

# ME 240: MECHANICAL DESIGN & FAILURE ANALYSIS

---

## In Workflow

1. ME Committee Chair (akuma@csus.edu)
2. ME Chair (akuma@csus.edu)
3. ECS College Committee Chair (troy.topping@csus.edu)
4. ECS Dean (kevan@csus.edu)
5. Academic Services (torsetj@csus.edu;%20212408496@csus.edu;%20cnewsome@skymail.csus.edu)
6. Senate Curriculum Subcommittee Chair (curriculum@csus.edu)
7. Dean of Undergraduate (james.german@csus.edu;%20celena.showers@csus.edu)
8. Dean of Graduate (cnewsome@skymail.csus.edu)
9. Catalog Editor (212408496@csus.edu;%20torsetj@csus.edu;%20cnewsome@skymail.csus.edu)
10. Registrar's Office (wwd22@csus.edu;%20wlindsey@csus.edu;%20sac19595@csus.edu;%20danielle.ambrose@csus.edu;%20h.skocilich@csus.edu;%20205109584@csus.edu)
11. PeopleSoft (PeopleSoft@csus.edu)

## Approval Path

1. Tue, 16 Apr 2019 14:13:44 GMT  
Akihiko Kumagai (akuma): Approved for ME Committee Chair
2. Tue, 16 Apr 2019 14:14:47 GMT  
Akihiko Kumagai (akuma): Approved for ME Chair
3. Fri, 03 May 2019 17:39:47 GMT  
Troy Topping (troy.topping): Rollback to ME Chair for ECS Committee Chair
4. Tue, 22 Oct 2019 22:16:23 GMT  
Akihiko Kumagai (akuma): Approved for ME Chair
5. Fri, 25 Oct 2019 17:27:36 GMT  
Troy Topping (troy.topping): Approved for ECS College Committee Chair
6. Fri, 25 Oct 2019 19:21:46 GMT  
Kevan Shafizadeh (kevan): Approved for ECS Dean

Date Submitted: Sat, 13 Apr 2019 21:05:40 GMT

## Viewing: ME 240 : Mechanical Design & Failure Analysis

Last edit: Fri, 25 Oct 2019 17:25:27 GMT

Changes proposed by: Jose Granda (101042041)

### Contact(s):

Name (First Last)	Email	Phone 999-999-9999
Jose Granda	grandajj@ecs.csus.edu	530-9023165

### Catalog Title:

Mechanical Design & Failure Analysis

### Class Schedule Title:

Mech Design & Failure Analysis

### Academic Group: (College)

ECS - Engineering & Computer Science

### Academic Organization: (Department)

Mechanical Engineering

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

No

### Catalog Year Effective:

Spring 2020 (2020/2021 Catalog)

### Subject Area: (prefix)

ME - Mechanical Engineering

**Catalog Number: (course number)**

240

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

148561

**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:**

There is an increased emphasis in industry to design products with safety considerations in mind and to minimize product liability. We have had ME240 in place for a number of years, but in this revision, we wish to update the class to include failure analysis using state of the art finite element computer simulations in design and product liability considerations. This course will add an element of forensic engineering to the course scope, which will enhance our curriculum. It will complement and enhance the vehicle and product design curriculum.

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

Advanced multidisciplinary design analysis, finite element modeling, computer simulations, and statistical methods to increase product safety and reduce product liability. Investigate and recreate cases of failures of machines, vehicles, structures and assemblies under dynamic or static loads or material failures using current software tools. Design with safety considerations. Use of two and three-dimensional models to study failures. Use of the theory of reliability and forensic engineering to increase product safety.

**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?**

No

**Does this course have corequisites?**

No

**Graded:**

Letter

**Approval required for enrollment?**

No Approval Required

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

Seminar

**Seminar Classification**

CS#05 - Seminar (K-factor=1 WTU per unit)

**Seminar 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."**

1. Explain design principles with failure analysis considerations.
2. Analyze failures from a practical and theoretical point of view.
3. Apply principles of forensic engineering to determine the cause of failures. For this purpose computer models in with dynamics or static finite elements will be used.
4. Analyze specific failure cases and explain the results.
5. Practice use of software tools to analyze design, safety and reliability
6. Analyze a specific case with the techniques learned in class.

**Attach a list of the required/recommended course readings and activities:**

ME240 Outline\_Fall\_2019\_.docx

**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.**

Students will be assessed by quizzes (ELO 1 and 2) , exams (ELO 1, 2, and 3) and a case study project including an oral presentation and written report (ELO 1-6).

**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:**

MS in Mechanical 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****Graduate (Masters) Learning Goals:**

Critical thinking/analysis  
 Communication  
 Information literacy

Disciplinary knowledge  
Intercultural/Global perspectives  
Professionalism  
Research (optional)

**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

**Is this a Graduate Writing Intensive (GWI) course?**

No

**Reviewer Comments:**

**Troy Topping (troy.topping) (Fri, 03 May 2019 17:39:47 GMT):**Rollback: Discuss prerequisites and attach syllabus.

Key: 3352