UTSA CSM PROGRAM LEARNING OBJECTIVES

CSM 2143-Construction Materials and Testing: Analysis of materials and methods used in the design and construction process with a particular emphasis on quality control, quality assurance, and testing including soils, concrete, steel, masonry, and wood.

A student completing CSM 2143 will be able to:
1. Understand the production processes and application of construction materials;
2. Be familiar with the properties (mechanical/nonmechanical) of major construction materials;
3. Be familiar with the gradation and designation of major construction materials;
4. Be familiar with the standard quality and relevant inspection/testing procedures;
5. Be able to interpret material testing reports.

CSM 2323-Construction Documents: Introduction to construction documents and applicable software for use in communicating building design intentions to field personnel, including an understanding of how to interpret, explain, quantify and use construction documents to bid, construct and manage construction projects.

A student completing CSM 2323 will be able to:
1. Interpret construction drawings and specifications relating to residential and commercial construction
2. Be familiar with units of measure in the English and metric systems
3. Be familiar with basic fundamentals of blue print reading
4. Be familiar with construction survey procedures relating to locating boundaries and layout of buildings
5. Be able to explain the components of a floor plan, elevations, sections and mechanical / electrical construction drawing
6. Be familiar with residential and commercial construction documents and the technical specification found in the CSI master format.

CSM 3011-Construction Industry Contemporary Issues: Exploration of various professional options and specialties across the construction industry, professional ethics and introduction to professional societies.

A student completing CSM 3011 will be able to:
1. Be familiar with construction industry subsectors and their practices.
2. Be familiar with construction practices, relationships, and professional ethics.
3. Be familiar with different project types and delivery systems
4. Be familiar with project professional opportunities and career paths within construction industry.

CSM 3113-Construction Surveying: Practical applications of surveying, including distance, grade and angular measurements, surveying equipment and its application to construction layout and control, surveying documentation and field work.

A student completing CSM 3113 will be able to:
1. Understand the fundamental concepts of surveying with construction applications.
2. Understand the professional and ethical responsibilities of construction managers.
3. Be familiar with distance, grade and angular measurements.
4. Be familiar with current surveying equipment and operation.
5. Be familiar with construction layout and control, surveying documentation and field practices.
CSM 3143-Structures I: Introduction to the physical principles that govern classical statics and strengths of materials through the design of concrete, timber, and steel components of structures.

A student completing CSM 3143 will be able to:
1. Develop an understanding of fundamental forces and structural systems.
2. Develop an understanding of equilibrium, forces, and moments.
3. Develop an understanding of stress, strain, and deformation of materials and structural components.
4. Develop an understanding of basic soil properties and behavior.

CSM 3621-Construction Safety I: Introduction to safety and safety programs, workers’ compensation, OSHA organization and structure, safety policies, standards, and record keeping. Emphasis on communication and job-site safety ethics and management.

A student completing CSM 3621 will be able to:
1. Understand the importance of construction safety and ethical responsibilities
2. Be familiar with legal and professional responsibilities
3. Be familiar with OSHA regulations, requirements and compliance
4. Be familiar with job site safety/hazard analysis and accident investigation procedures
5. Be familiar with the effects of jobsite environment/subsectors on construction safety

CSM 4013-Construction Estimating I: Introduction to estimating procedures for buildings related to quantity surveying, cost of materials and labor, life-cycle costs, and applicable software. (Formerly ARC 4013. Credit cannot be earned for both CSM 4013 and ARC 4013.)

A student completing CSM 4013 will be able to:
1. Interpret construction documents and specifications
2. Be familiar with units of measure in English and Metric systems
3. Be familiar with fundamentals of quantity survey and labor/production rates
4. Be familiar with construction procures relating to quantity survey, estimating, scheduling, and bidding in the CSI format.

CSM 4023-Construction Estimating II: Continuation of CSM 4013 with emphasis on pricing work, subcontracting, and bidding strategies utilizing applicable software. (Formerly ARC 4023. Credit cannot be earned for both CSM 4023 and ARC 4023.)

A student completing CSM 4023 will be able to:
1. Interpret and analyze construction documents and specifications.
2. Be familiar with applications of quantity survey and labor/production rates.
3. Be familiar with construction procures relating to quantity survey, estimating, scheduling, and bidding in the CSI format and other standard formats.
4. Be familiar with estimating software packages commonly used in industry practice.

CSM 4143-Structures II: Analysis and design of structural members in steel, reinforced concrete, reinforced masonry and their relationship to design and construction.

A Student completing CSM 4143 will be able to:
1. Perform static analysis of reinforced masonry and concrete structures.
2. Perform static analysis of steel structures.
3. Perform static analysis of wood and timber structures.
4. Conduct basic sizing and design of reinforced masonry and concrete structures.
5. Conduct basic sizing and design of steel structural components and systems.
6. Conduct basic sizing and design of wood structural components and systems.

**CSM 4513 - Project Management:** Introduction to project management of the construction process and integration with allied professions. Introduction to applicable software.

A student completing CSM 4513 will be able to:
1. Understand the fundamental concepts of management and roles in the construction industry.
2. Understand the professional and ethical responsibilities of construction managers.
3. Be familiar with administrative systems and procedures in the construction industry.
4. Be familiar with cost control data, jobsite documentation and procedures.
5. Be familiar with labor relationships, site management and quality control procedures and techniques in the construction industry.

**CSM 4523 - Project Planning and Scheduling:** Continuation of CSM 4513 with emphasis on scheduling and project delivery methods utilizing applicable software.

A student completing CSM 4523 will be able to:
1. Develop an understanding of the construction system elements and contractual and ethical relationships.
2. Develop an understanding of parameter estimates for component systems.
3. Develop an understanding of how various building components fit together and their sequence.
4. Develop an understanding of the importance of scheduling the project to maximize the efficient use of resources.
5. Develop an in-depth understanding of the use and importance of scheduling software.
6. Develop an understanding of methodologies used to evaluate actual field progress.

**CSM 4533 - Building Information Modeling for Construction Management:** Introduction to techniques used in development and management of Building Information Models. Emphasis on constructability and management.

A student completing CSM 4533 will be able to:
1. Understand the BIM definition and standards.
2. Understand the business process for successful BIM implementation.
3. Be familiar with BIM software including Revit 2014, Navisworks 2014 etc.
4. Be able to coordinate different disciplines with BIM.
5. Be able to conduct clash detections and generate reports using BIM software.
6. Be able to conduct QTO and estimating with BIM.
7. Be able to create 4D scheduling from BIM model.

**CSM 4613 - Sustainable Building Practice:** Ethics and application of environmental sustainability practice in building construction. Introduction to U.S. Green Building Council LEED program standards, methods, and procedures as applied to construction documents interpretation and construction.

A student completing CSM 4613 will be able to:
1. Understand the fundamental concepts of green design and construction
2. Understand the fundamental concepts of green construction and contacting.
3. Be familiar with LEED project requirements.
4. Be familiar with management of LEED certified projects.
5. Be familiar with contractual relationships and documentation of green construction projects.
CSM 4623-Construction Safety II: Development and management of safety programs, worker’s compensation, OSHA compliance, safety policies, standards, and record keeping.

A student completing CSM 4623 will be able to:
1. Understand the importance of construction safety and ethical responsibilities
2. Be familiar with legal and professional responsibilities
3. Be familiar with OSHA regulations, requirements and compliance
4. Be familiar with job site safety/hazard analysis and accident investigation procedures
5. Be familiar with the effects of jobsite environment/subsectors on construction safety

CSM 4633-Construction Law: Legal and ethical aspects of construction contracts, bonds, insurance, and bidding. Owner, architect, contractor, and subcontractor relationships.

A student completing CSM 4633 will be able to:
1. Understand the fundamental concepts of construction contracts, roles & responsibilities of parties
2. Understand the fundamental concepts of regulatory environment and licensing.
3. Be familiar with lien laws and the contractor's rights.
4. Be familiar with national and local labor law.
5. Be familiar with administrative procedures to avoid disputes.

CSM 4643-Mechanical, Electrical and Plumbing Systems: Building systems with an emphasis on design, installation and control of heating, ventilation and cooling, plumbing and drainage, electrical, fire and lightning protection systems.

A student completing CSM 4643 will be able to:
1. Develop an understanding of the principles, materials, and equipment used in plumbing and drainage systems.
2. Develop an understanding of the principles, materials, and equipment used in building electrical systems.
3. Develop an understanding of the principles, materials, and equipment used in HVAC systems.
4. Develop an understanding of the principles, materials, and equipment used in fire protection and suppression systems.
5. Read and interpret: electrical, mechanical, plumbing and fire protection building construction plans and specifications.
6. Conduct basic sizing and design of MEP systems based on the building specifications, loads and demands.

CSM 4713-Construction Capstone: Senior capstone project emphasizing integration of the design and construction processes. Project delivery systems, project development, estimating, scheduling and project controls of various types of construction projects.

A student completing CSM 4713 will be able to:
1. To develop an understanding of the construction system elements and contractual and ethical relationships
2. To develop an understanding of construction practice and project management principles.
3. To develop an understanding of project acquisition, planning and staffing, engineering, and construction of projects.
4. To develop an understanding of procedures used for start-up, close out, operation and maintenance and turnover for projects.
5. To develop an understanding of the importance of scheduling, updating and controlling the project in such a fashion as to maximize the efficient use of resources.