

# 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