Department of Civil Engineering

Placement Brochure 2009-2010

Indian Institute of Technology Guwahati

KNOW US

The Civil Engineering Department at IIT Guwahati offers B.Tech, M.Tech and PhD programmes. Its goal has always been to train the budding civil technocrats by various emerging tools and techniques of the profession. The faculty, through constant endeavour, updates the existing courses which helps in imparting the latest technical knowledge to the students.

Along with high quality teaching and instruction at both UG and PG levels, it also handles various R&D projects and consultancy to various organizations.

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Message from the Head of Department

Dr. S K Deb
HOD

Department of Civil Engineering at IIT Guwahati has continually upgraded itself in terms of academic programmes and all research infra-structure including state-of-the-art laboratories during last one decade after its establishment. The department attracts the finest young and dynamic faculty members and the best of students for its Bachelors, Masters and Doctoral programmes.

Students are exposed to well-defined academic programmes along with a host of sport, cultural and organizational activities on a vibrant and beautiful campus of IIT Guwahati. The presence of state-of-the-art experimental and computational facilities, active institute-industry interaction, national and international exchange programmes and industrial/research training opportunities help the students of the Department of Civil Engineering, IIT Guwahati to excel in the competi-tive professional life. Our graduates and postgraduates have been selected by leading national and multinational corporations and research /academic institutes. They really have made us proud!

I heartily welcome both the recruiters and our graduating students to come to a common platform and get the best out of each other.

PROGRAMS AT CIVIL ENGINEERING DEPARTMENT

B.Tech

The B.Tech curriculum involves an eight semester program which includes Solid Mechanics, Structural Engineering, Transportation Engineering, Design of Structures, Construction Management, Geotechnical Engineering, Hydraulics Engineering and Environmental Engineering. The objective of the curriculum is to provide a platform for the students to develop skills and knowledge in Civil Engineering field. The students are groomed to be good civil engineers capable of taking up challenging assignments. The constant endeavor to modify the academic curriculum and state-of-the-art laboratory facilities along with timely field trips helps students in updating their skills. The Department encourages students to actively participate in the ongoing research works taken up by various faculty members. Besides these, there are many ongoing construction projects going on in the campus and the students are actively participating in the ongoing field works and hence have gained a lot of field exposure.

M.Tech

The M.Tech curriculum involves a rigorous four semester program tailor-made to the area of specialization. The program follows a balanced approach of training in both qualitative/experimental and quantitative aspects of the respective field of specialization. With sufficient exposure to cutting edge practices, the students get acquainted with the know-how in the particular field.The students are also required to undertake teaching assistantship, thus grooming them into well-rounded individuals capable of completing challenging assignments.

The Specializations include

1. Structural Engineering
2. Transportation Systems Engineering
3. Water Resource Engineering and Management
4. Environmental Engineering
5. Geotechnical Engineering

PhD

The PhD program aimed at helping the student acquire proficiency in the chosen area is both exhaustive and rigorous. This manifests in the requirement of a minimum number of credits and a dissertation. The presence of an able and experienced faculty provides an environment conducive to achieve the expertise required for a doctorate degree. Students typically would be taking up experimental and theoretical research work in major areas of Civil Engineering such as Environmental Engineering and Sciences, Geotechnical Engineering, Hydraulics and Water Resources Engineering, Structural Engineering, Transportation Engineering and Earthquake Engineering.

INTERNSHIPS

Our students have done internships in industries and universities around the world. This exposure to real world situations makes the students more confident in taking independent decisions.

A brief overview of the organizations where the current batch has interned:

- Georg-August-Universität Göttingen, Germany
- Central Mine Planning & Design Institute Ltd, Ranchi
- FHECOR Ingenieros Consultores, Spain
- University of California, Davis (UCD), California
- Structural Consultancy, JTC
- Technischen Universität Hamburg-Harburg, Germany
- Saag Rr Infra Ltd
- University of Basilicata, Italy
- S P Singla constructions
- University of Bologna - DISTART, Italy
- Engineering Consultancy Groups, Dubai
- National Hydro Power Corporation at LSHEP, Assam
- LANCO, Hyderabad
- Gammon India Ltd, Guwahati (New Brahmaputra bridge site)
- RITES India Ltd, Kolkata
- École Nationale des Ponts et Chaussées (ENPC), Paris, France
- IVT, Swiss Federal Institute of Technology Zürich (ETH), Switzerland
- Wilbur Smith Associates Pvt Ltd, Bangalore
- University of Karlsruhe, Germany
- IIM Ahmedabad
- IIM Bangalore
- Loughborough University, United Kingdom
- Shapoorji Pallonji & Co Ltd
- IISc Banglore
- Universitat Politecnica de Catalunya, Terrassa, Spain
- L&T, Mumbai
- Punj Lloyd Ltd

LABORATORIES

1. Structural Engineering Laboratory

The Structural Engineering Laboratory serves a wide spectrum of activities covering those related to teaching, research, development, and consultancy. The primary activities include experimental studies on model/prototype of structural elements and assemblies under various static and dynamic loading conditions. The Structural Engineering Laboratory also offers technical services for testing and research on the structural behaviour and properties of materials.

The major equipments include 100T electronic UTM, a 200T CTM, Servo control hydraulic jack, LVDT, Electrical strain gauges etc. Sophisticated equipments to perform Non-destructive tests like Ultrasonic pulse wave, Rebound hammer, Permeability, Resonant frequency & Rebar locator etc. are also used. There is also a Concrete Laboratory as part of the Structural Lab. The concrete laboratory is equipped with moderate-scale manufacturing and testing of concrete specimens.

The major areas of current research in Structural Engineering include Structural Dynamics, Bridge engineering, Wind induced vibration & control, Performance based seismic design, Finite element mesh generation, Optimization, Retrofitting of structures, Spectral FEM, Structural reliability, Fluid-structure interaction, IT in construction management, Constitutive modeling, Fracture and Fatigue mechanics.

2. Transportation Engineering Laboratory

Transportation Engineering Lab has all the facilities needed for testing of materials such as soil, aggregate and bitumen used in highway construction. The facilities are also being used extensively for bituminous mix designs and pavement designs. The students get in depth training in the testing of properties of above materials in the lab. The laboratory is equipped with radar gun, handy cam, enoscope, falling weight deflectometer, GPS, VBOX etc. Latest softwares like MX Roads, HDM-4, TRANSYT, HCS, TSIS, Cube, VisSim, TransCAD and MapInfo are available in the department for data processing.

The major areas of current research in this field include Concrete block pavement evaluation, Urban and regional travel demand modelling, Traffic flow theory and modeling, Structural and functional evaluation of bituminous pavements, Traffic engineering and issues related to road safety.

3. Geotechnical Laboratory

This Laboratory has facilities for testing and research on the engineering behavior and fundamental properties of soil. It is equipped to test compaction, seepage, compressibility, deformation and shear strength, soil dynamics and ground improvement. Among other equipment, it has ion-chromatograph, block vibration test apparatus, tensiometer etc. Its field operation unit has a full range of tools for sampling soils and rocks and conducting vane tests, cone penetration tests, standard penetration tests, and electric logging etc.

The major areas of active research in this field include engineering seismology, wave propagation, seismic stability of slopes and retaining walls, geo-environmental engineering, dynamic soil-pile interaction, marine geotechnology, contaminant transport and retainment in geomaterials, study on liquefaction otential of soil, reinforced soil structures, soil dynamics, analysis and design of machine foundations.

4. Water Resources Laboratory

The laboratory provides support to both undergraduate and graduate, teaching so that students have the opportunity to see by themselves the essential fluid mechanics principles. The hydraulics laboratory has flumes for undertaking cutting-edge research in the area of pipe flow, open-channel flow, sediment transport processes and other dedicated equipments like Venturimeters, Pelton wheel, Kaplan and Francis turbines and Reynold's apparatus. Work is also being carried out in land use and land cover classification, river migration, water-shed delineation, flow accumulation and hill slope hydrology. This lab is also equipped with instruments like DGPS, Spectro-radiomenter and Canopy analyzer. Latest software such as Geomatica, MIKE 21C & CCHE2D have been installed on different computers in the Laboratory to carry out coursework.

The major areas of current research in this field include meso-scale distributed hydrological modeling, RS and GIS for water resources management, Computational river hydraulics, stochastic subsurface hydrology, heuristic method in reservoir optimization, GIS based Water-shed modeling, Dam break analysis, Flow through porous media, Sediment dynamics in fluvial systems, Environmental impact assessment.

5. Environmental Engineering Laboratory

The Environmental Laboratory is equipped with instrumentation need for advanced chemical and biological characterization of water, wastewater and air samples. Environmental laboratory is updated with latest instruments and equipments like UV visible spectrophotometer, Atomic absorpotion spectrophotometer and Digital spectrophotometer, BOD incubator, COD apparatus, pH meter, Muffle furnace & Nephelo turbidity meter.

The major areas of active research in this field include Air quality modeling in urban and industrial environment, Environmental noise modeling, Biodegradation of industrial wastewater, Removal of heavy metals from wastewater, Sludge treatment by physicochemical and biological process, Anaerobic wastewater treatment, Environmental geo-informatics.

6. Surveying Laboratory

Surveying laboratory has all the standard instruments required for instructional purposes like electronics theodolite, EDM, Auto level, GPS, plane table, planimeter. The surveying course exposes students to the fundamental land surveying measurement methods and advanced techniques.

7. Geology Laboratory

The Geology Laboratory is equipped with extensive rock and mineral samples as well as topographic, geologic and soil maps. All modern instruments like trinoculor zoom stereo microscope with digital image capturing facility, digital inclinometer, sample grinding and polishing machine, brunton pocket transit compass, all purpose soil tester kit, water and soil analysis kit are used by students to carry out intensive studies.

8. Computer Laboratory

The departmental computer center supports computing and programmingrequirements of the students. Nearly all the computer software like STAAD Pro, SAP, ANSYS, AutoCAD, MIKE 21C, FLUENT, Geomatica, HEC-RAS, RISE Model, SHAKE 91, FLAC3D, Soil Vision, GeoFlex, PVDrain, Geospec, MXROAD, TransCAD, GPS softwares like Pathfinder, HCS2000, TRANSYT-7F are made available here to the students

Representative list of B.Tech Projects

- Bearing capacity problems of tall structures
- Dynamic soil-structure interaction of base isolated buildings
- Vibration of structures under moving loads
- Dynamics and identification of cracked beams
- Inverse problem
- Lifecycle cost analysis of bridges
- Seismic retrofitting of structures
- Intercity travel demand modeling
- Solid waste management using Geographic Information System (GIS)
- Seismic behavior of reinforced soil walls
- Determination of specific surface area of soils
- FE modeling of steel structures
- Biofuels as a source of renewable energy
- Permeability of fly ash under stress
- Decision making for selection of transportation systems
- Lean construction
- Development of relative humidity based methodology for measuring high soil suction
- Evaluation of methods and mixes for pothole repair
- Numerical simulation of local scouring
- Ways of improving the seismic performance of open ground storey RC buildings
- Flood wave propagation in a braided river
- Meshless methods for structural analysis
- Environmental management information system
- Effect of fillers on performance of bitumen mixes
- Evaluation of VisSim software for simulation of Indian traffic
- PCU values for heterogeneous traffic

Representative list of M.Tech Projects

Structural Engineering

- Finding the damage levels using two structural health monitoring techniques
- Durability studies on concrete
- Inplane stiffness of masonry infilled walls
- Mesh free methods for beam problem

Transportation Engineering

- Macroscopic modeling of heterogeneous traffic
- A study on the behavior of plastic cell filled concrete block pavements with different thickness
- Analysis of fundamental relationships under heterogeneous traffic conditions
- Modeling of congested traffic

Water Resource Engineering and Management

- Impact of climate and land use change on tropical hydrologic catchments
- Geochemical modeling in landfill leaching
- Simulation study for flood risk management
- Development of rainfall and runoff model using WMS and ANN

Geotechnical Engineering

- Dynamic properties of soil for the design of machine foundations
- Strength of compressibility criteria for modified bentonite clay liner
- Experimental studies on blended soils
- Model for predicting the bearing capacity of geocell foundation

Environmental Engineering

- Surface water quality monitoring
- Removal of thiocyanate by adsorption
- Hydrochemical relationship between rainwater and groundwater
- Removal of iron from groundwater by artificial aquifer

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