

# CE 160: INTRODUCTION TO STRUCTURAL ANALYSIS

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## In Workflow

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## Approval Path

1. Sat, 12 Oct 2019 03:22:14 GMT  
Julie Fogarty (fogarty): Approved for CE Committee Chair
2. Mon, 14 Oct 2019 18:00:40 GMT  
Benjamin Fell (fellb): Approved for CE Chair
3. Fri, 25 Oct 2019 16:32:05 GMT  
Troy Topping (troy.topping): Approved for ECS College Committee Chair
4. Fri, 25 Oct 2019 16:53:48 GMT  
Kevan Shafizadeh (kevan): Approved for ECS Dean

## History

1. Apr 8, 2019 by Julie Fogarty (fogarty)

Date Submitted: Sat, 12 Oct 2019 03:11:52 GMT

**Viewing: CE 160 : Introduction to Structural Analysis**

**Formerly known as: CE 161**

**Last approved: Mon, 08 Apr 2019 14:01:00 GMT**

**Last edit: Sat, 12 Oct 2019 03:11:51 GMT**

Changes proposed by: Julie Fogarty (218645519)

### Contact(s):

Name (First Last)	Email	Phone 999-999-9999
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### Catalog Title:

Introduction to Structural Analysis

### Class Schedule Title:

Intro Structural Analysis

### Academic Group: (College)

ECS - Engineering & Computer Science

### Academic Organization: (Department)

Civil Engineering

### Will this course be offered through the College of Continuing Education (CCE)?

No

### Catalog Year Effective:

Fall 2020 (2020/2021 Catalog)

**Subject Area: (prefix)**

CE - Civil Engineering

**Catalog Number: (course number)**

160

**Course ID: (For administrative use only.)**

107336

**Units:**

3

**In what term(s) will this course typically be offered?**

Fall, Spring

**Does this course require a room for its final exam?**

Yes, final exam requires a room

**Does this course replace an existing experimental course?**

No

**This course complies with the credit hour policy:**

Yes

**Justification for course proposal:**

This course was approved for GE Area B5 in combination with CE 160L (formerly CE 113) for AY 2018-2019 to comply with EO 1100. No content has changed. Only the number and prerequisite numbers are changing for the reason below.

Undergraduate CE courses are being renumbered to clarify course pre- and co-requisites and topic areas to help students plan their path to graduation. Prerequisite numbers (not courses) are being changed to reflect course number changes.

Through curriculum paper forms in 2016, each CE course had the "Not currently enrolled in CE XXX" as a prerequisite approved, so that students could not register for a "CE" prefix course if they were currently enrolled in it. This was to prevent students who thought they were failing from giving up or taking up a seat they didn't need if they passed the course. That prefix managed to make it into the online system for only one or two classes and is being put through curriculum workflow again.

**Course Description: (Not to exceed 80 words and language should conform to catalog copy.)**

Analysis of statically determinate and indeterminate beams, frames, and trusses. Includes energy principles, flexibility and stiffness analyses, and influence lines. Computers are used to aid in the solution of complex structural problems.

**Are one or more field trips required with this course?**

No

**Fee Course?**

No

**Is this course designated as Service Learning?**

No

**Does this course require safety training?**

No

**Does this course require personal protective equipment (PPE)?**

No

**Does this course have prerequisites?**

Yes

**Prerequisite:**

CE 1, CE 101, ENGR 112, and (MATH 35 or MATH 100). Not currently enrolled in CE 160.

**Prerequisites Enforced at Registration?**

Yes

**Does this course have corequisites?**

No

**Graded:**

Letter

**Approval required for enrollment?**

No Approval Required

**Course Component(s) and Classification(s):**

Discussion

**Discussion Classification**

CS#04 - Lecture /Recitation (K-factor=1 WTU per unit)

**Discussion Units**

3

**Is this a paired course?**

No

**Is this course crosslisted?**

No

**Can this course be repeated for credit?**

No

**Can the course be taken for credit more than once during the same term?**

No

**Description of the Expected Learning Outcomes: Describe outcomes using the following format: "Students will be able to: 1), 2), etc."**

After completing this course, a student will be able to

- 1) Describe the relationship between structural analysis and design
- 2) Analyze determinate and indeterminate structural systems using various methods
- 3) Interpret analysis results from modern structural analysis programs

**Assessment Strategies: A description of the assessment strategies (e.g., portfolios, examinations, performances, pre-and post-tests, conferences with students, student papers) which will be used by the instructor to determine the extent to which students have achieved the learning outcomes noted above.**

Quizzes and exams (ELO 1 &amp; 2)

Computer assignment/project (ELO 3)

**Is this course required in a degree program (major, minor, graduate degree, certificate?)**

Yes

**Has a corresponding Program Change been submitted to Workflow?**

No

**Identify the program(s) in which this course is required:****Programs:**

BS in Civil Engineering

**Does the proposed change or addition cause a significant increase in the use of College or University resources (lab room, computer)?**

No

**Will there be any departments affected by this proposed course?**

No

**I/we as the author(s) of this course proposal agree to provide a new or updated accessibility checklist to the Dean's office prior to the semester when this course is taught utilizing the changes proposed here.**

I/we agree

## University Learning Goals

### Undergraduate Learning Goals:

Competence in the disciplines  
Knowledge of human cultures and the physical and natural world  
Integrative learning  
Intellectual and practical skills

**Is this course required as part of a teaching credential program, a single subject, or multiple subject waiver program (e.g., Liberal Studies, Biology) or other school personnel preparation program (e.g., School of Nursing)?**

No

## GE Course and GE Goal(s)

**Is this a General Education (GE) course or is it being considered for GE?**

Yes

**In which GE area(s) does this apply?**

B5. Further Studies in Physical Science, Life Forms and Quantitative Reasoning (Upper Division Only)

**Which GE objective(s) does this course satisfy?**

Use mathematical ideas to accomplish a variety of tasks.  
Gain a general understanding of current theory, concepts, knowledge, and scientific methods pertaining to the nature of the physical universe, ecosystems, and life on this planet.

**Attach Course Syllabus with Detailed Outline of Weekly Topics:**

CE Syllabus CE 160L (Area B).docx  
CE Syllabus CE 160 (Area B).docx

Syllabi must include: GE area outcomes listed verbatim; catalog description of the course; prerequisites, if any; student learning objectives; assignments; texts; reading lists; materials; grading system; exams and other methods of evaluation.

**Will more than one section of this course be offered?**

Yes

**Provide a description of what would be considered common to all sections and what might typically vary between sections:**

Different sections may be taught by different instructors but they all use the same course reader/note set across sections.

**Please write a statement indicating the means and methods for evaluating the extent to which the objectives of the GE Area(s) and any writing requirements are met for all course sections:**

Common syllabus and learning objectives; Meetings between part-time instructors and full-time faculty leads.

**What steps does the department plan to take to ensure that instructors comply with the respective category criteria and who is responsible?**

Oversight by full-time faculty and department curriculum committee.

## General Education Details - Area B5: Further Studies in Physical Science, Life Forms and Quantitative Reasoning

Section 1.

**Indicate in written statements how the course meets the following criteria for Category B5. Relate the statements to the course syllabus and outline. Be as succinct as possible.**

**Course type:**

Quantitative Reasoning

**For courses in quantitative reasoning:**

**Develops basic mathematical or logical concepts, quantitative reasoning skills, and has general applicability in solving problems.**

CE 160 is entirely composed of problem solving, building on mathematical concepts learned in Calculus II (integration), linear algebra (matrix operations) and physics (equilibrium).

**Develops computational skills or competence in the analysis of arguments.**

Computer program assignment in CE 160 required by all students. Evaluating results of software output.

Analysis of experimental results in CE 160L is constructing arguments about the interpretation and meaning of those results.

**Please Note: Courses listed in this category:**

- 1) **Need not be introductory courses and need not be as broad in scope as courses included in B1, B2, B3 or B4 i.e.; they may deal with a specialized topic.**
- 2) **These courses may have prerequisites or build on or apply concepts and knowledge covered in Areas B1, B2 and B4. For math courses, there must be an intermediate algebra prerequisite.**

**Addresses the specific GE student learning outcomes for area B5. A student should be able to do one or more of the following:**

**Cite critical observations, underlying assumptions and limitations to explain and apply important ideas and models in one or more of the following: physical science, life science, mathematics, or computer science.**

Students need to compare experimental data to agreed upon theoretical models based on physics and mathematics.

**Recognize evidence-based conclusions and form reasoned opinions about science-related matters of personal, public and ethical concern.**

Ethical issues of reporting data correctly, safety of public in analyzing structures (buildings and bridges).

**Discuss historical or philosophical perspectives pertaining to the practice of science or mathematics.**

NA

**Includes a writing component described on course syllabus**

1) **If course is lower division, formal and/or informal writing assignments encouraging students to think through course concepts using at least one of the following: periodic lab reports, exams which include essay questions, periodic formal writing assignments, periodic journals, reading logs, other. Writing in lower division courses need not be graded, but must, at a minimum, be evaluated for clarity and proper handling of terms, phrases, and concepts related to the course.**

2) **If course is upper division, a minimum of 1500 words of formal, graded writing. [Preferably there should be more than one formal writing assignment and each writing assignment (e.g. periodic lab reports, exams which include essay questions, a research/term paper etc.) should be due in stages throughout the semester to allow the writer to revise after receiving feedback from the instructor. Include an indication of how writing is to be evaluated and entered into course grade determination.]**

The 1500 words of formal writing is included in CE 160L as described in the attached document.

Section 2.

**If you would like, you may provide further information that might help the G.E. Course Review Committee understand how this course meets these criteria and/or the G.E. Program Objectives found in the CSUS Policy Manual, General Education Program, Section I.B.**

At the lower-division, the department has requested GE Area E credit through a combination of two courses, CE 1A and CE 4; at the upper division level, GE Area B credit for CE 160L and CE 160. The request is due to the CSU Executive Order 1100, mandating Area E be satisfied at the lower division, and Area B at the upper division.

Because of the rigid prerequisites of the courses used to satisfy EO 1100, namely CE 160L and CE 160, the double-counting for GE units should be considered major-only. For the Area E proposal, CE 1A and CE 4, any student can take these courses, but considering both must be completed, the department advises the subcommittee to not list them as part of the GE program for all students.

Civil engineering (along with the other engineering programs) has two additional constraints that are important to consider in the context of these proposals. First, CSU and Sacramento State Academic Affairs will not permit a unit increase for the civil engineering program, already at 124 units. Second, removing technical content will impair our ability to continue external ABET accreditation. Replacing units in the major to satisfy EO 1100 will harm our program and students' competitiveness in the region after graduation. Thus, without the proposed double-counting, EO 1100 will have the result of increasing the number of units required in the undergraduate civil engineering degree by 6 units. With the stated purpose of EO 1100 to "increase opportunities for student success and facilitate efficient degree completion," the EO will have the exact opposite effect on engineering students.

Finally, the CSU encouraged double-counting in 2014 to reduce engineering major requirements to 120 units as shown in the worksheet attached below. The CSU also considers double-counting as a "student-supportive policy change" as described in the FAQ listing for EO 1100 also attached.

**Please attach any additional files not requested above:**

CE 160L Writing Assignments.pdf

Key: 543