# 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.

## 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.

## 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.

## 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.

## 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.

## 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.

## 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.

## 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.

## 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.

## 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.

## 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.

## 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.

## 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.

## 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.