Engineering Department

Course Syllabus: ENGR 241,

Strength of Materials, (C-ID Descriptor ENGR 240)

Summer 2025 4-Units

Second course in engineering mechanics

Instructor Contact Information

- **Professor Christopher Herwerth,**
  - **MS Mechanical Engineering**
  - **BS Mechanical Engineering**
  - **CA Professional Engineer, License No. M 34433**
- **GCC Email: cherwerth@glendale.edu**

- **Course Meeting Time: Online**
- **Online Office Hours: Mondays, Wednesdays and Fridays 10:00-11:45 AM**

  - I will be holding online Synchronous Office Hours every Monday, Wednesday and Friday, **starting Friday June 20 at 10 AM, through Zoom.** This means, I will be online providing instant feedback during this time.
  - If students cannot make these hours and would like to talk another time, they may request an appointment to chat by sending me a message through CANVAS or email cherwerth@glendale.edu.
  - Students may also message me any questions and allow 24 hours for a response.
  - Inquiries sent on Fridays may not be returned until the following Monday.
  - There are also Q&A discussion forums where other students may help answer questions before I get there to do so.
  - Students are strongly advised to exchange contact information, as peer-to-peer discussion about technical content is frequently a highly successful learning activity.

Course Description

Description: ENGR 241 is the application of mechanics to determine the effect of forces and torques on materials. Students apply this knowledge to the design of load bearing components. The course covers the following topics: stress, strain, axial loading, torsion, flexural stresses, transverse shear stress, horizontal shear stresses, stress transformations, Mohr's circle, thin-walled pressure vessels, ductile and brittle failure theories, shear and bending moment diagrams, stresses in a beam, methods of superposition, and elastic strain energy. Statically indeterminate systems are studied using Castigliano's theorem

Prerequisites: ENGR 152 Engineering Mechanics - Statics OR the equivalent.

UC and CSU Transferable

About This Class

- This course is Online Asynchronous: We will not meet on-campus for any reason but you must log into the class via Canvas during each week (really daily) and complete course assignments. Attendance means that you have logged into Canvas and submitted assignments, quizzes each week.
- This 6 week, Online Asynchronous course officially starts Monday June 16 and ends Friday July 25.
- Students must log into CANVAS during the first week of this Online class and complete two assignments: 1. the Icebreaker discussion (self-introduction) and 2. the syllabus quiz, **both before Friday 11:59 pm, June 20.**
- Students who **do not** log in and complete both the introduction and Syllabus Quiz, **will be dropped from the course by the following Thursday 11:59 pm.**
- Syllabus Quiz: Click on the syllabus assignment **after** carefully reading the course syllabus, and follow the steps to answer the questions of the quiz.
- For more information on course drops, See Refund/Payment Policy: https://www.glendale.edu/home/showdocument?id=25858 REFUND/REPAYMENT POLICY A. Refund Policy for All Students - glendale.edu

- Below are a few resources for students about what it means to drop a class:

  - It's okay to drop a class, really! (Links to an external site.)
  - Should I Drop a Class? (Links to an external site.)
  - To Drop or Not to Drop?

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Browser Compatibility:

It is recommended to use the latest version of your preferred browser to make sure everything works correctly in Canvas.

The Quizzes or Final Exam will **not** be video monitored.

Student Learning Outcomes

1. create shear and moment diagrams and demonstrate their use in determining the location of maximum shear stress and bending moment on a beam;
2. analyze plane stress transformations by calculating principal stresses;
3. create and use Mohr's circle to determine the maximum plane stress;
4. demonstrate the energy method of calculating strain energies.

Textbook(s) and Required Materials

Russell C. Hibbeler, Mechanics of Materials 10th edition, Pearson, 2017.

ISBN 9780134319650

Alternate editions are acceptable, but students are responsible for any differences in content.

Course Communication

Email

If you ever have any questions, please email me through Canvas by clicking on "Inbox" on the left side of your homepage. Click on "Compose a new message", select this course and then select "Teachers" under the "To" field and you will find my name, **Christopher Herwerth.** This is email inside Canvas :-) I am not supposed to receive any personal email...Canvas email only, please! **I will respond to your email within 24 hours, M-F.** If you do not hear back from me within this time, please assume I did not receive your email and resend it.

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Course Assignments

Important Dates

The due dates for your assignments can be found in the *Calendar* in the **global navigation links at the top of your screen**. Please review these. In addition, I will post reminders prior to the due dates in the *Announcements*.

Weekly Assignments

Each week you will need to complete the following:

- Read/Watch the daily lessons. This will be available every **Monday through Thursday.**
- Take the **quizzes** on **Mondays by 11:59 pm**
- Complete the **assignments** in each course lesson by **Mondays 11:59 pm**
- Assignment Problem Solving Formatting: All assignments shall have a formal structure with Given, Find, Assumptions, Sketch, Free Body Diagram, Plan/Solution, Unit Check, alternate solution with Boxed Answers, and Discussion. See Canvas Page "Problem Solving Formatting" for additional details. Assignments submitted without the formal structure will be docked 50% with no re-submission allowed. Note that for this course the work "assignment" is used where you may be used to the word "homework". Basically, your assignments will be engineering problems to be solved.

Grading

Assignments	40%	90 - 100	A
Quizzes	30%	80 - 89	B
Final Exam	30%	70 - 79	C
Extra Credit	5%	60 -69	D

*Grading breakdowns are approximate. Your grade may be rounded up with professor's judgement of level of effort and understanding. ***Doing your own work and asking questions*** **are highly valuable. The Professor is here to help.**

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Notes on Grading Items:

Assignments: There will be up to 40 assignments given worth approximately 1 point each. Typically each assignment will be one or two strength of materials problems to solve. Most of these will require and explanation written in your own handwriting that demonstrates that you understand the problem. An Engineering Problem Solving Rubric is available to guide the format of assignments. All assignments are open resource and you are encouraged to form study groups to solve them. **(40%)**

Quizzes: There will be roughly 12 Quizzes including the Check in Syllabus Quiz. Quizzes will be fairly easy but they must be completed on time as there will be no make-up quizzes given. The Syllabus Quiz will be due on Thursday June 23 and subsequent quizzes will be due by 11:59 PM of the first day of the week; usually Mondays. **(30% total; 2.5% each quiz)**

Final Exam: The final exam will be a take home exam and like the assignments you will be required to explain each problem solution. **(30%)**

Extra Credit: All students are encouraged to meet with the instructor for teleconferences via Zoom. You may earn up to 5 points extra credit for verbally demonstrating knowledge of the course content. The meeting may involve the instructor asking technical questions about a specific topic or you may give a presentation of something of interest in the course. An example might be a discussion or explanation of how to solve for principal stresses in a beam. **(5% maximum, usually one point for each discussion)**

Course Grades & Feedback

You can view your grades using the *Grades* button in the **course navigation links.** Please check your grades regularly to make certain that I have received all your assignments. If you have a question about a grade, email me through the Canvas *Inbox* (left-side of your screen). Please do not post your personal concerns in a discussion forum.

I will be using the Canvas grading tool for your discussions and written assignments; however, your grade is based on the weights shown in the syllabus. You can see not only your grades, but also comments and feedback as well.

Verbal discussions or emailed communications do not supersede the requirements of the syllabus.

Submission Policy

Plan for success! Submit your work by the requested due date and time. If you have an extenuating circumstance, please contact me by private message **before** the assignment is due to make alternate arrangements. Late submissions are not allowed but there is 5% extra credit to offset missed coursework.

Attendance/Participation/Refund Policies

- **Students who do not participate each week may be dropped from the course.**
- **Participation/Attendance:** Attendance for this Online course is defined as completing coursework such as assignments and quizzes each week.
  - Any student that is added as a 'late add' student has until Sunday June 25th 11:59 pm to complete the Check-In Assignment or be dropped.
- **Students:** Please refer to Student Rights in an Online and Hybrid Course (https://www.glendale.edu/class-schedule/distance-education/de-faculty-center/student-rights-in-an-online-and-hybrid-course (Links to an external site.)) if you have further questions regarding the expectations from your course and instructor.
- Students do not need to disclose personal information to the instructor including medical or other difficulties. Extra credit is available to make up for any missed submissions.

Additional Policies and Resources

Academic Honesty

It is expected that all work submitted for grading is original, not copied from others and that the work being graded is indeed done by the student who is receiving the grade. Cheating and plagiarism are serious violations of the student conduct code. Cheating or plagiarizing will result in a zero on the assignment or test and may result in other disciplinary action taken by the College. All incidents of cheating or plagiarizing are reported to the Dean of Students. For more information, please refer to the Glendale Community College Academic Honesty Policy.

Late Work

- **Late work is not accepted for this course.**
- Extra credit is available to offset missed assignments.

- Manage your time and submit whatever work you have completed by the deadlines for credit.

Students with Disabilities

- All students with disabilities seeking accommodations are responsible for making arrangements in a timely manner through the Center for Students with Disabilities. Please let me know right away if you will need accommodations so we can pre-plan together.
- Please let me know if you have adaptive software and hardware to assist you with taking this course or if you have any specific needs of which I should be aware. You can find more information about Disabled Students Programs and Services (DSPS) or call the office at 818-240-1000 x5905.
- Students with disabilities have the right to receive reasonable academic adjustments in order to create an educational environment where they have equal access to instruction without fundamentally altering any course, educational program or degree. (GCC Board Policy, 2000)
  Any student who feels they may need an accommodation based on the impact of a disability should contact Disabled Students Program and Services (DSP&S) at (818) 240-1000 ext. 5905 or visit the DSP&S office.
- Requests for DSPS accommodations may take up to one week from the date of the request to implement in the course.

Non-discrimination and Equal Opportunity Policy:

"Glendale Community College District is a multicultural community of people from diverse racial, ethnic, linguistic and class backgrounds, national origins, religious and political beliefs, physical and mental abilities, gender identities, and sexual orientations. The activities, programs, classes, workshops/lectures, and everyday interactions of this district are enriched by our acceptance of one another, and we strive to learn from each other in an atmosphere of positive engagement and mutual respect." Please see the Glendale College Catalog, page 19.

Harassment Policy:

"All forms of harassment are contrary to basic standards of conduct between individuals and are prohibited by state and federal law, as well as this policy, and will not be tolerated. The district is committed to providing an academic and work environment that respects the dignity of individuals and groups. The District shall be free of sexual harassment and all forms of sexual intimidation and exploitation including acts of sexual violence. It shall also be free of other unlawful harassment, including that which is based on any of the following statuses: race, religious creed, color, national origin, ancestry, physical disability, mental disability, medical condition, genetic information, marital status, sex, gender, gender identity, gender expression,

age, or sexual orientation of any person, or because he or she is perceived to have one or more of the forgoing characteristics." Please refer to the Glendale College Catalog, page 19.

Student Technical Support

Go to the Student Tech Support page if you are having Canvas tech issues or check out the resources below:

- Canvas Questions ONLY: 24/7 Assistance at 1-844-600-4951
- Student Support through Live Chat
- Student Support On-Campus (SM 266)
- Student Canvas Guides
- Student Distance Education Success Tips

Student Online Services

There are many additional services to help you during this course. A few of these include:

- Free Online Tutoring, which can be accessed through the website or through Canvas.
- GCC Library (Databases & Online Chat), which can be accessed through the website or through Canvas.

Additional services can be found on the GCC Student Services Webpage.

Course Schedule (Tentative)

	ENGR 241 Strength of Materials			
	Summer 2025 Tentative Schedule			
Date	**Subjects**	**Section**	**Required Assignments**	**Due**
Week 1	**Review**		**These are the assignments in Canvas**	
16-Jun	Introduction, Units; SI and US Customary, Review of Statics, Equilibrium	Handouts	Assignment 1 Problem 1-9	23-Jun
	Problem Solving Procedures	Handout	Assignment 2 Problem Shear and Moment	23-Jun
	Chapter 1		Assignment 3 Units, Statics 1-9	23-Jun
	Normal and Shear Stress	1.1 – 1.5	Assignment 4 Problems 1-36, 1-51	23-Jun
	Factor of Safety, Limit State Design,	1.6 - 1.7	Assignment 5 Bone Problem	23-Jun
	Chapter 2		Assignment 6 Problem 2-2	23-Jun
	Deformation and Strain	2.1 – 2.2	Assignment 7 Problem 2-5	23-Jun
	Stress strain diagram, Hooke's Law, modulus of elasticity		Assignment 8 Problem 2-8, 2-25	23-Jun
Week 2	**Chapter 3**	3.1 - 3.2	Assignment 9 Problem Stress Strain Graph	30-Jun
23-Jun	**Quiz 2** Ductile and brittle material properties	3.3 – 3.4	Assignment 10 Problem F3-13	30-Jun
	Poisson's ratio, strain energy	3.4 – 3.6	Assignment 11 Problem F3-15	30-Jun
	Chapter 4		Assignment 12 Problem 3-1	30-Jun
	Axial load, Principle of superposition	4.1 -4.3	Assignment 13 Problem 3-2	30-Jun
	Thermal stress, stress concentrations	4.5 – 4.7	Assignment 14 Problem 3-13	30-Jun
	Chapter 5		Assignment 15 Problem 3-17	30-Jun
	Torsion	5.1 – 5.2	Assignment 16 Problem 3-25, 3-31	30-Jun
	Torsion	5.3	Assignment 17 Problem F4-2	8-Jul
Week 3	**Chapter 5**		Assignment 18 Problem 4-8	8-Jul
30-Jun	**Quiz 3** Angle of twist, shafts and thinned walled tubes	5.4 - 5.7	Assignment 19 Problem 4-23	8-Jul
	Chapter 6		Assignment 20 Problem 4-36, 4-40	8-Jul
	Bending stress Shear and moment diagrams	6.1 – 6.3	Assignment 21 Problem 4-69	8-Jul
			Assignment 22 Problem 4-72	8-Jul
	Flexure, beams, beam displacement	6.3 – 6.5, 6.8	Assignment 23 Problem 5-5, 5-7	8-Jul
			Assignment 24 Problem 5-69	8-Jul

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Week 4	**Chapter 7**		Assignment 25 Problem 5-25	8-Jul
7-Jul	**Quiz 4** Transverse shear stress	7.1 – 7.2	Assignment 26 Problem 5-81, 5-119	8-Jul
	Shear flow	7.3 – 7.5	Assignment 27 Problem F6-1, F6-3, 6-3	14-Jul
	Chapter 8		Assignment 28 Problem P6-2, F6-9	14-Jul
	Thin walled pressure vessels	8.1	Assignment 29 Problem 6-51, 6-61, 6-64	14-Jul
	Combined loading	8.2	Assignment 30 Problem F6-11, F6-14	14-Jul
	Chapter 9		Assignment 31 Problem 6-129	14-Jul
	Stress transformation	9.1 -9.2	Assignment 32 Problem F7-1, F7-4	14-Jul
	Principle stresses, Mohr's circle, maximum shear stress	9.3 – 9.4	Assignment 33 Problem 7-10, 7-12	14-Jul
Week 5	**Chapter 10**		Assignment 34 Problem 8-4, 8-11	14-Jul
14-Jul	**Quiz 5** Failure Theories, failure Criteria	10.7	Assignment 35 Problem F8-1	21-Jul
	Chapter 12		Assignment 36 Problem F9-1, F9-2	21-Jul
	Deflection of Beams and Shafts	12.1 - 12.5	Assignment 37 Problem F9-7, 9-80	21-Jul
	Chapter 13		Assignment 38 Problem 10-89, 10-90	21-Jul
	Column buckling, secant formula	13.3 - 13.4	Assignment 39 Problem F12-1, 12-4	21-Jul
	Chapter 14		Assignment 40 Problem F12-14	21-Jul
	Energy methods		Assignment 41 Problem F13-2, 13-6	21-Jul
Week 6			Assignment 42 Problem Mohr's Circle Problem	21-Jul
21-Jul	Energy methods, strain energy	14.1 - 14.4	Assignment 43 Problem Column Buckling	21-Jul
	Castigliano's theorem	14.8	Assignment 44 Problem 14-9, 14-22	21-Jul
	Review		Assignment 45 Problem 14-31	21-Jul
25-Jul	**Final Exam**			25-Jul