

Prospectus

2017-2018



INDIAN INSTITUTE OF TECHNOLOGY DELHI

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Indian Institute of Technology Delhi

Hauz Khas, New Delhi-110 016, INDIA

For Undergraduate Enquiry

Assistant Registrar (UG)

Ph. : +91 11 2659 1718

Fax : +91 11 2659 7114

E-mail : arugs@iitd.ac.in
adcur@admin.iitd.ac.in
deanacad@admin.iitd.ac.in

For Postgraduate Enquiry

Deputy Registrar (PGS&R)

Ph. : +91 11 2659 1737

Fax : +91 11 2658 2032

E-mail : drpgrs@iitd.ac.in
adres@admin.iitd.ac.in
deanacad@admin.iitd.ac.in

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CONTENTS			
1. INTRODUCTION	1-5	5.7 Stationery Shop/ Telephone Booths	26
2. ACADEMICS	6-13	5.8 Board for Sports Activities (BSA)	26
2.1 Academic System	6	5.9 Board for Recreational and Creative Activities (BRCA)	28
2.2 Academic Structure	7	5.10 Board for Student Publications (BSP)	31
2.3 Research and Innovation	8	5.11 Board for Students Welfare (BSW)	31
2.4 Collaborations	9	5.12 National Service Scheme (NSS)	32
2.5 Student Exchange Programmes	10	5.13 National Cadet Corps (NCC)	32
2.6 Academic Programmes	11	5.14 National Sports Organization (NSO)	32
3. ADMISSIONS	14-21	5.15 Student Counselling Service (SCS)	32
3.1 Undergraduate Programmes	14	5.16 Departmental Professional Societies	33
3.2 Postgraduate Programmes	15	5.17 Medical Facilities	33
3.3 Scholarships	16	5.18 Student-Teacher Interaction	33
3.4 Admission to PG Programmes	17	5.19 Alumni Association	34
3.5 Medals and Prizes	21	5.20 Conduct and Discipline	36
4. FEES	22-25	5.21 Honour Code	36
4.1 Fees for Entry Year 2017	22	5.22 Institute Policy on Ragging	36
4.2 Foreign National Students	24	5.23 Policy against Sexual Harassment	36
4.3 Mode of Payment	24	6. ACADEMIC UNITS	37-208
4.4 Deadlines for Payment	24	Applied Mechanics	37
4.5 Refund of Fees	25	Biochemical Engineering and Biotechnology	45
5. STUDENT LIFE ON CAMPUS	25-36	Chemical Engineering	51
5.1 Halls of Residence	25	Chemistry	61
5.2 Student Affairs Council (SAC)	25	Civil Engineering	67
5.3 Co-curricular and Academic Interaction Council (CAIC)	25	Computer Science and Engineering	79
5.4 Co-curricular Activities	26	Electrical Engineering	89
5.5 The Students' Activity Centre	26	Humanities and Social Sciences	99
5.6 Students' Canteens	26	Management Studies	105
		Mathematics	113

Mechanical Engineering	117	Bharti School of Telecommunication Technology & Management	191
Physics	125	Amar Nath and Shashi Khosla School of Information Technology	197
Textile Technology	135	Kusuma School of Biological Sciences	201
Centre for Applied Research in Electronics	141	Interdisciplinary Research Programme (TRIPP)	207
Centre for Atmospheric Sciences	145	Opto-electronics and Optical Communication Research Programme	208
Centre for Biomedical Engineering	151	Interdisciplinary M.Des./M.Tech. Programmes	208
Computer Services Centre	155		
Educational Technology Services Centre	161		
Centre for Energy Studies	165	7. MAJOR CENTRAL FACILITIES	209-226
Industrial Tribology Machine Dynamics and Maintenance Engineering Centre	171	7.1 Central Research Facilities (CRF)	210
Instrument Design & Development Centre	175	7.2 Industrial Research and Development Unit	217
Centre for Polymer Science and Engineering	179	7.3 Central Workshop	218
Centre for Rural Development and Technology	183	7.4 Training and Placement Unit	218
National Resource Centre for Value Education in Engineering	187	7.5 Institute Libraries	219
		8. ADMINISTRATIVE STRUCTURE	227-236
		Honour Code - Undertaking	237



1. INTRODUCTION

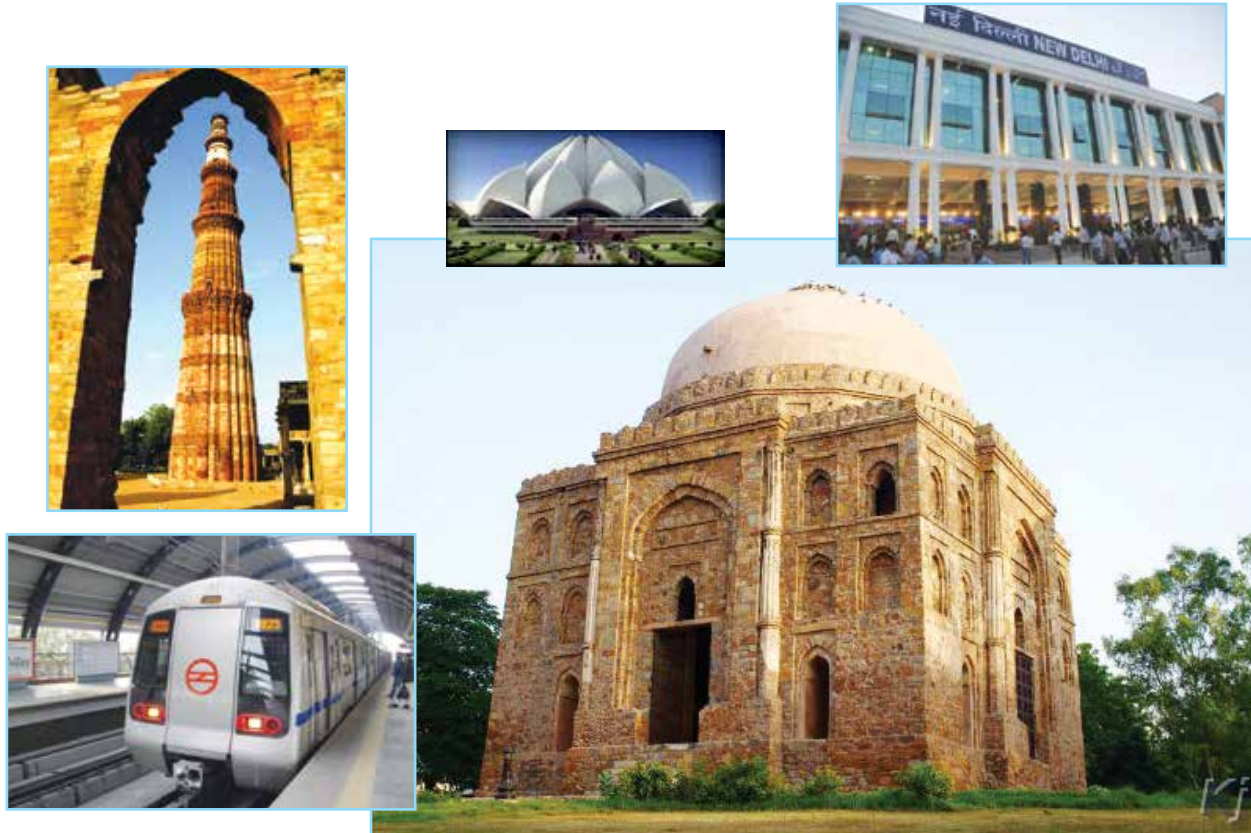
Indian Institute of Technology Delhi is one of the Twenty Three IITs created to be Centres of Excellence for training, research and development in science, engineering and technology in India.

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 45785 have graduated from IIT Delhi in various disciplines including Engineering, Physical Sciences, Management and Humanities & Social Sciences. Of these, nearly 4764 received Ph.D. degrees. The number of students who graduated with B.Tech. degree is over 15106. 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.

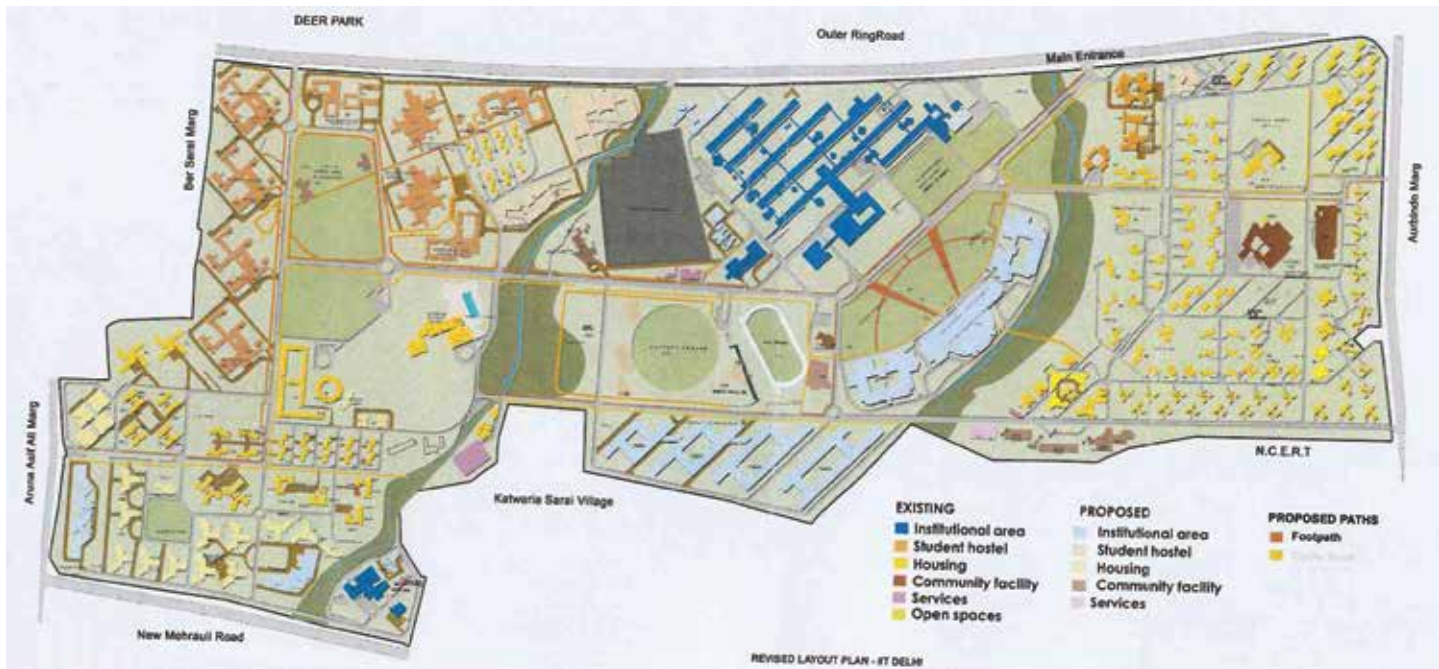
IIT Delhi is situated in Hauz Khas in South Delhi, which is a landmark place in the colourful and chequered history of Delhi. Bounded by the Sri Aurobindo Marg on the east, the Jawaharlal Nehru University Complex on the west, the National Council of Educational Research and Training on the south, and 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.



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

● ADMINISTRATION

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\$ 41 billion with operations straddling 36 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 – 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; NDTV Profit Business Leadership Awards 2012, “Most Inspiring Leader”; CNBCTV18 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, 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 Electrical Engineering
 Department of Humanities and Social Sciences
 Department of Management Studies
 Department of Mathematics
 Department of Mechanical Engineering
 Department of Physics
 Department of Textile Technology

Schools

Amar Nath and Shashi Khosla School of Information Technology
 Bharti School of Telecommunication Technology and Management
 Kusuma School of Biological Sciences

Centres

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

Interdisciplinary Research Programmes

Transportation Research and Injury Prevention Programme
 Opto-Electronics and Optical Communication Research Programme



● 2.3 RESEARCH AND INNOVATION

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

2.4 COLLABORATIONS

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 India4EU programme of the ERASMUS MUNDUS project of European Commission under which active student exchange is undertaken with European partner institutions.



2.6 ACADEMIC PROGRAMMES

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

Doctor of Philosophy (Ph.D.) :

All Departments, Centres and Schools offer Ph.D. programmes.

Master of Technology (M.Tech.) :

M.Tech. in Engineering 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

- **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 2017-2018.



● 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 ₹1000/- per month and tuition fee waiver are permissible to M.Sc. students to the extent of 25% of the sanctioned strength as per Institute rules. Only those students are eligible whose parents' gross income is upto ₹ 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

Degree	Status	Minimum Eligibility for Admission*	Selection basis
M.Sc.	Full Time	At least 55% aggregate marks(taking into account all subjects including languages and subsidiaries, all years combined) for General category candidates and at least 50% aggregate marks (taking into account all subjects, including languages and subsidiaries, all years combined) for SC/ST and PD category candidates in the qualifying degree. For Candidates with letter grades/CGPA (instead of percentage of marks), the equivalence in percentage of marks is decided by the Admitting Institute(s). For M.Sc. (Chemistry) Bachelor's degree with Chemistry as a subject for three years/ six semesters and Mathematics at (10+2) level. For M.Sc. (Mathematics) Bachelor's degree with Mathematics as a subject for at least two years/four semesters. For M.Sc. (Physics) Bachelor's degree with Physics as a subject for three years / six semesters and Mathematics for at least one year/two semesters.	JAM
M.Tech.	Full Time	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.	GATE and Written test and/or interview
	Full Time Direct Admission	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 > 300 or qualifying score whichever is higher for General/OBC and 200 or qualifying score whichever is higher for SC/ST/PD.	GATE and interview if required
	Part Time Evening Programme	B.Tech./M.Sc. or equivalent in relevant field with (a) CGPA 6.00 on a 10 point scale or 60% marks in aggregate for general Category and minimum experience (as per table 3.4-1). Must submit No Objection Certificate from employer (as per Note 4) Organisation should be located within 50km. of IIT Delhi. Also see Note. 6.	Written test and/or interview
	Sponsored PT/FT	Same as for M.Tech. part time requirements and Sponsorship Certificate from the employer as per Notes 4 and 5 respectively.	-Do-
M.Des.	Full Time	B.Tech./M.Sc. or equivalent in relevant field with CGPA 6.00 on 10 point scale or 60% marks in aggregate for general/OBC category and CEED score>(a) 75 percentile for general category/OBC, or (b) 50 percentile for SC/ST/PD category.	Written Test and/or interview
M.B.A.	Full Time	Bachelor's degree in Engineering/Technology/Architecture/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.	CAT and Group Discussion and/or interview
	Part Time (evening)	Same as M.B.A. full-time requirements and two-years experience.	Written test and interview

Degree	Status	Minimum Eligibility for Admission	Selection basis
M.S.	Full Time/ Part Time sponsored Full Time/ Part Time	Full Time/ Same as the corresponding M.Tech. requirements.	Same as the corresponding M.Tech. requirements.
Ph.D.	Full Time	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 & 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.	Written test and/or interview
	Part Time	Same as for Ph.D. full time and minimum experience (as per table 3.4-1) and No Objection from the employer	Written test and/or interview
	Sponsored Full Time or Part Time	Certificate from employer (as per Note 8.) No GATE required (Note.12)	-Do-
	Part Time Foreign National Posted in Delhi	Same as for full-time Subject to conditions stipulated in Note 13.	-Do-

*w.e.f. 2nd Semester 2017-18.

NOTES:

- 15% seats are reserved for SC candidates, 7.5% for ST candidates and 27% for OBC (non-creamy layer) candidates.
- 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.

$$G = G_x * 10 / X$$

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:

%	CGPA 10	CGPA 9	CGPA 6	CGPA 4
50	5	4.5	3	2
55	5.5	4.95	3.3	2.2
60	6	5.4	3.6	2.4
70	7	6.3	4.2	2.8
75	7.5	6.75	4.5	3
80	8	7.2	4.8	3.2
90	9	8.1	5.4	3.6

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:-

	1st semester	%	2nd semester	%
1st year	250/400	62.50	290/400	72.50
2nd year	205/400	51.25	280/400	70.00
3rd year	210/400	52.50	350/400	87.50
4th year	240/400	60.00	150/400	75.00
Total	905/1600		1070/1400	

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

- Sponsored (Full-time)/Part-time candidates are not required to possess GATE/CEED score for admission to postgraduate/Ph.D. programmes.
- 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 :-
 - The admission will be subject to production of Research Visa for study at IIT Delhi.
 - 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.

Table: 3.4-1 Experience required for admission to part-time Ph.D./ M.Tech./ M.S.(R) Programmes.

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

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 2017 entry year students are given in Table below

4.1 FEES PAYABLE BY STUDENTS OF THE ENTRY YEAR 2017

Tuition Fees (per Semester)			
Programme			Tuition Fee
B.Tech. Dual degree M.Tech.			₹ 1,00,000**
M.Sc.			₹ 2,500
M.Tech., M.S.(R) M.Des. (Receiving Institute / Project Assistantship or Teaching position holders)			₹ 5,000
M.Tech. / M.S.(R) / M.Des./DIIT (Sponsored, FT / PT & Non-Teaching position holders)			₹ 25,000
Ph.D.			₹ 2,500
M.B.A. Self-financing	Full Time		₹ 2,00,000
	Part Time		₹ 1,50,000
Foreign National	SAARC Countries	MBA	US\$ 2,000
		Programmes other than MBA	US\$ 1,000
	Non SAARC Countries	MBA	US\$ 4,000
		Programmes other than MBA	US\$ 2,000

Semester fee (to be paid every semester alongwith Tuition fee)

INSTITUTE FEES	
Examination fees	₹ 500
Registration / Enrolment fees	₹ 300
Gymkhana	₹ 500
Medical fees	₹ 100
Internet and computer access fee	₹ 500
Transport charges	₹ 100
Total	₹ 2,000
HOSTEL FEES	
Hostel seat rent	₹ 5,000
Amenity charges	₹ 300
Total	₹ 5,300

OTHER PAYMENTS	
Student Distress Fund Scheme	₹ 200
Insurance Scheme	₹ 500
Total	₹ 700

One Time payment to be paid at the time of admission

Non Refundable	
Admission fees	₹ 1,000
Student welfare fund	₹ 300
Modernization fees	₹ 500
Benevolent fund	₹ 200
Alumni fees	₹ 1,000
Training and Placement charges	₹ 500
Total	₹ 3,500
Refundable	
Institution security deposit	₹ 2,000
Library security deposit	₹ 2,000
Total fees payable at the time of admission	₹ 4,000

Total fee payable (with hostel) 15,500, without hostel 10,200.

NOTE :

#The tuition fee in 9th semesters and later will be ₹ 5,000/- per semester for Dual-degree programmes.

*Medical fee and transport charges are applicable to full time students only.

**1/3rd 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.

Thesis fee for M.S.(R) & Ph.D. is ₹ 500 and ₹ 1000 respectively and shall be payable at the time of submission of thesis.

All SC, ST, PD students will get 100 % tuition fee exemption.

Hostel is available only to full time students subject to availability.

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 ₹ 15,500 for SAARC Countries.
- ii) US \$ 2,000 and ₹ 15,500 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, Vindychal, 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.

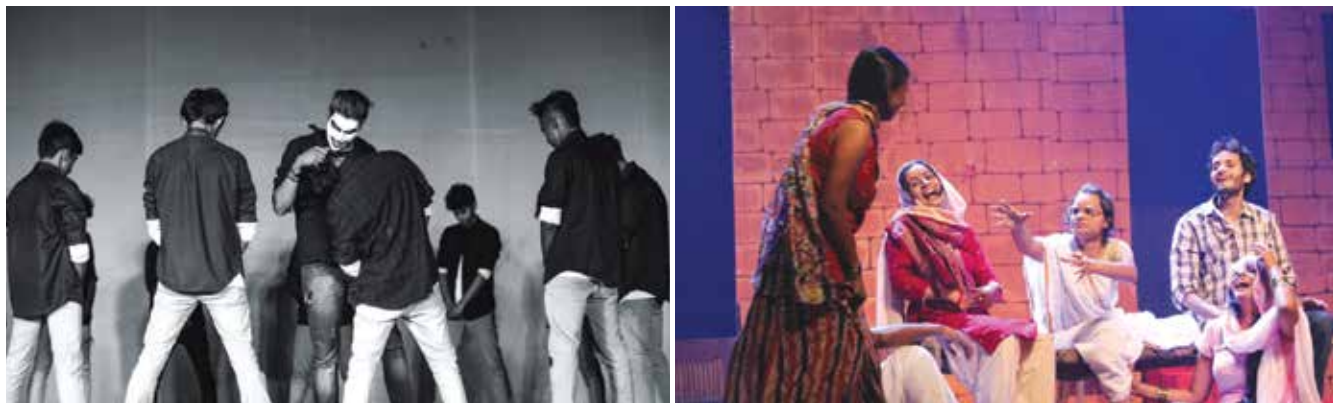
The Institute lays considerable emphasis on student's participation in various outdoor and indoor games. Such activities take place almost throughout the year. The students are encouraged to take part in the Fresher's events conducted for incoming first year students, friendly matches with the local 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 Origami, there is a lot to fulfil 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 organises a Reader's Circle to promote a reading culture among the students. To keep the fun quotient high events like word Games (Scrabble), Pot Pouri, 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.



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.



Literary Club

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.

Quizzing Club



The traditional notion of a quizzer is a person without a social Life who mugs up fact books day in and out. IITD's Quizzing Club is here to dispel this crude ideology and make quizzing a social hobby. The wide variety of questions will ensure that your knowledge, 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!

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, qawwalis 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!!

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

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

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

● 5.11 BOARD FOR STUDENTS WELFARE (BSW)

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

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

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

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

BSW also runs a student cooperative society (SCOOPS) which runs on a no profit-loss philosophy. Located near

Block I, its duty is to provide students access to buy good-quality subsidised stationary items, note books and related services.

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

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

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

● **5.12 NATIONAL SERVICE SCHEME (NSS)**

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

● **5.13 NATIONAL CADET CORPS (NCC)**

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

● **5.14 NATIONAL SPORTS ORGANIZATION (NSO)**

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

● **5.15 STUDENT COUNSELING SERVICE (SCS)**

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

● 5.16 DEPARTMENTAL PROFESSIONAL SOCIETIES

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

● 5.17 MEDICAL FACILITIES

The Institute has a 12 bedded hospital centrally located in the campus, providing facilities for OPD treatment and admissions. The Hospital is managed by a team of full time 10 Allopathic Doctors and one Homeopathic doctor. The Hospital is also visited by part time specialists from AIIMS in the field of Orthopaedics, ENT, Ophthalmology, Skin disease, Radio-Diagnosis, & Psychiatry. The doctors are assisted by efficient group of Pharmacists, Nurses, physiotherapist and other Paramedical Staff. The hospital is well equipped to take care of primary emergencies and serious patients are carried to All India Institute of Medical Sciences (AIIMS) and Safdarjang Hospital (SJH) in an Ambulance, which is available 24 hours, on all days.

IIT Delhi Hospital is the recognized centre for Pulse polio immunization, Measles, Matri Suraksha Abhiyan and other programmes by the Government. Hospital provides medical aid during sports meets, Rendezvous, culture function etc. Demonstrations in first- aid, AIDS and Cardio – pulmonary Resuscitation (CPR), and other medical problem are conducted for the students and other staff of the Institute. Free educative and health checkup camps are also provided for the IIT community.

● 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 46,000 graduates from our alma mater and is growing at about 1,700 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 in 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; Mob: 9825030828; Email: srparekh@gmail.com
- Bangalore : Mr. Naresh Kumar Agarwal; Mob: 09663379049; Email: naresh.agarwal@gmail.com
- Chandigarh : Mr. Brij Mohan Gulati; (R) 0172-2703197; Mob: 9815094002; Email: jdgulati@glide.net.in
- Chennai : *President* - JRK Rao (1978, Chemical, Kara); Email: jrk@whatarage.com
Vice President - Alok Bhatia (1983, Chemical, Kara); Email: alokbhatia3@gmail.com
Secretary - Vikash Goyal (2004, MBA, Jwala); Email: vikash.pallavi@gmail.com
Treasurer - Umesh Dhingra (1985, Civil, Jwala); Email: umesh@askyourdronline.com
- Hyderabad : Mr. Abhijith Jayanthi; Mob: +91-986-689-8311; Email: hydchapter@iitdalumni.com & abhijith.jayanthi@yahoo.com
- Kolkata : Mr. Biplab Shankar Bose; (R) 033 23373522 , Mob: 9830071282; Email: bipira_bose02@yahoo.co.in
 Ms. Anjali Saxena; Mob: 9836287182; Email: anj_goy@yahoo.co.in
- Jaipur : *President* - Mr. Sudhir Bansal; Mob: 9829019770; Email: sudhir@dil.in
Secretary - Mr. Chintan Bakshi; Email: chintan@startupoasis.in
Treasurer - Mr. Yogesh Soni; Mob: 9352556138; Email: sonisoniyogesh@gmail.com
- Mumbai : Mr. Sandip Bhatia; Mob: 72080-04490; Email: sandip.bhatia@gmail.com
 Mr. Narinder K. Madan; Mob: 9004040388; Email: narinder_madan@hotmail.com
 Mr. Gaurav Goyal; Mob: 9930949835; Email: gauravgoyal.iitd@gmail.com
- NCR East : Mr. Yogesh Andlay; Mob: 9810292741; Email: yogesh@iitdalumni.com
- NCR South : *President* - Mr. Ramakant Gupta; Mob: +91-9871775613; Email: rkguptausha@gmail.com
Secretary - Mr. Pramod Sahu; Mob: +91-9868503771; Email: pramod.sahu@hotmail.com

Chapters Abroad

- Australia : Dr. Nalin Sharda; Email: NalinSharda@gmail.com
 Residential Address: 112 Australia Drive, Taylors lakes, Victoria

Singapore : Mr. Venke Char; Email: Venke@3Thirdeye.com
UAE : Mr. Sunil Jain; Email : mrsuniljain@gmail.com
US : Susan Verghese; Email: susan.verghese@yahoo.com
Sanjiv Goel; Email: sanjiv.g@droisys.com
Residential Address: Droisys, Inc. 4800 Patrick Henry Dr.
Santa Clara, CA 95054
UK : Amit Sharma; Email: Amit.Sharma@macquarie.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.

DEPARTMENT OF

**APPLIED
MECHANICS**





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

Experimental Investigation of Turbulent Flows,
Stability Theory, Design Method for
Sustainable Development.

HEAD OF THE DEPARTMENT



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

Structural Dynamics, Off-shore Structures, Reliability
Engineering, Computational Mechanics, Low and
High Velocity Impact, Composites, Probabilistic
Mechanics, Finite Element Applications.

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

Mechanical Behavior Materials, Texture
Anisotropy, Microstructure Property
Correlation, Alloy Design, Phase Transformation.



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

Turbulent Flows, Optical Flow Measurement,
Applied Fluid Mechanics.

Santosh Kapuria, Ph.D. (IIT Delhi)
Professor

Smart Composite And Sandwich Structure,
Structures Health Monitoring, Active Vibration
Control, Functionally Grade and Structures,
Elasticity.



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

CFD Heat Transfer, Turbulence Renewable Energy.

Ajeet Kumar, Ph.D. (Cornell Univ.)
Assistant Professor

Theory of Rods, Plates and Shells,
Crystal Elasticity, Computational Materials
Science, Multi-Objective Optimization
Nano-Mechanics, Numerical Analysis.



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

Intermolecular and Surface Forces, Atomic Scale Origins of
Friction and Wear, Nanotribology of Engineering Materials
and Industrial Lubricant Additives, Nanoscale In Situ Methods
In Tribology, Surface Modification and Molecular Self-
Assembly Processes, Development of Novel Scanning Probe
Microscopy Techniques, Nanoscience and Nanotechnology.

Puneet Mahajan, Ph.D. (Montana State Univ.)
Professor

Homogenization and Mechanical Properties of
Composites, Low and High Velocity Impact of
Composites, Precision Glass Moulding, Helmets,
Snow Mechanics, Finite Element Applications.



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

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

Mechanical Behavior Of Advanced Materials: Bulk and Porous Forms, *In Situ* Phase Transformation Effect on Deformation Behavior and Structure-
Property Correlations of Materials and Materials Characterization.
Current Interest in Titanium Alloys, Trip Steels & Ti-, Ni- and
Fe- Based: Shape Memory Alloys, Stochastic Fibre Networks and Auxetic
(i.e. Negative Poisson's Ratio) Materials/Composites and Bio-Materials.





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

Professor

Nonlinear Static/Dynamic Analysis of Shells, Composite Structures, Functionally Graded Structures, Bimodular Composite Structures, Continuum Damage Mechanics, Multiscale Modelling of Nano-Structures.



Pradyumna S., Ph.D. (IIT Kharagpur)

Assistant Professor

Functionally Graded Materials, Structural Dynamics, Stability, Composite Structures, Smart Structures, Plates and Shells.



Rajesh Prasad, Ph.D. (Cambridge Univ.)

Professor

Physical Metallurgy, Metal Foams, Nanocomposites, Friction Stir Welding.



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

Assistant Professor

Soft Materials, Mechanobiology, Structural Mechanics.



Sanjeev Sanghi, Ph.D. (City Univ.)

Professor

Numerical and Analytical Studies of Turbulent Flows, Chaos and Dynamical Systems, Computational Fluid Dynamics, Educational Software, Proper Orthogonal Decomposition.



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.



Arjun Sharma, Ph.D. (Stanford)

Assistant Professor

Compressible Flows, Acoustics and Numerical Simulations.



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

Professor

Fluid Mechanics, Internal and External Flows, Computational Fluid Dynamics, Two – phase Flows, Flow Instrumentation, Wind Energy.



M.K. Singha, Ph.D. (IIT Kharagpur)

Associate Professor

Finite Element Modeling of Composite, Sandwich and FGM structures, Stability and Nonlinear Dynamics Of Plates and Shells Under Aero-Thermo-Mechanical Loads, High Strain Rate Behavior of Materials, Impact Mechanics.



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

Assistant Professor

Turbulence Theory and Modeling, Hypersonic Flows, Bridging Method of Turbulence, Boltzmann Equation-based Solvers.



Balaji Srinivasan, Ph.D. (Stanford)

Associate Professor

Computational and Theoretical Fluid Mechanics, Numerical Analysis, Turbulent Flows.



Vikrant Tiwari, *Ph.D. (South Carolina Univ.)*
Assistant Professor
Digital Image Correlation, Impact Mechanics,
Dynamic Fracture Mechanics, Product Design &
Analysis, Fuel Cells.



Lt. Cdr. Arun E., *M.Tech. (IIT Bombay)*
Adjunct Faculty
Naval Architecture, Structural Design of Warships,
Materials for Marine Vehicles.



Lt. Cdr. K. Vignesh Kumar, *M.Tech. (IIT Kharagpur)*
Adjunct Faculty
Naval Architecture, Marine Hydrodynamics, Ship
Resistance & Propulsion.

Lt. Cdr. Ishaq S. Makkar, *M.Tech. (IIT Kharagpur),
DIIT (IIT Delhi)*
Adjunct Faculty
Submarine Hydrodynamics, Submarine Design,
Computational Fluid Dynamics (CFD),
Underwater Technology.



Cdr. M.P. Mathew, *M.Tech. (IIT Kharagpur),
DIIT (IITD)*
Adjunct Faculty
Naval Architecture, Warship Design,
Ocean Engineering.



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



● 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 Master of Technology programme in Engineering Analysis and Design with specialization in any one from Product Design, Engineering Mechanics and Materials. Students opting for mechanics stream can do advanced courses 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:

- Elasticity, Plasticity, Large Deformation, Impact and Crash worthiness, Composite Materials, Composite Plates and Shells, Off-shore Structures, Smart Structures, Multi Functional Structures, Snow Mechanics, Computational Methods for Stress Analysis and Structures, Structural Optimization, Finite Element Method, Seismic analysis of Tall Structures, Parallel Computing, Non-linear Dynamics and Chaos, Stability and Bifurcation Theory, Nano-mechanics, Bio-Mechanics, Impact Mechanics, Continuum Damage Mechanics, Probabilistic Mechanics, Structural Health Monitoring.
- Hydrodynamic Stability Theory, 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.
- Elasto-Plastic Fracture Mechanics, Kinetics of Fatigue Crack Growth, Microstructure and Fracture Toughness, Failure Analysis and Residual Life Estimation, Strength and Deformation Behavior of Alloys, Thermo-mechanical Methods, Computational Materials Science.

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

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

Large Deformations, Impact Mechanics, Plasticity, Composite Materials, Composite Plates and Shells, Non-linear Dynamics and Chaos, Off-shore Structures, Smart Structures, Multi-Functional Structures, Structural Health Monitoring, Snow Mechanics, Stress analysis and finite element application, Damage mechanics, Railway vehicle dynamics, Computational Methods for Fluids Flows, Pollution Dispersion, Flow through Fluid Machines, Renewable Energy, Wind Engineering, Hydrodynamic Stability, Transition, Turbulence, Bio-Fluid Dynamics, Computer Aided Design, Design Engineering, Reliability Engineering, Availability and Maintainability Engineering, Physical and Mechanical Metallurgy, Metal Foams, Nanocomposites, Friction Stir Welding, Pattern Formation in Granular Materials, Fracture Mechanics, Fatigue Crack Propagation, Environmental Cracking, Failure analysis and Mechanical Properties of Solids, Nano-mechanics, Dynamic flow conditions on Warship Helicopter Decks etc.

● **LABORATORY FACILITIES**

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

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

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

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

Materials Science & Physical Metallurgy Laboratory: Rolling mill, Wire drawing bench, Environment controlled heat treatment furnaces (programmable), Vickers and Rockwell hardness testers. Neophot -30 and Carl Zeiss microscopes with camera, Image Analyzer.

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

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



MTS Laboratory: 250 kN MTS machine with facilities for mechanical testing, fracture mechanics testing and fatigue testing.

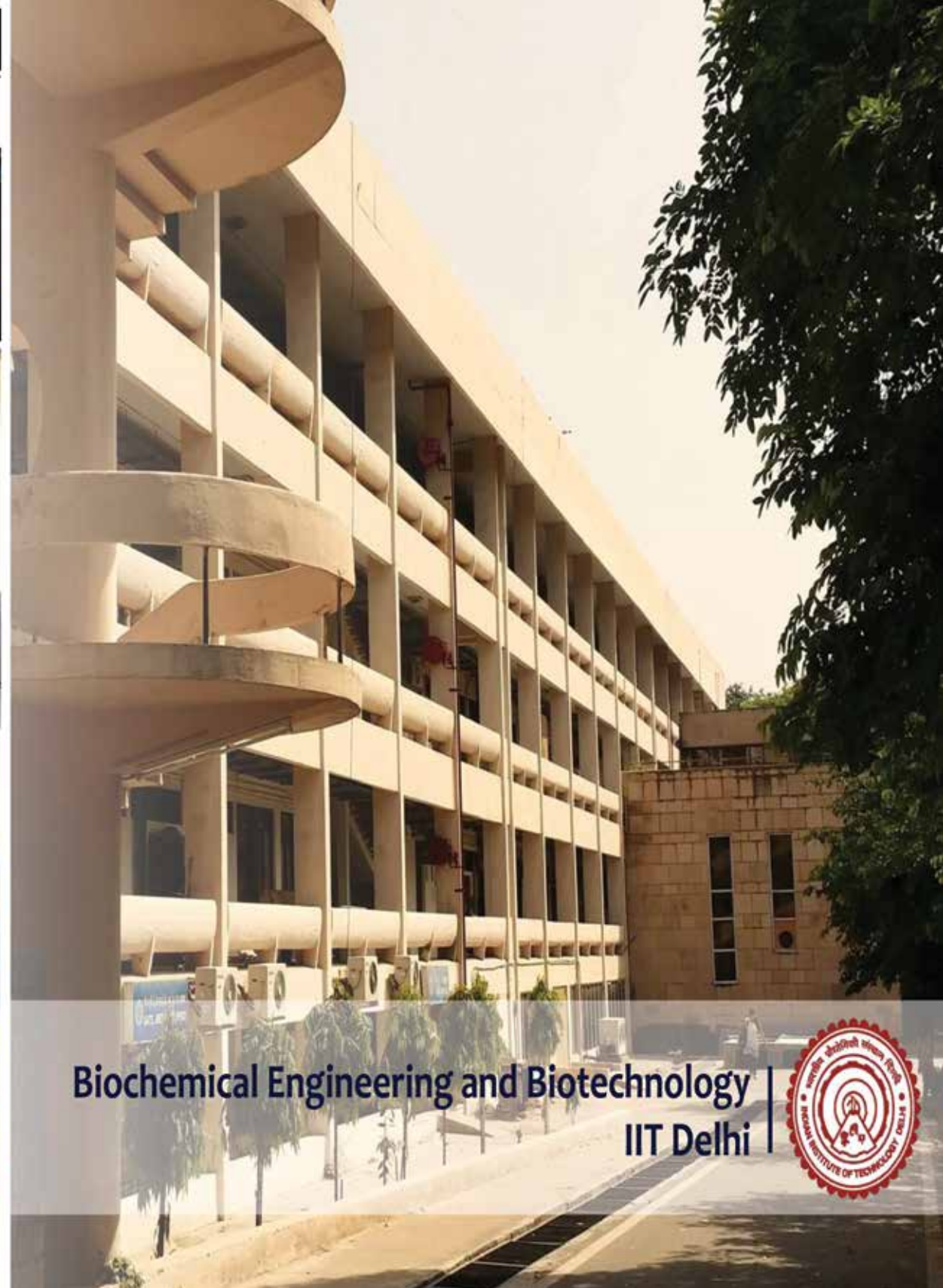
Strength of Materials Laboratory: 25 T Computerized Universal Testing machine (Zwick), 50 T Instron m/c, 10T and 100 T hydraulically operated Universal Testing m/c, Avery machines for hardness, impact, torsion and fatigue testing, Drop hammer facility (Instron 9250 HV) modified for Helmets.

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

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

Workshop: The departmental workshop has a number of machines that include Lathe machines, vertical milling machines, shaping machine, drilling machines, bench grinders, high temperature furnace, welding sets etc.





Biochemical Engineering and Biotechnology | IIT Delhi





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

HEAD OF THE DEPARTMENT



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

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



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

Prashant Mishra, Ph.D. (JNU)
Professor
 Enzyme Science and Engineering, Pharmaceutical Proteins, Bio-Nano-Technology, Drug delivery.



V.S. Bisaria, Ph.D. (IIT Delhi)
Professor
 Bioprocess Technology; Metabolic Regulation and Engineering; Bioconversions; Plant Cell Biotechnology.

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



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

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



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

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





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



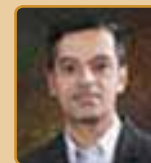
T.R. Sreekrishnan, Ph.D. (IIT Delhi)
Professor
Waste Engineering, Environmental
Biotechnology.



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.



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



Gupta M.N., Ph.D. (IISc., Bangalore)
Emeritus Professor
Chemical Modification and Chemical Crosslinking
of Proteins; Production and Separation of
Proteins/Enzymes.

● INTRODUCTION

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

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

● ACADEMIC PROGRAMMES

UNDERGRADUATE

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

POSTGRADUATE

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

● RESEARCH

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

- Bioprocess Engineering
- Cell and Molecular Biotechnology
- Downstream Processing
- Systems and Computational Biology
- 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.



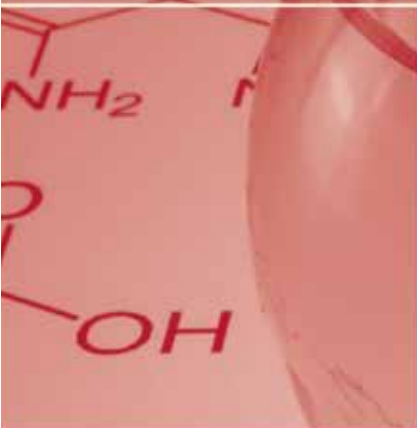
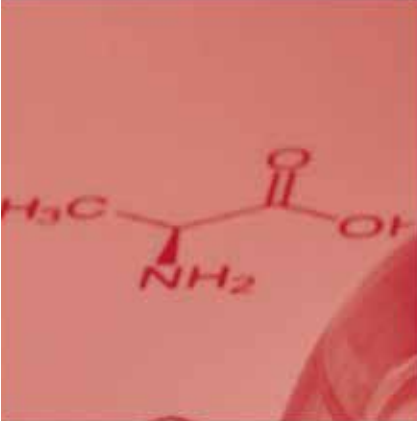
Bioseparation: Ultra-filtration unit, ultracentrifuge, ultrasonic disintegrator.

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.

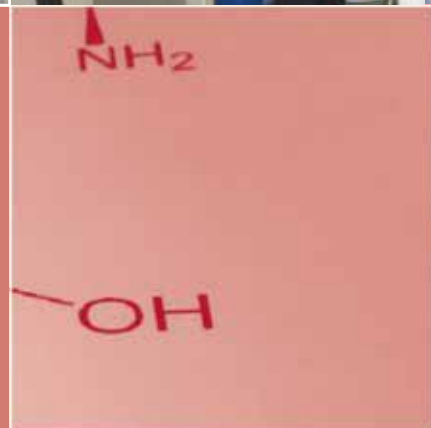
Computing facility: A separate computation lab with several PCs is also available. A Bioinformatics Centre sponsored by the Department of Biotechnology, Government of India, under the Biotechnology Information System Network (BTISnet) is also housed in the department.



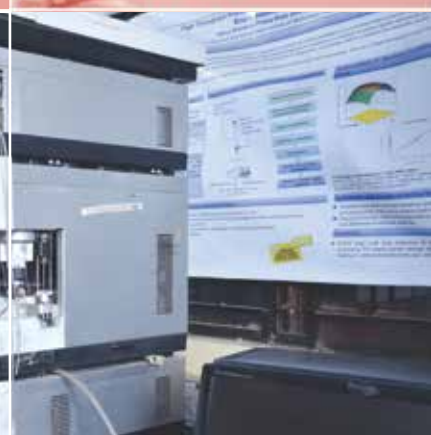
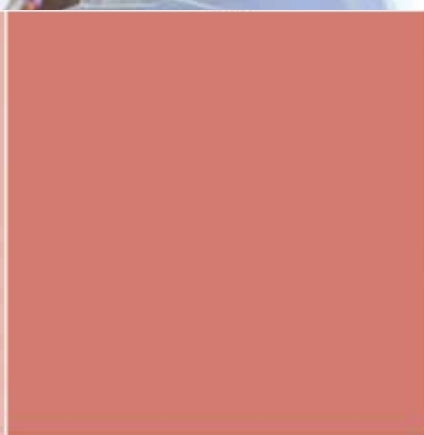
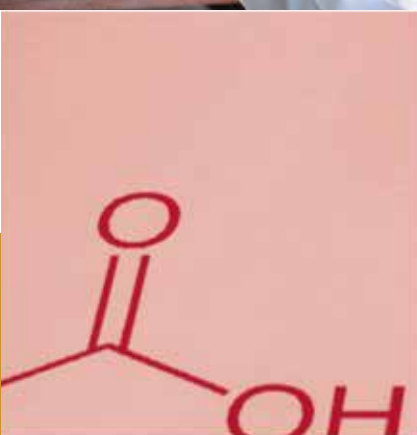
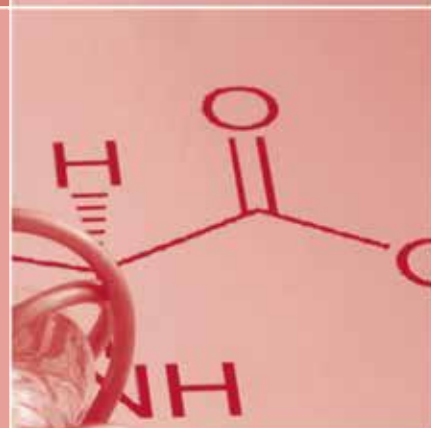


DEPARTMENT

OF



**CHEMICAL
ENGINEERING**





Rajesh Khanna, Ph.D. (IIT Kanpur)

Professor

Interfacial Engineering, Thin Liquid Films,
Mass Transfer and Numerical Methods.

HEAD OF THE DEPARTMENT



Siddhasatwa Basu, FNASc, Ph.D.

(IISc., Bangalore)

Professor

Interfacial & Electrochemical Engineering,
Hydrogen Energy and Fuel Cells Tech.,
CO₂ Reduction to Fuel.

Shalini Gupta, Ph.D. (NC State Univ.)

Associate Professor

Colloidal Assembly and Nanomaterials,
Lab-on-Chip Systems, Diagnostic
Bioassays, Biosensors.



Ashok Bhaskarwar, Ph.D. (IISc., Bangalore)

Professor

Interfacial Science and Reaction Engineering,
Product Design, Anti-pollution Technologies.

Sharad K. Gupta, Ph.D. (Brooklyn Univ.)

Professor

Transport Phenomenon, Membrane
Separation Process.



Divesh Bhatia, Ph.D. (Univ. of Houston)

Assistant Professor

Automotive Catalysis, NO_x Emissions,
Monolith Reactors, Kinetics of Fast Reactions.

Gaurav Goel, Ph.D. (Univ. of Texas, Austin)

Assistant Professor

Soft-Condensed Matter, Protein Aggregation,
Self-Assembly in External Fields.



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.



Paresh Chokshi, Ph.D. (IISc., Bangalore)

Associate Professor

Hydrodynamic Stability, Polymer Processing,
Computational & Theoretical Polymer Physics.

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
 Flow Through Porous Media, Unconventional
 Energy Resources, Enhanced Oil Recovery.



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 Patter Formation in
 Thin Films, Granular Materials,
 Computational Fluid Dynamics.



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



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



Sreedevi 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.



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

● INTRODUCTION

The Department of Chemical Engineering (ChE) at IIT Delhi, one of the finest in India, is dedicated to providing the best education, research practices and ecosystem to all its associated members. The undergraduate and postgraduate students can choose 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 refurbished 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./M.S. 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 Ph.D. research include 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.

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

(DST, DBT CSIR, DRDO, MNRE, etc.). The projects are directed towards development of innovative and indigenous technologies for processes relating to efficient heat and mass transfer, design of biosimilars, biomass thermochemical 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, NO_x reduction technologies such as lean NO_x traps and selective catalytic reduction.

Fluid and Particle Mechanics: Characterization of particles, comminution and gas-solid separation, flows through silos, pneumatic conveying of solids and flow through porous media, flow over deformable solids, hydrodynamic stability.

Heterogeneous Catalysis: Preparation, characterization and catalytic studies of various supported transition metal catalysts, metal oxides and zeolites.

Interfacial Engineering: 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 Dynamics 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.

Petroleum 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.

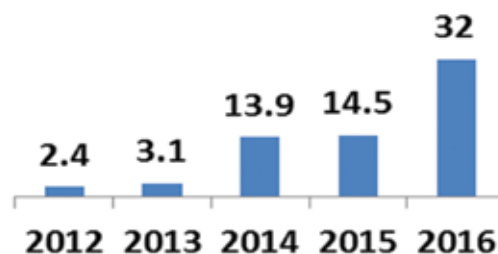
Process Systems Engineering: Planning and scheduling of batch and continuous process operations, process optimization, advanced process synthesis, process plant simulation and control, scheduling and planning, heat-exchanger network synthesis, water allocation network synthesis, modeling and simulation of polymer reactors, optimization and optimizing control of polymer reactors, stochastic optimization techniques: genetic algorithm, simulated annealing and other advanced computing techniques.

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.

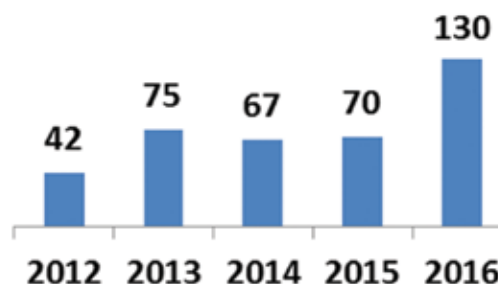
● A FEW DEPARTMENTAL RESEARCH STATISTICS (2012-2016)

Research funding: The Department is highly proactive in writing research grants. This has resulted into sponsored R&D Projects worth of INR 37.2 Cr over the last five years. The faculty also regularly does industrial consultancy work which has lead to sanctioning of projects worth INR 5.8 Cr. The year-wise split is shown in the adjoining bar graph.

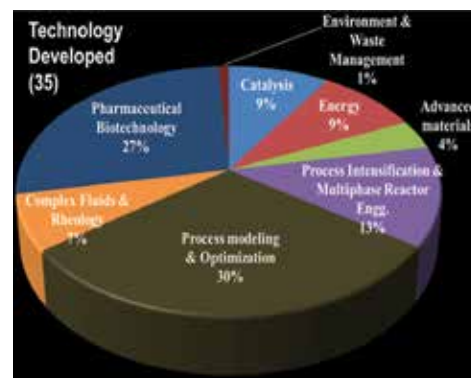


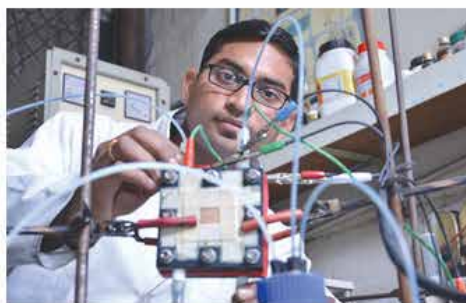
Number of peer reviewed international journal publications:

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 is 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.





Photos taken of the Chemical Engineering Ph.D. students in the year 2012. The Department has 160 Ph.D. students currently enrolled in the year 2017.



DEPARTMENT OF

CHEMISTRY



Ravi Shankar, Ph.D. (Panjab Univ.)

Professor

Inorganic Polymers, Organometallic Chemistry/ Coordination Chemistry of Silicon, Germanium and Tin.

HEAD OF THE DEPARTMENT



D.K. Bandyopadhyay, Ph.D. (I.A.C.S)

Professor

Metalloporphyrin Catalyzed Oxidation Reactions of Organic and Organometallic Compounds: Kinetics & Mechanistic Studies.

Ashok K. Ganguli, Ph.D. (IISc., Bangalore)

Professor

Chemistry of Novel Materials (Dielectric Oxides, Superconductors and Nanomaterials).



Pramit K. Chowdhury, Ph.D. (Iowa State Univ.)

Associate Professor

Physical and Biophysical Chemistry, Protein Folding using Single Molecule Confocal Microscopy.

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.



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.

V. Haridas, Ph.D. (NIIST, Trivandrum)

Associate Professor

Chemical Biology of Peptides and Proteins, Biophysics of Peptide/Protein Folding.



Tanmay Dutta, Ph.D. (Calcutta University)

Assistant Professor

Biochemistry, Enzymology, Molecular RNA Biology, Genetics.

Pravin P. Ingole, Ph.D. (University of Pune)

Assistant Professor

Electrochemical Techniques, Electroanalysis, Nanomaterials.



Anil J. Elias, Ph.D. (IIT Madras)

Professor

Synthetic Main Group and Organometallic Chemistry.

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

Statistical Mechanics of Soft-Matter, Molecular
Dynamics Simulations, Ionic Liquids, Lipid-Membranes.



Sunil Kumar Khare, Ph.D. (IIT Delhi)
Professor

Biochemistry, Enzyme Technology, Applied
Microbiology Synthesis.



Narayanan 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 Nagendran, Ph.D. (IIT Kanpur)
Associate Professor

Chemistry of Group 13 and 14 Elements with
Special Emphasis to the Low-valent Compounds
of Silicon.

Sayantana Paria, Ph.D. (Indian Asso. 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

Optical Spectroscopy, Advanced Fluorescence
Techniques, Molecularly Organized Media,
Environmentally Friendly Solvent Systems,
Chemosensors, Photophysical Processes.



Nalin Pant, Ph.D. (Princeton Univ.)
Professor

Theoretical and Experimental Studies
on Molecular Conformation, Molecular
Recognition.



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

Solid State Chemistry, Crystal Engineering,
Natural and Synthetic Materials.



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.
- **Biochemistry:** Peptide Synthesis for Molecular Device Construction, Computer Aided Molecular Design, Enzymology, e-Immobilization, Biocatalysis and Bioconversions, Microbial Biochemistry, Extremozymes and Extremophiles, Proteomics, Nano-biocatalysis and nanotoxicity, structural biology, inhibition of amyloid formation, ligand receptor interaction.
- **Inorganic Chemistry:** Organometallic Chemistry of Main Group/Transition Elements, Inorganic Polymers.
- **Supramolecular Chemistry:** Metallo porphyrins as Catalysts, Intermetallic Compounds, Chemistry

of Materials, Nanocrystalline Solids, Coordination Polymers, Crystal Engineering, Catalysis through Organometallic Compounds.

- **Organic Chemistry:** Total Synthesis of Natural Products and New Synthetic Methods, Transition–Metal Compounds in Organic Synthesis, Synthetic Carbohydrate Chemistry, Peptides, Proteins and other Natural Products, Chemistry of Singlet Oxygen, Molecular Recognition and Organization, Supramolecular Chemistry, Biorganic Chemistry, Kinetics and Mechanism of Organic Reactions, Ionic Liquids in Organic Synthesis.
- **Physical Chemistry:** Statistical Thermodynamic investigations of Chemical and Biochemical Systems via Computer, Electrochemical techniques, Electrocatalysis/Photocatalysis, nanomaterials, NMR methodology, biophysical chemistry, spectroscopy, Single Molecule Confocal Microscopy, Optical and Electronic Properties of Nanomaterials. Simulations, Theoretical Studies on Protein-DNA, Drug-DNA and receptor-ligand Interactions. Simulation Methods for Quantum Systems, Clusters, Magnetic and Photophysical Properties of Intercalated Materials. Structural and Physico-Chemical Characterization of Protein-protein Interaction and Protein Stability, Understanding Complex Fluidic Systems.

● LABORATORY FACILITIES

The following equipments are available as part of the department facilities:

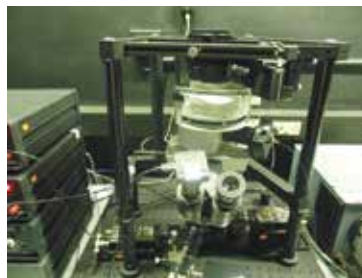
Single Crystal X-ray Diffractometer (Bruker). Powder X-ray Diffractometer (Bruker). DPX-300 NMR Machine (Bruker), 500 MHz NMR?? FTIR Spectrometer (Nicolet, Protege 460). Electrochemical (CH Instruments) and Spectro-electrochemical set-up (Metrohm Autolab, PGSTAT-302N) UV-Visible Spectrophotometer (Lambda 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).



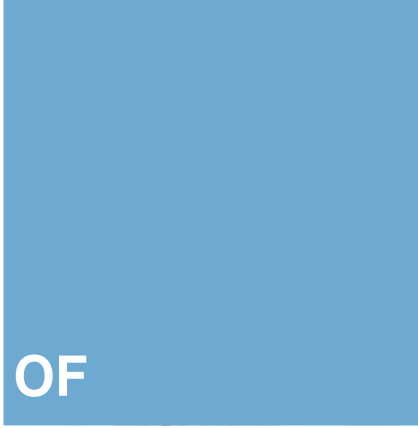
FTIR



NMR



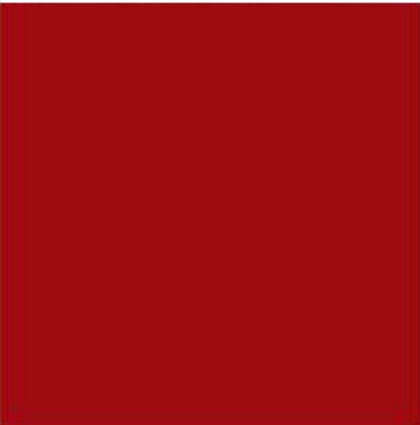
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DEPARTMENT OF



**CIVIL
ENGINEERING**





N.K. Garg, Ph.D. (Wales Univ.)
Professor

Water Resources System, Finite Element, Watershed Modelling, Irrigation Management, CAD.

HEAD OF THE DEPARTMENT



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

Environmental Engineering, Solid Waste Management, Incineration, Fluidized Bed Operations.

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.



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

Soil Dynamics and Earthquake Geotechnical Engineering, Pile Foundations, Deep Excavation and Tunnelling in Soft Ground, Problematic Soils and Ground Improvement, Experimental Geotechnics.

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

Canal Design, Groundwater Modelling and Artificial Recharge, Seepage and Drainage, Stream - Aquifer Interaction, Optimization, Numerical Techniques.



Gurmail S. Benipal, Ph.D. (IIT Delhi)
Associate Professor

Structural Engineering, Nonlinear Dynamics and Stability, Constitutive Modelling, Concrete Mechanics: Creep, Elastoplasticity, Damage, Cable Dynamics.

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

Settlement in Landfills, Gas Generation from Landfills, GIS Based Landfill Management, Bioreactor Landfill, Infiltration Characteristics of Different Vegetation and Landuse, Watershed Management, Water Contamination and Remediation, Open Channel Hydraulics, Contaminant Hydrology.



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

Structural Mechanics, Structural Health Monitoring, Smart Materials & Structures, Tensegrity Structures, Underground Structures, Bio-mechanics, Green Structures.

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

Foundation Engineering, Soil Plasticity and Constitutive Modeling, Blast Loading in Soil, Soil-Structure Interaction and Underground Construction in Soil and Rock.



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

Durability of Concrete, Rebar Corrosion, Cement based Composites, Construction Technology, Building Science, Green Building, Sustainability.

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
 Non-destructive Evaluation, Structural Dynamics and Control Systems, Mechatronics, Ultrasonics, Solid Mechanics.



A.K. Gosain, Ph.D. (IIT Delhi)
Professor
 Integrated Watershed Modelling, GIS Hydrological Modelling, Irrigation Management, Environmental Impact Assessment.



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



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



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



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

Construction Project Management, Project Success Factors, Schedule-Cost Estimation, Computer Applications in Project Management, Asset Management.



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

Hydraulic and Water Resources Engineering, Computational Fluid Dynamics, Sediment Transport, Hydraulic Structures, Slurry Pipeline, Flow Instrumentation.



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

Water Resources Systems, Stochastic Processes, Conflict Resolution and Hydrologic Modelling of Large River Basin.





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



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



J. Uma Maheswari, Ph.D. (IIT Madras)
Assistant Professor
Design Management, Automation in Design
and Construction, Planning for Fast-track and
Concurrent Engineering Projects,
Matrix Based Planning Tools.



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
Groundwater Contamination Bioremediation of
Soils, Flow through Porous Media,
Phyto-remediation, Biodegradation in Landfills.

Vasant Matsagar, Ph.D. (IIT Bombay)
Associate Professor
Structural Engineering, Earthquake and Wind
Engineering, Offshore Structures, Fiber Reinforced
Polymer Composites, Finite Element Analysis, Blast &
Fire Engineering, Multi-hazard Protective Structures.



A.K. Nema, Ph.D. (IIT Bombay)
Professor
Environmental Engineering, Modelling, Simulation
and Optimization of Environmental Systems,
Integrated Waste Management, Environmental
Impact and Risk Assessment.



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)
Associate Professor
Mass Transit Planning, Traffic Flow Modelling
and Travel Demand Modelling, Road Safety.





K.S. Rao, Ph.D. (IIT Delhi)

Professor

Rock Mechanics and Rock Engineering,
Geotechnical Engineering, Engineering
Geology, Seismic Microzonation.



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

Pavement Engineering, Constitutive Modeling of
Pavement Materials, Damage Mechanics.

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

Professor

Transportation Planning, Public Transport
Systems, Non-Motorised Vehicle Planning,
Traffic Safety.



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

Hydroclimatological Modelling, Nonlinear
Dynamics and Chaos Theory, Stochastic Hydrology,
Optimization in Water Resource Systems, Data
Mining in Hydrology, Water Resources Management.



● 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:

Building Science and Construction Management: Quantification in Industrial Research, Quantitative Techniques and Monitoring in Management of Capital Projects; Network Techniques for Scheduling and Resources Allocation Problems; Contract Management; Value Engineering. Durability, Creep, Shrinkage and Temperature Effects of Concrete, Fiber Reinforced and Special Concrete, Corrosion of Reinforcing Steels. Energy Efficient Building, Building Sciences, Asset Management, Project Success Factors, Green Buildings.

Design, Planning and Management, Lean Construction, Automation in Design & Construction.

Engineering Geology: Weathering Processes and their Effects, Petrography of Aggregate, Rock Drill Ability, Geomorphology, Terrain Evaluation, Landslide Hazard Zonation, Seismic Microzonation and Waste Disposal in Rocks, Hill Slope Engineering.

Environmental Engineering: Water Supply and Wastewater Engineering, Industrial Pollution Control, Physico-Chemical, Biological and Thermal Treatment Techniques for Wastes and Wastewaters, Emerging Molecules in the Environment, Solid Waste Management, Fluidized Bed Reactors, Carbon Sequestration, Environmental Impact and Risk Assessment, Microbiological Risk Assessment, Environmental Indices, E-Waste Management, Nanoparticles in the Environment, Human Health Risk Assessment, Air Pollution and Control, Urban and Regional Air Quality Management, Indoor Air Pollution, Aerosols, Chemical Constituents, Precursor Gases, Source Profile Development, Atmospheric Chemistry, Receptor Modeling, Climate Modeling, Benchmarking, Endocrine Disrupting Chemicals and Personal Care Products in Environment.

Geoenvironmental Engineering: Hazardous Waste Landfills, Municipal Solid Waste Landfills, Ash Ponds, Ash Utilization, Mine Tailings Dams, Waste Mounds, Liners, Covers, Vertical Barriers, Geotechnical Reuse of Waste Materials.

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.

Rock Engineering: Strength and Deformation of Rocks and Rock Masses, Joint Systems, Application of Finite Element Method, Boundary Element Method and other Methods, Stresses and Deformation around Underground Openings, Stability of Rock Slopes, Subsurface Exploration by Geophysical Methods, Geomechanics Modelling, Underground Support Systems, Ground Improvement, Servo Controlled Stiff Testing Machine, Environmental Hazards.

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.

Structural Engineering: Nonlinear Dynamics and Stability, Elasto-plasticity, Performance-based Seismic Design, Strengthening, Large-scale Seismic Testing, Micro-structural Modeling, Hydration of Cements and Supplementary Cementitious Materials, Smart Materials & Structures, Structural Health Monitoring, Bio-mechanics, Engineered Bamboo Structures, Energy Harvesting, Sustainability, Durability and Repair of Concrete Structured, Blast, Fire and Wind Engineering, Multi-hazard Protective Structures, Green Building, Non-destructive Evaluation, Structural Dynamics and Control Systems, Mechatronics.

Surveying and Remote Sensing: Land and Geographic Information Systems, Multipurpose Surveys using Aerospace Data, Remote Sensing Applications to Land and Water Resources, Environmental Problems, Analytical Photogrammetric Control Extension.

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.

Water Resources Engineering: Surface and Groundwater Hydrology, Flood Forecasting, Hydraulic and Hydrological Modelling, Irrigation, Drainage, Erosion and Sedimentation Problems, Mathematical Modelling of Geophysical Systems, Planning and Management of Water Resources Systems, Environmental Impact Assessment. Groundwater Contamination, Bio-remediation, Watershed Management, Physically Based and Statistical Modelling of Hydrologic Systems, Rationalization of Floods through Pattern Analysis, GIS and Remote Sensing, Finite Element and Optimization Methods in Water Resources.

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

Cementitious Materials, Durability of Concrete Structures, Multi-hazard Protective Structures, Green Building, Earthquake Engineering, Wind Engineering, Structural Control, Reinforced Concrete Structures, Bridge Engineering, Offshore Structures, Tall Buildings, Soil Structure Interaction, Fiber Reinforced Polymer Composites, Fire Engineering, Blast Resistant Structures, Waste Utilization in Building Materials, Corrosion of Concrete/Reinforced Concrete, Performance Life Prediction of Structure, Fatigue, and RC Mechanics, Neural Network, Brick Masonry, Constitutive Modelling: Creep, Elastoplasticity, Damage of Concrete, Rebar Band Modelling Self Compacting and High Performance Concrete, Smart Structures Non-Destructive Testing & Evaluation of Structures.

Geological Engineering, Rock Weathering, Aggregate Reaction, Rock Mechanics, Geophysical Methods, Stability of Rock Slopes, Underground Structures, Numerical, Physical and Geomechanical Modelling, Geosynthetics in Infrastructure Projects, Soil Mechanics, Foundation Engineering, Earth Dams, Earth Retaining Structures, Geosynthetics, Reinforced Soils, Environmental Geotechnology, Marine Geotechnology, Earthquake Geotechnics, Soil Dynamics, Landfill Engineering, Geotechnology for Roads and Railway Tracks.

Biological Processes for Wastewater Management: Upflow Anaerobic Sludge Blanket Reactors, Constructed Wetlands, Compact Activated Sludge Process; Urban Water, Water Quality Modeling, Urban Air Quality Management including Monitoring and Modeling, Indoor Air Pollution Modeling, Vehicular Pollution Modeling, Source and Atmospheric Aerosol Characterization, Emission Inventory Development, Receptor Modeling, Climate Modeling, Human Health Risk Assessments, Nanoparticle Removal, Nanoparticle Toxicity to Bacteria, Multi-criteria Multi-objective Multi-stakeholder Decision making, Emerging Molecules in the Environment, Carbon Sequestration through Mineral Carbonation, Engineered Landfills, GHG emissions from reservoirs, Circulating Fluidized Bed Operations, Environmental Forensics. Thermal performance of buildings and Energy Efficient Building Design.

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.

Mathematical Modelling in Water Resources, Flood Forecasting, Statistical Modelling in Hydrology, Water Resources Systems, Surface and Ground Water Quality Modelling, River Hydraulics, Applications of Remote Sensing Techniques in Water Resources, Soil Characteristics, Watershed Modelling, Vegetation and Crop response

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.

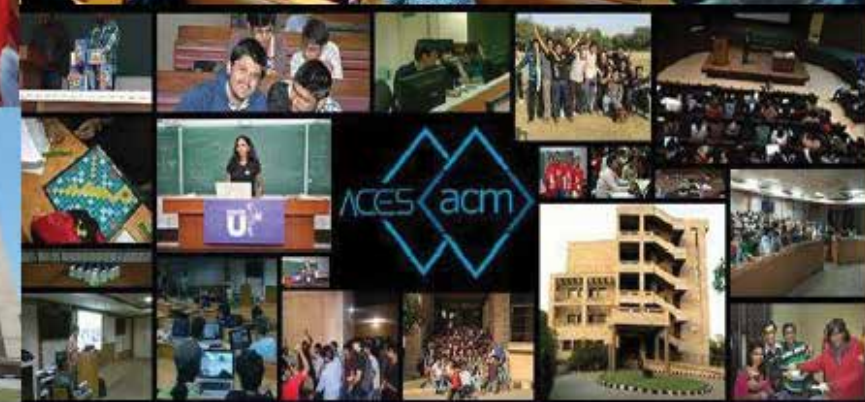
Environmental Engineering Laboratory is equipped to examine water and wastewater chemically, physically, bacteriologically and biologically. Filtration columns, pilot scale rotating biological contactors, mini ion exchange plant, Simulated landfills, cold model re - circulating fluidized bed reactor, 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.





Department of
Computer Science & Engineering

ROSHNI INDOOR NAVIGATION SYSTEM FOR VISUALLY IMPAIRED



Waist Module



Wall Module



Users Navigating with Roshni



Mobile Application



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

HEAD OF THE DEPARTMENT



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

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



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

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



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

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



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

Amit Kumar, Ph.D. (Cornell Univ.)
Professor
 Algorithms, Computer Networks.



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

Anshul Kumar, Ph.D. (IIT Delhi)
Professor
 CAD for VLSI, Computer Architecture.





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.



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



Kolin Paul, Ph.D. (BESU)
Professor
 Reconfigurable Computing, Embedded Systems.



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.



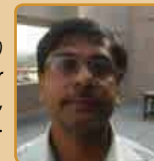
Huzur Saran, Ph.D. (Univ. of California, Berkeley)
Professor
 High Speed Networks, Graph Theory & Algorithms.



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.



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.



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



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



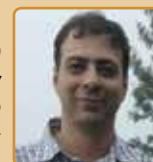
B.N. Jain, Ph.D. (State University of New York)
Visiting Professor
 Ad-hoc Networks, Sensor Networks,
 High-speed Networks, Network Security.



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)
Adjunct Faculty
 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 27+ faculty members (all Ph.D. from leading institutions). This number is expected to grow in the coming years. Apart from full time faculty, the Department currently has several visiting faculty members from leading academic institutions. In the recent past, researchers from IBM, IRL also have been participating in the teaching programmes regularly.

● ACADEMIC 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 upto the complexity of six million gates.

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

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

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

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

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

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 and Subodh Kumar). (**Website:** <http://www.cse.IITDelhi.ac.in/vglab>)

Computer Networks: Multimedia information representation, synchronization and retrieval, and interactive communications, network security, high-speed networks, sensor networks, congestion control, wireless and mobile communications (**associated faculty:** Huzur Saran, Vinay Ribeiro and Aaditeshwar Seth).

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

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

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



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

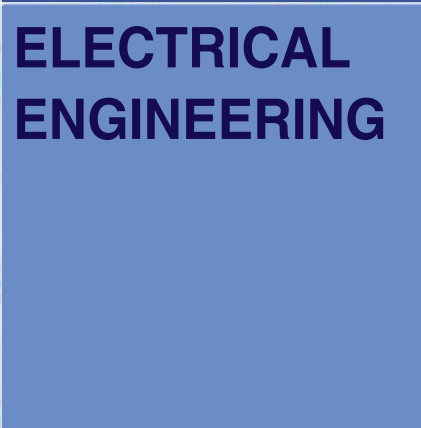
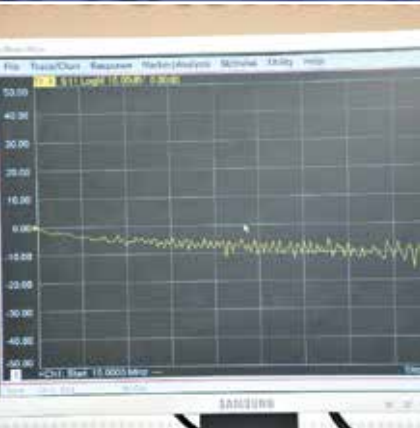
Security (associated faculty: Huzur Saran, Ragesh Jaiswal, Sanjiva Prasad and Kolin Paul).





DEPARTMENT OF

**ELECTRICAL
ENGINEERING**





S.D. Joshi, Ph.D. (IIT Delhi)

Professor

Statistical Signal Processing, Image Processing,
Theoretical Approach to Signal/Image Analysis.

HEAD OF THE DEPARTMENT



Abhijit R. Abhyankar, Ph.D. (IIT Bombay)

Associate Professor

Power System Restructuring Issues -Transmission
Pricing, Congestion Management, Market Models;
Power System Analysis and Optimization.

G. Bhuvaneshwari, Ph.D. (IIT Madras)

Professor

Power Electronics, Electrical Machines & Drives,
Power Quality.



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

Assistant Professor

Machine Learning, Complex Networks,
Systems Biology, Evolution and Evolvability,
Computational Linguistics, Cognitive Science,
Public Health Informatics.

Ranjan Bose, Ph.D. (Pennsylvania Univ.)

Professor, (Microsoft Chair)

Wireless Communications, Broadband Wireless
Access, Ultra Wideband Communications
(UWB), Information Theory and Coding.



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

Associate Professor

Nonlinear Control, Adaptive Control of Uncertain
Nonlinear Systems, Robotics, Autonomous Systems,
Reinforcement Learning Control, Approximate
Dynamic Programming, Differential Games.

Shouribrata Chatterjee, Ph.D. (Columbia Univ.)

Associate Professor

Analog Circuit Design and Vlsi, Analog and Digital
Filter Design, Low Power and Low Voltage Circuit
Techniques, Measurement and Instrumentation
Techniques.



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

Associate Professor

Signal Processing for MIMO Communication Systems,
Cooperative Communications, Ultra Wideband (UWB)
Communications, Non-Coherent Decoders, Cognitive Networks,
Coding Theory of MIMO Communication Systems, Power Line
Communication, Satellite Communications.

S. Chaudhury, Ph.D. (IIT Kharagpur)

Professor (Dhananjay Chair)

Computer Vision, Multimedia Systems,
Computational Intelligence.



Debanjan Bhowmik, Ph.D. (University of California Berkeley)

Assistant Professor

Magnetism, Spintronics, Micromagnetics,
Memory devices, Condensed Matter Physics.

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

Nanomaterials, Plasmonics, Photonic devices, Biosensors,
Biomedical Devices, Nanofabrication, Growth and self-Assembly
of Novel Optical & Electronic Materials, Integrated Nano-scale
Systems, Computational Electromagnetic, Sensors: Fiber-optic &
Chip-based, Biophotonics and bioimaging.



Abhishek Dixit, Ph.D. (K U Leuven Belgium)
Assistant Professor

Sub-10nm logic CMOS Device Design and Characterization,
CMOS variability/ reliability/thermal-effects, Aggressively
Scaled CMOS embedded DRAM (eDRAM) and SRAM cells,
Compact Device Modeling and Process Design Kits (PDK),
Modeling and Characterization of Si Solar-cells and Modules.



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

Power Electronics, High Performance Electric
Motor Drives, FACTS and Power Quality,
Power Generation Control, Renewable Energy.



Harshon Jagadeesh, Ph.D.
Assistant Professor

Coding Theory, Wireless Security,
Cyber-physical Systems, Wireless Networks,
Distributed Storage.



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, 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. Jagadish Kumar, Ph.D. (IIT, Madras)
Professor

Nanoelectronics, VLSI Device Modeling
and Simulation, IC Technology and Power
Semiconductor Devices.



Lalan Kumar, *Ph.D. (IIT, Kanpur)*
Assistant Professor
 Array Signal Processing.



Umesh Kumar, *Ph.D. (IIT Delhi)*
Associate Professor
 CHAOTIC Dynamics.



Brejesh Lall, *Ph.D. (IIT Delhi)*
Associate Professor
 Multiscale Modeling of Stochastic Processing,
 Widescale Cyclostationary Process
 Representation, Physical Layer in Wireless
 Communication.



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



R.K. Mallik, *Ph.D. (Univ. of Southern California)*
Professor, (Brigadier Bhopinder Singh Chair)
 Communication Theory & Systems, Difference
 Equations, Linear Algebra.



S. Mishra, *Ph.D. (Sambalpur Univ.)*
Professor, (Power Grid Chair)
 Power System Engineering, Intelligent
 Techniques for Control of Power System and
 Power Quality Studies, Renewable Energy.

Bhaskar Mitra, *Ph.D. (University of Michigan)*
Assistant Professor

All aspects of MEMS and Microfabrication,
 Microfluidics, Plastic MEMS, Microplasmas,
 Gas Phase Nanofluidics.



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

Wireless Communication (Large MIMO Systems/
 Massive MIMO Systems), Communication Theory
 and Systems, Information Theory and Statistical
 Signal Processing.



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

Control Systems, Guidance & Control, Computational
 Methods for Modeling, Simulation and Control, Finite
 Element Method, Distributed Parameter Systems,
 Flexible Structures, Electromagnetic & Coupled
 Systems, Electromagnetic NDT.



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.



S. Prakriya, *Ph.D. (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

Solid State Imaging, CMOS image sensors, Bio-inspired vision systems, Neuromorphic Imaging, Analog/Digital circuit design, Optoelectronics and Photonics.



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

Power System Stability and Control, Wide Area Measurement and Control, Statistical Techniques in Power Systems, Power Quality.



Shaunak Sen, Ph.D. (Caltech)
Associate Professor

Control Systems, Dynamical Systems.



Jun Bae Seo, Ph.D. (University of British Columbia, Canada)

Assistant Professor

Wireless Mobile Communication Networks, Computer Communication Networks, Computational Probability, Stochastic Processes, Queueing Theory and Optimizing Network of Queues.



Bhim Singh, Ph.D. (IIT Delhi)
Professor, (CEA Chair)

Power Electronics, Electrical Machines and Drives, HVDC, FACTS, Power Quality, Renewable Energy, DSP Based Control of Power Converter and Drive.

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

Flexible Electronics, Maskless Lithography And Printing Methods, Organic And Inorganic Photovoltaics, Organic Light-emitting Diodes, Nanoscale Transport, Sustainability, Wide-bandgap Semiconductors, Device Design And Characterization.



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

Assistant Professor

Signal processing, wireless communications, wireless sensor networks, optimisation, machine learning.



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

Emerging Non-Volatile Memory Technology, Bio-inspired/Neuromorphic Computing, Circuit-Device Interaction.



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

Power Electronics, High Frequency Switch-Mode Power Conversion, Fuzzy-Neuro controllers for PE systems, DSP based controllers, Object Oriented Modeling of PE systems, Development of MPPT controllers for Space/Photovoltaic sources, Photovoltaic Power Conversion, Intelligent controllers for VRMs, Digital Control Theory and Applications.



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

Adaptive Control, Nonlinear Dynamics, Image Processing.



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

Power Systems Analysis and Optimization, Distribution Systems, Analysis & Optimization.





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



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



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



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



Vinod Chandra, Ph.D. (IIT Delhi)
Emeritus Professor
Communication Systems, Fault Tolerant
Computing Systems, Optical Communication.



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



Hiranmay Ghosh, Ph.D. (IIT Delhi)
Adjunct Faculty
Semantic Video, Information Retrieval,
Agent Based Systems, Multimedia Systems.



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



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

● 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 under-graduate programmes and nine post-graduate programmes and Ph.D. programmes.

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

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

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

● ACADEMIC PROGRAMMES

UNDERGRADUATE

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

The B. Tech. programme in Electrical Engineering (Power and Automation) concentrates on automation technologies

and power engineering catering to the current needs of intelligent and effective energy management. Students of this B.Tech. Programme also have an option of specializing in specific areas by doing additional courses.

POSTGRADUATE

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

(I) M.Tech.

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

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

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

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

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

(II) M.S. (Research) Programme

The M.S. (Research) programme is appropriate for those wishing to pursue a career in research and development in the industry or for those pursuing a career in teaching. Unlike the students in the M.Tech. programme, the M.S. (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

Performance Analysis of Communication Systems, Cooperative Communications, Cognitive Radio, Information Theory and Coding, Communication Networks, Secrecy & High speed wireless and Wireline Communications, MIMO, Image / Video coding, Multirate Signal Processing, Array Signal Processing, Source Localization and Tracking, Optical Communication and Networks, FSO, Micro and Nano Photonics, Photonics & Switching, Electromagnetics, Plasmonics & Plasma Science, Molecular communications.

Computer Technology Group

Computer Vision, Multimedia Systems, Image Processing, Computer Networks, Computer Architecture, Embedded Systems, Parallel Computation, Neural Computation, Pattern Recognition, Artificial Intelligence, Music Information Retrieval, Bioinformatics, Machine Learning, Biometrics.

Control Engineering Group

Robust Control, Intelligent Control, Robotics, Optimal Control, System Identification, Reinforcement Learning Control, Nonlinear Systems and Control, DYNAMICAL SYSTEMS, Adaptive Control, Cooperative Control and Path Planning, Sensor Fusion, Guidance and Navigation, Sliding Mode Control, Interval Analysis in Control Design, Computational Methods for Simulation and Control, Modeling and model order reduction, Attitude Control and Structural Control, Numerical Modeling and Simulation, Embedded Control Systems, APPLICATIONS TO BIOMOLECULAR CIRCUITS.

Integrated Electronics & Circuits Group

Electronic and optoelectronic materials, flexible electronics, sensors, optoelectronic and photonic devices, field-effect and bipolar devices, MEMS devices, memory, spintronics, thin film and solution-processed devices, energy harvesting and scavenging devices, etc.

Power Engineering Group

Electrical Machines, Energy Conversion, Power Electronics, Power Quality, Drives, Power and Energy Systems, Protection, Stability, Optimization, Energy Conservation, HVDC and FACTS, Applications of Microprocessors

and Computers in Power and Drives, Renewable Energy Systems (Small Hydro, PV, Wind), and Energy Audit and Efficiency, Solar Inverters and Power Supplies.

● 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.





DEPARTMENT OF

**HUMANITIES
AND
SOCIAL
SCIENCES**





Ravinder Kaur, Ph.D. (Delhi Univ.)
Professor
 Social Change, Sociology of Development,
 Gender, Kinship, Family and Marriage,
 Anthropological Demography, Sociology of India.

HEAD OF THE DEPARTMENT



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

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



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.

Arjun Ghosh, Ph.D. (Jawaharlal Nehru Univ.)
Assistant Professor
 Culture Studies, Performance Studies,
 Authorship, Intellectual Property.



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

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



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

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



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

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.





Stuti Khanna, *D. Phil. (Oxford Univ.)*
Associate Professor

Modernism, Postcolonialism Twentieth-Century Literature, Indian Writing in English, Cities and Gender.



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

Economic Development, Education, Health and Nutrition, Indian Economy.



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.



Angelie Multani, *Ph.D. (Jawaharlal Nehru Univ.)*
Associate Professor

Indian Theatre in English, Culture Studies, Gender/ Studies, Contemporary Fiction.



Rukmini Bhaya Nair, *Ph.D. (Cambridge Univ.)*
Professor

Linguistics, Philosophy of Language, Cognitive Science and Cultural, Studies, Critical Theory, Postcolonialism, Gender, Creative Writing, Narratology.

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

Labour Economics, Empirical Development, Trade Policy, R&D and firm productivity, Technology spillover and labour market effects, Health and Nutrition, Household Behaviour Analysis, Crime and Inequality, Applied Microeconomic Theory.



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.



Rajakrishnan Rajkumar, *Ph.D. (Ohio State Univ., USA)*
Assistant Professor

Natural Language Generation (NLG), Syntactic theory and Psycholinguistics.



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

Energy & Environment Policy, Energy Innovation Policy, Climate Change Policy, S&T Policy, Technology & Development.



Sanil V., *Ph.D. (IIT, Kanpur)*
Professor

Philosophical investigations into Art, Science, Technology, Literature and Social Sciences, Reason and Revolt, Violence, Hate and Revenge, Contemporary Indian thought, Intellectual traditions of Kerala, Philosophy of Biology.



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

Postcolonial State, Civil Society and Democratization, Adivasis of India and the Politics of Development, Hindu Nationalism, Neo-liberal Globalization and Social Inequality, Sociology of Religion and (Anti-Christian) Violence.





Paroma Sanyal, Ph.D. (*English and Foreign Languages University, Hyderabad*)
Assistant Professor
 Phonology and Syntax, Theoretical Frameworks: Optimality Theory, Lexical Phonology, Distributive Morphology, Minimalism, Minor Research Area Language Teaching: English Language Teaching, Task-based Language Teaching.



Simona Sawhney, Ph.D. (*University of California*)
Associate Professor
 South Asian Language and Literature, Postcolonial Literature and Theory, Sanskrit Literature, Literary Theory.



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



Kamlesh Singh, Ph.D. (*Univ. of Rajasthan*)
Associate Professor
 Positive Psychology, Applied Positive Psychology, Environmental Psychology, Psychometrics, Community Psychology, Rural Women and Adolescents.



Purnima Singh, Ph.D. (*Allahabad Univ.*)
Professor
 Social and Applied Social Psychology, Justice, Identity, Inter Group Relations, Cognition and culture.



Varsha Singh, Ph.D. (*IIT Bombay*)
Assistant Professor
 Behavioural Decision Making and Choice Behaviour, Dual Process Theories of Decision Making, Heterogeneity and Constraints in Decision Making.



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



Naveen Thayyil, Ph.D. (*Tilburg University*)
Assistant Professor
 Law, Techno-science and Democratisation, Regulatory Issues in New and radical Technologies, Democratisation of Regulation of Technology, Risk Regulation, Use of ethics in Technology Regulation, Development of Technologies and Public Contestations, Public Participation in Regulation.



Jayan Jose Thomas, Ph.D. (*IGIDR, Mumbai*)
Associate Professor
 Labour, Capital and Technology in Indian Industrialization.



C.A. Tomy, Ph.D. (*Univ. of Hyderabad*)
Professor
 Philosophy of Mind and Cognition, Philosophy of Science, Scepticism, Metaphysics and Self.



V. Upadhyay, Ph.D. (*McMaster Univ.*)
Professor
 Development Economics, Economic Theory, Indian Economy.



Milind Wakankar, Ph.D. (*Columbia University*)
Associate Professor
 Indian Mystical Traditions and the Modern Critique of Caste.

● 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.

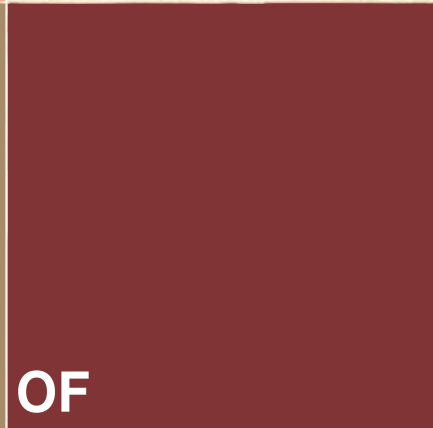
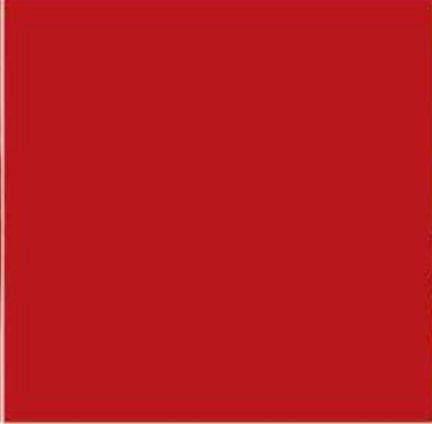
● RESEARCH

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 Religion, Gender Studies, Visual Sociology, Environmental Sociology, Ethnicity and Nationalism, Agrarian Studies; Economic Theory, Development Economics, International Economics, Quantitative Economics, Transport Economics, Environmental Economics, Industrial Economics, Indian Economy, Game Theory, Decision Theory, Mechanism Design; British Literatures, Theory of Criticism, Indian and Postcolonial Literatures, Performance Studies, Indian Political Thought, English Language, Linguistics, Philosophy of Language, Cognitive Studies. English Language, Linguistics, Philosophy of Language, Cognitive Studies; Epistemology, Metaphysics, Ethics, Aesthetics, Continental Philosophy, Phenomenology, Hermeneutics, Deconstruction, Law, Techno-Science and Democratization, Philosophy of Science, Technology and Social Sciences. History of Science, Sociology of Science, Technology and Society. Interface of Science and Technology with Humanities; Vulnerability and Adaption to Climate Change, Disaster Management Policy, Mitigation to Climate Change, Energy Policy, Social Identity, Intergroup Relations, Intergroup Contact and Social Change, Leadership and Collective Mobilisation.

● LABORATORY FACILITY

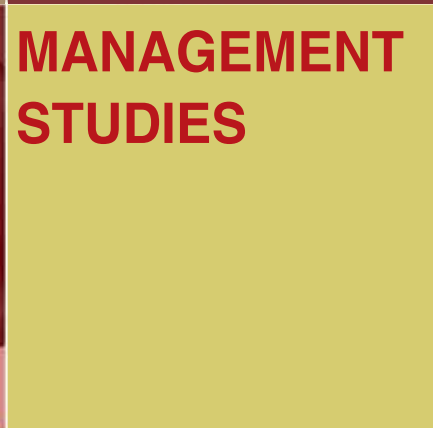
The Department has a Language Learning Centre offering support to all first year students to enhance their language and communication skills. The Department also houses a Cognitive and Behavioural Sciences Laboratory for teaching and research in Psychology and Linguistics. A new Economics Laboratory is in the process of being set up.





DEPARTMENT OF

MANAGEMENT
STUDIES





M.P. Gupta, Ph.D. (IIT Delhi)
Professor
 Information Systems & Strategy.

HEAD OF THE DEPARTMENT



Kanika T. Bhal, Ph.D. (IIT Kanpur)
(Modi Chair Professor)
 Human Resource Management, Business Ethics, CSR, Leadership and Culture.

Arpan Kumar Kar, Fellow, Ph.D. (XLRI)
Assistant Professor
 Business Analytics, Smart Cities, Social Media, Digital Ecosystems, Information Assurance.



Harish Chaudhary, Ph.D. (IIT Delhi)
Associate Professor
 Marketing Management, Strategic Marketing, Rural Marketing, Product Planning and Management, Brand Management.

Smita Kashiramka, Ph.D. (BITS, Pilani)
Assistant Professor
 Indian Financial System, Mergers & Acquisitions, Banking & Risk Management and Financial Management.



Sanjay Dhir, Fellow, Ph.D. (IIM, Lucknow)
Assistant Professor
 Strategic Management, Joint Ventures, International Strategy and Management of Change and Transformation.

Jitendra Kumar Madaan, Ph.D. (IIT Delhi)
Assistant Professor
 Closed Loop Supply Chain Management, Logistics, Healthcare System Management, Waste/ Resource Management, Green and Sustainable Energy Management, Sustainability, Business Analytics, Simulation, Green Project Management, Environment and Information Technology etc.



Amlendu Kumar Dubey, Ph.D. (IGIDR, Mumbai)
Assistant Professor
 Macro Economics & Econometrics.

Mahim Sagar, Ph.D. (IIITM, Gwalior)
Associate Professor
 Brand Management Ethical Brand Positioning, Product Development Management Telecom Policy.



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

Ravi Shankar, Ph.D. (IIT Delhi)
Amar S. Gupta Chair Professor
 Operations & Supply Chain Management, Business Analytics & Big Data, Project Management, Total Quality Management & Six Sigma and Quantitative modeling.





Seema Sharma, Ph.D. (IIT Delhi)

Associate Professor

Sustainable Development, Socio-economic Analysis, Productivity & Efficiency analysis and energy economics.



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

Associate Professor

Operations Management, Manufacturing Systems, Optimization Techniques, Operation Research and Supply Chain Management.



Shveta Singh, Ph.D. (Allahabad Univ.)

Associate Professor

Financial Management, Corporate Governance, Security Analysis and Portfolio Management.



Shuchi Sinha, Ph.D. (Univ. of London)

Assistant Professor

Identity regulation, Leadership, Contemporary Organizational Controls.



Sushil, Ph.D. (IIT Delhi)

Professor

Strategies Management, Strategic Alliances and M & A, Flexible Systems Management, Strategic Change & Flexibility, Interpretive Research Methods, Technology Management, Creative Problem Solving, Waste Management.



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

Professor

Corporate Finance, Corporate Finance, International Finance, International Business, Security Analysis & Portfolio Management, General Management.

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

Emeritus Professor

Financial Management, Financial Accounting, Management and Cost Accounting, Corporate Finance and Corporate Restructuring and Business Valuation .



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

Professor

Managerial Economics, Entrepreneurship Management & Intellectual Property Rights.



Jaijit Bhattacharya, Ph.D. (IIT Delhi)

Adjunct Faculty

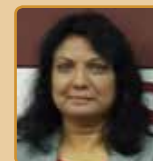
E-Governance, Open Technology and Applications, IT Business Modeling and Strategy.



Meenakshi Issar, Ph.D. (IIT Delhi)

Adjunct Faculty

Management of Technology, Global Strategies for Multinational Corporations, Strategies for Crisis Management, EVA based Corporate Valuation System, Total Quality Management.



Dr. Dennis F. Galletta

(Adjunct Faculty)

Professor
Katz Business School University of Pittsburgh, (USA)



Stan Kachnowski

Adjunct Faculty

Ph.D., MPA, CSEP, RSM Chair | HITLAB Chair | Royal Society of Medicine | NYC EDC Digital Health Breakthrough Network.



GUEST FACULTY

Dr. Anuj Kumar Srivastva, *Ex-Director (Retd.) BSNL*

Dr. Dipanjan Goswami, *DAICCHI SAKYO HIFEN, Ranbaxy Labs*

Dr. A Bhaskar, *Associate Professor, IMT Ghaziabad*

Prof. Jyotsana Bhatnagar, *Professor, MDI Gurgaon*

Dr. A.K. Nigam

Dr. Anuj Srivastvam, *(Retired from MTNL New Delhi)*

Dr. M.M. Chaturvedi, *(Retired from Indian Navy)*

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

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

Prof. Stan Kachnowaski, *Chairperson, HITLAB, USA*

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

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

Dr. K.V. Damodaran, *Joint Director, TRAI*

Dr. D. Vijayrao, *DRDO*

Dr. Roma Mitra Debnath, *IIPA, New Delhi*

Mr. Abhishek Sharma, *Founder & CEO of Beyond Evolution Tech Solutions*

Dr. Manmohan Chaturvedi, *Advisor, CISO Academy*

Prof. Premvrat, *Ex-Director- IIT Roorkee*

Prof. D.K. Banwet, *Retd, IIT Delhi*

Dr. Abhishek Sharma, *CEO- BES Pvt. Ltd.*

Mr. Amit Mishra, *India Head-F6S*

Prof. Rajendra Nargundkar, *IIM Indore*

Mr. Soumen Mukherji, *Partner-Country Head, Deloitte India*

Ms. Pooja Agarwal, *MD & CEO-Ordino Solutions*

Dr. Anuradha Balaram, *Former Civil Servant*

Dr. Ishita Tripathi, *Director, Govt. of India*

Dr. Puneeta Taneja, *Director & CFO, PC Solutions*

Dr. Anjali Nigam, *Founder, Whiteswan Consulting Group*

Mr. Surender Aggarwal

Mr. Vivek Mahajan

Ms. Jyotsana Bhatnagar, *MDI, Gurgaon*

Dr. Priyanka Jaiswal, *Assistant Professor, FORE School of Mgmt.*

Ms. Pritee Agarwal, *IIT Kanpur*

Mr. Ashok, *Chairman-Orient Resins Pvt. Ltd.*

Mr. Manish Sanghi, *MD-Everest Industries*

Dr. Ansh Gupta, *Milward Brown*

Dr. Narender Wadhwa, *AVP (Operations), Bajaj Energy Pvt. Ltd.*

Ms. Maneesha Kapur, *Founder-Teaching Expert & Coach*

Mr. Jay Bikram Bakshi, *Venture catalyst, Entrepreneur mentor*

Mr. Puneet Khurana

Mrs. Pavitra Solanki, *Strategic Consultant*

Prof. Roli Verma, *University of New Mexico*

● 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 on 'Telecommunication Systems Management' under the aegis of Bharti School of Telecom Technology and Management and a three-year Executive MBA programme with focus on 'Technology Management'. Department offers many functional electives in Finance, Marketing, Information Systems, Strategy, Operations & Supply Chain Management, Human Resource, Business Analysis, Technology Management 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 needs. The course content is very contemporary and has involved various stakeholders including industry experts, CEOs and our alumni. DMS faculties who have served on various UN related bodies and international professional associations etc. are widely acclaimed internationally for their contributions in knowledge generation and research publications. All faculty members have their international collaborative research network like with MIT, Rutgers, Aalborg, Loughborough, New Castle, Sheffield etc. 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 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 (GFS) 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 now 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 techno-managerial excellence imparted to the scholars at DMS. This programme is comprehensive in nature, involving all the business functions – Information Systems, Finance, Marketing, Strategic Management, Human Resources Management, with an emphasis on Telecommunications Systems Management, which provides a strong foundation in Telecom Technology, Business and Regulation, Telecom Planning Analysis and Design, International telecom Business etc. 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 contribute 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 PhD programme in Management. With its liberal multidisciplinary approach, the department provides excellent ambience for research amidst the world class infrastructure at IIT Delhi. In a 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; Strategy, and Technology Management.

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

Period of Assiatantship <i>(With B.E./B.Tech./M.Sc./M.Tech. or equivalent qualification)</i>	Assistantship Amount (As on June 2017)
First 2 year registration	₹ 25000 / Month
Next 2 year registration	₹ 28000 / Month

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.

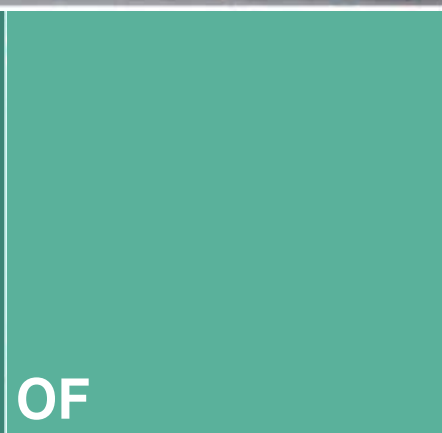
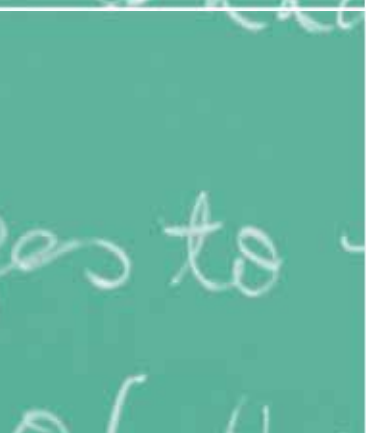
● LABORATORY FACILITIES

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:

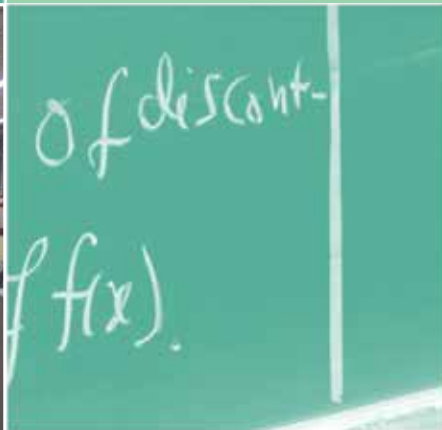
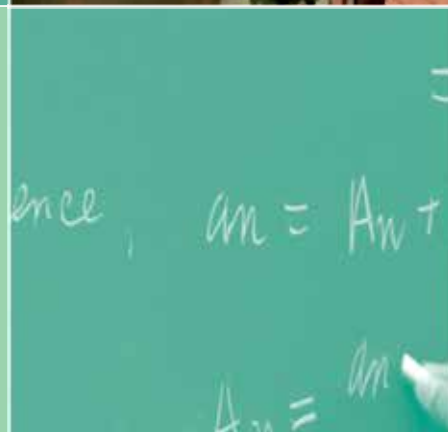
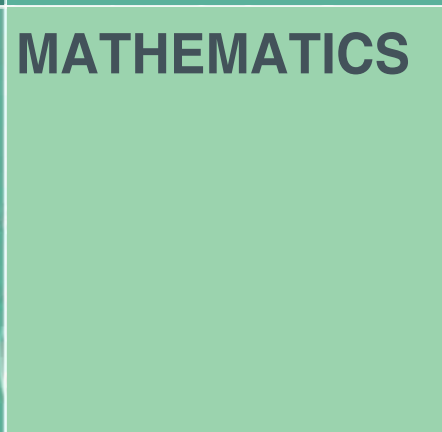
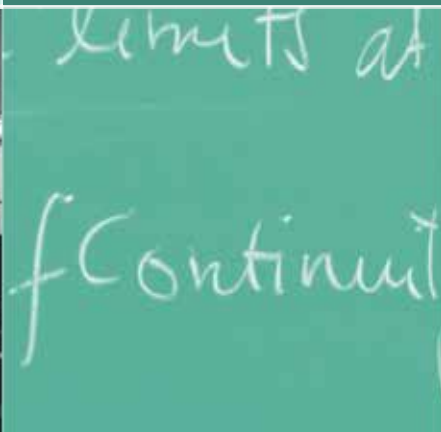
- Research Lab
- Economics Research Lab
- Marketing Lab
- Operations & Supply Chain Lab
- Computer Lab,
- Behavioral Lab,
- Strategy and Competitiveness Lab,
- Intellectual Property Rights Cell,
- Entrepreneurship Development Cell and
- Centre of Excellence “National Centre of Business Ethics, Corporate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

A large collection of software packages such as SPSS, AMOS, Vensim, I-Think, Liserai, 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 MATHEMATICS





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

HEAD OF THE DEPARTMENT



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

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



S. Dharmaraja, Ph.D. (IIT Madras)
Professor
Applied Probability, Queuing Theory, Performance Modeling, Financial Mathematics.

Aparna Mehra, Ph.D. (Delhi Univ.)
Associate Professor
Mathematical Programming, Fuzzy Optimization, Financial Mathematics.



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

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



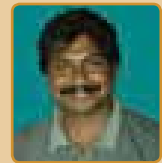
Shravan Kumar, Ph.D. (Madras Univ.)
Assistant Professor
Abstract Harmonic Analysis.

Anima Nagar, Ph.D. (Gujrat Univ.)
Associate Professor
Topological Dynamics.



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

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





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



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



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



Prosenjit Roy, Ph.D. (University of Zurich)
Assistant Professor
Elliptic Partial Differential Equations.



Sivananthan Sampath, Ph.D. (IIT Madras)
Assistant Professor
Applied Harmonic Analysis, Inverse Problems,
Learning Theory.



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



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.

The major research area of the department are: Algebra, Graph Theory, Computations PDEs, Cryptography, Coding Theory, Data Mining, Partial Differential Equations, Financial Mathematics, Measure Theory, Natural Language Processing, Number Theory, Numerical Analysis, Numerical and Scientific Computing, Optimization, Parallel Computing, Topological Dynamics, Topology, Wavelets and its Applications, Harmonic Analysis, Fractals, Inverse Problems, Learning Theory, Stochastic Game Theory.

● 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.



यांत्रिक इंजीनियरी विभाग
MECHANICAL ENGG. DEPT.

**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.

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



Ray Bahni, Ph.D. (IIT Kanpur)
Assistant Professor
Multiphase Flow, Physics of Fluids, Micro
Fluidics, Computational Fluid Dynamics,
Stability Analysis, Traffic Flow.

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



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

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



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.

Naresh Varma Datla, Ph.D. (University of
Toronto)
Assistant Professor
Experimental Mechanics, Failure Analysis,
Design of Medical Devices, Adhesion and
Adhesives.



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

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.



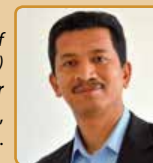
Sanjeev Jain, Ph.D. (IIT Delhi)
Professor
 Solar Cooling, Heat Exchangers, Microscale Heat Transfer.



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.



D. Ravi Kumar, Ph.D. (IIT Madras)
Professor
 Metal forming, Plasticity, Materials processing.



Mayank Kumar, *Ph.D. (Massachusetts Institute of Technology USA)*
Assistant Professor
 Multiphysics Simulations of Energy Conversion Systems, Turbulent Multiphase Reacting Flows, Coal Gasification & Clean Coal Technology.



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



Sudipto Mukherjee, *Ph.D. (Ohio State Univ.)*
Professor, (Volvo Chair)
 Mechanisms, Robotics, Mechanical Systems Design, Impact Biomechanics.



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



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



Sunil Pandey, *Ph.D. (IIT Delhi)*
Professor
 Welding & Fabrication Technology, Production Engineering, Manufacturing Processes, Process Engineering.



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



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



P. Venkateswara Rao, *Ph.D. (IIT Madras)*
Professor
 Conventional and Non-Conventional Material Removal Process, Micro/Nano Manufacturing.



M.R. Ravi, *Ph.D. (IISc., Bangalore)*
Professor
 Computational Fluid Dynamics, Heat Transfer, Renewable Energy, Rural Energy Systems.



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



Satinder Paul Singh, *Ph.D. (IIT Delhi)*
Professor (NTPC Chair)
 Dynamics of Rotating Machinery, Composite Materials, Machine Design, Active Vibration Control, Nanomechanics.



Sujeet Kumar Sinha, Ph.D. (Pune Univ.)
Professor
 Tribology, Lubrication, Nano-tribology,
 Coatings, New Tribological Materials.



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
 Radiative Heat Transfer, Heat and Mass
 Transfer in Porous Media, Computational
 Fluid Dynamics, Drying of Food Products.



T.K. Kundra, Ph.D. (IIT Delhi)
Guest Faculty
 Mechanical System Design, Concurrent
 Engineering, Vibration Design, Cad/Cam,
 Finite Element Model Updating.



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



Kshitij Gupta, Ph.D. (IIT Delhi)
Emeritus Professor
 Vibrations, Mechanical Design, Rotor
 Dynamics, Composite Materials.



A.D. Gupta, M.Tech. (IIT Delhi)
Visiting Faculty
 Industrial Engineering, Operations Research,
 Value Engineering, Industrial Quality Control.



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



Kiran Seth, Ph.D. (Columbia Univ.)
Emeritus Professor
Padma Shri
 Operations Research, Applied Probability
 Models, Fuzzy Models.

● INTRODUCTION

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

The research and teaching activities are supported by 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 these 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.

Production Engineering: Metal cutting, Metal forming, Welding, Metal casting, Material characterization, Non-traditional manufacturing processes, Measurements and metrology, Grinding of ceramics and metal matrix composites, Processing of polymers and composites, Injection moulding, Microcellular injection moulding, Finite element applications in manufacturing, CAD/CAM, Rapid prototyping, Intelligent manufacturing, Micro and nano-manufacturing, Biomaterials and medical implants, Nano-composites, Modeling of material behavior, Lean concepts in machine tool design. Magnetorheological Finishing, CNC Fishing Systems.

Thermal Engineering: Flame propagation, Flame stability, Heat transfer to/from flames, Combustion. Fire dynamics and fire safety. Internal combustion engines: alternative fuels, engine modelling and simulation, HCCI combustion in an engine. Biomass utilization, Experimental and modelling studies of gasifires, Biomass stoves, Sustainable energy systems, Energy efficient equipment and devices, Waste heat utilization, Renewable energy systems. High temperature natural convection, Cooling of electronic components, Micro-channel heat transfer, Transport phenomena in micro- and nano-fluidic devices, Heat transfer enhancement, Combined conduction-radiation problems. Heat transfer in two phase flows. Eco-friendly energy conversion, refrigeration and air-conditioning, Thermal system design and simulation. Particle-laden flows. Microfluidics, Flapping wing aerodynamics, Energy Storage, Heat Exchangers, Solar Cooling Technologies, Microscale Heat Transfer.

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, Turbo-machinery, 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.



DEPARTMENT OF
PHYSICS





Anurag Sharma, Ph.D. (IIT Delhi)

Professor

Fiber Optics, Integrated Optics, Gradient Index Optics, Applied Optics, Numerical Modelling of Guided Wave Optical Devices.

HEAD OF THE DEPARTMENT



Sujin B. Babu, Ph.D. (Univ. du Maine, France)

Assistant Professor

Aggregation of Colloids, Porous Media, Low Reynolds Number Swimmers.

Sujeet Chaudhary, Ph.D. (IIT Delhi)

Professor

Experimental Condensed Matter Physics: Thin Films, Nano-Magnetism, Spintronics.



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

Associate Professor

Statistical Mechanics of Complex Spin System, Surface Growth Phenomena, Fractal Architectures and their Characterization.

Pintu Das, Ph.D. (Uni. of Saarland, Germany)

Assistant Professor

Experimental Condensed Matter Physics-Magnetism at Nanometer Scale, Charge Carrier-dynamics (Low-frequency) as well as Atomic/Nanometer Scale Electronic Phenomena in Correlated Electron Systems, Instrumentation.



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

Assistant Professor

Computational Materials Science, Energy Conservation, Catalysis, Graphene, Genetic Algorithm, Machine learning.

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

Assistant Professor

Experimental Condensed Matter Physics: Electronic structure, Thin Films, Strongly correlated Systems, Surface-interface physics, High-Tc superconductors, Angle-resolved Photoemission Spectroscopy.



Mukesh Chander, Ph.D. (IIT Delhi)

Associate Professor

Electronics, Solid State Gas Sensors, Surface Characterization, Nanostructure Materials.

Joyee Ghosh, Ph.D. (Jawaharlal Nehru Univ.)

Assistant Professor

Quantum and Nonlinear Optics, Quantum Information Technologies; Atomic, Molecular and Optical Physics.



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

Professor

Experimental Condensed Matter Physics - Novel Magnetic Multi-functional Materials: Bulk and Nano/Thin Film forms

Santanu Ghosh, Ph.D. (Jawaharlal Nehru Univ.)

Associate Professor

Experimental Condensed Matter Physics, Thin Film, Ion Materials Interaction.





Sankalpa Ghosh, Ph.D. (Jawaharlal Nehru Univ.)
Associate Professor

Bose Einstein Condensate of Cold Atoms,
Quantum Hall Effect, Graphene,
Topological Insulator.



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

Photonics, Applied Optics, Holographic Data
Storage, Digital Holography, Optical Data
Security, Photonic Structures.



Bhaskar Kanseri, Ph.D. (University of Delhi)
Assistant Professor

Quantum Optics, Ultrafast and Non-linear
Optics, Optical Coherence and Interferometry,
Polarization and Spectral Switching.



Kedar B. Khare, Ph.D. (Univ. Rochester)
Assistant Professor

Optics/Photonics, Computational Imaging,
Inverse Problems, Compressive Sensing.



Neeraj Khare, Ph.D. (BHU)
Professor

Nano-Structure Functional Oxides, Novel
Magnetic Materials, Superconductors,
SQUID, Solar Cells.



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

Nonlinear Fibre Optics, Few-Cycle Laser
Pulses, Nano-Magnetics.

Arun Kumar, Ph.D. (IIT Delhi)
Professor

Fibre and Integrated Optical Waveguides,
Components and Devices, Plasmonic
Waveguides and Devices.



Sunil Kumar, Ph.D. (IISc, Bangalore)
Assistant Professor

Ultrafast Optics and Spectroscopy,
Plasmonics, Electron Correlated Solids.



Brajesh Kumar Mani, Ph.D. (PRL, Ahmedabad)
Assistant Professor

Computational Condensed Matter Physics;
Computational Many-Body Physics; Molecular
Dynamics and Monte Carlo Simulations.



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

Plasma Physics: Particle Acceleration, Instabilities,
Fusion, Microwaves-Plasma Interaction, Solitons,
Space Plasmas, THz Radiation Generation, Hall
Thrusters, Plasma-Material Interaction.



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.



G. Vijay Prakash, Ph.D. (Andhra Univ.)
Associate Professor

Nano-Photonics, Quantum Functional Materials,
Inorganic-Organic Nano-Hybrids, Non-linear
Optics.



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)
Associate Professor

Laser, Semiconductor, Raman Spectroscopy,
Ion Implantation, Laser Annealing
Superconductors and Nanoscience.



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

Semiconductor Materials and Processing,
Wide Band Gap Semiconductor, Semiconductor
Nano-Wires, Semiconductor Wafer Bonding.



J.P. Singh, Ph.D. (Jawaharlal Nehru Univ.)
Associate Professor
 Nano-Structure Growth, Nano-Science,
 Experimental Condensed Matter Physics.



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



R.K. Soni, Ph.D.(IIT Delhi)
Professor
 Laser Processing of Materials, Nanophotonics,
 Fluorescence and Raman Spectroscopy.



Pankaj Srivastava, Ph.D. (Rajasthan Univ.)
Professor
 Experimental Solid State Physics,
 Electronic Structure Of Materials,
 Surface-interface Physics.



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

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

Fibre-optics, Applied Optics, Fibre Optic
 Sensors, Plasmonics, Nano-particle Based
 Sensors.



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.



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

Thin Films, Nano-Materials, Green Energy,
 Spintronics, Nano-Magnetism,
 Thin Film Solar Cells.



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

Optical Fibre Communication, Optical Fiber
 Amplifier and Gratings, Nonlinear Interaction in
 Optical Fibres Guided wave quantum optics.



● 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

The Solid State Materials programme, encompasses science and technology of materials, their synthesis, characterization and applications in devices. The programme prepares graduates to take-up challenges in research and development in Solid State Technology, Nanoscience and Technology, Material Science and Engineering, and Semiconductor Technology and Processing.

M.Tech. in Applied Optics

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

Interdisciplinary M.Tech. in Optoelectronics and Optical Communication

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

● RESEARCH AREAS

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

Materials and Condensed Matter Physics: Thin Films, Materials and Devices, Novel Functional Magnetic Materials, Nanomaterials, Photovoltaics, Lattice Dynamics, Semiconductors and Amorphous Materials, Electronics Ceramics, Microwave Absorbing Materials, Microwave Processing, Quantum Functional Materials, Superconductivity, Nanomagnetism and Spintronics, Spin Dynamics, Charge Carrier Dynamics and Electronic Structure Studies of the Correlated Electron Systems, e.g., Fe-based high-Tc superconductors, Complex oxides, etc.

Optics and Photonics: Holography, High Density Data storage, Liquid crystals, Nonlinear Phase Conjugation, Optical Information Processing, Optical Data Security, Singular Optics, Nonlinear Optics, Nonlinear guided Wave Optics, Solitons, Quantum Optics, Fiber Optics, Integrated Optics, Fiber Optics Sensors and Biosensors, Fiber optics Components, Nanophotonics, Laser Spectroscopy and Applications, Terahertz Spectroscopy and Applications, Ultrafast Dynamics, Laser Processing and Fabrication, Green and Biophotonics, Photonic Metamaterials, Bio-Medical Imaging, Inverse Problems in Imaging, Optoelectronics.

Plasma Physics: Particle Acceleration, Nonlinear Waves and Instabilities in Plasma, Thermo Nuclear Fusion, Microwaves and Plasma Interaction, Solitons in Plasma, Space Plasmas, Terahertz (THz) Radiation Generation, Hall Thrusters, Interaction of Plasmas with Materials.

Theoretical Physics: Mathematical, Statistical Mechanics, and Computational Physics, Theoretical Studies in ultra-cold atoms, Nuclear Physics, Particle Physics, Ultrafast Optics. Soft Condensed Matter and Biophysics.

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: Nanomagnetism, Nanophotonics, Nanophotovoltaics, Nanoelectronics, Nanomechanics, Biosensors, and Mesoscale Devices.

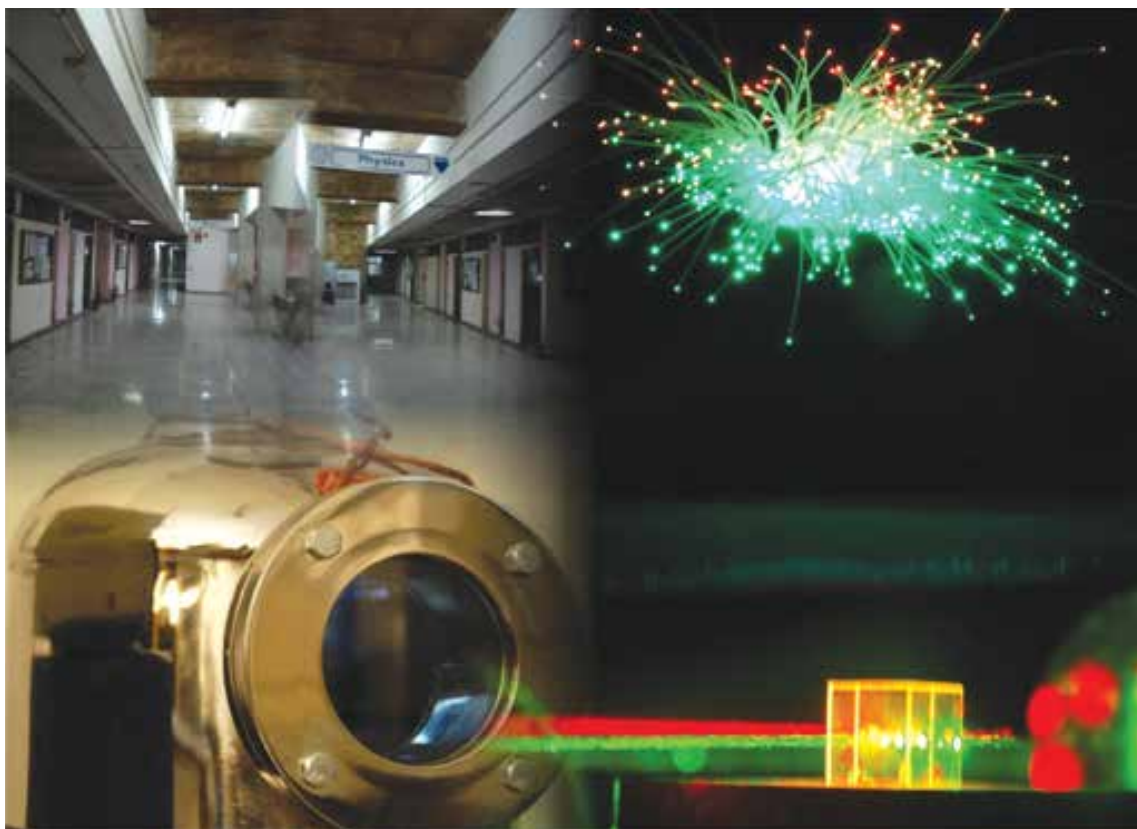
Students are trained at both the postgraduate and undergraduate levels by integrating the research done with multidisciplinary lab-oriented courses that are conducted at the facility. Research staff and Industry personnel will be trained over a period of five years by designing and conducting targeted 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**

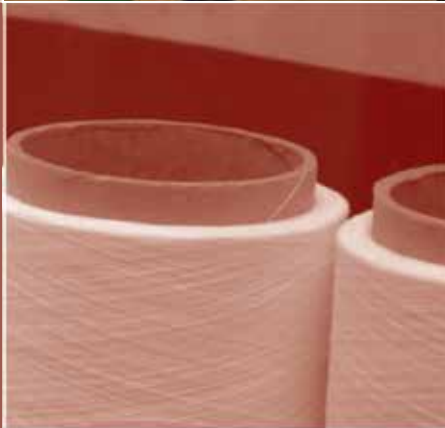
The Department has well-equipped laboratories for both teaching and research programmes. Some of the major research laboratories are: Solid State Physics Laboratory, Thin Film Laboratory, Magnetism & Advanced Ceramics Laboratory, Nano-Stech. Laboratory, Plasma Physics Laboratory, Beam Plasma Laboratory, 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 Electrochemical System, Optical Multichannel Analyser, Closed-cycle Helium Cryotip System, High Power Argonion/Neodymium/YAG/Excimer/Dye/Ti: Sapphire Lasers, Optical Photon-correlator, Plasma Diagnostics System, VSM Facility, Microwave Processing of Materials in a single (E- or H- field) or multiple mode. Ultrahigh Vacuum Units, Vacuum



Coating Units, DC and RF Sputtering Units, Concave Reflection Grating, Spatial Light Modulators, Optical Transfer Function Bench, Holographic Recording Set-up, Coherent Filtering Set-up, Facility for Optical Phase Conjugation with Photorefractives, Facility for Fabrication of Tunnel Diodes, Solar Cells, Thin Film Devices and Integrated Circuits, Optical Fibre Splicing and Characterisation Set-up, In-line Optical Fibre Components Fabrication and Testing, Fabrication and Characterization of Planar Optical Waveguides, Erbium doped fibre amplifiers, Optical Spectrum Analyser, Wavelength Meters, High resolution Microscope, DWDM wave length tuned Laser Diode light sources, Long Period Fiber Grating fabrication, variety of optical fibre sensors, and Facility for Making High Temperature Superconductors, Plasma and Photo CVD Units, DLTS, PL Facility, Optical CD Fabrication Facility. Indigenously developed HV compatible field emission measurement setup.

A new ultra fast optics (UFO) facility has been developed in the Department via a 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

Fabric Manufacturing Mechanics of Textile Structure, Textile Structural Composites, Modeling and Simulation, Project Management.

HEAD OF THE DEPARTMENT



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

Professor

Fibre Science & Technology, Polymers, Smart Textile Materials, Nano materials, Plasma Processing, Composite Fibres.

Apurba Das, Ph.D. (IIT Delhi)

Professor

Clothing Comfort, Nonwoven & Technical Textiles, Compression Bandage, Protective Clothing, Yarn Manufacturing, Instrumentation.



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.

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

Associate Professor

Nonwoven Products & Processes, Air Filtration by Fibrous Media, Fibre-to-Yarn Engineering, Mathematical Modeling of Fibrous Structures & Properties, Statistical Analysis & Optimization.



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

Assistant Professor

Functional Finishing of Textiles (Broadly, Textile Chemistry - Dyeing & Finishing), Nanotechnology in Functional Materials (Polymers & Textiles), Eco-friendly / Green Chemical Processing of Textiles, Electro-active Polymers and Textiles.

Saurabh Ghosh, Ph.D. (Basel Univ., Switzerland)

Associate Professor

Tissue Engineering, Medical Textile, 3D Bioprinting.



B.S. Butola, Ph.D. (IIT Delhi)

Associate Professor

Textile Chemical Processing, Polymeric Nano Composites, Enzymatic Processing of Textiles, Ballistic Textiles.

Bhuvanesh Gupta, Ph.D. (IIT Delhi)

Professor

Biotextiles, Tissue Engineering, Wound Care Systems, Intelligent Polymers & Fibres, Plasma Processing, Nano biotechnology and Nanomaterials.



R. Chattopadhyay, Ph.D. (IIT Delhi)

Professor

Yarn manufacturing processes, Quality assurance, Ropes and cordages, Product development.

Deepthi Gupta, Ph.D. (IIT Delhi)

Professor

Surface Functionalization, Medical Clothing, Garment sizing.





S.M. Ishtiaque, (Tech. Univ. of Liberec)
Professor
 New Spinning Technologies, Yarn Structure,
 Machine Design, Textile Management.



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 Nanocoatings, Bioactive and
 Functional Textiles, Material Development for
 Aerostats/Airships.



V.K. Kothari, Ph.D. (Leeds Univ.)
Emeritus Professor
 Comfort Aspects of Clothing, Technical Textiles,
 Product Development, Evaluation of Textiles
 and Quality Management.



Abhijit Majumdar, Ph.D. (Jadavpur Univ.)
Associate Professor
 Protective Textiles, Fabric Manufacturing,
 Soft Computing Applications,
 Operations and Supply Chain Management.



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
 Garment Technology, Mechanics of Yarns
 and Machines, Clothing and Comfort,
 Oil Spill Removal using Fibrous Materials,
 Nonwovens.



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



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



● INTRODUCTION

The Department offers a B.Tech. programme in Textile Technology and two M.Tech. programmes in Textile Engineering and in 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 dobby 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.

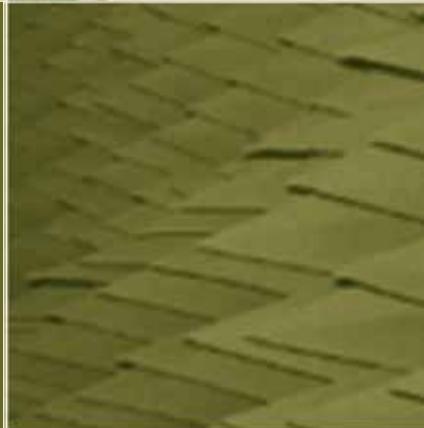
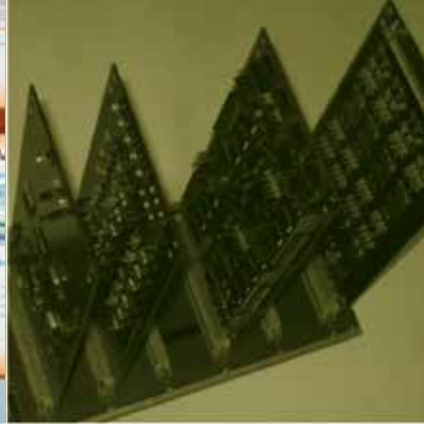
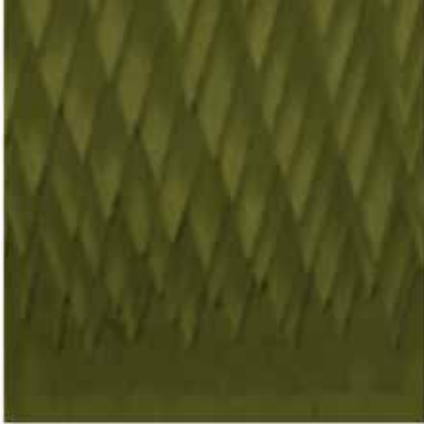
Textile Testing Laboratories of the department has modern instruments for testing various types of fibres, films, yarns, fabrics and carpets. Fibres can be tested for single fibre and bundle strength, breaking extension and yarn can be tested for mass irregularity (U% or C.V %) imperfections, spectrogram, 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.

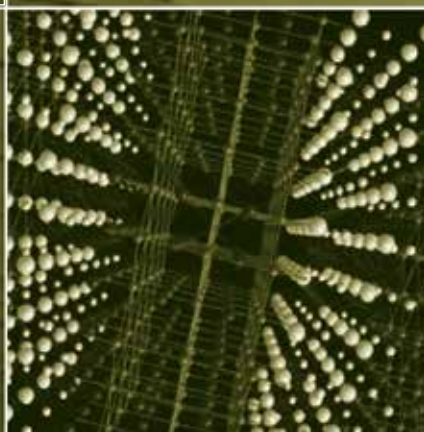
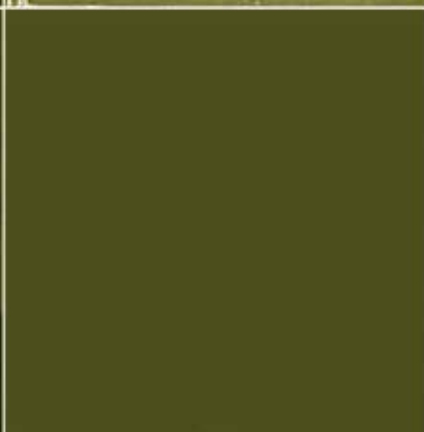
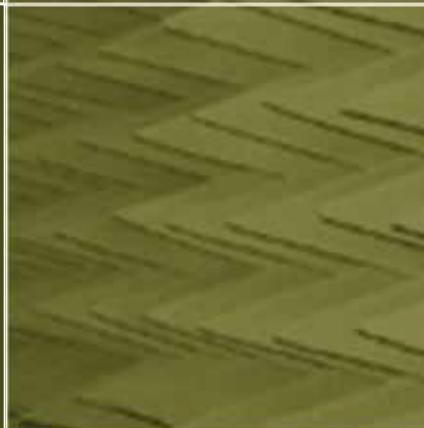
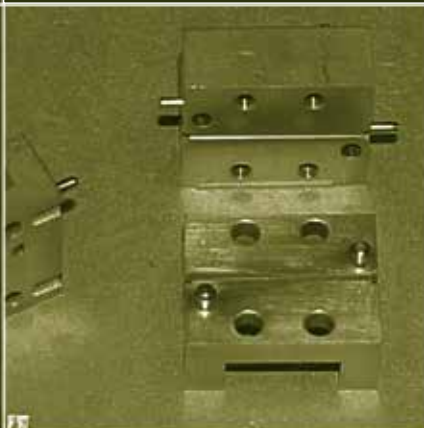
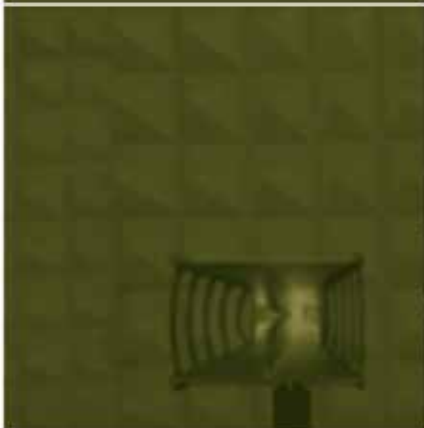
New Facilities: The newly created facilities include SMITA (Smart and Innovative Textile Materials), Medical textile and Protective textile laboratories.





CENTRE FOR

**APPLIED
RESEARCH IN
ELECTRONICS**





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

HEAD OF THE CENTRE



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

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



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

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



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

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



R. Bahl, Ph.D. (IIT Delhi)
Professor
Sensor Signal Processing, DSP System Design,
Underwater Acoustics, Bio-Acoustics.

Pushparaj Singh, Ph.D. (NTU, Singapore)
Assistant Professor
Microelectromechanical Systems (MEMS) Sensors
and Micro-systems, Nanowires for Nano Devices
and Sensing Applications, Through-silicon via
Interconnects and Packaging, MEMS/NEMS for
Biomedical Applications.



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

Saakshi Dhanekar, Ph.D. (Jamia Millia Islamia)
INSPIRE Faculty
Nano-Sensors, Microfluidics, Porous Silicon
Fabrication and Applications for Chemical
And Bio-detection.





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



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

Ulrich L. Rohde, Ph.D. (Clayton University, USA)
Honorary Professor
Microwave circuits, (Amplifiers, Oscillators and
Mixers) as well as Frequency Synthesizers.



● INTRODUCTION

The Centre for Applied Research in Electronics focuses on research and training in specialized areas of Electronics. The areas encompass Signal Processing, Microwaves & Microelectronics. The Centre has several excellent laboratory facilities for post-graduate training and conducting advanced research work.

● ACADEMIC PROGRAMMES

POSTGRADUATE

M.Tech. in Radio Frequency Design and Technology (RFDT) [Duration: 2 years/4 Semester]

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

● RESEARCH AREAS

The Centre offers doctoral programme which is highly rated in the country.

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

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

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

● LABORATORY FACILITIES

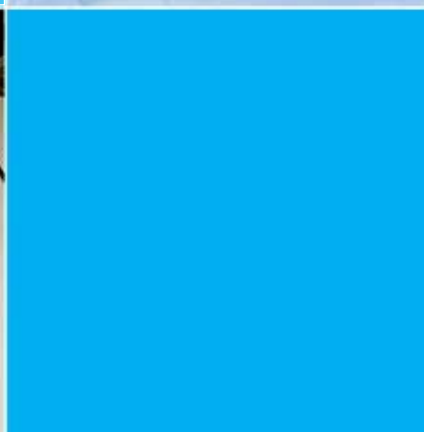
The Centre has several state-of-the art facilities, this includes:

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 furnace, Thermal, acoustic, optical and magnetic systems for non-destructive characterization, Surface profiler for thickness measurement, Texas Instruments DSP Processor Kits, NI DAQ 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.



CENTRE FOR

**ATMOSPHERIC
SCIENCES**





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.

HEAD OF THE CENTRE



Poornima Agarwal, Ph.D. (Srinagar, J&K)

Senior Scientific Officers-I

Environmental Chemistry, Mathematical Techniques.

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, .

Krishna Achuta Rao, Ph.D. (Tulane Univ.)

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.



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.

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 Meteorology.



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.

Maithili Sharan, Ph.D. (IIT Delhi)

Professor

Air Pollution Modelling, Atmospheric Boundary Layer, Computational and Mathematical Methods, Physiological Fluid Dynamics.



Vimlesh Pant, Ph.D. (Univ. of Pune)

Assistant Professor

Physical Oceanography, Ocean Modelling, Air-sea Interaction, Atmospheric Aerosols, Meteorological and Oceanographic Observations.

Sandeep Sahany, Ph.D. (IISc., Bangalore)

Assistant Professor

Tropical Deep Convection, High Frequency Rainfall Variability, Climate Modeling, Climate Change, Regional Climate Downscaling.



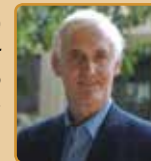


S.K. Dash, *Ph.D. (Physical Res. Lab, Ahmedabad)*
Emeritus Professor
Monsoon Studies, Global and Regional
Climate Modeling, Climate Change and Health,
Meteorological Computing.



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

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 MTech, programme in “Atmospheric and Oceanic Sciences & Technology” with the support of Ministry of Earth Sciences and Indian Space Research Organization, In the year 2011, the UG Minor Area Programme “Atmospheric and Oceanic Sciences” was initiated, which is the only one of its kind in the country. Currently, the Centre has faculty strength of 13, in the last six years, 20 Ph.D. and 47 M.Tech. degrees have been awarded by the Centre. Based on the number of research publications, degrees awarded, courses offered and student/faculty strength criteria, we estimate that CAS is ranked nationally among the top two Centres/Departments in the field. According to the 2011 US National Academy of Sciences benchmarking criteria, we also compare favorably with all US Centres/ Departments in our discipline.

● ACADEMIC PROGRAMMES

Currently CAS has three vibrant teaching programmes, namely:

- B.Tech. Minor Area in Atmospheric Sciences
- M.Tech. in Atmospheric-Oceanic Science & Technology
- Ph.D.

UNDERGRADUATE

The Centre has initiated Minor Area Programme in Atmospheric Sciences since 2011-12. In this minor area programme, there are six courses exclusively designed for UG students, which deal with fundamentals of weather, climate, climate change, oceanography, monsoon, earths 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

Atmosphere: Numerical Modeling of the Atmosphere, General Circulation, Tropical Meteorology and Indian Monsoon, Land-Surface Process Modeling, Land-Atmosphere Interaction.

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

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

Renewable Energy: Renewable Energy Meteorology, Renewable energy resource assessment and forecasting.

● 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.





CENTRE FOR

**BIOMEDICAL
ENGINEERING**





Veena Koul, Ph.D. (Kashmir Univ.)
Professor
 Biomaterials, Medical Devices, Clinical
 Diagnostics, Drug/Gene Delivery Systems,
 Nanomedicine.

HEAD OF THE CENTRE



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.



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.

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.



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

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



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).

Neetu Singh, Ph.D. (Georgia Tech., USA)
Assistant Professor
 Design of Nano-Structured Materials for
 Biomedical Implants, Cancer Diagnostics &
 Therapy, Tissue Engineering and Drug Delivery.
 Study of The Bioactivity of Nanostructures and
 Finding Structure-Bioactivity Relationships.



Amit Mehndiratta, M.B.B.S., D.Phil. (University of
 Oxford, U.K.)
Assistant Professor
 Quantitative Medical Image Analysis For Ct and Mri,
 Perfusion and Dfusion Imaging, Neuro-Rehabilitation,
 Mobile Healthcare.

Sneh Anand, Ph.D. (IIT Delhi)
Emeritus Professor
 Biomedical Instrumentation, Rehabilitation
 Engineering, Biomedical Transducers and Sensors,
 Biomechanics Technology in Reproduction
 Research. Controlled Drug Delivery System.



● 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. program and will be initiating M. Tech. in Biomedical Engineering from July 2017. Various courses relevant to Biomedical Engineering, which are open to undergraduate and graduate students at IIT Delhi are offered by the Center.

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: Orthopaedics, 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.

Recently major facilities such as Confocal laser scanning microscope, Raman Spectroscopy with imaging and Flow cytometer has been installed. New labs based on drug delivery, laser micromachining, Lab-on-a-chip and image processing have been initiated.

Technology developed by the centre include:

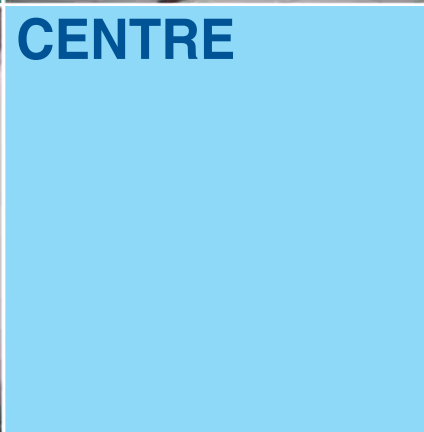
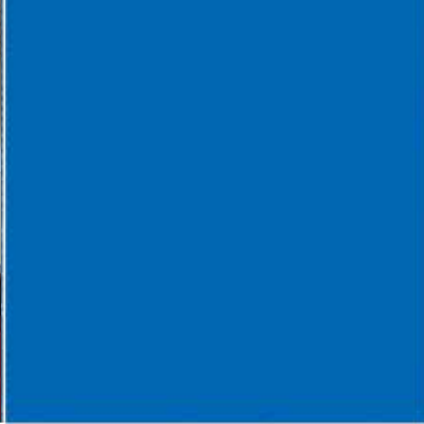
Novel kit for assay of iron in biological fluids; Modulated DC Iontophoretic Device; Electroculogram based Multimode Controller; Device for External Counter Pulsation Therapy ; Zig-G, A Wireless ECG system; A Pneumatic Damper Controlled AK Prosthesis; Development of a Biomedical Engineering Application 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- aminopenicillanic acid from penicillin; 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. (Univ. of California, Berkeley)
Professor
High Speed Network, Graph Theory & Algorithms.

HEAD OF THE CENTRE



Manish Agarwal, Ph.D. (IIT Delhi)
Senior Programmer
HPC & Administration, Large Scale Molecular Simulations, Parallelization of analysis codes.

Ajay Guleria, Ph.D. (NIT Hamirpur)
Senior System Programmer (SG)
Network & System Administration.



P.K. Baboo, Ph.D. (Berhampur)
Senior System Programmer
Database Management Systems, System Analysis and Design, System Administration.

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



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

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



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

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



P.K. Gupta, M.Tech. (IETE)
Senior System Programmer (SG)
Database Management Systems, System Analysis and Design, System Administration.

Sunil Kak, M.Tech. (IETE)
Senior System Programmer
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.



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



Subodh Kumar, *Ph.D. (Univ. of North Carolina)*
Professor (Associate Head)
Computer Graphics, Visualization, Geometry, High
Performance Computation.

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



Gaurav Munjal, *B.Tech. (DCRUST)*
Senior Programmer
Application programming, System
Administration, DBMS, Web Development,
OSS/BSS Systems.



K. Narayanan, *M.Sc. (Delhi Univ.)*
Senior System Programmer (SG)
Database Management Systems, 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 about 10,000 users consisting of undergraduates, postgraduates, research scholars, faculty and staff of the Institute and provide advice on all the aspects of academic computing. The Centre also participates in the academic programmes of various departments and centers.

● 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: 1000 TB

In addition there are CUDA based GPU mini-cluster environment of 16 nodes, each with 2x8 core ES-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 Roundcube and Squirrelmail 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 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 etc. are available for use.
- The center has the following **third party software packages**: Matlab-16b, Mathematica, Abaqus, 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.
- **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.
- 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.
- 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 located 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.
- MRTG and RRD **Health Graphs** have been provided to see the Status Reports of the various System activities/ Services.
- Complaint Registration and Monitoring System (**SLA** ticketing system) has been provided for resolving user problems regarding Network connectivity and Software issues on their systems.

PC Services

There are five PC Labs in the CSC premises having about 220 Desktop computers under Windows and Linux environment. Besides this there are four Computing labs in the new Lecture Hall Complex (LHC) having 235 desktop computers running Ubuntu and Windows. 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. The PC Labs in the Center are open round-the-clock for authorized users.

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 PowerGrid and RailTel. This connectivity provides virtual routing service, Internet Connectivity, and connectivity with other Institutes connected on the NKN backbone.

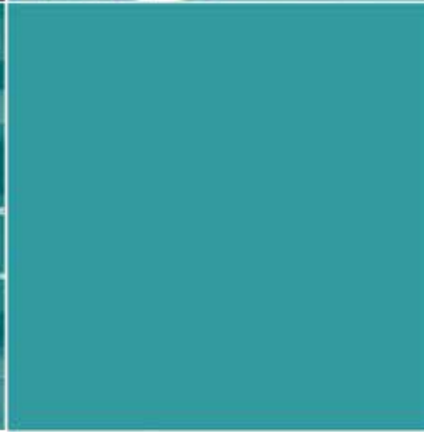
Internet and Intranet access is provided to faculty/officer homes via GPON over fiber (700+ houses) and ADSL connectivity over internal telephone lines.

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 500+ wireless access points. Many network services including mail, web, and domain name, anti-virus are being provided over this network.

IITD has upgraded the routers and switches for internet and the core and distribution network and has replaced the existing multimode fiber with single mode fiber. This has made the backbone 10 Gbps.



EDUCATIONAL TECHNOLOGY SERVICES



CENTRE





Shouribrata Chatterjee, Ph.D. (Columbia University)
Associate Professor
Department of Electrical Engineering.

HEAD OF THE CENTRE



Amit Gupta, Ph.D. (UCF)
Assistant Professor
Department of Mechanical Engineering.

Kolin Paul, Ph.D. (BESU)
Associate Professor
Department of Computer Science &
Engineering.



Ashok Gupta, Ph.D. (IIT Delhi)
Professor
Department of Civil Engineering.

Sanjeev Sanghi, Ph.D. (City University)
Professor
Department of Applied Mechanics.



Shalini Gupta, Ph.D. (North Carolina State
University, USA)
Assistant Professor
Department of Chemical Engineering.

Kushal Sen, Ph.D. (IIT Delhi)
Professor
Department of Textile Technology.



Prem K. Kalra, Ph.D. (EPFL, Switzerland)
Professor
Department of Computer Science &
Engineering.

Balaji Srinivasan, Ph.D. (Stanford)
Associate Professor
Department of Applied Mechanics.



● 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.

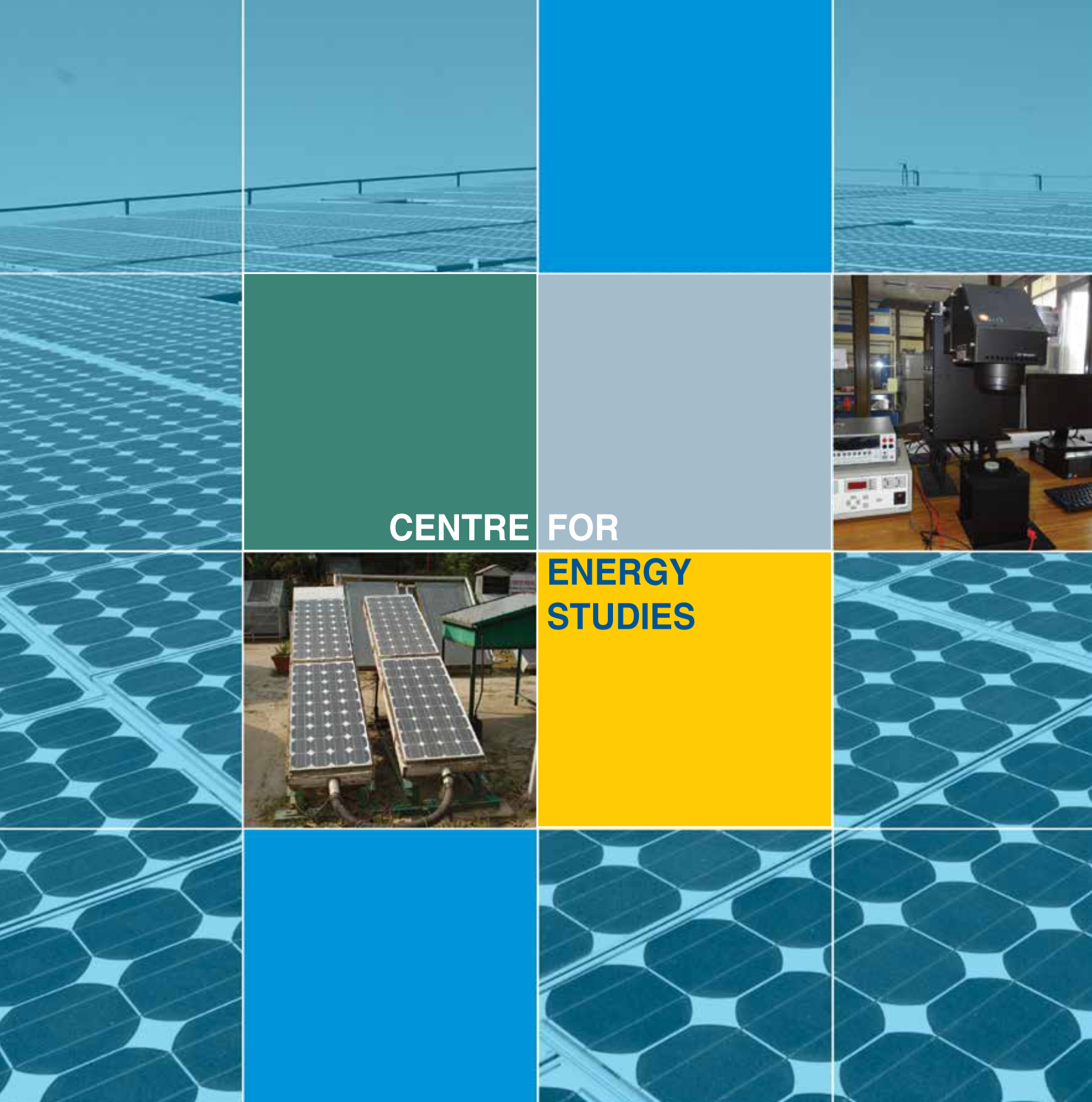
The Centre conducts short courses and modular programmes on different aspects of educational technology for teachers and staff from the Institute and from other educational institutions and industry institutions. These courses are designed to sensitize and guide the faculty to optimize their effort and time for classroom and laboratory instruction as well as professional development. The Centre offers its services to departments, individual faculty or groups of faculty members in revising, redesigning and innovating curricula.

The Centre has the expertise and experience of undertaking national and international level consultancy and sponsored research projects. It has worked with agencies such as the World Bank, AT&T, AICTE, UNESCO, UNDP Commonwealth of Learning. The British Council and Addis Ababa University, Ethiopia. The NPTEL project funded by MDRD has been successfully completed. Under this programme, all the seven IITs and Indian Institute of Science have worked together to develop web and video based education material for undergraduates courses initially in five disciplines, viz., Civil Engineering, Computer Science and Engineering, Electrical Engineering, Electronics and

Communication Engineering and Mechanical Engineering. The web courses so developed are available through the various servers authorized by NPTEL Phase II of NPTEL Project is nearing completion where its scope has been further expanded to include more disciplines and advanced/post graduate courses. ETSC has procured and installed Sony ANYCAST system in the Video Studio and in two lecture theatres for non linear editing and recording. Video Conferencing facilities have been installed in the two lecture theatres for non linear editing and recording. Video Conferencing facilities have been installed in the two lecture theatres and in the Conference Room of ETSC. The facility is being used for faculty interviews, meetings and distance education. For connectivity both ISDN and IP based network connection are used. For classes to Adis Ababa University, two lecture delivery rooms have been equipped with remote teaching facility. A dedicated two-way video link is also provided for live delivery. Two new lecture rooms have also been equipped with audio/video, projection, distance education and recording facilities. In addition, three Virtual Classrooms are also being equipped under National Knowledge Network (NKN).

The new Lecture Hall Complex (LHC) has become functional with state of the art audio visual facilities. 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, of lectures, tablets PCs for projection of the written lectures on the screens, document visualizers and microphone and speakers in the class rooms.





**CENTRE FOR
ENERGY
STUDIES**



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

HEAD OF THE CENTRE



T.S. Bhatti, Ph.D. (IIT Delhi)
Professor
 Electrical Energy Systems, Reactive Power Compensation, Power System Control and Optimization, Wind & Hydro Power Generation.

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



Tara C. Kandpal, Ph.D. (IIT Delhi)
Professor
 Solar Energy Utilization, Energy Economics and Planning.

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



K. Ravi Kumar, Ph.D. (IIT Madras)
Assistant Professor
 Concentrated Solar Thermal Power Systems, Solar Thermal Power Generation, Solar Heat for Process Heating Applications.

Dibakar Rakshit, Ph.D. (The Univ. of Western Australia)
Assistant Professor
 Waste Heat Recovery, Green Buildings, Solar Turbine Fluid, Central Solar Receiver Technology, Thermal Storage, Hydrodynamics and Thermodynamics of LNG Sloshing, Power plant technology, Electronic Chip Cooling, Emission Control System Design Analysis, Energy Audit, Multiphase Mass Transfer, Thermal Science and Engineering Applications.



Satyananda Kar, Ph.D. (IPR)
Assistant Professor
 Experimental Plasma.

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



Supravat Karak, Ph.D. (IIT Kharagpur)
Assistant Professor
 Organic Photovoltaics, Sensors, Persovkite Solar Cell, Organic Electronics.

R. Uma, Ph.D. (IIT Delhi)
Associate Professor
 Plasma Physics and Fusion.





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



S.K. Tyagi, Ph.D. (CSS, Meerut)
Associate Professor
 Heat Transfer and Thermodynamic Studies in Solar and Thermal Energy Conversion Systems, Energy and Exergy Analysis, Design and Evaluation of Biomass Cookstove, Energy Conservation, Thermofluids.



Sandeep Pathak, Ph.D. (University of Cambridge, U.K.)
Assistant Professor
 Hybrid Photovoltaic Devices.



Ashu Verma, Ph.D. (IIT Delhi)
Assistant Professor
 Power System, Renewable Energy Systems, Micro Grids.



L.M. Das, Ph.D. (IIT Delhi)
Emeritus Professor
 Alternate Fuels, Hydrogen Energy, I.C. Engines.

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

Solid Fuel (Coal/Biomass) Conversion Processes (Pyrolysis, Gasification, Liquefaction), Coal Bio Desulfurization, Industrial Waste and Effluent Treatment.



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

Thermal Science and Engineering, Solar Energy Utilization, Energy Efficiency Conservation and Management, Solar Refrigeration, Air conditioning and Power Generation, Solar Architecture, and Thermal Energy Storage, Plasmas and Fusion Energy.



A. Ganguli, Ph.D. (IISc, Bangalore)
Emeritus Professor

Plasma Physics, Plasma Sources.



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

Environmental Pollution, Fuel Technology, Biotechnology, Carbon-Materials, Polymers, Chemical Technology, Process Development.



● 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.

● RESEARCH

The focused topics of research at the centre are :

- Renewable Energy Sources
- Energy Efficiency
- Internal Combustion Engines
- Electrical Energy Systems
- Energy Efficiency in Buildings
- Energy Conservation and Management
- Fuel Technology
- Plasma Science and Technology
- Solar Cells

Doctoral Research is being carried out in:

Energy Efficiency, Fuel Technology, IC engines, Electrical Energy Systems, Heat & Mass Transfer, Renewable Energy Systems, Nanostructured Materials, Thin Films Science and Technology, Organic and Plasmonic Solar Cells, Solar

Thermal Systems, Environmental Pollution and Energy Planning, Plasma Physics and Plasma Sources, Industrial Application of Plasma, Energy Conservation in Building & HVAC Systems.

● LABORATORY FACILITIES

Excellent facilities are available in the centre for different uses of the industry and for educational and training programmes

Renewable Energy

Thin Film Deposition Facility, temperature Dependant I-V Characterization of Solar Cells using Flash Solar Simulator, Spectral Response Measurement using Filter Wheel, Lock-in based C-V-W Measurement System, Excitonic Solar Cell Fabrication Facility, Carrier Mobility Measurement Set-up, Time Resolved Photoluminescence Set-up, 25 KWp Roof Top Photovoltaic Generator, Thermal Conductivity Analyser, U Value Measurements, Alphanometer and Emissometer, Solar Transmittance Measurements, Fuel Technology, Gas Chromatograph : Gas Analyser, Proximate Analysis of Fuels, Coke Reactivity Index, Ion Meter for Fluoride Measurement, Viscometer, UV-Visible Spectrophotometer, BOD Incubator with Rotary Shaker, Extractor, Bomb Calorimeter, Pyrolyser, Microbial activities related to coal, biomass and industrial effluents (Laminar Flow, Orbital Shaker), Fractionation of liquid Mixtures, Carbon Nitrogen Hydrogen Sulphur Analyser.

Environment Pollution

Indoor Comfort Meter, Low Pressure Biogas Burner Testing Facility, Rodex Potentiometer, High Rate (upto 500 kW) Oil Burner, Combustion Chamber, Channel and Exhaust System, Evaluation of Biomass Fuel Stores for Thermal Efficiency and Air Pollution Emissions, Ash Resistivity Measurements Facility to Support ESP Programme in India, Atomic Absorption Spectro Photometer.

Electrical Energy Systems

HVDC & AC transmission system, Real Time Monitoring of Micro Alternators, Vertical Axis Wind Turbine Power Generation, Micro-Hydro Power Generation, Long Transmission Line Models, Wind/Solar emulator, Lab view based real time monitoring system.

I.C. Engines

Analysis of Engine process using Computational Fluid Dynamic, Facility for Basic Engine Testing of Performance and Emission Characteristics, Dynamometer for Evaluating Engine Performance, Gas Analyser for Measuring CO, HC and NO_x Emissions. Cylinder Gas Pressure Measuring and Processing, Measurement of Injection and Combustion Characteristics of IC Engine, Unit. AVL Research Engine to vary all Engine Parameters, Measurement of Flame Characteristics using AVL VISEOFEM for use of alternative Fuels, Passenger Car Engine Test Bed, Fuel Engine Development for use of alternative Fuels, Characterization of Fuel Quality for alternative Fuels.

Plasma Laboratory

Plasma Simulation Facility, Plasma Deposition of Thin Films, Dielectric Barrier Discharge for Fuel Gas Cleaning, Negative Ion Generating System, High Speed Coating and Surface Treatment using Thermal Plasma, Broadband Power Amplifiers in RF & LF Ranges upto to a few Hundred Watts, Spectroscopic System for (a) Measuring Flame Temperature up to 3000 K (b) Spectrum Analysis of Light, Sources in Visible Range, Plasma Kits for Air / Water Pollution Control, Plasma Simulation Facilities.

Energy Audit & Conservation

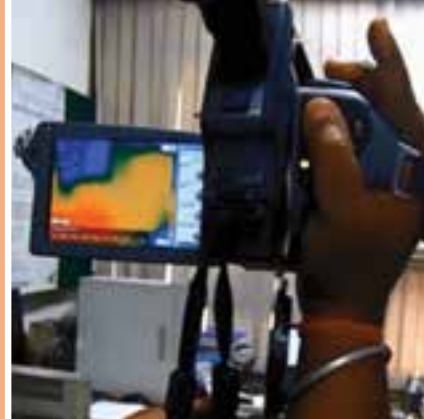
Portable energy audit instruments like temperature, humidity, velocity meters, surface temperature reading instruments, clamp type voltmeter, ammeter and powerfactor meter.

Energy Simulation Laboratory

A collection of excellent software backed by a comprehensive data base. The software packages can be used for Energy Efficient Building Design, Solar Photovoltaic and Solar Thermal System Design, Hybrid System Design and Calculation of AC loads. Optimal Power System Expansion Model including the Environmental Impacts and Design and Analysis of Electrostatic Monitoring Precipitator.

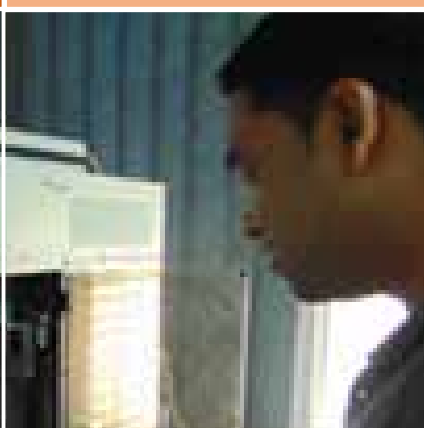
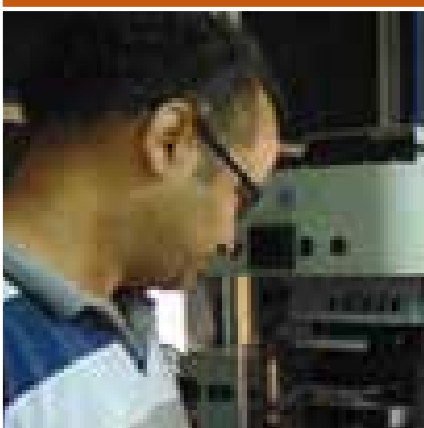


LVPS two planes Zoomed

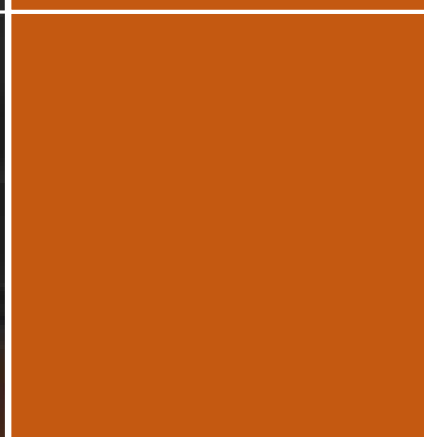
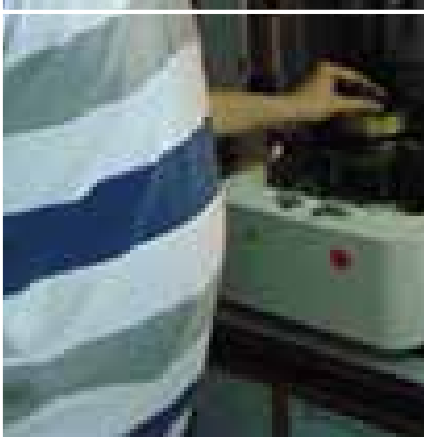


INDUSTRIAL
TRIBOLOGY
MACHINE
DYNAMICS

AND



MAINTENANCE
ENGINEERING
CENTRE





J. Bijwe, Ph.D. (IIT Delhi)

Professor

Tribology of Polymers / Composites,
Nano-Composites and Oil Analysis for
Condition Monitoring.

HEAD OF THE CENTRE



V.K. Agarwal, Ph.D. (IIT Delhi)

Professor

Dilute and Dense Phase, Pneumatic Handling
of Bulk Solids and Erosive Wear.

R.K. Rai, M.Tech. (IIT Delhi)

Design Engineer

Instrumentation and
Non-destructive Testing.



Deepak Kumar, Ph.D. (IISc., Bangalore)

Assistant Professor

Metalworking Fluids, Nanotribology,
Contact Mechanics, Atomic Force
Microscopy, Surface / interface Analysis.

O.P. Gandhi, Ph.D. (IIT Delhi)

Emeritus Professor

Maintenance, Reliability,
Risk Analysis and Safety.



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

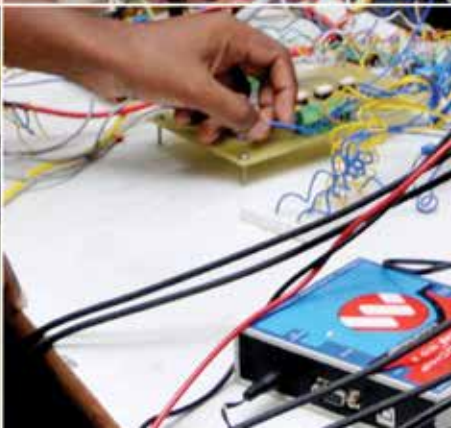
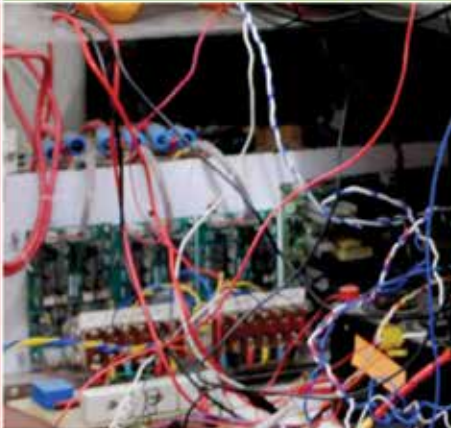
The Centre has excellent facility for experimental, analytical and development research activities. With its highly specialized manpower, the Centre interacts with industries through consultancy, field service and also joint sponsored research programmes. The Centre has well-equipped laboratories, which 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.

HEAD OF THE CENTRE



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

Assistant Professor

Digital Holography, Laser based Instrumentation for Measurement and Monitoring Systems, Design and Development of Opto-electronic Sensors.

A.L. Vyas, Ph.D. (IIT Delhi)

Emeritus Professor

Electronic Instrumentation, Smart Sensors, Sensor Networking, Body Area Sensor Networks and Signal Processing.



Gufran Sayeed Khan, Ph.D. (Friedrich-Alexander-University)

Associate Professor

Optical Instrumentation, Applied Optics, Interferometry, X-Ray Optics, Diffractive Optical Elements, Computer Generated Holography, Computer Controlled Polishing, Diamond Turning.

D.T. Shahani, Ph.D. (IIT Delhi)

Emeritus Professor

Electronic Instrumentation, Electro-magnetics, Antennas.



Jyoti Kumar, Ph.D. (IIT Guwahati)

Assistant Professor

Human Computer Interaction, Consumer Decision Making Process, Design Research Methodology, Design for Emotion and Persuasion, Design for Usability, User Experience Design.

Chandra Shakher, Ph.D. (IIT Madras)

Emeritus Professor

Interferometry, Holographic Optical Elements, Fibre-optic Sensors for Power Generating Industry, Flame Tomography and Optical Instrumentation.



Sumer Singh, M.Des. (IIT Delhi)

Assistant Professor

Product Design, Transportation Design, Design for Sustainability, Design Sketching. Computer Aided Surfacing, Design Innovation.

S.K. Atreya, D.I.I.T. (IIT Bombay)

Chief Design Engineers (S.G.)

Industrial Design, Graphic Design Computer Aided Design, Ergonomics Interior Design, Architecture, Instrument Enclosures, Education Technology, Software Development, HC Interaction Design.



● INTRODUCTION

The Centre is interdisciplinary in nature and is engaged in design and development of instruments and other industrial and consumer products. The primary goals of Instrument Design Development Centre are to undertake research, development and training in the area of Instrument Technology.

● ACADEMIC PROGRAMMES

The Centre coordinates the following POSTGRADUATE programmes

Interdisciplinary M.Tech. in Instrument Technology

This is an interdisciplinary M.Tech. programme. The teaching faculty is drawn from Instrument Design Development Centre, Departments of Electrical Engineering, Mechanical Engineering and Physics.

Interdisciplinary M.Des. in Industrial Design

This is an interdisciplinary M.Des. programme to candidates with bachelors in engineering or architecture. The programme is also open to candidates sponsored by Government Organizations and Public Sector companies on full time basis. The teaching faculty is drawn from Instrument Design Development Centre, and various other departments. The programme brings together the skills of understanding user needs, deciphering market needs and mapping the problems identified to creative solutions while keeping an eye on the existing and evolving technologies.



● RESEARCH AREAS

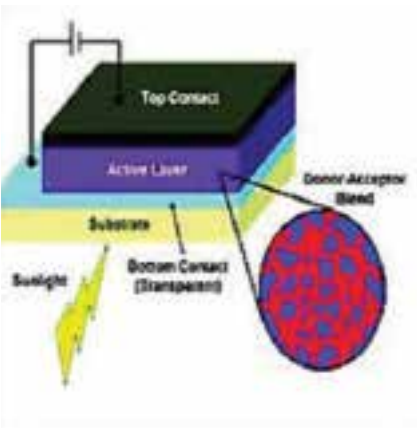
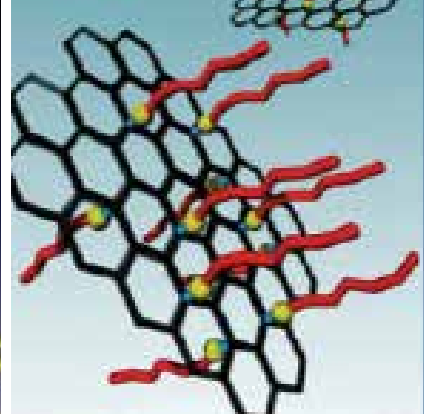
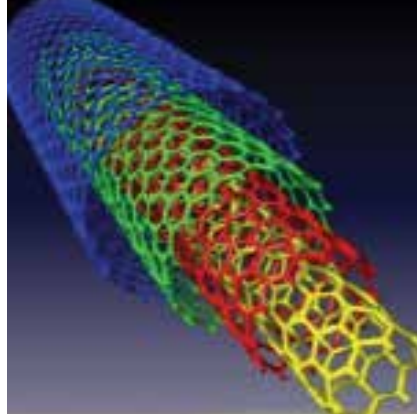
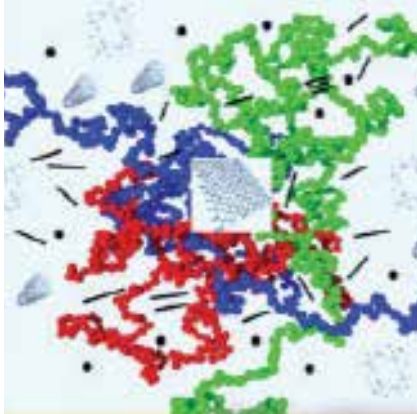
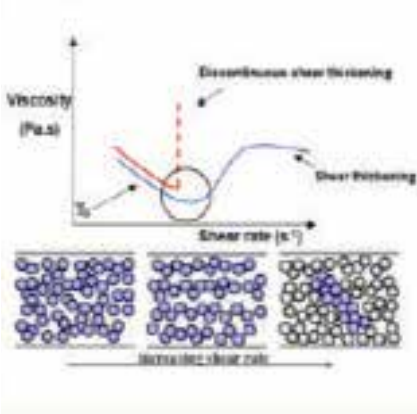
Doctoral research is being carried out in the following area:

The areas of CAD and Simulation of Electronic Systems, Microprocessor Applications, Power Electronics and Control, Electric Drives, Electromagnetic Sensors and Instrumentation, Smart Sensors and Sensors Networks, Digital System Design and DSP Applications, Digital Holography, Digital Speckle Pattern Interferometry, Flame Tomography, Fiber-Optic Sensors, Optical Coherence Tomography and 3D-surface Profilometry, Optical Tweezers and Their Applications, Optics of LEDs and OLEDs, Optical Metrology, Diffractive Optics, Aspheric and Free Form Optics and their Applications, Solid Mechanics, Stress-Strain Analysis, Mechanical Properties of polymers, Nano-Composite, Fiber re-inforced plastic composites, Computer Aided Product Design, Ergonomics, Graphic Design, Passive Solar Architecture, Environment Design, Human Computer Interface, Disaster Management, Design and Culture, Design for user Experience, Soft computing applications in product design, Sustainable product design, transportation Design, Design for sustainability, Design Innovation.

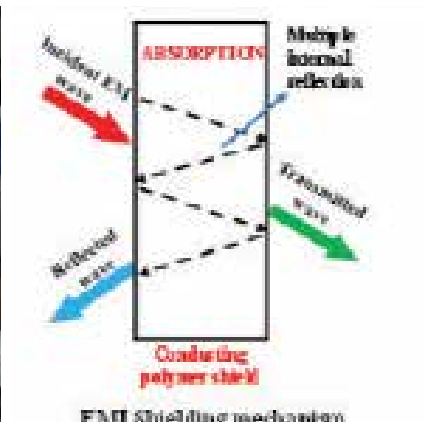
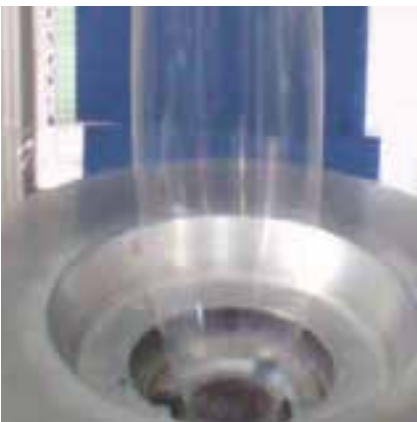
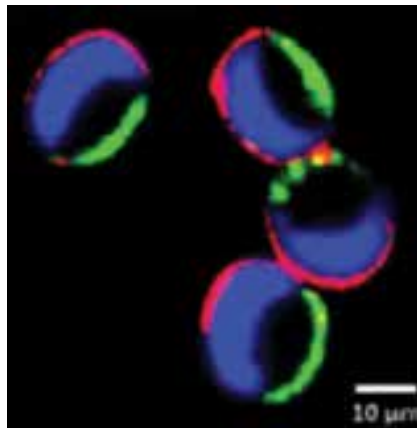
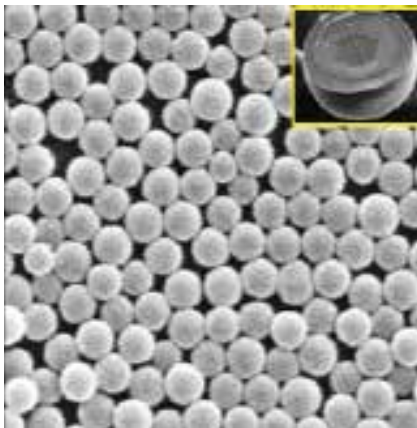
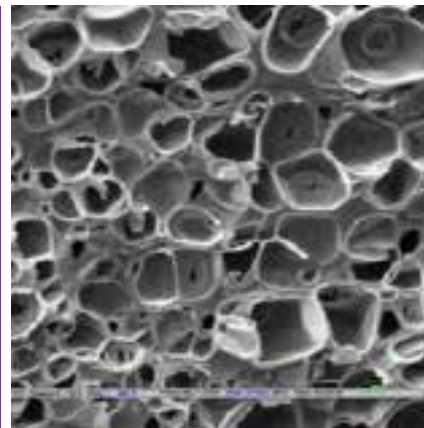


● LABORATORY FACILITIES

The Centre is equipped with (a) laboratories having facilities for Analog and Digital Electronic Design, Microprocessor Systems Development, Virtual Instrumentation, Mechatronics, Electromagnetic and ultrasonic instrumentation, (b) Manpower Development in Instrument Technology Laboratory, (c) Laser Applications and Holographic Laboratory; (d) Optical Workshop, (e) Industrial Design Laboratory and Model-making Workshop, (f) Industrial Design Clinic for Product Development with Ergonomics and Computer Aided Simulation Facilities. (g) User Experience Design Laboratory. (h) It also has MAC laboratory for CAD and Multimedia.



CENTRE FOR POLYMER SCIENCE AND ENGINEERING





Josemon Jacob, Ph.D. (Iowa State Univ.)
Professor

Polymer Synthesis, Semiconducting Polymers, Polymer based LEDs and Photovoltaics, Block Copolymers Biodegradable Polymers, Polymerization Catalysis.

HEAD OF THE CENTRE



A.K. Ghosh, Ph.D. (SUNY/Buffalo)
Professor

Rheology and Processing, Polymer Reaction Engineering, Polymer Blends and Alloys, Mixing and Compounding, Computer Aided Modelling, Polymeric Nano-Composites, Polymer Film Processing, Cellular and Biopolymers.



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.



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

Biodegradable Polymeric Materials, Polymer Brushes, Electrohydrodynamicco-jetting, Micro and Nano structured Materials, Multi-layered and Multi-compartmental Polymeric Particles.



Bhabani Satapathy, Ph.D. (IIT Delhi)
Associate Professor

Morphology and Phase Behaviour of Block Copolymers, Polymer Blends and Composites, Micromechanics, Fracture and Fatigue of Polymer Nano-composites, Tribology of Polymer Based Materials, Biotribology, Thermo-mechanical Behaviour of Biomaterials.

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

Functional Materials and Membranes with Tailored Properties, Next Generation Membranes for Water, Energy, and Separation, Clean Water Generation (Micro, Ultra, and Nanofiltration), Antifouling and Antibacterial Surfaces and Membranes, Nanostructured Membranes for Molecular Separation, Membranes, Separators, and Electrodes for Energy Generation and Storage, Flow Catalysis for Synthesis and Environmental Remediation, Platform for Enzyme Immobilization and Biocatalysis.



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

Synthesis and Characterization of High Temperature Polymer, Degradation and Stabilization of Polymers, Flammability of Plastic Materials, Smart Micro/Nano-Hydrogels for Biomedical Application, Functional Polymers for Fuel Cell Application, Polymer Blends and Nano-Composites for EMI Shielding, Biodegradeable Polymer.



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

Polymer and Rubber Technology, Compounding, Particulate Filled Composites, Thermal, Crystallization, Rheological, Morphological and Mechanical Properties, Polymer Blends, Micro and Nano-Composites, Structure-Properties, Relations in Polymer Systems.



● INTRODUCTION

The Centre for Polymer Science and Engineering (CPSE) is a leading Centre in the country for teaching and research in the emerging area of polymers. The principal thrust of the Centre is manpower development and research for enhancing the fundamental knowledge as well as developing new polymeric materials. The Centre emphasizes interaction with the related industry. The changing needs of the industry are kept in view while designing and upgrading teaching and research programs.

● ACADEMIC PROGRAMMES

The faculty of the Centre has the major role in teaching of interdisciplinary M.Tech. Programme in Polymer Science and Technology. The primary purpose of this programme is to train scientists and engineers to fulfill the constantly growing requirements of the polymer based industry in the country.

● RESEARCH AREAS

The broad area of research of the centre are: Polymer synthesis, modification of polymers, biodegradable/photodegradable polymers, nano-Composites, flame resistant polymeric materials, high energy polymeric binders, reinforcement of polymers, testing and characterization of polymers, polymer blends and alloys, polymer compounding, rheology and polymer processing, nano-Hybrid polymer particles as drug carries, microcellular polymers, smart hydrogels, biopolymers, polymer composites, surface modification, anti-fouling and biocompatible surfaces, multi-compartmental polymeric materials, polymer product design and modelling and simulation in processing. Sponsored research and consultancy are other major activities of the CPSE. Very large number of research projects sponsored by government organization, International Agencies and Industries have been undertaken over three decades. Functional Materials and Membranes with Tailored Properties, Next Generation Membranes for Water, Energy, and Separation, Clean Water Generation (Micro, Ultra, and Nanofiltration), Antifouling and Antibacterial Surfaces and Membranes, Nanostructured Membranes for Molecular Separation, Membranes, Separators, and Electrodes for Energy Generation and Storage, Flow Catalysis for Synthesis and Environmental Remediation, Platform for Enzyme Immobilization and Biocatalysis.

Doctoral research is being carried out in the following area:

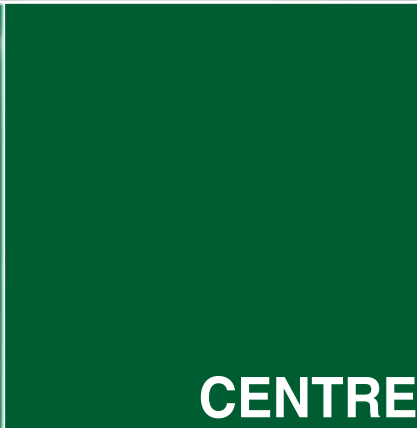
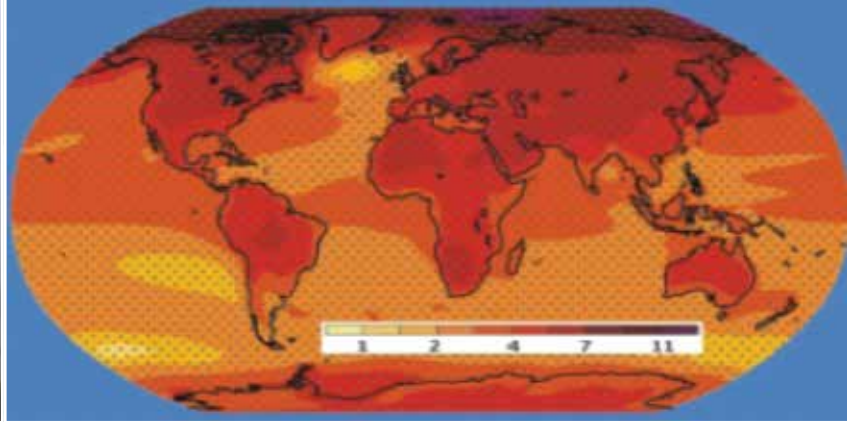
Synthesis of Speciality Polymers; Structure-Property Correlation in Polymeric Materials; Rheology and Processing of Polymers; Polymer Blends and Alloys; Fibre / Particulate Filled Thermoplastic / Thermoset Composites, Degradation and Stabilization of Polymer; Mechanical and Thermal Properties of Polymeric Systems, Reactive Polymer Processing; Modification of Polymers; Morphological Studies of Polymers; Modelling and Simulation in Processing; Design and Stress Analysis of Engineering Component from Polymeric Materials, Biodegradable

Polymers, Hydrogels, Smart Micro / Nano-Hydrogels for Biomedical Application, Nano-Composites, Conjugated Materials for Electronic Applications, Polymerisation Catalysts, Fracture and Fatigue of Nano-Structured Polymeric Materials, Biopolymers.

LABORATORY FACILITIES

Laboratories of CPSE are well equipped with various sophisticated instruments in the area of Polymer Synthesis, Characterization, Testing, and Processing. The facilities include TEM, VNA Optical Microscopes, FTIR Spectrophotometer, Zwick MTS, Differential Scanning Calorimeter, Thermogravimetric Analyzer, Capillary Rheometer, Rotational Rheometer, Twin screw Extruders, Compression Moulding Machine, Injection Moulding Machine, Micro Computing, Micro Injection Moulding, Polarising Microscope, Two Roll Mill, Tool Grinding Machine, Mettler Hot Stage, Brookfield Viscometer, Small Angle Light Scattering Set up with Laser Source, Impedance Analyser, Lab Scale Film Blowing Unit, Haake Rheocord, Charpy and Izod Impact Tester, Melt Flow Indexer, Gel Permeation Chromatograph, Dynamic Mechanical Analyser, Mold Flow 3D Analysis, Glovebox, Nano-particle Size Analyzer, Spectrophotometer, Friction Tester, Electrosopining.

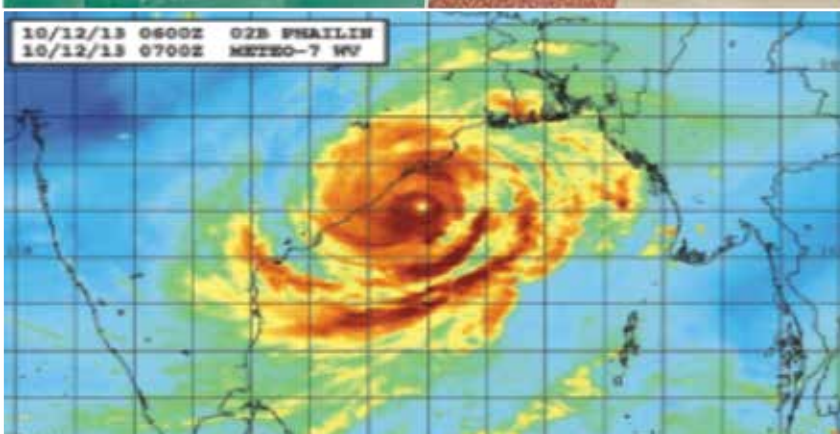




CENTRE FOR



**RURAL
DEVELOPMENT
AND
TECHNOLOGY**





Vijay V.K., Ph.D. (IIT Delhi)

Professor

Renewable Energy, Biogas Enrichment and Bottling, Animal Power, Rural Industrialization, Waste Management Systems, Cow Products (Panchgavya).

HEAD OF THE CENTRE



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

Water and Wastewater Treatment, Clean Technologies, Solid Waste Management, Waste to Energy, Rural Resource Planning, Independent Measurement and Evaluation, Village.



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

Oils, Fats and Waxes Technologies, Super Critical Fluid Extraction of Natural Products, Bio fuels, Minor Forest product.



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.



Santosh Satya, Ph.D. (IIT Delhi)

Professor

Food Quality and Safety, Bamboo Technology, Botanical Pesticides, Rural Energy-Environment Systems, Solid Waste Recycling, Sustainable Agricultural System.



Sharma Satyawati, Ph.D. (IIT Delhi)

Professor

Biofertilizers, Biopesticides, Tissue Culture, Rapid Composting and Waste Management, Phytoremediation Nutraceutical Mushrooms, Bioethanol.



Rajendra Prasad, Ph.D. (IIT Delhi)

Emeritus Professor

Rural Energy Systems, Improved Cookstoves, Rural Industrialization, Leather, Pottery, Carpet Making, Food Processing, Milk Processing.



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 as well as undergraduate students as electives.

● RESEARCH AREAS

The main research areas of the centre are:

Biomass and Environment: Biomass Production, Conversion and Utilization, Biomanures and Bio-pesticides, Bioremediation & Effluent Treatment, Solid Waste Management, Wasteland Reclamation, Ecological Sanitation, Nitrate and Phosphate Recovery, Panchagavya in Agriculture, Waste Management and Medicine.

Rural Energy: Biogas Production, Enrichment and Bottling, Algal biofuels, Biodiesel, Draught Animal Power, Biomass Gasifiers, Biomass Cookstoves, Engine Conversion Kits, Pico-hydel Systems, Rural Energy Systems.

Food and Natural Products: Sustainable food production system, Pesticide residues, Food quality and Safety, Botanicals for Grain Storage, Forest Products, Medicinal and Aromatic Plants & Nutraceuticals, Ethno-veterinary Medicine, Post-harvest Technology and Food Processing, Agro-waste Management and Value Addition, Panchagavya in Food and Nutrition.

Rural Engineering and Sustainable Habitat: Bamboo Bow Beams, Columns & other Housing Elements, Engineered Bamboo Structural Elements, Bamboo Composites, Bamboo Boards and Laminates, Improved Artisanal Tools, Value-added Craft Products.

● NATIONAL COORDINATION

In view of the initiatives of Govt. of India to encourage technological innovativeness for sustainable development of rural India, the Centre for Rural Development and Technology at IIT Delhi is emerging out as a forerunner for academic, research and outreach activities in the field of rural development in the country. 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 Validation and Research on Pachagavya: Scientific Validation and Research on Pachagavya (SVAROP) is scientific programme being coordinated by the Centre for Rural Development and Technology. SVAROP is a flagship programme of the Ministry of Science and Technology, Govt. of India and aims to strengthen research in Panchgavya and its various applications in agriculture, food, medicine and utilities. Vision of the programme to develop sustainable bio-based economy in the rural India. Attempts are being made to formulate scientific protocols for production and usage of panchgavya based products.

● LABORATORY FACILITIES

The major research laboratories are:

Food and Bioprocess Engineering Lab; Applied Microbiology Lab; Biomass Lab; Biogas Research Lab & Test Centre; Food Quality and Safety Lab; BioChem Lab; Agro-Forest Products Processing Lab; Agro Ecology Lab; Cook-stove Lab; Supercritical Fluid Extraction Lab; Applied Biomass Lab; Environmental Biotechnology Lab; Biogas Enrichment and Bottling Lab; Regional Testing and Knowledge Centre for Clean Cook-stoves.

Doctoral research is being carried out in the following area:

Biogas for vehicular application, Valorisation of food waste to biogas (VALORGAS), Optimization of biomethanation process for mixed feed digestion in various biogas reactors, Biogas enrichment and bottling, Development of low cost Biogas upgradation and bottling, Biogas slurry management, Phycoremediation and Algal biofuels, Fungal formulation for metal/dye removal from effluents, House-ry Control, Antimicrobial Agents, Biopesticidal formulations for termites, nematodes, plant pathogens and stored grain pests, Rapid composting through native earthworms & bioinoculants, Silvipastoral systems, Waste land development and value added products for housing, food, fodder & biofuel, Production of Biodiesel and Biolubricants from non-edible oil seeds, Extraction of Value added Chemicals by using Supercritical Fluid Processing Technology, Improved cook stove design and testing, Ecological sanitation: Nutrient recovery and recycling, Waterless urinals, Bamboo as a Green Engineering Material, Panchagavya and its products.



**NATIONAL
RESOURCE
CENTRE FOR
VALUE
EDUCATION IN
ENGINEERING**



Rahul Garg, Ph.D. (IIT Delhi)

Professor

Machine Learning, Big Data Analytics,
Neuroimaging, High Performance Computing.

HEAD OF THE CENTRE

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 Incultation, 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.



VSC-NRCVEE and AINA
IIT Delhi

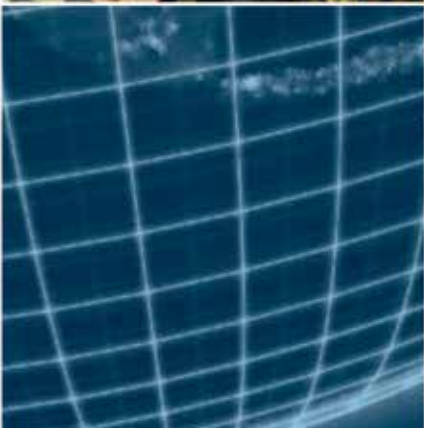
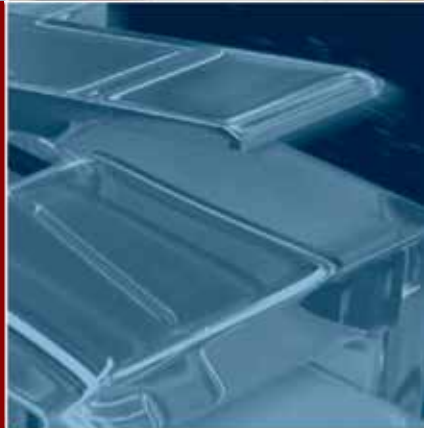
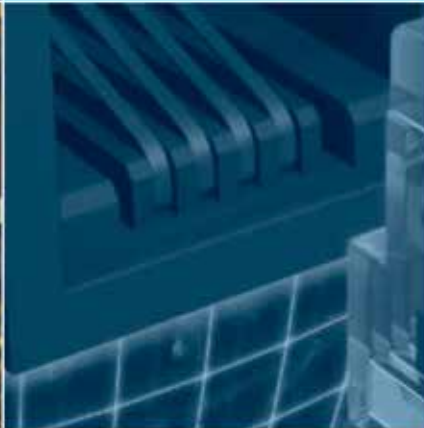
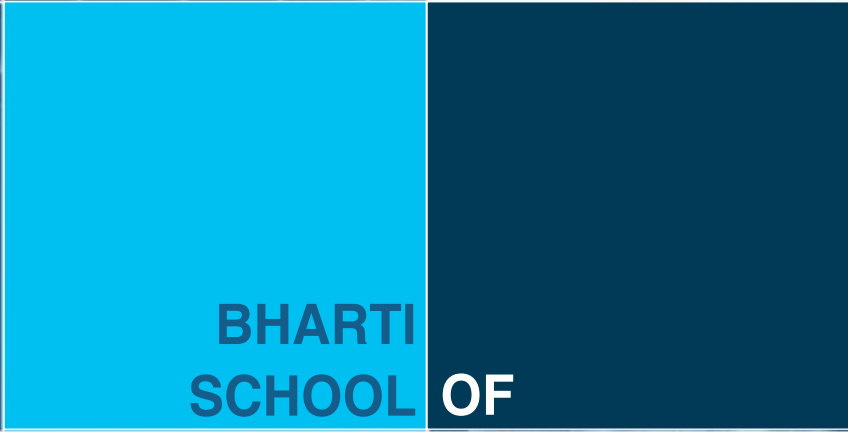
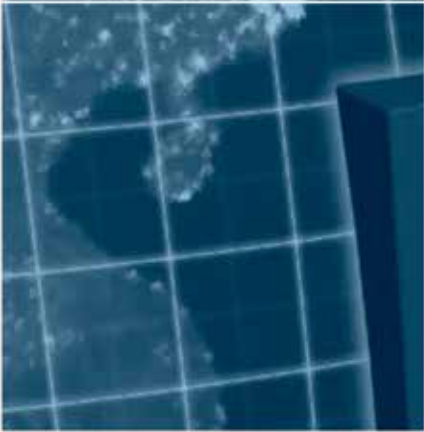
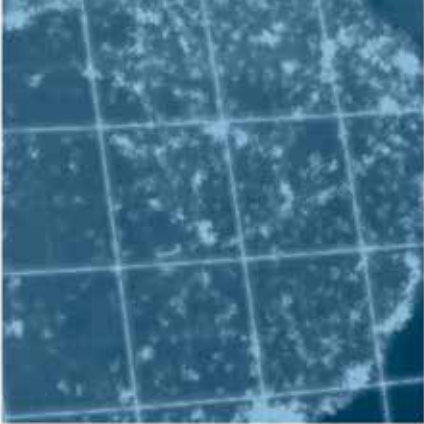
isha

Youth and Truth

Students
in Conversation
with Sadhguru

March 7, 2017
5pm-7pm, Dogra Hall







Brejesh Lall, Ph.D. (IIT Delhi)

Associate Professor

Multiscale Modeling of Stochastic Processing,
Cognitive Radio, Signal Processing for
Communications.

HEAD OF THE SCHOOL

Associated from Electrical Engineering Department

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)

V.K. Jain, Ph.D. (IIT Delhi)

S.D. Joshi, Ph.D. (IIT Delhi)

Shankar Prakriya, Ph.D. (Univ. of Toronto)

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)

Kushal K. Shah, Ph.D. (IIT Madras)

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

Dr. Abhishek Dixit, Ph.D. (Ghent University, Belgium)

Dr. Lalan Kumar, Ph.D. (IIT, Kanpur)

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 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 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 to provide research environment that attracts the best faculty and students.
- To invite and encourage the best talent in telecommunications to be a part of the activities of the School.
- To run graduate academic programs (including M.S. (R), 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 2 x 30 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 Analyzers, Function Generators, Signal Generators, Network Analyzers, 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 there from requires innovations in protocol stacks, hardware at layers 1,2 and 3, in large distributed back-end repositories and in inference engines for the analytics. We have provisioned cloud repositories and have web-enabled several application domains such as healthcare, agriculture and animal management.

Internet of Things (IoT) Lab:

With increase in machine to machine communication, IoT along with virtualization technology, aims to establish

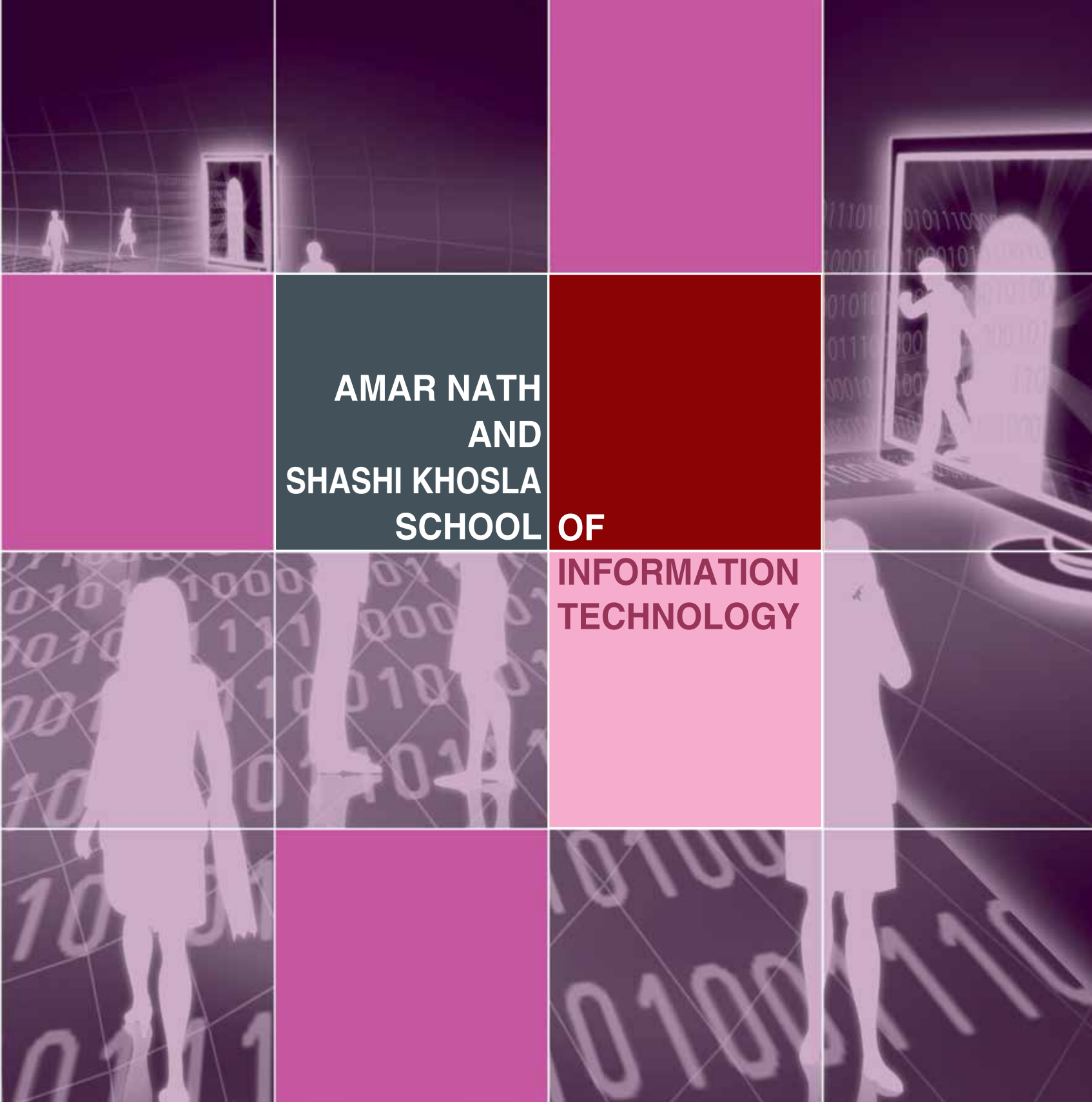
- A heterogeneous network where any device can plug in and starts using the services hosted by cloud service provider.
- Main research area is implementing a generic protocol where any remote device like smart car, smart phone, industrial instruments like sensors, etc. can connect to cloud server and 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,





**AMAR NATH
AND
SHASHI KHOSLA
SCHOOL OF
INFORMATION
TECHNOLOGY**



Prem Kumar Kalra, Ph.D. (EPFL, Switzerland)
Professor
 Computer Graphics, 3D Animation.
 Department of Computer Science & Engineering

HEAD OF THE SCHOOL

SCHOOL FACULTY



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



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



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



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

ASSOCIATED FACULTY

A.K. Gosain, Ph.D. (IIT Delhi)
 Integrated Watershed Modelling,
 GIS Hydrological Modelling,
 Irrigation Management, Environmental Impact.
 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

Deepti Gupta, Ph.D. (IIT Delhi)
 Functional Clothing, Product Design, Functional Finishes, Apparel Engg.
 Department of Textile Technology

Huzur Saran, Ph.D. (Univ. of California Berkeley)
 Wireless Networks, Network Performance Analysis, Algorithms.
 Department of Computer Science & Engineering

Jayaram B., Ph.D. (City University of New York)
 Theoretical Chemistry Biomolecular Modeling and Simulation,
 Physicochemical Model 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)
 Embedded Systems, Reconfigurable Computing.
 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 (on leave)

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:


Scalable & Dependable Computing, Information Security, Information Storage and Retrieval, High Speed Networks, Internet of Things, Multimedia Systems, Embedded Systems and Sensor Networks, HCI (Human Computer Interfaces), Image Processing, Biometrics, Computer Vision, Robotics and Intelligent Systems, Medical Applications of IT, Assistive Technologies, Computational and Systems Biology, Computational Neuroscience, ICTs for Development, Geographical Information Systems, Mobile and Web Based Computing.

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



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OF

**BIOLOGICAL
SCIENCES**



Tapan K. Chaudhuri, Ph.D. (Bose Institute)

Professor

Chaperone Assisted Protein Folding, Protein Engineering and Molecular Biophysics.

HEAD OF THE SCHOOL



Manidipa Banerjee, Ph.D. (UCSD)

Assistant Professor

Hepatitis A Virus Entry, Using Viruses as Nanoparticles for Drug Delivery.



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

Assistant Professor

Cell Penetrating Peptides, Marine Bioprospecting, Plant-based Therapeutics.



Chinmoy S. Dey, Ph.D. (Jadavpur Univ.)

Professor

Insulin Resistant (Type 2) Diabetes and Leishmaniasis, Signal Transduction.



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)

Assistant 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 Accelrys 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 focussing 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. Nomesha 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 programme introduces students from different backgrounds to various aspects of energy, sources, fuels, energy conversion and energy systems amongst others. Commercial and non-commercial energy sources are covered.

Industrial Tribology and Maintenance Engineering: Various basic and applied aspects of tribology, including wear and maintenance engineering are covered in this programme. Students are introduced to diagnostic maintenance, reliability, availability and maintainability engineering as well as failure analysis.

Instrument Technology: This programme includes students to various instruments, electronic techniques for signal conditioning and instrument design. The electives cover a wide range of topics in instrumentation, electrical engineering, mechanical engineering and physics.

Opto-Electronics and Optical Communication: This programme is jointly offered by physics and electrical engineering departments. The courses cover a wide variety of basic and applied courses in fibre optics, optical-electronics and digital communication.

Polymer Science and Technology: Faculty from centre for polymer science and technology, and textile, mechanical engineering and chemical engineering are participants in this programme. The focus is on polymer chemistry, physics, processing, and engineering applications.

VLSI Design Tools and Technology: This programme is taught by the faculty of computer science and engineering, electrical engineering departments and CARE. The coursework includes courses on MOS, VLSI and VLSI design and VLSI system. The students gain proficiency in the use of state-of-art tools in VLSI design. The programme is largely supported by industries engaged in VLSI design.

Telecommunication Technology for Management: A set of courses in digital communication and systems, wireless communication and telecommunication management form the core of this programme. Faculty of electrical engineering and management studies departments participate in the teaching of this programme.

● 7. MAJOR CENTRAL FACILITIES

The Institute has following central facilities for smooth functioning of Academics, Research and Outreach.

- Central Research Facilities
- Industrial Research and Development (unit)
- Central Workshop
- Training and Placement (unit)
- Institute Libraries

7.1 CENTRAL RESEARCH FACILITY (CRF)

Purpose and Aim of CRF

Central Research Facility (CRF) is a common instrument and fabrication facility of IIT Delhi created to primarily support the students in their research activities. CRF has state-of-the-art analytical instruments manned by qualified personnel to provide sample testing and analysis to UG, PG, Ph.D. students and other research staff. The facility is 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 properties of Biological and other Material Systems, down to nanoscale.
- To foster enthusiasm and collaboration in scientific research.
- To strengthen the research-relevant infrastructure of basic science and technology and built a facility that represents a key commitment for preserving and raising the efficiency of research to 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:

Sr. No.	Official	Status	Nominee of
1	Dy. Director (Strategy and Planning)	Chairman	Director
2	Dy. Director (Operations)	Member	Ex-officio
3	Dean (R&D)	Member	Ex-officio
4	Associate Dean Academics (PG Research)	Member	Ex-officio
5	Former-Head, CRF	Member	Ex-officio
6	Prof. A Ramanan (Chemistry Deptt.)	Member	Director
7	Prof. Tapan Chaudhuri (KSBS)	Member	Director
8	Prof. Ratnamala Chatterjee (Physics Deptt.)	Member	Director
9	Prof. Jayashree Bijwe (ITMMECH)	Member	Director
10	Prof. Ashwini K. Agrawal, Head, CRF	Member	Ex-officio
11	Prof. Sujeet Chaudhary, Assoc. Head, CRF	Convener	Ex-officio

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: 011-26591415 **E-mail:** ashwini@textile.iitd.ac.in

Associate Head

Prof. Sujeet Chaudhary

(Department of Physics)

Tel: 011-26591341 **E-mail:** sujeetc@physics.iitd.ac.in

Various facilities under CRF

Central Research Facility is equipped with the following instrument and fabrication facilities.

1. 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 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 cryo electron microscopy.

Faculty Coordinator:

Dr. Manidipa Banerjee

(Kusuma School of Biological Sciences)

Tel: 011-26597538 **Email:** mbanerjee@bioschool.iitd.ac.in

2. TEM

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 shone 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. The TEM facility in IIT Delhi is 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 multi touch screen for optimal ease of use.



Figure 1: Cryo HRTEM

Equipment in Facility:

Microscope: JEOL JEM-1400 Plus: The 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. $\times 10$) to the MAG mode (max. mag. $\times 1.2$ M) 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.



Figure 2 : TEMs in Central Facility and some Images

Point and Shoot function: With this function, user allows to move a field of view to target position pointed by clicking on a previously-acquired image. The Point & 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:

Prof. J.P. Singh
(Department of Physics)

Tel: 011-26591323

Email: jpsingh@physics.iitd.ac.in

Prof. Josemon Jacob
(Centre for Polymer Science & Engg.)

Tel: 011-26591425

Email: jacob@polymers.iitd.ac.in

Facility Staff:

Mr. V.K. Khanna, Mr. Jitendra Kumar and Mr. Anit

Main building, MS-108

Tel : 011-26596520

3. Liquid Nitrogen

The Liquid Nitrogen (LN₂) facility is involved in in-house production of LN₂ and its supply to various experimental laboratories of the institute. The current LN₂ plant was commissioned 1989 and subsequently upgraded in 2006. It has a production capacity of 8-10 liters/h. As the number of LN₂ users in the Institute has increased over the past few years, an alternative arrangement/facility of supplying LN₂ to them has been additionally put in place recently. For this, IIT Delhi has signed a MoU-cum-agreement with a commercial supplier of LN₂ who will frequently fill a ~1000 liter capacity LN₂ storage tank at IIT premises as and when IITD would demand so. After obtaining the mandatory license from Chief Controller of Explosives, Gol for installing the said storage, this alternative facility is now functional since April 2017. This will ensure that CRF will be able to fulfill the growing demand of LN₂ as more and more state-of-art instruments requiring LN₂ for their operation will be installed in the institute in future.

Faculty Coordinator:

Prof. Sujeet Chaudhary
(Department of Physics)

Tel: 011-26591341

E-mail: sujeetc@physics.iitd.ac.in

4. 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 2.0 nm resolution.



Figure 3 : LN₂ (above) and 1000 liter LN₂ capacity storage tank (below)



Figure 4: Scanning Electron Microscopy (SEM)

Faculty Coordinator:

Prof. Bhanu Nandan
(Department of Textile Technology)

Tel: 011-26591411

E-mail: coordsem@admin.iitd.ac.in

5. Micro Raman Spectroscopy

Micro-Raman spectroscopy system, consisting of inVia reflex Raman spectroscopy combined with research grade Leica make microscope, allows scatter, line, area mapping and confocal depth profiling measurements. Renishaw make Raman Spectrometer is equipped with two types of lasers- 514 nm and 785 nm with different magnification lenses.



Figure 5 : Raman Spectrometer

Faculty Coordinators:

Prof. Ashwini K. Agrawal
(Department of Textile Technology)

Tel: +91-11-26591415

E-mail: ashwini@textile.iitd.ac.in

Prof. Manjeet Jassal
(Department of Textile Technology)

Tel: 011-26591426

E-mail: manjeet@textile.iitd.ernet.in

6. FESEM + EDX

Quanta 200 FEG Scanning Electron Microscope (SEM) from FEI offers nanometer resolution and a high signal to noise ratio in both regular high vacuum and environmental modes. The EDS consists of 80 mm² SDD detector from Oxford (IE 250 X Max 80) that enables detection of elements under high resolution. Quanta FEG 200 comprises of different types of detectors, 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 high-resolution images and high contrast imaging of biological samples.



Figure 6 : FESEM with EDX

Faculty Coordinators:

Prof. Ashwini K. Agrawal
(Dept. of Textile Technology)

Tel: 011-26591415

E-mail: ashwini@textile.iitd.ac.in

Prof. Manjeet Jassal
(Dept. of Textile Technology)

Tel: 011-26591426

E-mail: manjeet@textile.iitd.ernet.in

7. NMR 400 MHz with Liquid and Solid Probe

In JNM-ECA Series (Delta V4.3 -) Delta - 400 MHz- FT-NMR instrument, both liquid and solid-state NMR measurement are possible. High-Resolution solid-state NMR measurement by techniques such as cross-polarization-magic angle spinning (CP/MAS) method with a probe for the solid-state measurement attached to the standard JNM-ECA/ECX instrument. Multinuclear observation (³¹P-¹⁵N) measurement and measurement under variable temperature (VT) are also possible in this system.



Figure 7 : NMR (400 MHz)

Faculty Coordinators:

Prof. Ashwini K. Agrawal
(Dept. of Textile Technology)

Tel: +91-11-26591415

E-mail: ashwini@textile.iitd.ac.in

Prof. Manjeet Jassal
(Dept. of Textile Technology)

Tel: 011-26591426

E-mail: manjeet@textile.iitd.ernet.in

8. Inductively Coupled Plasma Mass Spectrometry (ICPMS)

Agilent's 7900 ICP-MS has a robust plasma and Ultra High Matrix Introduction (UHMI) technology that enables routine measurement of 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 one 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.



Figure 8 : ICP-MS System, Agilent 7900

Faculty Coordinator:

Dr. Z.A. Shaikh

(Dept. of Biochemical Engineering and Biotechnology)

Tel: 011-26591006

E-mail: zia@iitd.ac.in

9. Nuclear Magnetic Resonance Spectroscopy Lab

NMR Spectroscopy Lab is equipped with three superconducting NMR spectrometers operating in the liquid 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.



Figure 10 : Glass Blowing Workshop

Faculty Coordinator:

Prof. S. Nagendran

(Department of Chemistry)

Tel: 011-26591523

E-mail: sisn@chemistry.iitd.ac.in

10. Glass Blowing Workshop

Various jobs undertaken in the workshop are: 'T' joints to mercury diffusion pumps; special glass apparatus, like B.E.T apparatus, Dewar flasks, distillation unit; various types of viscometers; all type of condensers, multi necked flasks, adapters; and setting up of vacuum lines, etc.

Faculty Coordinator:

Dr. Shashank Deep

(Department of Chemistry)

Tel: 011-26596596

E-mail: sdeep@chemistry.iitd.ac.in



Figure 10 : Glass Blowing Workshop

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. 157 Sponsored Research Projects with a funding of Rs. 219.27 crores were undertaken during the period April 1, 2016 to March 31, 2017. In addition, 318 Consultancy Jobs worth Rs. 20.36 Crores and 114 Miscellaneous Projects worth Rs. 34.34 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 Rs. One Lac to New Faculty Members who join the Institute.
- Support for Faculty Interdisciplinary Research Projects (FIRP) with the objective of enhancing Interdisciplinary and collaborative research interest in the Institute.
- Chair Professorships.
- Discover and Learn Projects (1-2-3-4) 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 Rs. 1 lakh per year has been provided for each project. About 20 projects have been initiated.
- Student Start-up Action scheme to support student start up activity in the campus. Each of the selected project will be given a seed grant of Rs. 1 Lakh. About 10 projects are in progress.
- Summer Undergraduate Research Award (SURA).
- Assistantships/Fellowships to 5th year Ph.D. Students.
- Open House

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, Metal Forging Woodworking, CNC programming and 3D Printing, Plastic Product manufacturing etc. M.Tech. students of Production group also use central workshop facilities for their practical classes in various courses as well as for project and research work.

The central workshop is fully equipped with latest power tools, equipments and facilities in all areas of manufacturing technologies. It also caters to the fabrication needs of students doing product design & manufacturing courses, minor projects, B.Tech. project, Masters thesis and Doctoral research. Large numbers of students use this facility to build products and compete at national and international level product building competitions like Formula student car, mini Baja, Robocon etc. The facility can also be used by external agencies for their manufacturing and training needs during the vacation period.

Central workshop has undertaken efforts to reorganize, modernized and prepare it for continuously changing global manufacturing scenario. Efforts are also on to prepare students for a broader view of manufacturing which involves planning and deploying optimum ways to transformation of raw material into goods by integration of people, capital, processes, systems and enterprises to deliver products of value to the society.

A new shop ‘CNC Learning’ is created in 2013-14 to imbibe product realization through computer generated geometries. A rapid prototype model can also be visualized by use of state of art 3D Printing technology in this new shop of Central Workshop.

7.4 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 9500 registered members.

LIBRARY HOURS

The Library remains open throughout the year except on six days, namely; Republic Day, Independence Day, Dussehra, Diwali, Holi, Mahatma Gandhi's Birthday and any other holiday declared as a special holiday. The book stack area at 1st floor and Ground floor is open from 9:00 AM to 9:00 PM (Weekdays) and 10:00 AM to 6:30 PM (Weekends & Holidays). Reading Area at Ground floor and 2nd Floor is open 24x7.

LIBRARY RESOURCES

Collection

The Central Library, IIT Delhi has a strong collection pertaining to physical sciences, engineering and technology, biotechnology, computer and information technology, social sciences and management.

Video Library

The Library is equipped with video viewing facility and has a collection of more than 2,500 CDs and kept in the Computer Application Division of the Central Library for viewing.

Reference Collection

The Library maintains a separate reference collection consisting of encyclopedias, dictionaries, handbooks, technical data, almanacs, atlases, bibliographies, etc.

Hindi Collection

The Central Library has built up a good collection of books in Hindi. Books in Hindi include books on various subjects being taught and researched at the Institute as well as books on literature in Hindi. Books in Hindi are prominently kept near the reference area in the Library to promote its usage. To increase the use of Rajbhasha Hindi, Central library offers borrowing facility of one extra Hindi Book to all its members apart from their entitlement.

ELECTRONIC JOURNALS AND ONLINE BIBLIOGRAPHIC DATABASES

The Institute have access to over 20,000 full-text electronic journals and 7 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 web site as well through the Library Web OPAC. More than 1 lakh bound volumes of journals are available in print form.



Video Surveillance integrated with the RFID based library system



RFID based Wireless Inventory Management System

E-RESOURCES AVAILBLE THROUGH THE CENTRAL LIBRARY/E SHODH 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(+AMR)
- ASTM Standards & Digital Library
- 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)

- I.C.E. Journals
- IEEE / IEE Library Online (IEL)
- InCites
- 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
- Lecture Notes in Computer Science, Mathematics and Physics (Vol.1/1959-Vol. 47617996)
- Manupatra
- MathSciNet
- Nature journals
- NOW Journals
- Online Miscellaneous Journals (8 Journals)
- Optical Society of America (OSA)
- Oxford Journals (Mathematics, Life Science, Humanities and Social Science)
- 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 Science
- Pearson
- Society for Industrial and Applied Mathematics (SIAM)
- Springer
- wiley
- 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 Frequency 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 Ph.D. theses database. Contains approximately 4500 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 38 e-textbooks for undergraduate students and the same are accessible in the campus through library website - <http://library.iitd.ac.in/index.php/e-resourc/etextbooks>.

Theses Consultation Facilities

Central Library receives all the Ph.D. Theses awarded by IIT Delhi in Hard copy along with their CDs. Print copies of theses are housed in Text Book & Book Bank Section located at the ground floor of the library for consultation purpose only. The abstracts of theses are made available through library Online Public Access Catalog (OPAC) - <http://libcat.iitd.ac.in:8080/jopacv11/html/> and also through another interface especially designed for searching the theses at: <http://library.iitd.ac.in/thesis>.

WEB-BASED COMPUTERIZED SERVICES FROM THE LIBRARY

The Central Library offers the following services to the Institute:

Network-based CD ROM Search Services

The Library has complete collection of Indian Standards and ASTM Standards on CD ROM that is available on the Campus network. The resources can be accessed on the Intranet at the URLs given below or through library website at <http://library.iitd.ac.in>:

Indian Standards	http://10.116.2.102/bis/
ASTM Standards	http://10.116.2.102/astm/
IEC Standards	http://10.116.2.102/iec/

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

The Eprints @ IIT Delhi has been set-up to host full-text of research publications of faculty and researchers of the IIT Delhi using Dspace, an open source Digital Library software developed by the Massachusetts Institute of Technology. The Dspace supports the Open Archives Initiative's Protocol for Metadata Harvesting (OAI-PMH), an internationally recognized protocol and interoperability standard. The Eprints@IIT Delhi provides a platform for faculty and researchers to deposit, reuse and share their research publications. The repository also has the ability to capture, index, store, disseminate and preserve digital materials created in any part of the Institute. Faculty and researchers can register themselves with the digital repository and submit their pre-prints (pre-refereed version of an article), post-prints (post-refereed final version) and publisher PDFs (if allowed by the publisher). The repository has around 2,100 full-text research articles and 4309 abstract of Ph.D. Theses.

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Apurba Das

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Viresh Dutta

S.G. Deshmukh

Anupam Dewan

Chinmoy Sarkar Dey

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Rahul Garg

James Gomes

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Sanjeev Jain

V.K. Jain

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B. Jayaram

Jayadeva

M. Jagadesh Kumar

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S.R. Kale

Prem Kumar Kalra

Tara.C. Kandpal

Santosh Kapuria

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Subrat Kar

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A.K. Keshari

Rajesh Khanna

Mukesh Khare

S.K. Khare

Neeraj Khare

Rakesh Khosa

Veena Koul (Ms.)

Sangeeta Kohli (Ms.)

S. Kundu

THE SENATE (contd.)

Ajit Kumar	Sunil Pandey	Puneet Mahajan
Amit Kumar	Siddharth Pandey	Sandeep Sen
Arun Kumar (Phy.)	K.K. Pant	Ravi Shankar (Chy.)
Arun Kumar (CARE)	Nalin Pant	Ravi Shankar (DMS)
S. Arun Kumar (CS&E)	Shankar Prakriya	Anurag Sharma
S.K. Koul	Rajesh Prasad	R.K. Sharma
N.D. Kurur	A. Ramanan	Satyawati Sharma (Ms.)
Manju Mohan (Ms.)	N.G. Ramesh	M.R. Shenoy
Alok Madan	A.D. Rao	Bhim Singh
Hitendra K. Malik	K.S. Rao	A.K. Singh
Ranjan Kumar Mallik	P.M.V. Subba Rao	Harpal Singh
B.R. Mehta	P.V. Rao	Jai Deo Singh
D.S. Mehta	S.C.S. Rao	Purnima Singh (Ms.)
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Maithili Sharan	M.R. Ravi	S.P. Singh
Saroj Mishra (Ms.)	V. Ravishankar	R.K. Soni
Sukumar Mishra	Anjan Ray	Sushil
Prashant Mishra	G.B. Reddy	A.K. Srivastava
Aditya Mittal	R.S. Rengasamy	Pankaj Srivastava
Sudipto Mukherjee	P.K. Roychoudhury	T.R. Sreekrishnan
Ratan Mohan	Shantanu Roy	N. Tandon
Atul Narang	Subir Kumar Saha	Geetam Tiwari (Ms.)
K. Narayanan	Ambuj D. Sagar	Amitabha Tripathi
B.P. Patel	Sanjeev Sanghi	Suneet Tuli
Sanjiva Prasad	Sanil V.	C.A. Tomy
R.B. Nair (Ms.)	Huzur Saran	V. Upadhyay
S.N. Naik	Anil Kumar Saroha	R.K. Varshney
Arvind K. Nema	Santosh Satya (Ms.)	M. Veerachary
Sunil Nath	Kushal Sen	S.V. Veeravalli
B.S. Panda	P. Santhikumar	V.K. Vijay
Preeti Ranjan Panda	Jagdish T. Sahu	S.S. Yadav

THE SENATE (contd.)

Three Educationists from Outside IIT Delhi

O.P. Kharbanda
Chandra Shekhar
Sudhir A. Shah

Head, Central Library

K.K. Pant

Head, Central Workshop

D. Ravikumar

One of the Wardens

Dipti Ranjan Sahoo

Chairman, Grades & Registration (UG&PG)

Mukul Sarkar

Chairman, Time Table Committee (UG/PG)

Anupam Shukla

Six Members of the Faculty

Mausam
Jayan Jose Thomas
A.K. Darpe
Sunil Kumar
Gopal Krishen
Vivekanandan Perumal

Three Alumni Representatives

Yogesh Kumar Gupta
Sanjeeva Shivesh
Aparna Saroagi (Ms.)

Four Student Representatives

Jyant Nahata (General Secy. (SAC))
(Shivalik)
Vaibhav Anand (General Secy.
(CAIC-UG)) (Aravali)
Umang Bhambri (M.Tech. Student)
(Satpura)
Darpagiri Mondal (M.Tech. Student)
(Girnar)

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 <i>Associate Dean (HM) Ex-Officio</i>	Board of Hostel Management
Sangeeta Kohli (Ms.) <i>(Vice Chairman)</i> <i>Associate Dean (SW) Ex-Officio</i>	Student Teacher Interaction Committee
Pramit K. Chowdhury <i>(President)</i>	Board for Sports Activities
Sangeeta Kohli (Ms.) <i>(President)</i> <i>Associate Dean (SW) Ex-Officio</i>	Board for Students Welfare
Shashank Bishnoi	Vice President BSW
V. Perumal	Vice President BSA
Samrat Mukhopadhyay	Vice President BRCA

LIBRARY

K.K. Pant	Chairman, ACL
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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 <i>Head, CSC (Ex-Officio)</i>	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.) <i>President BSW (Ex-Officio)</i>	Head, Counselling Service
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)
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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)**

J.P. Singh	TEM
S. Nagendran	NMR 300 MHz (Liq probe)
Pintu Das	Liquid Nitrogen Facility
Bhanu Nandan	SEM
Shashank Deep	Glass Blowing Workshop
Josemon Jacob	TEM, CPSE
Manidipa Banerjee (Ms.)	Cyro HR TEM
Shaikh Ziauddin Ahammad	ICP-MS
B.R. Mehta	AFM+STM (Atomic Force Microscope+Scanning Tunneling Microscope)
Ashwini K. Agrawal	Under SMITA Res. Lab. (a) Micro Raman Spectrocope (b) FE SEM + EDS (c) NMR 400 MHz with Liq. and solid probe
Neeraj Khare	Nanoscience Research Facility

CENTRAL WORKSHOP

Professor and Head	D. Ravi Kumar
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CHAIRPERSONS OF OTHER COMMITTEES

V. Ramgopal Rao (Director)	Official Language Implementation Committee
Bhim Singh	Institute Lecture Series Committee
Bhim Singh	Standing Committee for Convocation 2017
Bhim Singh	Kendriya Vidyalaya Mangement Committee
Bhim Singh	Nursery & K.G. School Advisory Committee
V.K. Agarwal	Commercial Establishments & Licencing Committee
V.K. Agarwal	Commercial Establishments Monitoring Committee
V.K. Agarwal	House Allotment Committee
V.K. Agarwal	Air-conditioning Committee
G.B. Reddy	Hospital Advisory Committee
Suhail Ahmad	Employees Welfare Committee
S.S. Yadav	Institute Grievance Committee
Ranjan K. Mallik	Security Advisory Committee
Ashok Gupta	Managing Committee of the Benevolent Fund Scheme
Ashok Gupta	Executive Committee of IITD Staff Welfare Scheme

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)	: K.C. Iyer
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
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STUDENT COUNSELLING SERVICE

Head	Sangeeta Kohli (Ms.)
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COUNSELLOR

Shachi Mathur

ADMINISTRATIVE COMPUTERISATION SUPPORT SERVICE

Head	Huzur Saran
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CVC

Chief Vigilance Officer	Anurag Sharma
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RTI

Public Information Officer	Vivek Raman
First Appellate Authority	Kalyan K. Bhattacharjee
Transparency Officer	Sandeep Chatterjee

HOSPITAL SERVICES

Head	Brahm Prakash
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ADMINISTRATION

Sandeep Chatterjee

M.K. Gulati

N.C. Chauhan

K.K. Bhattacharjee

Vivek Raman

Atul Vyas

N. Bhaskar

V.K. Vashistha

Mohd. Shamim

Ramesh Kumar Thareja

Alan V. Sinate

Mukesh Chand

Raj Kumar Gupta

Satish Narayanan Tiwari

Deb Ranjan Mukherjee

Sanjay Pande

Amitabh Mukherjee

G.K. Taneja

K.M. Vijay Kumar

Anuj Gaur

Rafat Jamal

V.K. Bharaj

Hitendra Govil

K.P. Mishra

Prem Kumar

Brahm Prakash

Ashok Kumar

Raju Ram Parihar

Pradip karamarkar

Brahm Prakash

Registrar

Joint Registrar (Accounts)

Joint Registrar (SP Section, Legal Cell, Nodal Officer for Public Grievances(PG), Vigilance Matters, Gender Grievances)

Deputy Registrar (FAA, Director's Office, E-II)

Deputy Registrar (Conference, Coordination, R&I, Hindi Cell, PIO, RTI)

Deputy Registrar (PGS, Publication Cell)

Assistant Registrar (Health Unit, E-I)

Assistant Registrar (R&D)

Assistant Registrar (R&D Accounts)

Assistant Registrar (Recruitment Cell, E-II) (On contract)

Assistant Registrar (UGS, Nursery and K.G. School, IIT Delhi)

Assistant Registrar (SAS)

Assistant Registrar (Accounts)

Assistant Registrar (Training & Manpower Dev. of Admin. & Tech. Staff)

Assistant Registrar (Accounts, Issue of PPO)

Assistant Registrar (Planning, Alumni Affairs & Intl. Programmes)

Assistant Registrar (Audit)

Executive Engineer & Offtg. Institute Engineer

Executive Engineer

Executive Engineer

Assistant Executive Engineer

Assistant Executive Engineer

Assistant Executive Engineer

Assistant Executive Engineer

Assistant Executive Engineer

Assistant Executive Engineer

Assistant Executive Engineer

Assistant Executive Engineer

Assistant Executive Engineer

Head, Hospital Services (On contract)

Lily Khosa (Ms.)	CMO (SAG)
Renu Misurya (Ms.)	CMO (SAG)
Ajay Kumar Jain	CMO (SAG)
M.K. Sagar	CMO (NFSG)
Anila Khosla (Ms.)	CMO
P.K. Rajesh	Sr. Medical Officer (Homeopathic)
Md. Ashafaque Hussain	Sr. Medical Officer
Sayed Yasmeeen Raunaq	Medical Officer
L. Pangerlemba	Medical Officer
Rajlaxmi Borah	Medical Officer (On contract)
Aliya Naaz	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)

INDIAN INSTITUTE OF TECHNOLOGY DELHI

THE HONOUR CODE

I, Entry No.
do hereby undertake that as a student at IIT Delhi :

1. I will not give or receive aid in examinations; that I will not give or receive unpermitted aid in class work, in preparation of reports, or in any other work that is to be used by the instructor as the basis of grading; and
2. I will do my share and take an active part in seeing to it that others as well as myself uphold the spirit and letter of the Honour Code.

I realise that some examples of misconduct which are regarded as being in violation of the Honour Code include :

- Copying from another's examination paper or allowing another to copy from one's own paper;
- Unpermitted collaboration;
- Plagiarism;
- Revising and resubmitting a marked quiz or examination paper for re-grading without the instructor's knowledge and consent;
- Giving or receiving unpermitted aid on take home examinations;
- Representing as one's own work, the work of another, including information available on the internet;
- Giving or receiving aid on an academic assignment under circumstances in which a reasonable person should have known that such aid was not permitted; and
- Committing a cyber-offence, such as, breaking passwords and accounts, sharing passwords, electronic copying, planting viruses, etc.

I accept that any act of mine that can be considered to be an Honour Code violation will invite disciplinary action.

Date :

Student's Signature

Name

Entry No.