VISION
To contribute to India and the World through excellence in scientific and technical education and research; to serve as a valuable resource for industry and society; and 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-the-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 views of every individual.
- Attention to issues of national relevance as well as of global concern.
- Breadth of understanding, including knowledge of the human sciences.
- Appreciation of intellectual excellence and creativity.
- An unfortified spirit of exploration, rationality and enterprise.

INDIAN INSTITUTE OF TECHNOLOGY DELHI
THE HONOUR CODE

I 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: ...............................................

1. INTRODUCTION 1-6
2. ACADEMICS 6-13
   2.1 Academic System 6
   2.2 Academic Structure 7
   2.3 Research and Innovation 8
   2.4 Collaborations 9
   2.5 Student Exchange Programmes 10
   2.6 Academic Programmes 11
3. ADMISSIONS 14-21
   3.1 Undergraduate Programmes 14
   3.2 Postgraduate Programmes 15
   3.3 Scholarships 16
   3.4 Admission to PG Programmes 17
   3.5 Medals and Prizes 21
4. FEES 22-25
   4.1 Fees for Entry Year 2018 22
   4.2 Foreign National Students 24
   4.3 Mode of Payment 24
   4.4 Deadlines for Payment 24
   4.5 Refund of Fees 25
5. STUDENT LIFE ON CAMPUS 25-36
   5.1 Halls of Residence 25
   5.2 Student Affairs Council (SAC) 25
   5.3 Co-curricular and Academic Interaction Council (CAIC) 25
   5.4 Co-curricular Activities 26
   5.5 The Students’ Activity Centre 26
   5.6 Students’ Canteens 26
   5.7 Stationery Shop/ Telephone Booths 26
   5.8 Board for Sports Activities (BSA) 26
   5.9 Board for Recreational and Creative Activities (BRCA) 28
   5.10 Board for Student Publications (BSP) 31
   5.11 Board for Students Welfare (BSW) 31
   5.12 National Service Scheme (NSS) 32
   5.13 National Cadet Corps (NCC) 32
   5.14 National Sports Organization (NSO) 32
   5.15 Student Counselling Service (SCS) 32
   5.16 Departmental Professional Societies 33
   5.17 Medical Facilities 33
   5.18 Student-Teacher Interaction 33
   5.19 Alumni Association 34
   5.20 Conduct and Discipline 36
   5.21 Honour Code 36
   5.22 Institute Policy on Ragging 36
   5.23 Policy against Sexual Harassment 36
6. ACADEMIC UNITS 37-215
   Applied Mechanics 37
   Biochemical Engineering and Biotechnology 43
   Chemical Engineering 49
   Chemistry 59
   Civil Engineering 65
   Computer Science and Engineering 77
   Design 87
   Electrical Engineering 91
   Humanities and Social Sciences 101
   Management Studies 107
Materials Science and Engineering 117
Mathematics 123
Mechanical Engineering 127
Physics 135
Textile Technology 145
Centre for Applied Research in Electronics 149
Centre for Atmospheric Sciences 153
Centre for Biomedical Engineering 159
Computer Services Centre 163
Educational Technology Services Centre 169
Centre for Energy Studies 173
Industrial Tribology Machine Dynamics and Maintenance Engineering Centre 179
Instrument Design & Development Centre 183
Centre for Rural Development and Technology 187
National Resource Centre for Value Education in Engineering 193
Bharti School of Telecommunication Technology & Management 197
Amar Nath and Shashi Khosla School of Information Technology 203
Kusuma School of Biological Sciences 207
Interdisciplinary Research Programme (TRIPP) 213
Opto-electronics and Optical Communication Research Programme 214
Interdisciplinary M.Des./M.Tech. Programmes 215

7. MAJOR CENTRAL FACILITIES 215-238
7.1 Central Research Facilities (CRF) 216
7.2 Industrial Research and Development Unit 229
7.3 Central Workshop 230
7.4 Training and Placement Unit 231
7.5 Institute Library 232

8. ADMINISTRATIVE STRUCTURE 239-248
Honour Code - Undertaking 249
1. INTRODUCTION

Indian Institute of Technology Delhi is one of the Twenty Three 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 48000 have graduated from IIT Delhi in various disciplines including Engineering, Physical Sciences, Management and Humanities & Social Sciences. Of these, nearly 5070 received Ph.D. degrees. The number of students who graduated with B.Tech. degree is over 15738. 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 k.m. away from the Delhi Main Railway Station, 14 k.m. from the New Delhi Railway Station, 21 k.m. from the Inter-State Bus Terminal (Kashmere Gate) and 10 k.m. from Delhi Airport. The nearest Metro Rail Station is Hauz Khas at a distance of about 1.5 k.m.
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 is 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.
ADMINISTRATION

IIT 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

Shri Kumar Mangalam Birla is the Chairman, Board of Governors of IIT Delhi.

Mr. Kumar Mangalam Birla took over as Chairman of Aditya Birla Group in 1995, at the age of 28. From a turnover of US$ 2 billion and operations in 8 countries in 1995, today under his stewardship, the Group’s revenues are in excess of US$ 43 billion with operations straddling 35 countries. He has made 36 acquisitions globally – the highest by an Indian multinational.

An iconic figure, Mr. Birla has won several accolades. To cite a few – Frost & Sullivan’s "The GIL Visionary Leadership Award" (Global Innovation Leader) 2017, the International Advertising Association’s (IAA) “CEO of the Year Award 2016”; US India Business Council (USIBC) 2014, “Global Leadership Award”; Economic Times “Business Leader Award” in 2003 and 2013; Forbes India Leadership Award – Flagship Award “Entrepreneur of the Year 2012; NASSCOM’s ‘Global Business Leader Award’ 2012; NDTV Profit Business Leadership Awards 2012, “Most Inspiring Leader”; CNBC TV 18 IBLA “Business Leader for Taking India Abroad 2012”; CNN-IBN “Indian of the Year Award 2010”; JRD Tata “Leadership Award 2008”; NDTV’s “Global Indian Leader of the Year 2007”

An educationist, Mr. Birla is the Chancellor of Birla Institute of Technology & Science (BITS). He is Chairman of IIT Delhi, IIM Ahmedabad and Chairman of Rhodes India Scholarship Committee for Oxford University. He serves on London Business School’s Asia Pacific Advisory Board and is an Honorary Fellow of the London Business School.

A Chartered Accountant, Mr. Birla earned an MBA from London Business School.

Mr. Birla and his wife, Mrs. Neerja Birla, have three children, Ananya, Aryaman Vikram and Advaitesha.

DIRECTOR

Prof. V. Ramgopal Rao is the Director of IIT Delhi.

Before joining IIT Delhi, Prof. Rao served as a P.K. Kelkar Chair Professor for Nanotechnology in the Department of Electrical Engineering at IIT Bombay. He has over 400 publications and is an inventor on 35 patents (including 12 issued US patents) and patent applications. He is also a co-founder of the company NanoSniff Technologies Pvt. Ltd.

Prof. Rao’s work is recognized with many awards and honors in the country and abroad, which include Shanti Swarup Bhatnagar Prize in Engineering Sciences in 2005, the Infosys Prize in 2013, the Swarnajayanti Fellowship Award from the Department of Science & Technology, IBM Faculty award, Best Research Award from the Intel Asia Academic Forum, Techno-Mentor award from the Indian Semiconductor Association, DAE-SRC Outstanding Research Investigator Award, NASI-Reliance Platinum Jubilee Award, Excellence in Research Award from IIT Bombay, JC Bose National Fellowship and CNR Rao National Nanoscience Award. Prof. Rao is a Fellow of IEEE, INAE, INSA, NASc and IASc.
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.

INSTITUTE COMMITTEES
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, appointed by the Senate to help the administration in the efficient running of the Institute.

2. ACADEMICS
IIT 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 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 Design
- Department of Electrical Engineering
- Department of Humanities and Social Sciences
- Department of Management Studies
- Department of Materials Science & Engineering
- 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
- Kusuma School of Biological Sciences
- School of Interdisciplinary Research
- School of Public Policy

#### 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 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

IIT 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, IIT Delhi is also one of the partner institutions under the ERASMUS 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 Analysis and Design
- 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 Construction Technology 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 Mechanical Design
- 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 Textile Chemical Processing
- M.Tech. in Radio Frequency Design and Technology
- M.Tech. in Atmospheric-Oceanic Science and Technology
- M.Tech. in Biomedical Engineering
- 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 Technology
- M.Tech. in Telecommunication Technology and Management
- M.Tech. in VLSI Design Tools and Technology
**Master of Science (Research) (MS(R)) :**
- 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 Kusuma School of Biological Sciences
- M.S. (R) in VLSI Design Tools & Technology

**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 (M.Des.) :**
- M.Des. in Industrial Design

**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 2018-2019.
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 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 Research Committee (CRC) / School Research Committee (SRC) 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 & PD students: Tuition fee exemption is admissible to all SC/ST/PD students irrespective of their parents’/guardians’ income, Institute offers several other benefits to students from these categories.

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

POST GRADUATE PROGRAMMES

M.Sc. Programmes
Merit-cum-Means scholarship of ₹1,000/- 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 up to ₹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 PROGRAMMES

<table>
<thead>
<tr>
<th>Degree</th>
<th>Status</th>
<th>Minimum Eligibility for Admission*</th>
<th>Selection basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>M.Sc.</td>
<td>Full Time</td>
<td>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.</td>
<td>JAM</td>
</tr>
<tr>
<td>M.Tech.</td>
<td>Full Time</td>
<td>B.Tech./M.Sc. or equivalent with a CGPA 6.00 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.</td>
<td>GATE and Written test and/or interview</td>
</tr>
<tr>
<td>Part Time Evening Programme</td>
<td>Full Time Direct Admission</td>
<td>B.Tech./M.Sc. or equivalent with (a) CGPA of 7.5 or 75% marks in aggregate for General/OBC Category, and CGPA of 7.0 or 70% marks in aggregate for SC/ST/PD category. GATE Score &gt; 300 or qualifying score whichever is higher for General/OBC and 200 or qualifying score whichever is higher for SC/ST/PD.</td>
<td>GATE and interview if required</td>
</tr>
<tr>
<td>Part Time Evening Programme</td>
<td>Sponsored PT/FT</td>
<td>Same as for M.Tech. part time requirements and Sponsorship Certificate from the employer as per Notes 4 and 5 respectively.</td>
<td>-Do-</td>
</tr>
<tr>
<td>M.Des.</td>
<td>Full Time</td>
<td>B.Tech./B.Des./B.Arch. or equivalent in relevant field with CGPA 6.00 on a 10 point scale or 60% marks in aggregate and a valid CEED score.</td>
<td>Written Test and/or interview</td>
</tr>
<tr>
<td>M.B.A.</td>
<td>Full Time</td>
<td>Bachelor’s degree in Engineering/Technology/Architecture/Pharmacy/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 6.00 on 10 point scale or 60% marks in aggregate for general category.</td>
<td>CAT and Group Discussion and/or interview</td>
</tr>
<tr>
<td>Part Time (evening)</td>
<td>Full Time</td>
<td>Same as M.B.A. full-time requirements and two-years experience.</td>
<td>Written test and interview</td>
</tr>
<tr>
<td>Degree</td>
<td>Status</td>
<td>Minimum Eligibility for</td>
<td>Selection basis</td>
</tr>
<tr>
<td>--------</td>
<td>--------</td>
<td>-------------------------</td>
<td>-----------------</td>
</tr>
<tr>
<td>M.S.</td>
<td>Full Time/Part Time sponsored</td>
<td>Full Time / Same as the corresponding M.Tech. requirements.</td>
<td>Same as the corresponding M.Tech. requirements.</td>
</tr>
<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 6.00 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 7.0 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.Tech. from IITs graduating with a CGPA of 8.0 or above, the requirement of qualification through a national examination is waived off. In respect of students from CFTIs (Centrally Funded Technical Institutions (IITs, NITs, IIITs 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 and / or interview</td>
</tr>
<tr>
<td>Part Time</td>
<td>Same as for Ph.D. full time and minimum experience (as per table 3.4-1) and No Objection from the employer.</td>
<td>Written test and / or interview</td>
<td></td>
</tr>
<tr>
<td>Sponsored Full Time or Part Time</td>
<td>Certificate from employer (as per Note 8.) No GATE required (Note.12)</td>
<td>-Do-</td>
<td></td>
</tr>
<tr>
<td>Part Time Foreign National Posted in Delhi</td>
<td>Same as for full-time Subject to conditions stipulated in Note 13.</td>
<td>-Do-</td>
<td></td>
</tr>
</tbody>
</table>

*W.e.f. 2nd Semester 2018-19.

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 5.50 on a 10 point scale or 55% in aggregate marks. Relaxation in CGPA to 5.50 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 the Department of Humanities & Social Sciences.

3. 5% 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 / School 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 conversion factor of 10 would be used for converting percentage to CGPA (divide by 10). However, this conversion to CGPA will only be applied in case of the primary method of evaluation followed in the graduating institution of the candidate seeking admission is percentage marks.
For CGPA with scales of other points, a linear interpolation will be used i.e.

\[ G = G_x \times \frac{10}{X} \]

where \( G \) is the GPA on 10 points scale and \( G_x \) is the GPA on 'x' point scale. Conversions worked out using the above formula for some scales are given in the following table:

<table>
<thead>
<tr>
<th>%</th>
<th>CGPA 10</th>
<th>CGPA 9</th>
<th>CGPA 6</th>
<th>CGPA 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>5</td>
<td>4.5</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>55</td>
<td>5.5</td>
<td>4.95</td>
<td>3.3</td>
<td>2.2</td>
</tr>
<tr>
<td>60</td>
<td>6</td>
<td>5.4</td>
<td>3.6</td>
<td>2.4</td>
</tr>
<tr>
<td>70</td>
<td>7</td>
<td>6.3</td>
<td>4.2</td>
<td>2.8</td>
</tr>
<tr>
<td>75</td>
<td>7.5</td>
<td>6.75</td>
<td>4.5</td>
<td>3</td>
</tr>
<tr>
<td>80</td>
<td>8</td>
<td>7.2</td>
<td>4.8</td>
<td>3.2</td>
</tr>
<tr>
<td>90</td>
<td>9</td>
<td>8.1</td>
<td>5.4</td>
<td>3.6</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:-

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

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

12. 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.
Experience required for admission to part-time Ph.D. / M.Tech. / M.S.(R) Programmes.

<table>
<thead>
<tr>
<th>For admission to part-time programme</th>
<th>Qualifications</th>
<th>Work Experience (Post Qualification)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ph.D.</td>
<td>M.E./M.Tech./M.S.(R)/M.D. or Equivalent</td>
<td>Nil</td>
</tr>
<tr>
<td>Ph.D.</td>
<td>B.E./B.Tech./M.Sc./M.A./M.B.A./MBBS or equivalent, from CFTIs/Central Universities</td>
<td>1 Year</td>
</tr>
<tr>
<td>Ph.D.</td>
<td>B.E./B.Tech./M.Sc./M.A./M.B.A./MBBS or equivalent, and working in IIT Delhi* (Project or Regular) *Through proper channel</td>
<td>1 Year</td>
</tr>
<tr>
<td>Ph.D.</td>
<td>B.E./B.Tech./M.Sc./M.A./M.B.A./MBBS or equivalent, from institutions other than CFTIs/Central Universities</td>
<td>2 Years</td>
</tr>
<tr>
<td>M.Tech./M.S.(R)</td>
<td>B.E./B.Tech./M.Sc. or equivalent, from CFTIs/Central Universities</td>
<td>6 Months</td>
</tr>
<tr>
<td>M.Tech./M.S.(R)</td>
<td>B.E./B.Tech./M.Sc. or equivalent, and working in IIT Delhi* (Project or Regular) *Through proper channel</td>
<td>6 Months</td>
</tr>
<tr>
<td>M.Tech./M.S.(R)</td>
<td>B.E./B.Tech./M.Sc. or equivalent from institutions other than CFTIs/Central Universities</td>
<td>1 Year</td>
</tr>
</tbody>
</table>

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 2018 entry year students are given in Table below.

### 4.1 FEES PAYABLE BY STUDENTS OF THE ENTRY YEAR 2018

<table>
<thead>
<tr>
<th>Programme</th>
<th>Tuition Fee</th>
</tr>
</thead>
<tbody>
<tr>
<td>B.Tech./ Dual degree M.Tech.</td>
<td>₹ 1,00,000**</td>
</tr>
<tr>
<td>M.Sc.</td>
<td>₹ 5,000</td>
</tr>
<tr>
<td>M.Tech., M.S.(R) M.Des. (Receiving Institute / Project Assistantship or Teaching position holders)</td>
<td>₹ 10,000</td>
</tr>
<tr>
<td>M.Tech. / M.S.(R) / M.Des. / DIIT (Sponsored, FT / PT &amp; Non-Teaching position holders)</td>
<td>₹ 50,000</td>
</tr>
<tr>
<td>Ph.D. (Full Time)</td>
<td>₹ 5,000</td>
</tr>
<tr>
<td>Ph.D. (Part Time)</td>
<td>₹ 10,000</td>
</tr>
<tr>
<td>M.B.A. Self-financing</td>
<td>₹ 2,20,000</td>
</tr>
<tr>
<td>M.B.A. (Part Time)</td>
<td>₹ 1,65,000</td>
</tr>
<tr>
<td>Foreign National</td>
<td></td>
</tr>
<tr>
<td>SAARC Countries</td>
<td></td>
</tr>
<tr>
<td>MBA</td>
<td>US$ 2,000</td>
</tr>
<tr>
<td>Programmes other than MBA</td>
<td>US$ 1,000</td>
</tr>
<tr>
<td>Non SAARC Countries</td>
<td></td>
</tr>
<tr>
<td>MBA</td>
<td>US$ 4,000</td>
</tr>
<tr>
<td>Programmes other than MBA</td>
<td>US$ 2,000</td>
</tr>
</tbody>
</table>

**Other charges (to be paid every semester alongwith Tuition Fee)**

<table>
<thead>
<tr>
<th>A</th>
<th>INSTITUTE FEES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Examination fees</td>
<td>₹ 1,000</td>
</tr>
<tr>
<td>Registration / Enrolment fees</td>
<td>₹ 500</td>
</tr>
<tr>
<td>Gymkhana</td>
<td>₹ 1,000</td>
</tr>
<tr>
<td>Medical fees</td>
<td>₹ 500*</td>
</tr>
<tr>
<td>Internet and computer access fee</td>
<td>₹ 750</td>
</tr>
<tr>
<td>Transport charges</td>
<td>₹ 100*</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>₹ 3,850</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>B</th>
<th>HOSTEL FEES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hostel seat rent</td>
<td>₹ 7,500</td>
</tr>
<tr>
<td>Amenity charges</td>
<td>₹ 500</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>₹ 8,000</td>
</tr>
</tbody>
</table>
### OTHER PAYMENTS

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount (₹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student Distress Fund Scheme</td>
<td>300</td>
</tr>
<tr>
<td>Insurance Scheme</td>
<td>500</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>800</strong></td>
</tr>
</tbody>
</table>

### D. One Time payment to be paid at the time of admission

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount (₹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Admission fees</td>
<td>1,500</td>
</tr>
<tr>
<td>Student welfare fund</td>
<td>500</td>
</tr>
<tr>
<td>Modernization fees</td>
<td>1,000</td>
</tr>
<tr>
<td>Benevolent fund</td>
<td>300</td>
</tr>
<tr>
<td>Alumni fees</td>
<td>1,500</td>
</tr>
<tr>
<td>Training and Placement charges</td>
<td>1,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>5,800</strong></td>
</tr>
</tbody>
</table>

### E. Refundable

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount (₹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Institution security deposit</td>
<td>3,000</td>
</tr>
<tr>
<td>Library security deposit</td>
<td>3,000</td>
</tr>
<tr>
<td><strong>Total fees payable at the time of admission</strong></td>
<td><strong>6,000</strong></td>
</tr>
</tbody>
</table>

1. **Total other charges payable for M.Sc. & MBA (with hostel)** ₹24,450, without hostel ₹16,450.
2. **Total other charges payable for Ph.D./M.Tech./M.S.(R)/DIIT/M.Des. (with hostel)** ₹26,950, without hostel ₹16,450.

**NOTE :**

1. #The tuition fee in 9th semesters and later will be ₹5,000/- per semester for Dual-degree programmes.
2. *Medical fee and transport charges are applicable to full time students only.
3. **1/3**rd of tuition fee for student with family income between ₹1 lac to ₹5 lac per annum. Other students (other than SC, ST & PD) whose family income is less than ₹1 lac per annum will get 100% tuition fee exemption.
4. Thesis fee for M.S.(R) & Ph.D. is ₹500 and ₹1000 respectively and shall be payable at the time of submission of thesis.
5. All SC, ST, PD students will get 100% tuition fee exemption.
6. Hostel is available only to full time students subject to availability.
7. Messing and electricity charges will be calculated on completion of each semester and will be notified separately.
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:

i) US $ 1,000 and ₹26,950 for SAARC Countries.
ii) US $ 2,000 and ₹26,950 for other Countries.

* likely to be revised

4.3 MODE OF PAYMENT
(a) Institute dues:
All Institute dues are to be paid through State Bank of India I-collect facility.
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.

(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 is mandatory. 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 are to be paid 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 ₹ 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/TELEPHONE BOOTHS

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

5.8 BOARD FOR SPORTS ACTIVITIES (BSA)

Sports, being the practical way of education, inculcates discipline and dedication in general life. In addition, it facilitates recreation and fosters social harmony. Board for Sports Activities (BSA) of IIT Delhi has been looking after this important component for the development of sports environment in the campus. Board for Sports Activities (BSA) is a constituent body of the Student Affairs Council and is responsible for the coordination of the various sports activities in the Institute. It ensures that adequate sports facilities are available 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.
Our facilities include, a cricket field with four turf wickets, four flood-lit cricket practice pitches, flood-lit hockey and football grounds, three flood-lit volleyball and two basketball courts, eight flood-lit tennis courts (four synthetic and four clay courts), tennis practice wall, two squash courts, one badminton hall, two table tennis halls with synthetic flooring, one weight-lifting hall, Olympic size swimming pool, kid’s pool, two multi-gyms, a flood-lit stadium with 400 meters athletics track, flood-lit jogging track and ancillary arrangements for all the games. Construction of a new multipurpose hall with facilities for badminton, table tennis and squash courts is under consideration. A team comprised of Sports officer, Physical training instructors (PTI), part-time coaches and ground staff, the President (BSA) and Vice President (BSA), help the students in their regular sporting activities ensuring that all facilities are being properly maintained and utilized.

The Institute lays considerable emphasis on student’s participation in various outdoor and indoor games. Such activities take place almost throughout the year. The students are encouraged to take part in the Fresher’s events conducted for incoming first year students, friendly matches with the local colleges, inter-hostel events, the annual IIT Delhi Inter-Collegiate event ‘Sportech’, the annual Inter-IIT Sports Meet and in sporting activities organized by Institutes outside Delhi. To summarise, IIT Delhi has a very vibrant sporting atmosphere contributed to, not only by students but staff and faculty alike.
5.9 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 Origamy, 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.

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.

Debating Club

The Literary Club aims to take your imagination and creativity to a higher level. The Club organizes a Reader's Circle to promote a reading culture among the students. To keep the fun quotient high, events like word Games (Scrabble), Pot Pourn, 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.
Music Club

Drama 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 dramebaaz 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.

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 organises 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 facts 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, howsoever 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.
5.10 BOARD FOR STUDENTS PUBLICATIONS (BSP)

Board for Student Publications is the electronic and print media body of the college, run almost entirely by students. It is involved in bringing out various publications and organizing events for nurturing the literary talent of the IITD community and carrying out journalistic activities.

At the beginning of the academic year, BSP releases a magazine called *Inception* which provides the incoming freshers with a glimpse of IITD life and gives them information about various avenues and opportunities. Apart from this, BSP's *Muse* is a magazine which provides an excellent forum for creative expression. The Board's annual technical magazine, *Elemental*, is a technical compendium of interesting research ongoing in IIT or around the world. A new magazine called *Impulse*, a collection of short fiction written by students, was launched this year.

Apart from its creative publications, the Board’s key area of focus remains its journalistic activities and bi-annual newsletter *Inquirer*. With interviews, detailed surveys and in-depth analyses of issues affecting the student community, the Board keeps track of all ongoing activities on campus and provides an interactive space for students, faculty and administration to debate relevant issues through its social media platforms and newly restructured website.

The BSP also organizes an annual literary festival, *Literati* which is recognized and appreciated as one of the best literary college festivals in North India. With workshops, competitive events and panel discussions featuring renowned authors and journalists, the Board aims to develop and sharpen the creative and media skills of the entire 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 14 bedded hospital centrally located in the campus, providing facilities for OPD treatment and admission for general ailments. The Hospital is managed by a team of full time 10 modern scientific based system doctors (allopathic), one homeopathic doctors, one dental doctor and 5 outsource doctors from Apollo life for morning, evening duties on weekdays and weekends as well as night duties to give 24X7 availability of doctors.

The Hospital is also visited by part time specialist from All India Institute of Medical Science (AIIMS) in the field of Ayurvedic, Cardiology, ENT, Endocrinology, Orthopaedics, Ophthalmology, Psychiatry and Radio- Diagnosis. The doctors are assisted by efficient group of Pharmacist, Nurses, Physiotherapist and other Paramedical staff. The Hospital is well equipped to take care of primary emergencies and serious patients are referred to All India Institute of Medical Science (AIIMS), Safdarjung Hospital (SJH) and IIT empanelled hospitals in an Ambulance which is available 24X7 on all days.

IIT Delhi Hospital is the recognized centre for pulse polio immunization. The Hospital provides medical aid during Sports meet, Rendezvous, Annual Convocation, other Cultural functions and events. First aid and CPR demonstration are organized by the hospital for students and staff of the institute. Free educative and health check-up camps are also provided for the IIT community. The group A employees are given yearly check-up facility at well equipped health facilities.

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. Student are encouraged to keep in constant touch with his/her adviser 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 Alumni Association:
IITD Alumni Association is dedicated to bringing together the alumni community on a common platform to build another channel of personal and professional support to members through 'self-help' within community. IIT Delhi Alumni Association today has a membership of over 48,000 graduates from our alma mater and is growing at about 1,800 members a year. It is one of the most active alumni associations and operates through a network of national and international chapters. Our alumni are spread world over and figure amongst who's who worldwide. Apart from serving as a base for information about the alumni, it initiates programs and organizes events important to alumni, their alma mater, and in the national interest.

Key IITDAA initiatives:
- To promote and foster mutually beneficial interaction between the Alumni and the present students of IIT Delhi, and between Alumni themselves.
- To encourage the Alumni to take an active and abiding interest in the work and progress of the Institute so as to contribute towards the enhancement of the social utility of their Alma Mater.
- Alumni Award for Academic Improvement for students.
• Alumni Award for Community Service for students.
• Alumni Award for Research & Innovation for students.
• Award for “Outstanding Contribution to National Development” to recognize contributions made by IIT Delhi alumni in various facets of national development.

IITDAA world-wide chapters

Our active members, who occupy key leadership roles in various parts of the world including Australia, Bay Area (USA), Boston (USA), Chicago (USA), Canada, Germany, Middle East (UAE), Singapore and UK.

In India we have a strong presence in all major cities and we engage them from time to time in various social and cultural events.

CHAPTERS OF IITD ALUMNI ASSOCIATION IN INDIA/ABROAD

Chapters India

Ahmedabad : Sunil Parekh; M: 9825030828; Email: srparekh@gmail.com
Bangalore : Mr. Naresh Kumar Agarwal; M: 09663379049; Email: naresh.agarwal@gmail.com
Chandigar : Mr. Brij Mohan Gulati; (R) 0172-2703197, M: 9815094002; Email: jdgulati@glide.net.in
Chennai : President – JRK Rao (1978, Chemical, Kara), jrk@whatarage.com
    Vice President – Alok Bhatia (1983, Chemical, Kara), alokbhatia3@gmail.com
    Secretary – Vikash Goyal (2004, MBA, Jwala), vikash.pallavi@gmail.com
    Treasurer – Umesh Dhingra (1985, Civil, Jwala), umesh@askyourdronline.com
Hyderabad : Mr. Abhijith Jayanthi; Mobile: +91-9866898311; Email: hydchapter@iitdalumni.com & abhijith.jayanthi@yahoo.com
Kolkata : Mr. Biplab Shankar Bose; (R) 033 23373522 , M: 9830071282; Email: bipira_bose02@yahoo.co.in
    Ms. Anjali Saxena; M: 9836287182; Email: anj_goy@yahoo.co.in
Jaipur : President - Mr. Sudhir Bansal; M : 9829019770; Email: sudhir@dil.in
    Secretary - Mr. Chintan Bakshi; Email: chintan@startupoasis.in
    Treasurer - Mr. Yogesh Soni; M : 9352556138; Email: sonisoniyogesh@gmail.com
Mumbai : President, Mr. Parrag Jain Nainutia; M : 9422273210; Email: pjnainutia@gmail.com
    Vice President, Mr. Sandeep Jain; M : 86000 17717; Email: sandyrail2003@yahoo.co.in
    Vice President, Mr. Atul Agrawal; M : +91 98200 63639; Email: atulagarwal201@gmail.com
    Secretary, Mr. Gaurav Goyal; M : 9930949835; Email: gauravgoyal.iitd@gmail.com
    Jt. Secretary, Mr. Subhash Chandra, IRS; M : +91 87500 03865; Email: schandra.iitd@gmail.com
NCR East : Mr. Yogesh Andlay; M : 9810292741; Email: yogesh@iitdalumni.com
NCR South : Mr. Ramakant Gupta; Mob: +91-9871775613; Email: rkguptausha@gmail.com
    Mr. Pramod Sahu; Mob: +91-9868503771; Email: pramod.sahu@hotmail.com
Chapters Abroad

Australia : Pradeep Khanna, 1977, B.Tech., Founder & CEO, GLOBAL MINDSET, +61 401144553;
Email: pradeep_khanna@hotmail.com, pradeepk@globalmindset.com

Singapore : Ms. Paramita Das: 2011, M.Tech; M : 6586966483; Email: paramitadas.iitd@gmail.com

UAE : Mr. Khawaja Hasan, 2003, M.Tech, M : +971-50-4383420; Email: khawaja.iitd@gmail.com

Email: narendrakpal@gmail.com
Mr. Sanjiv Goyal, 1996, M.Tech, CEO and President of Droisys; M : +1 415 215 3582;
Email: sanjiv.g@droisys.com

UK : Amit Sharma, 1997, B.Tech., Electrical, +44 7809 735 241;
Email: indiaspecialistsales@gmail.com

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 neighbourliness 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.
S.V. Veeravalli, Ph.D. (Cornell Univ.)
Professor

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

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

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

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

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

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.

Sitikantha Roy, Ph.D. (Utah State Univ.)
Assistant Professor

Sanjeev Sanghi, Ph.D. (City Univ.)
Professor
Sushma Santapuri, Ph.D. (Ohio State)  
**Assistant Professor**  
Mathematical Modeling of Functional/Smart/Advanced Materials; Electrodynamics of Continua; Asymptotic Theories for Smart Composite Structures; Thermodynamics of Functional Materials; Rod and Plate Theories; Multiferroic Materials and their Applications.

Arghya Samanta, Ph.D. (UPMC, France)  
**Assistant Professor**  
Falling Film Instability, Twolayer Channel Flow, Flow Transport Through Porous Media.

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

M.K. Singha, Ph.D. (IIT Kharagpur)  
**Associate Professor**  

Sawan Suman, Ph.D. (Texas A & M)  
**Assistant Professor**  

Balaji Srinivasan, Ph.D. (Stanford)  
**Associate Professor**  

Vikrant Tiwari, Ph.D. (South Carolina Univ.)  
**Assistant Professor**  

Suhail Ahmed, Ph.D. (IIT Delhi)  
**Emeritus Professor**  

**Adjunct Faculty**  
Naval Architecture, Structural Design of Warships, Materials for Marine Vehicles.

Lt. Cdr. K. Vignesh Kumar, M.Tech. (IIT Kharagpur)  
**Adjunct Faculty**  

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, Warship Design, Ocean Engineering.
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, & (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:


• Hydrodynamic Stability Theory and Turbulence (Theory Computation and Experiments), Low Dimensional Modelling, Computational Fluid Dynamics; Compressible flows; Industrial Aerodynamics, Pollution Dispersion, Wind Effects on Structures, Diffusers, Impellers, Combustors, Hypersonic Flows, Renewable Energy.
• 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:**

**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 IDEA, ABAQUS, FLUENT, MATLAB, MATHCAD, Ship design tools– NAPA, PARAMARINE.

**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 Anemometry, 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.

**MTS Laboratory:** 250 kN and 25 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 100 T 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, Reflection polariscobe, Moire 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.
Atul Narang, Ph.D. (Purdue Univ.)
Professor
Systems Biology of Microbial Gene Regulation.

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.

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

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

Ashish Misra, Ph.D. (Rutgers The State University of New Jersey, New Brunswick)
Assistant Professor
Metabolic Analysis and Engineering; Clinical Diagnostics; Bioprocessing.

Prashant Mishra, Ph.D. (JNU)
Professor

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

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

Shilpi Sharma, Ph.D. (Ludwig-Maximilians-Univ.)
Associate Professor
Functional Microbial Ecology.

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.)
Professor
Biochemical Engineering, Modelling, Optimisation and Control of Bioprocesses, Plant Cell Biotechnology.

D. Sundar, Ph.D. (Pondicherry Univ.)
Associate Professor
Bioinformatics, Computational Genomics, Genome Engineering, Synthetic Biology.
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

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

Microbial physiology and biochemistry; Metabolic engineering; Recombinant DNA technology; Enzyme science and engineering; Animal and plant cell fermentations; Bioreactor design and analysis; Bioseparation and downstream processing systems; Biological waste treatment; Biological molecular machines; Biosensors; 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:

**Bioreactors:** Several bioreactors with capacities ranging from 0.5 to 300 litres, equipped with instruments for monitoring and control pH, temperature, dissolved oxygen, and gaseous O2/CO2 levels. A pilot plant facility is available for transferring laboratory scale data to industrial scale.
**Bioseparation:** Ultra-filtration unit, ultracentrifuge, ultrasonic disintegrator.

**Analytical equipment:** Elemental analyzer, HPLC, IC, GC, FPLC, GC-MS, ICP-MS, LC-MS and other chromatography systems; visible and UV spectrophotometer, CD Spectropolarimeter; Spectrofluorimeter; Fluorescence microscope; and Flow cytometer.

**Molecular biology:** Several molecular biology labs containing standard equipment such as laminar flow chamber, anaerobic work cabinet, centrifuges, water baths, sonicators, lyophilizer, isoelectric focusing unit, scanning laser densitometer, PCR, and RT-PCR electroporation-electrofusion system. There is also a lab equipped with a scintillation counter for working with radioisotopes.

**Computing facility:** A separate computation lab with several PCs is also 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.
Suddhasatwa Basu, FNASC, Ph.D. (IISc., Bangalore)
Professor

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

Mohammad Ali Haider, Ph.D. (Univ. of Virginia)
Assistant Professor
Heterogeneous Catalysis, Solid Oxide Fuel Cells, Biorenewable Chemicals & Biofuels, Molecular Modeling, DFT Simulations.

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)
Associate Professor
Hydrodynamic Stability, Polymer Processing, Computational & Theoretical Polymer Physics.

Sharad K. Gupta, Ph.D. (Brooklyn Univ.)
Professor
Transport Phenomenon, Membrane Separation Process.

Gaurav Goel, Ph.D. (Univ. of Texas, Austin)
Assistant Professor
Soft-condensed Matter, Protein Aggregation, Self-Assembly in External Fields.

Mohammad Ali Haider, Ph.D. (Univ. of Virginia)
Assistant Professor
Heterogeneous Catalysis, Solid Oxide Fuel Cells, Biorenewable Chemicals & Biofuels, Molecular Modeling, DFT Simulations.

Hariprasad Kodamana, Ph.D. (IIT Bombay)
Assistant Professor
Model Based Control, System Identification, Process Monitoring, Bayesian Inference, Process Data Analytics.
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 Houston)
Assistant Professor

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

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

Shantanu Roy, Ph.D. (Washington Univ.)
Professor
Multiphase Reaction Engineering, Radioactive Trace Particle Tracking.

Jayati Sarkar, Ph.D. (IIT Kanpur)
Associate Professor
Instabilities and Pattern Formation in Thin Films, Granular Materials, Computational Fluid Dynamics.

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

Munawar Shaik, Ph.D. (IIT Bombay)
Associate Professor
Process Systems Engineering, Modeling, Optimization and Scheduling of Chemical Processes.

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

Vikram Singh, Ph.D. (Cornell)
Assistant Professor
Low Re Number Fluid Mechanics, Suspensions, Emulsions, Colloids, Aerosols and Geothermal Energy.
K.D.P. Nigam, Ph.D. (UDCT, Mumbai)
Honorary Professor

Sree devi U., Ph.D. (IIT Kharagpur)
Associate Professor
Heterogeneous Catalysis & Reaction Engg., Thermochemical & Chemical Pathways to Renewable Liquid Fuels, Green Chemical Technologies.

Anil Verma, Ph.D. (IIT Delhi)
Associate Professor
Batteries, Graphene, Microbial & PEM/DM Fuel Cells, Electrochemical CO₂ Reduction, C/C Composites.
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 from 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 in the country who are not only experts in 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 kept for use by all the students. Some of the 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 systems, bench-top optical and electron microscopes, centrifuges, GCMS, TGA, DTA, TPD/TPR, submicron particle size analyzer, powdered particle shape analyzer, high speed photographic equipment, data loggers, high speed multipoint recorders, XRF, HPLC, ion chromatograph, CHN analyzer, 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, rheometer and a surface texture analyzer. More instruments are constantly added to this repertoire.

In addition to the analytical instrumentation facilities, there are also extensive computing facilities and softwares like Aspen 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 computers and a state-of-the-art Tata-Honey Well Automation Laboratory.

Approximately once a week, the department organizes a research seminar in which external speakers or our own PhD students present their research work. This helps the students to stay abreast with the latest developments in the Chemical Engineering field and also gives them a perspective about their own research from a global view standpoint. Summer and winter schools under quality-improved program (QIP) are also organized from time to time. 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 as a developer of 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 manufacturing technology for production of biotech therapeutics. 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 5 year Dual Degree (B.Tech + M.Tech.). At the postgraduate level, the Department offers M.Tech., M.S. (Research) and Ph.D. degrees. The teaching 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 by laying emphasis on self study component in courses and assigning them TA duties to mentor UG students. Opportunities are provided
to the students at all levels to get acquainted with the latest developments in the various areas of Chemical Engineering. Our institute also has an M.O.U. with Ethiopia and we regularly get students from there as part of our M.Tech. and Ph.D. foreign programmes.

**UNDERGRADUATE**

B.Tech. students need to do a compulsory foundation courses in the areas of basic sciences, humanities and social sciences, and engineering sciences along with Departmental core and elective courses. Departmental courses constitute about half of the total curriculum. Some of the core chemical engineering subjects include fundamentals of mass/heat transfer, chemical reaction engineering, process control, thermodynamics, fluid mechanics, plant design and economics. Students also do open electives to broaden their repertoire of interdisciplinary knowledge-base. Further, there is provision to do a minor degree, for example in computer science and engineering, for which a student needs to do additional credits in the minor area to be eligible for the minor area specialization.

**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 which includes first semester of course work followed by three semesters of rigorous research work. There are also provisions for doing a part-time M.Tech./MS for persons already employed in the industry and are looking for value addition in their knowledge base and resumes.

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 a set of the advanced chemical engineering courses in their first year while maintaining a minimum CGPA requirement. The various broad topics of PhD research include renewable and non-renewable energy, catalysis, multiphase reaction engineering and process intensification, complex fluids and rheology, advanced materials, process modeling simulation, optimization, process control, pharmaceutical biotechnology, environmental engineering and waste management.

**RESEARCH AREAS**

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 government funding agencies
The projects are directed towards development of innovative and indigenous technologies for processes relating to efficient heat and mass transfer, design of biosimilars, biomass thermo-chemical conversion processes, 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, natural gas production from gas hydrates, solid oxide fuel cells, waste water treatment and design of novel diagnostic bioassays. The research activities of the department can be broadly classified in the following subareas.

Bioseparations and Bioprocessing: Quality by design, biosimilars, process analytical technology, multivariate data analysis, development of novel bioseparations technologies, process modeling, continuous processing.

Colloids and Nanoscale Engineering: Colloidal assembly in external fields, bioresponsive nanomaterials, low-cost bioassays and biomedical devices, drug delivery systems, soft lithography, pattern formation in unstable liquid thin films.

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, communition 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: Microfluid 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 Dynamic Simulations:** Structure-property relationships in soft-condensed matter, protein folding and aggregation studies, directed self-assembly in external fields.

**Density Functional Theory (DFT) Simulations:** Theoretical understanding of catalytic and electrocatalytic reactions is developed by Density Functional Theory (DFT) simulations, performed using Vienna ab-initio Simulation Package (VASP). The simulations help in developing a better mechanistic understanding leading to the nanoscale design of the catalytic materials and guiding routes for efficient catalytic transformation.

**Petro Technology:** Design, performance and scale-up studies on major equipment used in petroleum and petrochemical industries such as trickle bed reactors, coil flow inverters, 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, data-driven modelling of processes, model based control, fault detection and diagnosis of process systems.

**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 aphrons and reverse micellar extraction, de-bittering of fruit juices for improved shelf life and taste.
A FEW DEPARTMENTAL RESEARCH STATISTICS

**Research funding:** The Department is highly proactive in writing research grants. This has resulted into sponsored R&D Projects worth more tha INR 100 Crore over the last five years. The faculty also regularly does industrial consultancy work. The year-wise split is shown in the adjoining bar graph.

**Number of peer reviewed international journal publications:** The Department is also very productive in writing scientific articles These articles are published in international journals of great repute. The year-wise data of the number of international journal articles published in the last 5 years in given in the adjoining graph. As can be seen, the number has increased significantly in the last 3 years.

**Technology developed:** No scientific expedition is complete without validation of its potential for technology development and our faculty focuses on this aspect tremendously in their research endeavors. The layout of technology developed in the last 5 years in the different research areas including renewable and non-renewable energy, catalysis, multiphase reaction engineering and process intensification, complex fluids and rheology, advanced materials, process modeling simulation and optimization, pharmaceutical biotechnology, environmental engineering and waste management,, is shown in the adjacently shown pie chart.
D.K. Bandyopadhyay, Ph.D. (I.A.C.S)
Professor
Metalloporphyrin Catalyzed Oxidation
Reactions of Organic and Organometallic
Compounds: Kinetics & Mechanistic Studies.

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

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.

Tanmay Dutta, 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.

Ashok K. Ganguli, Ph.D. (IISc., Bangalore)
Professor
Chemistry of Novel Materials (Dielectric Oxides,
Superconductors and Nanomaterials).

Shivajirao L. Gholap, Ph.D. (IISc., Bangalore)
Assistant Professor
Natural Product Synthesis and Their Biological
Studies, Development of New Synthetic Method
and its Application in Organic Synthesis.

V. Haridas, Ph.D. (NIIST, Trivandrum)
Associate Professor
Chemical Biology of Peptides and Proteins,
Biophysics of Peptide/Protein Folding.

Pravin P. Ingole, Ph.D. (University of Pune)
Assistant Professor
Electrochemical Techniques,
Electroanalysis, Nanomaterials.

Nidhi Jain, Ph.D. (Delhi Univ.)
Associate 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 Univ.)  
Assistant Professor  

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

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

Kuntal Manna, Ph.D. (Iowa State University, USA)  
Assistant Professor  
Homogeneous and Heterogeneous Catalysis, Metal-organic Frameworks.

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

Sayantan Paria, Ph.D. (Indian Assa. for the Cultivation of Sci.)  
Assistant Professor  
Bioinspired Inorganic Chemistry, Water Oxidation Catalyzed by transition Metal Complexes, Nitrogen Fixation, Spectroscopic Characterization of metastable Reaction Intermediates.

Siddharth Pandey, Ph.D. (Univ. of North Texas)  
Professor  

Nalin Pant, Ph.D. (Princeton Univ.)  
Professor  
Theoretical and Experimental Studies on Molecular Conformation, Molecular Recognition.

Arunachalam Ramanan, Ph.D. (IISc., Bangalore)  
Professor  

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

Sameer Sapra, Ph.D. (IISc., Bangalore)  
Associate Professor  
Nanomaterials, Semiconductor Nanocrystals, Quantum Dots, Light Emitting Devices, Charge Transfer and Photovoltaics including DSSC and QDSC.
Ajai Kumar Singh, Ph.D. (Delhi Univ.)
Professor
Organochalcogen Ligand Chemistry, Designing of Metal Complexes for Catalyzing Organic Reactions.

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

Ravi P. Singh, Ph.D. (IIT Kanpur)
Assistant Professor
Asymmetric Catalysis, C-H and C-F Activation, Total Synthesis of Small Molecules.
INTRODUCTION

The Department offers M.Sc., M.Tech. and Ph.D. programmes in Chemistry and also caters chemistry courses for B.Tech. students in engineering disciplines. It provides good opportunities for research at doctoral and post-doctoral level 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 as well as winter workshops. 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 “ADVANCED CHEMICAL SYNTHESIS AND ANALYSIS” is one-of-a-kind programme in the country which 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.

- **Analytical Chemistry:** Optical Spectroscopy, Environmental / Chemical Analysis, Electroanalytical Methods.
- **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 as part of the department facilities:

- Single Crystal X-ray Diffractometer (Bruker).
- Powder X-ray Diffractometer (Bruker).
- DPX-300 NMR Machine (Bruker), 500 MHz NMR.
- FTIR Spectrometer (Nicolet, Protege 460).
- Electrochemical (CH Instruments) and Spectro-electrochemical set-up (Metrohm Autolab, PGSTAT-302N).
- UV-Visible Spectrophotometer (Lambda Bio 20, Perkin Elmer / Model 330, Hitachi, Beckman).
- Thermal Gravimetric Analyzer (Perkin Elmer).
- Differential Scanning Calorimeter (Perkin Elmer).
- C,H,N Analyzer 2400 (Perkin Elmer).
- Steady-State Fluorescence Spectrometer.
- Fluorescence Lifetime Spectrometer.
- Fast Protein Liquid Chromatography.
- Gas Chromatograph (Dionex).
- Gel Permeation Chromatography.
- High Pressure Liquid Chromatograph (Waters 1525) GPC.
- Vapour Pressure Osmometer (Knauer).
- Polarimeter (Rudolph).
- Ion Chromatograph (792 Basic IC, Metrohm).
- Supercomputing Facility for Bioinformatics and Computational Biology.
- Glass Blowing.
- Polymerase Chain Reaction System.
- Gel Documentation System.
- CD Spectrometer.
- Dynamic Light Scattering System.
- Glove Box.
- ESI MS/MS Mass Spectrometer (Bruker), Confocal Microscope (Nanonics).

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

Head 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.)
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)
Associate 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.)
Associate Professor

Manoj Datta, Ph.D. (IIT Delhi.)
Professor
Geotechnical Engineering, Geoenvironment, Landfills, Ash Ponds, Tailings, Ground Improvement, Slope Stability, Dams, Offshore Geotechnology.
Abhijit Ganguli, Ph.D. (ULB, Belgium)
Assistant Professor

Ashok Gupta, Ph.D. (IIT Delhi)
Professor
Structural Engineering, Earthquake Engineering, Health Monitoring of Structures.

Supratik Gupta, Ph.D. (Nagoya Univ.)
Assistant Professor
Structural Engineering, Concrete Mechanics, Self Compacting and High Performance Concrete, Utilization of Marble, Granite Powder in Concrete and Frc.

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

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

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)
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.)
Associate Professor
Human Health Risk Assessment, Nanoparticles, Water Treatment, Decision-making, Emerging Contaminants.
N.M. Anoop Krishnan, Ph.D. (IISc., Bangalore)
Assistant Professor

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)
Associate Professor
Foundations for Industrial Machines, Dynamic Soil-Pile Interaction, Soil Dynamics, Foundation Engineering, Geotechnical Earthquake Engineering.

M. Manoj, Ph.D. (IISc., Bangalore)
Assistant Professor
Transportation Planning, Activity/Travel Demand Modelling, Long-Term Mobility Decisions, Travel Behaviour Data Collection, Built Environment and Travel Behaviour, Econometric Modelling.

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

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

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

Nezamuddin, Ph.D. (Univ. of Texas)
Assistant Professor
Transportation Network Analysis, Transportation Logistics and Optimization, Traffic Operations, Intelligent Transportation Systems.

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.

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

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

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

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

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

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

Dhanya C.T. Ph.D. (IISc., Bangalore)
Assistant Professor

A.K. Gosain, Ph.D. (IIT Delhi)
Professor
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 different frontier areas of research in Civil Engineering. The Department has faculty of international reputation and possesses laboratories/research/computational facilities comparable to any lead in 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 service professionals through training and continuing education programs. The Department undertakes curriculum development activities by updating the existing course, developing new courses and preparing resource materials for teaching.

ACADEMIC PROGRAMMES

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; Landfill Engineering; Ground Improvement; Geotechnical Earthquake Engineering, Seismic Microzonation; Geotechnology related to Roads and Railway Tracks.


**Transportation Engineering:** Travel demand modeling, Public transport planning and operations (BRT, Metro, LRT, Bus systems), Traffic engineering and management, Traffic flow modeling and simulation (heterogeneous traffic), Pedestrian dynamics and evacuation modeling, Transportation system analysis, Urban and regional transportation system planning, Planning and modeling of non motorized transport system (pedestrian, bicycles), Traffic safety, Accident prediction modeling, Highway safety analysis, Evaluation of pavement materials, Modeling of pavement materials, Pavement Design and Modelling Economic Analysis to Transportation Systems, Airport engineering, Continuum damage mechanics, Recycling of pavement materials, Bitumen rheology.


**Doctoral research is being carried out in the following areas:**
Structural Dynamics and Control Systems, Elastodynamics and Stability, Smart materials & Structures, Structural Health Monitoring, Engineered Bamboo Structures, Micro-Structural Modelling of Cements and Supplementary


Contraction Management System Engineering and Design, Transport planning; Transport policy; transportation safety; construction work zone safety; Heterogeneous Traffic flow modeling; Traffic safety and capacity of hill roads; Mass transportation planning; Fuzzy systems; urban transport infrastructure planning and design; Expert systems in transportation engineering; Environmental impact assessment; Non-motorized transport planning; Modeling of pedestrian behavior; Geometric design of transportation infrastructure; Characterization of pavement materials; Pavement design (flexible and rigid); Damage modeling of bitumen and bituminous mixtures; Constitutive modeling of pavement materials; Recycling of civil infrastructure materials; Rheology of asphaltic materials; Condition assessment of highway infrastructure; Pavement management systems; Highway engineering; Airport infrastructure. Environmental Impact Assessment of Transportation and Urban Environment.

to Moisture, Application of Neural Networks in Water Resources Modelling; Bio-remediation of Soils, Irrigation Water Management, Climate Change and its Impact on Water Resources; GIS Applications in Water Resources Modelling; Morphotectonic and Geological Studies. Natural Hazards such as Landslides, Coastal Erosion etc. and Environmental Monitoring, Pattern Recognition in Remote Sensed Data, Digital Terrain Modelling and Computer Applications and Photogrammetry.

LABORATORY FACILITIES

Structural Engineering Laboratories is a cluster of 10 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 shaber, 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, 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. MASW
Shear wave velocity field testing apparatus, Geosynthetics test equipment for pullout, interface and sliding.

**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. Traffic data collection
system (miovision), Rut tester, Dynamic shear rheometer.

**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 re-circulating 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, LAN facilities for satellite image processing and application softwares dealing with ARCGIS and Expert System (LEVEL 5 OBJECT). Experimental facilities include 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.
ROSHNI INDOOR NAVIGATION SYSTEM FOR VISUALLY IMPAIRED

Waist Module

Wall Module

Users Navigating with Roshni

Mobile Application
Saroj Kaushik, Ph.D. (IIT Delhi)
Professor
Artificial Intelligence, Location Based Services.

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

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

Rahul Narain, Ph.D. (Univ. of North Carolina)
Assistant Professor
Computer Graphics, Animation.

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

Kolin Paul, Ph.D. (BESU)
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
Database and Information Retrieval Techniques for Semantic Web Data Management, Information Extraction and Opinion Mining.

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

Smruti Ranjan Sarangi, Ph.D. (Univ. of Illinois)
Associate Professor
Computer Architecture, Operating Systems.

Aaditeshwar Seth, Ph.D. (Waterloo Univ.)
Associate Professor
Computer networks, Social Network Analysis.
Rijurekha Sen, Ph.D. (IIT Bombay)
Assistant Professor
Embedded System, Mobile OS, Privacy Security.

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

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

Parag Singla, Ph.D. (Washington Seattle Univ.)
Assistant Professor
Machine Learning, Social Network Analysis, Artificial Intelligence.

Subhash Bhalla
Guest Faculty
New Query Languages for Web-users, Distributed Information Systems, Management of Voluminous Data.

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

Rajiv Shorey, Ph.D. (IISc. Bangalore)
Adjunct Faculty
Networks and Internet of Things.

Nisheeth Vishnoi, Ph.D. (Georgia Inst. of Tech., Atlanta)
Adjunct Faculty
Algorithms, Complexity and Optimization.

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

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

B.N. Jain, Ph.D. (State University of New York)
Visiting Professor

Srikant Bedathur, Ph.D. (IISc. Bangalore)
Adjunct Faculty
Computer Science, Data Management, Knowledge Discovery and Data Mining, Natural Language Processing.

Deepak Kapur, Ph.D. (MIT, USA)
Honorary Professor
Formal Methods, Program Analysis, Distributed Computing, and social Aspects of Computing.

Yogish Sabharwal, Ph.D. (IIT Delhi)
Adjunct Faculty
High Performance Computing Group IBM India Research.
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 28+ 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 PROGRAMMES

It currently offers B.Tech., 5 year Integrated Dual Degree, M.Tech., M.S. (Research) and Ph.D. programmes in Computer Science and 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 550 (280 in Undergraduate, 150 in dual degree, 70 in Masters and 50 in Doctoral programmes). Admission to the programmes is highly competitive; for the undergraduate and dual degree programmes, there is a nationwide 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 nationwide 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 Theory and Algorithms, Randomized Algorithms, Computational Geometry, High-Speed Networks, Network Based
Information Systems, Multimedia Communication, Wireless Networks, Network Security, Computer graphics, 3D Animation, 3D Modeling, Virtual reality, Visualization, Combinatorial optimization, Web services and SOA, Software architecture evaluation, Dynamic and static approaches to program checking, Semantics and verification, Data analytics, Social network analysis.

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 workstation 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/s links. 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 Synopsys) 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 co-processor boards for implementing designs up to 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 and 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, Machine Learning, 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 ₹30 million in diverse areas. Sponsored research projects have been carried out in many areas in the last five years. These include:
- Machine Learning
- Sensor Networks
- Computer Graphics
- Computer Vision
- Parallel Computation and High-Performance Computing
- Application Specific multi-processor SOC Design
- Design Methodology for Embedded Real-time 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
- Mobile OS
- Privacy Security
- Animation

**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, S. Banerjee, Amit Kumar, 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, Subodh Kumar and Rahul Narain). (Website: http://www.cse.IITDelhi.ac.in/vglab)


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, Mausam and Sayan Ranu).

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).

DEPARTMENT OF DESIGN
P.V. Madhusudhan Rao, Ph.D. (IIT Kanpur)
Professor
Product Design and Realization, Computer Aided Design & Manufacturing.

Jyoti Kumar, Ph.D. (IIT Guwahati)
Assistant Professor

Srinivasan Venkataraman, Ph.D. (IISc., Bangalore)
Assistant Professor

Sumer Singh, M.Des. (IIT Delhi)
Assistant Professor
**INTRODUCTION**

Design has enormous impact on human lives and is a vehicle for social and economic progress of any country. Keeping this in mind, IIT Delhi has started a new Department of Design which came into existence in the year 2017. Major objectives of creating this department are:

1. Imparting high quality design education to produce industry-ready and socially conscious design professionals.
2. Create new leaders in design among both faculty and students.
3. To inculcate design thinking among students and faculty across the campus.
4. Advancing knowledge through high impact research in the area of design.
5. To promote, nurture and advance the culture of design and innovation in the institute leading to significant contributions and breakthroughs impacting quality of human life.
6. Playing major role in addressing some of the grand challenges facing our society/country by designing and delivering products/solutions through multi-disciplinary teams.
7. Contribute to creation of intellectual property and entrepreneurial ecosystem in the institute and country.
8. Contribute to betterment of institute campus ambience using design as a tool.
9. To build flagship programmes in the area of design which can be replicated in other institutes/universities in our country.
10. To promote increased interactions/collaborations with institutes/organizations worldwide working in this area design education and research.


The faculty of department of design are responsible for running two postgraduate programs in the area of design namely Master of Design (M.Des.) in Industrial Design and Doctor of Philosophy (Ph.D.). Department has also started minor area in Design for B.Tech. students to specialize in. Department is planning to start Bachelor of Design (B.Des.) programme which will be launched in coming years.
DEPARTMENT OF

ELECTRICAL ENGINEERING
Abhijit R. Abhyankar, Ph.D. (IIT Bombay)
Associate Professor

Sumeet Agarwal, D.Phil. (Oxford Univ., U.K.)
Assistant Professor

Shubhendu Bhasin, Ph.D. (Univ. of Florida)
Associate Professor

Manav Bhatnagar, Ph.D. (Oslo Univ.)
Associate Professor

Debanjan Bhowmik, Ph.D. (University of California Berkeley)
Assistant Professor
Magnetism, Spintronics, Micromagnetics, Memory devices, Condensed Matter Physics.

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

Ranjan Bose, Ph.D. (Pennsylvania Univ.)
Professor, (Microsoft Chair)
Wireless Communications, Broadband Wireless Access, Ultra Wideband Communications (UWB), Information Theory and Coding.

Shouribrata Chatterjee, Ph.D. (Columbia Univ.)
Associate Professor (NXP/Philips Chair)

S. Chaudhury, Ph.D. (IIT Kharagpur)
Professor (Dhananjay Chair)
Computer Vision, Multimedia Systems, Computational Intelligence.

Anandarup Das, Ph.D. (IISc., Bangalore)
Assistant Professor
Power Electronics, High Power Multilevel Converters, Electric Drives, Modular Converters, Power Quality.
Swades De, Ph.D. (State Univ. of New York)
Professor
Communication Networks and Systems, Broadband Access and Mesh Networks, Performance Modeling and Analysis.

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

Abhisek Dixit, Ph.D. (K U Leuven Belgium)
Associate 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.

Abhishek Dixit, Ph.D. (Ghent University)
Assistant Professor
Optical Networks, Fibre-Wireless Converged Networks.

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

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

Harshan Jagadeesh, Ph.D.
Assistant Professor

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

Jayadeva, Ph.D. (IIT Delhi)
Professor
Machine Learning, Neuromorphic Engineering, VLSI Design, Swarm Intelligence Optimization.

I.N. Kar, Ph.D. (IIT Kanpur)
Professor
Robust Control, Mechatronics, System Identification, Intelligent Control, Non-linear Systems.

Subrat Kar, Ph.D. (IISc., Bangalore)
Professor, (Ram and Sita Sabnani Chair)
Photonic Switching, Optical Networks, Computer Communication Networks.

M. Jagadesh Kumar, Ph.D. (IIT, Madras)
Professor
Lalan Kumar, Ph.D. (IIT Kanpur)  
Assistant Professor  
Array Signal Processing.

B.K. Panigrahi, Ph.D. (Sambalpur Univ.)  
Professor  
Power Quality, FACTS Device, Power System Protection, AI Application to Power System.

Deepak U. Patil, Ph.D. (IIT Bombay)  
Assistant Professor  
Optimal Control, Multi-Agent Systems, Switched and Hybrid Systems.

Mashuq-un-Nabi, Ph.D. (IIT Bombay)  
Associate Professor  

B.K. Panigrahi, Ph.D. (Sambalpur Univ.)  
Professor  
Power Quality, FACTS Device, Power System Protection, AI Application to Power System.

R.K. Mallik, Ph.D. (Univ. of Southern California)  
Professor, (JC Bose Fellow)  
Communication Theory and Systems, Difference Equations, Linear Algebra.

Bhaskar Mitra, Ph.D. (University of Michigan)  
Assistant Professor  
MEMS and Microfabrication, Microfluidics, Plastic MEMS, Microplasmas, Gas Phase Nanofluidics.

Saif Khan Mohammed, Ph.D. (IISc, Bangalore)  
Associate Professor  

Mashuq-un-Nabi, Ph.D. (IIT Bombay)  
Associate Professor  

Ramkrishan Maheshwari, Ph.D. (Aalborg University, Denmark)  
Assistant Professor  
Power Electronics, Power Converters, Electric Drives, Grid-Connected Converters, DC-DC Converters.

Bhaskar Mitra, Ph.D. (University of Michigan)  
Assistant Professor  
MEMS and Microfabrication, Microfluidics, Plastic MEMS, Microplasmas, Gas Phase Nanofluidics.

Deepak U. Patil, Ph.D. (IIT Bombay)  
Assistant Professor  
Optimal Control, Multi-Agent Systems, Switched and Hybrid Systems.

S. Prakriya, Ph.D. (Univ. of Toronto)  
Professor  
Signal Processing for Communications, Cooperative Links, Cognitive Radio.

Sumantra Dutta Roy, Ph.D. (IIT Delhi)  
Associate Professor  
Computer Vision and Image analysis, Pattern Recognition, Audio Data Retrieval and Analysis, Biometrics and Bioinformatics.
Mukul Sarkar, Ph.D. (Technical University of Delft)
Associate Professor

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

Shaunak Sen, Ph.D. (California Instt. of Tech.)
Associate Professor
Control Systems, Dynamical Systems.

Bhim Singh, Ph.D. (IIT Delhi)
Professor (JC Bose Fellow)
Power Electronics, Electrical Machines and Drives, HVDC, FACTS, Power Quality, Renewable Energy, DSP Based Control of Power Converter and Drive.

Manan Suri, Ph.D. (INPG, France)
Assistant Professor

P. R. Bijwe, Ph.D. (IIT Delhi)
Emeritus Professor

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

Vivek Venkataraman, Ph.D. (Rajasthan Univ.)
Assistant Professor (Joint Faculty Phy/EE)
Nonlinear & quantum optics, fiber & integrated photonics, light-matter interaction & atomic physics, all-optical devices & novel light sources, optical signal processing and communication.

Seshan Srirangarajan, Ph.D. (University of Minnesota, USA)
Assistant Professor

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

B. Bhaumik, Ph.D. (IIT Kanpur)
Emeritus Professor
Biological Neural Networks, Analog and Mixed Signal VLSI Circuits.
Devi Chadha, Ph.D. (IIT Delhi)
*Emeritus Professor*
Optical Communication and Networks, Photonics, Microwave, Electromagnetics.

Vinod Chandra, Ph.D. (IIT Delhi)
*Emeritus Professor*

Hiranmay Ghosh, Ph.D. (IIT Delhi)
*Adjunct Faculty*

V.K. Jain, Ph.D. (IIT Delhi)
*Emeritus Professor*
Noise Study and Modeling, Digital Communications, Data Communications and Optical Communications and Networks.

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

M.L. Kothari, Ph.D. (IIT Delhi)
*Visiting Professor*
Power System Control, Stability, Protection, FACTS, Neutral Networks and Fuzzy Logic Systems.

Mona Mathur, Ph.D. (IIT Delhi)
*Adjunct Faculty*
Multimedia Systems, Video Processing and Compression, Social Media Analytics, Machine Learning.
INTRODUCTION

The faculty members of the department are involved in teaching and research in a wide variety of areas in electrical engineering.

The department offers two undergraduate programmes and nine post-graduate 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 foci 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 Engineering Department and Mechanical Engineering Department).
• 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. (Research) 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 and 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.
HEAD OF THE DEPARTMENT

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

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.

Bijoy H. Boruah, Ph.D. (Guelph Univ.)
Professor
Philosophical Aesthetics, Philosophy of Mind, Ethics and Value Theory, Metaphysics of the Self.

Arudra Burra, Ph.D. (Princeton University, USA)
Assistant 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.)
Associate 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, Historical Anthropology, Medical Anthropology, Migration, Kinship, Qualitative Research Methods.

Yashpal Jogdand, Ph.D. (University of St. Andrews)
Assistant Professor
Social Identity, Intergroup Relations, Humiliation, Prejudice and Stereotyping.
Ravinder Kaur, Ph.D. (Delhi Univ.)
Professor

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.

Stuti Khanna, D. Phil. (Oxford Univ.)
Associate Professor
Modernism, Postcolonialism Twentieth-Century Literature, Indian Writing in English, Cities and Gender.

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

Reetika Khera, Ph.D. (Delhi School of Economics)
Associate Professor

Bharati Puri, Ph.D. (Jawaharlal Nehru Univ.)
Associate Professor
Philosophy of Culture and History, Moral and Political Philosophy, Contemporary Thought and Intellectual History, Deep Ecology, Buddhism and Politics, Exile and Travel, Religion and Politics, Religion in East Asia, Peace Studies, Tibet/Tibetan Literature and Politics, Ethnicities and Margins, Culture Religion and Politics in Ladakh, Children and Literature.

Richa Kumar, Ph.D. (Massachusetts Institute of Technology)
Associate 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)
Associate Professor
International Trade, Economic Growth, Public Economics.

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

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

Ambuj D. Sagar, Ph.D. (Massachusetts Institute of Technology)
Professor
<table>
<thead>
<tr>
<th>Name</th>
<th>Degree</th>
<th>Position</th>
<th>Research Interests</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paroma Sanyal</td>
<td>Ph.D. (English and Foreign Languages University, Hyderabad)</td>
<td>Associate Professor</td>
<td>Phonology and Syntax, Theoretical Frameworks: Optimality Theory, Lexical Phonology, Distributive Morphology, Minimalism, Minor Research Area Language Teaching: English Language Teaching, Task-based Language Teaching.</td>
</tr>
<tr>
<td>Jayan Jose Thomas</td>
<td>Ph.D. (IGIDR, Mumbai)</td>
<td>Associate Professor</td>
<td>Labour, Capital and Technology in Indian Industrialization.</td>
</tr>
<tr>
<td>Naveen Thayyil</td>
<td>Ph.D. (Tilburg University)</td>
<td>Assistant Professor</td>
<td>Law, Techno-science and Democratization, Regulatory Issues in New and Radical Technologies, Democratization of Regulation of Technology, Risk Regulation, Use of ethics in Technology Regulation, Development of Technologies and Public Contestations, Public Participation in Regulation.</td>
</tr>
<tr>
<td>C.A. Tomy</td>
<td>Ph.D. (Univ. of Hyderabad)</td>
<td>Professor</td>
<td>Philosophy of Mind and Cognition, Philosophy of Science, Scepticism, Metaphysics and Self.</td>
</tr>
<tr>
<td>V. Upadhyay</td>
<td>Ph.D. (McMaster Univ.)</td>
<td>Professor</td>
<td>Development Economics, Economic Theory, Indian Economy.</td>
</tr>
<tr>
<td>Kamlesh Singh</td>
<td>Ph.D. (Univ. of Rajasthan)</td>
<td>Associate Professor</td>
<td>Positive Psychology, Applied Positive Psychology, Environmental Psychology, Psychometrics, Community Psychology, Rural Women and Adolescents.</td>
</tr>
<tr>
<td>Milind Wakankar</td>
<td>Ph.D. (Columbia University)</td>
<td>Associate Professor</td>
<td>Indian Mystical Traditions and the Modern Critique of Caste.</td>
</tr>
<tr>
<td>Sanil V.</td>
<td>Ph.D. (IIT, Kanpur)</td>
<td>Professor</td>
<td>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.</td>
</tr>
<tr>
<td>Upasna Sharma</td>
<td>Ph.D. (IIT Bombay)</td>
<td>Assistant Professor</td>
<td>Climate Change, Disaster Management, Hazard Early warning Systems, Index-Based Agricultural Insurance, Traditional Knowledge Systems for Weather Prediction, International Negotiations on Climate Change.</td>
</tr>
<tr>
<td>Simona Sawhney</td>
<td>Ph.D. (University of California)</td>
<td>Associate Professor</td>
<td>South Asian Language and Literature, Postcolonial Literature and Theory, Sanskrit Literature, Literary Theory.</td>
</tr>
</tbody>
</table>

**Indian Institute of Technology Delhi**
INTRODUCTION

The Department of Humanities & Social Sciences is an integral part of the Indian Institute of Technology Delhi. The Department houses most of the major disciplines of Social Sciences and Humanities with disciplinary and multi-disciplinary Ph.D. programmes, as well as a diverse range of Undergraduate elective courses at different levels. In addition to these, the Department also runs a Language Learning Centre for strengthening English Language skills. We also run short-term courses in French, German, Spanish and Japanese for students who wish to learn a foreign language.

ACADEMIC PROGRAMMES

UNDERGRADUATE

IITs are mandated to pursue teaching and research in science, technology and arts. IIT Delhi regards knowledge of Humanities and Social Sciences as a core value. All UG students must complete a minimum of 15 credits in HUSS courses. The courses offered for UG students are drawn from all the disciplines of the Department: Economics, Linguistics, Literature, Philosophy, Psychology, Policy Studies, and Sociology and some are also inter or multi-disciplinary. Courses are divided between 200 level and 300 level, and some advanced UG students may also choose to opt for 700 or 800 level courses, apart from doing an independent research paper in any of the HUSS disciplines.

POSTGRADUATE

We run a robust Ph.D. programme which is both disciplinary as well as inter-disciplinary. We have both a full-time as well as part-time Ph.D. programme to enable those who may be working to continue their academics. HUSS is one of the few departments that offer a genuine inter-disciplinary approach to academics that is both based on a strong disciplinary foundation and yet open to non-traditional ideas and approaches. We promote and support multidisciplinary work of the kind that is possible only when creative researchers from various disciplines are in close locational and intellectual proximity through pre-Ph.D. courses that provide a specialized disciplinary perspective as well as collaboratively taught courses which have a broader inter-disciplinary orientation. We also have Post-Doctoral positions where young doctorates are encouraged to continue their research in a supportive and intellectually exciting atmosphere.

RESEARCH

Doctoral research is being carried out in: Educational Psychology Industrial and Organizational Psychology: Organizational Behavior, Human Resource Management, Social Psychology, Positive Psychology, Environmental Psychology, Cognitive Psychology; Sociology of Culture and Knowledge, Sociology of Development, Sociology of

LABORATORY FACILITY

The Department has a Language Learning Centre offering support to all first year students to enhance their language and communication skills. The Department also houses a Cognitive and Behavioural Sciences Laboratory for teaching and research in Psychology and Linguistics. A new Economics Laboratory is in the process of being set up.
DEPARTMENT OF MANAGEMENT STUDIES
M.P. Gupta, Ph.D. (IIT Delhi)
Dhananjaya Chair Professor
Information System Policy.

M. P. Gupta, Ph.D. (IIT Delhi)
Professor

Kanika T. Bhal, Ph.D. (IIT Kanpur)
Professor

Arpan Kumar Kar, Fellow, Ph.D. (XLRI)
Assistant Professor
Digital Transformation, Business Analytics, E-governance, Information Assurance.

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

Harish Chaudhary, Ph.D. (IIT Delhi)
Associate Professor

Jitendra Madaan, Ph.D. (IIT Delhi)
Assistant Professor
Supply Chain Management, Healthcare System Management, Green and Sustainable Energy Management, Data, Simulation, Project Management, Supply Chain, and Big Data/Block Chain Technology.

P. Vigneswara Ilavarasan, Ph.D. (IIT/K)
Associate Professor
Information and Communication Technologies & Development (ICTD), ICTs & Government, Social Media & Business Practices, CAQDAS.

Sanjay Dhir, Fellow, Ph.D. (IIM, Lucknow)
Assistant Professor
Strategic Thinking, Innovations, Ambidexterity, Corporate Strategy, Alliances and Joint Ventures.

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

Jitendra Madaan, Ph.D. (IIT Delhi)
Assistant Professor
Supply Chain Management, Healthcare System Management, Green and Sustainable Energy Management, Data, Simulation, Project Management, Supply Chain, and Big Data/Block Chain Technology.

Mahim Sagar, Ph.D. (IIITM, Gwalior)
Associate Professor

Ravi Shankar, Ph.D. (IIT Delhi)
Amar S. Gupta Chair Professor
Seema Sharma, Ph.D. (IIT Delhi)
Associate Professor

Surya Prakash Singh, Ph.D. (IIT Kanpur; PDF, NUS Singapore-MIT USA Alliance)
Associate Professor

Shveta Singh, Ph.D. (Univ. of Allahabad)
Associate Professor
Financial Management, Security Analysis and Portfolio Management, Corporate Governance & CSR.

Shuchi Sinha, Ph.D. (Univ. of London)
Assistant Professor
Leadership, Managing Change Workplace spirituality, Workplace Deviance.

Sushil, Ph.D. (IIT Delhi)
Abdulaziz Alsagar Chair Professor

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

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

Sudhir K. Jain, Ph.D. (IIT Kanpur)
Adjunct Faculty
Ex. Professor, DMS, IIT Delhi.

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

Dennis F. Galletta
Adjunct Faculty
Professor, Katz Business School University of Pittsburgh, (USA)

Stan Kachnowaski
Adjunct Faculty
Ph.D., MPA, CSEP, RSM Chair | HITLAB Visiting Professor | IIT New Delhi Fellow | Royal Society of Medicine Chair | NYC EDC Digital Health Breakthrough Network.

Zach G. Zacharia
Adjunct Faculty
Department of Management, College of Business Administration & Economics Lehigh University, USA.
Christian Hicks
Adjunct Faculty
Deputy Director of Newcastle University Business School, Newcastle University, NE1 7RU, United Kingdom.

Soumitra Dutta
Adjunct Faculty
Founding Dean of Cornell SC Johnson College of Business Cornell University.

Neeru Chaudhry
Full-time Visiting Professor
Corporate Finance.

Venkat Ram Reddy
Full-time Visiting Professor
Cognition, Dispositions, Emotions, Judgment and Decision Making, and Social Norms.

Harshwardhan Mishra
Full-time Visiting Professor

Ranjan Pal
International Guest Faculty
Research Scientist – Viterbi School of Engineering University of Southern California (USA).

Arvind Mahajan
International Guest Faculty
Lamar Savings Professor of Finance Texas A&M University (USA).

Tim Unwin
International Guest Faculty
UNESCO Chair in ICT4D and Emeritus Professor, Royal Holloway, University of London (UK).
GUEST FACULTY

Prof. Prem Vrat, Ex. Professor, IIT Delhi & Ex-Director, IIT Roorkee
Prof. D.K. Banwet, Ex. Professor, DMS, IIT Delhi
Prof. Anuradha Balram, Chief Cord, Awakened Citizen Program NGO of RK Mission
Prof. Dipanjan Goswami, Lead Research Scientist at Ranbaxy Farmaceutical Ltd.
Prof. Ansh Gupta, Co-founder of Bogatchi Chocolates, Delhi
Mr. Atif Alvi, DGM, Recovery Division, SEBI
Prof. Punita Taneja, Director, PC Solutions Pvt. Ltd.
Mr. Siddhartha Misra, DGM, Dept. of Banking Supervision, RBI
Prof. Radhika Mittal, Sr. Research Associate, University of Hamburg, Germany
Prof. Attam Praksh, Ex Director, Centre for Promotion of Trade and Technology, New Delhi
Prof. Sandeep Goyal, CEO Shared Value (Institute of Competitiveness)
Prof. Anuj Kumar Srivastava, Former Executive Director, MTNL, Delhi
Prof. M.M. Chaturvedi, Chief Research Officer at CISO Cyber Security Pvt. Ltd.
Prof. Nikhil Verma, Faculty of Management of Ramapo College of New Jersey
Ms. Supriya Jain, Founder of Scribblers India

Prof. Ishita Tripathy, Director, Investment Division Department of Economic Affairs, GOI
Prof. Eda Ulus, University of Leicester, UK
Mr. Parvin Kumar, AST Corporation Chicago
Mr. Kanwal K. Muthu, President, Corporate Consultancy Services, Gurgaon
Prof. Navneet Arora, Department of Mechanical Engineering, IIT Roorkee
Mr. Pankaj Dubey, Managing Director, Polaris India, CEO & Director, Eicher Polaris, Startup Turnaround Specialist & Entrepreneurial Leader
Mr. G.P. Raghavender, Joint Secretary, Dept. of Justic Ministry of Law & Justic, GOI
Prof. Priyanka Vallabh, MDI, Gurgaon
Mr. Vatsal Juvarirda, Vice President, Global Marketing & Sales
Prof. A.K. Nigam, Vice President, Global Marketing & Sales
Prof. A.K. Nigam, Director HR & CSR Whiteswan Consulting Group (WCG India)
Prof. Alka Gupta, New Multan Nagar, New Delhi
Prof. Manpreet Kaur, Bharati Vidyapeet Institute of Management, Paschim Vihar, New Delhi
Mr. Himanshu Manglik, President WALNUTCAP Consultant LLP, Delhi
INTRODUCTION
The Department currently runs three variants of MBA program: a two-year full-time MBA programme, a two-year full-time MBA programme with focus electives on ‘Telecommunication Systems Management’ under the aegis of Bharti School of Telecom Technology and Management and a three-year Executive MBA programme with focus electives on ‘Technology Management’. Department offers functional electives in Finance, Marketing, Information Systems, Strategy, operations Management, Human Resource etc. The students in two-year full time MBA programme are admitted through a rigorous screening process of CAT (Common Admissions Test)*, Group discussion and Personal interview.

Department of Management Studies (DMS) has heavy research orientation as its forte, which is further used extensively for designing courses to respond to the current industry issues. The course content is very contemporary and has involved various stakeholders including industry experts, CEOs and our alumni. DMS faculty who have served on various UN related bodies and international professional associations are widely acclaimed internationally for their contributions in knowledge generation and research publications. Stanford has ranked DMS 2nd for its research output among IIMs and IITs. The faculty members are sought after nationally and internationally for consulting activities and research projects and have been widely acclaimed for their contributions. Till date in more than three decades of existence, over 150 PhDs have been groomed by Department. The faculty has contributed at the highest policy level committees of Government of India (GoI), served on various boards of corporate entities, as Chairman ‘All India Board of Management Education’ of AICTE and contributed to the establishment of 5th Indian Institute of Management (IIM) at Kozhikode; and 7th Indian Institute of Management at Shillong. The Department faculty has published over 80 books and over 1200 papers in various ‘A’ category journals and conference volumes.

DMS has a world class IT infrastructure with a very high faculty to student ratio. DMS has a rich software repository that facilitates computer aided instructions and enables hands on experience on leading business enterprises. The Global Field Study is an unique initiative which provides the students of DMS an international exposure through their visits to various other countries like Germany, Singapore, China (Beijing & Shanghai), Malaysia, Brussels, Netherland, Belgium, France.

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

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, 3 weeks of Social Sector attachment, and the like, to facilitate the same. The process-oriented learning is further enhanced by Global Field Study (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. Extensive research and consultancy that have gained wide peer level recognition back the teaching.

**Masters in Business Administration**

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, and Operations Management. Along with the functional electives, the students also get a cross functional perspective.

**Masters in Business Administration (Focus Electives Telecommunication Systems Management)**

The MBA Full Time Program with focus in Telecommunication Systems Management is a hallmark of technomanagerial 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 Resources 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.

**Masters in Business Administration (Focus Electives Technology Management) for Working Executives**

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, management of innovation and R&D and more. The Executive MBA programme with focus
electives on 'Technology Management' is aimed at fulfilling these requirements so as to enable the managers to effectively contributes in evolving core competencies in Indian industry. This programme is designed to impart management education to working executives.

**RESEARCH**

The Department of Management Studies has a full-fledged Ph.D. 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 2015 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.

The full-time doctoral students will receive a financial aid as below:

<table>
<thead>
<tr>
<th>Period of Assistance (With B.E./B.Tech./M.Sc./M.Tech. or equivalent qualification)</th>
<th>Assistantship Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>First 2 year registration</td>
<td>₹ 25000 / Month</td>
</tr>
<tr>
<td>Next 2 year registration</td>
<td>₹ 28000 / Month</td>
</tr>
</tbody>
</table>

The students are required to do academic duty for 8 hours per week (excluding their research work) as a Teaching Assistant (TA). TAs will be assisting the faculties in developing the course content, taking tutorial and grading. Fellowship is extended for the fifth year, only on the basis and review of the work. Students will be provided financial support for attending national and international conferences as per the institute norms.

**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:

- Research Lab
- Economics Research Lab
• Marketing Lab
• Operations & Supply Chain Lab
• Computer Lab
• Behavioral Lab
• Strategy and Competitiveness Lab
• Intellectual Property Rights Cell
• Entrepreneurship Development Cell and
• Centre of Excellence “National Centre of Business Ethics, Corporate Governance and Corporate Social Responsibility”
• Centre of Excellence in E-governance

A large collection of software packages such as SPSS, AMOS, Vensim, I-Think, Lisrd, 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.
DEPARTMENT OF MATERIALS SCIENCE AND ENGINEERING
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.

Nitya Nand Gosvami, Ph.D. (NUS, Singapore)
Assistant Professor

Jayant Jain, Ph.D. (British Columbia)
Assistant Professor

Josemon Jacob, Ph.D. (Iowa State Univ.)
Professor
Polymer Synthesis, Semiconducting Polymers, Polymer based LEDs and Photovoltaics, Block Copolymers Biodegradable Polymers, Polymerization Catalysis.

Suresh Neelakantan, Ph.D. (TU Delft)
Assistant Professor

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.

Rajesh Prasad, Ph.D. (Cambridge)
Professor

Sampa Saha, Ph.D. (Michigan State Univ.)
Assistant Professor

Bhabani K. 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.
Bijay P. Tripathi, Ph.D. (CSMCRI, Bhavnagar)  
Assistant Professor  

Veena Choudhary, Ph.D. (IIT Delhi)  
Emeritus Professor  

S.N. Maiti, Ph.D. (Calcutta Univ.)  
Emeritus Professor  
INTRODUCTION

The Department of Materials Science and Engineering (DMSE) has been established on 1st January 2018 for developing and undertaking research on materials for specific end uses. It holds the privilege of being the only materials research and engineering department in Delhi-NCR region. The principal thrust of the department is manpower development and research for enhancing the fundamental knowledge as well as developing new materials. The department emphasizes interaction with the related industry. The changing needs of the industry are kept in view while designing and upgrading teaching and research programmes.

Mission

To provide frontier education in Materials Science and Engineering at the postgraduate level to:

- Achieve excellence in education and research to meet the growing needs of the society
- Expose the students broadly to research intensive curriculum for skill enhancement to suit the global market.
- Provide an environment conducive to innovation, creativity, implementation of new ideas and team spirit so as to foster young and fresh talents.
- Promote high standards of professional ethics.

ACADEMIC PROGRAMMES

The new department envisions to embark on the postgraduate (PG) programme, M.Tech in Materials Engineering in July 2018, while the four year undergraduate programme shall start in July 2019. This PG programme will be running in parallel to the already existing M.Tech in Polymer Science and Technology programme (previously under the umbrella of Centre for Polymer Science and Engineering) of DMSE. The faculty of the department 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 fulfil the constantly growing requirements of the polymer based industry in the country.

RESEARCH AREAS

The broad area of research of the department are:

Structure-property correlations in advanced materials; Micro- and Nano-scale mechanical behavior of materials; Auxetic materials (Negative Poisson’s ratio), Failure analysis Fracture mechanics Functionally graded materials; Nanomaterials; Phase transformations; Transformation plasticity; Porous materials; Lattice materials; Shape memory alloys; Amorphous materials; Severe plastic deformation; Electron microscopy; Materials characterization; Processing, characterization of light-weight metals and metal matrix composites; 3D printing; High-entropy alloys; Nano-scale friction and wear behavior of materials; In situ microscopic study of mechanical and tribological behavior.
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 Polymers; Polymer nanocomposites; Smart Polymers; Micro / Nano-Hydrogels; High performance Polymeric materials; Microcellular processing of polymers; Polymer membranes; Design and Stress Analysis of Engineering Component from Polymeric Materials, Polymer Electronics; Synthesis of conjugated organic materials; Olefin Polymerisation Catalysts; Biodegradable Polymeric materials for drug delivery and packaging applications; Block Copolymers and Phase behavior; Surface Engineering using controlled radical Polymerization; Nanoporous membranes for water, separation; membranes and separators for battery and electrochemical processes.

**LABORATORY FACILITIES**

**Material Chemistry Lab**
Freeze Dryer, Specialised Polymerization Set-ups, Distillation Apparatus including Vacuum Distillation, Rotary Vacuum Evaporator, Constant Temperature Baths., Deionized & Distilled Water Apparatus, Hot Air Ovens, Vacuum Ovens, High Precision Balances, High Speed Stirrer, Glove Box, Spin Coater.

**Material Characterization Laboratory**
Differential Scanning Calorimeter (DSC), Thermo-gravimetric , Analyser (TGA), Gel Permeation Chromatography (GPC), FTIR Spectrometer, Nanoparticle Analyzer, Dynamic Mechanical Analyzer, UV-Visible Spectrometer, Fluorescence Spectrometer, Zeta Sizer, High-performance liquid chromatography, Atomic Force Microscopes, Scanning Electron Microscope with EDS, Optical microscopes with heating and cooling stage, Optical emission spectroscopy, Dynamic Contact angle measurement system, Four Probe Electrical Conductivity Apparatus, Vector Network Analyzer.

**Material Processing Lab**

**Material Testing Laboratory**
**Undergraduate Materials Laboratory**

Tensile and compression testing machines, Rolling mill, High speed cutting machine, Microhardness testing facility, Optical microscopes, X-Ray diffraction.

**Transmission Electron Microscope (TEM) Maximum point resolution - 0.4 nm**

Maximum magnification - 12 lacs, Facilitated with EDX.

**Central Facilities for Materials Testing**

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

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

Minati De, Ph.D. (ISI Kolkata)
Assistant Professor
Data Structures & Algorithm, Approximation Algorithms, Combinatorial and Computational Geometry.

S. Dharmaraja, Ph.D. (IIT Madras)
Professor

Surjeet Kour, Ph.D. (IIT Kanpur)
Assistant Professor
Commutative Algebra, Group Theory.

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.)
Professor

Mani Mehra, Ph.D. (IIT Kanpur)
Associate Professor
Application of Wavelets to Numerical Analysis and PDEs.
Anima Nagar, Ph.D. (Gujarat Univ.)
Associate Professor
Topological Dynamics.

B.S. Panda, Ph.D. (IIT Kanpur)
Professor
Algorithmic Graph Theory, Graph Theory, Algorithms, Parallel and Distributed Computing.

Shiv Prakash Patel, Ph.D. (TIFR Mumbai)
Assistant Professor
Representation Theory, Automorphic forms, Number Theory.

Kamana Porwal, Ph.D. (IISc. Bangalore)
Assistant Professor
Finite Element Methods for PDEs and Optimal Control Problems.

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

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

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

Punit Sharma, Ph.D. (IIT Guwahati)
Assistant Professor
Numerical Linear Algebra, Nearness Problems in Control Theory.

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

Vikas Vikram Singh, Ph.D. (IIT Bombay)
Assistant Professor
Stochastic Games, Chance Constraints, Stochastic Optimization.

A. Tripathi, Ph.D. (Univ. at SUNY, Buffalo)
Professor
Number Theory, Combinatorics and Graph Theory.

Viswanathan Puthan Veedu, Ph.D. (IIT Madras)
Assistant Professor
Approximation Theory, Fractal Functions.
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, a four year B.Tech. programme in Mathematics and Computing, and a two year M.Sc. programme in Mathematics. The Department also has an active Ph.D. programme.

ACADEMIC PROGRAMMES

UNDERGRADUATE

The 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 programs have replaced former five year integrating M.Tech. in Mathematics and Computing program from 2013 onward. The aim of these programs 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 programs 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 program 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. And in the second year, the student has an option of choosing modern advanced courses in some specialized area(s).

RESEARCH

Doctoral research is being carried out in all major areas of Mathematics, Applied Mathematics, Statistics and Operation Research and Theoretical Computer Science and its application.


LABORATORY FACILITIES

The Department has three well-equipped Computing Laboratories with 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.
DEPARTMENT
OF
MECHANICAL
ENGINEERING
Subir K. Saha, Ph.D. (McGill Univ.)
Professor (Naren Gupta Chair)
Robotics, Mechatronics and Multi-Body Dynamics.

HEAD OF THE DEPARTMENT

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

Supreet S. Bagha, Ph.D. (Stanord Univ.)
Assistant Professor
Theoretical and Experimental Micro/Nano-Fluidics, Electrokinetics And Electrohydrodynamics, Droplet Microfluidics, Lab-on-a-Chip Devices.

Naresh Bhatnagar, Ph.D. (IIT Bombay)
Professor
Processing and Manufacturing of Frp Composite Materials, Machining of Traditional and Non-Traditional Materials, Bio-Materials, Medical Implants, High Strain Rate Composites.

Nomesh Bolia, Ph.D. (Univ. of North Carolina)
Associate Professor
Operations Research, Stochastic Modeling, Data Driven Public Policy & Governance, Transportation.

Anoop Chawla, Ph.D. (IIT Kanpur)
Professor, (Henry Ford Chair)
CAD, CAE, Dynamics, Bio-mechanics, Transportation & Safety.

Ashish K. Darpe, Ph.D. (IIT Delhi)
Professor
Condition Monitoring, Rotor Dynamics, Vibration.

Debabrata Dasgupta, Ph.D. (IIT Kharagpur)
Assistant Professor
Microfluidics and Microscale Transport Processes, Computational Fluid Dynamics, Multiphase Transport, Transport in Multi-Scale Systems.

Naresh V. 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, Ph.D. (IIT Bombay)
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, Vibration Control,  
Viscoelasticity.

Sudarsan Ghosh, Ph.D. (IIT Kharagpur)  
Associate Professor  
Machining and Grinding of Superalloys, Composites,  
Nanofluid Application in Grinding, Fabrication of  
Ceramics.

Amit Gupta, Ph.D. (Univ. of Central Florida)  
Associate Professor  
Micro-Fluidics, Multiphase Flows, Lithium-Ion  
Batteries Modeling and Optimization.

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  
Solar Cooling, Heat Exchangers, Microscale Heat  
Transfer.

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, Biomass  
Based Technologies.

K. Rama Krishna, Ph.D. (IISc., Bangalore)  
Assistant Professor  
Kinematics and Mechanisms, Geometric  
Modeling for CAD and Manufacturing,  
Mechanics and Machine Design.

D. Ravi Kumar, Ph.D. (IIT Madras)  
Professor  
Metal forming, Plasticity, Materials  
processing.
Mayank Kumar, Ph.D. (Massachusetts Institute of Technology USA)
Assistant Professor

B. Premachandran, Ph.D. (IIT Madras)
Associate Professor
Heat Transfer, Computational Fluid Dynamics.

S.V. Modak, Ph.D. (IIT Delhi)
Professor
Vibration Engineering, Finite Element Model Updating, Experimental Modal Analysis, Vibro-Acoustics, Active Control of Sound.

P.V. Madhusudhan Rao, Ph.D. (IIT Kanpur)
Professor
Product Design and Manufacturing, Cad-Cam, Inclusive Innovation.

P. Venkateswara Rao, Ph.D. (IIT Madras)
Professor

Sudipto Mukherjee, Ph.D. (Ohio State Univ.)
Professor (Volvo Chair)

Varun Ramamohan, Ph.D. (Purdue University)
Assistant Professor
Probabilistic Modeling, Simulation and Optimization, with Applications in Healthcare Systems Engineering and Uncertainty of Measurement.

Pulak Mohan Pandey, Ph.D. (IIT Kanpur)
Professor
Rapid Prototyping, Unconventional Machining, Finite Elements Applications to Manufacturing, Cad/Cam.

Bahni Ray, Ph.D. (IIT Kanpur)
Assistant Professor

R.K. Pandey, Ph.D. (Banaras Hindu Univ.)
Professor
Bearing Lubrication, Design of Tribological Elements, Engine Tribology, Lubrication in Metal Forming.

M.R. Ravi, Ph.D. (IISc., Bangalore)
Professor

Sunil Pandey, Ph.D. (IIT Delhi)
Professor
**MECHANICAL ENGINEERING**

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

**Satinder Paul Singh**, Ph.D. (IIT Delhi)
*Professor (NTPC Chair)*

**Sujeet Kumar Sinha**, Ph.D. (Imperial College London)
*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)
*Professor*

**T.K. Kundra**, Ph.D. (IIT Delhi)
*Guest Faculty*

**Sivathanu A. Pillai**, Ph.D.
*Honorary Professor*
Defence and Space Technologies, Innovation, Creativity and Leadership.

**Kshitij Gupta**, Ph.D. (IIT Delhi)
*Emeritus Professor*

**A.D. Gupta**, M.Tech. (IIT Delhi)
*Visiting Faculty*

**Prem Vrat**, Ph.D. (IIT Delhi)
*Honorary Professor*
Industrial Engineering and Operations Management, Quality Management, Value Engineering, Scheduling, Maintenance and Supply Chain Management.

**Kiran Seth**, Ph.D. (Columbia Univ.)
*Emeritus Professor*
Padma Shri
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 17 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 Mechanical Design, 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. Recently, several faculty members have been engaged in improving rural technologies for enhanced livelihood.

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, Rural Technology Action Group (Rn TAG).

**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. Microfluidics, Combustion Refrigeration and Air-conditioning, Internal Combustion Engines, Turbomachinery, Heat Transfer 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. A state-of-the-art Micro-manufacturing laboratory houses sophisticated machines for micro- and nano-manufacturing.
**Anurag Sharma, Ph.D. (IIT Delhi)**

**Professor**

**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)**

**Professor**

**Mukesh Chander, Ph.D. (IIT Delhi)**

**Professor**

**R. Chatterjee, Ph.D. (IIT Kanpur)**

**Professor**

**Sujeet Chaudhary, Ph.D. (IIT Delhi)**

**Professor**

**Pintu Das, Ph.D. (Uni. of Saaraland, 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.

**Saswata Bhattacharya, Ph.D. (IACS, Kolkata)**

**Assistant Professor**

**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.

**Pradipta Ghosh, Ph.D. (IACS Kolkata)**

**Assistant Professor**
Phenomenological Analyses of Physics Beyond the Standard Model in the Areas of Neutrino Physics, Higgs Physics, Leptonic Flavor Violation, Dark Matter and Collider Studies.
Santanu Ghosh, Ph.D. (Jawaharlal Nehru Univ.)
Professor
Experimental Condensed Matter Physics, Thin Film, Ion Materials Interaction.

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

Sankalpa Ghosh, Ph.D. (Jawaharlal Nehru Univ.)
Associate Professor
Bose Einstein Condensate of Cold Atoms, Quantum Hall Effect, Graphene, Topological Insulator.

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

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

Sunil Kumar, Ph.D. (IISc., Bangalore)
Assistant Professor
Ultrafast Optics and Spectroscopy, Plasmonics, Electron Correlated Solids.

Bhaskar Kanseri, Ph.D. (University of Delhi)
Assistant Professor
Quantum Optics, Ultrafast and Non-linear Optics, Optical Coherence and Interferometry, Polarization and Spectral Switching.

Brajesh Kumar Mani, Ph.D. (PRL, Ahmedabad)
Assistant Professor
Computational Condensed Matter Physics; Computational Many-Body Physics; Molecular Dynamics and Monte Carlo Simulations.

Neeraj Khare, Ph.D. (BHU)
Professor

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

Rahul Suresh Marathe, Ph.D. (RRI Bangalore)
Assistant Professor
Non-equilibrium Statistical Mechanics, Biophysics Theory, Modelling, Simulations.
B.R. Mehta, Ph.D. (IITD)/(Schlumberger Chair)  
Professor  
Thin Film and Nanostructured Materials,  
Inorganic-Organic Hybrid Interfaces,  
Resistive Memory, Thermoelectric, Photo  
Electro Chemical and Solar Cell Devices.

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.

Rohit Narula, Ph.D. (MIT, USA)  
Assistant Professor  
Condensed Matter Theory; Raman  
Spectroscopy.

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

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

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

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

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

A.K. Shukla, Ph.D. (IIT Delhi)  
Professor  
Laser, Semiconductor, Raman Spectroscopy,  
Ion Implantation, Laser Annealing  
Superconductors and Nanoscience.
**Prospectus 2018-2019**

**Indian Institute of Technology Delhi**

**Physics**

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

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

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

**R.K. Soni, Ph.D. (IIT Delhi)**
Professor

**Vikrant Saxena, Ph.D. (IPR Gandhinagar)**
Assistant Professor
Computational Plasma Physics, Laser-plasma Interactions, Nonlinear Waves and Solitons in Plasmas, XFEL Irradiation of Rare Gas Clusters, Plasma based Particle Acceleration etc.

**Pankaj Srivastava, Ph.D. (Rajasthan Univ.)**
Professor

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

**Vivek Venkataraman, Ph.D. (Cornell Univ. USA)**
Assistant Professor (Joint Faculty Phy/EE)

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

**D.K. Pandya, Ph.D. (IIT Delhi)**
Emeritus Professor

**H.C. Gupta, Ph.D. (IIT Delhi)**
Visiting Professor
Thermal and Electrical Properties of Solids and Liquids, Microwave Integrated Circuits, Raman and Infra Red Phonons.

**A.K. Tyagi**
Visiting Professor
Surface Engineering, Nanotechnology, Thin films and Materials science.

**Vivek Venkataraman, Ph.D. (Cornell Univ. USA)**
Assistant Professor (Joint Faculty Phy/EE)

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

**D.K. Pandya, Ph.D. (IIT Delhi)**
Emeritus Professor

**H.C. Gupta, Ph.D. (IIT Delhi)**
Visiting Professor
Thermal and Electrical Properties of Solids and Liquids, Microwave Integrated Circuits, Raman and Infra Red Phonons.

**A.K. Tyagi**
Visiting Professor
Surface Engineering, Nanotechnology, Thin films and Materials science.

**Vivek Venkataraman, Ph.D. (Cornell Univ. USA)**
Assistant Professor (Joint Faculty Phy/EE)

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

**D.K. Pandya, Ph.D. (IIT Delhi)**
Emeritus Professor

**H.C. Gupta, Ph.D. (IIT Delhi)**
Visiting Professor
Thermal and Electrical Properties of Solids and Liquids, Microwave Integrated Circuits, Raman and Infra Red Phonons.
INTRODUCTION

The Department is engaged in advanced research in several areas of physics 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) Opto-electronics 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 & Computational Physics. State-of-the-art research on contemporary topics like Nanoscience and Technology, Energy Materials and Devices, Magnetics, Optical Fibers Sensors & Devices, Photonic Crystals, Optical Memory, Microwave and Laser-plasma Interaction, Quantum Optics Optical Imaging 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. Department offers programme linked courses to UG students of some other branches. Department also offers two minor area to UG students.

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

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
Doctoral and post-doctoral research is being carried out in:


**Theoretical Physics:** Mathematical, Statistical Mechanics, and Computational Physics, Theoretical Studies in ultra-cold atoms, Cavity Opto-mechanics with Ultra Cold Atoms, Nuclear Physics, Particle Physics, Ultrafast Optics. Soft Condensed Matter and Biophysics, Novel two Dimensional Materials such as Graphene, Topological Insulators etc.

**Computational Materials Science:** Designing Energy Materials, Thermal Transport, Electronic Structure, Band Engineering, Clusters and Catalysis, Pyroelectricity, Piezoelectricity, (Anti) ferroelectricity, (Anti ferromagnetism, Multiferroics, Spin and Lattice Dynamics, Caloric Effects, Non-collinear Magnetism, Genetic Algorithm, Machine Learning, Force Field, Density Functional Theory, Kinetic Monte Carlo, Molecular Dynamics, etc.

**Interdisciplinary:** Optical Spectroscopy under extreme conditions, High Pressure-High Temperature Physics, Energy Storage and alternative Energy Materials, CO2 sequestration, Mineral Physics.

**Multidisciplinary Research area: 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. About 12 faculty members from physics department are actively participating 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 covering 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 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, FESEM, TEM, SEM), Atomic Force Microscope (AFM), Scanning Tunneling Microscope (STM), MOKE Microscope, Scanning Auger Microprobe (SAM), Electron Spectroscopy for Chemical Analysis (ESCA). Photovoltaic, Thermoelectric and Photo electro chemical Characterization facility, 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

A new ultra fast optics (UFO) facility has been developed in the Department via a DST-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-photonics, material science & nano science and technology, 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.
DEPARTMENT OF TEXTILE TECHNOLOGY
B.K. Behera, Ph.D. (IIT Delhi)
Professor

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

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

B.K. Behera, Ph.D. (IIT Delhi)
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

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

Saurabh Ghosh, Ph.D. (Basel Univ., Switzerland)
Associate Professor
Tissue Engineering, Medical Textile, 3D Bioprinting.

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

Deepti Gupta, Ph.D. (IIT Delhi)
Professor
Surface Functionalization, Medical Clothing, Garment 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 Nanocomposite Fibres, Nanofibres and Nano-coatings, Bioactive and Functional Textiles, Material Development for Aerostats/Airships.

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

Bipin Kumar, Ph.D. (IIT Delhi)
Assistant Professor
Fabric Engineering, Functional Textiles, Medical Textiles, Textile/Polymer Physics and Mechanics.

Samrat Mukhopadhyay, Ph.D. (IIT Delhi)
Associate Professor
Natural Fibres and Modification Techniques, Composites, Technology Intervention in Handlooms, Energy Saving in Chemical Processing.

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

Amit Rawal, Ph.D. (Univ. Bolton)
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, Conducting Textiles.

Javed Nabibaksha Sheikh, Ph.D. (I.C.T. Mumbai)
Assistant Professor

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

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

The Department offers a B.Tech. programme in Textile Technology and two M.Tech. programmes in Textile Engineering and in Fibre Science and Technology, besides offering the Doctoral program.

The departmental 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. programme, 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 well as in the chemical processing of textile materials.

M.Tech. programme on Textile Chemical Processing focuses on advanced science and technology used in wet processing and trains students for the Textile Chemical Processing industry as also for research and academics.

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 fibre Production
to fibre 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, water jet 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 and circular 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 treatment 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 RF dyeing machines, HTHP dyeing machine, lab scale gigger and paddling mangles. New additions include magnetic levitation bases yarn dyeing system.

**Textile Testing Laboratories** of the department has modern instruments for testing various types of fibres, films, yarns, fabrics and carpets. Fibres can be tested for single fibre and bundle strength, breaking extension 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.
**Computer and Microprocessor 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 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), Medical textile and Protective textile laboratories.
CENTRE FOR APPLIED RESEARCH IN ELECTRONICS
Annanjan Basu, Ph.D. (Univ. of California)
Professor
Microwave and Millimeter-wave Engineering.

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.

Prabhu Babu, Ph.D. (UU, Sweden)
Assistant Professor
Signal Processing and Communications, Machine Learning and Optimization.

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

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

ANKUR GUPTA, Ph.D. (IIT Bombay)
Assistant Professor
MOS and III-V Device Design, DC/RF Measurements and Modelling, Smart Sensors design.

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

Arun Kumar, Ph.D. (IIT Kanpur)
Professor
Digital Signal Processing, Speech, Audio and Underwater Acoustics.

Pushparaj Singh, Ph.D. (NTU, Singapore)
Assistant Professor

Suneet Tuli, Ph.D. (IIT Delhi)
Professor
Nondestructive Characterization, Thermography & Thermal Imaging System.
Vikram Kumar, Ph.D. (Lehigh Univ.)
Honorary 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. 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.

LABORATORY FACILITIES
The Centre has several state-of-the art 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.
Manju Mohan, Ph.D. (IIT Delhi)
Professor
Chemical Transport Modeling and Atmospheric Pollution Studies, Heat Island Measurements and Modeling, Fog Modelling, Numerical Modeling of the Atmospheric Boundary Layer, Impacts of Urbanization on Weather, Climate and Air Pollution.

A.D. Rao, Ph.D. (IIT Delhi)
Professor
Ocean State Forecasting, Storm Surge Modeling, Coastal Circulation, Internal Waves.

Sagnik Dey, Ph.D. (IIT Kanpur)
Associate Professor
Aerosol-cloud-climate Interaction; Air Quality, Climate Change and Human Health; Remote Sensing of the Earth's Climate System.

Dilip Ganguly, Ph.D. (Physical Res. Lab., Ahmedabad)
Assistant Professor
Aerosol-cloud-precipitation Interaction, Cloud Parameterization, Radiative Forcing and Climate Change, Climate Sensitivity and Feedback Processes, Climate Diagnostics, Monsoon Dynamics.

Ravi Kumar Kunchala, Ph.D. (Univ. of Pune)
Assistant Professor

Saroj K. Mishra, Ph.D. (IISc., Bangalore)
Assistant Professor
Climate Modelling, Indian Monsoon, Climate Projection, Climate Change, Climate Mitigation and Adaptation, Tropical weather and Climate.

Vimlesh Pant, Ph.D. (Univ. of Pune)
Assistant Professor
Physical Oceanography, Ocean Modelling, Air-sea Interaction, Atmospheric Aerosols, Meteorological and Oceanographic Observations.

Krishna Achuta Rao, Ph.D. (Tulane Univ. USA)
Associate Professor
Climate, 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, Deforestation, Agriculture, Carbon Cycle; Mesoscale and Boundary Layer Modeling, Thunderstorms; Regional Climate Change; Renewable Energy Meterology.

Sandeep Sahany, Ph.D. (IISc., Bangalore)
Assistant Professor
Tropical Deep Convection, High Frequency Rainfall Variability, Climate Modeling, Climate Change, Regional Climate Downscaling.

Sandeep Sukumaran, Ph.D. (IIT Kharagpur)
Assistant Professor
Climate Modeling, Indian Summer Monsoon, Climate Change.
Maithili Sharan, Ph.D. (IIT Delhi)
Emeritus Professor
Air Pollution Modelling, Atmospheric Boundary Layer, Computational and Mathematical Methods, Physiological Fluid Dynamics.

Hunt J.C.R., Ph.D. (Cambridge University, U.K.)
Sir Gilbert Walker Chair Professor
Fluid Mechanics, Turbulence, Magneto Hydrodynamics, Meteorology, Climate and Applications, Air Pollution Dispersion, Oceanographic Processes.
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 seven years, 29 Ph.D. and 54 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 six courses exclusively designed for UG students, which deal with fundamentals of weather, climate, climate change, oceanography, monsoon, earth’s physical processes, climate modeling. UG Students need to take at least 2 courses from this pool for minor area.

The students also have options 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 minor area of 5 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 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 to train students from diverse backgrounds 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) The Ph.D. programme is for highly motivated students interested in an academic career. In addition to a thesis on a state-of-the-art topic, students are required to complete (for M.Sc. qualifying degree) or 6 (for M.Tech. qualifying degree) credits of coursework.

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 areas: 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 so that our faculty and students can keep abreast of the latest scientific developments in the field.

Key Research Areas


**Ocean:** Ocean Modeling, Coastal Processes, Ocean State Simulations and Forecasting, Storm Surges and Inundation.

**Climate:** Climate Dynamics, Climate Variability and Changes, Climate Change Detection & Attribution, Global and Regional Climate Modeling, Climate Projections, Climate Change Impacts on Extreme Weather, Health, Agriculture, Water Resources and Energy, Aerosol-Cloud-Climate Interactions.

**Air Pollution Modeling:** Urban Meteorology, Chemical Transport Modelling, Air Quality and Health Impact Studies, Heat Island Measurements and Modelling, Fog Prediction.


LABORATORY FACILITIES

The Centre has developed several teaching and research laboratories including one for High Performance Computing (HPC). 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 has purchased priority access to 60 teraflops in the IIT Delhi HPC 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 and ocean lab dedicated for ocean studies. Recently the Centre has acquired the following computing facilities; i) Chandra, a 15 node FUJITSU Primary CPU cluster located in the Centre’s High Performance Computing Laboratory; ii) Padum, a 422 node Petaflop-scale High Performance Computing cluster, one of India’s fastest supercomputers, located in the IIT Delhi Computer Services Centre; iii) Sikka, a 320 TB storage-cum-data analysis server located in the Centre’s High Performance Computing Laboratory; iv) STORAGE, a 115 TB data storage server located in the Centre’s High Performance Computing Laboratory.
**Veena Koul, Ph.D. (Kashmir Univ.)**
Professor
Biomaterials, Medical Devices, Clinical Diagnostics, Drug/Gene Delivery Systems, Nanomedicine.

**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.

**Deepak Joshi, Ph.D. (IIT Delhi)**
Assistant Professor
Biomedical Instrumentation, Rehabilitation Engineering.

**Dinesh Kalyanasundaram, Ph.D. (Iowa State University, USA)**
Assistant Professor
Biomechanics, Diagnostics, Design and Development of Implants (Orthopaedic & Orthodontics), Fabrication/Machining of Materials (Laser Machining).

Assistant Professor
Quantitative Medical Image Analysis for CT and MRI, Perfusion and Diffusion Imaging, Neuro-Rehabilitation, Mobile Healthcare.

**Jayanta Bhattacharyya, Ph.D. (IICT, Hyderabad)**
Assistant Professor
Biomaterials, Drug Delivery, Cancer Diagnosis & Therapy.

**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

**Sneh Anand, Ph.D. (IIT Delhi)**
Emeritus Professor
Biomedical Instrumentation, Rehabilitation Engineering, Biomedical Transducers and Sensors.
CENTRE FOR BIOMEDICAL ENGINEERING

Centre for Biomedical Engineering was established in 1971 as a Joint programme 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 faculty from diverse backgrounds who are actively engaged in various interdisciplinary research activities. In addition, the centre has collaborative projects with major institutes and hospitals in India and abroad. Over the years, it has become a premier centre for biomedical research in the country and has provided interdisciplinary base to develop health care technologies. In the last two decades the focus has expanded to include medical imaging, tissue engineering, nanomedicine, implants, biomedical devices, and informatics approaches for the prevention, diagnosis and treatment of diseases.

ACADEMIC PROGRAMMES

The Center has a Ph.D. programme and an M.Tech. programme in Biomedical Engineering. Various courses relevant to Biomedical Engineering, which are open to undergraduate and graduate students at IIT Delhi are offered by the Centre.

Some of the courses being offered include Introduction to basic Medical Sciences for Engineers, Industrial Biomaterial Technology, Research Techniques in Biomedical Engineering, Tissue Engineering, Biomaterials, Biosensor Technology, Medical Imaging and Processing, Emerging Biomedical Technology & Health Care, Biomechanical Design of Medical Devices, Cancer: Diagnosis and Therapy, Point-of Care-Medical Diagnostic Devices, Orthopaedic Device Design, Biofabrication, Nanomedicine.

RESEARCH

The Centre’s research focus spans in four thrust areas:

Bio-Instrumentation: Biosensor, Molecular markers in diseases, Lab-on-a-chip, Microfluidics, Biomedical transducers and sensors, Neuro endoscopy, Integrated healthcare, Assistive devices & rehabilitation, DNA based diagnostics.

Biomaterials: Nanomedicine, Controlled drug delivery systems, Soft skin regeneration, Targeting of bioactive molecules to brain and cancer, Wound care healing, Tissue engineering, Medical diagnostics and therapy.

Biomechanics: Orthopedics, Orthodontics, Computational analysis and software packaging, Neuromechanics, Neural prosthetics.

Medical Imaging: MRI, CT, etc., Development of protocols, methods/models, Techniques and software tools, Image processing, Quantitative image analysis.
The average number of Ph.D. students graduated over the last 5 years per faculty has been 4.4 and the average SCOPUS cited publication per faculty is 8. In the last five years the Center has received extramural research funding of ~ 25 Crores from government funding agencies and ~20 Lakhs as industrial consultancy.

**Technology developed by the centre include:**

Novel kit for assay of iron in biological fluids; Modulated DC Iontophoretic Device; Electroculogram based Multimode 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-aminopenicillinic 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; Iontophoretic Transdermal Device for delivery of Declofenac; Opto-electronic Hemoglobinometer and Surgical Stapler.

**LABORATORY FACILITIES**

The Centre has the following laboratory facilities: Bioelectronics, Biomechanics & Fabrication, Biomaterials, Biosensor, Pre-Clinical and Animal Experimentation (AIIMS), Bio-signal Processing, Soft Tissue Engineering, Drug delivery Laboratory, Nanoparticles Characterization, Biomaterials Instrumentation, Nanomaterial Synthesis Lab, Laser Micromachining Lab, Lab-on-a-chip, Biomedical Instrumentation, Medical Imaging Processing, Molecular Biology, Bio-therapeutics.
Huzur Saran, Ph.D. (University California, Berkeley)
Professor
High Speed Network, Graph Theory & Algorithms.

Manish Agarwal, Ph.D. (IIT Delhi)
System Architect
HPC & Administration, Large Scale Molecular Simulations, Parallelization of Analysis Codes.

P.K. Baboo, Ph.D. (Berhampur)
System Manager

Rajesh Bhat, Ph.D. (IIT Delhi)
System Manager
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)
System Manager
Networking & Systems Administration.

P.K. Gupta, M.Tech. (IETE)
Senior System Manager (SG)

Ajay Guleria, Ph.D. (NIT Hamirpur)
System Manager
Network & System Administration.

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

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

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

Sunil Kak, M.Tech. (IETE)
System Manager
System Administration, 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.

Subodh Kumar, Ph.D. (Univ. of North Carolina)
Professor (Associate Head)

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

Ram Lal, Ph.D. (Jamia Milia Islamia University)
System Architect
System Administration, Information Technology, E-Governance, MATLAB programming, Image Processing & Object-oriented Programming.

Gaurav Munjal, B.Tech. (DCRUST)
System Architect

K. Narayanan, M.Sc. (Delhi Univ.)
Senior System Manager (SG)
D.B.M.S., System Analysis and Design, System Administration, Web Design & ERP.

Ram Lal, Ph.D. (Jamia Milia Islamia University)
System Architect
System Administration, Information Technology, E-Governance, MATLAB programming, Image Processing & Object-oriented Programming.

Gaurav Munjal, B.Tech. (DCRUST)
System Architect

K. Narayanan, M.Sc. (Delhi Univ.)
Senior System Manager (SG)
D.B.M.S., System Analysis and Design, System Administration, Web Design & ERP.
INTRODUCTION
The Computer Services Centre provides round the clock computing and networking facilities to serve a user population of 12,000+ 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.

GENERAL COMPUTING FACILITIES
The Centre is equipped with 112 HP/CISCO UCS blade servers out of which 64 Blade Servers are used for Cloud computing with 200 TB of virtualized storage and 48 blade servers with 130 TB of storage for user homes and infrastructure use like email, proxy, web services etc. CSC also has around 450 Desktop computers and ten Dell workstations for Simulation connected over a switched fast Ethernet. Uninterrupted Power Supply is provided through 2x 80 KVA MGE UPS system and DG set.

HIGH PERFORMANCE COMPUTING (HPC)
The HPC facility in the Data Centre consists of the following:-
Compute Nodes: 422 (CPU nodes: 238, GPU nodes: 161 & Xeon Phi co-processors: 23)
Basic configuration:-
GPU: 2x NVIDIA K40 (12GB, 2880 CUDA cores)
Xeon Phi: 2x Intel Xeon Phi 7120P (16GB, 1.238 GHz, 61 cores)
CPU: 2x E5-2680 v3 2.5GHz/12-Core
RAM: 64 GB
8 CPU, 8 GPU and 4 Xeon Phi nodes have 512 GB RAM each
Storage:- Home space: 500 TB and Scratch space: from 1000 TB to 3300 TB by August, 2018.
In addition there are CUDA based GPU mini-cluster environment of 16 nodes, each with 2x8 core E5-2670 (Sandy bridge) CPU, 128 GB RAM and 2xNvidia K20 GPUs.

Facilities/Services
• The email facility is provided to all students, staff and faculty with webmail interfaces Round cube and Squirrel mail using user and mailing list definitions from the IITD LDAP and Kerberos for user authentication.
• Compute facilities for Research and Projects are provided through Baadal, the Cloud Computing environment.
• The Data Center (DC) consists of Cisco UCS B200 M3: Three chassis with 24 blade servers each with 2x12 Cores Intel(R) Xeon(R) CPU E5-2695 v2 @ 2.40GHz ("Ivy Bridge" Generation) and 128 GB RAM. Each blade has five virtual NICs connected to two Fiber interconnects with redundant paths.
• The Disaster Recovery Data Centre (DRDC) is situated in the SIT building. 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.

• The CSC provides Infrastructure Services through Virtualization technology.

• The CSC has Microsoft Volume Licensing EES agreement for the Campus under which Microsoft software such as Windows OS, MS Office, Office365 etc. are available for use.

• The center also has the following third-party software packages: Matlab-17b, Mathematica, Ansys, Fluent, LabVIEW, etc.

• The center maintains local repositories of several popular open-source and commercial licensed software. The system is fully integrated with IITD LDAP and Kerberos.

• The CSC has configured moodle a public domain course management software, for use by faculty and students for the courses running during the semester.

• 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 is also provided for user community. The utility supports storing and sharing of files, images, music and documents, contacts, calendars, tasks etc.

• To facilitate downloads of data files through non-standard ports, download Server: download.iitd.ac.in can be used and to facilitate download of huge data for Research, proxy server xen03.iitd.ac.in (Research proxy) can be used. The faculty has been authorized to provide download permissions to their students from the webpage.

• 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 provide Internet access to the visitors, the faculty and officers have been authorized to create user account for their visiting faculty/ students.

• 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 the Faculty/Retired Faculty/Emeritus and Part-time Ph.D. students for accessing IITD internal LAN from outside IIT Delhi. The faculty have been authorized to create cert-keys for their own use and students from the VPN webpage.
• Network Time Protocol (NTP) servers are synchronized with standard internet time servers with time drift less than a few milliseconds and can be used by all users.

• MRTG and RRD Health Graphs have been provided to see the Status Reports of the various System activities/Services.

• SLA ticketing system (Complaint Registration and Monitoring System) has been provided for resolving User problems pertaining to Network connectivity and Software issues on their systems.

**PC Services**

There are six PC Labs in the CSC premises having about 225+ Desktop computers under Windows10 and Ubuntu environment. Besides this there are four Computing labs in the Lecture Hall Complex (LHC) having 235+ desktop computers running Ubuntu and Windows 10. Projection facility is also provided for the UG/PG courses of the Institute which are held every semester. There are ten DELL workstations under windows environment for CAD/CAE/CUDA. Every user has been provided a Kerberos user-account and password for logging into the system and also for using Internet facility.

The PC Labs in the main building of the Centre are open Round-the-Clock for authorized users. These labs are extensively used by the departments for conducting UG/PG Lab courses and by general students.

**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, and 2x10 Gbps from NKN.

IIT Delhi is connected to the National Knowledge Network (NKN) with 10 Gbps dual connectivity from Power Grid 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 GPON over fiber (750+ houses) and ADSL connectivity over internal telephone lines.

The Academic, Hostel area, both Guest houses, RCA and Hospital are also connected through IITD_WIFI and Secure Wi-Fi (IITD_Secure_GUEST). There are 800+ wireless access points. Many network services including mail, web, and domain name, anti-virus is being provided over this network.

IITD has upgraded the routers and switches for internet and the core distribution and edge/access network and has replaced the existing multimode fiber with single mode fiber. This has made the backbone 10 Gbps. Internet/Network connectivity including WIFI is provided on six entry gates to IIT campus.
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.
- Undertake sponsored research and consultancy projects.
- 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 and through the NPTEL, Swayam, and Swayam Prabha Platforms.

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, British Council and Adis Abada University, Ethiopia. The NPTEL (Phase I and II) project, funded by MHRD have 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.

As the third phase of NPTEL, ETSC is involved in helping institute faculty develop massively open and online courses (MOOCs) under the NOC/Swayam (NPTEL online certification) platform. ETSC is also coordinating 6 TV channels under Swayam Prabha and IIT-PAL (Civil Engineering, Electrical Engineering, Physics, Chemistry, Mathematics and Biology).

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).

The new Lecture Hall Complex (LHC) has state of the art audio visual facilities managed by ETSC. The LHC includes 2 rooms of capacity 500; 3 rooms of capacity 300; 12 rooms of capacity 150; 9 rooms of capacity 60; and 6 rooms of capacity 30. The facilities include live video recording of lectures, tablet PCs for projection of the written lectures on the screens, document visualizers, microphones and speakers in the class rooms.
CENTRE FOR ENERGY STUDIES
**Indian Institute of Technology Delhi**

**Head of the Centre**

Viresh Dutta, Ph.D. (IIT Delhi)

*Professor*

Experimental Solid State Physics, Thin Film Physics, Photovoltaics.

---

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

*Professor*


---

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

*Professor*


---

**K. Ravi Kumar, Ph.D. (IIT Madras)**

*Assistant Professor*


---

**Satyananda Kar, Ph.D. (IPR)**

*Assistant Professor*

Experimental Plasma.

---

**Supravat Karak, Ph.D. (IIT Kharagpur)**

*Assistant Professor*


---

**Vamsi K. Komarala, Ph.D. (IIT Delhi)**

*Associate Professor*

Nanomaterials and Nanotechnology, Thin Film Science & Technology, Plasmonic Solar Cells.

---

**Ramesh Narayanan, Ph.D. (Jadavpur Univ.)**

*Associate Professor*

Plasma Physics and Fusion.

---

**Dibakar Rakshit, Ph.D. (The Univ. of Western Australia)**

*Assistant Professor*


---

**K.A. Subramanian, Ph.D. (IIT Madras)**

*Associate Professor*

Internal Combustion Engines and Alternative Fuels.

---

**R. Uma, Ph.D. (IIT Delhi)**

*Associate Professor*

Plasma Physics and Fusion.
A. Ganguli, Ph.D. (IISc., Bangalore)
Emeritus Professor
Plasma Physics, Plasma Sources.

S.K. Tyagi, Ph.D. (CSS, Meerut)
Associate Professor

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

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

R.P. Sharma, Ph.D. (IIT Delhi)
Emeritus Professor

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

Debaprasad Sahu, Ph.D. (IIIT Kanpur)
Assistant Professor
Experimental Plasma Physics.

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

Sandeep Pathak, Ph.D. (University of Cambridge, U.K.)
Assistant Professor
Hybrid Photovoltaic Devices.
**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 programme, leading to the award of M.Tech. degree:

**M.Tech. in Energy Studies** : Full time programme for Engineering graduates and Science postgraduates.

**M. Tech. in Energy & Environment Technologies and Management**

**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
- Clean Biomass Combustion
- Solar-Biomass hybrid Heating/cooling
- Plasma Science and Technology
- Perovskite 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

Development of dedicated IC Engines for alternative fuels (Hydrogen, Methanol, Compressed Natural Gas (CNG), Biodiesel, Dimethyl Ether etc.), Performance (brake thermal efficiency, power, torque etc.) and emissions (CO, HC, NOx, smoke, CO2 etc.), Greenhouse gas emissions, IC engine combustion characteristics, Flame kernel growth

**Plasma Physics Experimental and Simulation Laboratory.**

PLASMA sources of different kind, viz. ECR (electron cyclotron resonance), RF (radio frequency), DC (direct current) etc. A Compact ECR Plasma Source (CEPS) for producing high density plasma, A Large Volume Plasma System (LVPS) using multiple CEPS, for plasma processing application. An automated Langmuir probe system for plasma diagnostics. A high resolution spectrometer for study of plasma emission spectroscopy. Microwave and RF atmospheric plasma jet, Plasma Simulation Facilities.

![LVPS two planes Zoomed](image)

**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**

INDUSTRIAL TRIBOLOGY MACHINE DYNAMICS AND MAINTENANCE ENGINEERING CENTRE
J. Bijwe, Ph.D. (IIT Delhi)
Professor
Tribology of Polymers / Composites, Nano-Composites and Oil Analysis for Condition Monitoring.

V.K. Agarwal, Ph.D. (IIT Delhi)
Professor
Dilute and Dense Phase, Pneumatic Handling of Bulk Solids and Erosive Wear.

Deepak Kumar, Ph.D. (IISc., Bangalore)
Assistant Professor
Metalworking Fluids, Nanotribology, Contact Mechanics, Atomic Force Microscopy, Surface/Interface Analysis.

N. Tandon, Ph.D. (IIT Delhi)
Professor
Vibration and Acoustic Emission Monitoring and Noise Engineering.

S. Fatima, Ph.D. (IIT Kharagpur)
DST Inspire Faculty
Reliability Based Machinery Condition Monitoring, Industrial Noise Control and Acoustical Natural Materials.
**INTRODUCTION**

Industrial Tribology, Machine Dynamic 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 facilities 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 and Defence. The teaching faculty is also drawn from Departments of Applied Mechanics, 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:
Condition monitoring of machinery using vibration, noise, acoustic emission and wear debris, thermography, oil analysis, vibration and acoustic emission monitoring of bearing and gears, noise evaluation and control, Tribology of fiber reinforced polymer composites and nano-composites, friction, wear, and lubrication of machines and components, Tribology of non-asbestos friction materials, boundary lubrication studies, hydrodynamic and elastohydrodynamic lubrication (EHL), Engine Tribology, wear studies, development of wear resistant coating, nano-composite greases, aqueous lubrication. Design and troubleshooting of pneumatic conveying systems, residual life assessment of oils, friction and wear studies of composites and elastomers, maintenance, reliability and safety of mechanical systems.
P.V. Madhusudhan Rao, Ph.D. (IIT Kanpur)
Professor
Product Design and Realization, Computer Aided Design & Manufacturing.

Gufran Sayeed Khan, Ph.D. (University of Erlangen-Nuremberg, Germany)
Associate Professor

Chandra Shakher, Ph.D. (IIT Madras)
Emeritus Professor

Satish Kumar Dubey, Ph.D. (IIT Delhi)
Assistant Professor

D.T. Shahani, Ph.D. (IIT Delhi)
Emeritus Professor
Electronic Instrumentation, Electro-magnetics, Antennas.

A.L. Vyas, Ph.D. (IIT Delhi)
Emeritus Professor
Electronic Instrumentation, Smart Sensors, Sensor Networking, Body Area Sensor Networks and Signal Processing.

P. V. Madhusudhan Rao, Ph.D. (IIT Kanpur)
Professor
Product Design and Realization, Computer Aided Design & Manufacturing.
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 programme

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. The programme has intake from Electronics/Electrical/Electronics & Communication/Instrumentation/Mechanical and Physics stream.

Interdisciplinary M.Des. in Industrial Design
Specialised courses are developed to cater student inputs from varied disciplines. The programme provides an opportunity to the post-graduate students to learn the design and development of instruments for their use in industries, defence and the research laboratories.
**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) Optical Metrology Laboratory, (f) Simulator Laboratory.
Malik Anushree, Ph.D. (IIT Delhi)
Professor
Food & Environmental Microbiology, Bioremediation, Biopesticides, Anti-microbial Agents, Housefly Control, Algal biofuels, Phycoremediation.

Dashora Kavya, Ph.D. (CAZRI, Jodhpur)
Assistant Professor
Biosensors, Plant Pest Prediction Modelling, Non-Chemical Agricultural Pest Management, Micro Arthropods, Bt Formulations, Innovative Resource Management Cultivation Techniques, Rural Outreach, Monitoring and Impact Assessment, Panchgavya Products Quality, Control and Production Standards.

Vivek Kumar, Ph.D. (IIT Delhi)
Associate Professor

Chariar V.M., Ph.D. (IIT Delhi)
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.

Jatindra 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.

Sharma Satyawati, Ph.D. (IIT Delhi)
Professor
Biofertilizers, Biopesticides, Tissue Culture, Rapid Composting and Waste Management, Phytoremediation Nutraceutical Mushrooms, Bioethanol.

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)
Emeritus Professor
Vijay P. Bhatkar, Ph.D. (IIT Delhi)
Honorary Professor
Computer Science and ICT, Rural Development.

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
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:

Biomass and Environment: Biomass production, conversion and utilization, biomanures and biopesticides, bioremediation and effluent treatment, solid waste management, wasteland reclamation, ecological sanitation, and nutrients recovery.

Food and Natural Products Processing: Sustainable food production systems, food quality and safety, bioformulations for stored food products, value addition of non-timber forest, medicinal and aromatic plants and herbs, post-harvest technology, dairy and food engineering, agro-waste management, extraction, isolation and value addition of bioactives.

Green Solution 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.

Rural Energy Systems: Biogas production, enrichment and bottling, algal biofuels, biodiesel, draught animal power, biomass gasiers, biomass cookstoves, engine conversion kits, picohydel systems, rural energy systems.
NATIONAL COORDINATION

The Centre has initiated to mega programmes of Govt. of India.

Unnat Bharat Abhiyan: Unnat Bharat Abhiyan (UBA) is a flagship programme of Ministry of the Human Resource Development, Govt. of India. The programme aims to bring a transformational change in rural development by active participation of higher academic institutions with local communities, and reorientation of academic curricula and R&D design of knowledge institutions in the country. It also aims to create a virtuous cycle between society and an inclusive academic system by providing knowledge and practices for emerging professions and to upgrade the capabilities of both public and private sectors in responding to developmental needs of rural India. One of the important activities of the participating institutes in the programme is to provide knowledge inputs to district administration in preparation of Gram Panchayat Level Development Plan (GPDP) and Village Development Plan (VDP).

Scientific Utilization through Research Application- Products from Indigenous Cows (SUTRA-PIC): SUTRA-PIC INDIA is a scientific programme being coordinated by Centre for Rural Development and Technology. Aim of the programme is to achieve the target of cattle based economy and strengthening the rural sectors in India. It is essential to validate the products obtained from Indian Indigenous cows, using scientific techniques and methods. Cow based products, Panchagavya find wide applications in agriculture, food and nutrition, medicines and development of utility products and processes.

LABORATORY FACILITIES

The major research laboratories are:
Applied Microbiology Lab, Agro Ecology Lab, Agro-Forest Products Processing Lab, Applied Biomass Lab, Biogas Research Lab & Test Centre, Biomass Lab, Biochemical Lab, Biogas Enrichment and Bottling Lab, Cook-stove Lab, Environmental Biotechnology Lab, Food and Bioprocess Engineering Lab, Regional Testing and Knowledge Centre for Clean Cook-stoves, Supercritical Fluid Extraction Lab.

Doctoral research is being carried out in the following area:
Biomass and environment, Food and natural products processing, Food safety and quality, Green solution and sustainable habitat, Livelihoods and rural industrialization, Rural energy systems, Panchagavya and its products.
### HEAD OF THE CENTRE

**Rahul Garg, Ph.D. (IIT Delhi)**

*Professor*


---

**Sneh Anand, Ph.D. (IIT Delhi)**  
Biomedical Engineering

**Shubhendu Bhasin, Ph.D. (Univ. of Florida)**  
Electrical Engineering

**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)**  
Mathematics

**Harish Chaudhary, Ph.D. (IIT Delhi)**  
Management Studies

**V.M. Chariar, Ph.D. (IIT Delhi)**  
CRDT

**Devendra K. Dubey, Ph.D. (Purdue University)**  
Mechanical Engineering

**Sangeeta Kohli, Ph.D. (IISc., Bangalore)**  
Mechanical Engineering

**Amit Gupta, Ph.D. (Univ. of Central Florida)**  
Mechanical Engineering

**S.K. Gupta, Ph.D. (IIT Delhi)**  
Chemical Engineering

**Amit Kumar Jain, Ph.D. (IIT Guwahati)**  
Electrical Engineering

**Manjeet Jassal, Ph.D. (IIT Delhi)**  
Textile Technology

**Saroj Kaushik, Ph.D. (IIT Delhi)**  
Computer Science and Engineering

**Jyoti Kumar, Ph.D. (IIT Delhi)**  
IDDC

**Anushree Malik, Ph.D. (IIT Delhi)**  
CRDT

**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)**  
CRDT

**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

**Jayshree Santosh, Ph.D. (IIT Delhi)**  
Computer Service Centre

**S.K. Saha, Ph.D. (McGill Univ.)**  
Mechanical Engineering

**Kiran Seth, Ph.D. (Columbia Univ.)**  
Mechanical Engineering

**Kushal K. Shah, Ph.D. (IIT Madras)**  
Electrical Engineering

**Kamlesh Singh, Ph.D. (Univ. of Rajasthan)**  
Humanities & Social Sciences

**Parag Singla, Ph.D. (Washington Seattle Univ.)**  
Computer Science and Engineering

**D. Sundar, Ph.D. (Pondicherry Univ.)**  
Biochemical and Biomedical Engineering

**Rajiv Srivastava, Ph.D. (KTH, Sweden)**  
Textile Technology

**Santosh Satya, Ph.D. (IIT Delhi)**  
CRDT

**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.
BHARTI SCHOOL OF TELECOM TECHNOLOGY AND MANAGEMENT
Head of the School

Brejesh Lall, Ph.D. (IIT Delhi)
Associate Professor
Multiscale Modeling of Stochastic Processing,
Cognitive Radio, Signal Processing for
Communications.

Associated from Electrical Engineering Department
Prathosh AP, Ph.D. (Indian Institute of Science)
Manav Bhatnagar, Ph.D. (Univ. of Oslo)
Ranjan Bose, Ph.D. (Univ. of Pennsylvania)
Shouribrata Chatterjee, Ph.D. (Columbia University)
Santanu Chaudhury, Ph.D. (IIT Kharagpur)
Swades De, Ph.D. (State Univ. of New York)
Subrat Kar, Ph.D. (IISc., Bangalore)
Harshman Jagadeesh, Ph.D. (Indian Institute of Science)
S.D. Joshi, Ph.D. (IIT Delhi)
Ranjan K. Mallik, Ph.D. (Univ. of Southern California)
Saif K. Mohammed, Ph.D. (IISc., Bangalore)
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)
Abhishek Dixit, Ph.D. (Ghent University, Belgium)
Lalan Kumar, Ph.D. (IIT, Kanpur)

Associated from Computer Science and Engineering Department
M. Balakrishnan, Ph.D. (IIT Delhi)
Kolin Paul, Ph.D. (BEC, Kolkata)
Vinay Ribeiro, Ph.D. (Rice University)
Huzur Saran, Ph.D. (Univ. of California)
Aditeshwar Seth, Ph.D. (Univ. of Waterloo)

Associated from Mechanical Engineering Department
Nomesh Bolia, Ph.D. (Univ. of North California)

Associated from Management Studies Department
Harish Chaudhary, Ph.D. (IIT Delhi)
Arpan Kumar Kar, Ph.D. (XLRI)
P. Vigneswara Ilavarasan, Ph.D. (IIT Kanpur)
S.K. Jain, Ph.D. (IIT Kanpur)
Mahim Sagar, Ph.D. (IIITM, Gwalior)
Ravi Shankar, Ph.D. (IIT Delhi)
S.S. Yadav, Ph.D. (Paris University)

Associated from CARE Department
Monika Aggarwal, Ph.D. (IIT Delhi)
Mahesh Abegaonkar, Ph.D. (Pune University)
Ananjan Basu, Ph.D. (Univ. of California)
S.K. Koul, Ph.D. (IIT Delhi)

Associated from Mathematics Department
S. Dharamraja, Ph.D. (IIT Madras)
INTRODUCTION
The Bharti School of Telecommunication Technology and Management (BSTTM) functions jointly with the Departments of Electrical Engineering, Computer Science & Engineering, Mechanical Engineering, CARE, Mathematics and Management Studies.
The Bharti School was set-up in the year 2000 with 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 attract 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.) 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 self-supporting students in this category.

MASTER OF SCIENCE (RESEARCH) (BSY)
M.S. (Research) 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 LABS:

Telecom Software Lab:
Bharti School’s first eco-friendly lab - First workspace to adopt all LED / CFL lighting!

This secured access monitored lab is open for student access on 24/7/365 basis and provides 28 dedicated workstations with dual monitors having 15.6 GB memory and hard disk drive up to 1TB for computational support to Bharti School Students in their course work.

This lab supports free open source software - linux (Ubuntu-12.04) on all 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, CFSM-Esterel / Polis, ptolemy, Telelogic / DOORS and Telelogic TAU and opnet.

In addition, the lab supports the entire Bharti School by hosting 2x30 KVA 1:1 redundant UPS and hosting and maintaining 25 port network switching racks for Bharti School.

Wireless Research Lab:
The Lab has following facilities: Spectrum Analysers, Function Generators, Signal Generators, Network Analysers, Antenna Measurement Kits, Simulation Software: CST Microwave Studio, Commsim and EDA, Virtual Wireless Lab.

Telecom Networks Lab:

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 research group focuses on performance analysis of wireless communication systems which is helpful in practical link design. Specifically, the work is on Cognitive radio, and Smart grid technologies, Visible Light Communication (VLC), Free Space Optical (FSO) communication over large Multi-Input-Multi-Output (MIMO) systems. These technologies play an important role in enabling 5G communication. Another area is, providing routing solutions and designing protocols for best path selection to enable wireless data transfer with high coding and diversity gain. In 5G wireless networks, energy saving is an important area of research, for increasing lifetime of the devices and networks. The activities are aimed at addressing various security issues arising due to a presence of energy
harvesting nodes in the network. For indoor communication in future 5G networks, VLC and FSO technologies provide enhanced data rates, high energy efficiency at lower costs. Work on optimizing power allocation in FSO for different channel models by exploiting channel state information is also done in this lab.

Underwater acoustic channels are generally recognized as one of the most difficult communication media in use today. Random fluctuations, large delay and Doppler spread, small bandwidth of the acoustic signal and frequency dependent absorption make this channel extremely complex. The advent of vector sensor recently has provided an opportunity to correct this bleak scenario to some extent. In our research, we emphasize on performance analysis of underwater acoustic communication system such as capacity, BER, outage probability and system design by using vector sensors. In this lab, we are also planning to work on underwater optical and hybrid (acoustic and optical) communication.

Security is non-negotiable and reliability is vital when it comes to defense applications. We are also developing a scheme for identification of the channel coding type and estimation of channel coding parameters of an intercepted demodulated satellite signal in collaboration with DRDO.

**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 therefrom 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.

**Internet of Things (IoT) Lab:**
With increase in machine to machine communication, IoT along with virtualization technology, aims to establish

- A heterogeneous network where any device can plug in and starts using the services hosted by cloud service provider.
- Main research area is implementing a generic protocol where any remote device like smart car, smart phone, industrial instruments like sensors, etc. can connect to cloud server and can be managed centrally. Besides this, a smart building concept will be developed utilizing location sensors and smart devices.

**Next Generation Wireless Communication Lab:**
The “Next Generation Wireless Communication Laboratory” is focused on developing next generation wireless communication technologies (e.g., Large and Massive MIMO technologies, Cognitive Radio technologies, Physical Layer Security, Energy harvesting, Green Communication, Device to Device communication, mmWave
communication systems). Emphasis will be on building new wireless communication systems and development of new technologies. Facilities set up in this lab will aid technology development, and bring in large amount of research grants from government and industry. This lab is expected to become a leading wireless communication lab in India. It is expected to help faculty devote more attention to technology development and demonstration without taking away too much time from theoretical research. Through M.Tech/ B.Tech projects, students will also get trained in designing new communication technologies. This will lead to skill development which will satisfy industry needs.

**Ericsson IITD 5G Centre of Excellence:**

Ericsson has set up a Centre of Excellence with 5G/4.5G test bed & Incubation Centre at IIT Delhi which is being used to drive the development of country’s IoT ecosystem on the cellular technology. This program has been conceptualized to fast-track realization of Digital India initiatives and aid application development for Indian start-ups and industries. This centre of excellence enables research and development to explore how some of the country’s key challenges can be addressed with advanced mobile technologies. The whole Test Bed program has a planned duration of 2 years which will be split in two phases. First phase will consist of deployment of LTE-A (4.5G) solution with advanced test cases including use cases for IoT. Second phase will consist of 5G NR deployment and test cases catering to 5G RF characteristics and key use cases like Broadband, beam tracking etc. 4.5G system is already up and running in Centre of Excellence and use cases like water monitoring has already been demonstrated. Going forward the emphasis is to conceptualize more use cases and run analytics from the cellular IOT use case data which will ensure seamless connectivity for billions of connected devices, machines, and things, supporting consumer, business, and industrial applications. 5G equipment which will be first in India will place India on par with other developed countries in terms of 5G network and application deployment is expected to be installed in Centre of Excellence in Q1/Q2-2018.
AMAR NATH AND SHASHI KHOSLA SCHOOL OF INFORMATION TECHNOLOGY
SCHOOL FACULTY

Sanjiva Prasad, Ph.D. (Stony Brook Univ.)
Professor
Distributed Systems, Programming Languages, Semantics, Verification, mHealth.
Department of Computer Science & Engineering

Vinay Ribeiro, Ph.D. (Rice Univ.)
Associate Professor
Computer Networks.
Department of Computer Science & Engineering

Sorav Bansal, Ph.D. (Stanford Univ.)
Assistant Professor
Operating System, Compilers, Virtualization.
Department of Computer Science & Engineering

Aaditeshwar Seth, Ph.D. (Waterloo Univ.)
Associate Professor
Computer Networks, Social Network Analysis, ICT for Development.
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

Bijendra N. Jain, Ph.D. (Stony Brook Univ.)
Computer Networks.
Visiting Professor
BITS Pilani and Dept. of Computer Science & Engineering

Deepa Gupta, Ph.D. (IIT Delhi)
Department of Textile Technology

Huzur Saran, Ph.D. (Univ. of California Berkeley)
Department of Computer Science & Engineering

Jayaram B., Ph.D. (City University of New York)
Theoretical Chemistry Biomolecular Modeling and Simulation, Physicochemical Modeling for DNA Sequence Analysis, Ab Initio Protein Structure Prediction, Active Site Directed Drug Design.
Department of Chemistry

Kolin Paul, Ph.D. (Bengal Engg. College, Calcutta)
Department of Computer Science & Engineering

M. Balakrishnan, Ph.D. (IIT Delhi)
CAD of VLSI, Computer Architecture.
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.
Department of Computer Science & Engineering

M.P. Gupta, Ph.D. (IIT Delhi)
MIS, e-Governance.
Department of Management Studies

Niladri Chatterjee, Ph.D. (University of London)
Machine Translation, Artificial Intelligence, Reasoning,
Statistical Modelling and Semantic Web.
Department of Mathematics

Parag Singla, Ph.D. (Washington, Seattle Univ.)
Machine Learning, Statistical Relation Learning,
Social Network Analysis.
Department of Computer Science & Engineering

Preeti Ranjan Panda, Ph.D. (Univ. of California at Irvine)
Embedded Systems, Energy-efficient Computing, Memory
Systems and Technology, Design Automation.
Department of Computer Science & Engineering

P.V.M. Rao, Ph.D. (IIT Kanpur)
Product Design & Realization,
Computer Aided Design & Manufacturing.
Department of Mechanical Engineering

Rahul Garg, Ph.D. (IIT Delhi)
Medical Imaging, High-Performance Computing, Algorithms
and Game Theory, Communication Networks.
Department of Computer Science & Engineering

ADJUNCT FACULTY

Ashish Suri, M.Ch. Neurosurgery (AIIMS, Delhi)
Professor, Department of 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.

S.N. Maheshwari, Ph.D. (Northwestern Univ.)
Algorithms, Parallel Processing,
Information Systems, Computational Biology.
Emeritus Faculty
Department of Computer Science & Engineering

Santanu Choudhury, Ph.D. (IIT Kharagpur),
Computer Vision, Multimedia Systems,
Computational Intelligence.
Department of Electrical Engineering

Saroj Kaushik, Ph.D. (IIT Delhi)
Artificial Intelligence, Location Based Services.
Department of Computer Science & Engineering

Smruti Ranjan Sarangi, Ph.D. (University of Illinois)
Computer Architectures, OS Jitter Aware Systems,
Futuristic Storage Platforms.
Department of Computer Science & Engineering

Subhashis Banerjee, Ph.D. (IISc., Bangalore)
Computational Vision, Real Time Systems.
Department of Computer Science & Engineering

Subodh Kumar, Ph.D. (Univ. North Carolina)
Computer Graphics, Virtual Reality,
Visualization, Geometric Modelling.
Department 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.
Department of Electrical Engineering

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

Manik Verma, D.Phil. in Engineering (University of Oxford)
Machine Learning.
Microsoft Research and Dept. of
Computer Science & Engineering

B. Chandra, (Ms.), Ph.D. (Delhi Univ.)
Distributed Databases, Neural Networks for NLP, Adaptive
Control Models Sprinklr Solutions.
INTRODUCTION

The Amar Nath and Shashi Khosla School of Information Technology was established with an endowment from the distinguished IIT Delhi alumnus, Vinod Khosla (B. Tech, EE 1976). The objective of the School is to foster interdisciplinary, 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:

Also, students pertaining to disciplines other than those mentioned above can apply for SIT programmes and be admitted into them given that the synergy of these other disciplines can be established to the ongoing school activities.

LABORATORY FACILITY

The School has its own building, which houses specialized laboratories for collaborative and funded research activities.

- Assistive Technologies lab
- ICTD lab
- Medical Applications of IT lab
- Mobile & Machine to Machine lab
KUSUMA
SCHOOL
OF
BIOLOGICAL
SCIENCES
Tapan K. Chaudhuri, Ph.D. (Bose Institute)
Professor
Chaperone Assisted Protein Folding, Protein Engineering and Molecular Biophysics.

Manidipa Banerjee, Ph.D. (UCSD)
Associate Professor
Hepatitis A Virus Entry, Using Viruses as Nanoparticles for Drug Delivery.

Archana Chugh, Ph.D. (Delhi Univ.)
Associate 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.

James Gomes, Ph.D. (Tulane Univ.)
Professor
Systems and Network Biology, Neurodegeneration.

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)
Associate Professor
Hepatitis B Virus, Hepatocellular Carcinoma, microRNA in Liver Cancer, G-quadruplexes in Virus Genomes.

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 M.S. (Research) 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. (Research) 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 D. Sagar, Humanities & Social Sciences
Prof. V. Upadhyay, Humanities & Social Sciences
Prof. Ravi Shankar, Management Studies
Dr. Seema Sharma, 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 programme 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 recognises 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 programmes 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.

- Central Research Facilities
- Industrial Research and Development (unit)
- Central Workshop
- Training and Placement (unit)
- Institute Libraries
7.1 CENTRAL RESEARCH FACILITIES (CRF)

Purpose and Aim of CRF

Central Research Facility (CRF) is a common instrument and fabrication facility of IIT Delhi created to support students in their research activities. CRF has state-of-the-art analytical and instruments manned by qualified personnel to provide sample testing and analysis to UG, PG, Ph.D. students and other research staff. The facilities are also made available, on payment basis, to other academic and research institutions, industries and organizations in the neighborhood.

The aims of CRF are:

- To provide expertise in the analytical sciences and to facilitate research on the structure and function of molecules and materials.
- To engage in the analytical sciences with student community, government research labs and commercial partners.
- To foster enthusiasm and collaboration in scientific research.
- To strengthen the research-relevant infrastructure of basic science and technology and built a facility having capabilities to carry out research of top international standards.

Structure of CRF

The policies and activities of CRF are monitored by Central Facilities Committee (CFC), which is appointed by the Director and is chaired by DD (S&P). The constitution of the current CFC is as under:

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Official</th>
<th>Status</th>
<th>Nominee of</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Dy. Director (Strategy and Planning)</td>
<td>Chairman</td>
<td>Director</td>
</tr>
<tr>
<td>2</td>
<td>Dy. Director (Operations)</td>
<td>Member</td>
<td>Ex-officio</td>
</tr>
<tr>
<td>3</td>
<td>Dean (R&amp;D)</td>
<td>Member</td>
<td>Ex-officio</td>
</tr>
<tr>
<td>4</td>
<td>Associate Dean Academics (PG Research)</td>
<td>Member</td>
<td>Ex-officio</td>
</tr>
<tr>
<td>5</td>
<td>Prof. N.G. Ramesh (Chemistry Deptt.)</td>
<td>Member</td>
<td>Director</td>
</tr>
<tr>
<td>6</td>
<td>Prof. Amit Gupta (Mech. Engg. Deptt.)</td>
<td>Member</td>
<td>Director</td>
</tr>
<tr>
<td>7</td>
<td>Prof. (Ms.) Shalini Gupta (Chemical Engg. Deptt.)</td>
<td>Member</td>
<td>Director</td>
</tr>
<tr>
<td>8</td>
<td>Prof. Manidipa Banerjee (KSBS.)</td>
<td>Member</td>
<td>Director</td>
</tr>
<tr>
<td>9</td>
<td>Prof. Ashwini Kumar Agarwal, Head, CRF</td>
<td>Member</td>
<td>Ex-officio</td>
</tr>
<tr>
<td>10</td>
<td>Ex-Head CRF, Prof. C.S. Dey</td>
<td>Member</td>
<td>Ex-officio</td>
</tr>
<tr>
<td>11</td>
<td>Prof. Pankaj Srivastava, Assoc. Head, CRF</td>
<td>Member/Convener</td>
<td>Ex-officio</td>
</tr>
</tbody>
</table>
The operations of CRF are managed by Head and Associate Head. They may be contacted at:

**Head**
Prof. Ashwini Kumar Agrawal, Department of Textile Technology
Tel: +91-11-26591415  E-mail: ashwini@textile.iitd.ac.in

**Associate Head**
Prof. Pankaj Srivastava, Department of Physics
Tel: +91-11-26596558  E-mail: pankajs@physics.iitd.ac.in

**Various facilities under CRF**
Institute Central Research Facility is equipped with the following instrument and fabrication facilities. The facilities under CRF can be categorized under three major categories:

A. Electron Microscopy Facilities
B. Spectroscopy Facilities
C. Other Facilities

The details of the facilities are as follows:

**A. ELECTRON MICROSCOPY FACILITIES**

Transmission Electron Microscope is a very powerful tool to provide morphologic, compositional and crystallographic information on samples. A high energy beam of electrons in kV is passed through a very thin sample, and the interactions between the electrons and the atoms can be used to observe features such as the crystal structure, dislocations and grain boundaries.

1. **Cryo HR-Transmission Electron Microscopy (Cryo HR TEM)**

The TEM facility at IIT-Delhi consists of a 200 KV TEM, with a high brightness field-emission gun (FEG) source which produces improved sensitivity and resolution (0.1 nm) compared to more traditional thermionic sources like LaB6 or Tungsten filaments. This facility can also be utilized for high resolution analysis of the structure and organization of large biological molecules such as protein complexes, viruses etc through cryoelectron microscopy. Accessory equipment for plunge freezing samples, plasma cleaning grids and holders are available.

*Figure 1: Cryo HR TEM*
Faculty Coordinator:
Dr. Manidipa Banerjee
Associate Professor, Kusuma School of Biological Sciences IIT-Delhi, Hauz Khas, New Delhi-110 016
Tel.: 011-26597538; Email: mbanerjee@bioschool.iitd.ac.in

Physical Location of Lab:
Room No. MG-3, Ground Floor, Kusuma School of Biological Sciences IIT-Delhi, Hauz Khas, New Delhi-110 016
Tel.: 011-26597503

Operation In-charge:
Ms. Riti Rawat
Tel.: 011-26597503; Email: riti17dec@gmail.com

2. Transmission Electron Microscopy TEM
This facility consists of 120 kV TEM which is optimized for high contrast imaging for biological, low Z, and materials science applications. It is equipped with LaB6/Tungsten filaments emitter, latest large-area SDD detectors, compact footprint and simplified GUI with multitouch screen for optimal ease of use.

![TEMs in Central Facility and some Images](image_url)

Equipment in Facility:

Microscope: The JEOL JEM-1400 Plus Transmission Electron Microscope (TEM) features high resolution/high contrast imaging. It has a maximum accelerating voltage of 120 kV, a +70 degrees tilted computer controlled stage. With the JEM-1400Plus, images from the ultra LOWMAG mode (min. mag. ×10) to the MAG mode (max. mag. ×1.2M) can be acquired with AMT camera, resulting seamless observation with no switching of cameras or shifting one's gaze to a fluorescent screen. Using the auto montage function (provided as standard) makes it easy to acquire high-precision images of a wide field of view.
Point and Shoot function: This function allows the user to move a field of view to target position pointed by clicking on a previously-acquired image. The Point and Shoot function allows users to view a target image without changing optical conditions such as focus or magnification.

Intelligent Panel: An advanced-function, simply-designed operation panel was developed. The rich and various patterns on the color display of the organic EL enable to display a function of buttons with easy-to-see and user-friendly accessibility. About 50 kinds of button patterns are provided and the functions of the buttons are customizable on the user’s selection.

Softwares: TEMCON software is used for measurements.

Faculty Coordinators:
Dr. J.P. Singh
Professor, Department of Physics, IIT-Delhi, Hauz Khas, New Delhi-110 016
Tel: 011-26591323; Email: jpsingh@physics.iitd.ac.in

Dr. Josemon Jacob
Professor, Department of Materials Science & Engineering, IIT-Delhi, Hauz Khas, New Delhi-110 016
Tel: 011-26591425; Email: jacob@polymers.iitd.ac.in

Physical Location of Lab:
Main Building, MS-108 (Ex Hall), IIT Delhi, Hauz Khas, New Delhi-110 016
Tel.: 011-26596520

Operation In-charges:
Mr. V.K. Khanna; Mr. Jitendra Kumar and Dr. Anit Dawar
Tel.: 011-26596520

3. High-resolution Transmission Electron Microscopy (HRTEM)

The Tecnai G2 20 is a highly advanced, state-of-the-art transmission electron microscope with an unrivalled task-oriented user interface. It offers high performance with versatility, high productivity with ease of use, and all in a personal environment. The accessories that may be fitted onto these systems (e.g. STEM, CCD cameras, EDX) are embedded into the user interface, allowing differently experienced operators to fully utilize the functionality of the total system through one coherent interface.
The Tecnai G2 20 is a reliable and versatile instrument which is ideally suited for studying a wide range of general and advanced materials, soft matter, composites, hybrids, tissues and cellular compounds. The flexibility to change the high tension to any other value in a minute helps to operate the Tecnai G2 20 always at optimum experimental conditions. The combination of high resolution 2D imaging at both ambient conditions, bright-field, dark-field STEM imaging, electron diffraction and detailed microanalysis, makes the Tecnai G2 20 a versatile tool for classical materials science as well as life science applications.

**Faculty Coordinators:**
Dr. Bodh Raj Mehta
Schulmberger Chair Professor & Dean, IRD
Department of Physics, IIT Delhi, Hauz Khas, New Delhi-110 016
**Tel.:** 011-2659-1707; **Email:** brmehta@physics.iitd.ac.in

Prof. A.K. Ganguly
Professor, Department of Chemistry, IIT Delhi, Hauz Khas, New Delhi-110 016
**Tel.:** +91-11-26596452

**Physical Location of Lab:**
V1 Block, Room Number 112
Nano Research Facility, IIT Delhi, Hauz Khas, New Delhi-110 016 **Tel.:** +91-11-26596497

**Operation In-charge:**
Mr. Akshey Kaushal
**Tel.:** +91-11-26596497; **Email:** aksheykaushal@gmail.com

4. **Field Emission Scanning Electron Microscope (FESEM) with Oxford-EDX**

The Quanta 200 FEG Scanning Electron Microscope (SEM) offers nanometer resolution and a high signal to noise ratio in both regular high vacuum and environmental modes. The EDS consists latest 80 mm² SDD detector enables detection of elements under high resolution. Quanta FEG 200 comprises of different types like ETD (Everhart-Thornley detector), Backscattered Electrons Detector (BSED), Large Field Detector (LFD), and Gaseous Secondary Electron Detector (GSED). STEM (Scanning Transmission Electron Microscopy) is also possible to form atomic resolution images and high contrast imaging of biological samples.

*Figure 4: FESEM with EDX*
**Faculty Coordinators:**
Prof. Ashwini K. Agrawal and Prof. Manjeet Jassal
Professor, Department of Textile Technology, IIT-Delhi, Hauz Khas, New Delhi-110 016

**Physical Location of Lab:**
SMITA Research Laboratory, Room No. TX-110
Entrance through Eco Lawn, Near Committee Room
Department of Textile Technology, IIT-Delhi, Hauz Khas, New Delhi-110 016
Tel.: +91-11-26596615; Email: tests@smita-iitd.com

**Operation In-charges:**
Ms. Rashi Agarwal, Incharge & Ms. Surabhi Jha, Co-incharge

**Operators:**
Mr. Rajesh Kumar & Ms. Srishti Paliwal

---

5. **Scanning Electron Microscopy (SEM)**

Zeiss EVO 50 & EVO 18 are versatile analytical electron microscopes with a large specimen chamber. The EVO 50 series can handle large specimens at the analytical working distance of 8.5mm owing to a combination of the inclined detectors and the sharp conical objective lens. The class leading X-ray geometry allows for the addition of an EDS detector. The instrument can achieve 2.0nm resolution.

**Faculty Coordinator:**
Dr. Bhanu Nandan
Associate Professor, Department of Textile Technology, IIT-Delhi, Hauz Khas, New Delhi-110 016

**Physical Location of Lab:**
Room No. TX - 118, Department of Textile Technology, IIT-Delhi, Hauz Khas, New Delhi-110 016
Tel.: +91-11-26596645; Email: coordsem@admin.iitd.ac.in

**Operation In-charges:**
Mr. Kuldeep Sharma; Mr. Mahesh Soni and Ms. Aastha Sharma
Tel.: +91-11-26596645

Figure 5 : Scanning Electron Microscopy (SEM)
6. Ultramicrotomy

Ultramicrotomy is a method for cutting specimens into extremely thin slices, called ultra-thin sections, that can be studied and documented at different magnifications in a transmission electron microscope. Ultra thin sections of specimens are cut using a specialized instrument called an “ultramicrotome”. The usual thicknesses for transmission electron microscopic examinations range between 20 nm and 150 nm. There are various techniques for preparing such thin samples. Besides ion etching, FIB, tripod polishing and electrochemical processing, ultramicrotomy is a fast and clean method of producing ultra-thin sections of biological samples as well as polymers, rubber, ductile and even hard and brittle materials. A key advantage of ultramicrotomy is the size and homogeneity of the electron-transparent area of specimens prepared with this technique.

Faculty Coordinator:
Dr. Bhanu Nandan
Associate Professor, Department of Textile Technology, IIT-Delhi, Hauz Khas, New Delhi-110 016

Physical Location of Lab:
Room No. TX - 118, Department of Textile Technology, IIT-Delhi, Hauz Khas, New Delhi-110 016
Tel.: +91-11-26596645; Email: coordsem@admin.iitd.ac.in

Operation In-charges:
Mr. Kuldeep Sharma; Mr. Jitendra Kumar; Mr. Mahesh Soni and Ms. Aastha Sharma Tel.: +91-11-26596645

7. Atom Probe Tomography

Atom probe tomography is a unique characterization technique that facilitates three-dimensional visualization as well as in-depth analysis of nano-scale features at near-atomic scale resolution. APT is fundamentally a time-of-flight (TOF) mass spectrometry technique. The power of APT lies in its ability to tie compositional information to structure. LEAP accomplishes this with high analytical sensitivity which can reach one atomic part per million (appm).

Figure 6: Ultramicrotome (Leica UC-6)

Figure 7: Atom Probe Tomography Facility
Design and development of materials with tailored properties at the nano scale requires understanding of elemental distribution at the atomic scale. Atom probe tomography with Local Electrode Atom Probe (LEAP) has the capability of characterizing materials ranging from metals, polymers, ceramics, semiconductors and composites, for their elemental distribution in 3D at the atomic scale.

The APT facility at IIT Delhi is a part of the National Facility for Atom Probe Tomography (NFAPT) situated at IIT Madras with Nodal Centres at IIT Delhi, IIT Bombay, IIT Kanpur, IIT Kharagpur, IIT Ropar and ARCI.

**Faculty Coordinator and Operational In-charge:**
Dr. Khushboo Rakha  
Department of Applied Mechanics, IIT Delhi, Hauz Khas, New Delhi-110 016  **Tel.:** +91-11-26597361

**Physical Location of Lab:**  
Main Building, MS-108 (Ex Hall), IIT Delhi, Hauz Khaz, New Delhi-110 016  **Tel.:** +91-11-26596520

**Operation In-charge:**  
Mr. Akshey Kaushal

**B. SPECTROSCOPY FACILITIES**

1. **Nuclear Magnetic Resonance Spectroscopy (300 MHz, 400 MHz and 500MHz)**

NMR spectroscopy is equipped with three superconducting NMR spectrometers operating in the liquids mode. The spectrometers range from 7.05 Tesla (300 MHz 1H frequency) to 11.74 Tesla (500 MHz 1H frequency). All three spectrometers are of the Bruker Avance AV-III type and are equipped with broadband probes with a single axis gradient. The 400 MHz spectrometer has an auto sampler for accelerated workflow.

**Faculty Coordinator:**  
Dr. Selvarajan Nagendran  
Associate Professor, Department of Chemistry, IIT Delhi, Hauz Khas, New Delhi-110 016  **Tel.:** 011-26591523

**Physical Location of Lab:**
Room No. 144, Block Vth, IIT Delhi, Hauz Khas, New Delhi-110 016  **Tel.:** 011-26596516

**Operational In-charges:**
Aalok Yadav (Junior Technical Superintendent)  
**Tel.:** 011-26596516;  **Email:** a26812@chemistry.iitd.ac.in  
Ashin Amanulla (Project Associate)  
**Tel.:** 011-26596516;  **Email:** ird11961@textile.iitd.ac.in
2. NMR 400MHz with Liq. and Solid Probe

In JNM-ECA Series (Delta V4.3 -) Delta - 400 MHz- FT-NMR instrument liquid-state NMR as well as solid-state NMR measurement becomes possible. High-Resolution solid-state NMR measurement by techniques such as cross-polarization-magic angle spinning (CP/MAS) method becomes possible when you add optional attachments, such as a probe for the solid-state measurement, to the standard composition of JNM-ECA/ECX series. Multinuclear observation ($^{31}$P-$^{15}$N) measurement and measurement under variable temperature (VT) are also possible in this system.

Faculty Coordinators:
Prof. Ashwini K. Agrawal and Prof. Manjeet Jassal
Professor, Department of Textile Technology, IIT-Delhi, Hauz Khas, New Delhi-110 016

Physical Location of Lab:
SMITA Research Laboratory, Room No. TX-110, Entrance through Eco Lawn, Near Committee Room, Department of Textile Technology, IIT-Delhi, Hauz Khas, New Delhi-110 016
Tel.: +91-11-26596615; Email: tests@smita-iitd.com

Operation In-charges:
Ms. Neeta Prajapati, Incharge and Mr. Rajesh Kumar, Co-Incharge

Operators:
Mr. Rajesh Kumar and Ms. Srishti Paliwal

3. Inductively Coupled Plasma-Mass Spectrometry (ICP-MS)

Agilent’s 7900 ICP-MS has a robust plasma and optional Ultra High Matrix Introduction (UHMI) technology that enable the user to routinely measure samples containing up to 25% total dissolved solids (TDS)—100 times higher than the traditional matrix limit for ICP-MS.

Widest dynamic range—the new orthogonal detector system (ODS) delivers up to 11 orders of magnitude
dynamic range from sub-ppt to percent-level concentrations, enabling you to measure trace elements and majors in the same run. Faster analysis of transient signals—with 10,000 separate measurements per second, the 7900 ICP-MS provides short integration times for accurate analysis of transient signals.

**Faculty Coordinator:**
Dr. Z.A. Shaikh  
Assistant Professor, Department of Biochemical Engineering and Biotechnology  
IIT-Delhi, Hauz Khas, New Delhi-110 016  
Tel: +91-11- 26591006

**Physical Location of Lab:**  
ICP-MS Lab, Block- I, Room No. 233 (C),  
Department of Biochemical Engineering and Biotechnology, IIT-Delhi, Hauz Khas, New Delhi-110 016  
Tel: +91-11-26596390; E-mail: icpms.iitd@gmail.com

**Operational In-charge:**  
Mr. Animesh Bhowal  
Tel: +91-11-26596390

**4. MALDI-TOF/TOF Mass Spectrometry**
Matrix-assisted laser desorption/ionization mass spectrometry (MALDI-MS) emerged as an effective analytical tool use for studying the molecular mass determination, protein identification & characterization, identification of post translational modification, terminal sequencing and more other applications. In general, molecules in the gas phase (or species desorbed from a condensed phase) are ionized, and the ions are then accelerated by an electric field and separated on the basis of their mass-to-charge ratio (m/z) and further detected. A time-of-flight (TOF) mass spectrometer separates ions with identical kinetic energy but different m/z, since lighter ions travel faster than heavier ones. A mass spectrum is a chromatogram presenting the signal intensity (y-axis) versus m/z (x-axis). Interpretation of the fragmentation patterns and isotopic peaks can provide valuable clues for the structure determination of organic molecules. MALDI provides a ‘soft’ ionization source that prevents decomposition of fragile biomolecules, producing primarily singly charged, intact protein ions. The ions produced with the MALDI technique are analyzed using a time-of-flight (TOF) mass spectrometer, which is characterized by a high ion throughput and therefore high sensitivity.
Faculty Coordinator:
Prof. Bishwajit Kundu  
Kusuma School of Biological Sciences, IIT- Delhi, Hauz Khas, New Delhi-110 016  
Tel.: +91-11- 26591037; Email: bkundu@bioschool.iitd.ac.in

Physical Location of Lab:
Mass Spectrometry Laboratory  
Ground Floor, Kusuma School of Biological Sciences, IIT-Delhi, Hauz Khas, New Delhi-110 016  
Tel.: +91-11-2659-7503

Operational In-charge:
Mr. Subodh Jain  
Tel.: 011-2659-7503; Email: subodhjainalwar@gmail.com

5. Micro Raman Spectroscope

Micro-Raman spectrometer, inVia reflex Raman spectroscopy system combined with research grade Leica microscope allows scatter, line, area mapping and confocal depth profiling. Renishaw Raman can be used with two types of lasers- 514nm and 785nm with different magnification lenses. Argon Ion laser 514nm 20 MW-5000 hours usage. Renishaw Diode laser, solid state Near IR -3000 hour.

Faculty Coordinators:
Prof. Ashwini K. Agrawal & Prof. Manjeet Jassal  
Professor, Department of Textile Technology, IIT-Delhi, Hauz Khas, New Delhi-110 016

Physical Location of Lab:
SMITA Research Laboratory, Room No. TX-110  
Entrance through Eco Lawn, Near Committee Room  
Department of Textile Technology, IIT-Delhi, Hauz Khas, New Delhi-110 016

Phone: +91-11-26596615; Email: tests@smita-iitd.com

Operational In-charges:
Ms. Kumud Arora, Incharge & Ms. Neeta Prajapati, Co-Incharge

Operators:
Ms. Srishti Paliwal and Mr. Rajesh Kumar
6. Electrospray Ionization- Liquid Chromatography (ESI-LC)-Mass Spectrometry

Electrospray ionization (ESI) is a soft ionization technique to examine proteins using MS and MS/MS. In ESI, charged droplets are produced by passing a solubilized sample through a high voltage needle at atmospheric pressure. Desolvation occurs prior to entrance into the high vacuum of the mass spectrometer. This approach is often coupled with a chromatographic system, typically reverse phase chromatography or capillary electrophoresis, allowing analysis of very complex samples. ESI typically induces a range of charge states. LC-MS is a powerful technique used for many applications which has very high sensitivity and selectivity.

The ESI-MS facility at KSBS, IIT Delhi is a Bruker Electrospray Ionization instrument-amaZon SL Dual Funnel Iontrap bench top with a mass accuracy of 0.1Da. It is connected to a nano-liquid chromatography setup- EASY nLC-II with C18 column to fractionate sample containing mixture of peptides. There is a facility of direct probe injection as well as sample injection through nLC. This instrument is capable of performing analysis of intact proteins, mixtures of proteins and peptides, biomarker studies, identification of post translational modifications, and many more applications.

**Faculty Coordinator:**
Prof. Tapan K. Chaudhuri  
Kusuma School of Biological Sciences, IIT- Delhi, Hauz Khas, New Delhi-110 016  
Tel.: +91-11-26591012; Email: tkchaudhuri@bioschool.iitd.ac.in

**Physical Location of Lab:**
MG-2, Mass Spectrometry Laboratory  
Ground Floor, Kusuma School of Biological Sciences, IIT-Delhi, Hauz Khas, New Delhi-110 016  
Tel.: 011-2659-7503

**Operational In-charge:**
Mr. Subodh Jain  
Tel.: 011-26597503; Email: subodhjainalwar@gmail.com

C. OTHER FACILITIES

1. Liquid Nitrogen Facility
The Liquid Nitrogen (LN2) facility is involved in-house production of LN2 and its supply to various experimental
laboratories of the institute. The current LN2 plant was commissioned by M/s Stirling Cryogenics & Refrigeration in 1989. The original Model StirLIN-1 was then upgraded in 2006. This increased its production capacity from 6 liters/hr to 10 liters/hr. The plant is able to meet the current Institute's demand of approximate 1500 liters per month.

**Faculty Coordinator:**
Dr. Pintu Das  
Assistant Professor, Department of Physics, IIT-Delhi, Hauz Khas, New Delhi-110 016  
**Tel:** +91-11-26591324; **Email:** pintu@physics.iitd.ac.in

**Physical Location of Lab:**
Room No. 4, Block-I (Ground Floor), IIT-Delhi, Hauz Khas, New Delhi-110 016  
**Tel.:** +91-11-26596114

**Operation In-charges:**
Mr. Ghanshyam Sharma and Mr. Narinder **Tel.:** +91-11-26596114

**2. Glass Blowing Workshop**
Various jobs can be undertaken in the workshop are: ‘T’ joints to Mercury Diffusion pumps. Special glass apparatus like McLeod Gauge, B.E.T apparatus, Dewar Flasks, Distillation Unit, Various types of viscometers, All type of Condensers, Multi Necked Flasks, Various types of Adopters and setting of vacuum lines can be possible.

**Faculty Coordinator:**
Dr. Shashank Deep  
Associate Professor, Department of Chemistry, IIT Delhi, Hauz Khas, New Delhi-110 016 **Tel.:** +91-11-26596596

**Physical Location of Lab:**
Glass Blowing Workshop, Central Facility, MS-739, 6th floor, Department of Chemistry, IIT Delhi, Hauz Khas, New Delhi-110 016 **Tel.:** +91-11-26596513

**Operation In-charges:**
Mr. Virander Kumar Sharma (Jr. Tech. Superintendent)  
**Tel.:** +91-11-26596513; **Email:** a25719@chemistry.iitd.ac.in

Mr. Sunil Kumar (Jr. Laboratory Assistant), Mr. K. Kannan
7.2 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. 282 Sponsored Projects with a funding of ₹415.47 crores were undertaken during the period April 1, 2017 to March 31, 2018. In addition, 282 Consultancy Jobs worth ₹22.18 Crores were also undertaken during this period.

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 ₹ One Lac to New Faculty Members who join the Institute.
- Faculty Interdisciplinary Research Project (FIRP) scheme aims to enhance Interdisciplinary and collaborative research interest in the Institute. 19 projects were approved for support under Phase-II of FIRP. Selected projects are given an initial grant of ₹10 Lakh. It is expected that the joint research team will submit at least one research project to a funding agency on the completion of the 1st year. Additional funds covering the teaching assistance of a Ph.D student for 4 years can also be provided, if required and justified based on the progress of the first year.
- Equipment Matching Grant for new Faculty: IRD provides matching equipment grant to new faculty for the purchase of equipment sanctioned under a project. Faculty can avail this grant within 2 years of joining with a sealing of Rs. 35 Lacs or an amount equivalent to the funds sanctioned by funding agency for the equipment under the project whichever is lower.
- 1234 Discover and Learn Projects (1-2-3-4) Scheme: Objective of this scheme is to enhance research aptitude among undergraduate students and increase the component of ‘learning by research’. Involvement of students at a very early stage of their stay at the institute and working jointly with senior students will expose the students to the excitement of research. In addition, continuous operation of research project on a particular objective
for at least 4 years is expected to result in meaningful research output, which will add to profile of the students. Financial support of ₹1 lakh per year has been provided for each project.

- IRD Student Startup Action Projects: IRD support for student start up activity in the campus is given under ‘Student Start-up Action Scheme’. Students are engaged in start-up actions at different stages and different forms. The objective of this scheme is support this activity by providing a support environment in terms of recognition, initial seed grant and expert advice. The selected teams are given a seed grant of ₹2 Lacs per year.

- Summer Undergraduate Research Award (SURA): under this scheme, the students are required to submit the project proposals in association with identified Faculty of a Department/Centre to act as an Administrative Facilitator and a Guide.

- Assistantships/Fellowships are provided by IRD to the Ph.D. students during their 5th year. IRD provides support in the form of Gap Period Assistantship for both M.Tech./MS(R) and Ph.D. students who are drawing their fellowship/assistantship from the projects. These assistantships will be provided to the students once the projects get over and there is no other project to pay their assistantship. M.Tech./M.S.(R) students can be supported for a maximum gap period of six months and Ph.D. students would be supported for a maximum gap period of one year.

- Research Scholar Travel Award: IRD Unit provide all Research scholars a travel grant under “Research Scholar Travel Award” (RSTA) upto a maximum of ₹80,000/- from IRD Research Promotion Fund.

### 7.3 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, CNC programming and 3D Printing, Plastic Product manufacturing etc. M.Tech. students of Production Engg. 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, Master’s thesis and Doctoral research. Large number 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, modernize and prepare 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 transform 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. Laser cutting facility has also been added recently.

7.4 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/during 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.
7.5 INSTITUTE LIBRARY

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 9000 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 hrs.

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 Institute have access to over 25,000 full-text electronic journals and 10 bibliographic databases from a number
of publishers and aggregators through the Direct subscription/access through eShodh Sindhu consortium. A-Z list of subscribed journals are available on Central Library website. The details and links to these electronic journals are available through the Library website as well through the Library Web OPAC. More than 1 lakh bound volumes of journals are available in print form.

**E-RESOURCES AVAILABLE THROUGH THE CENTRAL LIBRARY/ESHODH SINDHU CONSORTIUM**

- AAAS – Science - Online & Science Classics
- ABI / Inform Complete
- ACM Digital Library
- ACS All Web Edition Journals Package
- AIP Journals
- American Mathematical Society Journals
- American Meteorological Society Journals
- Annual Reviews
- APS Journals
- ASCE Journals
- ASCE Proceedings
- ASME Digital and Archives
- ASME Journals (+ A M R)
- ASTM Standards & Digital Library
- BIS - Standards
- Cambridge University Press - HSS and S&T package
- Capitaline
- Crisil Research
- EBSCO - Business Source Complete
- EBSCO – World Textiles
- EBSCO Discovery Services
- EBSCO - Textile & Technology Complete
- Economic & Political Weekly (EPW)
• Electrochemical Society - Digital Library Package
• Elsevier’s Science Direct
• Emerald Full-text
• Euromonitor (GMID)
• Grammarly Software(Premium Version)
• I.C.E. Journals
• IEEE / IEE Library Online (IEL)
• Indiastat.com
• INFORMS Current Journals
• IoP Science extra and their Archival collection
• ISID database
• ISI Emerging Markets - EMIES
• Jgate+JCCC
• JOVE Biology
• JOVE Physics
• JSTOR
• Manupatra
• MathSciNet
• Nature journals
• NOW Journals
• Online Miscellaneous Journals (10 Journals)
• Optical Society of America (OSA)
• Oxford Journals (Mathematics, Life Science, Humanities and Social Science)
• Project Euclid(30+ Journals)
• Project MUSE Journals
• ProQuest Dissertation & Theses Global (PQDT Global)
• RSC GoldOnline
• RSC Journals Archive Titles (1841 - 2004)
• Sage - IMECH Collection
• Sage - HSS & Management Journals and their Archives
• Sage – Science and Technology Package
• Scientific American
• Scopus
• SIAM Journals and their Archives
• Springer Link
• Taylor & Francis, Current Core Science & Technology Titles+ Chemistry Backfiles
• Wiley Custom Package
• World Scientific Publication Mathematics
• World Textile All Digital Magazines

ELECTRONIC BOOKS
The Central Library has access to eBooks from the following publishers/aggregators which are available through wide access on IP range in the campus:
• Cambridge University Press
• Degruyter
• Elsevier
• Pearson
• Springer
• Wiley
• World Scientific Publisher
• McGraw Hill Education
• World Scientific Publisher
• E-Text Books (38 books)
• Lectures Notes in Computer Science, Mathematics and Physics (upto year 1996)

Apart from the above eBooks, following two eBook collections are also available through National Digital Library (NDL):
• World eBook Library
• South Asian Archives
COMPUTER AND NETWORKING FACILITIES

The Library has its own sub-LAN, which, in turn, is connected to the Campus LAN. It has over 90 PCs and six servers spread over three floors of the Library. The Library is a part of fibre optic-based campus-LAN. Of 90 PCs in the Library, 25 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 Frequecsty 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.
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/RFID patron card.

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.

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 access of approx. 150 e-textbooks for undergraduate students and the same are accessible in the campus through library website.

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

Institutional Repository at IIT Delhi (http://eprint.iitd.ac.in)

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 and 4662 abstract of Ph.D. Theses.
ADMINISTRATIVE STRUCTURE

THE VISITOR
Shri Ram Nath Kovind (Hon’ble President of India)

CHAIRMAN, BOARD OF GOVERNORS
Shri Kumar Mangalam Birla

DIRECTOR
Prof. V. Ramgopal Rao

DEPUTY DIRECTORS
Prof. Ashok Gupta (Operations) and Prof. M. Balakrishnan (Strategy and Planning)

Deans
Prof. Bhim Singh : Academics
Prof. Sandeep Sen : Faculty
Prof. B.R. Mehta: Research & Development
Prof. Sanjeev Sanghi : Alumni Affairs & Intl. Programmes
Prof. T.R. Sreekrishnan : Student Affairs
Prof. K.C. Iyer : Infrastructure

Associate Deans
Prof. Joby Joseph : Academics (Curriculum)
Prof. Shantanu Roy : Academics (PG Research)
Prof. Subrat Kar : Faculty
Prof. S.K. Khare : Research & Development
Prof. James Gomes : Students Events
Prof. A.K. Saroha : Hostel Management
Prof. (Ms.) Sangeeta Kohli : Student Welfare
Prof. Bishwajit Kundu : Infrastructure
Prof. Deepti Gupta (Ms.) : Infrastructure
Prof. Anurag Singh Rathore : Corporate Relations

REGISTRAR
Dr. Sandeep Chatterjee
THE SENATE

V. Ramgopal Rao, Chairman  
(Director)

Deputy Directors
Ashok Gupta
M. Balakrishnan

All Professors (or equivalent)
V.K. Agarwal
Ashwini K. Agarwal
Babu J. Alappat
R. Alagirusamy
S. Aravindan
S.K. Atreya
R. Bahl
D.K. Bandhopadhyay
S. Banerjee
Varsha Banerjee (Ms.)
B.K. Behera
Ananjan Basu
Kanika T. Bhal (Ms.)
Suresh Bhalla
A.N. Bhaskarwar
B. Bhattacharjee
Naresh Bhatnagar
G. Bhuvaneswari (Ms.)
Jayashree Bijwe (Ms.)
Ranjan Bose
Vivek Vithal Buwa
B.R. Chahar
N. Chatterjee
Ratnamala Chatterjee (Ms.)
R. Chattopadhyay
Santanu Chaudhury
Sujeet Chaudhary
Tapan Kumar Chaudhuri
Anoop Chawla
Mukesh Chander
V.M. Chariar
Apurba Das
Manoj Datta
Ashish K. Darpe
Swades K. De
S. Dharmaraja
Viresh Dutta
S.G. Deshmukh
Anupam Dewan
Chinmoy Sarkar Dey
J.K. Dutt
Anil Jacob Elias
A.K. Ganguli
Naveen Garg
N.K. Garg
Rahul Garg
Anup K. Ghosh
Santanu Ghosh
James Gomes
V.R. Gunturi
Bhuvanesh Gupta
Deepti Gupta (Ms.)
M.P. Gupta
Pardeep K. Gupta
S.K. Gupta (Ch.E.)
S.E. Hasnain
Sriram Hegde
Harish Hirani
S.M. Ishtiaque
K.C. Iyer
Josemon Jacob
A.K. Jain
Sanjeev Jain
Manjeet Jassal (Ms.)
B. Jayaram
Jayadeva
M. Jagadesh Kumar
Mangla Joshi (Ms.)
Joby Joseph
S.D. Joshi
R.R. Kalaga
S.R. Kale
Prem Kumar Kalra
Tara.C. Kandpal
Santosh Kapuria
Deo Raj Kaushal
Anshul Kumar
D. Ravi Kumar
Subodh Kumar
I.N. Kar
Subrat Kar
Ravinder Kaur (Ms.)
A.K. Keshari
Rajesh Khanna
THE SENATE (contd.)

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)  
S.K. Koul  
N.D. Kurur  
Brejesh Lall  
Puneet Mahajan  
Manju Mohan (Ms.)  
Alok Madan  
Anushree Malik (Ms.)  
Hitendra K. Malik  
Ranjan Kumar Mallik  
Shashi Mathur  
B.R. Mehta  
D.S. Mehta  
Subodh V. Modak  
Saroj Mishra (Ms.)  
Sukumar Mishra  
Prashant Mishra  
Aditya Mittal  
Sudipto Mukherjee  

Atul Narang  
K. Narayanan  
Sanjiva Prasad  
S.N. Naik  
Arvind K. Nema  
Sunil Nath  
B.S. Panda  
Preeti Ranjan Panda  
Pulak Mohan Pandey  
Raj Kumar Pandey  
Sunil Pandey  
Siddharth Pandey  
B.K. Panigrahi  
K.K. Pant  
B.P. Patel  
Nalin Pant  
Kolin Paul  
Shankar Prakriya  
Rajesh Prasad  
Sanjiva Prasad  
A. Ramanan  
N.G. Ramesh  
A.D. Rao  
K.S. Rao  
P.V. Rao  
S.C.S. Rao  
Anurag Singh Rathore  
M.R. Ravi  
V. Ravishankar  
Anjan Ray  
G.B. Reddy  

R.S. Rengasamy  
Shantanu Roy  
Subir Kumar Saha  
Ambuj D. Sagar  
Sanjeev Sanghi  
Huzur Saran  
Anil Kumar Saroha  
Kushal Sen  
P. Santhikumaran  
Jagdish T. Sahu  
Puneet Mahajan  
Sandeep Sen  
Ravi Shankar (Chy.)  
Ravi Shankar (DMS)  
Anurag Sharma  
R.K. Sharma  
Satyawati Sharma (Ms.)  
M.R. Shenoy  
A.K. Shukla  
Bhim Singh  
A.K. Singh  
Harpal Singh  
Jai Deo Singh  
J.P. Singh  
Purnima Singh (Ms.)  
S.N. Singh  
S.P. Singh  
Sujeet K. Sinha  
R.K. Soni  
Sushil  
A.K. Srivastava
THE SENATE (contd.)

Pankaj Srivastava  
T.R. Sreekrishnan  
K. Sreenadh  
N. Tandon  
Prabal Talukdar  
Geetam Tiwari (Ms.)  
Amitabha Tripathi  
Suneet Tuli  
C.A. Tomy  
R.K. Varshney  
M. Veerachary  
S.V. Veeravalli  
V.K. Vijay  
Sanil V.  
S.S. Yadav  

Three Educationists from Outside IIT Delhi  
D. Kanjilal  
G.C. Khilnani  
Shyam Menon  

Head, Central Library  
K.K. Pant  

Head, Central Workshop  
P.V. Madhusudhan Rao  

One of the Wardens  
Sudip Pattanayak (Satpura)  

Chairman, Grades & Registration (UG&PG)  
Mukul Sarkar  

Chairman, Time Table Committee (UG/PG)  
Anupam Shukla  

Six Members of the Faculty  
S. Pradyumna  
Paresh Chokshi  
N. Sen Roy  
Seema Sharma  
Vamsi Krishna  
(Ms.) Archana Chugh  

Three Alumni Representatives  
Sanjeev Jain  
Rajesh Aggarwal  
Updesh Verma  

Four Student Representatives  
Priyanshi (Himadri)  
Prakash Khude (Karakoram)  
Kushal Sogani (Aravali)  
Shivmohan Chauhan (Aravali)  

Registrar  
Sandeep Chatterjee  
(Secretary)
CHAIRPERSONS OF THE BOARDS

V. Ramgopal Rao  Board of Educational Research and Planning, Executive Committee of the Senate, Student Affairs Council
B.R. Mehta  Industrial Research and Development Board
Bhim Singh  Board for Academic Programmes

PRESIDENTS OF BOARDS FOR STUDENT ACTIVITIES

Simona Sawhney  Board for Students Publications
Jyoti Kumar  Board of Recreational and Creative Activities
A.K. Saroha  Board of Hostel Management
Associate Dean (HM) Ex-Officio
Sangeeta Kohli (Ms.)  Student Teacher Interaction Committee
(Vice Chairman)
Associate Dean (SW) Ex-Officio
Pramit K. Chowdhury  Board for Sports Activities
(President)
Sangeeta Kohli (Ms.)  Board for Students Welfare
(President)
Associate Dean (SW) Ex-Officio
Shashank Bishnoi  Vice President BSW
V. Perumal  Vice President BSA
Mausam  Vice President BRCA

LIBRARY

K.K. Pant  Chairman, ACL

OTHERS

Shalini Gupta (Ms.)  Advisor, Foreign Students
Rajesh Prasad  Coordinator, NSS
Brejesh Lall  Coordinator, NCC
Joby Joseph  SC/ST Preparatory Course
CHAIRPERSONS OF ACADEMIC ACTIVITIES

Huzur Saran  
*Head, CSC (Ex-Officio)*  
Computer User’s Committee

Aditya Mittal  
JEE Chairman (Advanced-2018)

K.K. Pant  
Advisory Committee for Library (ACL)

Apurba Das  
Chairman (GATE/JAM-2018)

Sangeeta Kohli (Ms.)  
Head, Counselling Service  
*President BSW (Ex-Officio)*

S.S. Yadav  
Hindi Cell (Head)

Mukul Sarkar  
Grades & Registration (UG & PG)

Anupam Shukla  
Time Table Committee (UG & PG)

COORDINATORS OF INTERDISCIPLINARY PROGRAMMES

**M.Tech. Programmes**

Deepak Kumar  
Industrial Tribology & Maintenance Engineering (ITMMEC)

B.K. Satapathy  
Polymer Science & Technology (CPSE)

K.A. Subramanyan  
Energy Studies / Energy & Environment Management (CES)

Jayadeva  
VLSI Design, Tools & Technologies (EE/CS&E/CARE)

G.S. Khan  
Instrument Technology (IDDC)

Jyoti Kumar  
Industrial Design (IDDC)

**M.Tech. and Research Programmes**

R.K. Varshney  
Opto Electronics & Optical Communications

Abhisek Dixit

**Research Programme**

Anoop Chawla  
Transportation Research and Injury Prevention Programme (TRIPP)

**Others**

Mahim Sagar  
Quality Improvement Programme/ Continuing Education Programme/OCDC

V.K. Vijay  
Unnat Bharat Cell (UBC)
### COORDINATORS OF CENTRAL FACILITIES
(Located in Departments/Centres)

<table>
<thead>
<tr>
<th>Name</th>
<th>Facility Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>J.P. Singh</td>
<td>TEM</td>
</tr>
<tr>
<td>S. Nagendran</td>
<td>NMR 300 MHz (Liq probe)</td>
</tr>
<tr>
<td>Pintu Das</td>
<td>Liquid Nitrogen Facility</td>
</tr>
<tr>
<td>Bhanu Nandan</td>
<td>SEM</td>
</tr>
<tr>
<td>Shashank Deep</td>
<td>Glass Blowing Workshop</td>
</tr>
<tr>
<td>Josemon Jacob</td>
<td>TEM, CPSE</td>
</tr>
<tr>
<td>Manidipa Banerjee (Ms.)</td>
<td>Cyro HR TEM</td>
</tr>
<tr>
<td>Shaikh Ziauddin Ahammad</td>
<td>ICP-MS</td>
</tr>
<tr>
<td>B.R. Mehta</td>
<td>AFM+STM (Atomic Force Microscope+Scanning Tunneling Microscope)</td>
</tr>
<tr>
<td>Ashwini K. Agrawal</td>
<td>Under SMITA Res. Lab. (a) Micro Raman Spectrocope (b) FE SEM + EDS (c) NMR 400 MHz with Liq. and solid probe</td>
</tr>
<tr>
<td>Neeraj Khare</td>
<td>Nanoscience Research Facility</td>
</tr>
</tbody>
</table>

### CHAIRPERSONS OF OTHER COMMITTEES

<table>
<thead>
<tr>
<th>Name</th>
<th>Committees</th>
</tr>
</thead>
<tbody>
<tr>
<td>V. Ramgopal Rao (Director)</td>
<td>Official Language Implementation Committee</td>
</tr>
<tr>
<td>Bhim Singh</td>
<td>Institute Lecture Series Committee</td>
</tr>
<tr>
<td>Bhim Singh</td>
<td>Standing Committee for Convocation 2017</td>
</tr>
<tr>
<td>Bhim Singh</td>
<td>Kendriya Vidyalaya Management Committee</td>
</tr>
<tr>
<td>Bhim Singh</td>
<td>Nursery &amp; K.G. School Advisory Committee</td>
</tr>
<tr>
<td>K.C. Iyer</td>
<td>Commercial Establishments &amp; Licencing Committee</td>
</tr>
<tr>
<td>K.C. Iyer</td>
<td>Commercial Establishments Monitoring Committee</td>
</tr>
<tr>
<td>K.C. Iyer</td>
<td>House Allotment Committee</td>
</tr>
<tr>
<td>K.C. Iyer</td>
<td>Air-conditioning Committee</td>
</tr>
<tr>
<td>Ashok Gupta</td>
<td>Hospital Advisory Committee</td>
</tr>
<tr>
<td>D.D. (Operations)</td>
<td>Employees Welfare Committee</td>
</tr>
<tr>
<td>Sangeeta Kohli (Mechanical Engg.)</td>
<td>Institute Grievance Committee</td>
</tr>
<tr>
<td>S.S. Yadav (DMS)</td>
<td>Managing Committee of the Benevolent Fund Scheme</td>
</tr>
<tr>
<td>Ashok Gupta</td>
<td>Executive Committee of IITD Staff Welfare Scheme</td>
</tr>
<tr>
<td>D.D. (Operations)</td>
<td></td>
</tr>
<tr>
<td>Ashok Gupta</td>
<td></td>
</tr>
<tr>
<td>D.D. (Operations)</td>
<td></td>
</tr>
</tbody>
</table>

### CENTRAL WORKSHOP

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professor and Head</td>
<td>P.V. Madhusudhan Rao</td>
</tr>
</tbody>
</table>
WARDENS OF HOSTELS
Rajendra Singh Dhaka  Kumaon
Dinesh Kalyanasundaram  Nilgiri
R. Abhijit Abhyankar  Aravali
Joyee Ghosh  Kailash
Ravi P. Singh  Jwalamukhi
B. Sujin Babu  Shivalik
M.C. Ramteke  Karakoram
Ashok Patel  Vindhyachal
A.K. Saroha  Nalanda / IP / New Vindhyachal
Paroma Sanyal (Ms.)  Himadri
Sudip K. Pattanayek  Satpura
Saif K. Mohammed  Zanskar
D. Sundar  Girnar
Smruti R. Sarangi  Udaigiri

PROFESSOR-IN-CHARGE OF DIFFERENT SECTIONS
Prof.-in-Charge (Planning)  :  Kanika T. Bhal
Prof.-in-Charge (Guest Houses & Halls)  :  Rakesh Khosa
Prof.-in-Charge (Training & Placement)  :  I.N. Kar
Prof.-in-Charge (EHLS Unit)  :  Nalin Pant
Officer-in-Charge (EHLS Unit)  :  S. Nagendran

HINDI CELL
Head  :  S.S. Yadav

STUDENT COUNSELLING SERVICE
Head  :  Sangeeta Kohli (Ms.)

COUNSELLOR
Shachi Mathur

ADMINISTRATIVE COMPUTERISATION SUPPORT SERVICE
Head  :  Huzur Saran

CVC
Chief Vigilance Officer  :  Anurag Sharma

RTI
Public Information Officer  :  Vivek Raman
First Appellate Authority  :  Kalyan K. Bhattacharjee
Transparency Officer  :  Sandeep Chatterjee

HOSPITAL SERVICES
Head  :  Lily Khosa
## ADMINISTRATION

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sandeep Chatterjee</td>
<td>Registrar</td>
</tr>
<tr>
<td>M.K. Gulati</td>
<td>Joint Registrar (Accounts)</td>
</tr>
<tr>
<td>K.K. Bhattacharjee</td>
<td>Joint Registrar (FAA, Director’s Office, E-I, Training and Manpower)</td>
</tr>
<tr>
<td>Vivek Raman</td>
<td>Joint Registrar (Conference, Coordination, R&amp;I, Hindi Cell, PIO, RTI)</td>
</tr>
<tr>
<td></td>
<td>(On Contract)</td>
</tr>
<tr>
<td>Atul Vyas</td>
<td>Joint Registrar (Academics, Publication Cell)</td>
</tr>
<tr>
<td>Mohd. Shamim</td>
<td>Deputy Registrar (R&amp;D Accounts)</td>
</tr>
<tr>
<td>N. Bhaskar</td>
<td>Assistant Registrar (Health Unit, E-I, Legal Cell, Nodal Officer for Public Grievances(PG), Vigilance Matters, Gender Grievances &amp; Related Works)</td>
</tr>
<tr>
<td>V.K. Vashistha</td>
<td>Assistant Registrar (R&amp;D)</td>
</tr>
<tr>
<td>Ramesh Kumar Thareja</td>
<td>Assistant Registrar (Recruitment Cell) (On contract)</td>
</tr>
<tr>
<td>Alan V. Sinate</td>
<td>Assistant Registrar (Store Purchase Section)</td>
</tr>
<tr>
<td>Mukesh Chand</td>
<td>Assistant Registrar (SAS)</td>
</tr>
<tr>
<td>Raj Kumar Gupta</td>
<td>Assistant Registrar (Accounts)</td>
</tr>
<tr>
<td>Satish Narayanan Tiwari</td>
<td>Assistant Registrar (Conference)</td>
</tr>
<tr>
<td>Deb Ranjan Mukherjee</td>
<td>Assistant Registrar (Accounts)</td>
</tr>
<tr>
<td>Sanjay Pande</td>
<td>Assistant Registrar (Planning, Alumni Affairs &amp; Intl. Programmes)</td>
</tr>
<tr>
<td>Amitabh Mukherjee</td>
<td>Assistant Registrar (Audit)</td>
</tr>
<tr>
<td>Suresh Kumar Gohar</td>
<td>Assistant Registrar (Academics)</td>
</tr>
<tr>
<td>Mukesh Khandelwal</td>
<td>Institute Engineer (On deputation)</td>
</tr>
<tr>
<td>G.K. Taneja</td>
<td>Executive 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>Rafat Jamal</td>
<td>Assistant Executive Engineer</td>
</tr>
<tr>
<td>V.K. Bharaj</td>
<td>Assistant Executive Engineer</td>
</tr>
<tr>
<td>Prem Kumar</td>
<td>Assistant Executive Engineer</td>
</tr>
<tr>
<td>Brahm 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>Lily Khosa (Ms.)</td>
<td>CMO (SAG), (Additional charge, Head, Hospital Services)</td>
</tr>
</tbody>
</table>
Renu Misurya (Ms.)   CMO (SAG)
Ajay Kumar Jain    CMO (SAG)
M.K. Sagar         CMO (SAG)
Anila Khosla (Ms.)  CMO (NFSG)
P.K. Rajesh        Sr. Medical Officer (Homeopathic)
Md. Ashafaque Hussain Sr. Medical Officer
Sayed Yasmeen Raunaq Sr. Medical Officer
L. Pangerlemba    Sr. Medical Officer
Rajlaxmi Borah     Medical Officer (On contract)
Shalini Singh      Medical Officer (Dental) (On contract) (Consolidated)
Deepak Negi        Sports Officer
Anishya Madan (Ms.) Industrial Liaison Officer
Shachi Mathur      Student Counsellor
Aakriti Astha      Student Counsellor (On contract) (Consolidated)
Aashita Mahendru   Student Counsellor (On contract) (Consolidated)
Sandeep Sharma     Security Officer and Transport Unit (On contract)
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. ..................................................................................................................................
VISION
To contribute to India and the World through excellence in scientific and technical education and research; to serve as a valuable resource for industry and society; and 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-the-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 views of every individual.
- Attention to issues of national relevance as well as of global concern.
- Breadth of understanding, including knowledge of the human sciences.
- Appreciation of intellectual excellence and creativity.
- An unfettered spirit of exploration, rationality and enterprise.

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.
   a) I realise that some examples of misconduct which are regarded as being in violation of the Honour Code include:
   b) Copying from another’s examination paper or allowing another to copy from one’s own paper;
   c) Unpermitted collaboration;
   d) Plagiarism;
   e) Revising and resubmitting a marked quiz or examination paper for re-grading without the instructor’s knowledge and consent;
   f) Giving or receiving unpermitted aid on take-home examinations;
   g) Representing as one’s own work, the work of another, including information available on the Internet;
   h) 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
   i) 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.………………………………
PROSPECTUS 2018-2019