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 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. 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 or computer science)
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. Students without test scores who are missing a full unit of trigonometry/pre-calculus/calculus or chemistry or physics will be evaluated through College Review.
7. Students having an ACT score of 19 or less in English (or equivalent SAT score) or a grade lower than B in high school English, must take ENGL 150 Writing and Inquiry or ENGL 151 Writing and Argument.

A total of 16 units is required for admission.
Engineering requires that student performance meet one of the following standards: composite ACT of 24, SAT of 1180, ACT Math subscore of 24, SAT Math subscore of 580, or a 3.5 cumulative GPA.

Any domestic first-year student who does not gain admission to Engineering but does gain admission to the University of Nebraska-Lincoln (UNL) will be reviewed through College Review. College Review is conducted through the College Review Committee which considers factors beyond standardized testing. Any first-year student who is not admitted through college review is placed in Pre-Engineering (PENG) with the Exploratory and Pre-Professional Advising Center (Explore Center). Students in the Explore Center can transfer to the College of Engineering once college admission requirements are met.

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 Explore Center or other colleges at UNL.

Students should consult their advisor, their department chair, or Engineering Student Services (ESS) 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 first-year student entrance requirements, 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 Kearney and the University of Nebraska 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.

Students who were previously admitted to COE and are returning to the College of Engineering must demonstrate a cumulative GPA of 2.5 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 their instructor, and appropriate department chair or school director (in that order). If a satisfactory solution is not achieved, the student may appeal their case through the College Academic Appeals Subcommittee.

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.

Students who have transferred from a community college may be eligible to fulfill the requirements as stated in the catalog for an academic year in which they were enrolled at the community college prior to attending the University of Nebraska-Lincoln. This decision should be made in consultation with the student’s College of Engineering academic advising team (e.g., ESS professional advisor and the chief faculty advisor for the student’s declared degree program). The chief faculty advisor has the final authority for this decision. Eligibility is based on a) enrollment in a community college during the catalog year the student wishes to utilize, b) maintaining continuous enrollment of at least 12 credit hours per semester at the previous institution for at least 2 semesters, and c) continuous enrollment at the University of Nebraska-Lincoln within 1 calendar year from the student’s last term at the previous institution.

Students must complete all degree requirements from a single catalog year and within the timeframe allowable for that catalog year.

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 121), 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)

<table>
<thead>
<tr>
<th>First Semester</th>
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</tr>
</thead>
<tbody>
<tr>
<td>CNST 131</td>
<td>Introduction to the Construction Industry</td>
</tr>
<tr>
<td>ENGL 151</td>
<td>Writing and Argument (ACE 1)</td>
</tr>
<tr>
<td>Course Code</td>
<td>Course Title</td>
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<tr>
<td>------------</td>
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<tr>
<td>ENGR 10</td>
<td>Freshman Engineering Seminar</td>
</tr>
<tr>
<td>ENGR 100</td>
<td>Interpersonal Skills for Engineering Leaders (ACE 2)</td>
</tr>
<tr>
<td>MATH 106</td>
<td>Calculus I (ACE 3)</td>
</tr>
<tr>
<td>ACE Elective</td>
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</tr>
<tr>
<td>CNST 112</td>
<td>Construction Communications</td>
</tr>
<tr>
<td>JGEN 200</td>
<td>Technical Communication I</td>
</tr>
<tr>
<td>PHYS 151</td>
<td>Elements of Physics (ACE 4)</td>
</tr>
<tr>
<td>PHYS 153</td>
<td>Elements of Physics Laboratory</td>
</tr>
<tr>
<td>STAT 218</td>
<td>Introduction to Statistics</td>
</tr>
<tr>
<td>ACE Elective</td>
<td></td>
</tr>
<tr>
<td>CNST 225</td>
<td>Introduction to Building Information Modeling (BIM)</td>
</tr>
<tr>
<td>CNST 241</td>
<td>Horizontal Construction</td>
</tr>
<tr>
<td>CNST 251</td>
<td>Construction Materials and Specifications</td>
</tr>
<tr>
<td>CNST 252</td>
<td>Construction Materials and Testing</td>
</tr>
<tr>
<td>ENGR 20</td>
<td>Sophomore Engineering Seminar</td>
</tr>
</tbody>
</table>

Credit Hours Subtotal: 15

Second Semester

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
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<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>or FINA 300</td>
<td>Financial Decision Making</td>
<td></td>
</tr>
<tr>
<td>CNST 241</td>
<td>Horizontal Construction</td>
<td>3</td>
</tr>
<tr>
<td>CNST 251</td>
<td>Construction Materials and Specifications</td>
<td>3</td>
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<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>
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</table>

Credit Hours Subtotal: 15

Third Semester

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</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 (ACE 6)</td>
<td>3</td>
</tr>
<tr>
<td>ACE Elective</td>
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Credit Hours Subtotal: 15

Fourth Semester

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<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
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<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</td>
<td>I</td>
<td></td>
</tr>
<tr>
<td>CNST 378</td>
<td>Construction Estimating I</td>
<td>3</td>
</tr>
<tr>
<td>CONE 378</td>
<td>Project Administration</td>
<td>3</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>
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</table>

Credit Hours Subtotal: 15

Fifth Semester

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arch 332</td>
<td>Structural Optimization</td>
<td>3</td>
</tr>
<tr>
<td>CNST 306</td>
<td>Electrical Systems</td>
<td>3</td>
</tr>
<tr>
<td>CNST 379</td>
<td>Construction Estimating II</td>
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</tbody>
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Construction Electives: 6

Credit Hours Subtotal: 15

Seventh Semester

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<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>Arch 332</td>
<td>Structural Optimization</td>
<td>3</td>
</tr>
<tr>
<td>CNST 306</td>
<td>Electrical Systems</td>
<td>3</td>
</tr>
<tr>
<td>CNST 379</td>
<td>Construction Estimating II</td>
<td>3</td>
</tr>
</tbody>
</table>

Credit Hours Subtotal: 15

Eighth Semester

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CNST 420</td>
<td>Professional Practice and Ethics (ACE 8)</td>
<td>3</td>
</tr>
<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>

Construction Electives: 3

Technical Electives: 3

Credit Hours Subtotal: 15

Total Credit Hours: 120

Construction Electives
* Any CNST 300 or 400 Level Course
* Any CONE 300 or 400 Level Course
  * BLAW 300 Business, Government & Society
  * FINA 300 Financial Decision Making
  * MNGT 300 Management Essentials For Contemporary Organizations
  * MRKT 300 Contemporary Marketing

Technical Electives
* Any CNST 300 or 400 Level Course
* Any CONE 300 or 400 Level Course
  * CHEM 109A General Chemistry I
  & CHEM 109L and General Chemistry I Laboratory
  * CRPL 300 The Community and the Future
  * CRPL 400 Introduction to Planning
  * ENTR 321 Foundations of Entrepreneurship
  * ENTR 322 Family Business
  * ENTR 421 Identifying and Exploring Entrepreneurial Opportunities
  * ENTR 422 Managing Rapid Growth and Change in Organizations
  * ENTR 423 Business Plan Development and Decision Making
  * FINA 363 Investment Principles
  * FINA 382 Real Estate Principles and Practice
  * MATH 107 Calculus II
  * MNGT 311 Leadership, Communication and Teams
  * MNGT 321 Foundations of Entrepreneurship
  * MNGT 322 Family Business
  * MNGT 360 Managing Behavior in Organizations
  * MNGT 361 Human Resource Management
  * MNGT 411 Philanthropy and Leadership
  * MNGT 412 Negotiating and Conflict Management
  * MNGT 414 International Management
Students may complete the requirements for a Business minor by selecting appropriate courses in the major. Please see your academic advisor or Engineering Student Services.

**Additional Major Requirements**

**Grade Rules**

**C- and D Grades**

All required and elective courses (including ACE 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 (https://ace.unl.edu/). Because of the specific needs of the program, most of these courses are specified in the curriculum. Please contact DurhamSchool@unl.edu 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, 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

3) **Building Systems**
   - CNST 242  Vertical Construction
   - CNST 252  Construction Materials and Testing

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**
   - CNST 476  Project Budgets and Controls
   - CNST 485  Construction Planning, Scheduling, and Controls

**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

**Experiential Learning:** Fieldwork

**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 378
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 378
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

Experiential Learning: Research
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 442 Healthcare Design and Construction  
Crosslisted with: AREN 442, AREN 842, CNST 842  
Prerequisites: Senior or graduate standing  
Description: Introduction to the design and construction of healthcare facilities. Healthcare regulations and standards, infection control, interim life safety measures, code requirements, medical equipment selection and coordination, healthcare design and construction techniques, and best practices will be addressed. Provides guidance in preparation for the Certified Healthcare Constructor credential offered by the American Healthcare Association.  
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  
Experiential Learning: Case/Project-Based Learning  

CNST 446 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  
Prerequisite for: CONE 489  

CNST 480 Productivity and Human Factors in Construction  
Crosslisted with: CNST 880  
Prerequisites: Corequisite CNST 489, 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  
Experiential Learning: Case/Project-Based Learning  

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: CONE 485, CNST 885, CONE 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; CONE 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
Experiential Learning: Case/Project-Based Learning

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
Experiential Learning: Fieldwork

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 - Phoenix, 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 - Colorado Springs, CO
- Project Engineer, Union Pacific - Tehachapi, CA
- Field Engineer, J.E. Dunn Construction - 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, JE Dunn Construction Company - Omaha, NE
- Project Manager, Ayars & Ayars - Omaha, NE
- Project Engineer, Swinerton Builders - Portland, OR
- Superintendent, Hawkins Construction - Omaha, NE
- Field Engineer, Constructors Inc. - Lincoln, NE
- Project Engineer, McCarthy Construction - 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 - 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
• Ph.D., Construction Management & Engineering, University of Nebraska-Lincoln - Lincoln, NE
• Master's in Construction Management & Engineering, University of Nebraska-Lincoln - Lincoln, NE
• Master's in Community and Regional Planning, University of Nebraska-Lincoln - Lincoln, NE
• Master's in Project Management, Norwegian University of Science and Technology - Trondheim, Norway
• Master's in Construction Management, University of Florida - Gainesville, FL
• Master's in Business Administration, Kaplan University