

CNS-CONSTRUCTION SCIENCE

CNS 1111 Introduction to Construction Management 1 Credit Hour

An introduction to the concepts and issues related to construction management, as well as a description of the roles and careers available in the construction industry. (F)

CNS 1312 Computers in Construction Lab 2 Credit Hours

Prerequisite: Majors only and CNS 2833. Introductory course providing students with basic computer application knowledge relevant to the construction industry. (Sp)

CNS 2133 Introduction to Housing in America 3 Credit Hours

This course covers housing in America. It provides a background of the evolution of the American home, including regional and cultural influences, governmental housing policies, urban and suburban residential development, and construction materials and methods. (Sp) [IV-WC].

CNS 2303 Construction Industry Fundamentals 3 Credit Hours

Students will gain an understanding of the construction industry. A brief history of the industry, its different segments, stakeholders, roles, and characteristics are covered. Attention is paid to the general construction process and the documents used in construction (blueprints, specifications, and contracts). These concepts are foundational to subsequent construction management courses. (F, Sp, Su)

CNS 2313 Construction Materials and Methods 3 Credit Hours

Students will gain an understanding of the materials and methods commonly used in the construction of buildings and other projects. Topics include: sitework, concrete, masonry, metals, woods and plastics, thermal and moisture protection, openings, finishes, specialties, Equipment, Mechanical, Electrical, & Plumbing. (F, Sp, Su)

CNS 2363 Materials and Form 3 Credit Hours

(Crosslisted with ARCH 2363) Prerequisite: ARCH or CNS majors only. An introduction to the nature of building materials with regard to form, strength, durability, workability, structure connections, surfaces and edges. Analysis of architectural expression through the use of building materials including the effects of light, air movement, humidity, and their relationships to both one another and formal and spatial expressions. (F)

CNS 2433 MEP Systems 1 3 Credit Hours

Prerequisite: CNS 2833; majors only. The Mechanical Electrical & Plumbing (MEP) Systems course introduces theories, concepts, and their materials and methods. The course prepares construction science students to work closely with mechanical engineers and subcontractors. Design aspects of MEP systems are introduced, while the course is mainly focused on understanding MEP systems, their procurement and installation. (Sp)

CNS 2811 Construction Fundamentals Lab 1 Credit Hour

Prerequisite: CNS 1111 and CNS 2363; Corequisite: CNS 2813. Practical exercises reinforce material seen in CNS 2813 to improve students' understanding and ability to interpret construction drawings and specifications, use hands on techniques to understand actual installation of common materials and systems used in building construction. (F)

CNS 2813 Construction Documents 3 Credit Hours

Prerequisite: Majors only; CNS 1111 and CNS 2363; Corequisite (major only, not required for CNS minor): CNS 2811. Students will learn to read, find information, and interpret the drawings and specifications of typical construction projects. (F)

CNS 2833 Materials and Methods for Construction 3 Credit Hours

Prerequisite: CNS 1111 and CNS 2363; CNS majors only. Focuses on materials and methods used to construct a building from the roofed frame to flooring installation. Content includes exterior cladding, finishes, and waterproofing, exterior glazing systems, electrical, plumbing, and mechanical system installation basics, above the ceiling installation, interior walls and finishes, interior doors and hardware, dropped ceilings and flooring. (Sp)

CNS 3103 Construction Surveying 3 Credit Hours

Prerequisite: Majors only; junior standing; CNS 2813 and CNS 1312; Corequisite: CNS 3533. The purpose of this course is to acquaint the student with basic concepts of surveying and to provide practical training necessary for construction applications. (F)

CNS 3303 Preconstruction Management 3 Credit Hours

Prerequisite: CNS 2303 and CNS 2313 or permission of instructor. Students will gain a deeper understanding of the preconstruction management aspect of construction. Special attention will be paid to business development, delivery methods, contract types, negotiation, bidding documents, and preconstruction. Students will explore these concepts through the lens of real world case studies. (F, Sp, Su)

CNS 3313 Applied Construction Project Management 3 Credit Hours

Prerequisite: CNS 3303. Students will gain a deeper understanding of project management processes and procedures. The course will focus on documentation, project cost controls, trade coordination, permitting, risk management, safety management, different meeting requirements, and the differences between project management for a general contractor vs a specialty contractor. (F, Sp, Su)

CNS 3323 Applied Construction Estimating & Scheduling 3 Credit Hours

Prerequisite: CNS 3313. Students will gain a deeper understanding of cost estimating and scheduling processes. Through the study of contract documents and estimating practices, students will learn basic estimating skills, schedule concepts and strategies, and basic scheduling software. (F, Sp, Su)

CNS 3333 Construction Efficiency 3 Credit Hours

Prerequisite: CNS 3313. Students will gain a deeper understanding of construction efficiency as facilitated through the application of specialized software, technology, sustainability concepts, and management strategies. Students will use these various lenses during the course to explore opportunities for efficiency during the various phases of a construction project. (F, Sp, Su)

CNS 3343 Communication and Personnel Management in Construction 3 Credit Hours

Prerequisite: CNS 3313. Students will gain a deeper understanding of communication and personnel management in construction. Students will learn about technical communication, the difference between leadership and management, relationships between trades people and general contractor staff, ethics and personal behavior, resumes, LinkedIn, proposal presentations, and personal growth. (F, Sp, Su)

CNS 3413 Construction Communication 3 Credit Hours

Prerequisite: Majors only; Junior Standing; CNS 3533 and COMM 1113; Corequisite: CNS 3823. A communication course designed to focus on written, visual, and oral communication appropriate to the construction industry. The course will expand on the fundamentals of communication with specific instruction about the techniques and tools used to communicate with both internal and external team members. (Sp)

- CNS 3440 Mentored Research Experience 3 Credit Hours**
0 to 3 hours. Prerequisites: ENGL 1113 or equivalent, and permission of instructor. May be repeated; maximum credit 12 hours. For the inquisitive student to apply the scholarly processes of the discipline to a research or creative project under the mentorship of a faculty member. Student and instructor should complete an Undergraduate Research & Creative Projects (URCP) Mentoring Agreement and file it with the URCP office. Not for honors credit. (F, Sp, Su)
- CNS 3443 MEP Systems 2 3 Credit Hours**
Prerequisite: Majors only; Junior Standing; CNS 2433; Corequisite: CNS 3533. This course builds on the theories, concepts, materials, and methods of mechanical, electrical, & Plumbing (MEP) systems students were introduced to in CNS 2433. The accumulated knowledge will be used to explore building science and coordination of MEP subcontractors. (F)
- CNS 3533 Construction Cost Estimating 3 Credit Hours**
Prerequisite: Majors only; Junior Standing; CNS 2813 and CNS 1312. In this course we will learn the basic foundations of the estimating process and about the different components of a construction project estimate. These include: quantity surveying, estimate organization, direct and indirect costs, cost database use, and bid preparation. Students will create cost estimates using manual and electronic take-off estimating software. (F)
- CNS 3543 Project Planning and Scheduling 3 Credit Hours**
Prerequisite: Majors only; Junior Standing; CNS 2813 and CNS 3533; Corequisite: CNS 3413. Students will learn about scheduling concepts in an integrated construction planning and control system. Students will gain knowledge about different scheduling techniques and computer applications employed to facilitate the scheduling process. Students will learn to create schedules using manual network computations and scheduling software. (Sp)
- CNS 3823 Project Management & Cost Controls 3 Credit Hours**
Prerequisite: Majors only; Junior Standing; CNS 3533; Corequisite: CNS 3543. Focuses on the management of a commercial building project after the contract is awarded. Content includes required project communication and documentation and setup and use of a cost accounting system to track and manage the project - including field productivity, work sequence, cost and profitability, payment and cash flow, schedule compression and updating change process and closeout. (Sp)
- CNS 3881 Construction Safety 1 Credit Hour**
Prerequisite: Majors only; Junior Standing; CNS 4941. Students will learn strategies and understand how construction managers proactively plan to ensure safety on an active job site, including the creation of a safety plan for a construction project. (F)
- CNS 3943 Field Work 3 Credit Hours**
Prerequisite: CNS major and permission. Utilize a construction work experience to prepare for construction management functions. Student is responsible for finding the construction-related activity and proposing a work-related project. Written and oral presentation is required. (F, Sp, Su)
- CNS 3960 Honors Reading 1-3 Credit Hours**
1 to 3 hours. Prerequisite: Admission to Honors Program. May be repeated; maximum credit six hours. Consists of topics designated by the instructor in keeping with the student's major program. The topics will cover materials not usually presented in the regular courses. (F, Sp, Su)
- CNS 3970 Honors Seminar 1-3 Credit Hours**
1 to 3 hours. Prerequisite: admission to Honors Program. May be repeated; maximum credit six hours. Subjects covered vary. Deals with concepts not usually treated in regular courses. (Irreg.)
- CNS 3980 Honors Research 1-3 Credit Hours**
1 to 3 hours. Prerequisite: Admission to Honors Program. May be repeated; maximum credit six hours. Will provide an opportunity for the gifted Honors candidate to work at a special project in the student's field. (F, Sp, Su)
- CNS 3990 Independent Study 1-3 Credit Hours**
1 to 3 hours. Prerequisite: permission of instructor and junior standing. May be repeated once with change of content. Independent study may be arranged to study a subject not available through regular course offerings. (F, Sp, Su)
- CNS 4133 BIM for Constructors 3 Credit Hours**
(Slashlisted with CNS 5133) Prerequisite: Majors only; Senior Standing; CNS 3823; Corequisite: CNS 4523. This Building Information Modeling (BIM) course is designed for the construction professional. Students will gain knowledge about the concepts, core business processes, and software involved in a building information model. BIM is presented as a methodology and tool that provides for shared information across the facility's lifecycle. No student may earn credit for both 4133 and 5133. (F)
- CNS 4143 Legal Issues in Construction 3 Credit Hours**
(Slashlisted with CNS 5143) Prerequisite: Majors only, Senior Standing, and CNS 4523. An examination of current construction law as it pertains to the day-to-day management of the construction contract. Includes legal ramifications of construction bidding, contracts, changes, delays, and dispute resolution. Course emphasizes reduction of disputes through knowledge. No student may earn credit for both 4143 and 5143. (Sp)
- CNS 4193 Architectural Structures I 3 Credit Hours**
(Crosslisted with ARCH 4193) Prerequisite: Architecture major and completion of MATH 1523 and PHYS 1114 or Construction Science major and completion of PHYS 2414 and MATH 1523 or permission of the division director. An introduction to basic physics, forces within structural systems, material strength, and associated structural engineering principles. Develops both intuitive and empirical knowledge of forces with structural systems that serve as a foundation for future courses within the structures sequence. (Sp)
- CNS 4213 Design-Build Principles and Practices 3 Credit Hours**
(Slashlisted with CNS 5213) Prerequisites: 3rd, 4th or 5th year College of Architecture student or instructor permission. Introduces design and construction students to the principles and practices of design-build. Course is approved by the Design-Build Institute of America. Students who successfully complete core course requirements will earn credit for the professional designation as Associate DBIA Professional. Students may not earn credit for both 4213 and 5213. (Sp)
- CNS 4303 Lean Construction Management 3 Credit Hours**
(Slashlisted with 5303) Prerequisite: Junior standing; Majors only; Permission of instructor. (Slashlisted with CNS 5303.) Explores the lean concepts specifically tailored to the Architecture Engineering Construction (AEC) industry. Students will learn how lean concepts along with creative transformational thinking and technological advancement can improve and sustain performance in the construction industry. Students may not earn credit for both CNS 4303 and CNS 5303. (Sp) No student may earn credit for both 4303 and 5303. (Sp)

- CNS 4403 Leadership in the Construction Industry 3 Credit Hours**
(Slashlisted with 5403) Prerequisite: Permission of instructor. A study of leadership styles and best practices found in the Architecture, Engineering and Construction industries. The course is designed to educate students about individual, organizational and process/structural leadership. No student may earn credit for both 4403 and 5403. (Sp)
- CNS 4503 Residential Construction 3 Credit Hours**
(Slashlisted with CNS 5503) Prerequisite: Junior standing; CNS majors only or instructor approval. Examines the processes and stakeholders specific to residential property development, including predevelopment activities, feasibility analyses, project financing, and relevant regulatory frameworks. The course also covers material selection and installation practices specific to residential projects, as well as emerging trends in homebuilding and multifamily construction. No student may earn credit for both 4503 and 5503. (F)
- CNS 4512 Soils and Foundations 2 Credit Hours**
Prerequisite: Majors only, Senior Standing, and CNS 4193. Content includes identification and classification of soil properties as they pertain to a construction project, the role of the geotechnical engineer, soils reports, soil preparation, foundation design, soil testing, and the causes of building settlement. Practical exercises are emphasized. (F)
- CNS 4523 Pre-Construction Services 3 Credit Hours**
(Slashlisted with CNS 5523) Prerequisite: Majors only; Senior Standing; CNS 3533 and CNS 3543; Corequisite: CNS 4133. Pre-construction services provide owners with greater project clarity and expectations before their project begins while also aligning owners, designers, and contractors. This course covers the practices performed during pre-construction to increase project success from the owner's, designer's, and contractor's perspectives. Topics include: feasibility reports, budget development, value engineering, economics, risk management, QC, site management, and subcontractor procurement. No student may earn credit for both 4523 and 5523. (F)
- CNS 4603 Design + Build: Construction Lab 3 Credit Hours**
Prerequisite: Junior standing and permission of instructor. Design + Build: Construction Lab is a comprehensive, interdisciplinary, and hands-on learning experience. Serving a community partner, students analyze a conceptual design for cost effectiveness and constructability, then assist in developing construction drawings. Upon completing material investigation and systems analyses, students spend the majority of the semester constructing the project and undertake all activities leading to a completed facility. (Sp)
- CNS 4853 Heavy Civil Construction Project Management 3 Credit Hours**
(Slashlisted with CNS 5853) Prerequisite: Junior standing and majors only. This course is designed to familiarize students with the peculiarities of the heavy-civil construction industry, and to provide students with the analytical skills to compete for projects in that arena. Students will study projects which may include the construction of airports, highways, bridges, dams, tunnels, and similar heavy civil projects. No student may earn credit for both 4853 and 5853. (Sp)
- CNS 4941 Field Work (Internship) - Required 1 Credit Hour**
Prerequisite: Majors only; Junior Standing; CNS 3533; CNS 3413; CNS 3813; CNS 3823. Utilize a construction work experience to prepare for construction management functions and understand entry level roles in the construction industry. Students are responsible for securing a construction-related internship. Written and oral presentation are required. Students must work for 12 weeks and 480 hours. (Su)
- CNS 4960 Directed Readings 1-4 Credit Hours**
1 to 4 hours. Prerequisite: senior standing, permission. May be repeated with change of subject matter; maximum credit eight hours. Subjects proposed by students or instructors may be used to expand knowledge beyond the normal core construction curriculum. Verbal or written presentation may be required to demonstrate successful completion of a subject unit. (F, Sp, Su)
- CNS 4970 Undergraduate General Departmental Seminar 1-4 Credit Hours**
1 to 4 hours. Prerequisite: senior standing, permission. May be repeated with change of subject matter; maximum credit 12 hours. Special topics in construction science. (Irreg.)
- CNS 4990 Independent Study 1-3 Credit Hours**
1 to 3 hours. Prerequisite: Senior standing and permission of instructor. May be repeated; maximum credit nine hours. Contracted independent study for a topic not currently offered in regularly scheduled courses. Independent study may include library and/or laboratory research and field projects. (Irreg.)
- CNS 4993 Construction Science Capstone 3 Credit Hours**
Prerequisite: Majors only; Senior Standing; CNS 4133 and CNS 4523. The capstone course is the culmination of the Construction Science undergraduate experience. Students apply all aspects of the construction project management process in an integrated manner to a construction project. Class interaction requires participants to utilize and extend knowledge of all areas of expertise used by construction managers. Teamwork, interdisciplinary collaboration, and cooperation are required. (Sp) [V].
- CNS 5003 Construction Fundamentals I 3 Credit Hours**
Prerequisite: Graduate standing and majors only. Course will familiarize students with the basic foundations of construction management, including reading and understanding construction plans and specifications, implementing cost estimating techniques, and developing and manipulating project schedules as applied to design and construction project management. (F)
- CNS 5013 Construction Fundamentals II 3 Credit Hours**
Prerequisite: Graduate standing; CNS 5003 and CNS 5033. The course is designed to continue to familiarize students with the basic foundations of the project management and control mechanisms from the owner's, the designer's and the construction contractor's perspective. These concepts include terms, vocabulary, and paperwork used in the construction industry, as well as construction site safety and construction methods. (Sp)
- CNS 5023 Research Methods in Planning, Design and Construction 3 Credit Hours**
Prerequisite: graduate standing and majors only. Framework for understanding the processes, components, and methods of empirical research used in the design and evaluation of planning, design, and construction problems. Emphasis is on understanding the primary types of research methods, evaluating the pros and cons of each, and developing the skills necessary to identify research questions and ways to answer research questions. (Sp)
- CNS 5033 Applied Project Management 3 Credit Hours**
Prerequisite: Graduate standing and majors only. Course is designed to familiarize students with the fundamental processes to apply principles of financial management to managing a construction project. These concepts include document management strategies, cost accounting and control, and project closeout. (F)

- CNS 5133 BIM for Constructors 3 Credit Hours**
(Slashlisted with CNS 4133) Prerequisite: Graduate standing; majors only; CNS 5013. This Building Information Modeling (BIM) course is designed for the construction professional. Students will gain knowledge about the concepts, core business processes, and software involved in a building information model. BIM is presented as a methodology and a tool that provides for shared information across the facility's lifecycle. No student may earn credit for both 4133 and 5133. (F)
- CNS 5143 Legal Issues in Construction 3 Credit Hours**
(Slashlisted with CNS 4143) Prerequisite: Graduate standing and majors only. An examination of current construction law as it pertains to the day-to-day management of the construction contract. Includes legal ramifications of construction bidding, contracts, changes, delays, and dispute resolution. Course emphasizes reduction of disputes through knowledge. No student may earn credit for both 4143 and 5143. (Sp)
- CNS 5213 Design-Build Principles and Practices 3 Credit Hours**
(Slashlisted with CNS 4213) Prerequisite: Graduate standing and majors only, or departmental permission for non-majors. Introduces design and construction students to the principles and practices of design-build. Course is approved by the Design-Build Institute of America. Students who successfully complete core course requirements will earn credit for the professional designation as Associate DBIA Professional. No student may earn credit for both 4213 and 5213. (Sp)
- CNS 5303 Lean Construction Management 3 Credit Hours**
(Slashlisted with CNS 4303) Prerequisite: Graduate standing; majors only; and CNS 5013 or concurrent enrollment. Explores the lean concepts specifically tailored to the Architecture Engineering Construction (AEC) industry. Students will learn how lean concepts along with creative transformational thinking and technological advancement can improve and sustain performance in the construction industry. No student may earn credit for both 4303 and 5303. (Sp)
- CNS 5403 Leadership in the Construction Industry 3 Credit Hours**
(Slashlisted with CNS 4403) Prerequisite: Graduate standing; majors only. A study of leadership styles and best practices found in the architecture, engineering, and construction industries. The course is designed to educate students about individual, organizational, and process/structural leadership. No student may earn credit for both 4403 and 5403. (Sp)
- CNS 5503 Residential Construction 3 Credit Hours**
(Slashlisted with CNS 4503) Prerequisite: Graduate standing. Examines the processes and stakeholders specific to residential property development, including predevelopment activities, feasibility analyses, project financing, and relevant regulatory frameworks. The course also covers material selection and installation practices specific to residential projects, as well as emerging trends in homebuilding and multifamily construction. No student may earn credit for both 4503 and 5503. (F)
- CNS 5523 Pre-Construction Services 3 Credit Hours**
(Slashlisted with CNS 4523) Prerequisite: Graduate standing; majors only; and CNS 5013. Pre-construction services provide owners with greater project clarity and expectations before their project begins while also aligning owners, designers, and contractors. This course covers the practices performed during pre-construction to increase project success from the owner's, designer's, and contractor's perspectives. Topics include: feasibility reports, budget development, value engineering, economics, risk management, QC, site management, and subcontractor procurement. No student may earn credit for both 4523 and 5523. (F)
- CNS 5611 Introduction to Construction Management 1 Credit Hour**
Prerequisite: Graduate standing and majors only. The purpose of this course is to learn about the various facets of the design and construction industry and the role of the construction manager. Students will engage in workshops with faculty and industry professionals from diverse backgrounds to explore the variety of specialties within the industry. (F, Sp)
- CNS 5612 Construction Business Development 2 Credit Hours**
Prerequisite: Graduate standing and majors only. The purpose of this course is to explore strategies for connecting with potential clients, nurturing relationships with industry partners, developing proposals, and setting goals that will lead to company success. (Sp)
- CNS 5621 Construction Management Capstone 1 Credit Hour**
Prerequisite: Graduate standing and majors only. This course gives students the opportunity to apply all of the concepts and topics from the program and create a project plan and proposal. Students will work with industry professionals and with fellow classmates in the development of the final project. (F, Sp)
- CNS 5622 Lean Construction: Principles and Methodologies 2 Credit Hours**
Prerequisite: Graduate standing and majors only. The purpose of this course is to explore lean concepts as they are applied in the design and construction industry. Students will learn how to use creative thinking and available technologies to apply lean concepts to processes in the design and construction industry to foster sustained, improved performance. (F)
- CNS 5632 Leadership Principles in the Construction Industry 2 Credit Hours**
Prerequisite: Graduate standing and majors only. The purpose of this course is to explore leadership styles, techniques, and best practices and how they are applied in the design and construction industry. (Sp)
- CNS 5642 Advanced Construction Law 2 Credit Hours**
Prerequisite: Graduate standing and majors only. The purpose of this course is to examine construction law as it pertains to the management of the design and construction process. Students will examine the legal ramifications of construction bidding, contracts, performance, changes, delays, and dispute resolution. Students will learn how legal requirements impact the design and construction process beginning in the feasibility and financing phase through completion. (Su)
- CNS 5652 Experiential Learning in Design and Construction 2 Credit Hours**
Prerequisite: Graduate standing and majors only. In this course, students will connect with industry professionals in a variety of roles within the industry to learn how the different roles contribute to the design and construction process. Students will shadow the professionals in the workplace and work with classmates to develop a framework of how various key team members influence a project. (F)
- CNS 5853 Heavy Civil Construction Project Management 3 Credit Hours**
(Slashlisted with CNS 4853) Prerequisite: Graduate standing; majors only. This course will familiarize students with the challenges of the heavy-civil construction industry and give them the analytical tools to compete for projects in that area. Skills include unit price estimating, construction equipment, linear scheduling, and major components of the construction of highways, bridges, and engineered facilities. No student may earn credit for both 4853 and 5853. (Sp)

CNS 5940 Construction Industry Practicum 1-3 Credit Hours

1 to 3 hours. Prerequisite: Graduate standing, majors only, and permission of instructor. May be repeated with change of content; maximum credit 3 hours. Students will utilize construction work experience to prepare for construction management functions. Students will find an activity and propose a work-related project. (F, Sp, Su)

CNS 5952 Special Studies Presentation 2 Credit Hours

Prerequisite: permission of committee chair. May be repeated; maximum credit six hours. Completion of research for the required special studies project selected by the student and advisory committee. (Irreg.)

CNS 5960 Directed Readings 1-4 Credit Hours

1 to 4 hours. Prerequisite: Graduate standing, majors only, and permission of instructor. May be repeated with change of content; maximum credit 6 hours. Studies in major field as approved by the individual instructor. (F, Sp, Su)

CNS 5970 Special Topics/Seminar 1-3 Credit Hours

1 to 3 hours. Prerequisite: Graduate standing and majors only. May be repeated with change of content; maximum credit 9 hours. Special topics or seminar course for content not currently offered in regularly-scheduled courses. May include library and/or laboratory research and field projects. (Irreg.)

CNS 5980 Research for Master's Thesis 2-9 Credit Hours

2 to 9 hours. Prerequisite: Graduate standing and majors only. May be repeated; Maximum credit applicable toward degree, 5 hours. Production of Master's Thesis. (F, Sp, Su)

CNS 5990 Independent Study 1-3 Credit Hours

1 to 3 hours. Prerequisite: Graduate standing and permission of instructor. May be repeated; maximum credit nine hours. Contracted independent study for a topic not currently offered in regularly scheduled courses. Independent study may include library and/or laboratory research and field projects. (Irreg.)

CNS 5993 Special Studies Research 3 Credit Hours

Prerequisite: Graduate standing and majors only. May be repeated with change of content; maximum credit 6 hours. Credit for applied research for the special studies project selected by the student and advisory committee. (Irreg.)