CONSTRUCTION MANAGEMENT

Description
Durham School of Architectural Engineering and Construction

Construction management (CNST) is a complete undergraduate degree program available to students within the Charles W. Durham School of Architectural Engineering and Construction located at Nebraska Hall on the Lincoln City Campus and at the Peter Kiewit Institute (PKI) on the Scott Campus in Omaha. Construction is one of the largest and most diversified industries in the country, accounting for approximately four percent of the U.S. gross domestic product (GDP). The key professional in this vast enterprise is the “constructor,” a term given to leaders and managers in the construction industry who are responsible for planning, scheduling, and building the projects designed by architects and engineers. These highly-specialized efforts are indispensable in meeting the country’s growing need for new structures, infrastructure and environmental controls that are of high quality and are cost effective, efficient and sustainable.

Construction firms vary in size from large corporations to small proprietorships and partnerships. These are often classified according to the kind of construction work they do—general contractors, heavy and highway contractors, specialty contractors—including mechanical and electrical—and residential builders and developers. Many firms engage in more than one category of work. Some larger companies incorporate the architectural and engineering design functions as part of their role as a design/build firm. Collectively, constructors manufacture our entire built environment—buildings for housing, commerce and industry, highways, railroads, waterways, airports, power plants, energy distribution systems, military bases and space center complexes. Thus, the construction management field is broad, requiring a unique educational background for its professional practitioners.

Although the range of construction activities appears wide and diverse, the general education requirements for construction management are universal regardless of a particular firm’s area of specialization. Since construction is primarily a business enterprise, the graduate must have a sound background in business management and administration as well as an understanding of the fundamentals of architecture and engineering as they relate to project design and the actual construction process in the field. Professional expertise lies in the fields of construction science, methods and management. A working knowledge of structural design, mechanical and electrical systems, methods and materials, soil mechanics and construction equipment is also essential.

The construction management curriculum embraces a course of study in:

1. Construction project management from pre-design through commissioning.
2. Project life-cycle and sustainability.
3. Health and safety, accident prevention and regulatory compliance.
4. Law, contract documents administration and dispute prevention and resolution.
7. Planning and scheduling.
8. Cost management including plan reading, quantity take offs and estimating.
10. Leadership and managing people.
11. Business and communication skills.

Program Educational Objectives
The following is a list of the Construction Management Program Educational Objectives (PEO) that graduates are expected to attain within a few years of graduation:

1. Develop construction project objectives and plans, including delineation of scope, budget and schedule.
2. Select project participants and set performance requirements.
3. Maximize resource efficiency through judicious procurement and management of labor, materials and equipment.
4. Implement and complete construction activities through coordination and control of scheduling, contracting, estimating and cost control.
5. Develop effective communication protocols and mechanisms for resolving conflicts associated with the construction process.
6. Ensure quality and safety through design, measurement, analysis and control.

Educational standards and criteria were established by the construction faculty of The Charles W. Durham School of Architectural Engineering and Construction and approved by the Construction Industry Advisory Committee (CIAC) and ABET, the accrediting agency for the construction management program at the University of Nebraska–Lincoln.

College Requirements

College Admission

College Entrance Requirements
Students must have high school credit for (one unit is equal to one high school year):

1. Mathematics – 4 units: 2 of algebra, 1 of geometry, and 1 of precalculus and trigonometry
2. English – 4 units
3. Natural sciences – 3 units that must include 1 unit of physics and 1 unit of chemistry (chemistry requirement waived for students in construction management)
4. Foreign language – 2 units of a single foreign language
5. Social studies – 3 units
6. Students having a composite ACT score of 28 or greater (or equivalent SAT score) will be admitted to the College of Engineering even if they lack any one of the following: trigonometry, chemistry, or physics.
7. Students having an ACT score of 19 or less in English (or equivalent SAT score) must take ENGL 150 Writing and Inquiry or ENGL 151 Writing and Argument.

A total of 16 units is required for admission.

Students must have an ACT (enhanced) score of 24 or greater (or equivalent SAT). Students who lack entrance requirements may be admitted based on ACT scores, high school rank and credits, or may be admitted to pre-engineering status in the Exploratory and Pre-
Professional Advising Center. Pre-engineering students are advised within the Exploratory and Pre-Professional Advising Center.

Students for whom English is not their language of nurture must meet the minimum English proficiency requirements of the University.

Students who lack entrance units may complete precollege training by Independent Study through the University of Nebraska–Lincoln Office of On-line and Distance Education, in summer courses, or as a part of their first or second semester course loads while in the Exploratory and Pre-Professional Advising Center or other Colleges at Nebraska.

Students should consult their advisor, their department chair, or Engineering Student Services if they have questions on current policies.

Other Admission Requirements
Students who transfer to the University of Nebraska–Lincoln from other accredited colleges or universities and wish to be admitted to the College of Engineering (COE) must meet COE freshman entrance requirements and have a minimum cumulative GPA of 2.5 and be calculus-ready. Students not meeting either of these requirements must enroll in the Explore Center or another University college until they meet COE admission requirements. Students transferring from UNO, UNL, or UNK to the College of Engineering must be in good academic standing with their institution.

The COE accepts courses for transfer for which a C or better grade was received. Although the University of Nebraska–Lincoln accepts D grades from the University of Nebraska at Kearney and at Omaha, not all majors in the COE accept such low grades. Students must conform to the requirements of their intended major and, in any case, are strongly encouraged to repeat courses with a grade of C- or less.

All transfer students must adopt the curricular requirements of the undergraduate catalog current at the time of transfer to the COE—not that in use when they entered the University of Nebraska–Lincoln. Upon admission to Nebraska, students wishing to pursue degree programs in the COE will be classified and subject to the policies defined in the subsequent section.

Students who were previously admitted to COE and are returning to the College of Engineering must demonstrate a cumulative GPA of 2.5 in order to be readmitted to COE.

College Degree Requirements

Grade Rules

Grade Appeals
In the event of a dispute involving any college policies or grades, the student should appeal to his/her instructor and appropriate department chair or school director (in that order). If a satisfactory solution is not achieved, the student may appeal his/her case through the College Academic Appeals Committee on his/her campus.

Catalog Rule

Students must fulfill the requirements stated in the catalog for the academic year in which they are first admitted at the University of Nebraska–Lincoln. In consultation with advisors, a student may choose to follow a subsequent catalog for any academic year in which they are admitted to and enrolled as a degree-seeking student at Nebraska in the College of Engineering. Students must complete all degree requirements from a single catalog year. The catalog which a student follows for degree requirements may not be more than 10 years old at the time of graduation.

Professional Admission Requirements

Before applying for admission to the construction management degree program, students must complete 28 semester hours, including the following courses with a C or better: MATH 106, PHYS 151 (or PHYS 142 or PHYS 212), ENGR 10 and at least one of ENGL 151, JGEN 200, STAT 218 or CNST 112. Additionally, a minimum cumulative GPA of 2.5 is required.

Learning Outcomes

Graduates of the construction management program will have:

1. An ability to identify, formulate and solve broadly defined technical or scientific problems by applying knowledge of mathematics and science and/or technical topics to areas relevant to the discipline.
2. An ability to formulate or design a system, process, procedure or program to meet desired needs.
3. An ability to develop and conduct experiments or test hypotheses, analyze and interpret data and use scientific judgment to draw conclusions.
4. An ability to communicate effectively with a range of audiences.
5. An ability to understand ethical and professional responsibilities and the impact of technical and/or scientific solutions in global, economic, environmental and societal contexts.
6. An ability to function effectively on teams that establish goals, plan tasks, meet deadlines and analyze risk and uncertainty.

The above student outcomes have been approved by the ABET Applied and Natural Science Accreditation Commission for use beginning with the 2019-20 academic year, and have been adopted by the faculty of The Charles W. Durham School of Architectural Engineering and Construction.

Major Requirements

Requirements for the Degree (Lincoln Campus)

First Semester

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CNST 131</td>
<td>Introduction to the Construction Industry</td>
<td>1</td>
</tr>
<tr>
<td>ENGL 151</td>
<td>Writing and Argument</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 10</td>
<td>Freshman Engineering Seminar</td>
<td>0</td>
</tr>
<tr>
<td>ENGR 100</td>
<td>Interpersonal Skills for Engineering Leaders</td>
<td>3</td>
</tr>
<tr>
<td>MATH 106</td>
<td>Calculus I</td>
<td>5</td>
</tr>
<tr>
<td>ACE Elective</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Note: Choose one course from not yet satisfied ACE outcomes 5, 7, or 9</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Credit Hours Subtotal: 15

Second Semester

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CNST 112</td>
<td>Construction Communications</td>
<td>3</td>
</tr>
<tr>
<td>JGEN 200</td>
<td>Technical Communication I</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 151</td>
<td>Elements of Physics</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 153</td>
<td>Elements of Physics Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>STAT 218</td>
<td>Introduction to Statistics</td>
<td>3</td>
</tr>
<tr>
<td>ACE Elective</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Note: Choose one course from not yet satisfied ACE outcomes 5, 7, or 9</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Credit Hours Subtotal: 17
### Third Semester

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONE 221</td>
<td>Geometric Control Systems</td>
<td>3</td>
</tr>
<tr>
<td>CONE 206</td>
<td>Engineering Economics</td>
<td>3</td>
</tr>
<tr>
<td>CNST 241</td>
<td>Horizontal Construction</td>
<td>3</td>
</tr>
<tr>
<td>CNST 251</td>
<td>Construction Materials and Specfics</td>
<td>3</td>
</tr>
<tr>
<td>CNST 252</td>
<td>Construction Materials and Testing</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 20</td>
<td>Sophomore Engineering Seminar</td>
<td>0</td>
</tr>
</tbody>
</table>

Credit Hours Subtotal: **15**

### Fourth Semester

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 200</td>
<td>Accounting for Business Decisions</td>
<td>3</td>
</tr>
<tr>
<td>CNST 225</td>
<td>Introduction to Building Information Modeling (BIM)</td>
<td>3</td>
</tr>
<tr>
<td>CNST 242</td>
<td>Vertical Construction</td>
<td>3</td>
</tr>
<tr>
<td>ECON 200</td>
<td>Economic Essentials and Issues</td>
<td>3</td>
</tr>
<tr>
<td>ACE Elective</td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

Choose one course from not yet satisfied ACE outcomes 5, 7, or 9

Credit Hours Subtotal: **15**

### Fifth Semester

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARCH 331</td>
<td>Structural Mechanics</td>
<td>3</td>
</tr>
<tr>
<td>CNST 305 /</td>
<td>Building Environmental Technical Systems /</td>
<td>3</td>
</tr>
<tr>
<td>ARCH 333 I</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CNST 378 /</td>
<td>Construction Estimating I</td>
<td>3</td>
</tr>
<tr>
<td>CONE 378</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CNST 411</td>
<td>Project Administration</td>
<td>3</td>
</tr>
<tr>
<td>CNST 444</td>
<td>Construction Site Safety Management</td>
<td>3</td>
</tr>
</tbody>
</table>

Credit Hours Subtotal: **15**

### Sixth Semester

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CNST 420</td>
<td>Professional Practice and Ethics</td>
<td>3</td>
</tr>
<tr>
<td>CNST 476 /</td>
<td>Project Budgets and Controls</td>
<td>3</td>
</tr>
<tr>
<td>CONE 476</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CNST 485</td>
<td>Construction Planning, Scheduling, and Controls</td>
<td>3</td>
</tr>
<tr>
<td>Construction Technical Electives</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

Credit Hours Subtotal: **15**

### Seventh Semester

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CNST 480</td>
<td>Productivity and Human Factors in Construction</td>
<td>3</td>
</tr>
<tr>
<td>CNST 489</td>
<td>Senior Construction Project</td>
<td>3</td>
</tr>
<tr>
<td>Senior Seminar</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Construction Technical Electives</td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>

Credit Hours Subtotal: **13**

### Eighth Semester

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CNST 480</td>
<td>Productivity and Human Factors in Construction</td>
<td>3</td>
</tr>
<tr>
<td>CNST 480</td>
<td>Productivity and Human Factors in Construction</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credit Hours: **120**

### Additional Major Requirements

#### Grade Rules

C- and D Grades

All required and elective courses must be passed with a grade of C or better to be included in the 120 credit hours needed for degree completion.

#### ACE Requirements

The Construction Management program follows the University of Nebraska–Lincoln ACE general education requirements (link: [https://ace.unl.edu/](https://ace.unl.edu/)). Because of the specific needs of the program, most of these courses are specified in the curriculum. Please contact Melissa Hoffman at melissa.hoffman@unl.edu or 402-554-4482, if you are interested in more information about this program.

#### Requirements for Minor Offered by Department

This minor is for engineering, architecture and business majors ONLY.

The College of Engineering enables its students to participate in this approved minor subject to the following conditions:

1. A minor will not reduce or alter the existing course or degree requirements for students electing to pursue a minor.
2. The minor program must be organized and approved by an advisor prior to the submission of the senior check to the department chair or head.
3. The minor must be approved by the advisor, the department chair or head, the dean, and the cognizant program offering the minor.
4. Minors on the Lincoln or Omaha campuses may be added by approval of the College of Engineering Curriculum Committee and faculty.
5. The minor requires taking one 3-credit course from each of the six required topics listed below for a total of 18 credit hours.

### Course Requirements

All courses must be taken for a letter grade.

Choose One Course for Each Requirement

1) **Communications**

   - CNST 112 Construction Communications

2) **Methods & Materials**

   - CNST 241 Horizontal Construction
   - CNST 242 Vertical Construction
   - CNST 252 Construction Materials and Testing

3) **Building Systems**

   - CNST 251 Construction Materials and Specifications
   - CNST 305 Building Environmental Technical Systems I
   - CNST 306 Electrical Systems

4) **Estimating**

   - CNST 378 Construction Estimating I

5) **Safety/Human Factors**

   - CNST 444 Construction Site Safety Management
   - CNST 480 Productivity and Human Factors in Construction
6) Budgeting/Scheduling

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CNST 476</td>
<td>Project Budgets and Controls</td>
<td>3</td>
</tr>
<tr>
<td>CNST 485</td>
<td>Construction Planning, Scheduling, and Controls</td>
<td>3</td>
</tr>
</tbody>
</table>

Credit Hours Subtotal: 18

Total Credit Hours 18

Grade Rules

C- and D Grades
A grade of C or better is required for all courses in the minor.

Pass/No Pass
All courses must be taken for a letter grade.

CNST 112 Construction Communications
Description: Development of communication skills including understanding of contract documents, working drawings, technical terminology, graphic symbols, and abbreviations. Fundamentals of drafting principles, sketching, and dimensioning techniques.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded
Prerequisite for: CNST 225, CNST 378, CONE 378

CNST 131 Introduction to the Construction Industry
Description: Introduction to basic management principles and practices for labor, materials, machinery, and budgets.
Credit Hours: 1
Max credits per semester: 1
Max credits per degree: 1
Grading Option: Graded
Prerequisite for: CONE 211

CNST 225 Introduction to Building Information Modeling (BIM)
Prerequisites: CNST 112
Description: Introduction to Building Information Modeling (BIM) concepts and techniques. Explore the use of the Revit Architecture platform to create detailed 3D models of construction projects and other BIM-related topics such as clash detection and point-cloud models.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Prerequisite for: CNST 440

CNST 241 Horizontal Construction
Prerequisites: MATH 106
Description: Introduction to earthmoving equipment and methods, labor, productivity, and economic aspects of excavation, material transportation, and fill work. Introduction to the financial principles of equipment ownership and operation.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded
Offered: FALL

CNST 242 Vertical Construction
Prerequisites: MATH 106
Description: Focus on vertical structures, from grade to topping out, with an emphasis on materials and material handling equipment. Includes the assembly process for a variety of applications including cast-in-place concrete, steel erection, wood framing, precast concrete, masonry structural elements, and material finishing.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded

CNST 251 Construction Materials and Specifications
Prerequisites: MATH 106
Description: Introduction to construction materials and proper methods of specifying to achieve design and construction goals, safety and inspection, and to meet zoning code and environmental requirements. Physical, mechanical and aesthetic properties of soils, concrete, masonry, metals, plastics and other materials will be studied as they relate to in-service conditions, acceptability, and performance.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded

CNST 252 Construction Materials and Testing
Prerequisites: MATH 106
Notes: Parallel registration in CNST 241 is recommended. Laboratory testing procedures emphasizing testing of aggregates, soil, and concrete.
Description: Introduction to basic materials used in construction. Laboratory testing and evaluation of material properties of soil, aggregate, and concrete.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded

CNST 305 Building Environmental Technical Systems I
Crosslisted with: ARCH 333
Prerequisites: PHYS 151.
Description: Characteristics and performance of buildings with respect to thermal and psychrometric environment in buildings related to human comfort, heat gain/heat loss, ventilation, natural energy systems and sustainable design principles, and plumbing and life safety systems in the Built environment.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded
Prerequisite for: ARCH 430, ARCH 430H; CNST 405

CNST 306 Electrical Systems
Prerequisites: MATH 106, PHYS 151
Description: Fundamentals of electric power generation and distribution, service, and circuits in buildings with an emphasis on electrical equipment and systems, lighting principles and applications, and fire protection systems. Review of National Electric Code.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Prerequisite for: CNST 405; CNST 406
CNST 331 Structural Mechanics
Crosslisted with: ARCH 331
Prerequisites: ARCH 232 or admission into the Construction Management degree program
Description: Introduction to various external force systems, and their resulting internal forces and deformations, which act on structural elements.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded
Prerequisite for: ARCH 332, CNST 332

CNST 332 Structural Optimization
Crosslisted with: ARCH 332
Prerequisites: ARCH 331
Description: Optimization of key properties of elemental components and systems of building structures: force, geometric, and material.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded
Prerequisite for: ARCH 430, ARCH 430H

CNST 378 Construction Estimating I
Crosslisted with: CONE 378
Prerequisites: CNST 112
Description: Preparation of detailed cost estimates based on contract documents. Identify and analyze cost components of building and site scopes of work to perform detailed quantity take-offs. Apply labor, material, and equipment pricing from RS Means. Use production rates and quantity takeoffs to prepare a preliminary construction schedule. Complete quantity takeoffs from 2D plans and from 3D BIM software models.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded
Prerequisite for: CNST 379; CNST 440; CNST 476, CONE 476

CNST 379 Construction Estimating II
Prerequisites: CNST 378
Description: Continuation of CNST 378 with emphasis on the determination of total project cost and preparation of complete bid proposals for self-performed and subcontracted commercial projects. Evaluation and analysis of subcontractor bids to determine overall project costs by completing a hard bid simulation scenario. Exploration of contract delivery methods and their effect on overall project cost.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded
Prerequisite for: CNST 405; CNST 406; CNST 489

CNST 405 Mechanical Estimating
Prerequisites: CNST 305, 306 and 379.
Description: Application of estimating principles, quantity take-off, bidding strategies, and computerization to the specialty field of mechanical construction.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded

CNST 406 Electrical Estimating
Prerequisites: CNST 305, CNST 306 and CNST 379
Description: Application of estimating principles, quantity take-off, bidding strategies, and computerization to the specialty field of electrical construction.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded

CNST 411 Project Administration
Crosslisted with: CNST 811
Prerequisites: Junior or senior standing
Notes: Not open to non-degree graduate students
Description: Ownership and administration of companies focusing on documentation and specifications, contracts, take-offs, estimating, bidding, bonds, insurance, project management and administration, scheduling, time and cost management, labor law and labor relations, and project safety.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded

CNST 415 Mechanical/Electrical Project Management
Crosslisted with: CNST 815
Prerequisites: CNST 305, CNST 306, CNST 379
Notes: CNST 405 and CNST 406 are recommended.
Description: Fundamentals of project management within the mechanical and electrical contracting industry. Codes, contract documents, productivity, coordination, project control and administration, scheduling, safety, and project closeout, from a specialty contracting perspective.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded

CNST 420 Professional Practice and Ethics
Crosslisted with: CNST 820
Prerequisites: CNST 379 and BLAW 300
Notes: Not open to non-degree graduate students
Description: Examination of professional practice considering the perspectives of designers and the contractors and their respective relationships to society, specific client types, and other collaborators in the design and construction fields. Focus on ethics, professional communication and responsibility, professional organization, office management, environmental stewardship, professional registration, and owner-designer-contractor relationships.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
ACE: ACE 8 Civic/Ethics/Stewardship
CNST 425 Alternative Project Delivery Methods
Crosslisted with: CNST 825
Prerequisites: CNST 379
Notes: Not open to non-degree graduate students
Description: Historical and current project delivery methods (PDM) are explored. Procurement strategies, contractual arrangements, and compensation methods are also discussed in conjunction with risks, costs, and legal and ethical issues that need to be considered when determining which system is best for a particular project.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded
Offered: SPRING

CNST 434 The Design-Build Project Delivery System
Crosslisted with: CNST 834
Prerequisites: CNST 379
Notes: Not open to non-degree graduate students
Description: The organizational, managerial, ethical and legal principles involved in design-build as a project delivery system. Advantages and disadvantages, growth, merits, and criticism of the design-build system.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded

CNST 436 Intent and Application of International Building Code
Crosslisted with: CNST 836
Prerequisites: CNST 379
Notes: Not open to non-degree graduate students
Description: Fundamentals of how to research, interpret, and apply building code requirements to the design and construction of both new and renovated structures.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

CNST 440 Building Information Modeling (BIM) II
Prerequisites: CNST 225, CNST 378
Description: Advanced topics in building information modeling, including structural and MEP modeling, 4/5 dimensional construction animations and visualization. Good knowledge of Revit Architectural Modeling and knowledge of construction estimating and scheduling is required before registering in this class.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded

CNST 444 Construction Site Safety Management
Crosslisted with: CNST 844
Prerequisites: CNST 241 or CONE 319
Notes: Satisfactory completion will partially qualify the individual to be designated by their employer as a construction site "competent person" by successfully completing the OSHA 30-hour Construction Safety Card as well as additional certifications in basic first aid, CPR, and AED. Not open to non-degree graduate students
Description: Introduction to safety management for project engineers, project managers, safety teams, and company safety officers. Addresses basic accident and injury models, human accident costs, safety behavior, ethical issues in safety, workers' compensation and EMR, job safety analysis (JSA), project site safety audits, safety promotion and training, emergency planning and response, safety management programs and training, and OSHA record-keeping and reporting.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Offered: FALL

CNST 476 Project Budgets and Controls
Crosslisted with: CONE 476
Prerequisites: CNST 378, and BSEN 206 or FINA 300
Description: The basic systems related to revenues and expenses associated with record keeping of construction contracts. Managerial accounting related to planning and control of construction projects.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded

CNST 480 Productivity and Human Factors in Construction
Crosslisted with: CNST 880
Prerequisites: CNST 379 and senior standing
Notes: Not open to non-degree graduate students
Description: Motivation and productivity improvement methods for management in typical job environments. Methods to improve working environments in the field and office. Procedures and mechanisms to implement human behavior and ergonomics concepts for enhanced productivity and safety.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Prerequisite for: CNST 489

CNST 482 Heavy and/or Civil Construction
Crosslisted with: CNST 882, CONE 482, CONE 882
Prerequisites: CNST 379
Notes: Not open to non-degree graduate students
Description: History, theory, methods, and management principles of planning and executing heavy and/or civil projects. Emerging and new equipment capabilities. Economical use of equipment and management of costs associated with production.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded
**CNST 485 Construction Planning, Scheduling, and Controls**
Crosslisted with: CNST 485, CNST 885, CNST 885

**Prerequisites:** CNST 378

**Notes:** Not open to non-degree graduate students

**Description:** Planning and scheduling a project using the critical path methods (CPM) with computer applications. Project pre-planning, logic networks, precedence diagrams, time estimates, critical path, float time, crash programs, scheduling, short interval schedules, pull planning, and monitoring project activities.

**Credit Hours:** 3

**Max credits per semester:** 3

**Max credits per degree:** 3

**Grading Option:** Graded

**Prerequisite for:** CNST 489

**CNST 486 Construction Management Systems**
Crosslisted with: CNST 886

**Prerequisites:** CNST 379

**Notes:** Not open to non-degree graduate students.

**Description:** Application of selected topics in systems analysis (operations research). Simulation, mathematical optimization, queuing theory, Markov decision processes, econometric modeling, neural networks, data envelopment analysis, decision analysis, and analytic hierarchy processes as used in the industry.

**Credit Hours:** 3

**Max credits per semester:** 3

**Max credits per degree:** 3

**Grading Option:** Graded with Option

**CNST 488 Residential Construction and Real Estate**
Crosslisted with: CNST 888

**Prerequisites:** CNST 379

**Description:** Application of various strategies to real estate development including community and residential design, planning, site selection, land development, marketing and customer service. Methods used by construction companies to analyze, bid, and market their developments to customers through the pre-construction and bidding process.

**Credit Hours:** 3

**Max credits per semester:** 3

**Max credits per degree:** 3

**Grading Option:** Graded

**CNST 489 Senior Construction Project**
Prerequisites: CNST 379, CNST 420, CNST 476, CNST 485. CNST 480 must be completed as a prerequisite or taken parallel

**Notes:** Capstone course.

**Description:** Execution of a project from conceptual design and location through estimating, bidding, site layout, planning and scheduling, cost control, records management, and project completion and documentation.

**Credit Hours:** 3

**Max credits per semester:** 3

**Max credits per degree:** 3

**Grading Option:** Graded with Option

**ACE:** ACE 10 Integrated Product

**CNST 495 Internship**
Crosslisted with: CONE 495

**Prerequisites:** Permission of instructor, Letter of application, Letter of agreement from industry mentor

**Notes:** Not open to non-degree graduate students

**Description:** Participation in a full-time summer internship associated with a construction-related entity. Includes weekly assignments and a final presentation designed to foster interactions between the intern and the business side of the entity. General topics include personnel and time management, structuring business plans, scheduling work, finance and budgets, marketing plans, contracts, risk analysis, and communication and leadership.

**Credit Hours:** 3

**Max credits per semester:** 3

**Max credits per degree:** 3

**Grading Option:** Graded

**Offered:** SUMMER

**CNST 498 Special Topics in Construction Management**
Crosslisted with: CNST 898

**Prerequisites:** Permission.

**Notes:** A signed student-instructor learning contract is required.

**Description:** Individual or small group investigation of topics in construction management.

**Credit Hours:** 1-6

**Min credits per semester:** 1

**Max credits per semester:** 6

**Max credits per degree:** 6

**Grading Option:** Graded

---

**PLEASE NOTE**

This document represents a sample 4-year plan for degree completion with this major. Actual course selection and sequence may vary and should be discussed individually with your college or department academic advisor. Advisors also can help you plan other experiences to enrich your undergraduate education such as internships, education abroad, undergraduate research, learning communities, and service learning and community-based learning.

---

**Career Information**

*The following represents a sample of the internships, jobs and graduate school programs that current students and recent graduates have reported.*

**Jobs of Recent Graduates**

- Project Engineer, McCarthy Building Co. - Pheonix AZ
- Project Superintendent, Chief Construction - Grand Island NE
- Engineer I, Kiewit - Omaha NE
- Project Manager/Designer, Continental Fire Sprinkler Company - Omaha NE
- Field Engineer, Hensel Phelps - Austin TX
- Project Engineer, McCarthy Building Co. - Colorado Springs CO
- Project Engineer, Union Pacific - Tehachapi CA
- Field Engineer, J.E. Dunn Construction Company - Kansas City MO
- Project Controls Associate, Black & Veatch - Overland Park KS
- Field Engineer - LEED Buildings, Hensel Phelps - Dallas TX
- Sales Engineer, Johnson Controls, Inc. - Oklahoma City OK
- Field Engineer, Skanska - Phoenix AZ
- Project Engineer, J.E Dunn Construction Company - Omaha NE
- Project Manager, Ayars & Ayars, Inc. - Omaha NE
• Project Engineer, Swinerton Builders - Portland OR
• Superintendent, Hawkins Construction Company - Omaha NE
• Field Engineer, Constuctors Inc. - Lincoln NE
• Project Engineer, McCarthy Construction Co. - Kansas City KS
• Office Engineer, Archer Western - Dallas TX
• Field Engineer, Mortenson Construction - Minneapolis MN
• Highway Construction Technician II, Nebraska Department of Roads - Grand Island NE
• Project Manager, Sampson Construction - Lincoln NE
• Project Manager, Balfour Beatty - San Francisco CA
• Field Engineer, Hensel Phelps Construction Company - Greeley CO
• Project Engineer, The Waldinger Corp - La Vista NE

Internships
• Estimating Intern, Walt Disney World - Lake Buena Vista FL
• Field Engineer Intern, Hensel Phelps - Houston TX
• Engineer Intern, Kiewit Building Group - Omaha NE
• Project Management Intern, Simply Better Homes - Omaha NE
• Superintendent Intern, Haselden Construction - Denver CO
• Field Coordinator, Holder Construction - Atlanta GA
• Project Management Intern, Brinkman Constructors - Denver CO
• Design Engineer, Continental Fire Sprinklers - Omaha NE
• Estimating Intern, Sampson Construction - Lincoln NE
• Assistant Project Manager, Ayars & Ayars, Inc. - Lincoln NE
• Facilities Management Intern, Union Pacific - Omaha NE
• Construction Management Intern, Alfred Benesch and Company - Omaha NE
• Office Intern, J.E. Dunn Construction Company - Kansas City MO
• Field Engineer, Hensel Phelps Construction Co. - Denver CO
• Assistant Project Manager, City Glass Company - Omaha NE
• Construction Intern, Black & Veatch - Overland Park KS
• Project Engineer, E&K Industries - Omaha NE
• Construction Administrator Intern, Alley Poyner Macchietto Architecture - Omaha NE
• Project Engineer Intern, Swinerton Builders - Portland OR
• Surveying Intern, Ehrhart Griffin & Associates - Omaha NE
• Field Engineer Intern, Hensel Phelps - Austin TX
• Office Engineer Intern, Mortenson Construction - Minneapolis MN
• Intern, Turner Construction - Kansas City MO
• Intern, Archer Western - Dallas TX
• Field Engineer Intern, The Whiting-Turner Contracting Company - Boston MA

Graduate & Professional Schools
• Construction Management & Engineering, Ph.D., University of Nebraska-Lincoln - Lincoln NE
• Construction Management & Engineering, M.S., University of Nebraska-Lincoln - Lincoln NE
• Community and Regional Planning, M.S., University of Nebraska-Lincoln - Lincoln NE
• Project Management, M.S., Norwegian University of Science and Technology - Trondheim, Norway
• Construction Management, M.S., University of Florida - Gainesville FL
• Master of Business Administration, Kaplan University - Online