COSC - CONSTRUCTION SCIENCE (COSC)

COSC 153 Introduction to the Construction Industry

Credits 3. 3 Lecture Hours. Characteristics of the construction industry; types of construction companies; contracts; people involved in a project, their responsibilities and interrelationships; evolution of a project; interpreting working drawings; construction bonds; contract documents. **Prerequisite:** COSL majors only.

COSC 175 Construction Graphics Communication

Credits 3. 3 Lecture Hours. Visualization, interpretation and communication of graphical geometry in construction design and engineering; graphical analysis of problems; sketching applications, computer aided design and fundamentals of information modeling software; introduction to common quantitative tools in construction. **Prerequisite:** AREN and COSL majors only.

COSC 184 Construction Safety I

Credit 1. 1 Lecture Hour. Administration and application of the OSHA Act in the construction industry; includes standards, the general duty clause, competent person, and hazard identification; fulfills the requirements for the ten-hour OSHA certifications. **Prerequisite:** COSL majors.

COSC 202 Introduction to Housing

Credits 3. 3 Lecture Hours. Overview of the social, economic, environmental and cultural impacts of housing on communities and nations; varied prospectives to understand the different facets of housing and their impacts on the human experience; critical thinking skills to gain knowledge and to be informed of housing choices.

COSC 214 Introduction to Facilities Management

Credits 3. 3 Lecture Hours. Overview of facilities management principles; acquisition, operation, maintenance and disposition of the built environment; topics include construction documents, building systems (envelope, architectural, mechanical, electrical, plumbing), utility services, real estate and events and emergency management; owner's interaction with occupants, architects, engineers and contractors.

COSC 222 Social Issues in the History of the Construction Environment

Credits 3. 3 Lecture Hours. . Introduction to cultural and social issues in the built environment; exploration of how individual and collective ideas, values and beliefs are expressed in the construction environment; how the field of construction internalizes and thinks about these values across cultures and how authority, majorities and privilege affect the creativity of the built environment; emphasizes civil discourse to help recognize positionality and work collaboratively in a multicultural society.

COSC 253 Construction Materials and Methods I

Credits 3. 3 Lecture Hours. (ARCH 2312) Construction Materials and Methods I. Overview of construction materials, methods, and sequences of the construction process; introduction to material specifications and construction drawings; focus of study includes wood, concrete, masonry, and steel.

COSC 275 Estimating I

Credits 3. 2 Lecture Hours. 3 Lab Hours. Systems approach to determining required quantities of construction materials; quantification of various types of foundation systems, structural systems and building envelope systems; excerpts of contract documents from a variety of different building projects. **Prerequisite:** COSC 253; concurrent enrollment in COSC 175.

COSC 284 Introduction to Applied Workplace Ethics, Etiquette and Communications

Credit 1. 1 Lecture Hour. Professional ethics, etiquette and communication for employment preparation with a construction or construction related company; various case studies emphasizing personal accountability, integrity and codes of conduct; etiquette and communication of all forms will be presented, applied and discussed in reflective writing assignments in order to prepare to meet the professional expectations of employers upon graduation. **Prerequisite:** COSL majors.

COSC 285 Directed Studies

Credits 1 to 3. 1 to 3 Other Hours. Special project in construction science. Project must be approved by the department. **Prerequisite:** Approval of department head.

COSC 291 Research

Credits 1 to 4. 1 to 4 Other Hours. Research conducted under the direction of faculty member in construction science. May be repeated 2 times for credit. **Prerequisites:** Freshman or sophomore classification; approval of instructor.

COSC 301 Construction Surveying

Credits 2. 1 Lecture Hour. 3 Lab Hours. Practical applications of surveying to the practice of construction project management; distance, grade and angular measurement; surveying equipment and its application to construction layout and control; surveying documentation and field work; introduction to other three dimensional measurement and positioning systems. **Prerequisite:** Admission to upper level in Construction Science.

COSC 303 High Performance Residential Building

Credits 3. 3 Lecture Hours. Exploration into the concepts of homebuilding operations using green building methods, tools to reach consumers, organizational and operational theories and market driven green building solutions; alignment with ICC 700 National Green Building Standard; operations of publicly traded and private production homebuilders and best practices; application for the professional designation of Certified Green Professional (CGP) given by the National Association of Home Builders (NAHB) upon completion. **Prerequisite:** Admission to upper level in Construction Science.

COSC 310 Design and Construction Leadership Education I

Credit 1. 1 Lecture Hour. Promotion of personal leadership skills utilized within the design and construction professions; primary understanding and developing management skills with specific attention to developing personal attributes and skills necessary for achieving organizational goals. **Prerequisite:** CARC majors only pursuing the minor in leadership in the design & construction professions; junior or senior classification.

COSC 314 Immersion in Facilities Management

Credits 3. 3 Lecture Hours. In-depth exploration of tasks required for acquisition, operation, maintenance, and disposition of the built environment; includes commercial, healthcare, education, performance, athletic and high-rise residential buildings; site visits to relevant facilities. **Prerequisites:** Grade of C or better COSC 214; junior or senior classification.

COSC 321 Structural Systems I

Credits 3. 3 Lecture Hours. Introduction to the physical principles that govern classical statics and strengths of materials through the design of architectural structures. **Prerequisite:** Admission to upper level in Construction Science.

COSC 322 Construction Discourse Leadership

Credits 3. 3 Lecture Hours. Practicum on leadership skills; leading and managing difficult discussions in a professional setting; mentorship of new students; presentation of difficult discussion topics, demonstration of constructive critique methods. **Prerequisite:** Grade of C or better in COSC 222.

COSC 325 Mechanical, Electrical and Plumbing Systems in Construction I

Credits 3. 3 Lecture Hours. Design, operation, materials and installation methods of mechanical, electrical and plumbing systems in construction. **Prerequisite:** Admission to upper level in construction science or minor in facility management.

COSC 326 Mechanical, Electrical and Plumbing Systems in Construction II

Credits 3. 3 Lecture Hours. In depth coverage of mechanical, electrical and plumbing (MEP) system operations, materials and installation methods; development of MEP drawings, specifications and contract documents as used in MEP specialty contracting industry. **Prerequisite:** COSC 325.

COSC 333 Project Management for Facility Managers

Credits 3. 3 Lecture Hours. Overview of project management for facility managers covering concepts and components of project management and their interrelationships in construction practice. **Prerequisite:** Minor in facility management; junior or senior classification or approval of instructor.

COSC 335 Life Cycle Assessment in Building Construction

Credits 3. 3 Lecture Hours. Life Cycle Assessment from a coupled energy-carbon-water (ECW) nexus perspective; key LCA concepts; the LCA process; LCA standards; application of LCA approaches and software to assess the energy, greenhouse gas (GHG) emissions, water, and other environmental impacts of building construction industry at the material and whole building levels; study and analysis of factors relating to material and assembly choices, site logistics, on-site and off-site construction and/or fabrication processes, additive construction (large-scale 3D printing), and construction and demolition waste to reduce the energy use, GHG emissions, and water use; analysis and comparison of LCA results of process-based and macro-economic model-based Life Cycle Inventory (LCI). **Prerequisites:** Junior or senior classification.

COSC 340 Building Codes and Construction

Credits 3. 3 Lecture Hours. Exploration of the complex interrelationship of building codes and their influence on construction projects; emphasis on building code organization, construction types, and occupancy classifications; examines the role and responsibilities of the construction professional, the permitting process, and the inspection process. **Prerequisites:** Admission to upper level in Construction Science.

COSC 353 Construction Project Management

Credits 3. 3 Lecture Hours. An introduction to construction project management covering concepts of project selection, estimating bidding, scheduling, subcontracting practices, cost controls, project documentation, construction bonds, insurance, payments and the elements of close out; development of professional communication skills through prepared multi-media presentations. **Prerequisite:** Admission to upper level in Construction Science.

COSC 354 Construction Materials and Methods II

Credits 3. 3 Lecture Hours. Continuation of COSC 253; emphasis on advanced building methods for the assembly of building systems; focus of study includes concrete, masonry, and steel. **Prerequisite:** COSC 253.

COSC 359 Industrial Construction

Credits 3. 3 Lecture Hours. Industry specific knowledge such as concepts of developing construction management strategies of industrial projects, materials and methods, structural and mechanical components; preparation to effectively resolve challenges faced in the industrial construction sector. **Prerequisites:** Admission to upper level in construction science.

COSC 375 Estimating II

Credits 3. 2 Lecture Hours. 3 Lab Hours. Quantification and pricing of direct field costs and general condition costs from construction documents; preparation of complete pricing proposal ready for project execution; completion of a response to a bid or request for proposal. **Prerequisites:** Admission to upper level in Construction Science; COSC 275.

COSC 381 Professional Ethics in the Construction Industry

Credit 1. 1 Lecture Hour. Principles of ethical behavior in preparation for a professional internship with a construction or construction-related company; various construction company case studies emphasizing personal accountability, integrity, moral courage, individual, association and company codes of conduct; accepted business practices, decision making, company cultures, peer pressure, public opinion. **Prerequisite:** Admission to upper level in Construction Science.

COSC 410 Design and Construction Leadership Education II

Credit 1. 1 Lecture Hour. Development of competencies in various leadership and management practices that are useful in an array of situations; emphasis on organizational leadership and management development with specific attention to intragroup relationships and techniques for achieving group goals. **Prerequisite:** COSC 310, CARC majors only pursuing the minor in leadership in the design and construction professions; junior or senior classification.

COSC 411 Seminar in Design and Construction Executive Leadership

Credit 1. 1 Lecture Hour. Promotes an understanding of leadership and builds the capacity to understand and meet the challenges involved in developing and leading ethical and sustainable organizations in today's economy; examination of theory, conceptualizing, reflection and application; share experiences in everyday life and learn to predict outcomes based on theoretical models. **Prerequisite:** COSC 410; CARC majors only pursuing the minor in leadership in the design and construction; junior or senior classification.

COSC 414 Contracted Services Management

Credits 3. 3 Lecture Hours. Overview of contracted services management for facilities design, construction, operations, and maintenance; topics include scope of work development, A/E and vendor selection and procurement, contract administration (insurance, payment, communication, scope execution, field oversight, closeout), and common tools, equipment, and material. **Prerequisites:** Grade of C or better COSC 214; Minor in Facilities Management; junior or senior classification or approval of instructor.

COSC 421 Soil and Structural Analysis.

Credits 3. 3 Lecture Hours. Advanced structural analysis of steel and concrete members with an introduction to soil properties and constituents; utilizations of computer analysis tools. **Prerequisite:** COSC 321.

COSC 427 Project Execution and Administration - Constructionarium United Kingdom

Credits 3. 3 Lecture Hours. Development of project execution and management of a mock commercial construction project; includes aspects of estimating, bidding, schedule development, real time scheduling, job-site safety plans, project execution plans, material procurement, cost controls, construction management, owner, and architect presentations, close out, and post-construction requirements; includes multiple day field trip during the mock construction project. **Prerequisites:** Admission to upper level in Construction Science.

COSC 428 Preconstruction - the Art of the Project

Credits 3. 3 Lecture Hours. Instruction in the pre-construction processes that are necessary in construction project evolution; exploration of alternative project delivery options from the traditional design-bid-build linear approach; focus on engagement of Construction Professionals at earliest project phase; familiarization with the roles of professionals in all phases of construction including design, construction, and ownership. **Prerequisites:** Admission to upper level in Construction Science.

COSC 433 Immersion in Facilities Management

Credits 3. 3 Lecture Hours. 1 Lab Hour. In-depth exploration of the varied tasks required for the acquisition, operation, maintenance and disposition of the built environment including commercial, healthcare, education, performance, athletic, high-rise residential buildings; exploration that entails site visits to appropriate buildings and their operational systems. **Prerequisites:** COSC 214; minor in Facilities Management or admission to upper level in Construction Science.

COSC 440 Interdisciplinary Capstone

Credits 3. 3 Lecture Hours. A senior capstone for students preparing to enter the designbuild sector of the construction industry; integration of the design and construction processes into a single, cohesive project delivery system, starting with project inception, and carrying through construction, operation and maintenance of various types of construction projects. **Prerequisite:** COSC 475; must be taken in graduating semester.

COSC 441 Residential Capstone

Credits 3. 3 Lecture Hours. A senior capstone course for students preparing to enter the residential construction industry; project management of residential projects, including market analysis, site analysis, residential design, building codes, estimating, scheduling, financing, subcontracting, marketing, business planning and current trends in design and construction. **Prerequisite:** COSC 475; must be taken in graduating semester.

COSC 442 Commercial Capstone

Credits 3. 3 Lecture Hours. A senior capstone course for students preparing to enter the commercial construction sector; project management of commercial construction projects, including aspects of design, bidding/estimating; presentation, value engineering, contracts/negotiation, subcontractor relations, cost controls, management during construction, close out, and post-construction requirements. **Prerequisite:** COSC 475; must be taken in graduating semester.

COSC 443 Industrial Capstone

Credits 3. 3 Lecture Hours. A senior capstone course for students preparing to enter the industrial construction sector; project management of industrial construction projects including project acquisition, planning and staffing, engineering, procurement, construction, start-up, close out, operations and maintenance, and turn-arounds. **Prerequisite:** COSC 475; must be taken in graduating semester.

COSC 446 Specialty Capstone

Credits 3. 3 Lecture Hours. Senior capstone course for students preparing to enter the mechanical, electrical or other specialty construction company; project management of specialty contracts including project acquisition, schematic system design, estimating/bidding, scheduling, systems integration, value engineering, management during construction of crews and procurement, contract administration, business planning and current industry issues. **Prerequisite:** COSC 475; must be taken in graduating semester.

COSC 461 Building Information Modeling System

Credits 3. 3 Lecture Hours. Exploration of a data-rich, object-oriented, and parametric digital representation of the facility, from which views and information can be extracted and analyzed for construction project acquisition, planning, and control. **Prerequisite:** Admission to upper level in Construction Science.

COSC 463 Introduction to Construction Law

Credits 3. 3 Lecture Hours. Introduction to basic contract and tort issues and their application in the construction industry; delineation of the various types of contracts and remedies available to parties involved in a construction project; additional related topics including bidding, delays, mechanics liens, site conditions, warranties and the Uniform Commercial Code as it relates to the construction industry, introduction to legal research and reasoning as used by professional constructors. **Prerequisite:** Admission to upper level in Construction Science.

COSC 464 Construction Safety

Credits 3. 3 Lecture Hours. Administration and application of the Occupational Safety and Health Administration Act in the construction industry; includes OSHA standards, the general duty clause, competent person and hazard identification; fulfills the requirements for the thirty-hour OSHA, CPR and First Aid certifications. **Prerequisite:** Admission to upper-level in construction science.

COSC 465 Advanced Topics in Construction Law

Credits 3. 3 Lecture Hours. Legal issues affecting construction, including the parties to construction work, contracting, responsibilities and risk, risk management, damages, handling of claims and disputes, indemnification, bonds, insurance, bankruptcy, labor and employment, and subcontract management; litigation and alternative dispute resolution methods regularly used in the construction industry. **Prerequisite:** COSC 463.

COSC 468 Risk Management in the Built Environment

Credits 3. 3 Lecture Hours. Decision-making and risk analysis concepts in the context of the built environment and construction projects; major categories and tools of risk management regularly used in the construction industry such as contracts, insurance and bonds. **Prerequisites:** Admission to upper level in construction science and COSC 463 or concurrent enrollment.

COSC 473 Built Environment in International Setting

Credits 3. 3 Lecture Hours. Survey of the built environment and how changing global societies have adapted in design, labor and materials used; exposure to to opinions and practices in the areas of politics, culture, gender and religion. **Prerequisite:** Junior or Senior construction science majors or instructor approval.

COSC 474 Facility Management Internship

Credits 3. 3 Lecture Hours. An internship (10 weeks, 400 hours) in a facility management related position that exposes the student to facility management activities; daily logs, monthly reports, final report and completion letter required; distance education off-campus course; does not satisfy College of Architecture semester away requirement. **Prerequisites:** COSC 333; approval of internship faculty coordinator.

COSC 475 Construction Project Planning

Credits 3. 2 Lecture Hours. 3 Lab Hours. Development of parameter cost estimates for activities that relate to the construction of a building project; work packages sequenced, planned and leveled to develop a working project execution document; development of procedures to monitor actual field progress. **Prerequisite:** COSC 353, COSC 375.

COSC 477 Construction Project Controls

Credits 3. 3 Lecture Hours. Introduction to construction related financial documents including schedule of values, labor and operations cost reports, income statements, balance sheets and construction budgets; emphasis on the development of techniques required to effectively monitor the financial aspects of a construction project. **Prerequisite:** COSC 353 and COSC 494.

COSC 481 Seminar

Credit 1. 1 Lecture Hour. Seminar discussion of construction equipment selection, utilization maintenance and operating cost. **Prerequisite:** Admission to upper level in Construction Science.

COSC 484 Internship - 10 Week

Credits 3. 3 Other Hours. An internship (10 weeks, 400 hours) with a construction or construction-related company that exposes the student to construction-related activities; daily logs, monthly reports, final report and completion letter required; distance education course with non-resident status; does not satisfy the College of Architecture semester away requirement unless taken while on Construction Science Spring Study Abroad. **Prerequisites:** COSC 284, COSC 353, and COSC 375; approval of internship faculty coordinator.

COSC 485 Directed Studies

Credits 1 to 5. 1 to 5 Other Hours. Special problems in building construction. **Prerequisite:** Admission to upper-level in Construction Science.

COSC 489 Special Topics in...

Credits 1 to 4. 1 to 4 Lecture Hours. Selected topics in an identified field of construction science. May be repeated for credit. **Prerequisite:** Admission to upper-level in Construction Science.

COSC 491 Research

Credits 1 to 4. 1 to 4 Other Hours. Research conducted under the direction of faculty member in construction science. May be repeated 2 times for credit. Registration in multiple sections of this course is possible within a given semester provided that the per semester credit hour limit is not exceeded. **Prerequisites:** Admission to upper level in Construction Science and approval of instructor.

COSC 494 Internship

Credits 6. 6 Other Hours. An internship (15 weeks, 600 hours) with a construction or construction-related company that exposes the student to construction-related activities, daily logs, monthly reports, final report and completion letter required; distance education course with non-resident status. No other Texas A&M Construction Science courses may be taken while enrolled in COSC 494. **Prerequisites:** COSC 284, COSC 353, and COSC 375; approval of internship faculty coordinator.