

Department of Civil Engineering

Indian Institute of Technology Bombay

INTRODUCTION

Indian Institute of Technology, Bombay was established in 1958 and the Department of Civil Engineering has been an integral part of the Institute since its inception. The Department has grown steadily over the years and is now recognized as one of the major engineering departments in the country.

The Department has developed strong links with the building and construction industry and academic and research institutions, both within and outside the country. Besides high quality teaching and instruction at undergraduate and postgraduate levels, the Department is actively involved in basic and applied research and provides expert technological advisory support through R & D and consultancy projects to various organizations. In recent years, the Department has attracted significant amount of sponsored research funding from government and private agencies.



ACADEMIC PROGRAMMES : The Department of Civil Engineering offers a broad-based undergraduate B. Tech. degree programme. A dual-degree B. Tech.M. Tech. programme is also run in Structural Engineering. Postgraduate M. Tech. (admissions through GATE/ Sponsorships) and Ph. D. (admissions through selections/ sponsorships) programmes are offered in the following five specializations:

Structural Engineering
Remote Sensing

Geotechnical Engineering
Transportation Systems Engineering

Water Resources Engineering

In the current academic year, 50 students have been admitted to the B. Tech and 20 in the dual degree programme. During the year, 50 M. Tech. students were admitted in the above specializations. This year 35 B.Tech. and 56 M.Tech. graduated from the Department.

RESEARCH OPPORTUNITIES : The Department offers excellent opportunities for research in various disciplines, with branch based doctoral programmes. During the year, 18 research scholars were admitted in doctoral programme and 10 were awarded Ph. D. Degree.

LABORATORY FACILITIES : The Department has excellent facilities for carrying out teaching, research and consultancy activities in various disciplines of Civil Engineering.

Some important facilities in the Department are:

Computational Laboratory
Experimental Mechanics Laboratory
Global Positioning System Laboratory
Hydraulics Engineering and Fluid Mechanics Laboratory
National Geotechnical Centrifuge Facility
Soil Mechanics Laboratory

Concrete Technology Laboratory
Geodesy Laboratory
Geo-textiles and Geo-synthetics Laboratory
Heavy Structures Laboratory
Photogrammetry and Remote Sensing Laboratory
Transportation Systems Engineering Laborator

COMPUTING FACILITIES :

The Department offers state-of-the-art computing facilities to the graduate students, research scholars and faculty members. These consist of the central computer laboratories, which include UG Computer Laboratory, PG Computer Laboratory, Research Scholars Computer Laboratory and Faculty Computer Laboratory. In addition every faculty member and research scholar is given one personal computer and most of the laboratories have their own computing facilities to meet their specialized requirements. Several servers, configured for specific tasks and a high-speed Local Area Network connection through the Institute's central facilities, ensure that all students and faculty have the most modern computing facilities, including round-the-clock internet and e-mail connection, to meet their academic and research needs.

EXTENSION ACTIVITIES : In order to encourage and facilitate interaction with professionals, a number of activities like organizing short-term courses (under Continuing Education Programme, Quality Improvement Programme and programmes sponsored by Government and other agencies), organizing regular Departmental Seminars, facilitating National and International conferences, etc. are promoted by the Department. Following are some of the activities organized recently by the Department:

- Course-cum-workshops on Urban Drainage Management for the Municipal Corporations of Mumbai, Ahmedabad, Bangalore, Calcutta, Thane and International Airports Authority of India, Mumbai and Central/Western Railway, Mumbai.
- Course on Base Isolation for Earthquake-Resistant Design of Structures.
- Courses on Global Positioning System and its Applications.
- International workshop on Transportation Planning & Implementation Methodologies for Developing Countries: Transportation Infrastructure.
- The Indian Geotechnical Conference (IGC 2000), The Millennium Conference.
- Course on Neural Networks in Civil Engineering.
- Course on Advanced Technologies in Water Resources and Environmental Management.

SPONSORED RESEARCH PROJECTS : A large number of sponsored research projects are carried out by the faculty in the various specializations of the Department. Some of the major funding agencies include the Department of Science & Technology, (DST) and Ministry of Human Resource Development (MHRD), Govt. of India, Centre for Advanced Computing (CDAC), National Science Foundation (NSF), USA, State Governments and industries. A few of the recent projects are:

- Base isolation strategies for seismic design of structures and components
- Research projects on GPS for earthquake studies in W. Maharashtra and Bhuj region of Gujarat.
- Indo-Hungarian joint research project on Space Geodesy
- Parallel computing in finite elements
- Comprehensive traffic management plan for Greater Guwahati
- Development of an analytical approach for detection of flaws in composite materials using high frequency Ultrasonic waves.
- Passive structural control using tuned liquid dampers
- Research project on coastal hydrodynamics
- Performance based seismic design of structures.
- Integrated studies on radionuclide migration at shallow land disposal facility.
- Design and characterization of composite materials with graded interface.
- Accelerated physical modelling of contaminant.
- Characterization of soil for ground water movement studies in unsaturated zone.

CONSULTANCY PROJECTS : A large number of consultancy projects in various disciplines are undertaken by the faculty. A total of 285 consultancy projects worth more than Rs.1.2 Cr. were undertaken during the year 2003-04. A few of the recent projects are:

- A fuzzy neuro on-line monitoring system for laminated composites.
- Use of fiber reinforced polymer materials for repair of deteriorated concrete and Masonry structures
- Natural disaster risk management
- Development of GUI based software package for elasto-plastic static and dynamic analyses of piping system
- Hydraulic analysis of pumps/ pipe networks
- Modelling studies for Narmada canal system
- Provision of GPS control for the Nagpur Airport
- Battlefield Management System
- Foundation for ground resting unit

PLACEMENTS : The placement opportunities for the Graduates and Post-Graduates are quite bright. Various public and private sector organization visit the campus for the recruitment in Construction, Design, Research and Development. The employers of our students include ACC, L&T Ltd., Halliburton, IOCL, INFOSYS, TCS, TIL, & BHEL & RIL.

FACULTY PUBLICATIONS & PARTICIPATION IN CONFERENCES : The faculty members publish extensively in international and national journals, and present their research work in symposia / seminars / conferences. During the year, a total of approximately 100 research papers were published by the faculty of the Department.

FACULTY AND SPECIALIZATION :

Structural Engineering

Tarun Kant : Solid mechanics, Plates, shells, fibre reinforced polymer composite laminates, Thermal stresses, Transient dynamic techniques and Computational mechanics.

P. Banerji : Artificial neural networks in earthquake engineering, Lifeline earthquake engineering.

A. Mukherjee : Computer aided design of civil engineering systems, Finite element method.

Alok Goyal : Concrete structures, Earthquake resistant design.

Ravi Sinha : Dynamic behavior of structures and equipment, Earthquake resistant design.

Yogesh M. Desai : Finite element analysis, Structural dynamics, Composite mechanics.

K. M. Bajoria : Computer aided design of structures, Earthquake resistant structure, Non linear structures.

R. S. Jangid : Base isolation for earthquake-resistant design, Non-linear dynamic analysis

Dr. Siddhartha Ghosh : Structural Engineering, Earthquake Engineering, Performance-Based Seismic Design, Reliability-Based Seismic Design, Plastic Design of Steel Structures, Life Cycle Cost Analysis of Buildings.

Geotechnical Engineering

D. M. Dewaikar : Bearing capacity, Laterally loaded piles, Ground improvement.

J. N. Mandal : FEM, CAD, ANN & Centrifuge modeling of geosynthetic reinforced soil structures.

D. N. Singh : Studies on Fly ash, leaching studies Solidification/ Stabilization / Immobilization of contaminated soils.

B. V. S. Viswanadham : Environmental geotechnics, Centrifuge modelling, Ground improvement.

Dr. Deepankar Chaudhari : Earthquake Geotechnical Engineering, Soil - Structure Interaction problems, Centrifuge modeling of Geotechnical Structures, Numerical and analytical modeling of retaining wall, anchor, shallow and pile foundations, Fundamentals of soil behaviour for fine grained soils, DDL theory, Swell-shrink behaviour of expensive soil

V. Jothiprakash : Water Resources Systems Analysis Stochastic Hydrological Modeling, Genetic Algorithms, Artificial Neural Networks

Water Resources Engineering

A. K. Rastogi : Ground water flow modelling of aquifer systems, Hydrodynamic dispersion.

M. C. Deo : Hydrodynamics of ocean waves, Statistics of ocean waves, Random data analysis, neural networks.

Kapil Gupta : Urban water infrastructure management, Flood protection structures.

T. I. Eldho : Groundwater flow and pollution investigations, Computational fluid dynamics, Watershed management.

A. Juneja : IN-SITU & laboratory Engg, Properties of soil: numerical & physical modeling in geo technics.

Geodesy and Remote Sensing

Madhav N. Kulkarni : Global Positioning System, GIS, Crustal dynamics, Space Geodesy, Surveying.

E. P. Rao : Runoff modelling of watersheds, Optimization of water distribution systems.

Transportation Engineering

P. K. Sikdar (On Lien) : Land use/transport modelling, Traffic flow theory and capacity analysis, GIS applications.

K. V. Krishna Rao : Travel demand modelling and forecasting, Behavioral travel modelling.

V. M. Tom : Urban bus transit route network design, Equilibrium network signal design.



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