Madras)  
Professor  
Conventional and non-conventional material removal process, Measurement and control.

M. R. Ravi, Ph.D. (IISc, Bangalore)  
Professor  
Computational fluid dynamics, Heat transfer, Renewable energy, Rural energy systems.

Anjan Ray, Ph.D. (Michigan State Univ.)  
Professor  
Combustion, Heat transfer.

Satinder Paul Singh, Ph.D. (IIT Delhi)  
Professor  
Dynamics of rotating machinery, Composite materials, Machine design, Active vibration control.
**Sujeet Kumar Sinha**, Ph.D. (Pune Univ.)  
Professor  

**P. M. V. Subbarao**, Ph.D. (IIT Kanpur)  
Professor  
Experimental turbulence, Tomography, Power generation systems and IC engines.

**Prabal Talukdar**, Ph.D. (IIT Guwahati)  
Associate Professor  
Radiative heat transfer, Heat and mass transfer in porous media, Moisture transfer in buildings, Computational fluid dynamics.

**B.C. Nakra**, Ph.D. (Imperial College London)  
INSA Senior Scientist

**Sivathanu A. Pillai**, Ph.D. (IIT Kanpur)  
Honorary Professor  
Defence and space Technologies, Innovation, Creating and Leadership

**A. D. Gupta**, M.Tech. (IIT Delhi)  
Visiting Faculty  
Industrial engineering, Operations research, Value engineering, Industrial quality control.

**Prem Vrat**, Ph.D. (IIT Delhi)  
Honorary Professor  
Industrial engineering and operations management, Quality management, Value engineering, Scheduling, Maintenance and supply chain management.

**Sasidhar Kondaraju**, Ph.D. (Wayne State Univ.)  
Inspire Faculty  
Complex fluids, droplet interfaces, Microfluidics and nanofluidics, Multiphase flows.

**T. K. Kundra**, Ph.D. (IIT Delhi)  
Honorary Professor  
Mechanical system design, Concurrent engineering, Vibration design, CAD/CAM, Finite element model updating.

**Kiran Seth**, Ph.D. (Columbia Univ.)  
Emeritus Professor  
*Padmshree*  
Operations research, Applied probability models, Fuzzy models.
INTRODUCTION

The faculty of the Department of Mechanical Engineering are engaged in research encompassing a wide variety of areas. Research of an inter-disciplinary nature is being performed in collaboration with faculty of other departments and centres of the institute, and with select faculty from other institutions in India and abroad. The research is largely supported by sponsored projects and consultancies. These research areas form a major portion of the topics of doctoral dissertations and Masters' theses. The research and teaching broadly covers topics in design, industrial, production and thermal engineering. A wide variety of courses in the above areas are offered by the department at all levels.

The research and teaching activities are supported by 35 skilled staff who manage 23 laboratories. Many of the laboratories are equipped with state-of-the-art facilities. The department is also host to faculty on sabbatical from Indian and foreign institutions, INSPIRE Faculty Fellows, and postgraduate and undergraduate students from several institutions/universities in India and abroad. Several faculty members serve as experts on national and international technical committees.

ACADEMIC PROGRAMMES

The department faculty offer courses at various levels catering to various degree programmes.

The offers two Undergraduate Programmes leading to the Bachelor of Technology degree with specializations in (i) Mechanical Engineering, or (ii) Production and Industrial Engineering.

The department offers four Postgraduate Programmes leading to respective Master of Technology degrees with a specialization in Design of Mechanical Systems, Industrial Engineering, Production Engineering, and Thermal Engineering. Also, Master of Science (Research) programmes are also offered in theses specializations. The faculty also participate in interdisciplinary Master of Technology programmes in Construction Technology and Management, Computer Application, Polymer Science and Technology, Industrial Tribology & Maintenance Engineering, Energy Studies, and Transportation Engineering. The faculty also participate in the Master of Design programme and activities of the Khosla School of Information Technology.

Mechanical Design: Mechanical vibrations, Rotor dynamics, Damped structures, Composite structures, Smart structures, Active vibration control, Experimental modal analysis and identification, Structural dynamic modification, Finite element model updating, Dynamic design, Noise engineering, Condition monitoring, Bearing dynamics, Lubrication, Mechanical system design, Computer aided mechanical design, Computer controlled mechanisms, Vehicle dynamics, Modeling the impact of vehicles, Impact biomechanics, Concurrent engineering design, Mechanisms, Robotics, Multi-body dynamics, Application of multi-body dynamics in design, Analysis of rural engineering systems, Mechatronics, Sensors and actuator design, MEMS, Design of micro-systems,
Nano-mechanics, Artificial intelligence applications in mechanical engineering, Expert systems for design and manufacturing, Mechanical engineering applications to medical science.

**Industrial Engineering:** Operations research, Applied probability, Stochastic modeling and simulation, Project management, Supply chain management, Computer integrated manufacturing systems, Facilities planning, Value engineering, Flexible systems, ERP, Intelligent manufacturing systems, e-business, Quality and reliability engineering, Maintenance management, Manufacturing system design and analysis, Service system design, Production planning and control. OR applications to healthcare, manufacturing, telecommunications, transportation, policy, governance, finance, etc.


**Interdisciplinary Research:** Transportation research and injury prevention program, Energy, quality and productivity audit of rural industries, Medical implants, Autonomous robotics, Development of composite materials, Atmospheric convection.

**LABORATORY FACILITIES**

The Department has 23 well-equipped laboratories that cater to the needs of research and teaching activities. The Production Engineering, Welding, Metrology and CNC laboratories encompass the different machinery required for manufacturing and inspection. Laboratories that cater to the activities in the area of mechanical design include: Mechatronics, Vibration and Instrumentation, Vibration Research, Mechanism and Simulation,
and Design Research laboratories. The Refrigeration and Air-conditioning, Internal Combustion Engines, Turbo-
machinery, Heat Transfer and Thermal Engineering Laboratories serve the needs of research and teaching in thermal engineering. Industrial engineering laboratories include Operations Research (OR), Supply Chain Management (SCM), Intelligent systems and Life Cycle Engineering laboratories. A Computer-Aided Graphics Instruction Laboratory, equipped with computers, and drawing and design software packages is used for imparting training in mechanical design. The Department also has computing clusters that cater to intensive computational activities. All major software packages are available for teaching and research. The department maintains a Rapid Prototyping (RP) laboratory that caters to the needs of the institute. A state-of-the-art Micro-
manufacturing laboratory houses sophisticated machines for micro- and nano-manufacturing.
B. R. Mehta, Ph.D. (IIT/D)(Schlumberger Chair)
Professor
Thin Film and Nanostructured Materials, Inorganic-Organic Hybrid Interfaces, Resistive Memory, Light Emitting and Solar Cell Devices.

Sujin B. Babu, Ph.D. (Univ. du Maine, France)
Assistant Professor
Aggregation of Colloids, Porous Media, Low Reynolds Number Swimmers.

Varsha Banerjee, Ph.D. (IISc, Bangalore)
Associate Professor

Sujeeet Chaudhary, Ph.D. (IIT, Delhi)
Professor

Pintu Das, Ph.D. (University of Saarland, Germany)
Assistant Professor
Experimental Condensed Matter Physics- Magnetism at nanometer scale, charge carrier-dynamics (Low-frequency) as well as atomic/nanometer scale electronic phenomena in correlated electron systems, Instrumentation.

Rajendra S. Dhaka, Ph.D. (UGC-DAE CSR, Indore)
Assistant Professor

Joyee Ghosh, Ph.D. (Jawaharlal Nehru Univ.)
Assistant Professor
Quantum and Nonlinear Optics, Quantum Information Technologies; Atomic, Molecular and Optical Physics.

Santanu Ghosh, Ph.D. (Jawaharlal Nehru Univ.)
Associate Professor
Experimental Condensed Matter Physics, Thin Film, Ion Materials Interaction.
Sankalpa Ghosh, Ph.D. (Jawaharlal Nehru Univ.)
Associate Professor
Bose Einstein Condensate of Cold Atoms, Quantum Hall Effect, Graphene, Topological Insulator.

B. D. Gupta, Ph.D. (IIT, Delhi)
Professor

Joby Joseph, Ph.D. (IIT, Delhi)
Professor

Kedar B. Khare, Ph.D. (Univ. Rochester)
Assistant Professor
Optics/Photonics, Computational Imaging, Inverse Problems, Compressive Sensing.

Neeraj Khare, Ph.D. (BHU)
Professor

Ajit Kumar, Ph.D. (Moscow Univ.)
Professor

Arun Kumar, Ph.D. (IIT, Delhi)
Professor
Fibre and Integrated Optical Waveguides, Components and Devices, Plasmonic Waveguides and Devices.

Hitendra K. Malik, Ph.D. (IIT, Delhi)
Professor

Rahul Suresh Marathe, Ph.D. (Andhra Univ.)
Assistant Professor

Dalip Singh Mehta, Ph.D. (NPL Delhi/CCS Univ. Meerut)
Professor
Optical Coherence Tomography and 3D-Profilometry, Optical Tweezers, Optics of LEDs and OLEDs, and Quantitative Phase Microscopy.

A. Mishra, Ph.D. (Utkal Univ.)
Associate Professor
Superconductivity in Quark Matter and Ultra-cold Atoms, In-medium Hadron Properties and Observable in High Energy Accelerator Experiments.

Pranaba Kishore Muduli, Ph.D. (Humboldt Univ. & PDI, Berlin)
Assistant Professor
Spin Torque Induced Magnetization Dynamics, Spintronics and Nanomagnetism.
G. Vijay Prakash, Ph.D. (Andhra Univ.)
Associate Professor

M. R. Shenoy, Ph.D. (IIT, Delhi)
Professor
Optoelectronics, Fibre and Integrated Optics, Optical Fiber Components, Nonlinear Guided Wave Optics.

V. Ravishankar, Ph.D. (Lehigh Univ.)
Professor
Semiconductor Physics, Devices and Technology, Organic Semiconductors, Nano-Technology.

A. K. Shukla, Ph.D. (IIT, Delhi)
Associate Professor

G. B. Reddy, Ph.D. (IIT, Delhi)
Professor
Thin Film Technology, Smart Windows, Nano-Structured Films.

Rajendra Singh, Ph.D. (Jawaharlal Nehru Univ.)
Associate Professor

Amartya Sengupta, Ph.D. (Rutgers Univ. & NJIT)
Assistant Professor
Experimental Ultrafast Optics, THz Spectroscopy, Optical Spectroscopy at High P-T, Mineral Physics.

J. P. Singh, Ph.D. (Jawaharlal Nehru Univ.)
Associate Professor

P. Senthilkumaran, Ph.D. (IIT, Madras)
Professor
Applied Optics, Singular Optics.

Aloka Sinha, Ph.D. (IIT, Madras)
Associate Professor
Nonlinear Optics, Liquid Crystals, Optical Information Processing, Biometrics.

Anurag Sharma, Ph.D. (IIT, Delhi)
Professor

R. K. Soni, Ph.D. (IIT, Delhi)
Professor
Pankaj Srivastava, Ph.D. (Rajasthan Univ.)
Professor

K. Thyagarajan, Ph.D. (IIT, Delhi)
Professor

V. D. Vankar, Ph.D. (Banaras Hindu Univ.)
Emeritus Professor

R. K. Varshney, Ph.D. (IIT, Delhi)
Professor
Fibre and Integrated Optics, Nonlinear Optics, Fiber Optic Sensors, Fiber Lasers

D. K. Pandya, Ph.D. (IIT, Delhi)
Emeritus Professor
INTRODUCTION
The Department is engaged in cutting edge research in several areas and offers a variety of courses for undergraduate and postgraduate students. The department offers a B.Tech. programme in Engineering Physics, M.Sc. programme in Physics, and M.Tech. programmes in (i) Solid State Materials, (ii) Applied Optics, and (iii) Optoelectronics and Optical Communications (an interdisciplinary programme, jointly with the Electrical Engineering Department).

The department has well-equipped teaching laboratories, and an excellent research infrastructure. The research is broadly focused on topical areas like Condensed Matter Physics, Optics and Photonics, Plasma Physics, and Theoretical Physics. State-of-the-art research on contemporary topics like nano science and technology, magnetics, microstructured optical fibers, photonic crystals, optical memory, microwave and laser-plasma interaction, quantum optics etc. is also being carried out.

ACADEMIC PROGRAMMES
UNDERGRADUATE
The department offers a variety of courses to all undergraduate students at IIT Delhi under the categories of Basic 'Science course' and 'Elective Course' requirement. The department also offers a set of specific 'Core Courses' for the undergraduate programme 'Engineering Physics'. These courses are also available to undergraduate students of other engineering disciplines as open Electives.

B.Tech. in Engineering Physics
The programme in Engineering Physics stresses the basic physics that underlies most developments in engineering and the mathematical tools that are important to all engineers and scientists. This emphasis, combined with hands-on-experience of working with modern computers, electronics, lasers and other equipments, culminates in an excellent preparation for a broad range of careers. There is also provision for students to opt for one of that two departmental specializations: 1) Nano-Science & Technology. 2) Photonics Technology.

POSTGRADUATE
M.Sc. in Physics
The M.Sc. (Physics) programme is designed to impart masters-level education in Physics through various lecture courses and laboratory classes. The department also offers three specializations in the broad areas of Optics & Photonics, Material Science and Theoretical Physics.
M.Tech. in Solid State Materials
The Solid State Materials programme, encompasses science and technology of materials, their synthesis, characterization and applications in devices. The programme prepares graduates to take-up challenges in research and development in solid state technology, material science and engineering, and semiconductor technology and processing.

M.Tech. in Applied Optics
The Applied Optics programme, which has been running in I.I.T. Delhi since 1966 is primarily designed to emphasise the “Applied” nature of modern and classical optics. The programme is suited to the requirements of various optical and opto-electronic industries and R&D organisations.

Interdisciplinary M.Tech. in Optoelectronics and Optical Communication
This Interdisciplinary programme is offered Jointly by Physics and Electrical Engineering Department. This program trains students in the areas of Fiber & Integrated Optics, and Optical Communication and Networks, which are useful to various industries.

RESEARCH AREAS

Microwave Processing of Materials.

In addition to the above, research leading to the Ph.D. degree is conducted on several topics:


**Multidisciplinary Research area: Inter-disciplinary Research in Nano- Science and Technology**

A Nanoscale research Facility has been set up at IIT Delhi for developing Nanofabrication processes and their use for making nanoscale devices. In particular, the facility aims to focus on non-silicon based technologies. Over thirty five faculty members from 10 departments and centres of the Institute are involved in this programme.

The objective of the project is the building and demonstration of select device prototypes in seven specific Research Areas: Nanomagnetics, Nanophotonics, Nanophotovoltaics, Nanoelectronics, Nanomechanics, Biosensors, and Mesoscale Devices.

Students are trained at both the postgraduate and undergraduate levels by integrating the research done with multidisciplinary lab-oriented courses that are conducted at the facility. Research staff and Industry personnel will be trained over a period of five years by designing and conducting targeted short-term laboratory-centered courses on nanofabrication and nano-manufacturing on a regular basis.

The focus is on setting up a state of the art Nano Fabrication Facility at IIT Delhi with resources for all aspects of research on nano- and meso-scale devices: synthesis of nano-materials, fabrication of nanoscale devices, their characterization, analysis and applications. The facility will provide opportunity for collaboration across many departments and centres in IIT Delhi and will also be available to other institutes and industries.
LABORATORY FACILITIES

The Department has well-equipped laboratories for both teaching and research programmes. Some of the major research laboratories are: Solid State Physics Laboratory, Thin Film Science and Technology Laboratory, Magnetics & Advance Ceramics Laboratory, Nano-Stech. Laboratory, Plasma Physics Laboratory, Beam Plasma Laboratory, Fibre and Integrated Optics Laboratory, Laser Spectroscopy Laboratory, Optical Image Processing Laboratory, Quantum Electronics Laboratory. A large number of facilities are available in these and other laboratories and these include: Electron Microscopes (HRTEM, TEM, SEM), Atomic Force Microscope (AFM), Scanning Tunneling Microscope (STM), MOKE Microscope, Scanning Auger Microprobe (SAM), Electron Spectroscopy for Chemical Analysis (ESCA). Secondary Ion Mass Spectroscopy (SIMS), Powder and Thin Film X-ray Diffractometers, XRR, FTIR Spectrophotometer, Laser Raman Spectroscopy System, SQUID Magnetometer, Dielectric and Ferroelectric set-up, Arc-melting, Auto Lab General Purpose Eletrochemical System, Optical Multichannel Analyser, Closed-cycle Helium Cryotip System, High Power Argonion/Neodymium/YAG/Excimer/Dye/Ti: Sapphire Lasers, Optical Photon-correlator, Plasma Diagnostics System, VSM Facility, Microwave Processing of Materials in a single (E- or H- field) or multiple mode. Ultrahigh Vacuum Units, Vacuum Coating Units, DC and RF Sputtering Units, Concave Reflection Grating, Spatial Light Modulators, Optical Transfer Function Bench, Holographic Recording Set-up, Coherent Filtering Set-up, Facility for Optical Phase Conjugation with Photorefractives, Facility for Fabrication of Tunnel Diodes, Solar Cells, Thin Film Devices and Integrated Circuits, Optical Fibre Splicing and Characterisation Set-up, In-line Optical Fibre Components Fabrication and Testing, Fabrication and Characterization of Planar Optical Waveguides, Erbium doped fibre amplifiers, Optical Spectrum Analyser, Wavelength Meters, High resolution Microscope, DWDM wave length tuned Laser Diode light sources, Long Period Fiber Grating fabrication, variety of optical fibre sensors, and Facility for Making High Temperature Superconductors, Plasma and Photo CVD Units, DLTS, PL Facility, Optical CD Fabrication Facility. Indigenously developed HV compatible field emission measurement setup.

A new ultra fast optics (UFO) facility has been developed in the Department via a FIST Project. This UFO facility is a unique facility that caters to diverse fields of inter-disciplinary research, wherever the research activity demands high power and ultrafast light. This facility, serves a wide variety of research activities aiming at the studies of spatial and temporal dynamics of light-matter interaction or stand-alone experiments. Potential beneficiary disciplines of the faculty are expected in the field of optics, nano-photonic, material science, plasma physics, optoelectronics, biology, biotechnology, medicine, chemistry and private industries. The facility is be expected to be useful to the research of other departments/Centers/Schools of IIT Delhi namely, Chemistry, Biochemical and biotechnology, Biomedical, Electrical, textile, CARE, IDDC, polymer sciences and school of biological sciences.
Head of the Department

Ashwini K. Agrawal, Ph.D. (Univ of Rochester)
Professor

R. Alagirusamy, Ph.D. (Georgia Univ.)
Professor
Textile Performers for Composite Applications, Natural Fibre Composites, Short Staple Spinning, Structure Property Relationship of Yarns, Textile Reinforced Concrete.

S. Wazed Ali, Ph.D. (IIT, Delhi)
Assistant Professor

B. S. Butola, Ph.D. (IIT, Delhi)
Associate Professor
Textile Chemical Processing, Polymeric Nano Composites, Enzymatic Processing of Textiles, Ballistic Textiles.

R. Chattopadhyay, Ph.D. (IIT, Delhi)
Professor
Yarn manufacturing processes, Quality assurance, Ropes and cordages, Product development.

Apurba Das, Ph.D. (IIT, Delhi)
Professor
Clothing Comfort, Nonwoven & Technical Textiles, Compression Bandage, Protective Clothing, Yarn Manufacturing, Instrumentation.

Dipayan Das, Ph.D. (Tech. Univ. of Liberec)
Associate Professor

Saurabh Ghosh, Ph.D. (Basel Univ., Switzerland)
Associate Professor
Tissue Engineering, Medical Textile, Polymeric Nanomaterials.

Bhuvanesh Gupta, Ph.D. (IIT, Delhi)
Professor

Deepti Gupta, Ph.D. (IIT, Delhi)
Professor
Surface Functionalization, Functional Clothing, Garment fit and sizing.
S. M. Ishtiaque, (Tech. Univ. of Liberec)
Professor

Manjeet Jassal, Ph.D. (IIT, Delhi)
Professor
Speciality & Innovative Polymeric Materials for Textile Applications, Smart Textiles, Nanomaterials and Nanomaterials reinforced composites, Electrospinning.

Mangala Joshi, Ph.D. (IIT, Delhi)
Professor
Nanotechnology Applications in Textiles, Polymer Nano composites, Fibres, Nanofibres and coatings, Nanomaterials and Nano coatings, Bioactive and Functional Textiles, Environmental issues and Eco Friendly Technologies for Textiles.

B. L. Deopura, Ph.D. (IIT, Kanpur)
Emeritus Professor
Fibre Science and Technology, Single Polymer Composites, Water Management through Textile based Sheet Materials.

V. K. Kothari, Ph.D. (Leeds Univ.)
Emeritus Professor

Abhijit Majumdar, Ph.D. (Jadavpur Univ.)
Associate Professor

Samrat Mukhopadhyay, Ph.D. (IIT, Delhi)
Associate Professor
Natural Fibres and Modification Techniques, Composites, Post-Spinning Operations, Process and Product Development.

Bhanu Nandan, Ph.D (Kanpur Univ.)
Assistant Professor
Self-Assembly in Polymers, Polymer Crystallization, Electrospinning, Organic-inorganic Hybrid Fibres, Small Angle Scattering Techniques in Polymers.

Amit Rawal, Ph.D. (Bolton Univ.)
Associate Professor
Nonwovens, Modelling of Fibrous Assemblies, Technical Textiles.

R. S. Rengasamy, Ph.D. (IIT, Delhi)
Professor

Kushal Sen, Ph.D. (IIT, Delhi)
Professor
Textile Chemical Processing, Texturing of Synthetics/Natural Fibres and Blends, Special Finishes, Structure-property Correlations.

Rajiv K. Srivastava, Ph.D. (KTH, Sweden)
Assistant Professor
Biodegradable Polymers, Enzyme Catalysis, Emulsions and Suspensions, Structure-Property Relationship, Electrospinning.
INTRODUCTION

The Department offers a B.Tech programme in Textile Technology and two M.Tech programmes in Textile Engineering, and in Fiber Science and Technology, besides offering the Doctoral program. The department activities are focused on niche and futuristic areas, such as technical & smart textiles, nanotechnology applications, biotextiles, engineering of functional apparel, etc. The department has tie-ups with several universities in India and abroad.

ACADEMIC PROGRAMMES

UNDERGRADUATE

The B.Tech. program in Textile Technology covers development and characterization of the polymeric raw materials and methods of conversion of the same into textile materials followed by further value addition and appropriate engineering into niche products. Issues related to the management of the production facilities and marketing the products are also covered adequately.

POSTGRADUATE

The M.Tech. programmes, in Textile Engineering focuses on training for mechanical processing of textile fibres into various textile products, The M.Tech programme in Fibre Science and Technology trains students for the manmade fibre industry as also the chemical processing of textile materials.

RESEARCH

Current areas of doctoral and post-doctoral research include study of structure and properties of fibres and fibrous materials, analysis and design of yarn and fabric formation systems, mechanics of production processes, comfort properties of textiles, optimization and mechanism of dyeing and preparatory processes, eco friendly processing, micro encapsulation, antimicrobial finishes, nanotechnology applications, plasma treatment, design of technical textiles, smart and innovative textiles, electroconductive textiles, medical textiles and tissue engineering, polymer composites and apparel engineering. The activities are supported by several funded projects.

LABORATORY FACILITIES

The department has several state of art laboratories which are briefly described below:
**Fibre Science and Fibre Production Laboratory:** This laboratory houses facilities starting from fiber Production to fiber Characterization. It hosts a complete range of characterization equipment such as DSC, TGA, and TMA, Brookfield Rheometer, FTIR, Wide angle X-ray diffractometer, sonic modulus analyzer, etc. It also houses facilities for polymerization from small to pilot scale. Recently bicomponent fibre production facility has also been installed.

**Yarn Manufacturing Laboratory:** has equipment and machinery for producing yarns with different technologies at research as well as production scale. Staple fibre yarns using ring and friction spinning technologies and air texturized yarns can be produced. For small-scale sample production, Miniature spinning plant is also available. New additions include miniature spinning line and units for twisting and wrapping.

**Fabric Manufacturing Laboratory:** The Weaving section is equipped with modern preparatory machines and looms. Preparatory section includes latest Schlafhorst 332 model winding machine, Savio lab model Orion winding machine and sectional warping machine with all controls. In weaving section- projectile, rapier, and airjet looms as also a sample loom along with single end sizing and warping machine are installed. Apart from these, the lab is equipped with needle loom for tape and label, Staubly electronic dobbby and Bonas electronic jacquard. Weaving section is also equipped with a CAD station system for both woven and printed design. Knitting section includes flat knitting machines. Nonwovens Research laboratory is part of this lab. Industrial sewing machines constitute the garment technology facility.

**Textile Chemical Processing:** Housed in this laboratory are lab-scale versatile equipment for chemical processing of textile fabrics, yarns and fibres. In addition, the laboratory contains relevant analytical / testing equipment for assessing performance of the treatments imparted to the textiles including computer colour matching systems, spectrophotometers, fastness testers, flame retardancy testers and a full fledged anti microbial testing facility. Textile Chemistry laboratories are equipped with a wide range of dyeing, printing and finishing machines including Rota dyer, HTHP dyeing machine, winch, pressure jig, and package dyeing machine. New additions include colour dispensing systems and vortex dyeing machine.

**Textile Testing Laboratories** of the department has modern instruments for testing various types of fibers, films, yarns, fabrics and carpets. Fibers can be tested for single fibre and bundle strengths, breaking extensions and yarn can be tested for mass irregularity (U% or C.V %) imperfections, spectrogram, hairiness, twist, yarn to yarn friction and abrasion resistance. Fabrics can be tested for practically all the normal specifications such as warp and weft count, fabric mass per unit area (gsm), tensile and tear strength, flat and flex abrasion resistance, crease recovery, compression recovery, creep, thermal insulation, pilling, air permeability, water permeability, bending rigidity, compressibility, thickness etc.
**Computers and Microprocessors Laboratory:** Facilities in these labs are used by students for course work, internet search, preparing reports, analyzing test data and preparing presentations. The microprocessor section of this lab is used to teach control and monitoring systems.

**Resource Centre and Library:** The resource centre is a repository of resources essential for investigators to further their research, for a student to continuously upgrade and ameliorate his knowledge database and for a teacher to keep abreast with the state of art in today’s world of textiles. The resource centre has a wide compilation of books, reports, theses (Ph.D., M.Tech., and B.Tech.) and journals. It also has a rich collection of samples of technical textiles for various applications.

**New Facilities:** The newly created facilities include SMITA (Smart and Innovative textile materials), Biotextile, Medical textile and Protective textile laboratorie.
CENTRE FOR
APPLIED
RESEARCH IN ELECTRONICS
Arun Kumar, Ph.D. (IIT, Kanpur)
Professor
Digital Signal Processing, Speech, Audio and Underwater Acoustics

Mahesh. P. Abegaonkar, Ph.D. (Pune Univ.)
Associate Professor
Microwave Engineering, Antennas

Monika Aggarwal, Ph.D. (IIT, Delhi)
Associate Professor
Signal Processing, Communication, Sensor Array Processing and Underwater Acoustics

R. Bahl, Ph.D. (IIT, Delhi)
Professor

Ananjan Basu, Ph.D. (Univ. of California)
Professor
Microwave and Millimeter-wave Engineering

Sudhir Chandra, Ph.D. (IIT, Delhi)
Professor
Microelectronics Technology, MEMS Technology, Sensors and Actuators

Samaresh Das, Ph.D. (IIT, Kharagpur)
Assistant Professor
Nanoelectronics and Optoelectronics.

S. K. Koul, Ph.D. (IIT, Delhi)
Professor
Microwave and Millimeter Wave Engineering, Antennas and RF MEMS

B.S. Panwar, Ph.D. (IIT, Delhi)
Professor
SAW Device Design & Modelling and Hetrostructures

Saakshi Dhanekar, Ph.D. (Jamia Millia Islamia)
INSPIRE Faculty
Nano-sensors, Microfluidics, Porous Silicon fabrication and applications for chemical and bio-detection.

Suneet Tuli, Ph.D. (IIT, Delhi)
Professor
Nondestructive Characterization, Thermography & Thermal Imaging System

Vikram Kumar, Ph.D. (Lehigh Univ.)
Emeritus Professor
Semiconductor Physics and Technology, Nanotechnology

Ulrich L. Rohde, Ph.D. (Clayton University, USA)
Honorary Professor
Microwave circuits, (Amplifiers, Oscillators and Mixers) as well as Frequency Synthesizers.
INTRODUCTION
The Centre for Applied Research in Electronics focuses on research and training in specialized areas of Electronics. The areas encompass Signal Processing, Microwaves, Microelectronics and Non-destructive Characterization Techniques. The Centre has several excellent laboratory facilities for post-graduate training and conducting advanced research work.

ACADEMIC PROGRAMMES

POSTGRADUATE
M.Tech in Radio Frequency Design and Technology (RFDT) [Duration: 2 years/4 Semester]
A multidisciplinary masters program in Radio Frequency Design & Technology is offered by the Centre. The program provides specialization in Microwave/Microelectronics/ Signal Processing. This course is unique in India imparting hands-on training focusing on hardware in a wide range of topics like digital signal processors and applications, speech processing, wireless and underwater communications, antenna design, active and passive circuit design at microwave and millimeter wave frequencies, fabrication of solid state devices, MEMS based sensors and actuators, RF MEMS etc. The projects done by the students are hardware intensive. Frequently, the projects are part of deliverable products for sponsoring agencies.

RESEARCH AREAS
The centre offers doctoral programme which is highly rated in the country.

Signal Processing: Underwater and air acoustics applications, speech and audio processing, signal processing for communications, systems and algorithms for object detection, localization, tracking and navigation, multi-sensor data fusion.

RF & Microwaves: RFIC and RFMEMS, imaging and surveillance, active and reconfigurable antennas and arrays, non-linear modeling and measurements, microwave, millimeterwave components and Millimetre-wave data links.

Microelectronics: MEMS devices and technologies, sensor development, nanostructured materials and devices.

Non-destructive Characterization: Techniques and systems.

LABORATORY FACILITIES
The centre has several state of are facilities, This includes:
Anechoic chamber for antenna testing and characterization, Vector network analyzers (upto 110 GHz) and
Spectrum analyzer (upto 40 GHz), Probe stations, Free space material property measurement, Real time oscilloscope upto 25 GHz, RF, MEMS and EM simulation tools, Reactive ion etching and RF sputtering System, Thermal evaporation System and diffusion/oxidation finance, Thermal, acoustic, optical and magnetic systems for non-destructive characterization, Surface profiler for thickness measurement, Texas Instruments DSP Processor Kits, NIDAQ Systems, Labview, Underwater acoustic tank facility for real-time underwater experiments, High speed multi-channel data acquisition systems and signal analysis tools, Full Anechoic Acoustic Chamber and Speech Processing research studies, Kerr Effect Measurements, 48 node computational cluster, Magnetorelaxometry.
A. D. Rao, Ph.D. (IIT, Delhi)
Professor
Developing numerical models for coastal ocean state prediction system along the Indian coasts; Modelling of storm surges and associated inundation, internal waves and wind waves.

Poornima Agarwal, Ph.D. (Srinagar, J&K)
Senior Scientific Officers-I
Environmental Chemistry, Mathematical Techniques.

Dilip Ganguly, Ph.D. (Physical Res. Lab., Ahmedabad)
Assistant Professor
Aerosol-cloud-precipitation interaction, Impacts of Aerosols and clouds on climate, Characterization of aerosols and clouds using ‘remote sensing’ and ‘in-situ observations’, Climate change and health.

Saroj K. Mishra, Ph.D. (IISc, Bangalore)
Assistant Professor

Manju Mohan, Ph.D. (IIT, Delhi)
Professor

Head of the Centre

Vimlesh Pant, Ph.D. (Indian Inst. of Tropical Metrology, Pune)
Assistant Professor
Physical Oceanography, Ocean Modelling, Atmospheric Aerosols, Meteorological and Oceanographic Observations.

Krishna Achuta Rao, Ph.D. (Tulane Univ.)
Associate Professor
Climate modelling, climate model validation, climate variability, climate change detection and attribution, ocean heat content, sea-level rise, air-sea heat transfer and climate data analysis tools.

Somnath Baidya Roy, Ph.D. (Rutgers, USA)
Associate Professor
Land - atmospheric Interaction, Renewable Energy, Wind energy, Boundary layer processes.

Maithili Sharan, Ph.D. (IIT, Delhi)
Professor
Air Pollution Modelling, Atmospheric Boundary Layer, Computational and Mathematical Methods, physiological fluid dynamics.

H. C. Upadhyaya, Ph.D. (IIT, Delhi)
Associate Professor
General Circulation Modelling, Data Assimilation, Adjoint Modelling
S. K. Dash, Ph.D. (Physical Res. Lab, Ahmedabad)
Emeritus Professor
Monsoon Studies, Climate Modelling and Meteorological Computing

Sai Ravela, (MIT, USA)
Adjunct Professor
Estimation, control and information theory, Statistical pattern recognition, Statistical inference and learning.

O. P. Sharma, Ph.D. (IIT, Bombay)
Emeritus Professor
Ocean Atmospheric Circulation Modelling, Aerosols and Atmospheric Chemistry, Methods of Applied Mathematics.
INTRODUCTION

The Centre for Atmospheric Sciences (CAS) was set up in the year 1979 with the objective of undertaking modelling studies of atmospheric and oceanic processes for a better prediction of monsoon and its variability. Subsequently, the Ministry of Education, Government of India funded the Centre under the Sixth Five Year Plan. The Centre was also co-sponsored by the India Meteorological Department with a view to initiate research and mathematical modelling in meteorology in an academic institute. In 1981, the Planning Commission upgraded CAS to an advanced Centre for research. In order to complement its research activities, the Centre started the Ph.D. programme in atmospheric sciences which was the first of its kind in the country. In 2008, CAS started the M.Tech programme in “Atmospheric and Oceanic Sciences & Technology” with the support of Ministry of Earth Sciences and Indian Space Research Organization. In the year 2011, the UG Minor Area Programme “Atmospheric and Oceanic Sciences” was initiated, which is the only one of its kind in the country. Currently, the Centre has faculty strength of 13. In the last six years, 20 Ph.D. and 47 M.Tech. degrees have been awarded by the Centre. Based on the number of research publications, degrees awarded, courses offered and student/faculty strength criteria, we estimate that CAS is ranked nationally among the top two Centres/Departments in the field. According to the 2011 US National Academy of Sciences benchmarking criteria, we also compare favorably with all US Centres/Departments in our discipline.

ACADEMIC PROGRAMMES

• Currently CAS has three vibrant teaching programmes, namely:
  • B.Tech. Minor Area in Atmospheric Sciences
  • M.Tech. in Atmospheric-Oceanic Science & Technology
  • Ph.D.

UNDERGRADUATE

The Centre has initiated Minor Area Programme in Atmospheric Sciences since 2011-12. In this minor area programme, there are two core courses which deal with the Fundamentals of Atmosphere & Ocean and Climate Change. Besides these two core courses, one course on numerical modeling of atmosphere and ocean is floated exclusively for UG students. The students also have option for 26 electives where they have a wide range of choice from various applied courses covering all important topics in atmospheric and oceanic sciences. In order to complete the Minor Area Programme in Atmospheric Sciences, students need to earn 20 credits from among these courses. A mini project of 6 credits is also introduced as part of the minor area programme to facilitate completion of 20 credits.
POSTGRADUATE

i) The M.Tech Programme in Atmospheric-Oceanic Science & Technology was introduced in the year 2008-2009 and was revamped this year in view of the Institute-wide M.Tech curriculum review on the basis of gained experience, feedback from various stakeholders including students, Government research organizations and private sectors. The courses under this programme are designed in such a way that students with engineering and science background will be able to get interested in the exciting field of Weather and Climate. The courses are also oriented to help the graduated students get employed in government organizations, public and private sectors or continue in a doctoral program within the country and abroad. There are 11 core courses including three bridge courses and a Major Project. In addition to these core courses, there are a number of electives which include all state-of-the-art topics in atmospheric and oceanic sciences. Some special modules for one credit are also floated every semester which are usually timed with the visits of distinguished scientists from inside the country and abroad.

ii) There are several advanced level courses in CAS for the benefit of students registered for Ph.D. in CAS. These courses include Tropical Meteorology, General Meteorology, Advanced Dynamic Meteorology, Dynamic and Physical Oceanography, Numerical Modelling and some other advanced level courses. In addition to the Ph.D. students registered in CAS, students from other disciplines also register for these courses.

RESEARCH AREAS

The goal of CAS is to carry out cutting-edge interdisciplinary research and create highly skilled manpower through M.Tech and Ph.D. programmes in 4 core area: atmospheric modeling, oceanic modeling, air pollution and climate science. In the last five years, CAS faculty has published more than 150 publications in peer-reviewed SCOPUS journals. Regular seminars by distinguished speakers of international repute from India and abroad are arranged in the Centre from time to time so that our faculty and students can keep abreast of the latest scientific developments in the field.

Key Research Areas


**Oceanic Science:** Coastal Ocean Processes and Modelling, Large-scale Ocean Circulation, Ocean State Simulations and Forecasting, Air-Sea Interaction Processes.

**Climate:** Climate Dynamics, Climate Variability and Change, Global and Regional Climate Modelling, Climate Projections, Climate Change Impacts, Geo-engineering, Climate change and Health.

Applied Mathematics: Numerical Methods, Data Assimilation and Adjoint Modelling, Inverse Modelling, GPU Computing.


LABORATORY FACILITIES
The Centre has developed several teaching and research laboratories including one for High Performance Computing (HPC) for carrying out its research programmes. The laboratories are equipped with latest computing equipment including 2 Beowulf clusters for parallel numerical model simulation, RAID storage for data archiving and high-end workstations for data visualization. Additionally, the Centre is in the process of acquiring a 60 teraflop high-performance computing cluster using a DST-FIST grant. The Centre has created a very modern M.Tech. lab for satellite image processing and interpretation with the ERDAS Imagine and Arc-GIS. There is an air pollution laboratory for the measurement and analysis of pollutants in the atmosphere. The Centre has a rich library with collection of latest books and printed materials in the relevant fields.
Veena Koul, Ph.D. (Kashmir Univ.)
Professor
Biomaterials, Medical Devices, Clinical Diagnostics and Drug Delivery Systems.

Nivedita K. Gohil, Ph.D. (IIT, Delhi)
Associate Professor
Biosensor Systems, clinical diagnostics and monitoring using biomolecular markers, study of haemodynamic basis of arterial disease, biomechanics and molecular biology of vascular cells in health and disease.

Sandeep Kumar Jha, Ph.D. (Bhabha Atomic Research Centre, Mumbai)
Assistant Professor
Biosensors; nanoparticle sensing; microfluidic lab-on-a-chip; capillary electrophoresis microchip; immobilization and stabilization of biomolecules.

Dinesh Kalyanasundaram, Ph.D. (Iowa State University, USA)
Assistant Professor
Micromachining of materials, Product Design, Solid Mechanics (Specific Areas) DNA based diagnostics, lab-on-chip device design, Orthopaedics, Orthodontics, Surface modification, laser machining.

Amit Mehndiratta, M.B.B.S, D.Phil. (University of Oxford, UK)
Assistant Professor
Quantitative medical image analysis for CT and MRI, Perfusion and Diffusion imaging, Neuro-Rehabilitation, Mobile Healthcare.

S. M. K. Rahman, M.Tech. (Univ. of Allahabad)
Assistant Professor
Computer architecture, embedded systems, microprocessor based industrial control, digital hardware design and medical electronics.

Anup Singh, Ph.D. (IIT, Kanpur)
Assistant Professor
Development of magnetic resonance imaging (MRI) techniques/methods based on exogenous or endogenous contrast agents, Medical image processing and data analysis.

Harpal Singh, Ph.D. (IIT, Delhi)
Professor
Medical diagnostics, Drug Delivery Systems, Antimicrobial Polymers, Polymeric Hydrogels, Nanobiotechnology, Polymer based implants & Medical devices.

Neetu Singh, Ph.D. (Georgia Tech., USA)
Assistant Professor
Design of nano-structured materials for biomedical implants, cancer diagnostics, tissue engineering and drug delivery. Study of the bioactivity of nanostructures and finding structurerbioactivity relationships.

Sneh Anand, Ph.D. (IIT, Delhi)
Emeritus Professor
Biomedical Instrumentation, Rehabilitation Engineering, Biomedical Transducers and Sensors, Biomechanics Technology in Reproduction Research.
CENTRE FOR BIOMEDICAL ENGINEERING

This centre was established in 1971 as a Joint venture of Indian Institute of Technology Delhi and All India Institute of Medical Sciences, Delhi. The Centre has applied engineering principles to address medical and biological problems. It has faculties drawn from IIT Delhi as well as AIIMS New Delhi. In addition, the centre has collaborative projects with major institutes and hospitals in India. Over the years the Centre has become premier centre in the country.

The growth rate of CBME IITD is comparable to the global R&D. Centre has provided interdisciplinary base to develop health care technologies. Over the last two decades the focus has shifted to include biological medicine, behaviour or molecular health and develop innovative biological materials, implants, devices, and informatics approaches for the prevention, diagnosis, treatment, rehabilitation and injury mechanics. Innovations in instrumentation, drug delivery, tissue engineering and biosensors have been internationally recognized.

ACADEMIC PROGRAMMES

Courses relevant to Biomedical Engineering is offered at IIT Delhi and AIIMS New Delhi and include Introduction to Basic Medical Sciences for Engineers, Industrial Biomaterial Technology, Research Techniques in Biomedical Engineering, Tissue engineering, Biomaterials, Biosensor Technology, Emerging Biomedical Technology & Health Care, Vascular Bioengineering, Biomechanical Design of Medical Devices. The centre is also looking to launch its own M.Tech. program in near future.

RESEARCH AREAS

The broad areas of research are:

The centre has main focus in research spanning areas which include: Medical Imaging, Biosensor applications, Vascular cell mechanics, Molecular markers in diabetes; Lab-on-a-chip, Microfluidics, Capillary Electrophoresis Microchip, Rehabilitation Engineering, Biomedical Transducers and Sensors, Technical validation of Alternate medicine, Neuro-endoscopy, Integrated Health Care, Nano medicine, Controlled Drug Delivery System, Soft skin regeneration, Wound healing, Brain and cancer targeting of bioactive molecules, Food Science & technology, Orthopaedics, Biomechanics, Recombinant DNA, synthetic biology, Computational analysis and software packaging. Bench to bedside research from phantoms to in-vivo in the areas of breast cancer and functional brain translational mapping.

The average number of Ph.D’s graduated over the last 5 years per faculty has been 4.4 and the average SCOPUS cited publication per faculty is 8. The amount of research projects per faculty is 70 Lakhs and industrial consultancy is 1.44 Lakhs per faculty per year in past 5 years. Recently major facilities such as confocal laser and
Raman spectroscopy have been installed. New labs based on drug delivery, skin regeneration, lab-on-a-chip, laser micromachining and image processing have been initiated.

**Technology developed by the centre include:**

Novel kit for assay of iron in biological fluids; Modulated DC Iontophoretic Device; electrocoulogram based Multi-mode Controller; Device for External Counter Pulsation Therapy; Zig-G, A Wireless ECG system; A Pneumatic Damper Controlled AK Prosthesis; Development of a Biomedical Engineering application Toolkit (BEAT); Contra Lateral Limb Controlled Prosthetic Knee Joint; Wireless ECG patch and system for obtaining High Definition mobile ECG; A Surgical Stapler; Bilayer dressing for wound healing;

**The centre has in past transferred following Technologies to industries:**

Heat sealable coatings onto paper for adhesion with PVC polyester and polystyrene films for packing application; Immobilization of aminoacylase on functionalized acrylics for production of 6-aminopenicillin acid from pencillin; Antimicrobial acrylic bone cement for fixation of hip and knee joints; Polymeric nanoparticles and process of preparation thereof for delivery of peptide based anticancer agents; Contra Lateral Limb Controlled Prosthetic Knee Joint; Blow Switch; Touch Pad and Word Editor; Remote Mouse and Word Editor; Iontophoretic Transdermal Device for delivery of Declofenac; TBIO Unit for development of opto electronic hemoglobinometer. Surgical Stapler

**LABORATORY FACILITIES**

The Centre has Bioelectronics, Biomechanics, Biomaterials, Biosensor, Preventive Cardiovascular, Animal Experimentation, Biosignal Processing, Tissue Engineering, Drug delivery Laboratory, Characterization of nanoparticles, Laser micromachining Lab, Lab-on-a-chip Biomedical Measurement Systems, Vascular Mechanics laboratories.
**Huzur Saran**, Ph.D. (Univ. of California, Berkeley)  
Professor  
High Speed Networks, Graph Theory & Algorithms.

**P. K. Baboo**, Ph.D. (Berhampur)  
Senior System Programmer  

**Subhashis Banerjee**, Ph.D. (IIS, Bangalore)  
Professor (Associate Head)  
Computer Vision, Real Time Systems, Robotics.

**Rajesh Bhatt**, Ph.D. (IIT, Delhi)  
Senior System Programmer  
Artificial Intelligence, Distributed and Network Computing, Component & Object Technologies in JAVA, Image Processing, E-Education Technologies, System Administration, Intelligent Imaging in medicine and GIS.

**Raj Kumar Chauhan**, M.C.A. (MITS, Gwalior)  
Senior Programmer  
Networking & Systems Administration.

**Savita Goel**, Ph.D. (IIT, Delhi)  
Senior System Programmer  

**P. K. Gupta**, M.Tech. (IETE)  
Senior System Programmer  

**S. R. Hegde**, Ph.D. (IIT, Delhi)  
Senior System Programmer (SG)  
CAD/CAM/CAE Service

**Pragya Jain**, Ph.D. (IIT, Delhi)  
Senior System Programmer  
Parallel Processing, Cloud Computing & Virtualization, Systems Administration, Numerical Analysis.

**Jaya**, M.Tech. (IIT, Delhi)  
Senior Programmer  
System Administration, Application Software, Object Oriented Programming, Programming Languages, DBMS.

**Sunil Kak**, M.Tech. (IETE)  
Senior System Programmer  
System Administration and management of Linux & Windows Services and Network Management.
N. C. Kalra, M.Tech. (IIT, Delhi)
Manager (SG)
Networking, Internet Computing, Microprocessor Based System Design, System Programming.

Gopal Krishen, M.Sc. (Kurukshetra Univ.)
Senior System Programmer
Hardware, Networking, Cloud Computing & Virtualization, System Administration, Database Mgmt. and DBA.

Ram Lal, Ph.D. (Jamia Milia Islamia)
Senior Programmer
Object Oriented Programming, System Administration, Information Technology, E-Governance, MATLAB programming, Image Processing.

K. Narayanan, M.Sc. (Delhi Univ.)
Senior System Programmer (SG)

R. Raghavan, M.Sc. (IIT, Delhi)
Senior System Programmer
INTRODUCTION
The Computer Services Centre provides round the clock computing and networking facilities to serve a user population of about 10,000 users consisting of undergraduates, postgraduates, research scholars, faculty and staff of the Institute and provide advice on all the aspects of academic computing. The Centre also participates in the Academic programmes of various departments and centers.

COMPUTING FACILITIES
The Centre is equipped with 96 HP blade servers out of which 64 Blade Servers are used for cloud computing with 50 TB of virtualized storage and 32 blade servers with 50 TB of storage for user homes and infrastructure use like email, proxy, web services etc. CSC also has 20 workstations for Simulation facility, and about 220 desktop computers connected over a switched fast Ethernet. Uninterrupted Power Supply is provided through 3x 80 KVA MGE UPS system and DG set.

The CSC is also equipped with CUDA based high performance computing GPU mini-cluster environment of 16 nodes, each with 2x8 core ES-2670 (Sandybridge) CPU, 64 GB RAM and 2xNvidia K20 GPUs. The nodes have 64Gbps IB interconnect. Very soon within next few months this will be extended to 750 Tera flops in the new Data Centre. The new Data Centre will be commissioned within the next few months.

Major Facilities/Services
• The Email facility is provided to all students, staff and faculty with webmail interfaces Roundcube and Squirrelmail using User and mailing list definitions from the IITD LDAP and Kerberos for user authentication.
• The CSC provides Infrastructure services through virtualization technology.
• Compute facilities for research and projects are provided through Baadal, the Cloud Computing environment.
• The centre maintains local repositories of several popular open-source and commercial licensed software.
• The CSC has Microsoft Volume Licensing EES agreement for the Campus under which Microsoft software are available for use.
• The centre has the following software packages: Matlab, Mathematica, Abaqus, Ansys, Fluent, Comsol, Visual Studio etc.
• IITD campus Wifi Service – IITD_WIFI and IITD_Guests are available in the academic area and guest houses. The campus Wi-fi provides secure wi-fi access using 802.1x authentication.
• IIT Delhi is also a part of Eduroam, a global Wifi roaming programme across academic campuses through ERNET India.
• Own Cloud, a file and document sharing utility similar to the popular drop box can be used by the IITD
community. The utility supports storing and sharing of files, images, music and documents, contacts, calendars, tasks etc.

- To facilitate research downloads through non-standard ports download server download.iitd.ac.in can be used. Internet access can be accessed on all ports from this system and all access and downloads will be logged.
- Virtual web hosting facility can be used for securely hosting all websites of the form http://xyz.iitd.ernet.in which are not maintained by CSC.
- User web pages is available for the use of faculty and PhD. students for hoisting their web-pages on the server web.iitd.ac.in
- To facilitate limited access within IITD, CSC has a separate web server privateweb.iitd.ernet.in where users can have their personal web pages.
- VPN facility is provided to all the faculty of IITD for accessing IITD internal LAN from outside IIT Delhi.
- Network Time Protocol (NTP) servers are available for use. These time servers are synchronized with standard internet time servers with time drift less than a few milliseconds.
- CSC has commissioned a new disaster recovery data centre (DRDC) in the SIT building on September 13, 2014. The DRDC has been built by IBM and can support a total IT load of 60 KW. It has redundant UPS power supplies and precision air conditioners in N+N and N+1 configurations respectively.

**Web Services**

- Virtual web hosting facility can be used for securely hosting all websites of the form http://xyz.iitd.ernet.in which are not maintained by CSC.
- Network Time Protocol (NTP) servers are available for use. These time servers are synchronized with standard internet time servers with time drift less than a few milliseconds.

**PC Services**

There are five PC Labs in the Centre having about 220 Desktop computers under Windows and Linux environment. The PC Labs I, II, III and IV have about 160 computers running Ubuntu 14.04 LTS and PC Lab-V has about 60 computers running Windows 7. The user areas of PC Labs I, II having Ubuntu systems and the main Hall housing Windows machines are open round-the-clock for authorized users.

**Simulation Lab**

The simulation lab is equipped with about 20 Dell workstations under Windows7 for CAD/CAE/ CUDA and High Performance Computing (HPC). This lab also has about ten Dell PCs for the computational work.
Network Services

The Institute LAN is a state of the art switched network with Fiber Optics and enhanced CAT5/CAT6 UTP backbone. It consists of more than 9000 network access points spread over the campus using about 265 Cisco switches and about 75 virtual LANs. Network access is provided to every student, faculty, Doctor, Laboratory and rooms in guest houses. Internet connection has been provided through a router, redundant firewall switching modules, 4x2Mbps leased circuits from VSNL, 1x2 Mbps circuit from ERNET and 2 Gbps from NKN.

IIT Delhi is connected to the National Knowledge Network (NKN) with 1Gbps dual connectivity from PowerGrid and RailTel. This connectivity provides virtual routing service, Internet Connectivity, and connectivity with other Institutes connected on the NKN backbone.

Internet and Intranet access is provided to faculty/officer homes via ADSL connectivity over internal telephone lines. The academic area is also connected through secure Wi-Fi. An independent network has been provided for administrative functions. Many network services including mail, web, and domain name, anti-virus are being provided over this network.

IITD has upgraded the routers and switches for internet and the core and distribution network and has replaced the existing multimode fiber with single mode fiber. This has made the backbone 10 Gbps ready. IIT Delhi will soon deploy GPON technology for residences and fiber-to-home (FTTH) is also in an advanced stage of completion.
INTRODUCTION

The Educational Technology Services Centre (ETSC) is actively engaged in promoting the use of Educational Technology at the Institute and also at the national level. Some of its major activities are:

- Design & Development of Instructional Resources (videos and web based).
- Provision and maintenance of AV equipment for classroom teaching.
- Video and computer based instructional packages.
- Organize training programmes for faculty and professionals across the country.
- Video conferencing for faculty selection interviews and meetings.
- E-learning and distance education.
- Offer support for classroom teaching.

The Centre has a modern video studio with recording and editing facilities in DVCAM format. A studio-classroom with seating capacity of 60 is available for on-line recording of courses. Nonlinear editing setup and Apple Streaming server are available for post production and video streaming. ETSC takes care of the audio-visual needs of faculty and students. In addition to equipping the classroom with these facilities, ETSC runs a loan service. A media reference library with multiple viewing cabins has been set up in the Central Library for the use of students and faculty. The Educational Technology Services Centre has a computer laboratory with modern multimedia capabilities and internet connectivity. Computer Aided Instruction/Computer Aided Learning courses/packages are developed in the computer laboratory. Learning materials generated by ETSC are disseminated at nominal price throughout the country and abroad. The Centre conducts short courses and modular programmes on different aspects of educational technology for teachers and staff from the Institute and from other educational institutions and industry institutions. These courses are designed to sensitize and guide the faculty to optimize their effort and time for classroom and laboratory instruction as well as professional development. The Centre offers its services to departments, individual faculty or groups of faculty members in revising, redesigning and innovating curricula.

The Centre has the expertise and experience of undertaking national and international level consultancy and sponsored research projects. It has worked with agencies such as the World Bank, AT&T, AICTE, UNESCO, UNDP Commonwealth of Learning. The British Council and Adis Abada University, Ethiopia. The NPTEL project funded by MDRD has been successfully completed. Under this programme, all the seven IITs and Indian Institute of Science have worked together to develop web and video based education material for undergraduates courses initially in five disciplines, viz., Civil Engineering, Computer Science and Engineering, Electrical Engineering,
Electronics and Communication Engineering and Mechanical Engineering. The web courses so developed are available through the various servers authorized by NPTEL Phase II of NPTEL Project is nearing completion where its scope has been further expanded to include more disciplines and advanced/post graduate courses. ETSC has procured and installed Sony ANYCAST system in the Video Studio and in two lecture theatres for non linear editing and recording. Video Conferencing facilities have been installed in the two lecture theatres for non linear editing and recording. Video Conferencing facilities have been installed in the two lecture theatres and in the Conference Room of ETSC. The facility is being used for faculty interviews, meetings and distance education. For connectivity both ISDN and IP based network connection are used. For classes to Adis Ababa University, two lecture delivery rooms have been equipped with remote teaching facility. A dedicated two-way video link is also provided for live delivery. Two new lecture rooms have also been equipped with audio/video, projection, distance education and recording facilities. In addition, three Virtual Classrooms are also being equipped under National Knowledge Network (NKN).
**Head of the Centre**

Viresh Dutta, Ph.D. (IIT, Delhi)
Professor
Experimental Solid State Physics, Thin Film Physics, Photovoltaics.

Ramesh Narayanan, Ph.D. (Jadavpur Univ.)
Assistant Professor
Plasma Physics and Fusion.

T. S. Bhatti, Ph.D. (IIT, Delhi)
Professor

Tara C. Kandpal, Ph.D. (IIT, Delhi)
Professor

Dibakar Rakshit, Ph.D. (The University of Western Australia)
Assistant Professor

K. A. Subramanian, Ph.D. (IIT, Madras)
Associate Professor
Internal Combustion Engines and Alternative Fuels

S.C. Kaushik, Ph.D. (IIT, Delhi)
Professor

G. N. Tiwari, Ph.D. (BHU)
Professor

Vamsi K. Komarala, Ph.D. (IIT, Delhi)
Associate Professor
Nanostructured metal and semiconducting Materials, Thin Film Science & Technology Plasmonic Solar Cells.

R. Uma, Ph.D. (IIT, Delhi)
Associate Professor
Plasma Physics and Fusion.
**Centre for Energy Studies**

**M. G. Dastidar, Ph.D. (IIT, Delhi)**  
Emeritus Professor  

**L. M. Das, Ph.D. (IIT, Delhi)**  
Emeritus Professor  

**M. G. Dastidar, Ph.D. (IIT, Delhi)**  
Emeritus Professor  

**S. C. Mullick, Ph.D. (IIT, Madras)**  
Emeritus Professor, (IREDA Chair)  

**D. K. Sharma, Ph.D. (Delhi Univ.)**  
Emeritus Professor  

**Ashu Verma, Ph.D. (IIT, Delhi)**  
Assistant Professor  

**S. C. Mullick, Ph.D. (IIT, Madras)**  
Emeritus Professor, (IREDA Chair)  

**D. K. Sharma, Ph.D. (Delhi Univ.)**  
Emeritus Professor  
INTRODUCTION
Energy forms an integral part of all the scientific and engineering disciplines. Since the demand for energy world-over has been leading to rise of known as well as future sources of energy. Study of energy resources and their efficient utilization has great impact on economic and social life. Energy experts are needed for developing sustainable sources of energy without impacting the environment extensively but yet be able to meet the growing demands. Centre of Energy Studies has mandated itself in training and research in Energy Engineering for serving the energy needs of the country.

ACADEMIC PROGRAMMES

UNDERGRADUATE
The Centre is offering several electives in the emerging areas of Energy and Environment for UG students on elective basis as open category courses.

POSTGRADUATE
The Centre offers the following interdisciplinary post-graduate programmes, leading to the award of M.Tech degree:


RESEARCH
The focused topics of research at the centre are:
- Renewable Energy Sources
- Energy Efficiency
- Internal Combustion Engines
- Electrical Energy Systems
- Energy Efficiency in Buildings
- Energy Conservation and Management
- Fuel Technology
- Plasma Science and Technology
- Solar Cells

Doctoral research is being carried out in:

**LABORATORY FACILITIES**

Excellent facilities are available in the centre for different uses of the industry and for educational and training programmes

**Renewable Energy**


**Environment Pollution**


**Electrical Energy Systems**


**I.C. Engines**

**Plasma Laboratory**

Plasma Simulation Facility, Plasma Deposition of Thin Films, Dielectric Barrier Discharge for Fuel Gas Cleaning, Negative Ion Generating System, High Speed Coating and Surface Treatment using Thermal Plasma, Broadband Power Amplifiers in RF & LF Ranges up to a few Hundred Watts, Spectroscopic System for (a) Measuring Flame Temperature up to 3000 K (b) Spectrum Analysis of Light, Sources in Visible Range, Plasma Kits for Air / Water Pollution Control, Plasma Simulation Facilities.

**Energy Audit & Conservation**

Portable energy audit instruments like temperature, humidity, velocity meters, surface temperature reading instruments, clamp type voltmeter, ammeter and powerfactor meter.

**Energy Simulation Laboratory**

Subir K. Saha, Ph.D. (McGill Univ.)
Professor, (Naren Gupta Chair)
Robotics, Mechatronics and multi-body dynamics.

V. K. Agarwal, Ph.D. (IIT, Delhi)
Professor
Dilute and Dense Phase, Pneumatic Handling of Bulk Solids and Erosive Wear.

J. Bijwe, Ph.D. (IIT, Delhi)
Professor
Tribology of Polymers / Composites, Nano-Composites and Oil Analysis for Condition Monitoring.

Deepak Kumar, Ph.D. (IISc, Bangalore)
Assistant Professor
Metalworking fluids, Nanotribology, Contact mechanics, Atomic force microscopy, Surface / interface analysis.

O.P. Gandhi, Ph.D. (IIT, Delhi)
Professor
Maintenance, Reliability, Risk Analysis and Safety.

R. K. Rai, M.Tech. (IIT, Delhi)
Design Engineer
Instrumentation and Non-destructive Testing.

N. Tandon, Ph.D. (IIT, Delhi)
Professor
Vibration and Acoustic Emission Monitoring, and Noise Engineering.

Head of the Centre

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INTRODUCTION

Industrial Tribology, Machine Dynamics and Maintenance Engineering Centre (ITMMEC) is a specialized Centre, established under Indo-Norwegian cooperation Programme. The Centre has close interaction with the industry through HRD programmes, consulting jobs and contract research. The Centre has been associated with sectors of industry like; automobiles, power, home appliances, manufacturing, mining, oil and gas, etc. The Centre has excellent laboratory facility to support industrially oriented research.

ACADEMIC PROGRAMMES

POSTGRADUATE

The centre coordinates an Interdisciplinary M. Tech. programme in ‘Industrial Tribology and Maintenance Engineering’. The Interdisciplinary programme is industry oriented and it offers curriculum and training, which are of relevance to the job requirement of engineers in industry. The programme is open to fresh candidates through GATE and sponsored candidates from industry. The teaching faculty is also drawn from Departments of Applied Mechanics, and Mechanical Engineering, and Centre of Polymer Science and Engineering (CPSE).

LABORATORY FACILITIES

The Centre has excellent facility for experimental, analytical and development research activities. With its highly specialized manpower, the Centre interacts with industries through consultancy, field service and also joint sponsored research programmes. The Centre has well-equipped laboratories, which are: Lubrication and Oil Monitoring Laboratory, Friction & Wear Laboratory, Machine Dynamics Laboratory, NDT Laboratory, Project Laboratory and Lubricant Laboratory.
The ongoing research areas of the centre are:

Arun Kumar, Ph.D. (IIT, Kanpur)
Professor
Digital Signal Processing, Speech, Audio and Underwater Acoustics

Head of the Centre

Chief Design Engineers (S.G.)

A. L. Vyas, Ph.D. (IIT, Delhi)
Emeritus Professor
Electronic Instrumentation, Smart Sensors, Sensor Networking, Body Area Sensor Networks and Signal Processing.

Gufran Sayeed Khan, Ph.D. (Friedrich-Alexander-Univ.)
Assistant Professor

D. T. Shahani, Ph.D. (IIT, Delhi)
Emeritus Professor
Electronic Instrumentation, Electro-magnetics, Antennas.

Jyoti Kumar, Ph.D. (IIT, Guwahati)
Assistant Professor

Chandra Shekhar, Ph.D. (IIT, Madras)
Emeritus Professor

Sumer Singh, M.Des. (IIT, Delhi)
Assistant Professor
INTRODUCTION
The Centre is interdisciplinary in nature and is engaged in design and development of instruments and other industrial and consumer products. The primary goals of Instrument Design Development Centre are to undertake research, development and training in the area of Instrument Technology.

ACADEMIC PROGRAMMES
The centre coordinates the following POSTGRADUATE programmes

Interdisciplinary M. Tech. in Instrument Technology
This is an interdisciplinary M.Tech. programme. The teaching faculty is drawn from Instrument Design Development Centre, Departments of Electrical Engineering, Mechanical Engineering and Physics.

Interdisciplinary M. Des. in Industrial Design
This is an interdisciplinary M.Des programme to candidates with bachelors in engineering or architecture. The programme is also open to candidates sponsored by Government Organizations and Public Sector companied on full time basis. The teaching faculty is drawn from Instrument Design Development Centre, and various other departments. The programme brings together the skills of understanding user needs, deciphering market needs and mapping the problems identified to creative solutions while keeping an eye on the existing and evolving technologies.
RESEARCH AREAS

Doctoral research is being carried out in the following area:

LABORATORY FACILITIES

The Centre is equipped with (a) laboratories having facilities for Analog and Digital Electronic Design, Microprocessor Systems Development, Virtual Instrumentation, Mechatronics, Electromagnetic and ultrasonic instrumentation, (b) Manpower Development in Instrument Technology Laboratory, (c) Laser Applications and Holographic Laboratory; (d) Optical Workshop, (e) Industrial Design Laboratory and Model-making Workshop, (f) Industrial Design Clinic for Product Development with Ergonomics and Computer Aided Simulation Facilities. (g) User Experience Design Laboratory. (h) It also has MAC laboratory for CAD and Multimedia.
**Head of the Centre**

**A. K. Ghosh, Ph.D. (SUNY/Buffalo)**  
Professor  
Rheology and Processing, Polymer Reaction Engineering, Polymer Blends and Alloys, Mixing and Compounding, Computer Aided Modelling, Polymeric Nano- Composites, Polymer Film Processing, Cellular and Biopolymers.

**Veena Choudhary, Ph.D. (IIT, Delhi)**  
Professor  

**Josemon Jacob, Ph.D. (Iowa State Univ.)**  
Associate Professor  
Polymer synthesis, semiconducting polymers, polymer based LEDs and photovoltaics, block copolymers biodegradable polymers, polymerization catalysis.

**Sampa Saha, Ph.D. (Michigan State Univ.)**  
Assistant Professor  
Biodegradable polymeric materials, polymer brushes, electrohydrodynamicco-jetting, micro and nano structured materials, multi-layered and multi-compartmental polymeric particles.

**Leena Nebhani, Ph.D. (Karlsruhe Institute of Technology)**  
Assistant Professor  
New synthetic routes for surface and interfacial engineering, controlled free radical polymerization techniques, anti-fouling and biocompatible polymers, rubber compounding and technology, sustainable additives.

**Bhabani Satapathy, Ph.D. (IIT, Delhi)**  
Associate Professor  
Morphology and phase behaviour of block copolymers, Polymer blends and composites, Micromechanics, Fracture and fatigue of polymer nano-composites, Tribology of polymer based materials, Biotribology, Thermo-mechanical behaviour of Biomaterials.

**S. N. Maiti, Ph.D. (Calcutta Univ.)**  
Emeritus Professor  
INTRODUCTION

The Centre for Polymer Science and Engineering (CPSE) is a leading Centre in the country for teaching and research in the emerging area of polymers. The principal thrust of the Centre is manpower development and research for enhancing the fundamental knowledge as well as developing new polymeric materials. The Centre emphasizes interaction with the related industry. The changing needs of the industry are kept in view while designing and upgrading teaching and research programs.

ACADEMIC PROGRAMS

The faculty of the Centre has the major role in teaching of interdisciplinary M.Tech. Programme in Polymer Science and Technology. The primary purpose of this programme is to train scientists and engineers to fulfill the constantly growing requirements of the polymer based industry in the country.

RESEARCH AREAS

The broad area of research of the centre are: Research in polymer synthesis, modification of polymers, biodegradable/photodegradable polymers, nano-Composites, flame resistant polymeric materials, high energy polymeric binders, reinforcement of polymers, testing and characterization of polymers, polymer blends and alloys, polymer compounding, rheology and polymer processing, nano-Hybrid polymer particles as drug carries, microcellular polymers, smart hydrogels, biopolymers, polymer composites, surface modification anti-fouling and bio-compatible surfaces, multi-compartmental polymeric materials, polymer product design and modelling and simulation in processing is being carried at the Centre. Sponsored research and consultancy are other major activities of the CPSE. Very large number of research projects sponsored by government organization, international agencies and industries have been undertaken over two decades.

Doctoral research is being carried out in the following area:

Synthesis of Speciality Polymers; Structure-Property Correlation in Polymeric Materials; Rheology and Processing of Polymers; Polymer Blends and Alloys; Fibre / Particulate Filled Thermoplastic / Thermoset Composites, Degradation and Stabilization of Polymer; Mechanical and Thermal Properties of Polymeric Systems, Crystallization of Polymers in Blends / Composites, Reactive Polymer Processing; Modification of Polymers; Morphological Studies of Polymers; Modelling and Simulation in Processing; Computer Analysis of Mould Filling; Design and Stress Analysis of Engineering Component from Polymeric Materials, Biodegradable Polymers, Hydrogels, Smart Micro / Nano-Hydrogels for Biomedical Application, Nano-Composites, Conjugated Materials for Electronic Applications, Polymerisation Catalysts, Fracture and Fatigue of Nano-Structured Polymeric Materials, Biopolymers.
LABORATORY FACILITIES

Head of the Centre

Vijay V. K., Ph.D. (IIT, Delhi).
Professor

Malik Anushree, Ph.D. (IIT, Delhi)
Associate Professor
Food & Environmental Microbiology, Bioremediation, Biopesticides, Anti-microbial agents, Housefly control, Algal biofuels, Phycoremediation.

Chariar V. M., Ph.D. (IIT, Delhi)
Associate Professor
Design for Sustainability, Traditional Knowledge Systems, Appropriate Housing and Ecological Sanitation, Wisdom-based Leadership.

S. N. Naik, Ph.D. (IIT, Delhi)
Professor

Hariprasad P., Ph.D. (Univ. of Mysore)
Assistant Professor
Environmental Microbiology and Biotechnology Microbial Biopesticide and Biofertilizer Bioethanol, Mycotoxins.

Jatendra K. Sahu, Ph.D. (IIT, Kharagpur).
Assistant Professor
Dairy Engineering, thermal & non-thermal processing of food materials, biopackaging, value addition to agro-commodities, on-farm technologies for agriculture produce.

Rajendra Prasad, Ph.D. (IIT, Delhi)
Emeritus Professor
Rural Energy Systems, Improved Cookstoves, Rural Industrialization, Leather, Pottery, Carpet Making, Food Processing, Milk Processing

Santosh Satya, Ph.D. (IIT, Delhi)
Professor
Food quality and safety, Bamboo technology, Botanical pesticides, Rural Energy-Environment Systems, Solid Waste Recycling, Sustainable Agricultural System.

Sharma Satyawati, Ph.D. (IIT, Delhi)
Professor
Biofertilizers, Biopesticides, Tissue culture, Rapid composting and Waste management, phytoremediation Nutraceutical mushrooms, Bioethanol.

Associate / Joint Faculty

M. R. Ravi, Ph.D. (IISc, Bangalore)
Mechanical Engineering

T. R. Sreekrishnan, Ph.D. (IIT, Delhi)
Biochemical Engineering and Biotechnology

P. M. V. Subbarao, Ph.D. (IIT, Kanpur)
Mechanical Engineering

S. K. Khare, Ph.D. (IIT, Delhi)
Chemistry

K. K. Pant, Ph.D. (IIT, Kanpur)
Chemical Engineering

S. K. Saha, Ph.D. (McGill Univ.)
Mechanical Engineering
INTRODUCTION
The Centre for Rural Development and Technology (CRDT) was established to coordinate and provide inputs for scientific and technological advancements in the rural sector by giving technical back-up for the sustainable rural development and create replicable models for the nation and world at large.

The mandate of CRDT is to identify problems of the rural sector requiring science and technology inputs and solve these within the paradigm of sustainable development involving the faculty and students. The centre aims to generate a sustainable technology base by blending appropriately modern ‘S&T’ with traditional knowledge and wisdom. The centre also undertakes appropriate teaching, research, information dissemination and outreach related activities and network with other technical institutions, NGOs, government agencies, and rural/SSI industries, for achieving rural industrialization and improve the quality of life in rural areas.

ACADEMIC PROGRAMMES
UNDERGRADUATE
The centre offers one elective course to undergraduate students.

POSTGRADUATE
The centre offers seventeen courses in rural development and technology to postgraduate students as electives.

RESEARCH AREAS
The main research areas of the centre are:


Rural Engineering and Sustainable Habitat: Bamboo bow beams, columns & other housing elements, Engineered bamboo structural elements, Bamboo composites, Bamboo boards and laminates, Improved artisanal tools, Value-added craft products

LABORATORY FACILITIES

The major research laboratories are:

- Applied Microbiology Lab
- Biogas Lab
- Biomass Laboratory
- BioChem Lab
- Ecological Sanitation Lab
- Bamboo Composites Lab
- Food Quality and Safety Lab, Agro Ecology Lab
- Regional Testing and Knowledge Centre for Clean Cookstoves
- Supercritical Fluid Extraction Lab

Doctoral research is being carried out in the following area:

- Biogas for vehicular application, Valorisation of food waste to biogas (VALORGAS), Optimization of biomethanation process for mixed feed digestion in various biogas reactors, Biogas enrichment and bottling, Development of low cost Biogas upgradation and bottling, Biogas slurry management, Phycoremediation and Algal biofuels, Fungal formulation for metal/dye removal from effluents, Housefly Control, Antimicrobial Agents, Biopesticidal formulations for termites, nematodes, plant pathogens and stored grain pests, Rapid composting through native earthworms & bioinoculants, Silvipastoral systems, Waste land development and value added products for housing, food, fodder & biofuel, Production of Biodiesel and Biolubricants from non-edible oil seeds, Extraction of Value added Chemicals by using Supercritical Fluid Processing Technology, Improved cook stove design and testing, Ecological sanitation: Nutrient recovery and recycling, Waterless urinals, Bamboo as a Green Engineering Material.
Sangeeta Kohli, Ph.D. (IISc., Bangalore)
Professor
Mechanical Engineering

V. M. Chariar, Ph.D. (IIT, Delhi)
Joint Faculty
CRDT

Santosh Satya, Ph.D. (IIT, Delhi)
Joint Faculty
CRDT

Kiran Seth, Ph.D. (Columbia Univ.)
Joint Faculty
Mechanical Engineering

R. R. Gaur
Honorary Visiting Faculty
Mechanical Engineering (Retd.)
Sneh Anand, Ph.D. (IIT, Delhi)  
Biomedical Engineering

S. Balaji, Ph.D. (Stanford Univ.)  
Applied Mechanics

G. Bhuvaneswari, Ph.D. (IIT, Madras)  
Electrical Engineering

P. R. Bijwe, Ph.D. (IIT, Delhi)  
Electrical Engineering

Nomesh Bolia, Ph.D. (Univ. of North Carolina)  
Mechanical Engineering

Niladri Chatterjee, Ph.D. (Univ. of London)  
Maths

Harish Chaudhry, Ph.D. (IIT, Delhi)  
Management Studies

Amit Gupta, Ph.D. (Univ. of Central Florida)  
Mechanical Engineering

S. K. Gupta, Ph.D. (IIT, Delhi)  
Computer Science

Manjeet Jassal, Ph.D. (IIT, Delhi)  
Textile Technology

Saroj Kaushik, Ph.D. (IIT, Delhi)  
Computer Science

Jyoti Kumar, Ph.D. (IIT, Guwahati)  
IDDC

T. K. Kundra, Ph.D. (IIT, Delhi)  
Department of Mechanical Engineering

M. S. Kulkarni, Ph.D. (IIT, Bombay)  
Mechanical Engineering

Anushree Malik, Ph.D. (IIT, Delhi)  
CRDT

Sanat Mohanty, Ph.D. (Univ. of Minnesota)  
Chemical Engineering

Samrat Mukhopadhyay, Ph.D. (IIT, Delhi)  
Textile Technology

Bhanu Nandan, Ph.D. (Kanpur Univ.)  
Textile Technology

Rajesh Prasad, Ph.D. (Cambridge Univ.)  
Applied Mechanics

Rajendra Prasad, Ph.D. (IIT, Delhi)  
Applied Mechanics

P. V. Madhusudan Rao, Ph.D. (IIT, Kanpur)  
Mechanical Engineering

M. R. Ravi, Ph.D. (IISc, Bangalore)  
Mechanical Engineering

Anjan Ray, Ph.D. (Michigan State Univ.)  
Mechanical Engineering

S. K. Saha, Ph.D. (McGill Univ.)  
Mechanical Engineering

Jayashree Santosh, Ph.D. (IIT, Delhi)  
Computer Service Centre

P. K. Sen, Ph.D. (IIT, Delhi)  
Applied Mechanics

Kamlesh Singh, Ph.D. (Univ. of Rajasthan)  
Humanities

Rajeev Srivastava, Ph.D. (KTH, Sweden)  
Textile Technology

D. Sundar, Ph.D. (Pondicherry Univ.)  
Biochemical and Biomedical Engineering

V. K. Vijay, Ph.D. (IIT Delhi)  
CRDT
INTRODUCTION

National Resource Centre for Value Education in Engineering (NRCVEE) was setup in 2001. The role of the Centre is to create awareness in the technical community about human values. Accordingly, the mandate of NRCVEE is to identify, develop and disseminate techniques by which engineering students and practicing engineers can be motivated to imbibe human values and appreciate their impact on technology development, professional ethics and human welfare.

ACADEMIC PROGRAMMES

The Centre offers elective courses for UG and PG students. The Centre runs a Ph.D. programme to support interdisciplinary research on topics that pertain to the impact of science and technology on human values and professional ethics and vice-versa. The Centre also provides a platform for faculty from across the institute to engage with students through projects, courses and other activities so as to develop better understanding of issues related to human values and technology. The Centre acts as a catalyst in the activity of sensitizing the campus community at large to these issues through lectures by eminent personalities. It also organizes several workshops on meditation, self-enquiry and the like for students and other campus residents.

RESEARCH

The Centre supports research primarily through its Ph.D. program in the following areas: Philosophy of Values, Professional Ethics, Integration of Science, Technology and Human Values, Values and Traditional Knowledge, Values for Sustainable Development, Excellence in Engineering, strategies for Value Inculcation, Wisdom-based Impersonal Leadership.

FACILITIES

The Centre has a unique collection of books and audio-visual material on topics pertaining to science, spirituality, human values and ethics. It also has a meditation room that can accommodate 30 people and is open to students and all campus residents.
**Coordinator**

**Shankar Prakriya, Ph.D. (Univ. of Toronto)**
Cooperative communications, Cognitive radio,
Signal Processing for Communications.

### Associated from Electrical Engineering Department

- **Subrat Kar, Ph.D. (IISc., Bangalore)**
- **Santanu Chaudhury, Ph.D. (IIT, Kharagpur)**
- **Swades De, Ph.D. (Univ. at SUNNY/Buffalo)**
- **Manav Bhatnagar, Ph.D (Univ. of Oslo)**
- **Shouribrata Chatterjee, Ph.D. (Columbia Univ.)**
- **S.D. Joshi, Ph.D. (IIT, Delhi)**
- **V.K. Jain, Ph.D. (IIT, Delhi)**
- **Brejesh Lall, Ph.D. (IIT, Delhi)**
- **Ranjan K. Mallik, Ph.D. (Univ. of Swth. California)**
- **Ranjan Bose, Ph.D. (Univ. of Pennsylvania)**
- **Saif K. Mohammed, Ph.D. (IISC Banglore)**
- **Uday Khakhoje, Ph.D. (Caltech)**
- **Kushal K. Shah, Ph.D. (IIT Madras)**
- **B.K. Panigrahi, Ph.D. (Univ. of Sambalpur)**
- **Jun Bae Seo, Ph.D. (University of British Columbia)**
- **Seshan Srirangarajan, Ph.D. (University of Minnesota, USA)**

### Associated from Computer Science and Engineering Department

- **M. Balakrishnan, Ph.D. (IIT, Delhi)**
- **Kolin Paul, Ph.D. (BEC, Calcutta)**
- **Vinay Ribeiro, Ph.D. (Rice Univ.)**
- **Huzur Saran, Ph.D. (Univ. of California)**
- **Aditeshwar Seth, Ph.D. (Univ. of Waterloo)**
- **Saroj Kaushik, Ph.D. (IIT, Delhi)**

### Associated from Mechanical Engineering Department

- **Nomesh Balia, Ph.D. (Univ. of UNC Chapel Hill)**

### Associated from Applied Res. in Elect. Centre

- **Mahesh Abegaonkar, Ph.D. (Univ. of Pune)**
- **Monika Aggarwal, Ph.D. (IIT, Delhi)**
- **Anantanjan Basu, Ph.D. (Univ. of California)**
- **S. K. Koul, Ph.D. (IIT, Delhi)**
- **Karun Rawat, Ph.D. (Univ. of Calgary)**
INTRODUCTION
The Bharti School of Telecommunication Technology and Management (BSTTM) functions jointly with the
Departments of Electrical Engineering, Computer Sc. & Engineering, and Management Studies.
The Bharti School was set up in the year 2000 through a grant from Bharti Enterprises with the following
objectives:
• To be a centre of excellence for education and research relating to all facets of Telecommunication
  Technology and Management.
• To host state-of-the-art laboratories and infrastructures, and a research environment so as to attracts the
  best faculty and students.
• To invite and encourage the best talent in telecommunications to be a part of the activities of the School.
• To run graduate academic programs (including M.S., M.Tech., MBA, Ph.D. and POST DOCTORAL) in
  collaboration with the various Departments and Centres at IIT Delhi.
• To run continuing education programs for personnel of the Telecom Industry.
The Bharti School also includes the Airtel IIT Delhi Centre of Excellence in Telecommunication (AICET), with a
mandate of contract research. Global Internship Programmes and Distance Education.

ACADEMIC PROGRAMME
The School offers the following post-graduate programmes:

MASTER OF TECHNOLOGY (JTM)
The M.Tech. (Telecom Technology and Management) programme is of 2 years (4 semester) duration. It is a
full-time programme with classes during the normal working hours. At the moment, there are no admissions
for part-time students or self-supporting students in this category.

MASTER OF SCIENCE (RESEARCH) (BSY)
MS(R) is a two-year programme for full-time students and three-year programme for part-time students. Its
emphasis is on research, with the thesis carrying 2/3rd of the credits.

DOCTOR OF PHILOSOPHY (BSZ)
Ph.D. full-time admissions are based on performance in M.Tech / B.Tech as well as GATE Scores. Part-time
admissions require 2 years experience in lieu of GATE scores.

MASTER OF BUSINESS ADMINISTRATION (SMT)
The MBA (with focus on Telecom Systems Management) is a 2 years (4 semesters) programme. It is designed to
be convenient for practising professionals, with most classes scheduled in the morning or evening.
LABORATORY FACILITIES

TEACHING LAB:

Telecom Software Lab:
The lab has following Facilities:
Telecom Software Lab is proud to be Bharti School’s first eco-friendly lab - first workspace to adopt all-LED/CFL lighting! This secure-access monitored lab is open for student access on 24/7/365 basis and provides 50 dedicated workstations for computational support to Bharti School students. Apart from these workstations, the lab also hosts four Quad Xeon CPU / 4 GB RAM Compaq servers and one 8-CPU / 16 GB RAM Dell Server. This lab supports Free Open Source Software - Linux (Ubuntu) on all the workstations and servers. The other equipment/ facilities include providing software support for thin client architecture for entire school and IDE-Forte/ Netbeans, Eclipse, UML-Poseidon, TTCN/MSC, CFMS-Esterel/Polis, Ptolemy, Telelogic/DOORS & TelelogicTau and Opnet. In addition, the lab supports the entire Bharti School by hosting 2x30 KVA 1:1 redundant UPS and hosting and maintaining 250 port network switching racks for Bharti School.

Wireless Research Lab:
The lab has following Facilities:

Telecom Networks Lab:
The lab has following Facilities:
This Eco-friendly Lab provides 50 personal dedicated workstations with dual screens for teaching and comprehensive computational support to Bharti School students in their course work. The other equipment/ facilities include tool chains based on Free Open Source Software, FPGA design tools, V2Pro, Arduino Shields, DSOs with CAN/LIN triggering, NetFPGA based router design.

RESEARCH LABS

Research Project Lab:
The lab has following Facilities:
Software : Matlab, visual studio, Android Application

Pervasive Telecom Lab:
The pervasive telecom lab hosts several unique research initiatives. Central to the theme is the idea that telecom devices can be made ubiquitous, and deployed in numbers which are so large that data they gather is at a very high resolution. This data may be multi-dimensional but even with two dimensions - of space and time - it is extremely useful. The resulting Internet of Things and the Big Data flowing there from requires innovations in protocol stacks, hardware at layers 1,2 and 3, in large distributed back-end repositories and in inference engines for the analytics. We have provisioned cloud repositories and have web-enabled several application domains such as healthcare, agriculture and animal management.
M. Balakrishnan, Ph.D. (IIT Delhi)
Professor
CAD of VLSI, Computer Architecture.

Coordinator

SCHOOL FACULTY

Sorav Bansal, Ph.D. (Stanford Univ.)
Assistant Professor
Operating System, Compilers, Virtualization
Department of Computer Science & Engineering

Sanjiva Prasad, Ph.D. (Stony Brook Univ.)
Professor
Distributed Systems, Programming Distributed Systems, Programming Languages, Semantics, Verification, Health.
Department of Computer Science & Engineering

ASSOCIATED FACULTY

A.K. Gosain, Ph.D. (IIT Delhi)
Department of Civil Engineering

Anoop Chawla, Ph.D. (IIT Kanpur)
CAD, CAE, Dynamics, Biomechanics, AI & Expert Systems for Design and Manufacturing.
Department of Mechanical Engineering

Anshul Kumar, Ph.D. (IIT Delhi)
CAD of VLSI, Computer Architecture.
Department of Computer Science & Engineering

B. Chandra, (Ms.), Ph.D. (Delhi Univ.)
Distributed Databases, Neural Networks for NLP, Adaptive Control Models.
Department of Mathematics

Bijendra N Jain, Ph.D. (Stony Brook Univ.)
Computer Networks.
BITS Pilani and Dept. of Computer Science & Engineering

Vinay Ribeiro, Ph.D. (Rice Univ.)
Associate Professor
Computer Networks
Department of Computer Science & Engineering

Aaditeshwar Seth, Ph.D. (Waterloo Univ.)
Assistant Professor
Computer Networks, Social Network analysis, ICT for Development
Department of Computer Science & Engineering

Huzur Saran, Ph.D. (Univ. of California Berkeley)
Department of Computer Science & Engineering

Kolin Paul, Ph.D. (BEC)
Department of Computer Science & Engineering

Mausam, Ph.D. (Washington, Seattle), Artificial Intelligence, NLP, automated planning, AI & crowdsourcing.
Department of Computer Science & Engineering

Maya Ramanath, Ph.D. (IISc, Bangalore)
Databases, Information Retrieval.
Dept. of Computer Science & Engineering

M. Balakrishnan, Ph.D. (IIT Delhi)
CAD of VLSI, Computer Architecture.
Department of Computer Science & Engineering

M. Hanmandlu, Ph.D. (IIT Delhi)
Department of Electrical Engineering
M.P. Gupta, Ph.D. (IIT Delhi)
MIS, e-Governance
Dept. of Management Studies

Parag Singla, Ph.D. (Washington, Seattle Univ.)
Machine Learning, Statistical Relation Learning,
Social Network Analysis
Dept. of Computer Science & Engineering

P.V.M. Rao, Ph.D. (IITK)
Product Design & Realization,
Computer Aided Design & Manufacturing
Dept. of Mechanical Engineering

Pankaj Jalote, Ph. D. (Univ. of Illinois)
Software Engineering
IIIT Delhi and Dept. of Computer Science & Engineering

P.K. Kalra, Ph.D. (EPFL, Switzerland)
Computer Graphics, 3D Animation
Dept. of Computer Science & Engineering

Rahul Garg, Ph.D. (IIT Delhi)
Medical Imaging, High-Performance Computing,
Algorithms and Game Theory,
Communication Networks
Dept. of Computer Science & Engineering

Ranjan Bose, Ph.D. (Pennsylvania Univ.)
Wireless Communication, Information Theory,
Error Control Coding
Dept. of Electrical Engineering

S.K. Gupta, Ph. D. (IIT Delhi)
Graph Theory, Data Mining
Dept. of Computer Science & Engineering

S.N. Maheshwari, Ph.D. (Northwestern Univ.)
Algorithms, Parallel Processing,
Information Systems, Computational Biology
Dept. of Computer Science & Engineering

Santanu Choudhury, Ph.D. (IIT Kharagpur),
Computer Vision, Multimedia Systems,
Computational Intelligence
Dept. of Electrical Engineering

Smruti Ranjan Sarangi, Ph.D. (University of Illinois)
Computer Architectures, OS jitter aware systems,
Futuristic Storage Platforms
Dept. of Computer Science & Engineering

Subhashis Banerjee, Ph.D. (IISc. Bangalore)
Computational Vision, Real Time Systems,
Dept. of Computer Science & Engineering

Subodh Kumar, Ph.D. (Univ. North Carolina)
Computer Graphics, Virtual Reality,
Visualization, Geometric Modelling
Dept. of Computer Science & Engineering

Sumantra Dutta-Roy, Ph.D. (IIT Delhi)
Computer Vision and Image Analysis,
Pattern Recognition, Audio Data Retrieval
and Analysis, Biometrics and Bioinformatics.
Dept. of Electrical Engineering

ADJUNCT FACULTY

Sakti Srivastava, M. D. (AIIMS)
Stanford University
Applications in medicine

Manik Verma, D.Phil. (University of Oxford)
Machine Learning
Microsoft Research and Dept. of Computer
Science & Engineering

Ashish Suri, M. Ch. Neurosurgery (AIIMS, Delhi)
Skull Base Surgery & Micro-neurovascular Surgery, Endoscopic Neurosurgery,
Neuro-Oncology, Spine-Craniovertebral Junction, Spinal Instrumentation &
Image Guided Spine Surgery, Neurosurgery Skills Training, Neuro-technology:
Neurosurgery Virtual Reality Simulation, Neurosurgery Instrumentation:
Research and Development
Professor, Department of Neurosurgery, AIIMS, Delhi

Mahesh Chowdhary, Ph.D. (The College of William and Mary, Virginia)
St. Microelectronics, Inc. USA GNSS, MEMS Sensors,
Wireless, Indoor Positioning, Mobile Devices
INTRODUCTION

The Amar Nath and Shashi Khosla School of Information Technology was established with an endowment from the distinguished IIT alumnus, Vinod Khosla (B. Tech, EE 1976). The objective of the School is to foster inter-disciplinary, goal-oriented research, innovation and post-graduate education in information technology. The School undertakes research in several interdisciplinary areas where there is a significant application of Information Technologies. The School has its own supporting staff and students, and its own joint faculty but encourages the participation of faculty members and students from other departments who have an interest in novel applications of computing sciences and technologies.

ACADEMIC PROGRAMMES

POSTGRADUATE

The School offers Ph.D. and M.S. (Research) programmes in Information Technology. The M.S. (Research) programme is a 2 year inter-disciplinary programme that admits students with various backgrounds. The school also develops and offers academic courses in a variety of application areas, for which interested students from diverse disciplines may enroll.

RESEARCH AREAS

Doctoral research is being carried out in:

LABORATORY FACILITY

The School is shifting into its own building, which will house specialized laboratories for collaborative and funded research activities.
- Assistive Technologies Lab
- IT for Society Lab
- Medical Applications of IT Lab
- Advanced Technologies & IoT Lab (Kripalani Lab)
- Architecture, Embedded & Energy Sensitive Computing Lab
- Cyber Security Research Lab
**James Gomes, Ph.D. (Tulane Univ.)**  
Professor  
Systems and Network Biology, Neurodegeneration.

**Manidipa Banerjee, Ph.D. (UCSD)**  
Assistant Professor  
Hepatitis A Virus Entry, Using Viruses as Nanoparticles for drug delivery.

**Tapan K. Chaudhuri, Ph.D. (Bose Institute)**  
Professor  
Chaperone Assisted Protein Folding, Protein Engineering and Molecular Biophysics.

**Archana Chugh, Ph.D. (Delhi Univ.)**  
Assistant Professor  
Cell Penetrating Peptides, Marine Bioprospecting, Plant-based Therapeutics.

**Chinmoy. S. Dey, Ph.D. (Jadavpur Univ.)**  
Professor  
Insulin Resistant (Type 2) Diabetes and Leishmaniasis, Signal Transduction.

**Seyed E. Hasnain, Ph.D. (JNU)**  
Professor  
M.tuberculosis Molecular Epidemiology, Functional Biology, New interventions and diagnostics.

**B. Jayaram, Ph.D. (City Univ. NY)**  
Professor  
Computational Biology, Molecular Design.

**Bishwajit Kundu, Ph.D. (Inst. of Microbial Tech.)**  
Associate Professor  
Protein Misfolding and Aggregation.

**Aditya Mittal, Ph.D. (Drexel Univ.)**  
Professor  
Kinetics and Self Assembly in Biological Systems.

**Vivekanandan Perumal, Ph.D. (CMC Vellore)**  
Assistant Professor  
Hepatitis B Virus, Hepatocellular Carcinoma, microRNA in Liver Cancer.

**Ashok K. Patel, Ph.D. (IMS, BHU)**  
Assistant Professor  
Biomolecular X-Ray Crystallography, Molecular and Structural Virology, Chromatin Remodeling and diseases.
INTRODUCTION

Modern biology has departed from emphasis on individual or species level understanding to appreciating unity in diversity at the genomic level. Work in modern biology is neither restricted to individual investigators nor to people trained in traditional disciplines considered under biological sciences. Rather, it has evolved into an inter- and multi-disciplinary quantitative science aimed at molecular, structural and systems level understanding of natural phenomenon that form the wonder considered ‘life’. After serious national level deliberations, lasting over two years, it was decided that IIT Delhi was capable of providing the right integrative atmosphere and expertise to contribute significantly in taking the country forward in the area of modern biology.

The proposal to establish a School of Biological Sciences at IIT Delhi was approved by the Board of Education Research & Planning (BERP) on 23-3-2007, the Executive Committee of the Senate (29-3-2007), the Senate (19-4-2007) and the Board of Governors (28-6-2007). An Internal Task Force was set up (6-9-2007) chaired by Prof. B. N. Jain (Deputy Director, Faculty) to steer the establishment of the School. Following the recommendations of the above academic bodies, a high power national advisory committee (NAC), co-chaired by Prof. Surendra Prasad, Director, IIT Delhi and Prof. M. Vijayan, President, Indian National Science Academy, was constituted. In pursuance of the recommendations of the Task Force, Senate, BoG and the NAC, and the interest by some of the faculty members to join the School full-time, a duly constituted assessment committee selected a few faculty from within IIT Delhi for transfer to the School. The physical space for the School was allocated on the campus and these faculty members moved to the School of Biological Sciences on 27-12-2008. Subsequently, five new faculty members have joined the school.

The NAC suggested following theme research areas that could be pursued in the School of Biological Sciences at IIT Delhi: (a) Infectious and non-communicable disorders, (b) Cognitive and computational neurosciences, and (c) Engineering Biomaterials.

The core faculty members and the coordinator of the School are already established individually in one or more aspects of the research areas suggested by the NAC. The exciting and challenging part is to tie up individual expertise into a team effort that will result in high end research to carve a global niche for the School of Biological Sciences at IIT Delhi. In line with this, the core faculty members, along with the coordinator have created a vision and mission statement for the School.

Vision: To become the pioneers of modern interdisciplinary biological sciences by integrating emerging disciplines with biological sciences, and to nurture and sustain a vibrant comprehensive programme in research and instruction.
**Mission:** Promoting goal-oriented innovative interdisciplinary research by interfacing modern biology with applied engineering sciences to address problems affecting human health and welfare, and training scholars to be the next generation scientists.

**ACADEMIC PROGRAMMES**

Currently, the School offers a Ph.D. Programme MS(R) and a Minor Area option in Biological Sciences for undergraduate students. The key strengths of these programmes are their multi- and inter-disciplinary perspective of biological sciences. The flagship UG course of the School is SBL 100: Introductory Biology for Engineers, a core requirement for all incoming UG students. This course, with a laboratory component, is aimed at introducing students to modern biology with an emphasis on evolution of biology as a multi-disciplinary field. Students are made aware of application of engineering principles in biology and how to engineer robust solutions inspired by biological examples.

**Ph.D. Programme**

In general, there will be no restriction on the background of the student in terms of the qualifying degree. However, it is expected that the student’s prior academic career will demonstrate interest in the broad field of biological sciences. A student applying to the programme can have a B.Tech., B.E., M.Tech., M.E., M. Sc. or M. S. in any discipline of science and engineering. Interested/deserving candidates are encouraged to apply as per the procedures at the IIT Delhi admissions website. Selection of Ph.D. students is based on a written test (for the eligible applicants) followed by an interview (of those screened from the written test). The written test will
examine the analytical ability of students with examples from biology, and does not require memorization of any biological terminologies. A sample question paper is available on the School’s website. After admission to the Ph.D. programme, the background needed for carrying out research work by the students will be developed through a selection of courses from those developed for this Ph.D. programme, and from existing courses in the Institute. The courses for the Ph.D. programme will be evolving continuously with the aim of training the next generation of researchers in biological sciences. These courses will bring together a combination of experiment and theory for understanding how biological systems work from the cellular to the systems level.

**Minor Area Programme:** Academia and industry are realizing the rapid transformation of society driven by bio-based economy. The impact of biological sciences on all aspects of human life, particularly, healthcare and utilization of biodiversity for sustainable future, is evident. The creation of new technology and its management will need a new genre of skilled human resources knowledgeable in the field of biological sciences. Emerging technologies are now being created where biology meets the engineering sciences, physics, chemistry, computer science and mathematics. Engineering new materials and devices inspired by nature, engineering drug delivery systems are but a few of a plethora of opportunities arising at the interface of biological sciences. Keeping in view, the potential of biological sciences in various spheres of life, the School of Biological Sciences has floated a Minor Area programme for undergraduate students. Through this programme, a student will discover biology from an engineering science viewpoint. A student will have the opportunity to explore a variety of areas within the diverse field of biological sciences or specialize in a certain aspect of biological sciences by choosing courses in an area of interest.

**DOCTORAL**

In general, there will be no restriction on the background of the student in terms of the qualifying degree. However, it is expected that the student’s prior academic career will demonstrate interest in the broad field of biological sciences. A student applying to the programme can have a B.Tech., B.E., M.Tech., M.E., M.Sc. or M.S. in any discipline of science and engineering. Interested/deserving candidates are encouraged to apply as per the procedures at the IIT Delhi admissions website.

The background needed for carrying out research work by the students will be developed through a selection of courses from those developed for this Ph.D. programme, and from existing courses in the Institute. The courses for the Ph.D. programme will be evolving continuously with the aim of training the next generation of researchers in biological sciences. These courses will bring together a combination of experiment and theory for understanding how biological systems work from the cellular to the systems level.
M.S. (Research)

The M.S. (Research) programme was initiated to enhance existing teaching and research activities being carried out by the School. Students will be trained on newer technologies currently desirable in the industry and academia. The technological focus on the M.S. (Research) programme would be to provide students with practical knowledge.

The School will admit students from different academic backgrounds and levels of preparation. The board guidelines for admission are:

i) Bachelor’s or Master’s degree in any engineering discipline.

ii) Bachelor’s (four-year programme) or Master’s degree in any Chemistry, Physics, Mathematics or Life Sciences.

The admission will be according to Institute rules once a year. A student may enroll as a full-time or a part-time candidate. Student admitted to the programme will be assigned course work according to the requirements of the research problem. The credits and the minimum CGPA requirements will be according to the Institute rules. The courses will be awarded to build the student’s background and to impart knowledge in specific area. The student must take the all courses under the compulsory category and the remaining credits from the other courses of the School or relevant courses from the Institute. The research problems will be given by the faculty from their area of expertise. The student will complete the problem assigned by the supervisor, execute the research work and write a thesis that merits the award of M.S. (R) degree.

Laboratory Facilities

The school has all facilities to carry out research in biological sciences. These include spectrophotometers, refrigerated tabletop centrifuges, ultracentrifuges, fast protein liquid chromatography (FPLC) and high pressure liquid chromatography (HPLC) systems, gel imaging and documentation equipment, PhosphorImager, cell culture facilities including hoods, incubators, and inverted microscope, CD machine, fluorimeter, real time PCR system for quantification of nucleic acids, ELISA washers and readers, confocal microscope for advanced cell biological studies. The new major equipment include FACS Aria III, Microarray platform comprising of Affymetrix system Gene chip 7G, Gene chip Scanner 3000 7G, Gene chip Fluidics Station, Gene chip Hybridization Oven, Real time PCR system (MX3000P), Lab chip GX, Zephyr genomics workstation and Cryo-EM system. In addition to all these, the school has the complete Discovery Accelyrs software with licences for teaching and research. It has inter- and intra-net and dedicated access to the supercomputing computing facility of IIT Delhi.
INTERDISCIPLINARY RESEARCH PROGRAMME IN TRANSPORTATION RESEARCH AND INJURY PREVENTION (TRIPP)

TRIPP is an interdisciplinary programme focusing on the reduction of adverse health effects of road transport. TRIPP attempts to integrate all issues concerned with transportation in order to promote safety, cleaner air, and energy conservation. The Programme is recognized as a Centre of Excellence by the Ministry of Urban Development, Govt. of India. It is recognized as a WHO Collaborating Centre for research and training in safety technology. It is also recognized as a Centre of Excellence for Research on Future Urban Transport by the Volvo Research Foundation.

The programme has associated faculty from different departments/centres of the institute, viz., Applied Mechanics, Biomedical Engineering, Civil Engineering, Computer Science and Engineering, Mechanical Engineering, Humanities and Social Sciences, Mathematics. Experts from other organizations and hospitals in Delhi are also associated with TRIPP. TRIPP organises short-term courses and workshops on road safety and transport regularly every year.

The TRIPP research areas are: Transportation planning and traffic flow analysis for optimising mobility and minimising accidents and pollution; Vehicle crash modelling, road safety studies, safer vehicle and helmet design; Studies related to public transport, traffic management, road design and land use planning; Epidemiology of factors associated with road traffic injuries, injury analysis and pre hospital care; Studies on vehicle technology and engines to minimise fuel consumption and pollution. TRIPP also organises short-term courses and workshops on road safety and transport issues regularly.

ASSOCIATED FACULTY MEMBERS

Prof. Geetam Tiwari, Civil Engineering - Coordinator
Prof. Puneet Mahajan, Applied Mechanics
Prof. Sanjeev Sanghi, Applied Mechanics
Prof. Anupam Dewan, Applied Mechanics
Prof. A.K. Gosain, Civil Engineering
Dr. Arvind Swamy, Civil Engineering
Dr. K.N. Jha, Civil Engineering
Dr. Kalaga R. Rao, Civil Engineering
Dr. Gazala Habib, Civil Engineering

Prof. S. Banerjee, Computer Science & Engineering
Prof. Ambuj Sagar, Humanities & Social Sciences
Prof. V. Upadhayay, Humanities & Social Sciences
Prof. Ravi Shankar, Management Studies
Prof. Anoop Chawla, Mechanical Engineering
Dr. Nomesh Bolia, Mechanical Engineering
Prof. S. Mukhrjee, Mechanical Engineering
Prof. S.R. Kale, Mechanical Engineering
Prof. N. Chatterjee, Mathematics Department
OPTO-ELECTRONICS AND OPTICAL COMMUNICATION RESEARCH PROGRAMME

The programme is focused for research in the field of Fibre Optics and Optical Communication. Main participating departments/centres are Physics, Electrical Engineering, IDDC and CARE. This programme has received fundings from the Government agencies like MHRD, DST, DIT (formerly DoE), and DoT. In addition, R&D work has also attracted considerable international collaboration from universities in UK, France and National Institute of Standards and Technology in USA. The development work has led to commercialisation of a fibre optic educational kit and an erbium doped fiber amplifier.

The programme carries research in the following areas: analytical and numerical modelling of the propagation characteristics of optical fibres and integrated optical waveguides, design and simulation of novel in-line fibre optic components such as polarizers, directional couplers, and mode filters, characterisation of birefringent fibres, development of optical fibre-based sensors, nonlinear interactions in fibre and integrated optical waveguides, Optical Amplifier, Coherent optical communication, Optical Networks, QoS issues of WDM Networks, SONET / SDH, fiber in Access Networks, Erbium Doped Fibre Amplifiers (EDFA), Raman Fiber Amplifiers, Dispersion Compensating Fibres (DCF), Fibre Bragg Gratings (FBG), fibre optic sensors for civil engineering structures, photonic band gap fibres, free space optical systems, OCDMA systems, etc.

INTERDISCIPLINARY M.DES/M.TECH. PROGRAMMES

Besides a number of regular courses that are offered at the postgraduate level by the academic departments/centres, the Institute offers Interdisciplinary M.Tech. and one M.Des. programme which are managed by the Programme Executive Committees and Programme Advisory Committees that are constituted by nominating faculty from the concerned departments and centres. Each programme is looked after by the Programme Coordinator who is appointed by the Director.

MASTERS OF DESIGN PROGRAMME

The M. Des. programme caters to the requirement of industry for innovators and designers capable of creating high quality design of products for competitive markets. It is open only to graduates in Engineering and Architecture. The programme is of two years duration, and admission to the eprogramme is through CEED. It involves extensive studio work with hands on practice and is a project based, industry and consumer oriented programme. The thesis projects are often supported by the industry and there is close interface with the industry throughout the programme of study. The programme emphasizes development of free hand conceptualization skills, CAD modeling skills on mid level platforms and above all design thinking skills and detailing over a diverse range of products.
INTERDISCIPLINARY M.TECH. PROGRAMMES

The institute recognizes and actively supports academic activities jointly conducted by faculty across the departments and centres. Such activities encourage teaching, research and industry/professional interactions, these are listed below. The Interdisciplinary Post Graduate programmes are in the following specializations:

Energy Studies: This programme introduces students from different backgrounds to various aspects of energy, sources, fuels, energy conversion and energy systems amongst others. Commercial and non-commercial energy sources are covered.

Industrial Tribology and Maintenance Engineering: Various basic and applied aspects of tribology, including wear and maintenance engineering are covered in this programme. Students are introduced to diagnostic maintenance, reliability, availability and maintainability engineering as well as failure analysis.

Instrument Technology: This programme includes students to various instruments, electronic techniques for signal conditioning and instrument design. The electives cover a wide range of topics in instrumentation, electrical engineering, mechanical engineering and physics.

Opto-Electronics and Optical Communication: This programme is jointly offered by physics and electrical engineering departments. The courses cover a wide variety of basic and applied courses in fibre optics, optical-electronics and digital communication.

Polymer Science and Technology: Faculty from centre for polymer science and technology, and textile, mechanical engineering and chemical engineering are participants in this programme. The focus is on polymer chemistry, physics, processing, and engineering applications.

VLSI Design Tools and Technology: This programme is taught by the faculty of computer science and engineering, electrical engineering departments and CARE. The coursework includes courses on MOS, VLSI and VLSI design and VLSI system. The students gain proficiency in the use of state-of-art tools in VLSI design. The programme is largely supported by industries engaged in VLSI design.

Telecommunication Technology for Management: A set of courses in digital communication and systems, wireless communication and telecommunication management form the core of this programme. Faculty of electrical engineering and management studies departments participate in the teaching of this programme.
7. MAJOR CENTRAL FACILITIES

The Institute has following central facilities for smooth functioning of Academics, Research and Outreach.

- Industrial research and development (unit)
- Central workshop
- Training and placement (unit)
- Institute libraries
- Other Facilities

7.1 INDUSTRIAL RESEARCH AND DEVELOPMENT (UNIT)

The Indian Institute of Technology Delhi lays a strong emphasis on the Sponsored Research and Industrial interaction. The Industrial Research & Development Unit was specifically set up in the Institute to provide specialized administrative and managerial support for the operation of Sponsored Research Projects, Consultancy Jobs and other related research and development activities. Over the years, the Institute has set up many modern laboratories and supporting infrastructure through these projects.

The Institute has given due emphasis to jobs of varied nature like trouble shooting, product and process development, design checks and investigation of problems of direct relevance to the needs of the country through time-bound Sponsored Research Projects and Consultancy Projects. During April 1, 2014 to March 31, 2015, 164 new Sponsored Research Projects with a funding of Rs. 153.77 crores were undertaken. In addition, 394 Consultancy Jobs worth Rs. 24.81 Crores and 36 Miscellaneous Projects worth Rs. 10.88 Crores were also undertaken.

The Institute is actively involved in Collaborative programmes with national and international organizations/universities and IRD Unit manages these projects and always look forward for projects of National importance and society improvement.

IRD has several schemes to encourage research and development among Faculty and students. Few of them are listed below:

- One time grant of Rs. One Lac to New Faculty Members who join the Institute.
- Chair Professorships.
- Summer Undergraduate Research Award (SURA).
- Assistantships/Fellowships to 5th year PhD Students
- Open House
7.2 CENTRAL WORKSHOP

Central Workshop is one of the pivoting units of the institute which teaches conceptually “how” a product comes to its present form by way of imparting core manufacturing education to all the first year students of IIT Delhi. It also provides product manufacturing support to entire institute community in general and undergraduate students in particular. More than 900 undergraduate students in their first year acquire hands-on manufacturing skills in this Central Workshop. The Central workshop not only introduces art and science of manufacturing but also infuses confidence to take up product design and manufacturing activities in future. Central Workshop is also a place where B.Tech students of Mechanical Engineering and B.Tech students of Production & Industrial Engineering acquire training and knowledge in specialized areas of manufacturing like Metal Casting, Metal Forming, Metal Machining, Welding & Joining, Metal Forging Woodworking, CNC programming and 3D Printing, Plastic Product manufacturing etc. M.Tech. students of Production group also use central workshop facilities for their practical classes in various courses as well as for project and research work.

The central workshop is fully equipped with latest power tools, equipments and facilities in all areas of manufacturing technologies. It also caters to the fabrication needs of students doing product design & manufacturing courses, minor projects, B.Tech, project, Masters thesis and Doctoral research. Large numbers of students use this facility to build products and compete at national and international level product building competitions like Formula student car, mini Baja, Robocon etc. The facility can also be used by external agencies for their manufacturing and training needs during the vacation period.

Central workshop has undertaken efforts to reorganize, modernized and prepare it for continuously changing global manufacturing scenario. Efforts are also on to prepare students for a broader view of manufacturing which involves planning and deploying optimum ways to transformation of raw material into goods by integration of people, capital, processes, systems and enterprises to deliver products of value to the society. A new shop ‘CNC Learning’ is created in 2013-14 to imbibe product realization through computer generated geometries. A rapid prototype model can also be visualized by use of state of art 3D Printing technology in this new shop of Central Workshop.

7.3 TRAINING AND PLACEMENT UNIT

The Training and Placement unit actively interacts with industrial, management and research organisations in the country with the dual aim of ensuring that the students are given adequate technical exposure / industrial training during their pre-final year and subsequently enabling them to get employment in organisations.
Training
Students of B.Tech., Dual Degree, and Integrated Programmes, can opt for practical training during summer vacations / a semesters in partial fulfilment of their Design & Practical Experience (DPE) component requirements. The Training and Placement unit facilitates the placement of students in Industry and Research Laboratories for this purpose.

Placement
An active and dynamic programme of securing jobs for students graduating from the Institute is initiated by inviting industries of repute and other organisations to conduct interviews. Wide publicity of the academic and extra-curricular activities is given to the organisations.

Organisations that have hitherto not participated in Training or Placement of the students are contacted actively.

Support Services
The Training and Placement unit organizes lectures for students to supplement the above information with special talks. Workshops are organized on various subjects such as: career counselling, interview techniques and modes of communication.

7.4 INSTITUTE LIBRARIES
The IIT Delhi Library System comprises of a Central Library and 18 departmental libraries that collectively support the teaching, research and extension programmes of the Institute. All students, faculty and employees of the Institute are entitled to make use of the Library facilities. The Alumni of the Institute are also entitled to Library services provided they are members of the Institute's Alumni Association. Similarly, industrial establishments can avail the Library services on taking corporate membership of the Library. Library consultation facilities are extended to faculty, students of outside organizations and the wards of IIT faculty and staff on their request. Retired teaching and non-teaching staff members can also avail Library facilities. The Library has over 9500 registered members.

LIBRARY HOURS
The Library remains open throughout the year except on six days, namely; Republic Day, Independence Day, Dussehra, Diwali, Holi, Mahatma Gandhi’s Birthday and any other holiday declared as a special holiday. The book stack area at 1st floor and Ground floor is open from 9:00 AM to 9:00 PM(Weekdays) and 10:00 AM to 6:30 PM(Weekends & Holidays). Reading Area at Ground floor and 2nd Floor is open 24x7.
**LIBRARY RESOURCES**

**Collection**
The Central Library, IIT Delhi has a strong collection pertaining to physical sciences, engineering and technology, biotechnology, computer and information technology, social sciences and management.

**Video Library**
The Library is equipped with video viewing facility and has a collection of more than 2,500 CDs and kept in the Computer Application Division of the Central Library for viewing.

**Reference Collection**
The Library maintains a separate reference collection consisting of encyclopedias, dictionaries, handbooks, technical data, almanacs, atlases, bibliographies, etc.

**Hindi Collection**
The Central Library has built up a good collection of books in Hindi. Books in Hindi include books on various subjects being taught and researched at the Institute as well as books on literature in Hindi. Books in Hindi are prominently kept near the reference area in the Library to promote its usage. To increase the use of Rajbhasha Hindi, Central library offers borrowing facility of one extra Hindi Book to all its members apart from their entitlement.
ELECTRONIC JOURNALS AND ONLINE BIBLIOGRAPHIC DATABASES

The Library subscribes to 441 current journals (online) and 30 online packages (Current and Archives) which are also accessible online from the publishers’ web site. Links to these electronic journals are available through the Library web site as well through the Library Web OPAC. More than 1 lakh bound volumes of journals are available in print form.

Besides, the Institute has access to over 15,000 full-text electronic journals and 6 bibliographic databases from a number of publishers and aggregators through the INDEST-AICTE Consortium. The INDEST-AICTE Web Site (http://paniit.iitd.ac.in/indest) hosts search and browse interface to locate these journals and their URLs. Details of resources made accessible to IIT Delhi through the Consortium along with their URLs are given in “Library Reference Guide” and on the Library & INDEST websites. Tutorials on e-resources accessible through the INDEST-AICTE Consortium are available on the INDEST-AICTE Web Site and are also published in “Compendium for the Members of the INDEST-AICTE Consortium”.

E-RESOURCES AVAILABLE THROUGH CENTRAL LIBRARY

• Online Miscellaneous Journals
• ACS Archives
• American Mathematical Society Journals
• American Meteorological Society Journals and Archives
• ASME Digital and Archives
• Availability of Hindi on the Internet
• Cambridge University Press HSS and S&T package
• E-Books from Textbooks Section
• EBSCO Textile & Technology Complete
• I.C.E. and their Archives
• Imech E Publications Current
• INFORMS Current Journals
• IoP Science and their Archival collection
• ISI Emerging Markets [Tutorial]
• JSTOR [Tutorial]
• Oxford Journals on Mathematics, Life Science, Humanities and Social Science
• Project MUSE Journals
• RSC Journals Archive Titles (1841 - 2004)
E-RESOURCES AVAILABLE THROUGH INDEST-AICTE CONSORTIUM

- ABI / Inform Complete
- ACM Digital Library
- AIP/APS Journals
- ASCE Journals
- ASME Journals (+ A M R)
- ASTM Standards & Digital Library
- Capitaline
- EBSCO Databases
- Elsevier’s Science Direct
- Emerald Full-text
- Euromonitor (GMID)
- IEEE / IEE Library Online (IEL)
- INSIGHT
- Nature
- Optical Society of America (OSA)
- ProQuest Science
- Springer Link
- MathSciNet

ELECTRONIC BOOKS

The Institute has access to electronic books from the following publishers / aggregators:

- Springer’s Electronic Books (about 100 e-books) (http://ebooks.springerlink.com)
• Wiley InterScience Electronic Books (about 100 e-books)
• Myilibrary
• E-Text Books (38 books)

**COMPUTER AND NETWORKING FACILITIES**

The Library has its own sub-LAN, which, in turn, is connected to the Campus LAN. It has over 100 PCs and eight servers spread over three floors of the Library.

The Library is a part of fibre optic-based campus-LAN. Of 100 PCs in the Library, 70 Internet-enabled PCs are exclusively devoted for the Library users. As a member of the DELNET, the users can access databases offered by the DELNET. The Library Home Page provides a link to the DELNET database.

**COMPUTERIZATION OF IN-HOUSE ACTIVITIES**

All in-house activities in the Library including Acquisition, Cataloguing, Circulation and Serials Control are fully computerized using Libsys Software Package. The Online Public Access Catalogue (OPAC) of the Library is operational both on Intranet and Internet. It can be accessed online to search more than 1,75,000 bibliographic records, available in the Library database through a web-based search interface or with a window client of the Libsys on Intranet as well as on Internet. The editing and updation activities are done on regular basis. Besides, the Central Library has two in-house databases for specialized collections. These databases include: Database of Ph.D. theses submitted to the IIT Delhi and Database of research articles by the faculty and researchers of the Institute.

The Library uses bar-code technology for computerized circulation system. Every document in the Library (except reference sources and bound volumes of journals) bear a bar-code tag that facilitates identification of document and the borrower in the circulation process. Similarly, all categories of users have a bar-coded patron cards. The Library has developed in-house facility for bar coding of books and patron cards.

**RFID TECHNOLOGY IN THE LIBRARY**

The Library also has the Radio Frequecy IDentification (RFID) based system. It is the best automated library automation system used world wide and is an effective way of managing collections of the library and providing enhanced services to the users having benefits like: self check-out of books, self-check-in (book drop), to control theft, to find misplaced reading material, sorting, inventory accuracy, stock verification procedures, security control, video surveillance, people counter, Smart Card issuance, etc. It is an automatic data capture technology that uses tiny microchips and miniature antennas affixed to documents. RFID plays a vital role in redefining the library processes to make everyone’s job easier right from the users to library staff.
LIBRARY SERVICES AND FACILITIES

Reader’s Assistance

The Library provides assistance to its users ranging from location of a book to finding specific information required by a user. A suggestion book is maintained with Incharge, Reader’s Services where the users of the Library can suggest measures for improvements in its facilities and services.

RFID based Exit Gates (EAS pedestal) at Central Library

RFID based Staff Workstation, Self Check-in/out Machine and Book Drop Box at Central Library
Circulation of Books and Library Membership

The Library members, according to their borrowing category can borrow stipulated number of books at a time against their bar-coded patron card. During the period under report, about 70,000 volumes were borrowed by the members of the Library from general collection.

Inter Library Loan (ILL) and Resource Sharing Facility

The Library arranges books and journals from other libraries in Delhi on Inter Library Loan (ILL). Photocopies of research articles are also arranged from other IITs under a resource sharing agreement signed by all IITs. The Library also facilitates Demand based procurement of research publications, photocopies of research articles, etc. from other IITs and institutions in Delhi as well as from other parts of India on reciprocal basis.

Database of Ph.D. Theses Submitted to the IIT Delhi

The library has in-house design and developed PhD theses database. Contains approximately 5000 bibliographic records of Ph.D. theses submitted to the IIT Delhi. In the year 1966 the first Ph.D. has awarded after that number of Ph.D. research has been continuously increasing every year till dated. The Database developed and maintained in MySQL Database and programmed using PHP language to facilitate access on the Intranet and Internet.

Photocopying Facility

The Library provides photocopying facility within its premises through an external vendor on payment basis.
Book Bank Facilities
The Book Bank holds multiple copies of selected textbooks for making them available to the students for the entire period of a semester. During the period under report, approximately 800 students (including SC/ST students) availed the benefit of book bank scheme.

Text Books Facilities (Print and Online)
The text books are most useful collection of the library especially for course/syllabus related reading. The section has approximately 10,000 syllabus related text books. The books for this section are purchased generally on the recommendations from different faculty members through the concerned Heads of the Department. The timings for issuing the books from the Text Book Section are from 2 PM to 5 PM during Monday to Friday and the same are issued for overnight only (for one day). The books of this section may be returned back during 9 AM to 1 PM only. A maximum total of 2 of books are issued from the section at a time. The Central Library also has 35 e-textbooks for undergraduate students and the same are accessible in the campus through library website - http://library.iitd.ac.in/index.php/e-resourc/e-textbooks.

Theses Consultation Facilities
Central Library receives all the Ph.D. Theses awarded by IIT Delhi in Hard copy along with their CDs. Print copies of theses are housed in Text Book & Book Bank Section located at the ground floor of the library for consultation purpose only. The abstracts of theses are made available through library Online Public Access Catalog (OPAC) -http://libcat.iitd.ac.in:8080/jopacv11/html/ and also through another interface especially designed for searching the theses at: http://library.iitd.ac.in/thesis.

Web-based Computerized Services from the Library
The Central Library offers the following services to the Institute:

Network-based CD ROM Search Services
The Library has complete collection of Indian Standards and ASTM Standards on CD ROM that is available on the Campus network. The resources can be accessed on the Intranet at the URLs given below or through library website at http://library.iitd.ac.in:

- Indian Standards http://10.116.2.102/bis/
- ASTM Standards http://10.116.2.102/astm/
- IEC Standards http://10.116.2.102/iec/

Institutional Repository at IIT Delhi (http://eprint.iitd.ac.in/dspace/)
The Eprints @ IIT Delhi has been set-up to host full-text of research publications of faculty and researchers of
the IIT Delhi using Dspace, an open source Digital Library software developed by the Massachusetts Institute of Technology. The Dspace supports the Open Archives Initiative’s Protocol for Metadata Harvesting (OAI-PMH), an internationally recognized protocol and interoperability standard. The Eprints@IIT Delhi provides a platform for faculty and researchers to deposit, reuse and share their research publications. The repository also has the ability to capture, index, store, disseminate and preserve digital materials created in any part of the Institute. Faculty and researchers can register themselves with the digital repository and submit their pre-prints (pre-refereed version of an article), post-prints (post-refereed final version) and publisher PDFs (if allowed by the publisher). The repository has around 2,100 full-text research articles.

**INDEST-AICTE Consortium**

The “Indian National Digital Library in Engineering Sciences and Technology (INDEST) Consortium” was set-up in 2003 by the Ministry of Human Resource Development (MHRD) on the recommendation of an Expert Group appointed by the Ministry. The IIT Delhi has been designated as the Consortium Headquarters to coordinate its activities. The Consortium enrolls engineering and technological institutions as its members and subscribes to electronic resources for them at discounted rates of subscription and favourable terms and conditions. The Ministry provides funds required for subscription to electronic resources for 65 centrally-funded Government institutions including IITs, IISc Bangalore, NITs, IIITs, IIMs and few other Institutions that are considered as core members of the Consortium. The benefit of consortia-based subscription to electronic resources is not confined to its core members but is also extended to all educational institutions under its open-ended proposition. 94 Govt. / Govt.-aided engineering colleges are provided access to selected electronic resources with financial support from the AICTE. The Consortium was re-named as INDEST-AICTE Consortium in December 2005 with the AICTE playing a pivotal role in enrolling its approved engineering colleges and institutions as members of the Consortium for selected e-resources at much lower rates of subscription. Presently, Prof. R.K. Shevgaonkar, Director, IIT Delhi is the Chairman of the National Steering Committee of the INDEST-AICTE Consortium, which formulates guidelines for the Consortium and Prof. B.D. Gupta is National Coordinator, INDEST-AICTE Consortium.

**7.5 OTHER FACILITIES**

The following Central Facilities are available to the institute community. Services are available on payment basis and are available to all faculty and students as well as for outside individuals and organizations.

<table>
<thead>
<tr>
<th>Facility</th>
<th>NMR</th>
<th>SAM/ESCA</th>
<th>ICPE Spectroscopic</th>
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<tbody>
<tr>
<td>Glass Blowing Workshop</td>
<td>NMR</td>
<td>SAM/ESCA</td>
<td>ICPE Spectroscopic</td>
</tr>
<tr>
<td>TEM</td>
<td>SEM</td>
<td>ICPE</td>
<td>Spectroscopic</td>
</tr>
<tr>
<td>GC/MS</td>
<td>Mechanical Fabrication</td>
<td></td>
<td>Liquid Nitrogen Facility</td>
</tr>
</tbody>
</table>
ADMINISTRATIVE STRUCTURE

THE VISITOR
Shri Pranab Mukherjee (Hon'ble President of India)

CHAIRMAN, BOARD OF GOVERNORS
Dr. Vijay P. Bhatkar

OFFTG. DIRECTOR
Prof. K. Gupta

DEPUTY DIRECTORS
Prof. Sushil (Operations) and Prof. S.K. Koul (Strategy and Planning)

Deans
Prof. Anurag Sharma : Academics
Prof. Kushal Sen : Faculty
Prof. Suneet Tuli : Research and Development
Prof. Mukesh Khare : Alumni Affairs & Intl. Programmes
Prof. S.K. Gupta : Student Affairs
Prof. K.S. Rao : Infrastructure

Associate Deans
Prof. M.R. Ravi : Curriculum
Prof. T.C. Kandpal : PG Research
Prof. Naresh Bhatnagar : Research & Development
Prof. Aditya Mittal : Students Events
Prof. P.M.V. Subba Rao : Hostel Management
Prof. (Ms.) Manju Mohan : Student Welfare
Prof. Neeraj Kumar Jha : Infrastructure
Prof. B.K. Panigrahi : Infrastructure

REGISTRAR
Dr. Rakesh Kumar
THE SENATE

K. Gupta, Chairman
(Director)

Deputy Directors
Sushil
S.K. Koul

All Professors (or equivalent)
G.P. Agarwal
V.K. Agarwal
Ashwini K. Agarwal
Suhail Ahmad
Babu J. Alappat
R. Algirusamy
S.K. Atreya
Anshul Kumar
R. Bahl
M. Balakrishnan
D.K. Bandhopadhyay
S. Banerjee
B.K. Behera
Bijoy H. Boruah
Ananjan Basu
S. Basu
Kanika T. Bhal (Ms.)
A.N. Bhaskarwar
B. Bhattacharjee
T.S. Bhatti
Naresh Bhatnagar
B. Bhowmik (Ms.)
G. Bhuvaneswari (Ms.)
Jayashree Bijwe (Ms.)

V.S. Bisaria
Ranjan Bose
Chandra B. (Ms.)
Charusita Chakravarty (Ms.)
B.R. Chahar
Sudhir Chandra
N. Chatterjee
Ratnamala Chatterjee (Ms.)
R. Chattopadhyay
Santanu Chaudhury
Sujeet Chaudhary
Tapan Kumar Chaudhuri
Veena Chaudhary (Ms.)
Anoop Chawla
Apurba Das
Manoj Datta
S. Dharmaraja
Viresh Dutta
S.G. Deshmukh
Anupam Dewan
Chinmoy Sarkar Dey
J.K. Dutt
Anil Jacob Elias
Naveen Garg
O.P. Gandhi
A. Ganguly
A.K. Ganguli
Anup K. Ghosh
N.K. Garg
Rahul Garg

James Gomes
A.K. Gosain
V.R. Gunturi
Ashok Gupta
Bhuvnesh Gupta
Deepthi Gupta (Ms.)
M.P. Gupta
S.K. Gupta (CS&E)
S.K. Gupta (Ch.E.)
Seyed E. Hasnain
Sriram Hedge
Harish Hirani
S.M. Ishtiaque
K.C. Iyer
A.K. Jain
P.K. Jain
S.K. Jain
Sanjeev Jain
V.K. Jain
Manjeet Jassal (Ms.)
B. Jayaram
Jayadeva
M. Jagadesh Kumar
Mangla Joshi (Ms.)
S.D. Joshi
S.R. Kale
N.C. Kalra
Prem Kumar Kalra
Tara C. Kandpal
Santosh Kapuria
THE SENATE (contd.)

I.N. Kar
Subrat Kar
Ravinder Kaur (Ms.)
S.C. Kaushik
Saroj Kaushik (Ms.)
A.K. Keshari
Rajesh Khanna
Mukesh Khare
S.K. Khare
Neeraj Khare
Rakesh Khosa
Veena Koul (Ms.)
Sangeeta Kohli (Ms.)
S. Kundu
Ajit Kumar
Amit Kumar
Arun Kumar (Phy.)
Arun Kumar (CARE)
S. Arun Kumar (CS&E)
N.D. Kurur
Manju Mohan (Ms.)
Alok Madan
Hitendra K. Malik
Ranjan Kumar Mallik
B.R. Mehta
D.S. Mehta
Shashi Mathur
Maithili Sharan
Saroj Mishra (Ms)

Sukumar Mishra
Prashant Mishra
A.K. Mittal
Aditya Mittal
Sudipto Mukherjee
Ratan Mohan
Atul Narang
K. Narayanan
B.P. Patel
Sanjiva Prasad
R.B. Nair (Ms)
S.N. Naik
Arvind K. Nema
Sunil Nath
B.S. Panda
Preeti Ranjan Panda
Sunil Pandey
Siddharth Pandey
K.K. Pant
Nalin Pant
B.S. Panwar
Shankar Prakriya
Rajesh Prasad
K.R. Rajagopal
A. Ramanan
N.G. Ramesh
A.D. Rao
K.S. Rao
P.M.V. Subba Rao

P. Venkateswara Rao
S.C.S. Rao
Anurag Singh Rathore
M.R. Ravi
V. Ravishankar
Anjan Ray
G.B. Reddy
R.S. Rengasamy
P.K. Roychoudhury
Shantanu Roy
Subir Kumar Saha
Ambuj D. Sagar
Sanjeev Sanghi
Sanil V.
Huzur Saran
Anil Kumar Saroha
Santosh Satya (Ms.)
Kushal Sen
P. Senthikumaran
Jagdish T. Sahu
Puneet Mahajan
Sandeep Sen
Ravi Shankar (Chy.)
Ravi Shankar (DMS)
Jagdish T. Shahu
Anurag Sharma
R.K. Sharma
Satyawati Sharma (Ms.)
M.R. Shenoy
THE SENATE (contd.)

Bhim Singh
A.K. Singh
Harpal Singh
Jai Deo Singh
Purnima Singh (Ms.)
S.P. Singh
R.K. Soni
A.K. Srivastava
Pankaj Srivastava
T.R. Sreekrishnan
N. Tandon
G.N. Tiwari
Geetam Tiwari (Ms.)
K. Thyagarajan
Amitabha Tripathi
Suneet Tuli
C.A. Tomy
V. Upadhyay
R.K. Varshney
M. Veerachary
S.V. Veeravalli
V.K. Vijay
S.S. Yadav

Three Educationists from Outside IIT Delhi
O.P. Kharbanda
Chandra Shekhar
Sudhir A. Shah

Head, Central Library
B.D. Gupta (PIC - Library)

Head, Central Workshop
P.V. Madhusudan Rao

One of the Wardens
Abhijit Majumdar

Chairman, Grade & Registration (UG&PG)
D. Ravi Kumar

Chairman, Time Table Committee
Joby Joseph

Six Members of Faculty
D. Sundar
V. Haridas
K. Sreenadh
Hariprasad
Saif K. Mohammed
Vinay Ribeiro

Three Alumni Representatives
Pravin Puran
Ashok Kumar
Malti Goel (Ms.)

Four Student Representatives
Shivali Goyal (Himadri)
Yoshita Agrawal (Ms.) (Kailash)
Avadh Singhal (Shivalik)
Saksham Kakar (Vindhyachal)

Registrar
Rakesh Kumar
(Secretary)
CHAIRMEN OF THE BOARDS
K. Gupta  
Board of Educational Research and Planning, Executive Committee of the Senate, Student Affairs Council
Suneet Tuli  
Industrial Research and Development Board
Anurag Sharma  
Board for Academic Programmes

PRESIDENTS OF BOARDS FOR STUDENT ACTIVITIES
S.K. Khare  
Board for Students Publications
Jyoti Kumar  
Board of Recreational and Creative Activities
P.M.V. Subbarao  
Associate Dean (HM) Ex-Officio
Manju Mohan (Ms.)  
Student Teacher Interaction Committee  
(Vice Chairman)
Associate Dean (SW) Ex-Officio
Anil Saroha  
Board for Sports Activities  
(President)
Manju Mohan (Ms.)  
Board for Students Welfare  
(President)
Associate Dean (SW) Ex-Officio
Dr. Shashank Vishnoi  
Vice President BSW
Dr. Pramit Chouwdhury  
Vice President BSA
Dr. Samrat Mukhopadhyay  
Vice President BRCA

LIBRARY
B.D. Gupta  
Chairman, ACL
Deputy Librarian  
Nabi Hasan
Neeraj Kumar Chaursasia

OTHERS
A.K. Saroha  
Advisor, Foreign Students
Rajesh Prasad  
Coordinator, NSS
Brejesh Lall  
Coordinator, NCC
R.K. Varshney  
SC/ST Preparatory Course
CHAIRMEN OF ACADEMIC ACTIVITIES

**Huzur Saran**  
Head, CSC (Ex-Officio)  

**T.R. Sreekrishnan**  
JEE Chairman (Advanced-2015)  

**B.D. Gupta**  
Advisory Committee for Library (ACL)  

**K.K. Pant**  
Chairman (GATE/JAM-2016)  

**Manju Mohan (Ms.)**  
Head, Counselling Service  
President BSW (Ex-Officio)  

**Santosh Satya (Ms.)**  
Hindi Cell (Head)  

**D. Ravi Kumar**  
Grade & Registration (UG & PG)  

**Joby Joseph**  
Time Table Committee

COORDINATORS OF INTERDISCIPLINARY PROGRAMMES

**M.Tech. Programmes**  

<table>
<thead>
<tr>
<th>Name</th>
<th>Programme</th>
</tr>
</thead>
<tbody>
<tr>
<td>N. Tandon</td>
<td>Industrial Tribology &amp; Maintenance Engineering</td>
</tr>
<tr>
<td>J. Jacob</td>
<td>Polymer Science &amp; Technology</td>
</tr>
<tr>
<td>K.A. Subramanyan</td>
<td>Energy Studies / Energy &amp; Environment Management</td>
</tr>
<tr>
<td>N. Chatterjee</td>
<td>Computer Applications</td>
</tr>
<tr>
<td>Anshul Kumar</td>
<td>VLSI Design, Tools &amp; Technologies</td>
</tr>
</tbody>
</table>

**M.Tech. and Research Programmes**  

<table>
<thead>
<tr>
<th>Name</th>
<th>Programme</th>
</tr>
</thead>
<tbody>
<tr>
<td>R.K. Varshney</td>
<td>Opto Electronics &amp; Optical Communications</td>
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</tbody>
</table>

**Research Programme**  

<table>
<thead>
<tr>
<th>Name</th>
<th>Programme</th>
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</thead>
<tbody>
<tr>
<td>Geetam Tiwari (Ms.)</td>
<td>Transportation Research and Injury Prevention Programme (TRIPP)</td>
</tr>
</tbody>
</table>

**Others**  

<table>
<thead>
<tr>
<th>Name</th>
<th>Programme</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mahim Sagar</td>
<td>Quality Improvement Programme/ Continuing Education Programme/OCDC</td>
</tr>
<tr>
<td>S.K. Saha</td>
<td>Unnat Bharat Cell (UBC)</td>
</tr>
</tbody>
</table>
### COORDINATORS OF CENTRAL FACILITIES

(Located in Departments/Centres)

<table>
<thead>
<tr>
<th>Name</th>
<th>Facility</th>
</tr>
</thead>
<tbody>
<tr>
<td>N.D. Kurur</td>
<td>NMR</td>
</tr>
<tr>
<td>Sujeet Chaudhary</td>
<td>Liquid Nitrogen</td>
</tr>
<tr>
<td>Kushal Sen</td>
<td>SEM</td>
</tr>
<tr>
<td>Sameer Sapra</td>
<td>Glass Blowing Workshops</td>
</tr>
<tr>
<td>G.B. Reddy</td>
<td>TEM</td>
</tr>
<tr>
<td>B.R. Mehta</td>
<td>AFM+STM (Atomic Force Microscope+Scanning Tunneling Microscope)</td>
</tr>
<tr>
<td>Vikram Kumar</td>
<td>Nanoscience Research Facility</td>
</tr>
</tbody>
</table>

### CENTRAL WORKSHOP

<table>
<thead>
<tr>
<th>Role</th>
<th>Name</th>
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</thead>
<tbody>
<tr>
<td>Professor and Head</td>
<td>P.V. Madhusudan Rao</td>
</tr>
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</table>

### CHAIRMEN OF OTHER COMMITTEES

<table>
<thead>
<tr>
<th>Role</th>
<th>Name</th>
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</thead>
<tbody>
<tr>
<td>Official Language Implementation Committee</td>
<td>R.K. Shevgaonkar (Director)</td>
</tr>
<tr>
<td>Institute Lecture Series Committee</td>
<td>Anurag Sharma</td>
</tr>
<tr>
<td>Standing Committee for Convocation 2014</td>
<td>Anurag Sharma</td>
</tr>
<tr>
<td>Kendriya Vidyalaya Management Committee</td>
<td>Anurag Sharma</td>
</tr>
<tr>
<td>Nursery &amp; K.G. School Advisory Committee</td>
<td>Anurag Sharma</td>
</tr>
<tr>
<td>Commercial Establishments &amp; Licencing Committee</td>
<td>K.S. Rao</td>
</tr>
<tr>
<td>Commercial Establishments Monitoring Committee</td>
<td>K.S. Rao</td>
</tr>
<tr>
<td>House Allotment Committee</td>
<td>K.S. Rao</td>
</tr>
<tr>
<td>Air-conditioning Committee</td>
<td>K.S. Rao</td>
</tr>
<tr>
<td>Committee for House Building and other Advances</td>
<td>M.P. Gupta</td>
</tr>
<tr>
<td>Hospital Advisory Committee</td>
<td>G.B. Reddy</td>
</tr>
<tr>
<td>Employees Welfare Committee</td>
<td>T.C. Kandpal</td>
</tr>
<tr>
<td>Institute Grievance Committee</td>
<td>M. Balakrishnan</td>
</tr>
<tr>
<td>Managing Committee for Eating Outlets</td>
<td>S.K. Gupta</td>
</tr>
<tr>
<td>Security Advisory Committee</td>
<td>S.N. Singh</td>
</tr>
<tr>
<td>Managing Committee of the Benevolent Fund Scheme</td>
<td>S.N. Singh</td>
</tr>
<tr>
<td>Executive Committee of IITD Staff Welfare Scheme</td>
<td>S.N. Singh</td>
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</table>
### WARDENS OF HOSTELS

<table>
<thead>
<tr>
<th>Name</th>
<th>Hostel</th>
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<tbody>
<tr>
<td>V.V.K. Srinivas</td>
<td>Kumaon</td>
</tr>
<tr>
<td>Abhijeet Majumdar</td>
<td>Nilgiri</td>
</tr>
<tr>
<td>Sudarshan Ghosh</td>
<td>Aravali</td>
</tr>
<tr>
<td>Seema Sharma (Ms.)</td>
<td>Kailash</td>
</tr>
<tr>
<td>Ravi P. Singh</td>
<td>Jwalamukhi</td>
</tr>
<tr>
<td>Dipayan Das</td>
<td>Shivalik</td>
</tr>
<tr>
<td>M.C. Ramteke</td>
<td>Karakoram</td>
</tr>
<tr>
<td>Dipti Ranjan Sahoo</td>
<td>Vindhyachal</td>
</tr>
<tr>
<td>P.M.V. Subbarao</td>
<td>Nalanda / IP / New Vindhyachal</td>
</tr>
<tr>
<td>Sreedevi U. (Ms.)</td>
<td>Himadri</td>
</tr>
<tr>
<td>Sudip K. Pattanayek</td>
<td>Satpura</td>
</tr>
<tr>
<td>Saif K. Mohammed</td>
<td>Zanskar</td>
</tr>
<tr>
<td>D. Sundar</td>
<td>Girnar</td>
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<tr>
<td>R.S. Sarangi</td>
<td>Udaigiri</td>
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### HINDI CELL

<table>
<thead>
<tr>
<th>Position</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head</td>
<td>Santosh Satya (Ms.)</td>
</tr>
</tbody>
</table>

### STUDENT COUNSELLING SERVICE

<table>
<thead>
<tr>
<th>Position</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head</td>
<td>Manju Mohan (Ms.)</td>
</tr>
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</table>

### COUNSELLOR

<table>
<thead>
<tr>
<th>Name</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rupa Murghai</td>
<td></td>
</tr>
<tr>
<td>Rama Raj</td>
<td></td>
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### ADMINISTRATIVE COMPUTERISATION SUPPORT SERVICE

<table>
<thead>
<tr>
<th>Position</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head</td>
<td>Huzur Saran</td>
</tr>
</tbody>
</table>

### CVC

<table>
<thead>
<tr>
<th>Position</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chief Vigilance Officer</td>
<td>S.S. Yadav</td>
</tr>
</tbody>
</table>

### RTI

<table>
<thead>
<tr>
<th>Position</th>
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<tbody>
<tr>
<td>Public Information Officer</td>
<td>N.C. Chauhan</td>
</tr>
<tr>
<td>Appellate Authority</td>
<td>Rakesh Kumar, Registrar</td>
</tr>
</tbody>
</table>

### HOSPITAL SERVICES

<table>
<thead>
<tr>
<th>Position</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head</td>
<td>Ajay Kumar Jain</td>
</tr>
</tbody>
</table>
## ADMINISTRATION

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rakesh Kumar</td>
<td>Registrar (on deputation)</td>
</tr>
<tr>
<td>M.K. Gulati</td>
<td>Deputy Registrar (Accounts)</td>
</tr>
<tr>
<td>P. G. Basak</td>
<td>Deputy Registrar (Audit)</td>
</tr>
<tr>
<td>N.C. Chauhan</td>
<td>Deputy Registrar (Legal Cell &amp; E-I)</td>
</tr>
<tr>
<td>K.K. Bhattacharjee</td>
<td>Deputy Registrar (SP Section &amp; RTI)</td>
</tr>
<tr>
<td>Vivek Raman</td>
<td>Deputy Registrar (PGS)</td>
</tr>
<tr>
<td>Atul Vyas</td>
<td>Deputy Registrar (Director’s Office)</td>
</tr>
<tr>
<td>N. Bhaskar</td>
<td>Assistant Registrar (Coordination, Health Unit)</td>
</tr>
<tr>
<td>V.K. Vashistha</td>
<td>Assistant Registrar (IRD)</td>
</tr>
<tr>
<td>Ram Parsad</td>
<td>Assistant Registrar (Estate)</td>
</tr>
<tr>
<td>Mohd. Shamim</td>
<td>Assistant Registrar (R&amp;D Accounts)</td>
</tr>
<tr>
<td>Ramesh Kumar Thareja</td>
<td>Assistant Registrar (E-II &amp; Manpower Training)</td>
</tr>
<tr>
<td>Alan V. Sinate</td>
<td>Assistant Registrar (UGS)</td>
</tr>
<tr>
<td>Mukesh Chand</td>
<td>Assistant Registrar (SAS)</td>
</tr>
<tr>
<td>Raj Kumar Gupta</td>
<td>Assistant Registrar (Accounts Section)</td>
</tr>
<tr>
<td>Satish Narayanan Tiwari</td>
<td>Assistant Registrar</td>
</tr>
<tr>
<td>Deb Ranjan Mukherjee</td>
<td>Assistant Registrar</td>
</tr>
<tr>
<td>Sanjay Pande</td>
<td>Assistant Registrar (Plan, Alumni, Conference, Transport)</td>
</tr>
<tr>
<td>Amitabh Mukherjee</td>
<td>Assistant Registrar SAS (Accounts)</td>
</tr>
<tr>
<td>G.K. Taneja</td>
<td>Executive Engineer &amp; Offtg. Institute Engineer</td>
</tr>
<tr>
<td>K.M. Vijay Kumar</td>
<td>Executive Engineer</td>
</tr>
<tr>
<td>Anuj Gaur</td>
<td>Executive Engineer</td>
</tr>
<tr>
<td>Sanjeev Kumar</td>
<td>Executive Engineer (deputation)</td>
</tr>
<tr>
<td>Rafat Jamal</td>
<td>Assistant Executive Engineer</td>
</tr>
<tr>
<td>V.K. Bharaj</td>
<td>Assistant Executive Engineer</td>
</tr>
<tr>
<td>Hitendra Govil</td>
<td>Assistant Executive Engineer</td>
</tr>
<tr>
<td>K.P. Mohan</td>
<td>Assistant Executive Engineer</td>
</tr>
<tr>
<td>Prem Kumar</td>
<td>Assistant Executive Engineer</td>
</tr>
<tr>
<td>Brah Prakash</td>
<td>Assistant Executive Engineer</td>
</tr>
<tr>
<td>Ashok Kumar</td>
<td>Assistant Executive Engineer</td>
</tr>
<tr>
<td>Raju Ram Parihar</td>
<td>Assistant Executive Engineer</td>
</tr>
<tr>
<td>Pradip karamarkar</td>
<td>Assistant Executive Engineer</td>
</tr>
<tr>
<td>Vishal</td>
<td>Assistant Executive Engineer (on deputation)</td>
</tr>
<tr>
<td>Lily Khosa (Ms)</td>
<td>Medical Officer (SS)</td>
</tr>
<tr>
<td>Renu Misurya (Ms)</td>
<td>Medical Officer (SS)</td>
</tr>
<tr>
<td>Ajay Kumar Jain</td>
<td>Medical Officer (SS) Head, Hospital Services</td>
</tr>
<tr>
<td>Anila Khosla (Ms)</td>
<td>Medical Officer</td>
</tr>
<tr>
<td>M.K. Sagar</td>
<td>Medical Officer (SS)</td>
</tr>
<tr>
<td>P.K. Rajesh</td>
<td>Medical Officer (Homeopathic)</td>
</tr>
<tr>
<td>Md. Ashafaque Hussain</td>
<td>Medical Officer</td>
</tr>
<tr>
<td>Sayed Yasmeen Raunaq</td>
<td>Medical Officer</td>
</tr>
<tr>
<td>L. Pangerlemba</td>
<td>Medical Officer</td>
</tr>
<tr>
<td>Deepak Negi</td>
<td>Sports Officer</td>
</tr>
<tr>
<td>Anishya Madan (Ms.)</td>
<td>Industrial Liaison Officer</td>
</tr>
</tbody>
</table>
INDIAN INSTITUTE OF TECHNOLOGY DELHI

THE HONOUR CODE

I ..................................................................................................................., Entry No. ....................................................................................
do hereby undertake that as a student at IIT Delhi:

1. I will not give or receive aid in examinations; that I will not give or receive unpermitted aid in class work, in
   preparation of reports, or in any other work that is to be used by the instructor as the basis of grading; and

2. I will do my share and take an active part in seeing to it that others as well as myself uphold the spirit and
   letter of the Honour Code.

I realise that some examples of misconduct which are regarded as being in violation of the Honour Code include:
• Copying from another’s examination paper or allowing another to copy from one’s own paper;
• Unpermitted collaboration;
• Plagiarism;
• Revising and resubmitting a marked quiz or examination paper for re-grading without the instructor’s
  knowledge and consent;
• Giving or receiving unpermitted aid on take home examinations;
• Representing as one’s own work, the work of another, including information available on the internet;
• Giving or receiving aid on an academic assignment under circumstances in which a reasonable person
  should have known that such aid was not permitted; and
• Committing a cyber-offence, such as, breaking passwords and accounts, sharing passwords, electronic
  copying, planting viruses, etc.

I accept that any act of mine that can be considered to be an Honour Code violation will invite disciplinary action.

Date : .................................................. Student’s Signature ............................................................................

Name ..................................................................................................................................................

Entry No. ........................................................................................................................................