



Course Outline

2026-2027 Catalog

CNST 10 - Properties and Applications of Concrete

Catalog Description

Transfer Status: CSU

Unit(s): 4.00

Lecture: 51.00 Contact hours/102.00 Out of class hours/153.00 Total hours/3.00 Unit(s)

Lab: 51.00 Contact hours/0.00 Out of class hours/51.00 Total hours/1.00 Unit(s)

Total: 102.00 Contact hours/102.00 Out of class hours/204.00 Total hours/4.00 Unit(s)

Course Description: This course is a study of various types of concrete materials and applications. The students will learn about concrete production, transportation, forming, reinforcing, placing, consolidating, jointing, finishing, and curing. The students will be introduced to foundations, pavements, slabs on grade, structural concrete, and tilt-up/pre-cast concrete. Quality control, quantity take-off, and estimating will be included throughout as they relate to each topic.

Objectives

Upon successful completion of this course, the student should be able to:

1. Describe the components of concrete and different mix designs.
2. Identify the correct concrete for the application.
3. Demonstrate the process of forming and placing concrete.
4. Explain the different processes for finishing and curing of concrete.
5. Identify the different contemporary applications of concrete.
6. Discuss quality control, quantity take-off, and estimating in concrete construction.
7. Classify failures and defects in placed concrete, and their causes.
8. Demonstrate the different techniques and tools for finishing concrete.
9. Practice safety and safe industrial handling of cement, concrete products, and tools.

Course Content

Topic Titles / Suggested Time Topic

Lecture

<u>Topics</u>	<u>Lec Hrs</u>
Safety in concrete construction	2.00
History and evolution of concrete construction	2.00
Introduction to concrete components and mix design	6.00
Introduction to applications for concrete	3.00
Stem-wall foundations and concrete walls	4.00
Concrete slab on grade	3.00
Structural concrete	4.00
Pre-cast and tilt up concrete	3.00
Architectural and decorative concrete	3.00
Introduction to forming and form systems	6.00
Introduction to reinforcement for concrete	3.00
Transportation and placing of concrete	3.00
Concrete finishing	3.00
Concrete admixtures and curing	3.00
Introduction to concrete failure and defects	3.00

Total Hours: 51.00

Lab

<u>Topics</u>	<u>Lab Hrs</u>
Concrete safety and lab procedures	3.00
Introduction to hand tools and power tools	3.00
Concrete components and mix design	6.00
Concrete applications	3.00
Foundations	9.00
Concrete slab on grade	6.00

Topics	Lab Hrs
Structural Concrete	6.00
Architectural and decorative concrete	3.00
Forming systems	6.00
Concrete finishing	6.00
Total Hours:	51.00

Methods of Instruction

- A. Demonstrations
- B. Homework: Students are required to complete two hours of outside-of-class homework for each hour of lecture
- C. Lecture
- D. Multimedia Presentations
- E. Laboratory Projects

Methods of Evaluation

- A. Exams/Tests
- B. Quizzes
- C. Homework
- D. Lab Projects

Examples of Assignments

Reading Assignments

1. Read the chapter on Mineral Admixtures and be prepared to discuss in class.
2. Read the specifications for reinforcing in the Butte College Field House Project and be prepared to discuss in class.

Writing Assignments

1. Write a one-page explanation of the relationship between cement and water that addresses the correlation of ratio to strength.
2. Given a set of project parameters, explain your sequence of operations to complete the concrete place and finish.

Out-of-Class Assignments

1. Go to an active construction project, and from a safe distance document an hour of work as it pertains to a concrete activity
2. Go to the California Department of Transportation website and find the standard plan for a concrete head-wall for a 12" pipe. Print out the drawing and calculate the quantity of concrete that will be needed, showing your work on the printout.

Recommended Materials of Instruction

Nawy, Edward. (2008). Concrete Construction Engineering Handbook. *CRC Press, 2nd.*

Other Learning Materials

All tools listed in the Core Program Guide.

Minimum Qualifications

Building Codes And Regs
 Construction Management
 Construction Technology
 Engineering (Masters Required)
 Engineering Technology (Masters Required)
 Industrial Technology
 Manufacturing Technology

Created/Revised by: Williams, Tom

Date: 02/25/2019