CNST-2131: CONSTRUCTION METHODS AND MATERIALS

Cuyahoga Community College

Viewing: CNST-2131 : Construction Methods and Materials

Board of Trustees:
10/26/2023

Academic Term:
Fall 2024

Subject Code
CNST - Construction Engineering Tech

Course Number:
2131

Title:
Construction Methods and Materials

Catalog Description:
Study of common construction principles that affect jobsite performance, material selection and testing, and the general properties of traditional materials used. There will be focus on sustainability of materials and an introduction to non-traditional materials used in building assemblies.

Credit Hour(s):
3

Lecture Hour(s):
2

Lab Hour(s):
2

Requisites

Prerequisite and Corequisite
CNST-1290 Construction Print Reading; and MATH-0910 Basic Arithmetic and Pre-Algebra, or qualified Math placement; or departmental approval.

Outcomes

Course Outcome(s):
Classify construction materials into appropriate categories of either structural metals, structural lumber, engineered lumber, concrete, or masonry.

Objective(s):
1. Recognize and differentiate structural erection methods used in residential and commercial construction.
2. Compare traditional stud wall framing with structural insulated wall panels.
3. Perform aggregate sieve test with soil sieve shaker.

Course Outcome(s):
Distinguish appropriate construction methods and procedures required, according to contract specifications.

Objective(s):
1. Recognize and differentiate structural erection methods used in residential and commercial construction.
2. Explain the different types of Portland cement.
3. Perform slump tests with mixes of concrete.
4. Analyze and compare the moisture content of soil samples.

Course Outcome(s):

Make use of appropriate math formulas to calculate material properties.

Objective(s):

1. Test and analyze samples of concrete for compressive strength.
2. Perform soil analysis with soil sieve shaker.

Methods of Evaluation:

1. Quizzes
2. Text assignments
3. Tests
4. Laboratory assignments
5. Final laboratory project
6. Written laboratory assignments
7. Participation
8. Instructor observation/evaluation of student lab exercise performance
9. Oral presentations

Course Content Outline:

1. Construction as an industry
    a. Building systems and types of construction
    b. Construction materials
    c. Zoning ordinances and building codes
        i. regional and national codes
        ii. trade associations
2. Material properties
    a. Mechanical properties
    b. Thermal properties
3. Site construction
    a. Site plans
    b. Site preparation
        i. earthwork requirements
        ii. excavation and grading
        iii. bearing capacity of soil
    c. Site work activities
        i. classification of soils
        ii. soil tests and analysis
        iii. soil boring reports
    d. Foundation types and design
4. Concrete for construction
    a. Aggregate mixture and types
        i. aggregate sieve test
    b. Concrete tests
        i. Slump test
        ii. Compressive strength test
    c. Concrete types
        i. cast-in-place
        ii. pre-cast
        iii. concrete admixtures
5. Ceramic building materials
    a. Stone
    b. Brick
    c. Ceramic tile
6. Metals for construction

a. Ferrous metals
    i. steel components
    ii. structural properties
    iii. fire protection
b. Non-ferrous metals
    i. corrosion characteristics
    ii. non-ferrous metal types
c. Steel frame construction
    i. erection and fastening
    ii. decking and trusses
    iii. pre-engineered systems

7. Organic materials for construction
    a. Wood products
        i. lumber types and sizes
        ii. lumber grades and tests
        iii. structural properties
        iv. wood preservatives and treatment
    b. Engineered wood products
        i. panel products
        ii. laminated beams
        iii. trussels and joists
    c. Wood frames for construction
        i. platform framing
        ii. balloon framing
        iii. pole construction
        iv. structural and modular panel construction
8. Thermal and moisture protection
    a. Bonding agents and sealants
    b. Waterproofing coatings
9. Sustainability in construction
    a. Material sustainability attributes
    b. Fundamentals of LEED
    c. non-traditional building materials
        i. Structural insulated panels
        ii. Composite decking
        iii. Fly ash cement

Resources

Ching, Francis and Adams, Cassandra. *Building Construction Illustrated*. 7th. New York: John Wiley and Sons, 2020.

Mehta, Scarborough and Ampriest. *Building Construction: Principles, Materials, and Systems.* 3rd. New York, NY, 2018.

American Concrete Institute. *Concrete Fundamentals.* 1st. Farmington Hills, MI: American Concrete Institute, 2016.

American Concrete Institute. *Concrete Field Testing Technician-Grade I*. 2017-05-31.

Michael S. Mamlouk. *Materials for Civil and Construction Engineers*. 4th. Pearson, 2017.

NICET. "Level I Selected General References" *Construction Materials Testing - Asphalt*. NICET, 2/5/2022. https://www.nicet.org/nicetorg/assets/File/public/CMT_Asphalt_I_References.pdf

Instructional Services

OAN Number:
Transfer Assurance Guide OET016 and Career Technical Assurance Guide CTCON003

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