TCM Construction Management

TCM 1131 Building Materials and Systems
3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.
The materials, systems and methods of construction. Topics include material properties, selection and application criteria and construction processes. Covers divisions 3-9 & 31 of the CSI Master format.

TCM 1231 Introduction to Construction Management
3 Credit Hours. 0.2 Lecture Hours. 0.2 Lab Hours.
This course presents an introduction to the construction management profession and the construction industry that it serves. It includes an overview of industry sectors, professional organizations, and the industry’s impact on the economy. The basics of the construction process and delivery systems will be discussed. Students will be introduced to software that is part of the construction manager’s day-to-day role. A thorough understanding of the construction management curriculum and the various courses will be provided.

TCM 1232 Construction Graphics
3 Credit Hours. 0.2 Lecture Hours. 0.2 Lab Hours.
This course is a study of construction drawings and specifications. It exposes students to fundamental graphical communication knowledge and print-reading skills. Students will also learn necessary modeling techniques to create basic construction models and generate construction drawings using the most cutting-edge Building Information Modeling (BIM) tools. Topics include print reading, sketching and drafting techniques for the presentation of floor plans, elevations, sections and building components using BIM software.
Prerequisite(s): A minimum grade of "C" in TCM 1231 and MATH 1112 or MATH 1113 or MATH 1441.

TCM 2233 Construction Surveying
3 Credit Hours. 0.2 Lecture Hours. 0.2 Lab Hours.
Introduction to the equipment and techniques used for construction surveying, including measurement of distances, horizontal and vertical angles, and differences in elevation. Emphasis is placed on accuracy of measurements, precise operation of instruments, completeness in laboratory exercises, and accurate field notes.
Prerequisite(s): A minimum grade of "C" in TCM 1232 or ENGR 1133 and MATH 1112 or MATH 1113 or prior or concurrent enrollment in MATH 1441.
Cross Listing(s): CENG 2231.

TCM 2234 Mechanical and Electrical Equipment and Systems
3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.
This course includes a study of mechanical and electrical equipment and systems as related to the construction industry. The course is composed of three basic parts. Part one addresses available energy sources, thermoflow and ventilation characteristics, air handling systems, and mechanical codes. Part two addresses domestic water and waste systems, fire sprinklers and stand pipe systems and plumbing codes. Part three addresses electrical power, lighting and communication systems and electrical codes.
Prerequisite(s): A minimum grade of "C" in TCM 1232 or ENGR 1133 and PHYS 1111 or PHYS 2211 or permission of instructor.

TCM 2235 Introduction to Structures
3 Credit Hours. 0.2 Lecture Hours. 0.2 Lab Hours.
This course introduces students to the theory of structural analysis and design and its application to construction. Topics include analysis of coplanar force systems, analysis of trusses and frames, friction, centroids and moment of inertia, stresses and strains, properties of materials, bending, shear, deflections in beams, combined stresses and analysis of columns.
Prerequisite(s): A minimum grade of "C" in PHYS 1111 or PHYS 2211.

TCM 2333 Building Information Modeling for Construction Management
3 Credit Hours. 0.2 Lecture Hours. 0.2 Lab Hours.
Introduction to Building Information Modeling (BIM). This course highlights the merits of BIM in promoting productivity and profitability in the construction industry. Topics include the history of information modeling technology and its impacts on construction industry; major BIM software applications and basic modeling techniques; application of BIM authoring and analysis skills for construction projects. The course emphasizes hands-on modeling skills and the utilization of BIM technology to solve construction project problems.
Prerequisite(s): A minimum grade of "C" in TCM 1232 or ENGR 1133 and MATH 1112 or MATH 1113 or prior or concurrent enrollment in MATH 1441.

TCM 2430 Construction Safety
3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.
This course includes a study of safe construction practices. Topics include workers’ compensation insurance, OSHA regulations, construction disasters, safe construction training and planning, and the hidden costs of accidents. Students are highly encouraged to obtain the OSHA 30-hour safety card as part of this course.

TCM 3231 Steel Structures
3 Credit Hours. 0.2 Lecture Hours. 0.2 Lab Hours.
This course explores the means and methods used in the construction of structural systems with a primary focus on steel structures. The course presents topics on the fundamental material properties and strengths of structural steels and on the purposes of different structural elements (beams, columns, shear and moment connections, splices, braces, composite slabs, gusset plates, bolts, anchor rods, shear studs, welds, stiffeners, etc.) The course additionally presents a description of the design methods in steel structures and construction of various structural systems.
Prerequisite(s): A minimum grade of "C" in TCM 1232 or ENGR 1133 and TCM 2235 or TCM 2240.

TCM 3232 Concrete and Masonry Structures
3 Credit Hours. 0.2 Lecture Hours. 0.2 Lab Hours.
This course discusses the means and methods used in the construction of structural systems with emphasis on concrete and masonry structures. The course presents topics on the fundamental properties and characteristics of concrete, concrete mix, strengths, design and construction of concrete formwork, concrete reinforcing, placing, testing, masonry materials and construction of various structural systems.
Prerequisite(s): A minimum grade of "C" in TCM 1232 or ENGR 1133 and TCM 2235.

TCM 3330 Quantity Estimating
3 Credit Hours. 0.2 Lecture Hours. 0.2 Lab Hours.
Construction estimating with emphasis on quantity take-off and specifications, including techniques of interpreting a visualizing construction drawings.
Prerequisite(s): A minimum grade of "C" in TCM 1131 and prior or concurrent enrollment in TCM 3231 or TCM 3232 or approval of the instructor.

TCM 3331 Construction Finance
3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.
This course introduces the long-term contract methods for recognizing revenue and their impact on construction company financial statements. The course also covers the analysis of construction company financial statements and their use in developing budgets, project cash needs, pricing construction projects, and forecasting the impact of business decisions on profit. The project cost control and the contract delivery methods are also discussed, along with ethical guidelines for professional conduct and code of ethics.
Prerequisite(s): A minimum grade of "C" in ECON 2105 and ACCT 2030.
### TCM 3332 Construction Equipment Management
3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.
The various aspects of heavy equipment management and ownership. Topics include equipment acquisition and disposition options, production costs and productivity, cost analysis and control, management staffing and responsibilities, selected topics in maintenance, depreciation and economic life.
**Prerequisite(s):** A minimum grade of "C" in MATH 1112, MATH 1113, MATH 1441.
**Cross Listing(s):** TCM 332S.

### TCM 3333 Building Codes
3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.
This course includes a study of codes applicable to the construction industry with emphasis on the Standard Building Code. An introduction to construction related federal regulations with an emphasis on labor related issues; construction labor unions and the collective bargaining process. 
**Prerequisite(s):** A minimum grade of "C" in TCM 1231.

### TCM 3890 Special Problems in Construction
1-4 Credit Hours. 1-4 Lecture Hours. 0-4 Lab Hours.
Individualized study in the area of building construction and contracting not otherwise available in the student's program.
**Prerequisite(s):** Permission of instructor 6 weeks prior to term course will be taken.

### TCM 4090 Selected Topics in Construction
1-3 Credit Hours. 1-3 Lecture Hours. 0-2 Lab Hours.
Scheduled on an infrequent basis to allow the exploration of undergraduate topics within building construction and contracting. Course shall carry a subtitle for topic identification.
**Prerequisite(s):** Permission of instructor.

### TCM 4432 Construction Administration
3 Credit Hours. 0.2 Lecture Hours. 0.2 Lab Hours.
Terms, documents and operations inherent in building construction management. Topics include business ownership, company organization, project bidding/negotiating methods, construction contracts, bonds, insurance and accounting.
**Prerequisite(s):** A minimum grade of "C" in TCM 3331 and Junior status.

### TCM 4434 Soils and Foundations
3 Credit Hours. 0.2 Lecture Hours. 0.2 Lab Hours.
The site development construction process with an emphasis on soils as a construction material. Topics include soils investigation, testing, classification, engineering properties and modification techniques, excavation equipment, construction dewatering, slope stability and support, layout and grade staking, sediment and erosion control, foundations, underground utilities and pavements.
**Prerequisite(s):** A minimum grade of "C" in TCM 3332 and TCM 2233 or CENG 2231.

### TCM 4518 Introduction to Senior Project
1 Credit Hour. 1 Lecture Hour. 0 Lab Hours.
Introduction to Senior Project is the first component of the senior project series of two courses dedicated to the successful completion of a final project deliverable. This first course introduces students to contemporary construction management considerations and professional practice in a global, economic, environmental, and societal context. This course prepares students to function on multi-disciplinary teams while completing preliminary tasks required for a larger capstone project.
**Prerequisite(s):** A minimum grade of "C" and prior or concurrent enrollment in COMM 1110 and STAT 2231 or BUSA 3131 and Senior Standing and Approval of Department Chair.

### TCM 4530 Senior Project
3 Credit Hours. 0.2 Lecture Hours. 0.2 Lab Hours.
This course includes an exercise in project management, including estimating and scheduling from construction documents of a project. The assigned project includes developing a fictitious organization, production of a project estimate and schedule and preparing a construction bid and other construction documentation.
**Prerequisite(s):** A minimum grade of "C" in TCM 4518 TCM 5431 and TCM 5433.

### TCM 4710 Construction Internship
1 Credit Hour. 0 Lecture Hours. 0 Lab Hours.
This course is designed for students to receive practical work experience with an approved construction employer. A minimum total of 400 documented contact hours of employment with the selected construction employer are required.
**Corequisite(s):** COOP 4090F.

### TCM 4730 Experiential Learning in Construction Management - COOP
3 Credit Hours. 0 Lecture Hours. 0 Lab Hours.
This course provides an opportunity for Construction Management students to participate in experiential, Cooperative Education, and receive practical work experience with a pre-approved construction management employer. A minimum total of 400 documented contact hours of employment per work assignment with the selected construction employer are required for course credit.
**Prerequisite(s):** Completion of TCM 2233.

### TCM 5330 Green Building and Sustainable Construction
3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.
This course is a study of advanced topics in green construction beginning with the philosophy behind sustainability related technology and its implementation. The course provides a thorough expansion on LEED (Leadership in Energy and Environmental Design) core concepts including construction and design for sustainable sites, water efficiency, energy & atmosphere, materials & resources, indoor environmental quality and innovation and design. The course also examines sustainable construction methodologies and their associated environmental impacts.
**Prerequisite(s):** A minimum grade of "C" in TCM 1131, TCM 2234 or permission of instructor.
**Cross Listing(s):** TCM 5330G.

### TCM 5330G Green Building and Sustainable Construction
3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.
This course is a study of advanced topics in green construction beginning with the philosophy behind sustainability related technology and its implementation. The course provides a thorough expansion on LEED (Leadership in Energy and Environmental Design) core concepts including construction and design for sustainable sites, water efficiency, energy & atmosphere, materials & resources, indoor environmental quality and innovation and design. The course also examines sustainable construction methodologies and their associated environmental impacts. Graduate students will be required to complete individual advanced level research in an area beyond the scope of the undergraduate requirements that demonstrates a higher level of mastery in the subject matter with additional required deliverables representative of graduate level work, as determined by the instructor.
**Prerequisite(s):** A minimum grade of "C" in TCM 1131 and TCM 2234 or permission of instructor.
**Cross Listing(s):** TCM 5330.
TCM 5333 Building Information Modeling  
3 Credit Hours. 0.2 Lecture Hours. 0.2 Lab Hours.

This course is an introduction to building information modeling (BIM). It highlights the strength of BIM in promoting productivity and profitability in civil engineering and construction. Topics include the history of information modeling technology and its impacts on civil engineering and construction; popular software applications and basic modeling techniques; and implementation of BIM authoring and analysis tools for project delivery. Emphasis is placed on hands-on modeling techniques, and problem-solving using modern BIM technologies.  
Prerequisite(s): A minimum grade of "C" in TCM 1232 or ENGR 1133.  
Cross Listing(s): TCM 5333G.

TCM 5333G Building Information Modeling  
3 Credit Hours. 2 Lecture Hours. 2 Lab Hours.

This course is an introduction to building information modeling (BIM). It highlights the strength of BIM in promoting productivity and profitability in civil engineering and construction. Topics include the history of information modeling technology and its impacts on civil engineering and construction; popular software applications and basic modeling techniques; and implementation of BIM authoring and analysis tools for project delivery. Emphasis is placed on hands-on modeling techniques, and problem-solving using modern BIM technologies. Graduate students will be required to complete additional advanced level study beyond the scope of the undergraduate requirements of the course, demonstrating a higher level of mastery of the subject matter and including additional deliverables as determined by the instructor.  
Prerequisite(s): A minimum grade of "C" in TCM 1232 or ENGR 1133.  
Cross Listing(s): TCM 5333.

TCM 5431 Construction Cost Estimating  
3 Credit Hours. 0.3 Lecture Hours. 0.1 Lab Hours.

This course includes methods and procedures for estimating costs of construction projects. Topics include types and purposes of estimates, direct and indirect costs, labor and equipment cost analysis, the CSI Masterformat, approximate estimates, and computerized estimating methods.  
Prerequisite(s): A minimum grade of "C" in TCM 3330, TCM 3331 or permission of instructor.  
Cross Listing(s): TCM 5431G.

TCM 5431G Construction Cost Estimating  
3 Credit Hours. 3 Lecture Hours. 1 Lab Hour.

This course includes methods and procedures for estimating costs of construction projects. Topics include types and purposes of estimates, direct and indirect costs, labor and equipment cost analysis, the CSI Masterformat, approximate estimates, and computerized estimating methods. Graduate students will be required to complete individual advanced level research in an area beyond the scope of the undergraduate requirements that demonstrates a higher level of mastery in the subject matter with additional required deliverables representative of graduate level work, as determined by the instructor.  
Prerequisite(s): A minimum grade of "C" in TCM 3330 and TCM 3331 or permission of instructor.  
Cross Listing(s): TCM 5433.

TCM 5433 Proj Planning/Scheduling  
3 Credit Hours. 2 Lecture Hours. 2 Lab Hours.

This course covers the fundamentals and techniques of planning and scheduling for construction projects. Topics include bar charts, Critical Path Method using both arrow and node networks, precedence networks, cost-time trade-offs, PERT, resource leveling, updating schedules during construction, project control, earned value method, lean construction principles and practices, and computerized scheduling techniques. Graduate students will be required to complete individual advanced level research in an area beyond the scope of the undergraduate requirements that demonstrates a higher level of mastery in the subject matter with additional required deliverables representative of graduate level work, as determined by the instructor.  
Prerequisite(s): A minimum grade of "C" in TCM 1231 and STAT 2231 or BUSA 3131 or permission of instructor.  
Cross Listing(s): TCM 5433G, TCM 5431G.