CE 5020: Construction Project Engineering and Management

Course Description:

Application of engineering and management control techniques to complex construction projects. Construction project control techniques, project administration, construction process simulation, quality management, and productivity improvement programs.

Course objectives (course designed to provide students with):

This course will focus on the complexities of project management and help students identify techniques to overcome project barriers. The course will also address organizational issues, business applications, trends in innovation, team dynamics and performance.

Course Outcomes (students should be able to):

1. Understand the role of the construction engineer and the constructor's collaboration with design professionals and owners during the construction phase on projects delivered using different project delivery methods (Construction Manager-at-Risk, Construction Manager as Agent, and Design-Build).
2. Develop the ability to estimate at all levels including feasibility, conceptual, and guaranteed maximum price with contingencies, and understand the concepts, roles and responsibilities of the estimator in each type.
3. Develop greater understanding of project management team building, leadership styles and innovation, organizational and business management.
4. Understand the cost implications of safety, quality management, sustainable design and construction, constructability, and other administrative programs.
5. Apply risk management principles to critical path schedules and cost estimates through stochastic simulations to develop rational budget and schedule contingencies
6. Improve oral communication and writing skills.

Course Topics

- Introduction to project management (basics of managing a construction project)
- Project Initiation (steps to begin a construction project)
- Cost and Risk Analysis (predict and manage project contingency and risk)
- Project Budgeting (track and plan financial and capital resources)
- Project Scheduling (Ryan Company, P6 Labs)
- Project Tracking (how to monitor project progress and resources)
- Project Leadership (leadership styles and promoting an inclusive project environment)
- Project Team Management and Dynamics (building team trust, team dynamics and conflict management)
- Organizational Management (project selection, strategy, mission and vision, and learning AHP)
- Learning Organizations and Projects (knowledge management, communication, social network analysis, design thinking, innovation, use of technology in construction, management of global and virtual teams).