Iowa State University

GLF-CEM 2012

CEM Graduate Program Structure
Body of Knowledge

• Preconstruction Project Engineering and Management.
• Construction Project Engineering and Management.
• Construction Management. Processes and Functions
• Design of Construction Systems
• Research Methods
Preconstruction Project Management

• Preconstruction project controls
• Determinants of success
• Conceptual estimating
• Design and planning for
  – Automation
  – Safety
• Constructability review
• Value engineering
Construction Project Management

- Construction project controls
- Equipment selection and utilization
- Project administration
- Construction project simulation
- Quality management
- Productivity improvement
Construction Management and Functions

• Organizational systems
• Theory/application for
  – Motivation
  – Planning
  – Leadership
  – Organizational change
• Construction finance
Design of Construction Systems

- Engineering design case studies for representative elements of the construction process
  - Formwork and falsework (includes moving load analysis)
  - Excavation support
  - Aggregate production (blasting and crushing)
  - Rigging
Research Methods

• Identification and selection of methods
  – Quantitative
  – Qualitative
• Development of research design
• Criticism of construction research
Electives (594? special topics)

- Highway and heavy cost estimating
- Automatic machine guidance
- Building energy systems
- Design-Build Construction
- Industrial construction project admin and controls (CII Class)
TA & RA Experience for future

• Apprentice Professor

• Participate in both TA and RA activities
  – Some instructional tasks directly involving undergraduates (if full charge of a class at least once at PhD level)
  – Some direct research tasks directly involving practitioners

• Have considerable contact with faculty members other than advisor (feeling of community)
Graduate Degree Structure

• Credit Requirement
  – MS/MEng 30 cr. total
    • 15 cr. CEM MS
    • 18 Credit CEM MEng
    • 6 cr. research thesis MS
    • 2 cr. research non thesis MS
    • 0 cr. research MEng
  – 6 cr. outside CEM for all
  – PhD 72 (includes MS)
  – Certificate 12

• Other
  – Onsite and online students take the same classes and have same requirements
  – Enter program in any semester
  – Graduate courses do not require other grad courses for prerequisites
  – MS, MEng and PhD must meet ABET Requirements
Pedagogy for future

• Hybrid learning model
  – Passive learning online for both online and onsite students (includes most lecture material and problem demonstration)
  – Active learning for higher order learning goals
    • Small group activities
    • Student presentations
    • Discussions
  – Integration of onsite and online students