CONS 103 Course Outline as of Fall 2025

CATALOG INFORMATION

Dept and Nbr: CONS 103 Title: CONST MAT, MET & EQPT
Full Title: Construction Materials, Methods and Equipment
Last Reviewed: 9/11/2023

Units		Course Hours per Week		Nbr of Weeks	Course Hours Total	
Maximum	3.00	Lecture Scheduled	2.00	17.5	Lecture Scheduled	35.00
Minimum	3.00	Lab Scheduled	3.00	6	Lab Scheduled	52.50
		Contact DHR	0		Contact DHR	0
		Contact Total	5.00		Contact Total	87.50
		Non-contact DHR	0		Non-contact DHR	0

Total Out of Class Hours: 70.00 Total Student Learning Hours: 157.50

Title 5 Category:	AA Degree Applicable
Grading:	Grade Only
Repeatability:	00 - Two Repeats if Grade was D, F, NC, or NP
Also Listed As:	
Formerly:	

Catalog Description:
Students will explore the materials, methods, tools, and equipment used in construction. Areas covered will include construction site organization, materials handling and staging, materials and product physical properties, suitable applications for different materials, manufacturing, and service life expectations. Common construction methods and building component detailing to create functioning systems will also be included. Proper use of Personal Protective Equipment (PPE) and safe work practices will be discussed. Field trip(s) will be required.

Prerequisites/Corequisites:

Recommended Preparation:
Eligibility for ENGL C1000 OR EMLS 100 (formerly ESL 100) or equivalent

Limits on Enrollment:

Schedule of Classes Information:
Description: Students will explore the materials, methods, tools, and equipment used in construction. Areas covered will include construction site organization, materials handling and staging, materials and product physical properties, suitable applications for different materials,

manufacturing, and service life expectations. Common construction methods and building component detailing to create functioning systems will also be included. Proper use of Personal Protective Equipment (PPE) and safe work practices will be discussed. Field trip(s) will be required. (Grade Only)
Prerequisites/Corequisites:
Recommended: Eligibility for ENGL C1000 OR EMLS 100 (formerly ESL 100) or equivalent
Limits on Enrollment:
Transfer Credit:
Repeatability: Two Repeats if Grade was D, F, NC, or NP

ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:

AS Degree:	**Area**	Effective:	Inactive:
CSU GE:	**Transfer Area**	Effective:	Inactive:
IGETC:	**Transfer Area**	Effective:	Inactive:

CSU Transfer:	Effective:	Inactive:
UC Transfer:	Effective:	Inactive:

CID:

Certificate/Major Applicable:
Certificate Applicable Course

COURSE CONTENT

Student Learning Outcomes:
At the conclusion of this course, the student should be able to:
1. State standard units of measure for all major construction materials.
2. Identify and compare the properties and use of construction raw materials and finish materials.
3. List common materials and products used in residential and light commercial construction projects.

Objectives:
At the conclusion of this course, the student should be able to:
1. Describe the physical properties and proper applications of construction materials.
2. Describe the relationship between material properties and structural form.
3. Research relevant manufacturing processes.
4. Demonstrate a basic understanding of project logistics including material availability and delivery, and product lead time.
5. Explain the basic safe use of equipment and tools.
6. Research the selection of materials based on availability, suitability, and costs.

Topics and Scope:

I. Materials of Construction: Logistics and Design Considerations
A. Variety of construction materials and uses
B. Factors affecting choice of materials, such as structural form, material availability, lead time, and logistics

C. Material fundamentals in physical properties, durability, sustainability, strength, and structural performance

II. Materials of Construction: Manufacturing, Properties, Comparative Performance, Applications in Construction, Associated Equipment, and Placement

A. Temporary construction components
1. Scaffolding
2. Shoring
3. Fencing
4. Construction facilities
5. Vehicular access and parking
6. Barriers and enclosures
7. Cleaning, sorting, and waste management
8. Stormwater pollution prevention program (SWPPP) and erosion control

B. Soil and aggregates
1. Soil types
   a. Soil characteristics
   b. Moisture, density, and strength
   c. Testing
2. Soil stabilization
   a. Overexcavation and recompaction
   b. Chemical additives
   c. Geotextile fabrics
   d. Retaining walls
   e. Soil nails and piles
3. Manufactured aggregates
   a. Select fill
   b. Aggregate base
   c. Specialty aggregate mixes

C. Surfacing and pavement
1. Asphaltic-concrete
2. Concrete
3. Permeable surfaces
   a. Grass pavers
   b. Decomposed granite
   c. Asphalts
   d. Concrete
4. Roadway surfacing
   a. Seal coat
   b. Slurry seal
   c. Chip seal
5. Striping, signage, and markings

D. Underground utilities
1. Sewer
2. Storm drains
3. Water and fire protection systems
4. Joint trench
5. Utility structure components
   a. Vaults
   b. Manholes
   c. Inlets
   d. Pump stations and mechanical systems

E. Landscaping and irrigation

1. Planting
2. Irrigation systems

F. Fencing and outdoor specialty equipment

G. Concrete
1. Site concrete versus building concrete
2. Concrete mix and additives
3. Testing
4. Formwork
5. Concrete finishes
6. Construction and control joints
7. Concrete accessories and embedments
8. Concrete reinforcing
    a. Steel bars
    b. Welded wire mesh
    c. Stressed tendons
9. Precast concrete
10. Lightweight concrete

H. Masonry
1. Concrete masonry units (CMU)
2. Brick
3. Stone
4. Mortar
5. Accessories
6. Grouting

I. Metals
1. Structural steel
    a. American Institute of Steel Construction (AISC) shapes and sizing
    b. Connections
2. Metal framing
3. Metal fabrications
4. Metal decking
5. Non-ferrous metals

J. Wood
1. Rough carpentry
    a. Heavy timber
        i. Species
        ii. Moisture content
        iii. Lumber grading
        iv. Sizes
    b. Dimensional lumber
        i. Species
        ii. Moisture content
        iii. Lumber grading
        iv. Sizes
    c. Prefabricated structural components
        i. Glulam beams
        ii. Structural composite lumber
        iii. I-joist
        iv. Trusses
        v. Structural insulated panels (SIP)
    d. Sheathing products
        i. Plywood

ii. Other sheathing products
e. Fasteners, hardware, and adhesives
i. Nail types
ii. Staples
iii. Screws
iv. Prefabricated connectors
v. Adhesives
2. Finish carpentry
a. Exterior finish carpentry
b. Interior finish carpentry
c. Cabinetry and casework

K. Thermal and moisture protection
1. Waterproofing
a. Membrane waterproofing
b. Sheet-applied
c. Fluid-applied
2. Sealants
a. Joint fillers
b. Expansive
c. Acoustical
d. Fire and smoke sealants
3. Insulation types
a. Fibrous insulation
b. Sound insulation
c. Batt insulation
d. Rigid insulation
e. Foam-in-place insulation
f. Fire-proofing insulation

L. Roofing
1. Membrane systems
a. Built-up systems
b. Single ply systems
2. Shingle systems
3. Metal roofing
4. Foam roofing
5. Insulation
6. Specialty roofs

M. Sheet metal
1. Flashing: roof, door and window, caps, and parapets
2. Gutters and downspouts
3. Louvers

N. Doors and door hardware
1. Function and styles
a. Fire ratings
b. Accessibility requirement
2. Metal doors and frames
3. Wood doors
4. Specialty doors
5. Door hardware

O. Windows and glass
1. Function and styles
2. Frame and sash materials

3. Aluminum storefront
4. Curtain wall
5. Glass and mirror

P. Lath and plaster
1. Furring and lath
2. Cement plaster
3. Plaster accessories
4. Finish

Q. Gypsum wallboard
1. Wallboard types
2. Wallboard accessories
3. Cementitious backer panels
4. Finish

R. Tile
1. Ceramic
2. Stone
3. Stone slab

S. Flooring
1. Carpet
2. Engineered
3. Wood
4. Liquid and emulsion applied flooring
5. Resilient flooring and base
6. Terrazzo

T. Ceilings
1. Suspended ceiling systems
2. Other

U. Painting and staining
1. Volatile Organic Compounds (VOC)
2. Exterior and interior uses
3. Special Coatings

V. Specialties
1. Site furnishings
2. Toilet partitions and restroom accessories
3. Food Service and refrigeration
4. Kitchen appliances
5. Laboratory/medical
6. Fire extinguishing equipment
7. Lockers and benches
8. Postal specialties
9. Wardrobes and closets
10. Flagpoles
11. Wayfaring devices
12. Signage
13. Loading dock equipment
14. Unit kitchens

W. Furnishings

X. Window Coverings

Y. Fixed seating

Z. Special Construction
1. Pre-engineered buildings
2. Manufactured units

3. Swimming pools
4. Solar energy systems
    a. Passive systems
    b. Photovoltaic (PV) systems

AA. Conveying systems
1. Elevators
2. Moving stairs and walks
3. Accessibility lifts

BB. Plumbing and piping
1. Cold water distribution
2. Hot water distribution
3. Fixtures
4. Process piping
5. Gas piping distribution
6. Water supply and treatment
7. Fluid waste disposal and treatment

CC. Fire protection
1. Chemical suppression
2. Fluid suppression

DD. Heating, ventilation, and air conditioning (HVAC)
1. Heating systems
2. Cooling systems
3. Air Distribution

EE. Control systems

FF. Electrical
1. Power generation
2. Power transmission
3. Distribution
4. Lighting
5. Low voltage systems

GG. Alternative building materials and processes

All topics are covered in the lecture and lab portions of the course.

Assignment:

Lecture-related Assignments:
1. Reading assignments (20-40 pages per week)
2. Study question set(s) (1-3 weekly)
3. Quiz(zes) (1-4)
4. Midterm exam
5. Final exam

Lecture and Lab-related Assignments:
1. Field Reports (6-12)

Methods of Evaluation/Basis of Grade:

Writing: Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

Field reports	Writing 10 - 30%

Problem Solving: Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

Study question sets	Problem solving 20 - 40%

Skill Demonstrations: All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

None	Skill Demonstrations 0 - 0%

Exams: All forms of formal testing, other than skill performance exams.

Quiz(zes); midterm exam; final exam	Exams 30 - 50%

Other: Includes any assessment tools that do not logically fit into the above categories.

Class participation	Other Category 5 - 10%

Representative Textbooks and Materials:
Construction Materials, Methods and Techniques: Building for a Sustainable Future. 5th edition. Kultermann, Eva, and Spence, William P. Cengage Learning. 2022.
Construction Planning, Equipment, and Methods. 10th edition. Peurifoy, Robert L., Schexnayder, Clifford, Schmitt, Robert, and Shapira, Aviad. McGraw Hill. 2023.

Instructor prepared materials