

# CONSTRUCTION MANAGEMENT (CMGT)

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## **CMGT 4110 Preconstruction Integration and Planning (4 Credits)**

This course examines the role of preconstruction services, team integration, and joint design planning in various Integrated Project Delivery (IPD) approaches. Various tools and techniques associated with preconstruction services and design planning from the proposal stage through the design stages of a project are considered.

## **CMGT 4120 Construction Planning & Scheduling (4 Credits)**

Understanding and applying scheduling and control to construction projects is essential to successful construction management. Project scheduling emphasizes network-based schedules, such as critical path management (CPM), network calculations, critical paths, resource scheduling, probabilistic scheduling and computer applications. Project control focuses on goals, flow of information, time and cost control, and change management. Prerequisite or Corequisite: CMGT 4420.

## **CMGT 4155 Sustainable Development (4 Credits)**

The course includes many case studies of historic and contemporary structures exemplifying various sustainability features. Emphasis is placed on how LEED project certification influences the overall construction project. Topics include LEED certification techniques for sustainable sites, water efficiency, energy and atmosphere, materials and resources, indoor environmental quality, innovation and design. The following topics are covered from a LEED perspective: ventilation, air conditioning, heating, electrical lighting, energy efficiency, and building control systems. The student studies and analyzes how management and LEED techniques are applied to current construction projects.

## **CMGT 4177 Environmental Systems and MEP Coordination (4 Credits)**

A study of electrical and mechanical systems used in the construction of buildings. Course content includes system design, component selection and utilization for energy conservation, cost estimating or systems, coordination and management of installation. Specific systems included are electrical, air conditioning, heating, ventilation and plumbing, fire protection, life safety, communication, power systems and lighting. The course also considers coordination of MEP systems and explores emerging technology and environmental issues related to mechanical and electrical systems in buildings.

## **CMGT 4200 Lean Construction Project Management (4 Credits)**

This advanced course focuses on cutting edge lean tools and other productive strategies for the management of people and processes in the construction industry. The tools and strategies presented draw on the very successful Toyota Production System adapted to the construction industry. Lean construction methodologies such as the Last Planner System, the Lean Project Delivery System, and Integrated Project Delivery are discussed. Topics also include sustainability and the emerging interest in "green construction," as well as the use of Building Information Modeling to enhance the development and management of integrated projects. This course also looks at the human element in relation to motivation, safety, and environmental stresses. A number of case studies are presented to highlight best practices in Lean Construction Project Management. Prerequisite: CMGT 4480.

## **CMGT 4230 Design Management and Schedule Control (4 Credits)**

This course examines the various strategies and techniques associated with managing the design delivery process to align with the construction budget and schedule needs in an integrated fashion. Design planning, scheduling, and resource allocation are considered along with design value determination and management of the design-construct interfaces.

## **CMGT 4250 Construction Job Site Management (4 Credits)**

This course addresses how a successful construction project is managed and administered from design through construction to closeout. Emphasis will focus on how to unite the key stakeholders (contractors, architects, engineers, etc.) to provide them with a workable system for operating as an effective project team. The latest technology, laws and regulations associated with contract administration will be presented. Topics pertinent to each stage of a project are introduced and discussed as they occur throughout the life of the project. Numerous real-world examples will be utilized throughout the course. Various electronic project administration tools and techniques will be demonstrated including Building Information Modeling.

## **CMGT 4310 Cost Modeling and Trend Management (4 Credits)**

This course covers various approaches to construction cost estimating at the conceptual stages of planning and design through detailed construction. Students learn parametric estimating techniques and how they are applied to construct and predict reliable budgets at the earliest stages of design. Students build cost models and refine those models with greater detail as design develops through a project. Building information modeling is introduced and used to create massing models to demonstrate design impacts on project costs. Cost trending techniques are presented to manage, monitor and document project performance relative to cost.

## **CMGT 4320 Introduction to Architecture and Design Management (4 Credits)**

This course introduces students to the significant value that architecture brings to real estate and the built environment and the various services and professions associated with it. Students will be introduced to principles, protocols and the planning process related to the design function and the link between the architect's vision and the finished physical structure. Students will be introduced to design, thinking, theory and application. Student will learn to read and interpret the various graphical and written construction documents as well as know how they are developed and what information they contain. Architectural, structural, mechanical, electrical, plumbing and civil drawings and specifications are covered. The business model for design services will be explored as well as the unique risks and challenges associated with managing the design throughout the various stages of development and construction.

**CMGT 4410 Construction Building Systems (4 Credits)**

A survey of residential and commercial construction materials, means, and methods associated with the various structural and architectural systems used to design and construct buildings. Project plans and specifications are incorporated to teach the basic sequencing and overall construction process. The influence of sustainability in construction is introduced. This class will also have an off campus, experiential learning lab associated with it.

**CMGT 4420 Construction Estimating (4 Credits)**

This course is designed to provide the student with the theory, principles and techniques of quantity analysis (take-off), labor determinations, overhead and profit analysis. It offers insight into the construction estimating process. The role of the estimator, types of estimating, CSI divisions, bid/contract documents, change order pricing, design/build projects and estimation compilation will be introduced. Discussions regarding the cost/benefit of sustainable materials and typical construction materials will enhance the requisite knowledge of construction estimating. Experiential learning lab is associated with this course. Prerequisite: CMGT 4320 and CMGT 4410. This course is a co/prerequisite for CMGT 4120.

**CMGT 4480 Const Project Management (4 Credits)**

Principles and techniques of construction project management, use of systems analysis, internal and external procedures, planning, programming, budgeting and staffing, controlling major projects, emphasis on construction scheduling techniques with case application.

**CMGT 4490 Residential Development (4 Credits)**

A course sequence designed to emphasize the practical application of the theories and concepts of residential development. The course provides a capstone experience for seniors. Students are expected to apply their knowledge of general business, real estate and construction management practices by forming a student business entity, acquiring land, building and selling a residential property in a case format. Students will apply accounting, finance, marketing, real estate and construction management techniques in the planning for a residential development. The application of green building materials and methods is emphasized.

**CMGT 4560 Relational Contracting and Risk Mitigation (4 Credits)**

Relational contracting is a construction project delivery framework for multidisciplinary, integrated projects that focuses on aligned goals, high performance, innovation, mutual respect, open communication and a "no blame" culture between Client, Contractor, and Design Team. This approach to contracting, also known as Alliance Contracting, is becoming more prevalent in the United States and is often applied when using integrated project delivery systems. This course compares and contrasts transactional contracting methods with relational contracting methods and the influences on the project team and projects outcomes. Relational contracting is also considered in the context of risk mitigation and project optimization.

**CMGT 4700 Topics in Construction Mgmt (0-4 Credits)****CMGT 4980 Construction Mgmt Internship (0-10 Credits)**

Daniels College of Business's graduate curriculum is designed to be experiential and build upon practical experience. To gain the full benefit of this curriculum, students are encouraged to expand their experiential learning beyond the short term experiences required in the classroom. Internships that allow students to apply newly learned skills and theories in the workplace are considered an integral to the curriculum and all students are strongly encouraged to seek such opportunities.

**CMGT 4991 Independent Study (1-10 Credits)****CMGT 4995 Independent Research (1-10 Credits)**