Master of Engineering Management (MEM)

Raid Al-Aomar, PhD
Director of MEM program
Abu Dhabi University

Program Facts

- This is a unique graduate program for professionals who seek advancement in their career of engineering management.
- The program targets graduates of all engineering disciplines, in addition to computer science graduates.
- The program allows students to widen their breadth of knowledge beyond their technical field into Management and Business.
- The program curriculum is developed to be project-based and industry-oriented to meet the career needs of practitioners.
**Program Facts**

- The program is one-year old.
- The program is independent from Civil Engineering
- The majority of MEM students are working in construction companies
- The program is offered in collaboration with Purdue University Calumet (PUC).
- A new program in Master of Project Management (MPM) is under construction

**MEM Program Curricula/Core Courses**

- ACC 522: Advanced Managerial Accounting
- MEM 501 Project Management
- MEM 502 Engineering Economics
- MEM 504 Quality Engineering
- MEM 506 Simulation & Operations Research
- MEM 509 Information Technology Management
- MEM 511 Operations and Supply Chain Mgt.
- ECO 533 Managerial Economics
- 523 Strategic Management
- MGT 577 Management for Engineers
**MPM and Diploma Core Courses**

- MPM 501/MEM 501 Project Management
- MPM 521 Enterprise Project Planning, Integration and Scope Management
- MPM 531 Project Scheduling and Time Management
- MPM 561/MEM 508 Project Risk Management
- MPM 571/MEM 504 Managing Quality for Projects
- MPM 581 Project Cost Estimating and Control

**Issues of concern**

- The uniqueness of the program
- The development of the new programs; Project Management Master (PMP) and Diploma
- Lack of research resources
- Opportunities for collaboration with other universities
- No PhD program
FULTON schools of engineering
sustainable engineering and the built environment

New Structure

School of Sustainable Engineering and the Built Environment
(Edd Gibson—Interim Director)

Del E. Webb School of Construction
(Edd Gibson—Program Chair)

Civil, Environmental and Sustainable Engineering
(Mike Mamlouk—Program Chair)

Construction Engineering
(approved Oct 2010)
(Program Chair TBD)

Fulton Schools Vision

Engineering vision
Leading Engineering Discovery and Innovative Education for Global Impact on Quality of Life.

Engineering mission
SEBE Programs

- Civil, Environmental and Sustainable Engineering
  - Degree Programs
    - ABET accredited BSE, CE
    - Non-thesis MSE, CESE
    - Thesis MS, CESE
    - Ph.D., CESE
- DEW School of Construction
  - ACCE accredited BS CM
  - Non-thesis and thesis MS, CM
  - Ph.D., CM
- Construction Engineering (NEW)
  - ABET accredited BSE (2013)
  - Non-thesis MSE

SSEBE Enrollment

- Undergraduate Student Enrollment
  - Civil, Environmental and Sustainable Engineering (CESE)
  - Del E. Webb School of Construction (DEWSC)

- Undergraduate Degrees Awarded
  - Civil, Environmental and Sustainable Engineering (CESE)
  - Del E. Webb School of Construction (DEWSC)
SSEBE Enrollment

Graduate Student Enrollment
Civil, Environmental and Sustainable Engineering (CESE)
Del E. Webb School of Construction (DEWSC)

![Bar chart showing enrollment trends for SSEBE programs.]

Graduate Degrees Awarded
Civil, Environmental and Sustainable Engineering (CESE)
Del E. Webb School of Construction (DEWSC)

![Bar chart showing degree award trends for SSEBE programs.]

FULTON schools of engineering
sustainable engineering and the built environment

Research

- DEWSC Research
  - $1.4 M expenditures FY 2010, DEWSC
  - Trend is up 40 percent in three years

- Hiring:
  - New hire this year
    - Innovations in Design and Construction of Infrastructure Systems

FULTON schools of engineering
sustainable engineering and the built environment
Strengths

- Strong faculty (11)
- Eight faculty hold P.E. Licenses
- DEWSC has an international reputation
- CM and ConE in the same School
- Two mandatory internships for DEWSC
- Second language requirement considered for ConE
- Good support from Dean’s level
- Excellent Industry Support
- Significant annual giving and endowed funds
- Phoenix Metro Area – 6th Largest in USA

Challenges

- Resources
  - Facilities (limited space)
  - Money (2011)
  - Time (not much)
- Administrative turnover and alignment
- Aging faculty
- Curriculum reflects old paradigm (120 hours)
- Cultural change toward collaboration
DEWSC Priorities in 2011

- Hiring of new and diverse faculty
- More engagement of the industry advisory board for the School
- Curricula revisions
- Student retention/growth
- Growth in endowments
- International programs

The Greatest Challenge Today

"By God, gentlemen, I believe we've found it—the Fountain of Funding!"

© The New Yorker Collection 1977 Lee Lorenz from cartoonbank.com. All Rights Reserved.
The Construction Engineering and Management Profile
at Bauhaus-Universität Weimar

Hans-Joachim Bargstädt
Professor for Construction Engineering and Management
Bauhaus-Universität Weimar

Content:
• The Management program
• Research activities
• Disaster management
• CONVR2011 3. + 4. nov. 2011

The built environment

Bachelor program • Master program since 2001
Management
[Bau Immobilien Infrastruktur]
Management
[Construction Real Estate Infrastructure]
Changed needs

- Structural change in the construction market
  - Internationalisation of construction activities
  - Increasing networks of Construction Industry with other branches and disciplines
  - Demand for complete contract packages and functional solutions regarding the life cycle of buildings

- Professionalism of real estate business
  - Increasing importance of buildings as objects for investment
  - Evolution of real estate economics to a scientific discipline

- Changes in the operation strategies of infrastructure
  - Administrative reforms (New Public Management)
  - Increasing privatisation / PPP Models

The study programs in Management [Construction Real Estate Infrastructure] are the consequent answer to these challenges

Building Life Cycle

Civil engineers and architects have traditionally concentrated on planning and construction

Integration of architectural, engineering, economical, legal Aspects
Involvement of different engineers

- Drafting
- Designing
- Designing
- Sizing
- Simulation
- Analysis
- Modelling
- Assessing
- Operating
- Construction

Architektur • Engineering • Economics • Legal Aspects

Structure of Study Program

Consecutive structure of Bachelor and Master programs

Master of Science (M.Sc.)
4 Semester 120 credits

10
9
8
7

M.Sc. Arbeit

Austauschstudium
Projektstudium

Qualifizierungsstufe

Bachelor of Science (B.Sc.)
6 Semester 180 credits

6
5
4
3
2
1

B.Sc. Arbeit
Fachstudium
Grundstudium

Quereinstieg für:
- Managementingenieure
- Architekten
- Bauingenieure
- Wirtschaftswissenschaftler
- Wirtschaftsjuristen

➤ mit B.Sc.
➤ vergleichbarem Abschluss
➤ evtl. mit Berufserfahrung

Semester
**Characteristic features of our Graduates**

Our graduates are prepared in an excellent way for the actual and the future challenges on the labor market:

- **Interdisciplinary profile by integration of:**
  - technical, economical and some legal knowledge
  - Soft Skills
- **Consequent profiling for the considered branches by:**
  - Teaching the relevant methodological scientific expertise
  - Adressing innovations
- **Experience from abroad, for example by:**
  - projects in foreign languages
  - study phase abroad
  - Knowledge Centre @ Weimar
- **Practical input by:**
  - Higher share of lecturers from the national and international construction industry
## Main Teaching staff

- Prof. Alfen – professor for construction economics
- Prof. Bargstädt – professor for construction engineering and management
- Prof. Beucke – professor for information technology in civil engineering
- Prof. Nentwig – professor for Construction Management and Construction Economy

- Prof. Steinmetzger – associate professor for construction machinery and safety
- Prof. Grove – junior professor for infrastructure management/infrastructure economics
- Prof. Wellner – Junior professor for Real estate economics
- N. N. – Junior professor for building information modeling

- Prof. Havers – honorary professor for construction contracts
- Prof. Bauch – honorary professor for project management
- Prof. Höfler – honorary professor for contracting

## High level employment of Bauhaus graduates

<table>
<thead>
<tr>
<th>Commerz Leasing und Immobilien AG</th>
<th>Düsseldorf</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brune Consulting</td>
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<tr>
<td>HOCHTIEF Global One GmbH</td>
<td>Essen</td>
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<td>Ernst &amp; Young</td>
<td>Wiesbaden</td>
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<td>Landesbetrieb Liegenschaften- und Baubetreuung</td>
<td>Mainz</td>
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<tr>
<td>HERMANN KIRCHNER Projektgesellschaft mbH</td>
<td>Bad Hersfeld</td>
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<td>Helaba - Landesbank Hessen-Thüringen</td>
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<tr>
<td>Wachovia Bank N.A.</td>
<td>Frankfurt am Main</td>
</tr>
<tr>
<td>VBD Beratungsgesellschaft für Behörden mbH</td>
<td>Berlin/ München</td>
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<tr>
<td>OFB Projektentwicklung GmbH</td>
<td>Frankfurt am Main</td>
</tr>
<tr>
<td>WestKC (Westdeutsche Kommunal Consult GmbH)</td>
<td>Düsseldorf</td>
</tr>
<tr>
<td>Egnatia Odos SA</td>
<td>Thessaloniki/ GR</td>
</tr>
<tr>
<td>SRE Siemens Real Estate</td>
<td>München</td>
</tr>
<tr>
<td>Archon Group (Goldman Sachs Group Inc.)</td>
<td>Berlin</td>
</tr>
<tr>
<td>IVG Immobilien AG</td>
<td>Bonn</td>
</tr>
<tr>
<td>Lefevre Corporation</td>
<td>Los Angeles/ USA</td>
</tr>
<tr>
<td>WISAG Facility Management</td>
<td>Frankfurt am Main</td>
</tr>
<tr>
<td>Allen Consult GmbH</td>
<td>Weimar</td>
</tr>
</tbody>
</table>

und viele mehr ....
Folie 11

Hans-Joachim Bargstädt
Professor Dr.-Ing.

Research activities

Modeling

• 3d-Model with all components

![Diagram of curb model with components: inner curb, outer curb, concrete, reinforcement, protective layer, stainless steel clad sheeting, bituminous sheeting, sealing, primer.]

• Linking to the building processes

Mean value: 1.5 N/mm²
Minimum:

Inner curb
- Apply sealing
- Curing time: 12 - 18 h
- Curing time: 24 h

Outer curb
- Apply sealing
- Curing time: 12 - 18 h
- Curing time: 24 h

Research activities

Hans-Joachim Bargstädt
Professor Dr.-Ing.

Hong Ha Le, M.Sc.

Impact of weather on construction processes

Weather effects on construction processes

- Prevents workers from working
- Reduces labor productivity
- Prevents crane from operation
### Co-operation with shipbuilding industry

**Outfitting = finishing work**

**Constraint-concept with**
- Hard constraints (to be strictly observed)
- Soft constraints (respecting them results in certain benefits)

**discrete event simulation**

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<table>
<thead>
<tr>
<th><strong>Shipyard</strong></th>
<th><strong>construction site</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Outfitting processes</td>
<td>-</td>
</tr>
<tr>
<td>Structural steel work</td>
<td>-</td>
</tr>
<tr>
<td>Strict access control to site</td>
<td>-</td>
</tr>
<tr>
<td>Commissioning of material</td>
<td>-</td>
</tr>
<tr>
<td>Gantry &amp; tower cranes</td>
<td>-</td>
</tr>
<tr>
<td>Own company workers</td>
<td>-</td>
</tr>
<tr>
<td>Decisional authority</td>
<td>-</td>
</tr>
</tbody>
</table>

**In case of change orders:**
- Fixed completion date | Completion subject to changes
**Soft Constraints**

- Strategie Verschmutzung
  - „schmutzige“ vor „sauberen“ Prozessen
  - Vermeidung ungeplanter Aufräumprozesse
- Strategie Arbeitsbeanspruchung
  - Berücksichtigung der Beanspruchung der Arbeiter
  - Vermeidung von Überbeanspruchung und resultierende Ausführungsfehlern

---

**Management leadership information model**

- Management – Führung – Information – Simulation im Bauwesen

http://www.mefisto-bau.de
- high variability in construction processes, site equipment and logistic processes (variability by type, temporal & spatial)
- strong interaction of production and logistic processes

→ complex system with problems of multicriteria optimization
→ to find a feasible solution requires countless simulation runs
Standard book of construction work
Dynamische Baudaten – Standard-Leistungsbuch

Dynamic construction
Data
→ „German R.S.Means“

A comprehensive collection of current, neutral, and VOB-compliant tender information.
Several millions of specifications for 77 service areas are currently available.
Well-defined, technically sound and competitively neutral specification text.

ASIM Working group “one-of-a-kind”-processes

Objective:
Monitoring and gathering of various methods and tools for modelling and simulation of one-of-a-kind processes. These can be in construction industry, in industrial plants, in ship building, power plants.

More and more also the automotive industry and other consumer’s industries are shifting to high flexibility and more individualisation for the customers satisfaction. Therefore their methods and tools for modelling get more and more attractive also for the construction industry.
### Analogy

**Project Management – Disaster Management**

<table>
<thead>
<tr>
<th>Timeframe</th>
<th>Organisation Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 hrs – 6 weeks</td>
<td>disaster management organisation</td>
</tr>
<tr>
<td>6 days – 6 month</td>
<td>military operational organisation</td>
</tr>
<tr>
<td>6 weeks – 6 years</td>
<td>project management organisation</td>
</tr>
</tbody>
</table>

### Typology of disasters

- **Conflicts**
  - war
  - crime
  - terrorism attacks

- **Technical disasters**
  - oil-pollution
  - Emission of toxic gases
  - emission of radioactive substances
  - explosions
    - great fires
    - railway accidents
  - and so on

- **Disasters by nature**
  - **geological causes**
    - Earthquake
    - tsunami
    - land slipping
  - **extreme weather conditions**
    - flood
    - hurricane
    - hale
    - coldness
    - heat-wave
    - grasshopper-plague
    - snow-avalanches
Kinds of Incidents and Disasters

<table>
<thead>
<tr>
<th>Incident or Disaster</th>
<th>Dynamic</th>
<th>Unstable stationary</th>
<th>Stable stationary</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Fire</td>
<td>Landslide or collapsed building with injured people affected from it or enclosed by it</td>
<td>Traffic accident without injured persons</td>
</tr>
</tbody>
</table>

Traffic accident without injured persons
Aerial view of site of accident

Organisation of rescue areas
Crisis = Decision Situation

unfortunate progress = emergency

emergency:
requires fast actions

emergency-management:
acting
secure ability to act

crisis:
requires fast decisions

crisis-management:
decisions
secure ability to decide

11. International Conference on
Construction Application of Virtual Reality 2011

3.+ 4. November 2011
Weimar, Germany

www.convr2011.com
Overview of Carnegie Mellon
Civil and Environmental Engineering Department

Spring 2011

Lucio Soibelman Ph.D.
Professor
Co-Chief Editor of the ASCE Journal of Computing in Civil Engineering
Director Pennsylvania Smarter Infrastructure Incubator IBM Infrastructure/Facilities Information Analytics Lab

The Vision for this Department is...

to continue to achieve national and international recognition through the impact of its research and alumni in four core areas:

- advanced infrastructure systems;
- mechanics, materials and computing;
- water and air quality; and
- green design.

Our vision includes our department being a collegial, collaborative and welcoming environment in which to learn and work.
CEE, CIT and the University

CIT = Carnegie Institute of Technology, the Engineering College
CIT is about ~25% of Carnegie Mellon
CEE is about ~10% of CIT

What Makes CEE@CMU Unique?

- Remain highly ranked program with smaller number of faculty, staff and student body than most peers (USNWR Grad Rankings: 7 EE, 10 CE)
- Faculty distributed in a few areas of comparative advantage
  - AIS, EESM, MMC, and GD
  - Unique foci when compared to more traditional departments
- Systemic interdisciplinarity in research and educational activity
  - 4 joint appts, many co-advised students, a significant amount of research in units outside of CEE
- Extensive research center activity associated with department (9 centers)
- Significant external recognition for work in these areas
  - national awards, journal editorships, conference chairs, competitive in national grant competitions.
CEE Graduate Programs – AIS and GSC

This program focuses on planning, design, construction, and operation of built infrastructure:

1) **sensing and informatics** for the construction, operation and maintenance phases of infrastructure;
2) **new models, methods and tools** for planning, design, construction and facility management; and
3) developing **more sustainable processes and components** used in the built infrastructure.

**New Sensors** for civil infrastructure applications. Acoustic emission sensing is used to detect flaws or fatigue cracks in steel structures and piezoelectric transducers for detection of defects in natural gas pipelines.

**Exploring the use of laser scanners and embedded sensors during the construction process for the purpose of identifying and classifying construction deviations.**

CEE Graduate Programs - GD

Focuses on education and research to link responsible social and environmental stewardship with the design and engineering of products and systems

1) **sustainable infrastructure**
2) **energy and environment**
3) **carbon footprinting**
4) **life cycle assessment**, and
5) **education and outreach**

**Assessing the areas of product and infrastructure life cycles with the greatest environmental and energy impacts, e.g. life cycle infrastructure effects of various alternative fuel pathways.**

Green Design Apprenticeship program introduces environmental system problem solving skills to local high school students.
CEE Graduate Programs - EESM

This program focuses on:
1) air quality
2) environmental management, and
3) water, soil, and sediment quality

Sensor Networks for Monitoring Regional Water Quality. In collaboration with the River Alert Information Network (RAIN), evaluating total dissolved solids in the Monongahela River and the relationship of bromide precursors to high disinfection by-product formation in regional drinking water distribution systems.

Airborne Particulate Matter. Atmospheric particles are associated with significant public health problems and are also agents of climate change. These impacts are studied through laboratory studies, ambient monitoring, and computer modeling.

Environmental Implications of Nanotechnology. Elucidate the properties of engineered nanomaterials that determine their environmental fate, transport, and effects.

Bio-energy. Certain bacteria, known as electricigens, can couple their metabolism with electricity production while growing on electrodes.

CEE Graduate Programs - MMC

Focuses on modeling and large-scale computer simulation, with emphasis on
1) mechanics of crystalline, granular, and amorphous materials from atomistic to macroscopic scales;
2) engineering seismology, and
3) earthquake engineering

Field theory prediction of location, sequence, and type of partial dislocation nucleation in fcc Ni, validated against lattice statics calculation.

Snapshot of displacement profile due to an earthquake dislocation in Southern California.
CEE-Related Research Centers

- Brownfields Center
  - Director: Lange
- CAPS: Center for Atmospheric Particle Studies
  - Director: Donahue (ChemE)
- CEINT: Center for Environmental Implications of Nanotechnology
  - Director of CMU Activity: Lowry
- CenSCIR: Sensed Critical Infrastructure Research
  - Co-directors: Garrett and Moura (ECE)
- CM2EM: Center for Multiscale Modeling of Engineering Materials
  - Director: Acharya
- Green Design Institute
  - Co-directors: Hendrickson and Lave (Tepper)
- CSE: Center for Sustainable Engineering
  - Director: Davidson
- SEER: Steinbrenner Environmental Education and Research Institute
  - Director: Dzombak
- WaterQUEST: Urban Water Quality
  - Director: VanBriesen

CEE Faculty/Student Statistics for 2010/11

22 Faculty Members
  (19 FTE)
  (~12% of CIT)

125 undergraduate students
  (~7% of CIT)

144 FTE graduate students
  (~10% of CIT)
Graduate Students

- 144 FTE Graduate Students: 62 PhD, 82 MS
- 166 Graduate Students (Headcount): 76 PhD, 90 MS

New Initiatives in CEE

- The IBM Smarter Infrastructure Lab at Carnegie Mellon recently announced
  - 3D cave, high-end computing and data storage, and a number of other visualization technologies.
- NSF IGERT on the topic of: “Educating at the Interface: Nanotechnology-environmental effects and policy”
- CMU is part of a consortium, led by PSU, given a $129 million federal DOE grant to build an "energy innovation hub" at the Philadelphia Navy Yard.
  - The facility will serve as a testing ground for energy-efficient building technologies
- A number of grants from the National Energy Technology Lab have been recently awarded related to energy and the environment
- Dual PhD Degree Programs now with:
  - METU, EAFIT (in process)
Questions?
A Premier 
Construction Program

Irtishad Ahmad, Ph.D., P.E., F.ASCE 
Professor and Chair, Construction Management
FLORIDA INTERNATIONAL UNIVERSITY

Construction Management at FIU is unique because we offer:

- Location in Miami, proximity to Latin American and Caribbean countries, existence of a vibrant south Florida construction industry.
- Academic programs that are geared to working professionals and part-time students. Classes are offered in the afternoons, evenings and on weekends. In addition distance learning and online courses are also offered.
- Professors from industry: Adjunct Faculty who have extensive work experience in the field.
- Significant Workforce Development: Through a challenging curriculum and job-site work experience, students are work-ready from day one on the job and are fully prepared to make an impact in the field. They add great value to their profession and their companies.
- New program initiatives such as: the overseas program in the Dominican Republic and Panama, and online only Masters program.
Our Graduates

We are the program of choice and valued resource for the local construction industry. Our highly qualified graduates are eagerly sought by the industry because of their superior education, strong professional skills and extensive on-site work experience. In the past 3 years, our undergraduate enrollment has increased by 46% to 400, while graduate enrollment has shown a 24% increase to 200, reflecting the growing demand for FIU-trained construction managers.

Partnership with Industry

The Industry Advisory Council plays an important role in curriculum advising, identifying areas for continuing professional education, promoting industry support, raising funds for the department.
The FIU Construction Management Program now has:

- 400 undergraduate and 200 graduate (masters) students
- $400,000 of Endowment Fund Principal
- $500,000 in annual research funding
- 9 full-time faculty members and 15 adjunct faculty members (including presidents and senior management of local companies as well as law firm partners)
- 4,000 square feet of dedicated space; classroom and lab space are shared with the other departments in the College of Engineering

Research:

- ICT, Data Warehousing, ERP, Delivery Systems (I. Ahmad)
- Dispute Review Process, Sustainability, BIM (Y. Zhu)
- Warranty in construction, PPP in infrastructure construction (E. Bayraktar)
- Planning for disaster (W. Orabi)
International Conferences:


• Construction in the Twenty First Century-CITC VI-July 5-7, 2011, Kuala Lumpur, Malaysia, Organizer: Dr. I Ahmad and Dr. S. Ahmed (now at East Carolina University), http://www.citc.ecu.edu. For earlier CITC conferences please visit: www.fiu.edu/~citc
Construction Engineering and Management Program at IIT Delhi

by Prof. K.C. Iyer

Indian Institute of Technology Delhi is one of the seven Institutes of Technology created as centres of excellence for higher training, research and development in science, engineering and technology in India.

- 'Institute of National Importance'
- Heritage of excellence
- Autonomous body
- Freedom from Bureaucracy
- Institute of International standards
- Brand Value of IIT
- Global recognition

ABOUT IITDELHI

<table>
<thead>
<tr>
<th>IIT Delhi: Vital Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Departments</td>
</tr>
<tr>
<td>Centres</td>
</tr>
<tr>
<td>Schools</td>
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<tr>
<td>M.B.A</td>
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<tr>
<td>Ph.D.</td>
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</table>
### DEPARTMENTS AT IIT DELHI

1. Applied Mechanics  
2. Biochemical Engineering and Biotechnology  
3. Chemical Engineering  
4. Chemistry  
5. Civil Engineering  
6. Computer Science and Engineering  
7. Electrical Engineering  
8. Humanities and Social sciences  
9. Management Studies  
10. Mathematics  
11. Mechanical Engineering  
12. Physics  
13. Textile Technology

### CENTRES AT IIT DELHI

1. Centre for Applied research in Electronics (CARE)  
2. Centre for Atmospheric Sciences (CAS)  
3. Centre for Biomedical Engineering (CBME)  
4. Computer Service Centre (CSC)  
5. Centre for Energy Studies (CES)  
6. Educational Technology Services Centre (ETSC)  
7. Industrial Tribology, Machine Dynamics & Maintenance Engineering (ITMMEC)  
8. Instrument Design Development Centre (IDDC)  
9. Centre for Polymer Science & Engineering (CPSE)  
10. Centre for Rural Development & Technology (CRDT)  
11. National Resource Centre for Value Education in Engineering (NRCVEE)
## DEMOGRAPHICS AT IIT DELHI

### M.O.U.
- Foreign University/Industry: 47
- Indian Industry: 35

### HUMBOLDT Fellows
- 23

### HUMBOLDT Research Awards
- 2

### NRDC Awards
- 10

### Padma Shree
- 1

### Sponsored Research Projects
- 09-10: 116, Value Million UDS: 12.7
- 05-10: 490, Value Million UDS: 71.0

### International Projects
- Number: 33, Value Million UDS: 92

### Patents
- Applied for: 27, Granted: 10

### Continuing Education/Quality Improvement Programs
- Number: 35, Participants: 880
- Number: 139, Participants: 3172

### Average Pass-outs every year

<table>
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<tr>
<th>Degrees Awarded</th>
<th>Number</th>
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<tbody>
<tr>
<td>Ph.D.</td>
<td>134</td>
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<tr>
<td>M.S.(R.)</td>
<td>11</td>
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<tr>
<td>M.Tech</td>
<td>816</td>
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<tr>
<td>MBA</td>
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<tr>
<td>M.Sc.</td>
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<tr>
<td>Dual Degree</td>
<td>168</td>
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<tr>
<td>B.Tech</td>
<td>950</td>
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<tr>
<td>M.Des</td>
<td>20</td>
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<tr>
<td>DIIT</td>
<td>15</td>
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</tbody>
</table>

### Papers Published
- National/International Journals per year: 1252
- National/International Conferences per year: 1025

### ABOUT IIT DELHI

Continued.
Sponsored Research Projects at IITD

Stat. of Consultancy Projects at IITD
The IIT Delhi Library System consists of a Central Library and 18 departmental libraries which collectively support the teaching, research and extension programs of the Institute.

The Library uses Libsys software package which is an integrated multi-user library management system that supports all in-house operations of the Library.

More than 1,30,000 bibliographic records of books available in the Library.

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One of the primary Engineering Departments of the Institute, the Department of Civil Engineering offers B. Tech., M. Tech. and Ph.D. degrees programs.

- Geotechnical & Geoenvironmental Engineering Engineering
  - Engineering Geology
  - Rock Mechanics
- Structural Engineering
  - Offshore Structures
  - Construction Engineering Management & Building Science
- Environment Engineering & Management
  - Surveying & Remote Sensing
- Transportation Engineering
- Water Resources Engineering
Bachelor of Technology

Course Structure
- BS: Basic Sciences (Core)
- EAS: Engineering Arts and Sciences (Core)
- HU: Humanities and Social Sciences (Core)
- HM: Humanities and Social Sciences (Elective)
- DC: Departmental Core (Core)
- DE: Departmental Electives (Elective)
- OC: Open Category (Elective)

Admission through All India Admission Test (JEE) after 12th Std
Success Ratio ≈ 1 in 1000

The overall credits structure
Bachelor of Technology in Civil Engineering

<table>
<thead>
<tr>
<th>Undergraduate Core (UC)</th>
<th>Undergraduate Elective (UE)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Category</strong></td>
<td><strong>Credits</strong></td>
</tr>
<tr>
<td>DC</td>
<td>62</td>
</tr>
<tr>
<td>BS</td>
<td>20</td>
</tr>
<tr>
<td>EAS</td>
<td>21</td>
</tr>
<tr>
<td>HU</td>
<td>2</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>106</strong></td>
</tr>
</tbody>
</table>

Total credits = 180
Master of Technology

Admission to

- Fresh Graduates (Indian Nationals) – An All India Test (GATE)
- Industry sponsored (Indian Nationals) – A special test
- Foreign nationals – Based on Grad score & recommendations

Course Structure

- PC: Programme Core (42 credits)
- PE: Programme Electives (12 credits)
- OC: Open Category (9 credits)
- Total: 60 credits

CEM at IIT Delhi

- Aims to develop competent, knowledgeable construction and project managers with potential to manage a wide range of construction projects with complete control.

- The M.Tech program in Construction Engineering and Management trains engineers and architects in different areas of Construction technology and Management, analytical knowledge, functional design of buildings and building materials, safety and quality control and most importantly managing contracts and contractual projects.

- Aim is to expose the students to the latest and appropriate techniques in these areas.
STRENGTH OF CEM

- A Batch of young **architects and engineers**, prepared to get knowledge and skills required in the diverse fields of construction, quality and project management & co-ordination.

- Sharing classroom with various sponsored and experienced candidates widens the rational vision.

- Diverse knowledge of various analytical tools as well as exposure to designing, simulation, BIM and Project Management softwares.
  - Microsoft Project
  - Primavera
  - Auto CAD
  - Matlab
  - Revit (BIM)
  - STAAD Pro
  - Symphony
  - TORA

INDUSTRY PARTICIPATION AT CEM

- A unique blend of GATE qualified and sponsored candidates from Defence and best construction companies like LARSEN& TUBRO and DMRC allows exposure to best practices in the construction industry.

- Sharing classroom with various sponsored and experienced candidates widens the rational vision.
  - **L&T BIS**: Candidates selected through All India Exam allowing both the fresh and experienced engineers from Larsen & Tubro.
  - **DMRC**: Engineers and Architects from Delhi Metro Rail Corporation selected through rigorous process.

- An online programme for Ethiopian students through Video Conf Mode.
The Department takes pride in having excellent and dedicated faculty.
- Dedicated world class faculty with degrees from the best national and international institutes.
- Authors of renowned books and major research journals with several patents on their name.
- Best consultants in industry and also mentor students in startups.

Jain A.K. [Ph.D. (IIT/D)] Professor
**Area of Interest:** Design of RCC and Steel Structures, Earthquake Engineering, Wind Engineering, Offshore Structures.

B. [Ph.D. (IIT/D)] Professor
**Area of Interest:** Durability of Concrete, Rebar Corrosion, Cement based Composites, Construction Technology, Building Science.

Iyer K.C. [Ph D. (IIT Madras)] Professor
**Area of Interest:** Financial Management; Project Risks; Legal Issues in Business; and Project Management.

Gupta Supratic [Ph.D. (Nagoya)] Asst. Professor
**Area of Interest:** Concrete Mechanics, Self Compacting Concrete, FEM analysis of Structures, Constitute Modeling of Material.

Jha K. N. [Ph.D. (IIT Delhi)] Asst. Professor
**Area of Interest:** Financial Management; Project Success Factors, Organizational Management, Project Risks, Construction Safety

Maheswari J. U. [Ph.D. (IIT/M)] Asst. Professor
**Area of Interest:** Construction Project Management with Fast Track & Concurrent Engineering Projects, Design Management.
COURSES IN CEM AT IIT DELHI

- Project Planning and Control
- Quantitative Methods in Construction Management
- Civil Engineering Materials
- Construction Engineering Practices
- Construction Methods and Equipments
- Construction & Contract Management
- Construction Economics & Finance
- Construction Engineering and Information Technology Lab
- Systems Design and Value Analysis
- Recent Advances in Construction Materials
- Management of Quality and Safety in Construction
- Functional Planning, Building Services and Maintenance Management
- Building Science

INDIAN INSTITUTE OF TECHNOLOGY DELHI
CONSTRUCTION ENGINEERING AND MANAGEMENT

PLACEMENT AT IIT DELHI

Following list is of companies which took part in the Campus Recruitment Process 2010-11.

- Indian Oil Corporation Ltd (IOCL)
- Atkins
- BPCL
- Caterpillar
- Cushman & Wakefield
- Deloitte
- DLF
- Engineers India
- Ernst & Young
- Fluor Daniel
- International Design & Engg. Solutions
- IRCON.
- ITC
- Larsen & Toubro
- NTPC
- Pricewaterhouse Coopers
- Reliance Industries
- Schlumberger
- Shimizu Corporations
- TCE Consulting Engineers
Thank you
Iowa State University

Construction Engineering and Management Program
Charles Jahren and Edward Jaselskis

Unique Features (UG Program)

- 50 years of tradition (senior dinners, awards ceremony, and family environment)—see anniversary book
- One of eleven ABET accredited Construction Engineering programs (largest program with ~400 UG students)
- Strong Learning Community (team building, leadership, and program/industry awareness)
- Two capstone courses (Design-Build and Competitive Bid)
- Six active student organizations (AGC, DB, MCA, NECA, SLC, and Residential)
- ASC teams that consistently place at the top in regional competitions and at the national level (Regional: 40 awards; National: 5)
- Dedicated Industry Advisory Council
Unique Features (Graduate Program)

- Strong relationship with Iowa and InTrans Institute
- CMAT Program within InTrans
  - Evolution to more funding from feds and other states
  - Provides support to
    - Concrete Paving Technology Center
    - Asphalt Materials & Pavements Program
    - Bridge Engineering Center
    - Earthworks Research Technology Center
    - Geo-ConE Program
- Online Education program for MEng students
- Good synergy between graduate and undergraduate programs
  - Graduate students TA and grade courses
  - Graduate courses serve as senior elective for high performing students
Activities of the
Institute for Technology and Management in Construction

Prof. Dr.-Ing. Fritz Gehbauer, M.S.

First Global Leadership Forum for Construction Engineering and Management Programs
March 20 - 22, 2011

Contents

1. Karlsruhe and the University
2. The Institute
3. Teaching
4. Research in Technology
   4.1 Technology in general
   4.2 Decommissioning of Nuclear Facilities
5. Research in Management
   5.1 Lean Construction Management
   5.2 Real Estate and Facility Management
First Global Leadership Forum for Construction Engineering and Management Programs
March 20 - 22, 2011

1. Karlsruhe and the University

„Fan city“ Karlsruhe
First Global Leadership Forum for Construction Engineering and Management Programs
March 20 - 22, 2011

Karlsruhe University - Campus South

Research Pioneers of the Universität Karlsruhe

Carl ENGLER
1842-1925
Chemistry:
Petroleum Research

Carl BENZ
1844-1929
Automobile Engineer

Ferdinand BRAUN
1850-1918
Physics:
Braun Tube (TV)
Nobel Prize 1909

Heinrich HERTZ
1857-1894
Physics:
Electromagnetic Waves

Theodor REHBOCK
1864-1950
Hydraulic Engineer:
Hydraulic Experiments

Fritz HABER
1868-1934
Chemistry:
Ammoniac Synthesis
Nobel Prize 1918
First Global Leadership Forum for Construction Engineering and Management Programs
March 20 - 22, 2011

Faculties

<table>
<thead>
<tr>
<th>Faculties</th>
<th>Institutes</th>
<th>Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematics</td>
<td>5</td>
<td>1,048</td>
</tr>
<tr>
<td>Physics</td>
<td>11</td>
<td>1,273</td>
</tr>
<tr>
<td>Chemistry and Lifesciences</td>
<td>8</td>
<td>1,232</td>
</tr>
<tr>
<td>Humanities and Social Sciences</td>
<td>6</td>
<td>1,253</td>
</tr>
<tr>
<td>Architecture</td>
<td>10</td>
<td>988</td>
</tr>
<tr>
<td>Civil Engineering-, Geo- and Environmental Sciences</td>
<td>19</td>
<td>1,323</td>
</tr>
<tr>
<td>Mechanical Engineering</td>
<td>20</td>
<td>3,020</td>
</tr>
<tr>
<td>Chemical and Process Engineering</td>
<td>6</td>
<td>703</td>
</tr>
<tr>
<td>Electrical Engineering and Information Technology</td>
<td>14</td>
<td>1,724</td>
</tr>
<tr>
<td>Computer Sciences</td>
<td>8</td>
<td>2,718</td>
</tr>
<tr>
<td>Economics and Business Engineering</td>
<td>11</td>
<td>3,009</td>
</tr>
<tr>
<td>Interfacultative Master Courses</td>
<td>30</td>
<td></td>
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<tr>
<td>„Studienkolleg“</td>
<td></td>
<td>176</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>18,515</td>
</tr>
</tbody>
</table>

Faculty of Civil Engineering, Geo- and Environmental Sciences

Civil Engineering

- Construction Engineering
- Water and Environment
- Urbanisation and Infrastructure Planning
- Construction Management
- Geotechnics

Including 23 Institutes
2. The Institute for Technology and Management in Construction (Construction Management)

Staff

- **Director of Institute:**
  - Prof. Dr.-Ing. Fritz Gehbauer

- **Manager of Facility Management:**
  - Prof. Dr.-Ing. Dipl.-Wi.-Ing. Kunibert Lennerts

- **Manager of Decommissioning of Nuclear Facilities**
  - Prof. Dr.-Ing. Sascha Gentes
First Global Leadership Forum for Construction Engineering and Management Programs
March 20 - 22, 2011

3. Teaching
3.1 Teaching for all students

(Bachelor of Science)

Teaching for all students

- Structural engineering and turnkey prefabricated buildings

formwork and scaffolding in building construction and civil engineering, materials preparation technologies, concrete batching and transport technologies
Teaching for all students

Law and Contracts

3.2 Teaching for students specializing in Construction Management
(Master of Science)
### Structure of the TMB Master Programme at the KIT (over 2 years in 4 semesters)

#### Part 1

<table>
<thead>
<tr>
<th>Module</th>
<th>Course</th>
<th>Credit Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction Management and Work Planning</td>
<td>Work Planning</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Site Operation Methods and Equipment in Construction</td>
<td>3</td>
</tr>
<tr>
<td>Mechanical Engineering</td>
<td>Basic Principles of Machine Technology</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Construction Machinery and Mechanical Process Engineering</td>
<td>4</td>
</tr>
<tr>
<td>Construction Management and Building Law</td>
<td>Site Management</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Safety in Construction</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Law of Contract and Law of Site Management</td>
<td>3</td>
</tr>
<tr>
<td>Economics and Management in Construction</td>
<td>Cost Estimation</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Financing / Investment / Controllin</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Forms of Organisations</td>
<td>1</td>
</tr>
<tr>
<td>Facility Management and Real Estate Management</td>
<td>Facility Management 1</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Real Estate Management 1</td>
<td>3</td>
</tr>
</tbody>
</table>

**TOTAL CORE MODULES**

<table>
<thead>
<tr>
<th>Credit Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
</tr>
</tbody>
</table>

#### Part 4

<table>
<thead>
<tr>
<th>Module</th>
<th>Course</th>
<th>Credit Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technics of Construction Equipment</td>
<td>Mechanics and Technology of Construction Equipment</td>
<td>3</td>
</tr>
<tr>
<td>Aggregate and Concrete Production</td>
<td>Seminar Construction Equipment</td>
<td>3</td>
</tr>
<tr>
<td>Aggregate Production</td>
<td>Blasting Techniques</td>
<td>1</td>
</tr>
<tr>
<td>Aggregate Production</td>
<td>Aggregate Production</td>
<td>2</td>
</tr>
<tr>
<td>Production and Transport of Concrete</td>
<td>Production and Transport of Concrete</td>
<td>3</td>
</tr>
<tr>
<td>Dismantling of Nuclear Facilities</td>
<td>Disassembly and Decontamination of Nuclear Facilities</td>
<td>3</td>
</tr>
<tr>
<td>Sustainability in Construction and Lifecycle Management</td>
<td>Lifecycle Management</td>
<td>3</td>
</tr>
<tr>
<td>Facility Management of Special types of Real Estate</td>
<td>Facility Management of non standard Real Estate</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Public Real Estate Management</td>
<td>2</td>
</tr>
<tr>
<td>Building Maintenance and Preservation</td>
<td>Conservation, Restoration and Reinforcement</td>
<td>3</td>
</tr>
<tr>
<td>Human Resources and Customer Relationship Management</td>
<td>Human Resources and Customer Relationship Management in the Sector of Real Estate</td>
<td>6</td>
</tr>
</tbody>
</table>

**TOTAL CORE ELECTIVE MODULES** (at least 10 modules with 6 CP each selected)

- 60
- 60

**TOTAL MASTER CREDIT POINTS (CP)**

<table>
<thead>
<tr>
<th>Credit Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>120</td>
</tr>
</tbody>
</table>
4. Research in Technology

Automatic Control and Shock Stress Limitation for Vibratory Pile Driving
Decommissioning of nuclear facilities

Rescue and saving of buried people
First Global Leadership Forum for Construction Engineering and Management Programs
March 20 - 22, 2011

Computer integrated road construction

Adaptation of construction vehicles to rescue applications

Suction pipe on the arm of a hydraulic excavator
Extended suction pipe led over cantilever arm
Suction machine
Postgraduate programme "Natural Disasters"

Technologies and Projects

- e.g. for decontamination
Technologies and Projects

- Further developments of AMANDA with practical application at the nuclear power station in Würgassen, Germany

Technologies and Projects

- e.g. separation of steel and reinforced concretes
Technologies and Projects

- **ASTU**
  - Automatisierte Seilsägetechnologie für Unterwasserdemo"ntage (Automated Wire Cutting Technology for Underwater Dissassembly)

- Funded by BMBF
- A joint project with Siempelkamp Nukleartechnik GmbH and Hilti Corporation

Technologies and Projects

- e.g. for the management of the entire decommissioning process
Technologies and Projects

- Lean Management – WAK
  - Introduction of lean management methods for the highly complex field of decommissioning nuclear facilities
  - Pilot project for the decommissioning of the reprocessing facility’s vitrification plant in Karlsruhe, Germany
  - Increased efficiency and added value for the entire procedural chain up to the release of a decontaminated site

- KIT stand at Hannover Trade Fair 2009
  - Presentation of AMANDA I
  - Test rig of suction plates
Examples of Completed Projects

- Cutting off of brackets KWO – SNT
- Test rig at TMB

5. Research in Management
5.1 Lean Construction Management

(separate presentation)

5.2 Education and research in the area of Real Estate and Facility Management
Maintenance Budgeting – new approach

Calculation method \textbf{PABI}

- \textbf{P} Practical oriented
- \textbf{A} Adaptive
- \textbf{B} Budgeting
- \textbf{I} Maintenance measures (I = Instandhaltung)

\[ B_{IH} = \sum_{i=1}^{n} B_{IH,i}^{r} + \sum_{i=1}^{n} B_{IH,i}^{e} \]

- \( B_{IH} \) maintenance budget
- \( r \) regular
- \( e \) singular
- \( n \) number of buildings

Institute for Technology and Management in Construction

Prof. Dr.-Ing. Fritz Gehbauer, M.S.
First Global Leadership Forum for Construction Engineering and Management Programs
March 20 - 22, 2011
Where is Taiwan?
Location

- Taipei
- Kaohsiung
- 50 km from Taipei city
- 20 km from Taiwan Taoyuan International Airport

History

- Established in 1991, as one area in the Department of Civil Engineering at NCU
- Became a separate Institute in 2001 and offers both Master and Ph.D. degree programs
- There are currently 5 full time and 5 adjunct faculty members, 32 Master students, 40 part-time Master students and 18 Doctoral students.
- Following the successful development of the Division, the Institute continues to grow vigorously in all dimensions owing to the tremendous need of the country for the domain knowledge of construction engineering and management.
Facilities

Statistics - last 5 years

- **Percentage of Graduation (Master)**
  - 97.1% (2 years)

- **Percentage of employment (Master)**
  - 81.5% (actual)
  - 100% (leave out involuntary unemployment)

- **Research funding**
  - National Science Council: 260,000 US$/yr
  - Government, industry: 400,000 US$/yr
Faculty

Rong-Yau Ethan Huang

• **Research Interest**
  1. Sustainable Construction
  2. Green Building and Construction
  3. Recycling and Management of Building and Construction Wastes
  4. Life-Cycle Management of Infrastructure
  5. Lean Construction

Professor & Chairman
Purdue University, U.S.A., Ph.D.
Nie-Jia Jerry Yau

- **Research Interest**
  1. Scheduling and Delay Analysis
  2. Construction Disputes and Arbitration
  3. Bridge Management System
  4. Disaster Management System

Professor
University of Illinois at Urbana-Champaign, U.S.A., Ph.D.

Ting-Ya Hsieh

- **Research Interest**
  1. Construction Public Laws
  2. International Turkey Contracting
  3. Construction Contract Dispute Resolution
  4. Construction Productivity
  5. Project Risk Management & Decision Making

Professor
University of Texas at Austin, U.S.A., Ph.D.
University of Pennsylvania, U.S.A., LLM
Soo-Chow University, R.O.C., Master of Laws
Jyh-Bin Yang

• **Research Interest**
  1. Construction Management and Project Management
  2. Project Scheduling & Delay Analysis
  3. Procurement Performance Evaluation and Performance-Based Contract
  4. Knowledge Management System Development
  5. Applications of AI & IT in Construction Management

Professor
National Central University, R.O.C., Ph.D.

Jieh-Haur Chen

• **Research Interest**
  1. Computational Intelligence and Human-Computer Interaction in Construction
  2. Cost Control and Human Resource Management
  3. Managerial Finance in Engineering
  4. Real Estate and Property Management

Associate Professor
University of Wisconsin at Madison, U.S.A. Ph.D.
Northwestern University, U.S.A., Master of Management
Non tenure track

<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
<th>Education</th>
<th>Research Interest</th>
</tr>
</thead>
</table>
| Chien-Chung John Li   | Adjunct Professor    | Michigan State University, U.S.A., Ph.D.      | • Governmental Procurement Regime  
• Private Participation in Public Construction  
• Public Construction Policy                  |
| Tsung-Chung Kao       | Adjunct Professor    | University of California, Berkeley, U.S.A., Ph.D. | • Project Management  
• Construction Management                      |
| Chung-i Kevin Yen     | Adjunct Assistant Professor | Purdue University, U.S.A., Ph.D. | • Infrastructure management and maintenance  
• IT application in construction management  
• Operation research and system analysis  
• Scheduling and project management            |
| Yu-Sheng Chang        | Adjunct Assistant Professor | National Cheng Kung University, R.O.C., Ph.D. | • Green Construction  
• Environmental Control System                  |
| Po-Chein Wang         | Adjunct Assistant Professor | University of Illinois, U.S.A., Master of Laws | • Contracts and Laws  
• Project disputes and arbitration               |

Teaching

- **Undergraduate (supporting Civil Dept.)**
  - Construction Management (3)
  - Construction Project Management (3)
  - Engineering Economics (3)
  - Introduction of Management (2)

- **Graduate**
  - Construction Planning and Control (3)
  - Computer Applications in Construction Management (3)
  - Construction Contract and Arbitration (3)
  - Legal Topics in Engineering (3)
Teaching (cont.)

- Managerial Finance for Construction Engineering and Management (3)
- Cost accounting in Engineering (3)
- Construction Productivity (2)
- Simulation of Construction Operations (3)
- Construction Engineering System Analysis Methods (3)
- Green Building & Green Building Materials (3)
- Special Topics in Construction Law (3)
- Research Methodology for Construction (3)
- Construction Management Seminar (1)
- ISO Managerial Systems and CSI Standards Seminar (1)

Teaching (cont.)

• Graduate (Part-time Master Degree)
  - Project Integration and Scope Management (3)
  - Project Schedule Management (3)
  - Project Cost Management (3)
  - Project Quality Management (3)
  - Project Human Resource Management (3)
  - Project Information and Communication Management (3)
  - Project Procurement Management (3)
  - Project Risk Management (3)
  - Project Contract Management (3)
  - Engineering Research Methodology & Special Topics (3)
Activity

Visiting activities

- 2006: Taiwan High Speed Rail
- 2008: Thermal power plant
- 2007: Alumni back to school
- 2006: Visiting Southeast University
- 2006: Visiting City University HK
- 2007: ILDMI symposium
- 2010: Visiting Chongqing University
Extra-curriculums activities

Thank you for your attention

Please do come and visit us at National Central University !!
Areas of research

1. Government Procurement and BOT.
2. Internet in construction management.
3. Expert systems in construction management.
4. Project disputes and arbitration.
5. Facility and bridge management systems.
6. Construction Operation and Lean Production.
7. Life cycle management and green construction.
11. Construction risk management.
13. Human resource management.
14. Professional construction management and innovative Project delivery systems.
15. Professional liability insurance in construction.
North Carolina State University

Dr. William Rasdorf

CCEE Department

• 3 BS Degree Programs - (EAC-ABET)
  – Civil Engineering
  – Construction Engineering & Management
  – Environmental Engineering
  – 1,000 Undergraduate Students
  – 170 CE
  – 29 CEM
  – 16 ENE
degrees, 2009-10

• MCE, MS, PhD - Civil Engineering
  – 300 Graduate Students

• 13th in program quality (US News & World Report)
CCEE Department

• 40+ Faculty Members
• 3rd Largest NCSU Engineering U/G Program
• 2nd Largest NCSU Engineering Grad Program
• 3rd best buy in public universities
  – (US News & World Report)
• 4.4 M$ in research expenditures 2009-10

Trends

"kids": sharp + aware (responsive to "ads")

• overall: growth
• CEM
  – 9/11 (w/ CE)
  – 25% unempl.
• ENE
  – market
  – "green"

![Enrollment Trends](chart)
CFL - Research & Development

- Large Structural Systems
- Construction Materials & Processes
- Geotechnical Engineering Systems

Construction Engineering & Management

- 1964: NCSU - Construction Extension Program
  - established in cooperation with Carolinas AGC
- 1976:
  - Graduate program in CEM grows significantly
  - ABET: Construction Engineering Program Criteria
    - NC State faculty + ASCE, AGC & others
  - NC State BSCEC under new criteria, renamed
  - BS in Construction Engineering & Management (CEM)
Construction Engineering & Management

- 1980: CE Distance courses offered
  - College of Engineering’s Master of Engineering (MoE)
- 2000: Distance courses increase; more CEM
  - improvements in technologies and demand
- 2002: Master of Civil Engineering, distance only
  - approved by Graduate School
  - Construction Engineering & Manag’t - 1 of 5 specialties
    - about 50 CE courses taught - students in 28 states

Outreach

- Engineering On-Line
- Construction Extension
  - DOD, DOT, CM diploma

Distance Extension

- about 60 short courses & workshops per year
- with about 2500 industry attendees
Construction Engineering & Management

• Faculty:
  – David Johnston - retiring in December
  – Mike Leming (NCSU '77)
    • Coordinator of Advising; CEM Program Coord'r
  – Min Liu
  – Extension Specialist - Roberto Nunez

  looking for more

Construction Engineering & Management

• Topics
  Construction Project
  – Construction Materials; Soils; Steel; Concrete…
  – Construction courses:
    • Time Value of Money; Decision Making
    • Estimating
    • Planning and Scheduling
    • Legal Aspects of Construction
    • Construction Equipment & Methods
    • Building Construction
  – Others (Mech-Elec; accounting, econ, …)
Unique Features of CEM @ Purdue

Makrand (Mark) Hastak, Ph.D., CCE
Professor and Head
Construction Engineering & Management
Purdue University, USA

Introduction to CEM @ Purdue

• Established in 1976 (35 years) as a stand alone degree granting Division within College of Engineering

• CEM Faculty
  – 7 tenure track CEM/CE faculty
  – 2 tenure track ME faculty (Courtesy Appointment)
  – 2 tenure track NE faculty (Courtesy Appointment)
  – 4 Continuing Lecturers/ Lecturers
  – 1 Director of Internships/Continuing Lecturer
Introduction to CEM @ Purdue

CEM Curriculum

- Degree: BSCEM
  - 80% Engineering, 20% Management
  - Focused on construction industry requirements
  - Areas of specialization
    - Students can Minor in any areas of Engineering
    - Three 12-week internships with CEM sponsor firm (Required for Graduation)
- Minor in CEM available for students in other majors
- Also BSCE (with specialization in Construction offered through Civil Engineering)
  - Courses covered by faculty with CEM/CE appointments
The Purdue Construction Graduate Program:
- students admitted through CE
- whereas UG students are directly admitted through CEM

- Over 50 construction Ph.D.s have graduated in CEM over the past 20 years.
  - Most of them have found academic placement.
Discovery and innovation in construction engineering and management:

- Augmented Reality/Virtual Reality (Dunston)
- Contract Management with IT (Dunston, Martinez, Kandil, Hastak)
- Construction Safety (Abraham)
- Cost control and risk management (Hastak, Kandil)
- Dispute Resolution (Kandil)
- Disaster risk reduction (Hastak, Abraham)
- GIS (Cai)
- Infrastructure management (ALL)
- Project management and decision-making (ALL)
- Profitability (Hastak)
- Simulation (Martinez)
- Strategic planning (Hastak)

Research supported by: NSF, NCHRP, ODOT, INDOT, NIOSH, QNRF, and CII.
First Global Leadership Forum for Construction Engineering and Management Programs

Purdue University
March 20 - 22, 2011

Stuart Anderson, PhD, PE
Construction Engineering and Management
Zachry Department of Civil Engineering

Context

• Civil Engineering Department
  - 1100 undergraduate students
  - 400 plus graduate students
  - Ten areas covered including Construction Engineering and Management

• Department Organization
  - Four Divisions
  - CEM under Construction, Geotech, and Structures

• CEM Program
  - Undergraduate specialty area with 50 to 75 students
  - Separate area for Graduate Program with 42 students
    • Offer ME, MS, PhD, DEng
  - Five faculty in CEM area
Unique Features of CEM Program

- Faculty have substantial Industry experience
  - Industrial Design and Construction - over 25 years
  - Commercial Building - over 12 years
  - Airports - over 2 years

- National Academy Representation
  - Engineering
  - Construction

- Risk is a primary focus area
  - Course content - every course has some risk content
  - Research

- Large endowments sponsored by Industry donors
  - Zachry Construction Company
  - Clark Construction
  - Beavers Foundation

Unique Features of CEM Program

- Two one year industry driven CEM graduate programs
  - Construction Engineering
  - Construction Project Management

- Doctor of Engineering Program
  - Practice focused degree
  - One year internship with Record of Study
  - Oral defense and archive Record of Study

- Collaboration with Texas Transportation Institute
  - Research in Highway Industry at both state and national levels
  - Research in Other Transportation Industries
Questions
A Presentation to the
First Global Leadership Forum for CEM Programs
At Purdue University

The College of Architecture at
Texas A&M University
At-A-Glance

Dr. Jorge Vanegas
Dean

March 21, 2010

Howdy from Ajman, UAE...!
College of Architecture
Differential Tuition Proposals FY 2012

Vision
Is about a higher quality of life for PEOPLE (individuals, families, communities, & public/private organizations), and a higher quality of PLACE (natural, built, & virtual), where they live, work, serve, learn, heal, play, buy, interact, and more...
Talent +
(Development and Maintenance of Technical, Interpersonal, Communications, Leadership, Management, Thinking, Learning, and Technological Skills, Abilities, & Competencies)

Infrastructure =
(Processes, Mechanisms, and Resource Base for Learning/Teaching, Research/Creative Work/Scholarship, Engagement, Integration in Theory & Practice, Pluridisciplinarity, Discovery/Knowledge Creation, Expanded Scholarship, and Technology)

Capacity for Impact
(Individuals, Families, Communities, Organizations in the Public & Private Sectors, Society, and the World)
... With a focus on five primary thrust areas within our academic mission...
College of Architecture
Differential Tuition Proposals FY 2012

1. **Sustainability**

Is about the development of robust tools to assess the effectiveness, efficiency, vulnerability, and resiliency of real-world ecosystems across temporal and spatial scales, from regional/urban to facility scales.

2. **Health**

Is about the development of evidence-based design strategies and guidelines to ameliorate the negative impact of the natural and physical environment on health and safety, also across temporal and spatial scales, from regional/urban to facility scales.
3 Visualization
Is about the creation of a commorancy where art, science, and technology enable visually-mediated understanding of natural, built, and virtual environments.

4 Integration
Is about pursuing the elusive goal of integration
(a) in Academia;
(b) in Theory; and
(c) in Practice...
Integration
Integration in Academia...

Pluridisciplinarity
Knowledge Creation
Expanded Scholarship

Integrated
Academic Missions &
Learning Environments
First:

**CARC initiatives follow a paradigm of pluridisciplinarity...**

Disciplinarity, multidisciplinarity, interdisciplinarity, crossdisciplinarity, and transdisciplinarity are like five arrows shot from but a single bow: **unity of knowledge**
We pursue...

Questions,

Problems,

Needs,

Opportunities,

Aspirations...

How we do it, varies...

Disciplinarity

Question
Problem
Need
Opportunity
Aspiration in the
Natural, Built,
or Virtual
Environments
Pluridisciplinarity is concerned with the study of a Q/P/N/O/A, not in only one discipline, but in several at the same time.

Multidisciplinarity

- Question
- Problem
- Need
- Opportunity
- Aspiration in the Natural, Built, or Virtual Environments

Discipline B

Discipline A

Discipline D

Discipline C

Discipline E
Interdisciplinarity

(Discipline A, B, C, D, E)

Question
Problem
Need
Opportunity
Aspiration in the
Natural, Built, or Virtual
Environments

Crossdisciplinarity

(Discipline A, B, C)

Question
Problem
Need
Opportunity
Aspiration in the
Natural, Built, or Virtual
Environments
Transdisciplinarity

Unity of Knowledge

Second:

CARC initiatives follow a paradigm of integrated academic missions and integrated learning environments, built upon a foundation of transdisciplinarity...
College of Architecture
Differential Tuition Proposals FY 2012

Transdisciplinarity

Learning/Teaching
Teaching what is researched
Researching what is taught and how
Taking to Practice what is taught
Teaching what is being practiced

Research/Creative Work/Scholarship
Researching what is being practiced
Taking to Practice what is researched
Researching what is being practiced

Engagement
(Practice, Outreach, and Service)

Teaching what is researched
Researching what is taught and how
Taking to Practice what is taught
Teaching what is being practiced

Enhanced Learning Experiences
(1)

Learning/Teaching
Through Integrated Learning/Teaching & Research/Creative Work

Research/Creative Work/Scholarship
Through Integrated Research/Creative Work & Engagement

Engagement
(Practice, Outreach, and Service)

Enhanced Learning Experiences
(2)

Enhanced Learning Experiences
(3)

Transdisciplinarity
Third:

CARC initiatives follow a paradigm of discovery and knowledge creation to move from the Baseline of what is, to a Vision of what can be, also built upon a foundation of transdisciplinarity...

From what is...

DRIVERS

External Context

Questions, Problems, Needs, Opportunities, Aspirations...

Current State (Status Quo)

Internal Context

Transdisciplinarity
To what can be...

Answers,
Solutions,
Satisfaction,
Realization,
Fulfillment...

Transdisciplinarity

Through...

DRIVERS

OUTCOMES

External Context

Current State
(Status Quo)

Future State
(Vision)

Internal Context

RD4E

Transdisciplinarity
Fourth:

CARC initiatives follow a paradigm of expanded scholarship, also built upon a foundation of transdisciplinarity...
Transdisciplinarity

Foundation of Scholarship in CARC

Capacity for Impact
Infrastructure
Talent

Departments, Centers & Institutes, and Other Sources of Scholarship within the College (Well Rounded Foundation)
College of Architecture
Differential Tuition Proposals FY 2012

Expanded Vision of Scholarship in CARC

- Teaching (contextual)
- Application (contextual)
- Engagement (contextual)
- Discovery (disciplinary)
- Integration

Disciplinary Depth Within the Knowledge Domains in each College Unit

Departments, Centers & Institutes, and Other Sources of Scholarship within the College (Well Rounded Foundation)

Transdisciplinarity

... At a global scale...

Through strategic alliances and partnerships... ... and...
Integration in Theory, among disciplinary areas of focus within CARC...

Integrated Regional Planning
Integrated Urban Planning and Design

Integrated Land Development
Integrated Facility Delivery
(Planning, Design, and Construction)

Integrated Facility Management
Integration in Practice, among disciplinary areas of focus within CARC...
College of Architecture
Differential Tuition Proposals FY 2012

Integrated Business Practices

Integrated Project Delivery
Integrated High Performance Teams

Integrated Design Processes
Integrated Procurement/Construction Processes

↓

Integrated Technologies
Technology

Is about the development of technologies that support integration in academia, in theory, and in practice, and also, it is about the implementation of interoperability among them.
Framing BIM... Building Information MODELING

Institutional Context
For the AEC Industry and Academic Programs (Practice, Education, and Research)

(BIM Platform)

(College of Architecture
Dr. Jorge Vanegas, Dean

(Inspired by M. Vorster)
To use information modeling/models to **accelerate** the drawing production processes...

To exchange data with partners to **transform** business...
To smooth supply chains for **industry-wide transformation**...

And the future for **CARC**...?
It begins with...

**CARC's Academic Mission:**
- Learning/Teaching
- Research, Creative Work, and Scholarship
- Engagement (Practice, Outreach, & Service)

Embedded within...

**An Integrated Discovery & Knowledge Generation Continuum:**
1. Benchmarks & Baselines
2. Visions & Desired Outcomes
3. Research
4. Development
5. Demonstration
6. Deployment
7. Dissemination
8. Evaluation
An Engagement Continuum with Relevant Sociotechnical Groups:

(1) Building science investigators; (2) Social science investigators; (3) Land & real estate development specialists; (4) Planning & AE design specialists; (5) General contractors & specialty subcontractors specialists; (6) Facility managers specialists; (7) Visualization specialists; (8) Policy/Code-makers; (9) Utilities/Service providers; (10) Technology, equipment, products, and materials manufacturers; (11) Financial institutions; and (12) Educational institutions...

Creating over time...
Creating over time...

Visions & Desired Outcomes

Benchmarks & Baselines

Time

Leading to...

(1) Innovative **Sustainable Products** for the Natural, Built, and Virtual Environments

(2) Innovative **Sustainable Processes** for the Natural, Built, and Virtual Environments

(3) Innovative **Sustainable Business Models** for the Delivery of Innovative Products and Processes for the Natural, Built, and Virtual Environments

(4) Innovative **Barrier Breakers, Obstacle Removers, and Enablers** for the Implementation of Innovative Sustainable Products, Processes, and Business Models for the Natural, Built, and Virtual Environments
... To enable our vision:

A higher quality of life for PEOPLE (individuals, families, communities, & public/private organizations), and a higher quality of PLACE (natural, built, & virtual), where they live, work, serve, learn, heal, play, buy, interact, and more...

Thank you...
Working towards a world-class academic department in the construction and real estate field

Professor Geoffrey Q.P. Shen
Department of Building and Real Estate
The Hong Kong Polytechnic University

21-22 March 2011

Greetings!
1. Overview of BRE

- One of the very first three departments of the University established in 1937
- Strong research activities
- Attractive teaching programmes
- Large number of established alumni
- Strong links with the industry
- Intellectually-challenging environment
Vision and Mission

**Vision**: To become a world-class academic department in the construction and real estate field

**Mission**: To achieve academic excellence in the context of construction and real estate.

---

2. Research/Scholarly Activities

- Leading position in winning RGC GRF grants in the building and real estate field in Hong Kong.
- Outstanding publications in “A” journals in the construction and real estate field.
- Research projects not only have academic merits, but also application value to the industry.
- Thomson Routers ranked PolyU No. 1 in terms of publications and citations between 2003-2008 in “Construction and Building Technology”.
Research Funding

- For nine consecutive years since 2001/2002, PolyU ranked 1st among all institutions in Hong Kong in both the amount of funding and the number of grants received in the discipline of “Civil Engineering, Surveying, Building & Construction”.

Our Scholarly Publications

*Thomson Reuters Survey, 2009*

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*For the entire University of Illinois system but mainly the University of Illinois at Urbana-Champaign*

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<td>The Technical University of Denmark</td>
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Research Centres/Groups

Department of Building and Real Estate

Research Centre for Construction & Real Estate Economics
  - Land & Construction Economics
  - Real Estate Economics

Research Centre for Construction Innovation
  - Sustainable Development
  - Construction Safety
  - Housing
  - Construction IT
  - Value Management in Construction
  - Contractual & Regulatory Innovations
  - Project Management

Impact on Industry/Community

- International recognition by peers
- Members of editorial board of leading journals
- Keynote addresses in international conferences
- Members of scientific committees of conferences
- Technology transfer to the construction industry
- Roles played by our staff and alumni in society
Entire project team collaborating on one BIM model

• Grand Award – International Presbyopia Centre 2006
• Gold Award
  - Award of High Scientific and Technological Level of the Invention from Romania Ministry of Education, Research and Youth
  - High-power LED Street Lighting System with a Modular Lamp Holder
  - Inventor: Ir Prof Wing-bun Lee
  - Dr Sandy To
  - Team members: Dr Mui-lan Chung, Dr Wing-kin Tang

• Grand Award – Prize of the First Invention & Researcher in Islamic World
  - Gold Award
  - Chinese Chess for the Visually Impaired People
  - Inventor: Dr Kueh-Wai Michael Siu
  - Team members: Dr Cheung Yiu-ming, Dr Siu Kiu-leung

• Gold Award with the congratulations of the Jury
  - Award of High Scientific and Technological Level of the Invention from Romania Ministry of Education, Research and Youth
  - Rapid Demountable Platform (RDP)
  - Inventor: Prof Albert P C Chan
  - Prof Francis K W Wong
  - Team members: Dr Lam Po-chung, Dr Michael Ch. Yap, Mr Paul Li, Madeline C, Kathy Wong, Mrs Winnie Lui, Dr M K Lo, Mr W W Wong

By Department of Building and Real Estate / Industrial Centre / College of Science / Technology
3. Teaching and Learning Activities

- Biggest educator of professional manpower for the building and real estate industry in HK.
- A wide range of academic programmes including PhD, Master, and Bachelor degrees.
- Popular programmes, with strong curriculum and extra-curricular activities.

Outstanding PolyU Alumni

Dr. the Hon. Leung Chun-ying
Higher Diploma in Surveying, 1974
Member of Executive Council, HKSAR and Chairman, DTZ Debenham Tie Leung Ltd

Ir Prof. Ng Sai-ko
Diploma in Building, 1962
Consultant, DLS Management Ltd

Dr. Alex Cheung Wai-kei
Associate in Building Technology & Management, 1982
Managing Director, Professional Engineering Ltd., Former Director of Buildings Department

Mr. David C. C. Chan
Higher Diploma in Surveying & Building Technology, 1970
Chief Executive Officer, China Land (Asia Pacific) Ltd

Prof. Kenneth Pang Tsan-wing
Higher Diploma in Surveying / Building Technology, 1967
Former Commissioner of Rating and Valuation, Rating and Valuation Department, Government of the HKSAR

Mr. Liu Sing-cheong
Higher Diploma in Surveying (General Practice), 1973; Advanced Higher Diploma in General Practice Surveying, 1979
Managing Director, Pearl River Hong Kong Real Estate Consultants Ltd

Ir Lo Yiu-ching
Higher Diploma in Structural Engineering, 1966
Former Permanent Secretary for the Environment, Transport & Works (Works), HKSAR

Mr. Marco W. Moon-kei
Higher Diploma in Surveying and Building Technology, 1987
Vice-Chairman, Hong Kong Housing Society

Mr. Ng Wing-hong
Diploma in Building, 1940

Mr. Thomas Ho On-sing
Higher Diploma in Building Technology and Management, 1978
Chief Executive, Gammon Construction Ltd.
Academic Programmes

PhD/MPhils (50 Students)

Master programmes: (400 Students)
- Construction Law and Dispute Resolution
- Construction and Real Estate
- Project Management
- International Real Estate

Degree programmes (760 Students)
- Building Engineering and Management
- Property Management
- Surveying

Student Exchange Programmes

- Deakin University
- University of Western Sydney
- University of Seoul
- University of Montreal
- Loughborough University
- Georgia Institute of Technology
- Osaka University
- Queensland University of Technology

Source: http://www.libertytravel.com/Maps/global_map1.jpg
Work Integrated Education

Mentorship Scheme
4. Professional Services

- Black and Veatch
- Chevalier (Construction) Co. Ltd.
- China Vanke Co. Ltd.
- Chiu Hing Construction & Transportation Company Limited
- Chubb Hong Kong Limited
- Chun Wo Construction & Engineering Co. Ltd.
- Civil Engineering and Development Department
- Construct IT (Hong Kong) Ltd.
- Consumer Council
- Drainage Services Department
- E Man Construction Co. Ltd.
- Fukien Secondary School (Kwun Tong) Ltd
- Gammon Construction Ltd.
- Henderson Real Estate Agency Limited
- Highways Department, HKSAR
- Ho & Ip Solicitors
- Housing Authority
- Housing Society
- K. Wah Real Estates Co. Ltd.
- Land Supreme Surveyors Ltd.
- MTR Corporation Limited
- Pat Davie Ltd.
- Shenzhen Real Estate Research Center
- Sun Hung Kai Real Estate Agency Ltd.
- The Hong Kong Institute of Surveyors
- The University of Hong Kong
- Wah Dai Engineering Company Limited
- Water Supplies Department
- Yau Lee Construction Ltd.

Industrial Links
5. Staffing & Resources

Academic Staff (33)
- Chair Professors: 2
- Professors: 7
- Associate Professors: 8
- Assistant Professors: 8
- Senior Lecturer/Lecturers: 8

Teaching Staff (12)
- Teaching Fellows: 2
- Instructor/Tutors: 10

Adjunct/Visiting Staff (12)

Admin/Technical Staff (22)

Research Staff (42)

Experienced and Dedicated Staff
Research and Teaching Facilities

– Sustainable City Lab
– Building Technology Lab
– Virtual Prototyping Lab
– Information Technology Lab
– Project Studio

6. Summary

• A long journey
• Benchmarking
• Indicators
  – Professors
  – Students
  – Facilities
  – Environment
  – Others?
Academically-challenging and rewarding environment

Happy moments in the congregation!
Construction Engineering and Management at

Tsinghua University

Prof Dongping FANG
March 21-22

Tsinghua Facts

55 Departments in 15 Schools
3,100 faculty members
31,000 students
HISTORY

1911  *Tsinghua University* Founded (100 years ago)

1926  *Civil Eng. Division in Engineering School*

1928  *Dept of Civil Engineering*

1952  *Dept of Hydraulic Engineering*

1953  *Division of Construction Engineering*

1985  *Construction Engineering and Management*  
(a program in civil engineering department)

Dept of Civil Engineering  
Dept of Hydraulic Engineering  

Feb, 2000

*School of Civil Engineering*

Dept of Civil Engineering  
Dept of Hydraulic Engineering  
Dept of Construction Management

VIP Graduate:  *Hu Jintao, the President of P.R. China*
Department of Construction Management

18 faculty members
100 undergraduate students
70 graduate students + PhD candidates

Department Organization

• Administration:
  – Under School & shared School General Office
  – Dept Head & Deputy Head + Dept Secretary

• Academic Institutes:
  – Institute of Engineering Management
  – Institute of Real Estate Studies
  – Institute of International Engineering Project Management
  – Institute of Construction Tech & Project Mgmt

• Joint Centers:
  – Tsinghua-Gammon Construction Safety Research Center
  – Tsinghua-Hong Kong PolyU Center for IT in Construction
  – Tsinghua-RICS Learning Center
  – Tsinghua-CIOB Learning Center
Research

Construction Engineering, Economics and Management

construction engineering
building technology and green construction, advanced technology for concrete engineering, IT and productivity in construction;

building economics
value management, life-cycle costing and feasibility study for developers;

laws and regulations related to construction
construction laws, insurance and bonding system, and anti-corruption strategies in public and private works;

Research

Construction Engineering, Economics and Management (continued)

project management
organizational project management, project governance, procurement and contract management; risk management for construction program/projects

international construction and project finance (BOT/PFI/PPP);

SHE (safety, health and environment) management in construction
Safety culture, BBS, environmental management system and life-cycle environmental impact assessment of construction project.
Research

Real Estate Economics and Management

urban and real estate economics, real estate finance and investment, real estate development, housing policy, property management and land management.

Current research

Information Cost and Market Efficiency in Housing Market
the Spatial Interaction of Jobs and Housing in Chinese Cities
the Urban Economy and Housing Market, the Urban Housing Price Index based on Real Transactions in 40 Major Chinese Cities
the Measurement of Risk and Return in Chinese Real Estate Market

Degree Programs

• Undergraduate Program (full-time) (30 students/year)
  • Construction and Real Estate

• Masters Program (full-time) (15-20 students/years)
  • Management Science and Engineering with specialization in:
    - Construction Project Management
    - Real Estate Economics and Management
    - Advanced Construction Technology

• Masters Program (part-time) (200 students)
  • Project Management
  • Architecture and Civil Engineering

• Ph.D. Program (full-time) (30 students)
  • Management Science and Engineering with specialization in:
    - Construction Engineering and Management
    - Real Estate Economics and Management
Tsinghua Summer School for International Construction 2011

The summer school will cover hot topics in international construction, including:
1. Global and Chinese construction industry
2. Project financing
3. Safety and risk management
4. Labor issues, etc.

Beijing, China
13-20th July, 2011
Tsinghua University

For more information and to register, please visit http://www.globalprogram.cn

Tsinghua University
Beijing, China

1. Zero Harm
2. A destination for 2012
3. A life with no death from work-related illness
4. Aim to get Zero Harm from 2011
Construction Engineering and Management Innovation Competition
Yu Kuan Chair Professors Group

Master’s program for international students

International Construction and Project Management
Targeted Students

- **Priority**
  - 1st Mgmt. professionals (managers, CEOs)
  - 2nd Perspective undergrads

- **Requirements**
  - Mandatory
    - Non-Chinese / international students)
    - First Degree: Bachelor
    - English ability (GRE, TOFEL, Etc.)
  - Preferable
    - Industrial experience
    - Professional qualifications
    - MS degree
    - Chinese proficiency

Themes / Features

- Internationalization
- Sustainability
- Effective project delivery
- Chinese culture / market
The ICPM Framework

Graduation Requirements: Courses

Required: Culture, Math, Seminar, etc. (Credit = 9)
Optional: (Credit = 14)

Research Skills
- Mathematics (Operational Research, Applied statistics) (REQ)
- Lit. Review / Proposal, Seminar (REQ)
- Metrics (Liao)
- Research Methods (TBD)
- English Writing for Construction Students (TBD)

Technical Aspect
- Construction Management (Pan) (PM) (HR)
- Concession Project Finance (Wang) (FM)
- Risk and safety management in construction (Fang) (PM)
- Professionalism, Ethics, and Leadership (Ofori) (BM)
- Information Technology (Chimney) (PM)
- Construction Business Management (Flanagan) (BM)

Theme / Culture
- Chinese Fundamental (REQ)
- Chinese Culture (REQ)
- Construction Contract Law (Liao)
- Regional / Urban and Real Estate Economic (Yang, Zheng) [Market]
- Anti-Corruption in the Construction Industry (Deng) (HR)
- History of Chinese Architecture (Dept. of Architect)
- Green Building (Dept. of Architect)
- Intl Project Management (TBD)
Graduation Requirements: Research

- **Master Report (Supervisor + Reviewer)**
  - Min. standard: Case studies or above
  - Expected achievement: International comparisons OR Practical solutions

- **Master Thesis (with Defense)**
  - Min. standard: regular master
  - Expected achievement: academic contributions

Leveraging Courses and Research

- Research
- Course
- Report
  - CR=27
- Thesis
  - CR=23
Tsinghua Campus Tour
Question?

Thanks
University of Alberta

Dr. Simaan Abourizk

The Hole School of Construction Engineering
ROOTED IN INDUSTRY PARTNERSHIPS

Over 50 Companies Involved
Truly Collaborative Research
Built from the Ground Up with Industry Partners
Funded Jointly by NSERC and Companies: IRC, CRD
Research and Apply Simulation Tools and Concepts
Since 1991, **13** Construction Engineering Professors

**Introduced Graduate Training** to Alberta Contractors

Nearly All Graduates Go On to **Careers with Partners**

- **36** MEng students (24 credits, project), **22** MSc students (18 credits, thesis), **28** PhD students (thesis)

**11** Graduate Courses, **3** Undergraduate Courses

Industry Involvement via **Site Visits & Industry Guests**
Construction Program at the University of British Columbia

Thomas Froese
First Global Leadership Forum for Construction Engineering and Management Programs
March 21, 2011

Vancouver, Canada

- On Canada’s west coast, its 3rd largest city
- Rated “the most livable city in the world”
  The Economist Magazine
- 2010 Winter Olympics
- Very multicultural population
The University of British Columbia

- 35,000 undergrads; 7,500 graduate students
- One of Canada’s Top Universities, in world’s ‘Top 40’

Project & Construction Management at UBC

- Group within The Department of Civil Engineering
Faculty

• **Prof. Thomas Froese**, PhD (Stanford)
  • Assoc. Head, Undergraduate Programs
  • Construction Group Leader
  • Director, M.Eng, International Option

• **Prof. Alan Russell**, Ph.D. (M.I.T.),
  • Chair of Computer Integrated Construction

• **Assoc. Prof. Sheryl Staub-French**, PhD (Stanford)
  • Bauder Chair of Engineering Economics
  • Director of Engineering Management Option

Research Focus Areas

• **Construction IT**
  • Interoperability
  • BIM
  • Information Management
  • Project Planning and Control Systems

• **Project Delivery Systems**
  • Public-Private Partnerships
  • Economic and Risk Management

• **Sustainability**

• **Infrastructure Management**

• **Engineering Education**
Undergraduate

- One core & two elective course in civil eng. program
- Project management in team project/professional skills courses throughout program
- Active project-based, team-based, and community-service learning

Graduate Programs

- Master of Engineering
  - Non-thesis
  - About 40 students per year
- Master of Applied Science
  - Thesis
  - 5 Students
- Ph.D.
  - 12 students
Courses

- Construction Planning and Control
- Construction Case Studies and Production Management
- Construction Economics
- Project Management
- Construction Law
- Construction Information Systems
- 3D /4D Modelling
- Project Delivery
- Introduction to building systems
- Sustainable Infrastructure Management

International Option

- First term in Beijing
International Option

Program completed in Vancouver

Graduate student numbers

Grad Students per Faculty Member

- Construction: 30.3
- Rest of Civil: 6.9
- Rest of Engineering: 7.1

Legend:
- All Grads Per Fac
- PhD per Fac
Hiring

Expect to be hiring one faculty and one instructor within the next year or two.
University of Colorado

Dr. Keith Molenaar

Construction Engineering and Management Program

University of Colorado Boulder

Global Leadership Forum for Construction Engineering and Management Programs

Purdue University
March 20-22, 2011
Colorado CEM Faculty

James Diekmann
Professor Emeritus, NAC

Matthew Hallowell
Assistant Professor

Amy Javernick-Will
Assistant Professor

Keith Molenaar
Department Chair &
Lewis CEM Professor

William Yearsley
Senior Instructor &
Petry CEM Professor

Colorado CEM Courses
(Architectural and Civil Engineering Degrees)

**Undergraduate**
- Introduction to Building Construction
- Introduction to Construction
- Construction Equipment and Methods
- Construction Cost Engineering
- Planning and Scheduling
- Construction Contract Administration

**Graduate**
- Construction Financial Management
- Construction Project Delivery
- Design Development
- Engineering Risk and Decision Analysis
- Global Projects and Organizations
- Legal Aspects of Construction
- Safety and Quality
Colorado CEM Research

High-Performance Project Delivery

- Innovative Project Delivery
- Cost and Schedule Risk Analysis
- Global Projects and Organizations
- Knowledge Management
- Organizational Learning
- Construction Safety
The School of the Built Environment

Professor Mike Kagioglou
Head of School

Where is Salford?

Salford is one of 3 universities in Manchester

Manchester is the largest student city in Europe (200,000 students approx.)

Manchester is 2 hours from London by train, Manchester International Airport is 20 minutes from the University

Manchester is the UK’s second cultural city after London

Manchester Public Tram system
The University of Salford

Founded 1896 currently approximately 22,000 students - 3500 International

12 Schools grouped into 3 Colleges:
- Science and Technology:
  - School of the Built Environment
  - School of Science and Technology
  - School of Environmental and Life Sciences
- Arts, Media and Social Sciences
- Health and Social Care
To be the UK centre of excellence, in the Built Environment and recognised as one of world’s top 5 Built Environment schools

77 academic staff (from 14 countries) and 50 researchers and project managers - including 21 professors and in addition 30 external visiting Professors. Our academic staff include:

- Construction Managers
- IT Specialists
- Architects
- Quantity Surveyors
- Building Surveyors
- Facilities Managers
- Construction Economists
- Sustainability Specialists
- Lawyers
- Real Estate Specialists
- Civil Engineers
- Building Service Engineers

Premier Quality - Top in Research
Premier Quality - Highly rated Teaching

RICS Accredited
Chartered Institute of Building Accredited
Chartered Institute of Architectural Technologists Accredited
Queen's anniversary prize award
Directorates and Centres within the school

- SCRI/HaCIRIC
- SURFACE
- CIT
- RCEBE
- Urban Quality
- MIC
- CDR
- CFM&RE
- SURF
- CCI
- CIAA
- ThinkLab

<table>
<thead>
<tr>
<th>Undergraduate courses</th>
<th>Accreditation</th>
<th>Duration</th>
<th>Entry requirements</th>
</tr>
</thead>
</table>
| BSc (Hons) Architectural Design and Technology            | CIAT, CIOB    | Full-time, 3 years  
 or with optional work placement 4 years or Part-time, 5 years | 300 points (A level BBB) to include English and Maths at level C or above  
 ND: Distinction/Merit/Merit  
 NC: Distinction/Distinction                                |
| BSc (Hons) Quantity Surveying                            | RICS, CIOB    |                                                   |                                                         |
| BSc (Hons) Building Surveying                            | CIOB          |                                                   |                                                         |
| BSc (Hons) Property Management and Investment            | RICS          |                                                   |                                                         |
| BSc (Hons) Construction Project Management               | CIOB          |                                                   |                                                         |
| BSc (Hons) Construction Management (Employer sponsored)  | CIOB          | Sandwich with industrial placements, 4 years     |                                                         |
| HND/HNC Construction and Property                        |               | Full-time, 2 years  
 Part-time, 2 years | 180 points (BC or DDD at A level)  
 BTEC ND: Merit/Pass/Pass or NC Merit/Merit              |
SOBE MSc programmes offer flexible options

- Urban Design and regeneration
- BIM and Integrated Design
- Sustainable Building Design
- Digital Architectural Design
- Accessibility & Inclusive Design
- Project Management in Construction
- Construction Management
- Quantity Surveying
- Quantity Surveying (M & E)
- Real Estate and Property Management
- Real Estate Development
- Corporate RE and Facilities Management
- Construction Law and Practice

MSc
Full time (12 months)
or
Part time by interactive, Internet distance learning (28 months)
or
Part time on campus (28 months)

180 credits are needed ASSESSMENT is only through coursework

Programmes enrol September and January (NB Jan starts normally add 4 months to duration)

SOBE students are from all over the world

MSc
India
Nigeria
Turkey
Colombia
Egypt
Bahrain
Syria
Eire
Bangladesh
Malaysia
Saudi Arabia
North America
Zimbabwe
Cyprus
UAE
Iran

Doctoral
India
Libya
Malaysia
Sri Lanka
Nigeria
Ireland
Turkey
China
Ghana
Eire
Kuwait
Saudi Arabia
Iran
Bangladesh
N. America
Indonesia
Australia

BSc
India
Malaysia
Cyprus
Botswana
Zimbabwe
Nigeria
Pakistan
Poland
Sri Lanka
Zaire
Angola
Turkey
Oman
Libya
Eire
China
Iran
SOBE Student population
Over 2200

UG FT by region
- UK and EU: 83%
- Other: 17%

PGT by mode of study
- Full-time: 24%
- Part-time: 76%

Distance learning: 72%

PGR by mode of study
- FT: 54%
- PT: 46%

Embedded in Industry - Driving Innovation

Research power (FTE x Average)

School of the Built Environment
www.sobe.salford.ac.uk

UoA 30 (Architecture & BE) - (RAE 2008)
SOBE Research Centres
We play a leading role in Built Environment research internationally through innovative fundamental and real-world research.

Centre for IT Construction
Communication, visualisation, integration and systems research.

Centre for Disaster Resilience
The role of construction in disaster resilience.

Centre for Real Estate and Facilities Management
Empowering operational assets.

Management in Construction

Salford Centre for Research and Innovation and Health and Care Infrastructures Research and Innovation Centre
Multidisciplinary research

Inclusive Design Research Centre

Urban Quality Research Centre
Built environment development to satisfy quality-of-life expectations.

Centre for Sustainable Urban and Regional Futures
Inter-disciplinary research on sustainable Urban policy.

Centre for Archaeology

Some Achievements
Centre for Disaster Resilience: 1 out of only five UN internationally recognised centres and the only academic

Salford Centre for Research & Innovation
(EPSRC funded Research Centre -> 2011; £8M)

Health and Care Infrastructure Research & Innovation Centre
(EPSRC funded Research Centre; £2.3M)

- 2 EU Roadmaps
- NoE - Intellicity
- IP - ManuBuild (21 partners; €11M)
- IP - Future Work Spaces (€12M)
- High level representation at EU/UK

- 7 EPSRC Networks
- SUE II Project (SURegen, £3M)
- Media City Project (£2.7M)
Disaster Management Research

• Capability and capacity building
• Built environment education for disaster management
• Advanced skills creation
• Disaster management in developing countries
• Disaster preparedness

Communication research: Advanced Virtual Environment technologies

- eSpaces
- Think Lab
- Imaging
- Powerwall
- Future working
- Tracking
Centre for Construction Innovation

A network of over 30,000 individuals and 15,000 organisations in the North West

40,000 hits per month on our website

10 interns per annum, who have gone on to have successful careers at Tate, Liverpool, Christie’s, and Sotheby’s, London

One of the most exciting art, architecture and design contracts in Europe

CUBE commissioned art
University of Seoul (South Korea)

CEM Program

Professor Chang-Taek Hyun, Ph.D., P.E.
Vice President, KICEM (Korea Institute of CEM)

CONTENTS

1. Department History
2. Research
3. Teaching
4. Academic Management
5. Issues and Concerns
6. Collaboration Opportunities
7. KICEM
1. Department History

1975: Inauguration of Architectural Engineering Department

1982: Inauguration of the Masters program in the Graduate School

1985: Inauguration of the Ph.D program in the Graduate School

1985: Inauguration of the Masters program in the Graduate School

1985: Inauguration of the Ph.D program in the Graduate School

1996: The Programs in Architecture and Architectural Engineering were reestablished as 4-year programs within the newly formed Faculty of Architecture, Urban Planning, Landscape Architecture, and College of Urban Sciences

1999: Post-professional Graduate program re-established as Graduate School of Urban Science

2000: Department of Architecture and Department of Architectural Engineering established

2002: Inauguration of the 5-year Program in Architecture

2002: Start to prepare ABEEK (Accreditation Board for Engineering Education of Korea)

2003: Department of Architecture and Department of Architectural Engineering established as independent programs in the Graduate School

2005: Reorganization into School of Architecture and Architectural Engineering

2009: Receive the Accreditation of ABEEK

2009: Receive the Accreditation of ABEEK

Department: From 1975~(36 years)

CEM Program: From 1997~(14 years)
1. Department History

- Purpose of Department

- Prepare opportunity to study overall construction process, form feasibility study to maintenance and demolition

- Provide global leadership in the Architectural Engineering and urbanism of the Asian Arena

- Nurture fundamental engineer based on innovative program, various practical experience, and extramural activities

1. Department History

- Purpose of CEM

To produce excellent specialists who can proactively lead the 21st century’s construction environments.

- Construction environments are being rapidly changed both in Korea and abroad.

- The Laboratory of Construction Engineering and Management performs research in various fields.
1. Department History

- Faculty

Professor

Dr. Chang-Taek Hyun
Construction Engineering and Management

Dr. Jung-Ho Huh
Building Energy and Environment, HAVC System Design and Control

Dr. Myung-O Yoon
Architectural Materials & Fire Protection Engineering

Dr. Ki-Hyuk Kwon
Evaluation and Analysis of Structures

Associate Professor

Dr. Myung-Jun Kim
Noise & Vibration Control in Buildings

Dr. Kyoo-Jin Koo
Construction Engineering and Management

Job opening
CE & M

Dr. Sung-Mo Choi
Structures Engineering and Steel Structure

Dr. Kang-Su Kim
Structures Engineering and Concrete Structure

Assistant Professor

Dr. Yoo-Sang Yoon
Mega Project

Research Professor

Dr. Yoo-Sang Yoon
Mega Project

Dr. Hyun-Seok Moon
BK21

Staff

Sun-Young Lee

Jung-Min Lee

* BK21: 'Brain Korea 21st century' Program funded by Government
2. Research

- Research Areas (CE & M)

**Dr. Chang-Taek Hyun**
- Construction Eng. & Mng.
- Program Management
- Sustainability & Green Building
- Design VE & Constructability
- Contract and Claims
- Project Delivery System

**Dr. Kyo-Jin Koo**
- Project Financing & Project development
- Feasibility Study
- Time Management
- Information Technology

**New Member (Job Opening)**
- CE & M (Maintenance, LCC, LCA, etc.)

**Dr. Myong-O Yoon**
- Architectural Materials
- Fire Protection Engineering

*New subjects related to technology changes.*

---

*5*
2. Research

**Research Areas (Structural Eng. & Environmental Eng.)**

- **Dr. Ki-Hui Kwon**
  - Evaluation and Analysis of Structures

- **Dr. Sung-Mo Choi**
  - Structural Engineering and Steel Structures

- **Dr. Kang-Su Kim**
  - Structural Engineering and Concrete Structures

- **Dr. Jung-Ho Huh**
  - Building Energy and Environment
  - HVAC System Design and Control

- **Dr. Myung-Jun Kim**
  - Noise & Vibration Control in Buildings
  - Architectural Acoustics

- **Dr. Hyung-Joon Kim**
  - Structural Engineering and Building Vibration Control

---

**Industry Collaboration**

![Diagram showing the relationship between University of Seoul CEM Program, A/E, Contractor/Builder, Owner, CMr/PMr, and various industry partners.]

- **Public & Private**
  - MLTM
  - Ministry of Knowledge Economy

- **Owner**

- **Contractor/Builder**

- **University of Seoul CEM Program**

- **A/E**

- **CMr/PMr**

- **Solutions/Information**
  - Problems/Raw Data

- **Solutions/Information**
  - Problems/Raw Data

---

11

12
2. Research

- On going Research 01

**DEVELOPMENT OF THE INTELLIGENT PROGRAM MANAGEMENT INFORMATION SYSTEM (I-PGMIS) FRAMEWORK FOR MEGA-PROJECTS**

http://www.mega-cm.co.kr/

Ministry of Land, Transportation & Maritime Affairs
High-Tech Urban Development Program

2. Research

- On going Research 01: 5W2H

1. **Who?**
   Participation of the Highest Level CEM Specialist.
   - Leader: Univ. of Seoul
   - Total: 34 org.

2. **When?**
   Dec 2007 ~ Apr 2014 (6 years and 3 months)

3. **Where?**
   Mega Projects or Multiple Projects

4. **What?**
   the Development of Intelligent Program Management Information System

5. **How?**
   a Practical and Theoretical Approach

6. **Why?**
   1) 10% reduction in capital and maintenance cost
   2) 20% reduction in the program duration

7. **How much?**
   $10,200,000 (₩11 Billion)
   ※ 1 $ = 1,100 ₩
2. Research

□ On going Research 01: The Trend of Mega-Projects

- Decaying The downtown
- Change in Industrial structure
- Expansion of Cities

Mega-Projects for Urban Renaissance

2. Research

□ On going Research 01: i-PgMIS Concept

- MLTM: Ministry of Land, Transportation & Maritime Affairs
- Local Government
- UR Program
- Program Portal System
- Stakeholder’s System
- Program Status
- Notice
- Legislation check
- News
- Web control Center
- Budget & Cost Situation
- Schedule & Performance Situation
- Notice
- Legislation check
- News
- Web control Center
- Program Status
- Notice
- Legislation check
- News
- Web control Center
- Budget & Cost Situation
- Schedule & Performance Situation
- Process Optimizati on System

MLTM: Ministry of Land, Transportation & Maritime Affairs

Process Optimizati on System
2. Research

**On going Research 01 : i-PgMIS Composition**

Tech-1 : Cost Mgt. System

Tech-2 : Program Duration Mgt. System

Tech-3 : Process Optimization System

Tech-4 : BPM & BRMOM System

Intelligent Program Management Information System

① Cost Mgt. System

② Duration System

③ Maintenance System

④ Performance System

⑤ Portal Information System

Top-menu click

① Improvement procedure

② Core technique module

③ Core technique operation

④ Top-menu click

⑤ Link with related system

⑥ Link with related system

※※ ※※

2. Research

**On going Research 02**

A research on estimating family construction cost and establishing a management system

Application public multi-family housing and office buildings

http://www.icce.re.kr:8080/work_index.jsp

Ministry of Land, Transportation & Maritime Affairs

the Research Policy and Infrastructure Development Program
2. Research

On going Research 02 : 5W2H

1. Who?
Participation of the Highest Level Construction Cost Managers

2. When?
SEP 2006 ~ MAY 2011 (4 years and 8 months)

3. Where?
1) Cost Budgeting in Multifamily Housing Projects
2) Public Office Building Projects

4. What?
The Development of Fair Construction Cost Estimating System

5. How?
A Practical and Theoretical Approach

6. Why?
to Reduce Expected Accuracy Range(%):
As Is... -30 ~ +50 To Be.. -15 ~ +15

On going 02 : Fair Cost

7. How much?
$ 2,000,000 (₩ 2 Billion)
※ 1 $ = 1,100 ₩

2. Research

On going Research 02 : The Need to Estimate Fair Cost

<table>
<thead>
<tr>
<th>OUTPUT</th>
<th>300</th>
<th>400</th>
<th>500</th>
<th>600</th>
<th>700</th>
<th>800</th>
<th>900</th>
<th>1000</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.49</td>
<td>1.24</td>
<td>2.45</td>
<td>6.25</td>
<td>12.25</td>
<td>17.25</td>
<td>22.25</td>
<td>27.25</td>
<td>32.25</td>
</tr>
<tr>
<td>0.24</td>
<td>0.96</td>
<td>1.98</td>
<td>3.96</td>
<td>7.96</td>
<td>11.96</td>
<td>15.96</td>
<td>19.96</td>
<td>23.96</td>
</tr>
<tr>
<td>_</td>
<td>7</td>
<td>14</td>
<td>21</td>
<td>28</td>
<td>21</td>
<td>28</td>
<td>21</td>
<td>28</td>
</tr>
</tbody>
</table>

(ex: concrete pouring activity)
2. Research

- **On going Research 02 : Definition of “Fair Construction Cost”**

  - **Total cost : Based on the design phase, include following costs**
    1. Direct cost : A cost directly attributable to the constructing product, such as material cost, direct labor cost, and estimated expenses
    2. Legal Indirect cost : indirect construction cost, administrative cost, insurance fee, surtax, etc
    3. Acceptable profit
    4. Incidental expenses : design fee, superintendent fee, CM fee, permission, etc

  - **Fair Construction Cost : ①, ②, ③ should be included**

    ※ Within Accuracy (planning ±25% / Design Development ±15% /Construction Document ±10% / Bidding ±5%)

<table>
<thead>
<tr>
<th>ANSI/Z94.0, AACE(1997)</th>
<th>Order of Magnitude estimate</th>
<th>Budget estimate</th>
<th>Definitive estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>+50 ~ -30%</td>
<td>+30 ~ -15%</td>
<td>+15 ~ -5%</td>
</tr>
<tr>
<td>Ahuja(1988)</td>
<td>Concept</td>
<td>Preliminary</td>
<td>Detailed</td>
</tr>
<tr>
<td></td>
<td>± 25%</td>
<td>± 15%</td>
<td>± 10%</td>
</tr>
<tr>
<td></td>
<td>Tender</td>
<td></td>
<td>± 5%</td>
</tr>
<tr>
<td></td>
<td>20%</td>
<td>15%</td>
<td>10%</td>
</tr>
<tr>
<td></td>
<td>Detailed</td>
<td></td>
<td>Definitive</td>
</tr>
<tr>
<td></td>
<td>5%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **On going Research 02 : Framework for Cost prediction**

  - Case-based reasoning (CBR) is a highly effective technique in the artificial intelligence (AI) domain by solving or providing suggestions for the current problems by storing and retrieving results of previous cases.
3. Teaching

- Graduate Programs

The Department of Architectural Engineering offers one of the most diverse graduate programs in Korea, at both Master and Ph.D. level. There are presently nine research laboratories in the department.
## 3. Teaching

### Curriculum: Graduate (CE & M)

<table>
<thead>
<tr>
<th>Subject</th>
<th>Subject</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Construction Contraction and legal Aspects</td>
</tr>
<tr>
<td>2</td>
<td>Advanced Construction Productivity</td>
</tr>
<tr>
<td>3</td>
<td>Construction Resource management</td>
</tr>
<tr>
<td>4</td>
<td>Construction Technology Seminar</td>
</tr>
<tr>
<td>5</td>
<td>Construction management Seminar</td>
</tr>
<tr>
<td>6</td>
<td>Building Maintenance</td>
</tr>
<tr>
<td>7</td>
<td>Construction Safety Management</td>
</tr>
<tr>
<td>8</td>
<td>Studies in Environment Design</td>
</tr>
<tr>
<td>9</td>
<td>Advanced Construction Quality Management</td>
</tr>
<tr>
<td>10</td>
<td>Advanced Construction Cost Management</td>
</tr>
<tr>
<td>11</td>
<td>Construction Decision Making</td>
</tr>
</tbody>
</table>

## 4. Academic Management
4. Academic Management

- Support from the university / college

- Asian Coalition for Building Science and Construction Engineering (ACBC)

- Osaka University, The Hong Kong Polytechnic University

- Brain Korea 21 (BK21) : “Development of Technology for Efficient Construction and Hazard Protection in High-rise Buildings”

- Engineering Accreditation (ABEEK)

- Student Exchange Program

- Architectural Field Trips

- and so on ….

4. Academic Management

- System Support : WISE

- Online Submission

- Academic Planner

- Private Information

- WISE : Academic Manager Support System

- Faculty

- Students

- Staff

- Examination Management

- Time table

- Student Progress Reports
4. Academic Management

- Structure

- Architecture Aesthetics (Design)
- Architectural Engineering Function (Facilities)
- Technology (Material, Structure, Construction, management, environment)

5. Issues and Concerns
5. Issues and Concerns

- Program Management
- Delivery Systems incl. CM at Risk
- Sustainability & Green
- Global Collaboration

6. Collaboration Opportunities
6. Collaboration Opportunities

- Support from the college: ACBC, MOU

- Support from the university

29 Countries, 116 Exchange Universities

North America

Asia

Europe

Africa

Oceania

South America
7. **KICEM**  
(Korea Institute Construction Engineering Management)

### About KICEM

1. Founded in 1999.
2. The leading professional membership society of construction engineering and management in Korea.
3. More than 3,000 professionals from a variety of construction business and research fields have joined KICEM.
4. Their collaborative efforts made significant contributions to the construction profession in Korea.
5. KICEM has held an annual conference as well as various seminars and workshops.
6. The Korean Journal of Construction Engineering and Management and technical reports published by KICEM are also important sources.
7. KICEM has been providing several continuing education and certification granting programs for construction engineers.
7. KICEM (Korea Institute Construction Engineering Management)

**Mission Statement and Goals**

“KICEM promotes professional leadership in construction engineering and management, in representing the construction engineering profession, and in enhancing the capabilities of those who are involved in the application, education training, research or development of construction engineering and management.”

- To construct a systematic knowledge base on construction engineering and management.
- To exchange and share technical knowledge, experience, and information through education programs and cooperative activities between members.
- To strengthen cooperative international relationships with regard to construction.
- To improve the efficiency of construction engineering and management practices by means of collaborative research efforts among industry, academia, and research institutes.

---

7. KICEM (Korea Institute Construction Engineering Management)

**Membership**

KICEM offers four types of membership for any individual or organization interested or involved in construction-related matters.

- **Professional Members**: Professional members are for the careered professionals in practice, research and education who have contributed to KICEM.

- **Associate Members**: Associate members are open to any qualified person who is interested in or engaged in construction industry practice.

- **Student Members**: Student membership is open to students currently enrolled in a degree-granting construction program at either a college or university.

- **Corporate Members**: Companies that are engaged in construction-related services may qualify for this type of membership.
7. KICEM (Korea Institute Construction Engineering Management)

- **KICEM Activities**

**KICEM Annual Conference**
- KICEM has an annual conference, which is the only one exclusively focused on construction engineering and management area in Korea. Categories of interests in the conference are: Recent CM Projects, Management & Business in Construction, Computer & Information Technology in Construction, and Advanced Construction Management Technology.

**Korean Journal of CE & M**
- KICEM publishes the Korean Journal of Construction Engineering and Management bimonthly, which is the recognized academic journal by the Korean Research Foundation.

**Education and Training Program**
- KICEM provides education and training programs for individuals in the practice or for specific organizations, such as professional institutes and construction or engineering companies. KICEM has a great pool of instructors, including university professors and industrial experts, involved in KICEM.

7. KICEM (Korea Institute Construction Engineering Management)

- **Research and Development**

“KICEM has performed many construction engineering and management related research projects and consulting works since its outset. University professors, researchers and experts from the industry have been involved in those projects.”

- Priority Analysis for Improvement of Construction Information System
- On-line Construction Project Control System through Process and Data Modeling
- Information Management Process Analysis for Construction Acquisition and Life-cycle Support (CALS)
- Intelligent Construction Work Information Gathering and Management System
- Intelligent Management System for Construction Daily Work Plans and Reports
- General Contractor’s Strategic Planning for Application of Construction Management Technology
- Work Process Modeling in Pre-construction Phase
- Improvement of Time Management System in office Building Construction
7. KICEM (Korea Institute Construction Engineering Management)

- Research and Development

- Measurement and Improvement of Efficiency in Construction Site Office
- Performance Measurement of Construction Management Delivery System
- Application of Construction Management System in Large BOT Capital Projects
- Application of Innovative Construction Schedule Management System to Construction Site
- Development of Knowledge Management System for Earth Work in Building Construction
- Modeling for Construction Progress Measurement
- Decision Process Model for Construction Finish Work
- Facility Management System for Public Arts Center
- Effective Construction Equipment Application for Productivity Improvement

http://www.jcepm.org/
The topics include:

- Construction Engineering Economics
- Construction Engineering Practices
- Construction Management
- Computer Application in Construction
- Construction Technology
- Infrastructure Asset Management
- Facility Management
- Maintenance and Operation in Construction

- Computer-Aided Design and Engineering
- Process Simulation Models
- Information Technology
- Green Construction
- Sustainability
- Building Information Modeling
- Life Cycle Assessment and Life Cycle Environmental Analysis
- Carbon Accounting
- Cost Estimating in Green Construction

7. KICEM

JCEPM-CALL FOR PAPERS

All the Contents should be written in English and not be over 10,000 words. Papers are needed to be prepared in full-size format on A4 size paper.

More information about paper template can be found at [www.jcepm.org](http://www.jcepm.org)

Those who are interested in our journal are welcome to submit a technical paper by e-mail to [jcepm@kicem.or.kr](mailto:jcepm@kicem.or.kr)

The submission due date for the first publication is 2011/02/28. The journal will be published quarterly so papers can be submitted continuously even after above date.
Volunteering  Exercising

Site trip  Membership

Workshop  Bazaar

Q & A

E-mail: cthyun@uos.ac.kr

http://cemuos.uos.ac.kr/korean/portal.php
Graduate Program in Civil Engineering with concentration in Construction Management

Prepared by: Sanjiv Gokhale, Ph.D., P.E., F. ASCE
2010-2011 Enrollment

Enrollment Undergraduate:
Full-time 6,831
Part-time 48
Total 6,879

Graduate and Professional:
Full-time 5,045
Part-time 790
Total 5,835

Total full-time students: 11,876
Total part-time students: 838
Total: 12,714

Men: 5,900 (46%)
Women: 6,814 (54%)


Enrollment by School

- College of Arts & Science: 4,285
- Blair School of Music: 211
- Divinity School: 249
- School of Engineering: 1,327
- Graduate School: 2,228
- Law School: 615
- School of Medicine: 618
- School of Nursing: 882
- Owen Grad Sch of Mangmt: 577
- Peabody College: 1,702
- Unclassified Studies: 27

Total: 12,721
Today’s construction managers are faced with unprecedented challenges in planning, designing and managing the construction process and maintaining the public and private facilities required to meet society’s needs.

**Program Mission:**

The mission of the graduate degree program in Civil Engineering with concentration in Construction Management is to develop future leaders that can understand and solve the broad range of challenges confronting the construction industry and the built environment.
Program Status

- Total number of current students = 35 (Spring 2011)
  - 30 Continuing Students
  - 5 Admitted for Spring 2011
- Total number of students graduated = 72 (since 2006)
  - Table 2
- 100% Employment upon graduation (2010, N= 21)
  - Median salary = $63,000
  - Salary Range = $58,000-$75,000
- 100% Internships
- New Courses
  - CE298: Building Systems and LEED (Fall 2010)
  - CE289: Advanced Project Management (Broadcast – CII, Austin, TX) (Fall 2010)
  - CE299: Building Information Modeling (Spring 2011)
- New course proposed – Fall 2011
  - CE299: Real Estate Development
Degree Requirements

### Typical Plan of Study (16 months)

<table>
<thead>
<tr>
<th>PLAN OF STUDY (M.ENG.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FALL 2009</td>
</tr>
<tr>
<td>CE286 Construction Project Management (3 cr), W 5:20-7:50</td>
</tr>
<tr>
<td>CE287 Construction Estimating (3 cr), T 4:10-6:50</td>
</tr>
<tr>
<td>ENGM 251 Accounting &amp; Finance (3 cr), M 3:10-6:30</td>
</tr>
<tr>
<td>9 CREDITS</td>
</tr>
</tbody>
</table>

**Required Course**

**Elective**
CE 289: Building Systems & LEED (NEW)

OBJECTIVE:
The “invisible” building systems are critical to the functioning and operation of building facilities. These systems include heating, ventilating, air conditioning and refrigeration (HVAC/R), and water and wastewater systems. Students will develop an understanding and appreciation for the various building system topics including: energy management, mechanical system, indoor air quality, building automation systems, heating, cooling, refrigeration, electrical and electronic controls, and instrumentation. After completion of the course, students will be able to take the LEED Professional Accreditation certification test.

CE 289: Advanced Project Management (NEW)

OBJECTIVE:
This course will discuss the issues in construction, and introduce the best practices defined and developed by CII over the last twenty five years. To address these subjects, the course covers a substantial amount of material. Preparatory readings will be available via Blackboard. Students are expected to have read this material ahead of the class. Post-class readings and on-line quizzes will be arranged via CII’s website.

By taking this class students will be able to:

Understand the critical issues in the construction industry;
Gain the knowledge of CII Best Practices;
Apply the CII Best Practices to improve project performance.
OBJECTIVE:

Introduce students to the design and construction industry topic of Building Information Modeling (BIM). The course will help enhance the student’s ability to understand the full range of the aspects of BIM including: BIM on the design side, basic modeling, interoperability, software, project delivery implications, BIM on the construction side, and workflow transformations.

Software used:

Bentley Microstation
Bentley Structural
Ram Structural System
Recruitment

In 2007-089, an estimated 623,805 international students came to the U.S., an increase of 7 percent from previous year.

*The Chronicle of Higher Education, Nov. 21, 2008*
Symposiums & Workshops
Sanjeev,

Congratulations on a successful conference and thank you for all of the hard work. It was very informative and I enjoyed myself. When I began sending the presentations to different people within our organization, I noticed that David Intracazo’s presentation consisted of only 4 slides. See attached. Do you think we could get the entire presentation? There was a lot of information that I wanted to review.

Thank you again.

Dave

David S. Verner, AIA
Senior Vice-President
SSOE, Inc.
615-308-4913

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Congratulations to you and your team on a great event. We look forward to participating again next year.

Richard Perko
President
Lee Company

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Many thanks to both of you and the others for making the workshop a great success! It was a long day but a very enlightening day and I look forward to returning next year.

Having worked in Nashville for forty years has allowed me to meet and/or work with many of the local participants and this was an opportunity to not only learn but also to see many long-time friends. Is it possible to receive a list of the final attendees?

Thanks.

Ed

Ed Houk, AIA
Sr. Vice President
NFR Design, Inc.

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Dr. Gokhale,

Can you please tell me the date for the 2010 Healthcare Design and Construction Workshop? I was out of town for the event this year and want to make sure I have it on my calendar for 2010.

Thank you.


FASONS
521 Pemberton, Grosse Pointe Park, MI 48230
F:313-642-1322 M:313-910-6395
melanie.berger@parsons.com
Vanderbilt University Construction Management Program Presents
Sustainable Buildings: Progress, Practice and Challenges

Tuesday, March 9th, 2010
Jacobs Belvedere Auditorium, Featheringall Hall, Vanderbilt University

The green building movement continues to grow at an amazing pace despite a down economy. Whether you are involved in new construction or an existing building owner, new opportunities have arisen that can have dramatic effects relating to your bottom line, occupant health and productivity, and other sustainability goals. As Nashville strives to become a sustainability leader in the United States, many still need to increase their awareness of the opportunities and learn how to put them into practice.

Come hear from local and national sustainability leaders who have already incorporated this movement into their designs, construction practices and building operations. This all day forum will include the following presentations and panel discussions:

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>08:30-08:45</td>
<td>Introduction &amp; Workshop Overview</td>
</tr>
<tr>
<td>08:45-09:15</td>
<td>Keynote</td>
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<tr>
<td>09:15-10:00</td>
<td>Empire State Building Retrofit Case Study</td>
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<tr>
<td>10:00-10:15</td>
<td>Break</td>
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<tr>
<td>10:15-11:00</td>
<td>LEED for Existing Buildings Operations and Maintenance (LEED-EB O&amp;M)</td>
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<tr>
<td>11:15-11:45</td>
<td>Panel Discussion - LEED for Existing Buildings - Successes and the Process</td>
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<tr>
<td>11:45-1:00</td>
<td>Lunch</td>
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<tr>
<td>1:00-1:30</td>
<td>National and International Trends in Green Healthcare Buildings</td>
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<tr>
<td>1:30-2:30</td>
<td>Panel Discussion - Vanderbilt University Sustainable Building Program</td>
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<tr>
<td>2:30-2:45</td>
<td>Break</td>
</tr>
<tr>
<td>2:45-3:15</td>
<td>Nashville Green Building Initiatives</td>
</tr>
<tr>
<td>3:15-3:45</td>
<td>Sustainable Building Incentive Programs</td>
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<tr>
<td>3:45-4:30</td>
<td>Legal Issues in Sustainable Building - The Green Standard of Care - Managing Green Building Risks</td>
</tr>
</tbody>
</table>
Program Committee

Greg Cashion, Smith, Cashion & Orr
Hal Clark, Land Design
Johnny Epstein, Clean Edison
Rose Faegre-Bartson, Urban Land Institute Nashville
Sanjiv Gokhale, Department of Civil & Environmental Engineering, Vanderbilt University
Kim Hawkins, Hawkins Partners
Keith Loomis, Campus Planning and Construction Department, Vanderbilt University
Vic McConnell, Smith, Cashion & Orr, Plc, Co-Chair
Tara Myers, Earl Swenson Associates
Brian Phelps, Hawkins Partners
Jamie Qualls, SRCCx, Co-chair
Ken Scalf, Architectural Energy Corporation
Katy Sheeley, Hoar Construction
Erin Sheffer, SRCCx
Rebekah Wright, Crescent Resources
Bill Young, Associated General Contractors of Tennessee

Sustainability Symposium

You replied on 3/16/2010 9:57 AM.
Bryn Olsen [bolsen@hardaway.net]
Sent: Wednesday, March 10, 2010 9:48 AM
To: Gokhale, Sanjiv B

Dr. Gokhale,

I thoroughly enjoyed yesterday’s presentations during the Sustainability Symposium, and wanted to thank you and everyone involved in the planning and execution of the event.

Respectfully,

Bryn Olsen, LEED AP BD+C
Project Manager

HARDAWAY Construction Corp.
311 Main Street, P.O. Box 60939, Nashville, TN 37206
Tel: 615.234.5401 Fax: 615.234.4138 www.hardaway.net

Dr. Gokhale:
Excellent conference. Thank you for hosting. Survey attached.
-Dan

Daniel H. Oliver
Enterprise Electric
1300 Fort Negley Blvd.
Nashville, TN 37203
Direct: 615.493.5016
Mobile: 615.428.0201
Office: 615.350.7270 x116
Graduate Program

• Endowed by the Vecellio Family
• Housed in Civil Engineering
• MS and PhD degrees
• 4 FTEs
• 2 Named Professorships
• ~45 students

Graduate Program Cont’d.

• Teaching load: 3.x courses per year
• Adjunct Faculty from industry
• Industrial Affiliates program thru MLSoC
• Entering graduate students need Engrg background
Undergraduate Program

• Housed in the Myers-Lawson School of Construction (MLSoC)
• 4-year ABET accredited degree
• ~120 students
• 4 FTEs

MLSoC

• A unique dimension
• A bridge between:
  • Architecture & Engineering
• To facilitate “Academic Commerce”
  • Free flow of students, faculty and ideas
• 15 FTEs (4CEE +4MLSoC +7BC)
Issues

• Re-invigorate Cnst Engrg content
• Attract a larger share of domestic students
• Attract a larger share of underrepresented students
• Raise $ for a Professor of Practice
• Raise $ for an Eminent Scholar Program
• Strengthen ties from Industry
• Re-tool pedagogical techniques