San José State University
Department of Mechanical Engineering
ME 260 Applied Stress Analysis

Course and Contact Information

Class Days/Time:	Tuesdays and Thursdays
Classroom:	Engineering 340
Registration Code:	
Prerequisites:	BSME degree or instructor consent
Instructor:	Dr. Feruza Amirkulova
Office Location:	Engineering 310J
Telephone:	(408) 924-2045
Email:	feruza.amirkulova@sjsu.edu
Office Hours:	Monday, Wednesday 3:15pm – 4:15 pm in E310J and by appointment

Course Format

This is a mixed-mode class, with both in-person and online components. Online components require use of the Canvas learning management system, accessed via https://sjsu.instructure.com/. Successful completion of course requirements necessitates accessing the course website frequently, typically at least twice a week on a regular basis. Technical support for Canvas is available at http://www.sjsu.edu/at/ec/canvas/. Important communications regarding this class may be sent via Canvas or to student email addresses listed in MySJSU, and thus each student is expected to maintain up-to-date contact information in both systems.

Course Description http://info.sjsu.edu/web-dbgen/catalog/courses/ME260.html

Introduction to stress analysis techniques, including advanced strength of materials, energy methods and theory of elasticity. Elastic-plastic stresses, creep, fatigue, fracture mechanics, failure analysis.

Course Learning Outcomes

Upon successful completion of this course, students will be able to:

1. Represent and apply 3-D strains and displacements in rectangular and cylindrical coordinates.
2. Represent and manipulate stress states in matrix form and graphical representation. Apply stress transformations and find 3-D principal stresses.
3. Describe major components of the theory of elasticity, and apply constitutive relations to solve linear elastic problems in structural mechanics.
4. Apply stress functions (e.g., Airy, Prandtl) to solve for spatial stress distributions.
5. Explain and apply energy methods for solving structural mechanics problems.
6. Describe distinguishing characteristics and constitutive relations for elastic, hyperelastic, plastic, and viscoelastic material behavior.

7. Explain and apply principles from fracture mechanics and fatigue analysis.

Required Textbook

Advanced Strength and Applied Stress Analysis, 2nd ed. by R. Budynas, McGraw-Hill (1998). A low-cost print alternative with the necessary chapters is available with ISBN 9781308788111via http://www.spartanbookstore.com/ and an eBook is available with ISBN 9781308864181 via https://create.mheducation.com/shop/. The full original hardbound textbook (ISBN 9780070089853) is also acceptable.

Course Requirements and Assignments

In addition to textbook reading and class participation, course requirements and assignments are as follows:

- Homework: Homework problems will be assigned corresponding to lecture topics and assigned reading. Students are encouraged to discuss strategies collaboratively, but each individual is expected to prepare and submit his or her own work. Raw copying is cheating and will be reported accordingly.
- Participation Tasks: Throughout the semester there will be several participation tasks to promote active engagement. Specific examples include discussion posts, online quizzes or surveys, and peer review. Completed task will be tallied for credit with strict deadlines and there are no make-up options. Tasks may be in-class or online, so it is important to attend class and to check Canvas regularly.
- Analysis Project: This is a team-based project that features a comparison between analytical solutions and finite element simulation. Preferably at least one member of each team should have had a course in finite element analysis (e.g., ME 160 or ME 273) beforehand, but brief introduction will be provided for those who have less experience. Instructions on project development and project report writing will be provided.
- Exams: There are two exams. All students are expected to complete exams in class as scheduled. Disability accommodations must be coordinated through the Accessible Education Center http://www.sjsu.edu/aec/.

Grading Information

The course grade is calculated from a weighted sum of all graded components as follows:
20% for Homework
5% for Participation Tasks
25% for Exam-1
25% for Exam-2
25% for Final Analysis Project

Percentage points for grades assignments and exams correspond to letter grade as follows:
93.0-100 A | 90.0-92.9 A- | 87.0-89.9 B+ | 83.0-86.9 B | 80.0-82.9 B-
77.0-79.9 C+ | 73.0-76.9 C | 70.0-72.9 C- | 67.0-69.9 D+ | 63.0-66.9 D | 60.0-62.9 D- | 0-59.9 F

Late Policy: Unless otherwise specified for a particular assignment, work that is submitted late will be accepted with reduced credit according to a discount factor $d = 1 - (n/168)^{0.75}$, where n is an integer that counts the number of late hours breached. The number of hours breached is determined by online submission time stamp or email-received time stamp. Specific examples of depreciated values using this formula are shown in the following table. (This does not apply to exams; exams must be submitted when allocated time closes.)

If the extent of lateness is:	1 minute	61 minutes	1 day	3 days	7 days
The number of hours breached is:	1	2	24	72	168
The corresponding discount factor is:	0.979	0.964	0.768	0.470	0.000
100 (if on time) becomes:	98	96	77	47	0
90 (if on time) becomes:	88	87	69	42	0

80 (if on time) becomes:	78	77	61	38	0

Team Assignments and Peer Grading: Team assignments will be used for some portions of the course, and some assignments may involve peer grading. Alternative options will be considered for compelling reasons, but arrangements must be pre-approved in writing with ample time before corresponding deadlines (i.e. several days or even weeks in advance).

Exceptions: Any grading appeals or petitions must be communicated promptly in writing (or email). Exceptions will normally be evaluated at the very end of the semester in context with overall semester track record and all other exceptions class-wide. Special consideration for truly unavoidable and extenuating circumstances will depend on timeliness and strength of supporting documentation (e.g., doctor's note, jury summons, military orders).

Classroom Protocol

Although University Policy F15-12 at http://www.sjsu.edu/senate/docs/F15-12.pdf states that "Attendance shall not be used as a criterion for grading", the policy also states, "Students are expected to attend all meetings for the courses in which they are enrolled as they are responsible for material discussed therein" and furthermore, "Participation may be used as a criterion for grading when the parameters and their evaluation are clearly defined in the course syllabus and the percentage of the overall grade is stated."

University Policies

The link below contains university-wide policy information relevant to all courses, such as academic integrity, accommodations, etc. This information is maintained by the Office of Graduate and Undergraduate Programs.
http://www.sjsu.edu/gup/syllabusinfo/

iClicker Cloud

We will be using iClicker Cloud this semester to conduct polls, and quizzes in class. This will help me to understand what you know, and give everyone a chance to participate in class. This will also provide you a prompt feedback on how well you understand course concepts, help you master the challenging material in this class, and allow you to review material after class.

You are required to bring a device to participate in my iClicker sessions during class. I will be allowing the use of iClicker Reef on a smartphone, tablet or laptop OR iClicker remotes.

It is your responsibility to properly register your iClicker Reef device and/or iClicker remote in a timely fashion. It is also your responsibility to regularly check your iClicker grades for any discrepancies and bring them to my attention quickly.

Registration Instructions:

Regardless of which device you use in class, you must create an iClicker Reef account–or use your existing Reef account if you already have one–to ensure that your grades sync to my iClicker gradebook. You can do this by downloading the mobile app via the App Store or Google Play, or by visiting iclicker.com.

It is your responsibility to make sure your account is in working order, and to regularly check your grades for any discrepancies and bring them to my attention immediately. If you already have a Reef account, simply add my course to it. **Do not create a duplicate account.**

Grading Information

Class attendance/polls will be worth X% of your final grade. You will earn X points for each correct question you answer.

Academic Integrity Information
iClicker activities fall under the provisions of our campus's academic honesty policy. Students must not engage in academic dishonesty while participating in iClicker activities. This includes but is not limited to answering polling

questions while not physically in class, looking at other students' devices while answering live questions, or using more than one iClicker remote or account at a time. Any student found to be in violation of these rules will lose polling points for the entire term and may be reported to the Dean of Student Discipline.

Need Help?
You can contact eCampus or check their website for more information. Contact information: Email= ecampus@sjsu.edu
Phone= (408)924-2337 Building/Room= IRC206
Website= www.sjsu.edu/ecampus

You may also find the answers to many of your questions by visiting iclicker.com/support.

ME 260 Applied Stress Analysis Course Schedule

This schedule is subject to change with fair notice via announcement in class or notification via Canvas.

Week	Dates	Topics and Textbook Reading Sections	Assignments and Deadlines
1	01/27, 01/29	Force [1.2], stress [1.3], strain [1.4], displacement [1.5], generalized stress-strain [2.3]	
2	02/03, 02/05	Stress transformations [2.1, 2.2, 3.9] and principal stresses	HW01 due (02/05)
3	02/10, 02/12	Equilibrium and compatibility [2.4, 2.5], plane stress and plane strain [4.1]	HW02 due (02/12)
4	02/17, 02/19	Axial loading [3.2], torsion [3.3], bending [3.4], buckling [3.10], pressurization [3.6],	HW03 due (02/19)
5	02/24, 02/26	Superposition [3.7], statically indeterminate problems [3.8]	HW04 due (02/26)
6	03/02, 03/04	Stress functions [4.2, 4.3]	HW05 due (03/04)
7	03/09, 03/11	(Review)	**Exam-1** (03/11)
8	03/16, 03/18	Applied problem scenarios (e.g., plates, curved beams, hollow cylinders) [Chapter 5]	HW06 due (03/18)
9	03/23, 03/25	Work [6.1, 6.2], strain energy [6.3], hyperelasticity	Project selection, HW07 due (03/25)
10	03/30, 04/01	**No Class on campus, due to upcoming spring recess**	
11	04/06, 04/08	Work-energy theorems [6.4, 6.5, 6.6]. Static failure theories (review) [7.3].	HW08 due (04/08)
12	04/13, 04/15	Static failure theories (review) [7.3], fracture mechanics [7.4], fatigue analysis (review) [7.5].	Project updates, draft reports due 04/15
13	04/20, 04/22	Plasticity [7.7]	HW09 due (04/22)
14	04/27, 04/29	(Review)	**Exam-2** (04/29)
15	05/04, 05/06	Viscoelasticity and creep. Approximations for indeterminate loading [7.8]	HW10 due (05/06)
16	05/11	Project presentations	Project reports due 05/11/20

NOTE: This is not a firm list. There may be additions or deletions during the semester