

COSC - CONSTRUCTION SCIENCE

COSC 601 Construction Practices

Credits 3. 3 Lecture Hours. Materials and methods of construction with emphasis on the design and construction process; includes structural steel and other metals, foundation materials, precast and tilt wall concrete, concrete reinforcement including pre-stressing, wood dimension lumber framing, and heavy timber framing. **Prerequisites:** Graduate classification in the Department of Construction Science.

COSC 602 Construction Cost Estimating

Credits 3. 3 Lecture Hours. Determination of quantities for various types of construction materials and works including earthwork, foundations, structural systems, mechanical and electrical systems, and building finishes; methods used for pricing of construction works including labor, materials, equipment, sub-contractors, overhead and profit; use of various types of cost data catalogs available in the industry. **Prerequisite:** Graduate classification in the Department of Construction Science.

COSC 603 Construction Scheduling

Credits 3. 3 Lecture Hours. Introduction to commonly used techniques and computer applications for the planning, scheduling, monitoring, and controlling of construction projects; includes key scheduling techniques such as Gantt Chart, CPM, PERT, LSM, and EVM; practical scheduling practices such as tracking, controlling, and forecasting trends of schedules, cost control, and reporting. **Prerequisite:** Graduate classification in the Department of Construction Science.

COSC 606 Mechanical and Electrical Construction

Credits 3. 3 Lecture Hours. Building environmental systems with a major emphasis on the design and control of the heating, ventilation and cooling systems, plumbing and drainage systems, electrical, fire and lightening protection, and lighting; design opportunities, calculations, equipment selection and economics as they relate to design and construction. **Prerequisites:** Graduate classification in the Department of Construction Science.

COSC 608 Structural Principles and Practices

Credits 3. 3 Lecture Hours. Investigations into practical applications of structural design including the analysis and design of structural members in steel and concrete; surveys and studies of various structural systems. **Prerequisites:** Graduate classification in the Department of Construction Science.

COSC 620 Construction Company Operations

Credits 3. 3 Lecture Hours. Running a construction company; strategic planning; business planning; organizational theory; competitor analysis; risk management; financial analysis; human resources; management information systems; leadership; codes of ethics; best practices. **Prerequisites:** Graduate classification in the Department of Construction Science.

COSC 621 Advanced Project Management

Credits 3. 3 Lecture Hours. Theoretical, practical, and strategic development in the management of contemporary construction projects; advanced techniques used in scheduling and evaluating progress in construction project control; exploration of state-of-the-art management principles and practices, and development of additional insights.

Prerequisite: COSC 603 or COSC 475.

COSC 622 Construction Economics

Credits 3. 3 Lecture Hours. Foundation in Life Cycle Cost Analysis computation within the context of current issues in environmental sustainability and evidence-based thinking; lean construction as a strategy to overcome the hurdle of first cost. **Prerequisites:** Graduate classification in the Department of Construction Science.

COSC 624 Construction Accounting and Financial Management

Credits 3. 3 Lecture Hours. Fundamental theories and applied methods of construction accounting and construction financial management including cash flow analysis, financial planning, risk analysis, and project financing. **Prerequisites:** Graduate classification.

COSC 628 Construction Contracts and Risk Management

Credits 3. 3 Lecture Hours. Advanced construction law, contracts, and risk management applicable to construction management; identification of common disputes and construction risks among the owner, design professionals, and contractor; analysis of construction contracts with an emphasis on troublesome provisions and solutions; demonstration of tools of negotiation and dispute resolution; ethics in construction.

Prerequisites: Graduate classification.

COSC 631 Advanced Productivity and Lean

Credits 3. 3 Lecture Hours. Introduction to lean history, concepts and methods; deduction of basic training modules in lean project delivery; application of lean management in construction projects. **Prerequisites:** Graduate classification in the Department of Construction Science.

COSC 642 Construction Information Technology

Credits 3. 3 Lecture Hours. Exploration of emerging technologies for the construction industry including hardware and software systems such as BIM, RFID, Wireless/Mobile, information systems, construction specific programs, and information strategy planning; using information strategy planning by owners and contractors to effectively enhance the management of business entities and projects in construction.

Prerequisites: Graduate classification.

COSC 644 Advanced Construction Systems

Credits 3. 3 Lecture Hours. Theoretical, practical, and strategic development in contemporary construction systems; exploration of state-of-the-art innovations in environmental control systems, structural principles and practices; integration of innovations with information technologies, and development of additional insights. **Prerequisites:** Graduate classification.

COSC 650 Advanced Construction Visualization

Credits 3. 3 Lecture Hours. Introduction to the theory and application of 3-D computer models in the design/build construction process; creation, positioning in 3-D space, and linking of building components to a database record; creation of a wide range of construction related information useful in controlling project quality. **Prerequisites:** Graduate classification.

COSC 663 Sustainable Construction

Credits 3. 3 Lecture Hours. Contribution of materials and methods to meeting the needs of the present without compromising the ability of future generations to meet their own needs; overview of international, national and local programs promoting sustainable construction; characteristics of the components of successful sustainable construction projects; theories and practices through case studies. **Prerequisites:** Graduate classification in the Department of Construction Science.

COSC 664 Advanced Construction Safety and Health Management

Credits 3. 3 Lecture Hours. Evaluation of safety management practices and accident prevention techniques, including state and federal laws related to general and construction projects; theoretical concepts and industry practices used to model, evaluate, and improve construction worker safety through the design of the project features, construction operations, and site safety program elements; causes of construction site accidents, hazard recognition and comprehension, safety risk valuation and mitigation, and the true costs of injuries and fatalities; role of technology in enhancing safety and health management; fulfills the requirements for the ten-hour OSHA certification **Prerequisites:** Graduate classification in the Department of Construction Science.

COSC 670 Facilities Asset Management

Credits 3. 3 Lecture Hours. Fundamentals of facility asset management and property management including concepts, theories, and principles of design, construction, accounting, finance, and management of the built environment; an overview of a project throughout its entire life cycle from various perspectives including the owner, users, designers, constructors and facility management personnel. **Prerequisites:** Graduate classification.

COSC 681 Seminar

Credit 1. 1 Lecture Hour. Discussion and review of degree requirements, career opportunities, and current research activities in construction management. **Prerequisite:** Graduate classification.

COSC 684 Professional Internship

Credits 3 to 6. 3 to 6 Other Hours. Approximately 400-600 hours with a construction or construction-related company that exposes the student to construction-related activities; an initial report, monthly progress reports, a final report, and a final completion letter are required. **Prerequisites:** Graduate classification; approval of graduate coordinator; approval of internship coordinator.

COSC 685 Directed Studies

Credits 1 to 6. 1 to 6 Other Hours. Individual problems in the area of building construction involving the application of theory and practice. **Prerequisite:** Approval of instructor.

COSC 689 Special Topics in...

Credits 1 to 4. 1 to 4 Lecture Hours. Selected topics in an identified field of construction management. May be repeated for credit. **Prerequisite:** Approval of instructor.

COSC 690 Theory of Research in Construction Science

Credits 3. 3 Lecture Hours. Introduction to research, research tools, proposal writing and research reports; emphasis on research planning and design, conducting a comprehensive review of literature, quantitative and qualitative research methodologies, defining research problems in construction science, and the development of research proposals. **Prerequisite:** STAT 651 or concurrent enrollment.

COSC 691 Research

Credits 1 to 23. 1 to 23 Other Hours. Research for thesis. **Prerequisites:** COSC 690 or concurrent enrollment; approval of graduate coordinator.

COSC 693 Professional Study

Credits 1 to 6. 1 to 6 Other Hours. Approved professional study of project undertaken as terminal requirement for Master of Science, non-thesis option. Preparation of a record of study summarizing the rationale, procedure and results of the completed study. May be repeated for credit. **Prerequisite:** COSC 690 or concurrent enrollment; approval of graduate coordinator.