

## BC CORE CURRICULUM

Course Number	Course Title	Description	Credit Hours
BC 1214	INTRODUCTION TO BUILDING CONSTRUCTION I	This is an introduction to the world of construction with an overview of the important areas of contracting and the inter-workings of the construction industry. Emphasis is placed on the theory and terminology of the construction industry supplemented with the graphical representation of construction documents and laboratory building experiments.	3
BC 1224	INTRODUCTION TO BUILDING CONSTRUCTION II	Continuation of introduction to the world of construction with an overview of the important areas of contracting and the workings of the construction industry. Emphasis is placed on the application of theory, processes and vocabulary of the construction industry supplemented with computer aided graphical representation of construction documents. Grade of C- or better required in prerequisite. Pre: 1214.	3
BC 2014	CONSTRUCTION PRINCIPLES I	This course covers the fundamentals of construction technology and processes emphasizing materials, methods, techniques and sequences for the construction of buildings (CSI Divisions 1-6). Planning, scheduling and quantity surveying for the management of construction resources are among the topics studied. Pre: 1224. Co: MATH 1225.	3
BC 2024	CONSTRUCTION PRINCIPLES II	This is a continuation of the fundamentals of construction technology and processes emphasizing materials, methods, techniques and sequences for the construction of buildings in CSI divisions 7-16. Planning, scheduling, quantity surveying and control systems for the management of these construction resources are among the topics studied. Pre: 1224, 1214, 2014. Co: 2064.	3
BC 2134*	CONSTRUCTION DATA ANALYSIS	Construction data and the tools for analyzing construction data to support decision making. Different forms of applying mathematics to construction, market for better productivity, safety and processes across the industry. Form insights to inform management and investment decisions. Pre: MATH 1114.	2
BC 2044	BUILDINGS & MATERIALS	Introduction to the theory and applications of building materials. Properties, composition, and characteristics of building materials with particular focus on ferrous and non ferrous metals, concrete, bricks and blocks, timber, glass and plastics. Emphasis on physical behavior of materials under load, including thermal loads, compatibility deformations and material behavior requirements, interaction among different materials, non- destructive/destructive methods for evaluation and testing of construction materials, basic analysis and design applications of major structural components. Pre: 2214 or CEM 2104.	3
BC 2064*	INTEGRATED CONSTRUCTION SERIES I	Develop a competency in applying construction means and methods as they relate to quantity take-off, cost management, scheduling and resource management in support of a senior capstone project. Pre: 2014, 2114. Co: 2024.	3
BC 2104	BUILDING EFFECTIVE CONSTRUCTION TEAMS	Introduction to tools and techniques to help build effective construction teams including building trust, managing conflict, communicating clear expectations and priorities, accountability, attention to results and commitment towards construction management team mission, embracing innovative change and ethics. Other topics include networking skills, time management tools and effective construction team-based negotiations. Pre: 1224, (COMM 1016 or ENGL 1106).	3
BC 2114	INFORMATION TECHNOLOGY IN DESIGN AND CONSTRUCTION	Building delivery and project management improvements through the use of computer applications are explored, including scheduling software, building information modeling (BIM) tools, and virtual design and construction (VDC) simulation software and their corresponding theories and concepts the integrate design and construction. Pre: 1224 or CEM 2104. Co: 2014.	3

BC 2214	WHY BUILDINGS STAND UP	Addresses why structures remain stable under various loading conditions. Explores different types of structures and applied loads and analyzes both determinate and indeterminate supported structures. Explores different types of soils and their strength properties. Pre: MATH 1225 or MATH 1025.	3
BC 3064*	INTEGRATED CONSTRUCTION SERIES II	Develop a competency in the application of Building Environmental Systems, through modeling, scheduling, estimating, and experiments in support of a senior capstone project. Pre: (2064, 3114, PHYS 2305) or (CEM 2104, PHYS 2305).	3
BC 3114	BUILDING SYSTEMS TECHNOLOGY	Emphasis is placed on the integration and physical installation of passive and active environmental control systems including: heating, ventilation, air conditioning, lighting, acoustics, plumbing, and fundamentals of thermal loads. Pre: (2024 or CEM 2104), PHYS 2305.	3
BC 3134	TEMPORARY STRUCTURES IN CONSTRUCTION	Introduction to temporary structure systems used to support construction operations. Concrete formwork, scaffolding systems, excavation shoring systems, dewatering techniques, and hoisting operations. Assessment of systems, cost, quality, safety, sustainability, and schedule impacts. Pre: (2044, 2024, MATH 1226) or CEE 3684.	3
BC 4064*	INTEGRATED CONSTRUCTION SERIES III	Application of the business and construction practices related to operation of a construction company to the execution of a senior capstone project. All project management concepts learned in prior courses are applied in the capstone lab experience. Written and oral work is formally presented and critiqued among construction faculty, students, and industry professionals. Pre: 3064. Co: 4434.	3
BC 4164	PRODUCTION PLANNING AND PROCESS DESIGN FOR CONSTRUCTION	The course deals with the planning and design of construction processes. Course topics include production systems, behavior of construction systems and workers, the relationships between subsystems in the construction process, queuing systems, process modeling and simulation. The major emphasis is on production and productivity. Production problems that typically occur in construction systems are discussed. The course also explores recent innovations in construction system design such as lean construction and agile construction. Pre: 3114, 3064.	3
BC 4434	CONSTRUCTION PRACTICE I	Business and construction practices related to operation of a construction company are studied. Construction operation is examined as it relates construction, financial and personnel management. Project management topics studied in this course include permitting, site evaluations, design development and design phase considerations such as preliminary estimates and project constructability. Pre: (2044, 3064) or CEM 2104. Co: 4064.	3
BC 4444	CONSTRUCTION PRACTICE II	This course explores and applies the business and construction practices related to operation of a construction company to a capstone experience. Construction operation is examined as it relates to construction, financial and personnel management. Project management topics studied in this course are applied in the corequisite lab. This course is formally designated as a writing intensive course. Formal written and edited and oral presentations are presented and critiqued by the BC faculty team, the writing resource center, students and industry professionals. Pre: 4434.	3

## BC CONCENTRATION COURSES

### RESIDENTIAL

BC 4324	INNOVATION IN RESIDENTIAL CONSTRUCTION	Mechanisms of historical and current innovations in the residential construction industry, including the explanation of theory and application within the realms of innovation, diffusion, technology, adoption, new product development, housing innovation literature, supply chain management, sustainability, information technology, and commercialization. Apply innovative theories and applications to residential construction through the analysis and utilization of data-driven hypotheses typical to the industry.	3
BC 4374*	RESIDENTIAL HOUSING AND LAND DEVELOPMENT	Application of means, methods, and strategies for delivering single and multi-family residential housing in urban and suburban contexts. Project planning, including market analysis to determine highest and best use of an identified property, site and product design, infrastructure requirements, zoning and government agency requirements, financial analysis and feasibility study, financing strategies, and delivery control systems is the focus of study. Students will play the roles of developer and project team to prepare formal proposals for a housing development to be submitted for financing. Special topics include green development and affordable housing.	3

### SUSTAINABLE BUILDING PERFORMANCE

BC 3014	BUILDING PHYSICS AND ENVIRONMENTAL SYSTEMS	Theory and analysis methods relative to performance of envelope systems and the design and integration of mechanical and electrical building systems. Topics covered include: envelope systems and performance metrics, conceptual and technical design theory, operational principles, and maintenance issues, all necessary for determining the selection of passive and active environmental control systems within a building including: envelope system, heating, active environmental control systems within a building including: envelope system, heating, ventilation, air conditioning, lighting, and acoustical systems. Pre: PHYS 2305.	3
BC 4314	BUILDING PERFORMANCE AND ENERGY MANAGEMENT	Fundamentals of building performance mandates for the built environment, practical means and methods for evaluating building performance metrics. Specific focus on energy resources consumed by thermal, hygrothermal, lighting, and other environmental building systems. Assessment of building energy consumption and analysis of retrofit scenarios through performance evaluation over the entire building life cycle. Pre: 3014.	3
BC 4334	SUSTAINABLE BUILDING PERFORMANCE MANAGEMENT	Introduction to means and methods for managing the sustainability of buildings and their performance over the life cycle. Best practices for sustainable projects in the areas of planning/development, site design, project management, energy and water conservation and green building assessment tools and methods; Leadership in Energy and Environmental Design (LEED) rating system; economic analysis of green building alternatives; and implementation planning. Pre: 3064, 3014.	3

### VIRTUAL DESIGN CONSTRUCTION

BC 4114	BIM IN DESIGN AND CONSTRUCTION	Introduction to means and methods to enrich the geometric information of a building model with semantic data such as, material, structural and performance values. Concept of interoperability in architecture, engineering and construction industry. Overview of approaches to information modeling such as Standard for the Exchange of Product model data (STEP), Industry Foundation Classes (ifc), Construction Operations Building Information Exchange (COBie) and Green Building XML (gbXML). Key concepts of object-oriented modeling and programming. Pre: 2114.	3
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BC 4124	DIGITAL CONSTRUCTION AND MANUFACTURING	Explore and experiment with construction from the perspective of digital information, computer numerical control (CNC), and computer aided manufacturing (CAM) processes. Tools like 3D scanners, 3D printers, CNC manufacturing techniques and others will be used in a lab setting intended to provide familiarity with these technologies and a sense of their benefits and limitations. Pre: 2114.	3
BC 4364*	LIFECYCLE BIM IN FACILITY MANAGEMENT	Use of BIM (Building Information Modeling) concepts and tools to address facility life cycle data handover to owners in order to support facility operations and maintenance. Methods to capture and deliver facility life cycle data using spreadsheet-based and BIM-based deliverables for defining and assigning information parameters. Utilization of various BIM and data management platforms to analyze, export, and exchange data from BIM models to facility management systems. Use of a real-life facility project for reviewing and understanding MEP systems from a practical perspective. Development of workflow processes for data exchange between BIM models and facility management systems. Pre: 2114	3

\*Indicates course that is being modified or proposed with College Curriculum Committee.