CENTRE FOR BIOMEDICAL ENGINEERING (M. Tech)

Training and Placement brochure

2020-21
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 the last two decades the focus has expanded to include biological medicine, development of innovative biomaterials, implants, biomedical devices and informatics approaches for the prevention, diagnosis and treatment of diseases.
Faculty

Veena Koul, Ph.D (Kashmir Univ.)

S.M.K Rahman, Ph.D (MNIT, Allahabad)

Sandeep Kumar Jha, Ph.D (BARC, Mumbai)

Neetu Singh, Ph.D (Georgia Tech., USA)

Dinesh Kalyanasundaram, Ph.D (Iowa State Univ., USA)

Harpal Singh, Ph.D (IIT, Delhi)

Anup Singh, Ph.D (IIT Kanpur)

Amit Mehndiratta, D. Phil (Oxford, UK)

Deepak Joshi, Ph.D (IIT Delhi)

Jayanta Bhattacharyya, Ph.D (IITC, Hyderabad)

Arnab Chanda, Ph.D (University of Alabama, USA)

Biswarup Mukherjee, Ph.D (IIT Madras)
ACADEMICS

✓ M. Tech programme in Biomedical Engineering is designed for students from both engineering and science disciplines to give training in frontier areas for solving the longstanding problems of healthcare.

✓ During 1st Year students are provided with basic knowledge across biology, chemistry, mathematics, clinical science and engineering.

✓ During 2nd year students will undertake research project in their area of interest.

✓ Some of the core courses and electives taught by the centre to students are as follows:
  Biomechanics
  Biomedical Instrumentation
  Medical Device design
  Medical Imaging
  Biomaterials
  Biosensors
  Industrial biomaterial technology
  Tissue Engineering
  Mechanics of biomaterials
  Biomedical Signal and Image Processing
  Nanomedicine
  Cancer: Diagnosis and Therapy
  Emerging Biomedical Technologies and Healthcare.
RESEARCH AND DEVELOPMENT @ CBME

Biomedical Imaging

Biomechanics

Bioinstrumentation

Core areas

Biomaterials

Technologies and devices for biomedical applications

- Diagnostics
- Therapeutics
- Implants
- Rehabilitation
FACILITIES @ CBMEB

Biomechanics Lab
- Wireless EEG System
- EMG System (Trigno)
- Flexural testing

Biosensor & POCT
- BSL 2 facility
- 8” Mask aligner
- Thermal evaporator

Biomaterials Characterization
- Laser Confocal Microscopy
- Raman microscopy
- Particle Analyser
- Flow cytometer - BD Accuri
- RT-PCR
- GPC-Viscotek
Development of Methods and Software tools for processing and analysis of Medical Imaging and Signal Data; Quantitative Imaging; Applications of Machine Learning; Patient specific 3D modelling
FACILITIES @ CBMEB

Medical Device Fabrication facility

3D-Printer –Stratasys
Objet30 OrthoDesk

400 W CW Fibre laser

Injection Molding
BOY XXS

Dual Laser (CO2 + fibre laser)

Device Testing Laboratory

High resolution spectrometer HR2000+ES
TECHNOLOGIES DEVELOPED

• Intelligent prosthetic leg for amputees
• Polymeric nanoparticles and process of preparation thereof for delivery of chemotherapeutics, peptide and DNA based anticancer agents
• Hemoglobin meter
• Antimicrobial acrylic bone cement for fixation of hip and knee joints
• Polymeric nanoparticles based toners for digital imaging and related applications
• Heat sealable coatings onto paper for packing applications
• Iontophoresis Unit for transdermal drug
• Surgical drill guides for scoliosis
• Forcemyography
MEDICAL PRODUCTS

Hemoglobinometer

Intelligent prosthetic leg

Variable stiffness elbow implant

Caliper for ossicle surgery

Soft skin regeneration

Instrumented Shoe

Affordable hearing screening device

Portable typhoid diagnostic device

Alveolar distractor
ON-GOING RESEARCH PROJECTS

✓ Artificial skin for Burn and Trauma care

✓ Bio-Nano Composite Scaffold for Chronic wounds

✓ Concomitant delivery of anti-cancer drug

✓ Naturally derived vesicles for targeted drug delivery

✓ Quantitative software tools to detect intracranial masslesions

✓ Methodology for Quantitative CEST-MRI

✓ Multimaterial Orthopaedic screws

✓ Fall prediction and hip protection

✓ Adaptive prosthesis for transfemoral amputee
ON-GOING M.TECH THESIS PROJECTS

BIOINSTRUMENTATION

✓ A Biophysical insight on forcemyography genesis via deep learning model.

BIOMECHANICS

✓ Biomechanical Modelling of Artificial skin.
✓ Mathematical Modelling of knee Meniscus tear

BIOMATERIALS

✓ Development of novel carbon dots for the detection of pathogen.

MEDICAL DEVICE DESIGN

✓ Development of Footwear Based Energy Harvesting System.
✓ Magnetic growth rods for scoliosis patient.
MEDICAL IMAGING

✔ Detection of Cirrhosis and Hepatocellular Carcinoma using Multi-phase Abdominal CT scans.

✔ Automated segmentation of Brain Tumour using Machine learning.
COLLABORATIONS

1. GOVERNMENT ORGANISATIONS
   DRDO: Defense Research and Development Organization
   CSIR - Central Scientific Instruments Organization
   National Physical Laboratory (NPL)
   National Institute of Immunology (NII)
   National Institute of Health and Family Welfare

2. ACADEMIC
   Jawaharlal Nehru University
   Massachusetts Institute of Technology
   The University of Texas at Austin
   Advanced Industrial Science and Technology

3. PRIVATE ORGANIZATIONS
   Boston Scientific Private Limited
   Stryker India Private Limited
   Fortis Hospitals
   Indian Spinal Injury Center
   Mahajan Imaging Centre
EXTRAMURAL FUNDING

1. GOVERNMENT ORGANISATIONS
   Indian Council of Medical Research
   BIRAC, Department of Biotechnology
   Indo-German Science & Technology Center
   Department of Science & Technology
   Department of Biotechnology

   ![Indian Council of Medical Research](image1.png)
   ![BIRAC](image2.png)
   ![Indo-German Science & Technology Center](image3.png)
   ![Department of Science and Technology](image4.png)
   ![Department of Biotechnology](image5.png)
OUR RECRUITMENT PROCESS

Placement office sends invitations to companies and organizations along with relevant information. You can also send us a mail at placement@admin.iitd.ac.in regarding the same.

Companies and organizations interested to recruit, register to the OCS website.

Companies may fill Job Notification Form (JNF) or Training Notification Form (TNF) for each profile they wish to hire for. Once the filled JNF or TNF with all the required details is received, companies are registered and given login credentials to access their online account on the OCS website.

Companies/Organizations if interested in conducting a Pre-Placement-Talk can request for it along with the preferred date.
The JNF or TNF is frozen on the OCS website by the company till a deadline, after which the student shall be able to view all the details, and the eligible students may apply. The company will then shortlist the students either based on their CVs or they can conduct a Test/GD for shortlisting the students.

Shortlisted students are notified.

The placement office allots the dates for campus interviews, by considering factors like student preference, job profile, compensation, history with the campus, etc.

After completion of selection process, company is required to announce the final list of the students on the same day itself.
Faculty Placement Co-Ordinator & M.Tech Programme Co-ordinator
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Student Placement Co-ordinator
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