**CEST 81 Course Outline as of Fall 2021**

# CATALOG INFORMATION

Dept and Nbr: CEST 81 Title: CIVIL ENGINEERING DESIGN
Full Title: Civil Engineering Design/ Drafting
Last Reviewed: 4/13/2015

| 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 | 17.5 | 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

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| 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: | CONS 81 |

**Catalog Description:**
Computations, design and CAD drafting applied to engineering drawings of site and grading plans, underground utilities, highways, retaining walls and similar concrete structures. Includes use of standard detail sheets.

**Prerequisites/Corequisites:**

**Recommended Preparation:**
Course Completion of CEST 85

**Limits on Enrollment:**

**Schedule of Classes Information:**
Description: Computations, design and CAD drafting applied to engineering drawings of site and grading plans, underground utilities, highways, retaining walls and similar concrete structures. Includes use of standard detail sheets. (Grade Only)
Prerequisites/Corequisites:
Recommended: Course Completion of CEST 85
Limits on Enrollment:

Transfer Credit:
Repeatability: Two Repeats if Grade was D, F, NC, or NP

## ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:

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

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| **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. Apply fundamental civil engineering principles to solve engineering design problems.
2. Apply knowledge of local and State regulatory requirements to solve engineering design problems.
3. Prepare a set of civil engineering drawings using the plan, profile and cross section views.

**Objectives:**
Upon completion of this course, students will be able to:
1. Prepare plan, profiles, typical detail sheets, working drawings, site map, and grading plans for site construction and drainage.
2. Apply civil engineering design principles to problem solving situations such as parking lot layout, flexible pavement design, hydrology and hydraulic computations, fire protection system design, concrete retaining walls design, and storm drain design.
3. Interpret and apply zoning, fire and storm water regulations and California construction codes to solve civil engineering design problems.

**Topics and Scope:**

I. Basic Civil Engineering principles as applied to
  A. Highway and roadway design including
  B. Site development and surface drainage control
  C. Storm water management
  D. Fire Code requirements related to site access and
II. Research of regulatory documents
  A. Local design, construction and zoning standards
  B. California design and construction codes, including building and fire regulations
III. Design and documentation of civil engineering projects incorporating regulatory requirements
  A. Typical cross section for roadway computations

B. Plan and profile for storm drain, including details and necessary calculations
C. Working drawing for concrete retaining wall including all details and tables
D. Site and grading plan including quantity estimates
E. Working drawings for hydrology and hydraulics of storm drain design and parking lot design

IV. Lab Assignments such as:
A. Provide needed calculations to justify design of 2-dimesnionanl Plat Map
B. Produce 2-dimensionsl Plat Map for a commercial syructure with parking
C. Provide needed calculations to justify design of 3-dimensional Site Plan
D. Produce 3-dimensional Site Plan for a commercial syructure with parking
E. Provide needed calculations to justify design of route/s
F. Develop and document route/routes associated with Plat Map and Site Plan that conform to Fire Code; including typical plan, profile and cross section
G. Provide needed calculations to justify drainage design
H. Develop and document site hydrological and surface run-off patterns and associated grading to proposed storm drain inlets
I. Produce quantity survey calculations for grading, trenching and compacting activities
J. Provide needed calculations to justify retaining wall design
K. Develop and document retaining wall and diversion structure plans
L. Provide needed calculation to justify design of storm drain network
M. Develop and document storm drain network to exhaust water off-site

**Assignment:**

1. Read approximately one chapter of the instructor prepared lab manual per week
2. 5-7 computational homework assignments
3. 5-7 CAD/Civil 3-D drawings
3. Quizzes: 3-8
4. Final exam or project

**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.

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| None, This is a degree applicable course but assessment tools based on writing are not included because problem solving assessments and skill demonstrations are more appropriate for this course. | Writing<br>0 - 0% |

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

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| Lab assignments including Civil Engineering computations | Problem solving<br>15 - 25% |

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

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| Weekly lab assignments using CAD technology | Skill Demonstrations<br>40 - 60% |

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

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| Quizzes and final exam: multiple choice, true/false, matching items, completion | Exams<br>25 - 35% |

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

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| Class participation | Other Category<br>0 - 10% |

**Representative Textbooks and Materials:**
Civil Drafting Technology, D.A. Madsen, T. Shumaker and D.P. Madsen; 7th Edition, Prentice Hall, 2009
Civil Drafting for the Engineering Technician (Drafting and Design), G. Baker; Cengage Learning, 2006 (classic)
Instructor provided lab manual.