Civil and Construction Engineering

Introduction

The Department of Civil and Construction Engineering at Chaoyang University of Technology, established in 1994 is young but prospective department among civil/construction engineering institutions in Taiwan. Currently offers Bachelor, Master, and PhD degrees. The department has been accredited by the IEET (ABET equivalent) since 2005. The department has three service centers and 13 specialized laboratories with a total area over 2,600 square meters. The service center - CNDT (center for Non-Destructive Testing) been promoted to university level R&D center has the annual commissioned budget averages ten million NT dollars.

Equal emphasis is placed on practical training and theoretical study throughout the academic program. Hands-on training is emphasized in the curriculum. Respective professionals at construction or consulting firms are invited as instructors for certain practical courses, such as Building Information Modeling, MEP Design and Collaboration, Working Drawing, and Construction Methods, etc. These efforts will enhance students' competitiveness in the job market.

Feature

The teaching and research activities of our faculties can be classified into three major groups: structural and material engineering, geotechnical engineering, and construction management, with an emphasis on the nondestructive evaluation.

Structural and Material Engineering

Main topics in the structural and material engineering group include investigations of loads and load combinations, calculation of internal forces and stresses, characterization of structural materials and members, and structural behavior. In additional to these traditional topics, versatile research topics such as behavior of cold-formed steel structure, non-destructive test (NDT) for concrete structures, assessment and repair of concrete cracks, special purpose concrete materials, and green building materials were also studied in depth.

Geotechnical Engineering

The main activities in the geotechnical group include: soil mechanic and foundation engineering, soil dynamics, natural hazard mitigation techniques related to earthquake, flood, debris/mud flow control; the application of soil and rock mechanics principles to the evaluation, design and construction of structures in and on soil or rock, including design of anchor systems, and soil improvement techniques; nondestructive integrity evaluation of driven piles and drilled shafts; and geophysical site investigation by stress wave propagation techniques.

Construction Management

The research topics in the construction management group include: 1. engineering law; 2. procurement system of public sector construction projects; 3. dynamic risk management in construction projects; 4. effective simulation mechanism for construction operations; 5. optimization of construction operations; 6. exploring the spatial information from given imagery visualizing the analyzed data by different mathematic methods; 7. analyzing the collected spatial data and applying the data

Curriculum

The aim of the undergraduate curriculum is for preparing students to attain the abilities and skills required for the following three representative job titles, namely: (1) Consulting Engineer, (2) Contracting Engineer, and (3)Project Management Engineer. 32 required courses include all the basic theoretical and technical knowledges which need to be acquainted with for the three job titles. Besides, students in junior year need to select one group of the courses which most related to their choice of professional job title.
The background of the faculty members includes structural engineering. geotechnical engineering. and management. Research projects are usually focused on topics related to construction technology, construction managemant, and construction materials. Areas of studies include, but not limit to, design and analysis, construction management, and materials for construction.

Undergraduate Program

Consulting Engineer (picking five courses form ten courses)

Engineering Mathematics (I), Structural Analysis(II), Steel Structural Design (II), Soil Mechanics (II), Reinforced Concrete Design(II), Measurement Science, Fluid Mechanics, Site Investigation and Planning, Prestressed Concrete, Road Way Engineering

Contracting Engineer (picking five courses form nine courses)

Building Facility, Field Safety and Environmental Protection, Industrial Safety, Hill Side Development Engineering, Measurement Science, Building Code, Industrial Hygiene, Site Investigation and Planning, Road Way Engineering

Project Management Engineer (picking five courses form nine courses)

Engineering Economy, Field Safety and Environmental Protection, Industrial Safety, Building Code, Industrial Hygiene, Building Information Modeling, Project Financial Management, MEP Design and Collaboration, Case Study on BIM Implementation

Graduate Program

Regard less of the Field

Writing of Science and Technology Reports

for the Field of Construction Management

Building Information Modeling, Construction Management, Information System, Project Management and Control, Applications of Artificial Intelligence and Deep Learning in Construction, Special Topics: System Analysis Method(I-III)

for the Field of Geotechnical Engineering

Rock Mechanics, Advanced Foundation Engineering, Advanced Soil Mechanics, Soil Dynamics, Special Topics on Excavation Technology (I-III)

for the Field of Structural Engineering

Structural Dynamics, Structural Design, Advanced Reinforced Concrete, Finite Element Analysis, Special Topics:Advanced Concrete Technology(I-III)

Structural testing

Scaffolding compression test

connections of steel structure design

Lab. and Research Center

Technical Service Center

The center for professional services was established as an affiliated unit with technical supports from the faculty members of the department of construction engineering. In addition to providing essential laboratory and field tests for the teaching programs of the department, the center also serves as liaison and platform of performing engineering consultants, which is opened to the general publics in Taiwan.

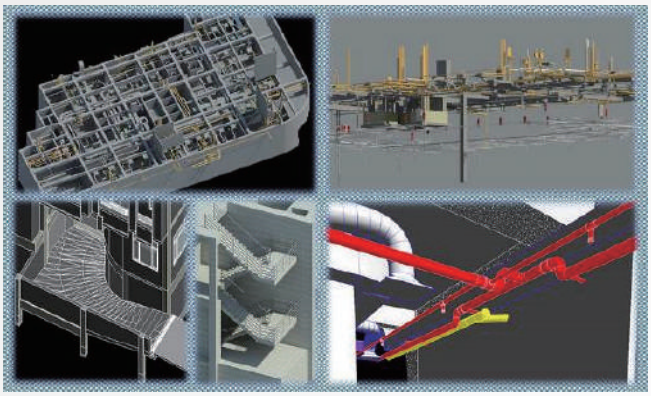
Center for Non-Destructive Testing (CNDT)

In CNDT, there are dozens of projects carried out each year. The annual commissioned budget averages ten million NT dollars. The main operative test methods include ground-penetrating radar, the stress wave methods (Impact-echo method, Impulse Response), the bridge dynamic displacement measurement, Infrared thermography, etc.. The testing subjects include nuclear power plants, high-speed railways, prestressed bridges, airport pavement, pier fundations, high-tech factory plants, dikes, dams, wind turbines, and residential structures, etc.

BIM Center

Development objective and strategy: The development objective for the Center is for the department to become an important base for which professional BIM talent cultivation and development of real-world practice research and innovation can prosper simultaneously. To pursue this goal, the operational scope of the Center will include talent cultivation and education, professional services, and industry-university cooperation research projects, while focusing on the development of skills necessary for proficiency in real-world application and practice of BIM as the core principle.

Ground Penetration Radar



Building structure and MEP system integration modeling results

Instruments measured by 3-D Lidar

Measurement on windmill by drone

Faculty

Name	Title	Education	Specialty
Cheng, Chia-Chi	Professor	Ph.D., Dept. of Civil Engr., Cornell University	Non-destructive evaluation for structural concrete
Cheng, Tao-Ming	Professor	Ph.D., Dept. of Civil Engr., Purdue University	GA/Simulation Applications
Chiang, Chih-Hung	Professor	Ph.D., Dept. of Mechanical Engr., University of Colorado Boulder	NDT of Structural Materials, Signal Processing
Hsu, Shih-Tsung	Professor	Ph.D., Dept. of Construction Engr., National Taiwan Univ. of Sci. & Tech.	Ground Anchors
Hsu, Sung-Chi	Professor	Ph.D., Dept. of Civil Engr., University of Texas at Austin	Rock Engineering, Tunneling, Engineering Geology
King, Won-Sun	Professor	Ph.D., Dept. Civil Engr., Purdue University	Structural Analysis and Design, Engineering Ethics, Green Building Materials
Lee, Ming-Gin	Professor	Ph.D., Dept. of Civil Engr., University of Florida	Concrete Engineering, Pavement Engineering
Lin, Ji-Yuan	Professor	Ph.D., Dept. of Civil Engr., National Chung Hsing University	Hazard Mitigation of Debris Flows
Pan, Chi-Ling	Professor	Ph.D., Dept. of Civil Engr., University of Missouri at Rolla	Cold-Formed Steel Structures
Yu, Wen-Der	Professor	Ph.D., Dept. of Civil Engr., Purdue University	Project Management Knowledge Management, Artificial Intelligence (AI), Building Information Modeling (BIM).
Chang, Tzyy-Shiou	Associate Professor	Ph.D., Dept. of Civil Engr., University of Michigan at Ann Abbor	Soil dynamic, Earthquake Engineering
Hsu, Wei-Ting	Associate Professor	Ph.D., Dept. of Civil Engr., National Chung Hsing University	Structural engineering, Facilities management
Huang, Yishuo	Associate Professor	Ph.D., Dept. of Civil Engr., University of Florida	Digital Photogrammetry, Data Visualization, Spatial Data Analysis
Kan, Yu-Cheng	Associate Professor	Ph.D., Dept. of Civil Engr., Kansas State University	Concrete Engineering
Lai, Jiunnren	Associate Professor	Ph.D., Dept. of Civil Engr., University of Texas at Austin	Geotechnical Engineering, Laboratory Testing, In-Situ Monitoring
Tsai, Pei-Hsun	Associate Professor	Ph.D., Dept. of Civil Engr., National Cheng Kong University	Soil Stabilization
Wang, Grace	Associate Professor	Ph.D., Dept. of Civil Engr., University of California at Irvine	Earthquake Engineering
Wu, Hsien-Tang	Associate Professor	Ph.D., Dept. of Civil Engr., National Cheng Kong University	Construction Management, Computer Simulation Optimization
Wu, Shengming	Associate Professor	Ph.D., Dept. of Civil Engr., University of Cincinati	Steel Structures, Engineering Law
Hsian, Wen-Ta	Assistant Professor	Ph.D., Dept. of Civil Engr., National Chung Hsing University	Construction Valuation, Construction Machinery, Construction Management
Hsu, Keng-Tsang	Assistant Professor	Ph.D., Dept. of Civil Engr., National Chung Hsing University	Non-destructive evaluation, Ground Penetration Radar (GPR), image processing
Wang, Kun-Chi	Assistant Professor	Ph.D., Dept. of Civil Engr., National Chiao Tung University	Quantity takeoffs based on BIM, Cost estimation based on BIM, Construction management based on BIM

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