

# BI 0020 - FOUNDATIONS AND FRAMING

## Catalog Description

Formerly known as CET 20

Hours: 108 (36 lecture, 72 laboratory)

Description: Fundamentals of construction foundation and framing techniques involving layout and construction to include, establishing elevations, site preparation, types of foundation forms, rebar and bolt installation, concrete placement techniques for slab on grade, cast in place (CIP), and pre-cast installations, structural steel, various types of floor systems, and applicable code requirements specific to the above. Introduction to California Green Technology and "Net Zero Energy" policies and sustainability practices for residential, commercial, and industrial construction. (CSU)

## Course Student Learning Outcomes

- CSLO #1: Demonstrate proper safety procedures and ergonomic working standards.
- CSLO #2: Compare and contrast types of foundation forms.
- CSLO #3: Demonstrate foundation layout techniques.

## Effective Term

Fall 2021

## Course Type

Credit - Degree-applicable

## Contact Hours

108

## Outside of Class Hours

54

## Total Student Learning Hours

162

## Course Objectives

Lecture Objectives:

1. Describe and demonstrate the proper safe usage of tools and equipment and practices utilized in the construction industry; predict and evaluate common safety hazards.
2. Describe and compare floor foundations and pre-cast and evaluate the advantages of each.
3. Discuss methods of concrete estimating.
4. Describe and compare lumber grades and grading for the construction industry.
5. Discuss current building codes applicable to residential construction both conventional and insulated block forming relative to California Green Technology and "Net Zero Energy" policies."
6. Discuss the future of construction utilizing sustainable building practices.
7. Use math skills to layout and build a foundation and rough frame.

8. Solve arithmetic function including addition, subtraction, multiplication and division of whole numbers, fractions, decimals, and percentages as related to construction topics.

9. Demonstrate fluency in reading a set of plans and understanding the installation process for sub-trades including, structural steel, light gauge metal framing, dry mechanical, plumbing, and electrical.

10. Identify and develop materials list.

Laboratory Objectives:

1. Practice safe usage of tools and equipment utilized in the construction industry;
2. Demonstrate the use of construction math to evaluate materials needed from a set of plans.
3. Design a foundation system utilizing concrete forms to adhere to current code requirements.
4. Estimate the amounts of concrete needed for distinct types of foundations.
5. Compare and contrast floor systems and evaluate the advantages of each.
6. Compare four lumber grades (select structural, select 1&2, economy) and evaluate the standards for acceptance.
7. Construct a foundation and framing system project utilizing metal studs and structural steel applications according to standard practices of the trade and adhering to applicable building code requirements.
8. Identify methods of quality control, moisture protection, waterproofing (including testing) and assurances.

## General Education Information

- Approved College Associate Degree GE Applicability
- CSU GE Applicability (Recommended-requires CSU approval)
- Cal-GETC Applicability (Recommended - Requires External Approval)
- IGETC Applicability (Recommended-requires CSU/UC approval)

## Articulation Information

- CSU Transferable

## Methods of Evaluation

- Projects
  - Example: Major student projects will be graded according to completeness, adherence to building codes, and passing foundation and floor system inspections. The grading is determined by a grading rubric. Example: Framing of a foundation pour and walls
- Skill Demonstrations
  - Example: Students will build a stem wall and slab layouts according to the plan specifications. The grading is determined by a grading rubric.

## Repeatable

No

## Methods of Instruction

- Laboratory
- Lecture/Discussion
- Distance Learning

Lab:

1. Lab techniques will be presented in a "describe / show / review" methodology. Students will complete a safety test before using

equipment. Instructor will work with students until they can successfully complete the test with 100% success rate. (Lab Objective 1)

Lecture:

1. Instructor will lecture on current code requirements and facilitate class discussion on applications in various types of foundations. The student will be given an opportunity to clarify any questions in an instructor-guided discussion. (Lecture Objective 3)

Distance Learning

1. Students in online classes participate, individually and in groups, in discussion boards and respond to weekly assignments via the Learning Management System. The instructor will provide documented material (including videos) explaining or exploring the course content and provide individual feedback on all assignments. The instructor will discuss common building code, including California's Green movement and "Net Zero Energy" policies. Students will then search their local jurisdiction's websites for code adoptions and compare with classmates. (Lecture Objective 4)

## Typical Out of Class Assignments

### Reading Assignments

1. Read assigned pages in textbook and be prepared to discuss the procedure for pouring concrete slabs.
2. Construct a drawing of two different floor systems as described in the readings and be prepared to discuss in class.

### Writing, Problem Solving or Performance

1. Layout and square a foundation per plan requirements as described in lecture.
2. Calculate the amount of concrete needed from foundation plan.

### Other (Term projects, research papers, portfolios, etc.)

Construct a foundation and floor system project.

### Required Materials

- Carpentry
  - Author: Floyd Vogt
  - Publisher: Cengage Learning
  - Publication Date: 2019
  - Text Edition: 7th
  - Classic Textbook?: No
  - OER Link:
  - OER:

### Other materials and-or supplies required of students that contribute to the cost of the course.