

Building Science - BSCI

Courses

BSCI 1100 INTRODUCTION TO CONSTRUCTION (3) LEC. 3. Introduction to construction industry and education, current issues, and career opportunities.

BSCI 2200 CONSTRUCTION DOCUMENTS (3) LEC. 2. LAB. 3. Pr. BSCI 2300. Reading and interpreting working drawings, specifications, shop drawings, and digital 3D models for use in estimating and administering various types of construction projects.

BSCI 2300 CONSTRUCTION METHODS AND MATERIALS (3) LEC. 3. Materials, methods and construction equipment used in the construction of buildings.

BSCI 2400 STRUCTURE OF BUILDINGS I (3) LEC. 3. Pr. (PHYS 1500 or PHYS 1600) and (MATH 1610 or MATH 1150 or (MATH 1120 and MATH 1130)). Principles of mechanics and materials behavior related to building structures. Includes force systems, frame analysis, gravity load tracing, wind and seismic resistance for concrete and steel buildings.

BSCI 3200 CONSTRUCTION COMMUNICATION (3) LEC. 3. Overview of communication skills and tools required to succeed as a construction manager. Oral communication, written communication, ethics, visual literacy, and video capture in the context of construction risk management.

BSCI 3300 FIELD SURVEYING (2) LEC. 1. LAB. 6. Surveying techniques, construction layout, use of equipment, and dimensional controls for buildings. Surveying camp, a concentrated, 10 working day course held during breaks.

BSCI 3400 STRUCTURES FOR ARCHITECTS II (3) LEC. 3. Pr. BSCI 2400. Primary and secondary member design, connection design, temporary bracing/shoring, and steel shop drawing review.

BSCI 3440 STRUCTURE OF BUILDINGS II (3) LEC. 3. Pr. BSCI 2400. Principles of static equilibrium and materials behavior related to building structures. Includes force systems, frame analysis, section properties, stress, basic design of structural elements in buildings.

BSCI 3450 STRUCTURES FOR ARCHITECTS III (3) LEC. 3. Pr. BSCI 3400. Introduction to the design of reinforced concrete and related formwork including beams, columns, slabs, footings, retaining walls, and pre-stressed members.

BSCI 3500 CONSTRUCTION AND INFORMATION TECHNOLOGY I (3) LEC. 2. LAB. 2. To explore, discover and create applications of information communication technology (ICT) for Construction Processes.

BSCI 3600 ESTIMATING AND COSTING (4) LEC. 3. LAB. 3. BSCI Major. Introduction to construction estimating for CSI Divisions 1-33. Students perform quantity take-of (QTO), pricing, and preparation for a commercial construction project using computer-based techniques.

BSCI 3660 PRECONSTRUCTION AND PROJECT MANAGEMENT (3) LEC. 2. LAB. 2. Pr. BSCI 3600. Project(s) simulation as a context to discuss, negotiated procurement, pre-construction services in the alternative delivery environment and construction phase management procedures.

BSCI 3700 CONSTRUCTION SAFETY (3) LEC. 3. Construction safety, including OSHA guidelines, accident investigation, and the creating of construction safety plans and worker training program.

BSCI 3800 CONTRACTING BUSINESS (4) LEC. 4. Pr. BSCI 3600. Construction-specific look at the business functions associated with the industry; includes organizational structures, construction finance, risk analysis, construction contracts, project delivery, and associated documents with these functions.

BSCI 4200 RESIDENTIAL CONSTRUCTION (3) LEC. 3. Provides an overview of residential construction and development practices and professional issues including: local ordinances and codes, land use law, financing practices, architect-builder relationship, spec homes vs. custom homes, etc.

BSCI 4300 PRINCIPLES OF CONSTRUCTION & DESIGN (3) LEC. 3. Provides a basic overview of the design and construction process with a focus on project planning and management practices which relate to interactions between the architect, constructor, and project developer. Includes: aspects of the roles and responsibilities of the designer and contractor, design process, pre-construction and construction phase contractor activities.

BSCI 4350 CONSTRUCTION PROJECT ANALYSIS (3) LEC. 3. Pr. BSCI 3660. Analysis of methods, materials and equipment used to construct projects. Methods used to assure the quality of construction projects.

BSCI 4360 SERVICE LEARNING IN CONSTRUCTION (2-3) LEC. 2. LAB. 2. Pr. BSCI 3700 and BSCI 3660. Application of Construction Management-relevant knowledge to real-life situations through active participation in a directed community service experience. Course may be repeated for a maximum of 3 credit hours.

BSCI 4410 PROBLEMS IN CONSTRUCTION MEANS AND METHODS (3) LEC. 2. LAB. 2. Pr. BSCI 3660. Solving challenging problems encountered in construction processes, including form work, scaffolding, framing, steel erection, rigging, lifting, safety, and site management.

BSCI 4420 MANAGEMENT FOR CONSTRUCTION SUPERINTENDENTS (3) LEC. 1. LAB. 4. Pr. BSCI 3660. Senior Standing in Building Science. Development of expanded management strategies for construction superintendents including field conditions analysis, direction of tradesmen, communication skills, and project hoisting and equipment.

BSCI 4500 INFORMATION AND COMMUNICATION TECHNOLOGY FOR CONSTRUCTION II (3) LEC. 2. LAB. 2. To recognize, experiment and practice the applications of advanced information and communication technology (ICT) for Construction Processes.

BSCI 4610 SCHEDULING AND FIELD OPERATIONS (4) LEC. 4. Pr. BSCI 3660. The third of a sequence of three project controls classes; an in-depth study of construction project sequencing and scheduling, jobsite cost control measures, construction cash flow analysis, and a variety of leadership and management issues associated with field operations.

BSCI 4700 MECHANICAL SYSTEMS IN BUILDINGS (3) LEC. 2. LAB. 2. Pr. BSCI 3500 and BSCI 3600. Overview of the plumbing and mechanical systems of buildings. Basic design, sustainability concepts, systems, installation and testing are covered.

BSCI 4710 MECHANICAL CONSTRUCTION ESTIMATING AND MANAGEMENT (3) LEC. 2. LAB. 2. Pr. BSCI 4700. Advance study of mechanical construction industry. Study and application of design principles, estimating and management techniques used in the industry.

BSCI 4750 ELECTRICAL SYSTEMS IN BUILDINGS (3) LEC. 3. Pr. BSCI 3500. Electrical systems commonly used in buildings; basic theory and design concepts, with emphasis on lighting and electrical distribution equipment and its installation.

BSCI 4850 CONSTRUCTION LAW AND RISK MANAGEMENT (3) LEC. 3. Pr. BSCI 3660. Construction law, business law and risk management; the legal system and terminology, contracts, insurance, warranties, liens, environmental concerns, workplace issues, damages, and dispute resolution.

BSCI 4860 ADVANCED CONSTRUCTION INFORMATION TECHNOLOGY (3) LEC. 2. LAB. 2. Pr. BSCI 3660. Exploration and creation of advanced applications of Information and Communication Technology (ICT) for planning, decision making, projects monitoring, and controls.

BSCI 4870 CONSTRUCTION HISTORY (3) LEC. 3. Survey of historic construction projects to analyze how and why buildings and structures were constructed in the way they were.

BSCI 4880 CONSTRUCTION EQUIPMENT MANAGEMENT (3) LEC. 3. Pr. BSCI 3660. Construction equipment management and ownership. Equipment acquisition and disposition options, production costs and productivity, cost analysis and control, management staffing and responsibilities.

BSCI 4890 LEAN CONSTRUCTION PRINCIPLES AND PRACTICES (3) LEC. 3. Pr. BSCI 3660. This course provides an understanding of lean construction principles involving lean design, assembly, supply, production and work processes.

BSCI 4960 SPECIAL PROBLEMS (1-6) IND. Special problems in construction topics. Course may be repeated for a maximum of 6 credit hours.

BSCI 4990 BUILDING SCIENCE THESIS (4) LAB. 12. Individual project demonstrating mastery of curriculum content through the application of skills/knowledge to a theoretical construction company and project. Requires a written thesis and oral defense of work.

BSCI 5430 SITE & EARTHWORK CONSTRUCTION (3) LEC. 3. Pr. BSCI 3660. This course provides a general overview of means and methods associated with sitework-related construction through evaluation of Earthwork Operations, Equipment Selection and Productivity, Optimizing crew and productivity, Cost Estimating, Risks related Sitework-Related Projects, Concrete Construction, Erosion and Sediment Control, and an overview of Bridge and Highway Construction.

BSCI 5450 BUILDING GREAT STRUCTURES (3) LEC. 3. Departmental approval. Conceptual Analysis of a variety of structural systems using observation and modeling of the world's greatest structures. Emphasis on construction innovations necessary to build these structures. May count either BSCI 5450 or BSCI 6450.

BSCI 5460 PLANNING AND DECISION MAKING IN CONSTRUCTION (3) LEC. 3. Pr. BSCI 3660. Departmental approval. Applications of quantitative methods in various phases of project life cycle to assist project stakeholders in making effective planning and informed decision making. May count either BSCI 5460 or BSCI 6460.

BSCI 5470 SMALL UNMANNED AIRCRAFT SYSTEMS IN CONSTRUCTION (3) LEC. 3. Departmental consent. Overview of FAA requirements including hands on training with small unmanned aerial systems and associated software focused on applications in construction.

BSCI 5810 SERVICE LEARNING IN CONSTRUCTION MANAGEMENT - STUDY ABROAD OR STUDY AWAY (3) LEC. 1. LAB. 4. Pr. BSCI 3700. Departmental approval. Application of Construction Management-relevant knowledge to real-life situations through active participation in a directed community service experience at an international or domestic location. Repeatable with instructor permission.

BSCI 5830 GLOBAL CONSTRUCTION MANAGEMENT (3) LEC. 3. This course will discuss global construction issues and related project management practices. Departmental approval. May count either BSCI 5830 or BSCI 6830.

BSCI 5840 MULTI-CULTURAL ISSUES IN CONSTRUCTION (3) LEC. 3.

BSCI 5920 INTERNSHIP IN CONSTRUCTION MANAGEMENT (0) INT. SU. Professional work experience in a construction management position. Students participating in BSCI 5920/6920 are expected to work in a full-time, 40 hour/week, construction management job. Course may be repeated for a maximum of 10 credit hours.

BSCI 5960 SPECIAL PROBLEMS (1-6) AAB. Departmental approval. Special problems in construction topics. Offered only at the discretion of the department head. Course may be repeated for a maximum of 6 credit hours.

BSCI 5970 SPECIAL TOPICS IN CONSTRUCTION (1-3) AAB. 1-3. Departmental approval. Special topics in construction focuses on topics in Building Science that are in addition to the regular curriculum. Offered only at the discretion of the department head. Course may be repeated for a maximum of 6 credit hours.

BSCI 6430 SITE & EARTHWORK CONSTRUCTION (3) LEC. 3. Pr. BSCI 7020. This course provides an overview of sitework-related construction through evaluation of Earthwork Operations, Equipment Selection and Productivity, Optimizing crew and productivity, Cost Estimating, Risks related Sitework-Related Projects, Concrete Construction, Erosion and Sediment Control, and an overview of Bridge and Highway Construction.

BSCI 6450 BUILDING GREAT STRUCTURES (3) LEC. 3. Conceptual Analysis of a variety of structural systems using observation and modeling of the world's greatest structures. Emphasis on construction innovations necessary to build these structures. May count either BSCI 5450 or BSCI 6450.

BSCI 6460 PLANNING AND DECISION MAKING IN CONSTRUCTION (3) LEC. 3. Departmental approval. Applications of quantitative methods in various phases of project life cycle to assist project stakeholders in making effective planning and informed decision making. May count either BSCI 5460 or BSCI 6460.

BSCI 6470 SMALL UNMANNED AIRCRAFT SYSTEMS IN CONSTRUCTION (3) LEC. 3. Overview of FAA requirements including hands on training with small unmanned aerial systems and associated software focused on applications in construction.

BSCI 6810 SERVICE LEARNING IN CONSTRUCTION MANAGEMENT - STUDY ABROAD OR STUDY AWAY (3) LEC. 1. LAB. 4. Pr. BSCI 7020. Departmental approval. Application of Construction Management-relevant knowledge to real-life situations through active participation in a directed community service experience at an international or domestic location. Repeatable with instructor approval. Must complete Construction Safety elective course prior to taking this course. Course may be repeated for a maximum of 6 credit hours.

BSCI 6830 GLOBAL CONSTRUCTION MANAGEMENT (3) LEC. 3. This course will discuss global construction issues and related project management practices. Departmental approval. May count either BSCI 5830 or BSCI 6830.

BSCI 6840 MULTI-CULTURAL ISSUES IN CONSTRUCTION LABOR (3) LEC. 3.

BSCI 6920 INTERNSHIP IN CONSTRUCTION MANAGEMENT (0) INT. SU. Professional work experience in a construction management position. Students participating in BSCI 5920/6920 are expected to work in a full-time, 40 hour/week, construction management job. Course may be repeated for a maximum of 10 credit hours.

BSCI 6960 SPECIAL PROBLEMS IN CONSTRUCTION (1-5) AAB. Departmental approval. Individually proposed problems or projects related to the construction industry. Students must prepare a written proposal with defined deliverables. Course may be repeated for a maximum of 5 credit hours.

BSCI 6970 SPECIAL TOPICS IN CONSTRUCTION (1-3) AAB. Departmental approval. Special topics in construction focuses on topics in Building Science that are in addition to the regular curriculum. Course may be repeated for a maximum of 3 credit hours.

BSCI 7010 CONSTRUCTION LABOR AND PRODUCTIVITY (3) LEC. 3. Departmental approval. Construction labor issues, productivity measurement, and productivity improvement in the construction industry. Includes reading, research, and an out of class project.

BSCI 7020 INTEGRATED BUILDING PROCESSES I (3) LEC. 3. Departmental approval. Project manifestation and development preceding design and construction phases with emphasis on the project owner's perspective, the financial parameters, and the speculative demand driving project viability.

BSCI 7030 CONSTRUCTION INFORMATION MANAGEMENT (3) LEC. 3. Applications of advanced information technology in construction.

BSCI 7040 INTEGRATED BUILDING PROCESSES II (3) LEC. 3. Departmental approval. Construction project delivery, from pre-construction service through ownership. Topics include project management, pre-construction services, pre-planning, procurement, site utilization, subcontracts, commissioning, closeout, building operation, and long-term ownership.

BSCI 7050 EXECUTIVE ISSUES IN CONSTRUCTION (3) LEC. 3. Construction industry executives will present 6 to 10 topics that represent a cross-section of significant management issues.

BSCI 7060 RESEARCH METHODS IN BUILDING SCIENCE (3) LEC. 3. A study of the academic research process, with an emphasis on defining research problems in construction and the development of a research proposal.

BSCI 7100 GRADUATE ELECTIVE IN PROJECT MANAGEMENT: PROJECT MANAGEMENT AND SCHEDULING (3) LEC. 3. This course develops advanced student knowledge and skills in construction business facets such as delivery, contracts and financial management; and develops tactile skills in producing advanced construction schedules in current software applications. Credit will not be given for both BSCI 7100 and BSCI 7106. Course may be repeated with change in topics.

BSCI 7110 CONSTRUCTION CONTRACTING BUSINESS (3) LEC. 3. Business functions associated with construction industry; organizational structure, construction finance; risk analysis, construction contracts, project delivery, and associated documents. Admission to Certificate in Construction Management.

BSCI 7120 CONSTRUCTION LAW AND RISK MANAGEMENT (3) LEC. 3. Construction law, business law and risk management; the legal system and terminology, contracts, insurance, warranties, liens, environmental concerns, workplace issues, damages and dispute resolution. Admission to Certificate in Construction Management.

BSCI 7130 BUILDING CONSTRUCTION SUSTAINABILITY (3) DSL. Students must be admitted to the Executive Technical Certificate in Construction Management. The role of sustainable practices & processes in the construction industry. Role of built environment in consuming resources. Minimizing construction waste. Standards for sustainable construction.

BSCI 7140 STRUCTURAL SYSTEMS OF BUILDINGS (3) LEC. 3. Students must be admitted to the Executive Technical Certificate in Construction Management. Role of structural systems of buildings. Forces in buildings. Temporary structures in construction. Common failure models of structures.

BSCI 7150 HEAVY CIVIL CONSTRUCTION (3) LEC. 3. Students must be admitted to the Executive Integrated Processes Certificate in Construction Management. Principles of heavy civil construction including budget, planning, excavation, haul, equipment, temporary structures and types of projects involved.

BSCI 7200 ELECTIVES IN CONSTRUCTION LABOR (3) LEC. 3. Departmental approval. Special course offerings related to construction labor topics. Course may be repeated with change in topic.

BSCI 7300 ELECTIVES IN INFORMATION TECHNOLOGY AND INNOVATION (3) LEC. 3. Departmental approval. Special course offerings related to information technology, innovation, and robotics in construction. Course may be repeated with change in topic.

BSCI 7900 DIRECTED READING IN CONST (1-3) IND. Departmental approval. Individually proposed exploration of a construction industry related topic not covered in existing course offerings. Students must prepare a written proposal of the topic. Course may be repeated for a maximum of 3 credit hours.

BSCI 7950 GRADUATE SEMINAR (1) SEM. 1. Departmental approval. Project manifestation and development preceding design and construction phases with emphasis on the project owner's perspective, the financial parameters, and the speculative demand driving project viability. Course may be repeated for a maximum of 3 credit hours.

BSCI 7980 CAPSTONE PROJECT (3) LAB. 6. Departmental approval. Independent exploration of an approved topic with final written report of findings and an oral defense of the work. Specific capstone project requirements are established by the supervising committee and vary based on the chosen topic.

BSCI 8060 ADVANCED RESEARCH METHODS IN BUILDING SCIENCE-I (3) LEC. 3. Current areas and topics of research in building construction, study of academic research process, defining a research problem, develop effective search and analytical evaluation skills of published literature, analyze research products and write a comprehensive review of literature, and understand ethical principles and methods to successfully carry out research projects. The course is designed to provide a comprehensive introduction to the doctoral research process and methods used in building construction research.

BSCI 8070 ADVANCED RESEARCH METHODS IN BUILDING SCIENCE-II (3) LEC. 3. A study of the practical skills necessary to produce and disseminate doctoral level research in Building Construction. The course is designed to provide comprehensive knowledge about research design and selecting an appropriate methodology, qualitative, quantitative and mixed data collection and analysis methods appropriate for Building Construction research, research validation techniques, and technical writing strategies appropriate for a PhD dissertation.

BSCI 8950 DISSERTATION SEMINAR (1) LEC. 1. Professional and social integration into doctoral program; enhancement of professional knowledge through structured inquiry, professional dialogue, and reflective thinking; and preparation of students to develop pedagogical skills. Departmental Permission Required. Course may be repeated for a maximum of 6 credit hours.

BSCI 8990 RESEARCH AND DISSERTATION (1-10) LEC. 1-10. Individual doctoral dissertation research. May be repeated for credit. Course may be repeated with change in topics.