Glendale Community College

Engineering Department

Course Syllabus: ENGR 152 Engineering Mechanics - Statics,

Fall 2024 3-Units

C-ID Descriptor ENGR 130 Statics

First course in engineering mechanics

Instructor Contact Information

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

- **Course Dates September 3 through December 18, 2024**
- **Online Office Hours: Mon, Wed, and Fri, from 10:00 AM to 11:45 AM**
    - I will be holding online Synchronous Office Hours starting Thursday February 22 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.

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Course Description

Description: This is a first course in engineering mechanics. ENGR 152 covers the composition and resolution of co-planar and non-planar force systems, equilibrium of rigid bodies, distributed forces, forces in trusses, frames and cables, shear and bending moments in beams, and moments of inertia of areas and bodies.

Prerequisites: MATH 104E Calculus with Analytic Geometry II AND PHYSICS 101 Physics for Scientists and Engineers A OR Equivalent

UC and CSU Transferable

About This Class

- This course is considered an Online course: We will not meet on-campus for any reason, but you must log into the class via Canvas each week and participate in the course activities. Attendance for this course means logging into Canvas and completing assignments, quizzes and discussion on a weekly basis. Completing work and advancing through the course material will likely mean that you will be logging into Canvas and working daily.
- This 16 week, asynchronous, Distance Education (online) course officially starts Tuesday September 3 and ends December 18, 2024.
- 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 Sunday 11:59 pm, September 8.
- Students who do not log in and complete both the Icebreaker Discussion (self-introduction) and Syllabus Quiz, will be dropped from the course by the following Sunday 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?

Browser Compatibility:

It is highly recommended to use the most recent version of Chrome, Firefox, Edge or Safari as your browser to make sure everything works correctly in Canvas.

Student Learning Outcomes

1. Create a Free Body Diagram (FBD), showing all external forces, reactions, constraints and moments.

2. Apply equilibrium conditions and solve statically determinant problems.

3. Implement various techniques to calculate and create Load (Force), Shear and Moment diagrams.

Textbook(s) and Required Materials

Russell C. Hibbeler, Engineering Mechanics: Statics, 14th edition, Pearson, 2015.

ISBN-10: 0133918920

The 15th edition is acceptable. The 13th edition has a different chapter structure, but any Statics textbook will be useful to this course.

Alternative Textbook Source https://www.redshelf.com/

- Please let me know right away if any materials are not accessible in this course and I will ensure access in a timely manner.

Additional Textbook Resources

Bedford and Fowler, Engineering Mechanics: Statics,

Beer and Johnston, Vector Mechanics for Engineers - Statics

Meriam and Kraige, Engineering Mechanics: Statics

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 or GCC 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.

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 available 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, and Unit Check, alternate solution with Boxed Answers. 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 word "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 Graded Items:

Assignments: There will about 40 assignments given worth approximately 1 point each. Typically, each assignment will be one or two statics problems to solve. Most of these will require an explanation written in your own handwriting that demonstrates that you understand the problem. All assignments are open resource and you are encouraged to form study groups to solve them. May also include discussions. (40%)

Quizzes: There will be about 10 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 Sunday February 25th and subsequent quizzes will be due by 11:59 of the first day of the week; usually Mondays except for any holidays which would set the quiz due date back by one day; Tues. (30%)

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 a truss problem using method of sections. (5% maximum, usually one point for each discussion)

Verbal discussions with the instructor do not supersede the course syllabus. Late work is not accepted. Canvas is for feedback and communication. Grades are based on the weighted categories in this syllabus, not necessarily what Canvas calculates.

A note on Collaboration, Computer Tools, Artificial Intelligence, Machine Learning, Finite Element Analysis, Computational Fluid Dynamics, Simulation software and other engineering tools and methods.

Students are encouraged to collaborate on problem solving as this mimics real engineering work in industry. It is an excellent idea to form a student group. Engineers frequently work together and use an array of computer-based tools to solve problems especially those with long or tedious mathematical computations. However, students should be careful of relying too heavily on newer artificial intelligence or machine learning computer tools. There is no substitute for a highly trained human mind to process both the input and output of any AI solution. If you use AI, you are required to write your problem solutions in your own words and demonstrate that you fully understand both the solution and the meaning of the problem. As future professional engineers you, not the computer, will be responsible for the work that you do and for protecting humans and the environment. C. Herwerth

Rubric Here is the problem-solving Rubric to be used for assignments and exams:

Engineering Problem Solving Rubric

Criteria	Ratings			Pts
Problem Set-up Problem is clearly organized with Given, Find, Assumptions, Equations, Solution section with Unit Check or Alternate Solution. Includes all relevant information. A sketch and/or free-body diagram are drawn.	**35 pts** **Full Marks** The problem solution contains all necessary and significant structure and set-up information.	**20 pts** **Partial Marks** The solution contains some but not all necessary structure and information or may be missing a diagram or stated requirement.	**0 pts** **No Marks** The solution does not contain any structure of information for the set up of the problem.	35 pts
Calculation and Answers Problem solution contains step by step calculations that are neat and easily read. The answer is clearly circled or boxed and a unit check or alternate solution calculation is included.	**35 pts** **Full Marks** Full set of calculations are included with clearly marked answers with unit check or alternate solution of other check.	**20 pts** **Partial Marks** The solution is missing the unit check or alternate calculation or other checking method or the solution does not show sufficient calculation steps for understanding.	**0 pts** **No Marks** Little or no calculations are shown and no check of the answer is presented	35 pts
Discussion or description of the problem An explanation of the solution is included such as one or two sentences explaining what the answer means. Alternate solutions may be explained or the importance of the solution is included. Bulleted descriptions of the calculation steps are included in the calculation section in addition to the final discussion.	**30 pts** **Full Marks** There is a written explanation of the solution or other discussion of the importance or relevance of the calculations. One or two sentences is included and the explanation demonstrates understanding of the underlying concepts of the problem.	**15 pts** **Partial Marks** The discussion is limited or trivial. Explanation does not demonstrate a full understanding of the concepts.	**0 pts** **No Marks** No discussion or explanation is included at the end or throughout the problem solution.	30 pts
				Total Points: 100

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. You can see not only your grades, but also comments and feedback as well.

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 generally not accepted.**

Attendance/Participation/Refund Policies

- Students who do not complete the Syllabus Quiz and Check-in Discussion by Sunday September 8, 11:59 pm will be dropped from the course per CA state requirements on Distance Education.
- Participation/Attendance: Attendance for this Online course is defined as logging into the course in Canvas each week and completing assignments, quizzes and discussions.
    - Any student that is added as a 'late add' student has until Sunday September 15, 11:59 pm to complete the Check-In Assignment or be dropped.
    - Students who miss two or more weeks of assignments, quizzes and discussions may be dropped from the course.
    - Students are not required to divulge personal health information to instructors.
    - Do your best to submit all work on time.
- 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.

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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

- There are weekly assignments. Late work is generally not accepted. If allowed, late work is only accepted at a 10% reduction *per day* late rate. For example, if your assignment is two calendar days late (i.e. due Feb 23rd 11:59 pm and student submits Feb 25th 3:15 pm, student can only earn a maximum of 80%.

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. Incorporating accommodations may take up to two days from the time that the instructor is notified by DSPS or up to five days from the initial request.
- 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 in the San Rafael Building, 2nd Floor.

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.

Canvas Course Content and Privacy

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Students are encouraged to download all technical content from Canvas in this course. However, written permission is required to record Instructor Zoom sessions or images. Office Hours Zoom session will not be recorded but Chat sessions may be saved.

Course Schedule (Tentative)

ENGR 152 Engineering Mechanics - Statics
Fall 2024 Tentative Schedule

Date	Subjects	Section	Assignments
Week 1			
3-Sep	Introduction, Definitions, Fundamental Concepts, Units; SI and US Customary, Problem Solving Procedures	1.1 – 1.6	Assign 1 Chapt 1 Problems 1.17, 1.19 Units
			Assign 2 Chapt 1 Problems 1.20, 1.21
Week 2			Assign 3 Chapter 2 Problems 2.4, 2.32
9-Sep	Vector Operations	2.1 – 2.4	Assign 4 Chapter 2 Problems 2-74, 2-98
			Assign 5 Chapt 2 Problem F2-29, 2-106
Week 3			Assign 6 Chapt 3 Problems 3-3, 3-15, 3-21, 3-65, Spring
16-Sep	Cartesian Vectors	2.5 – 2.9	Assign 7 Chapt 4 Problem 4-4
			Assign 8 Chapt 4 Problem 4-16
Week 4			Assign 9 Chapt 4 Problem F4-15
23-Sep	Equilibrium of a Particle, Free Body Diagram	3.1 – 3.4	Assign 10 Chapt 4 Problem F4-19
	3D Force Systems		Assign 11 Chapt 4 Problem 4-60
Week 5			Assign 12 Chapt 4 Problem 4-96
30-Sep	Moment of a Force	4.1 - 4.5	Assign 13 Chapt 4 Problem 4-108
	Moment of a Couple, Distributed Loads	4.6 - 4.9	Assign 14 Chapt 5 Problem 5-10
Week 6			Assign 15 Chapt 5 Problem 5-11
7-Oct	Two and Three Force Members	5.1 – 5.4	Assign 16 Chapt 5 Problem 5-12
	Equations of Equilibrium	5.1 - 5.4	Assign 17 Chapt 5 Problem 5-79
Week 7			Assign 18 Chapt 5 Problem 5-84
14-Oct	Constraints and Statical Determinacy	5.5 - 5.7	Assign 19 Chapt 6 Problem F6-1, 6-6
			Assign 20 Chapt 6 Problems F6-7, F6-8
Week 8			Assign 21 Chapt 6 Problems F6-22, 6-61
21-Oct	Method of Joints	6.1 - 6.4	Assign 22 Chapt 6 Problem R6-4
	Method of Sections	6.1 - 6.4	Assign 23 Chapt 6 Problem 6-81
Week 9			Assign 24 Chapt 7 Problems F7-1, F7-4
28-Oct	Frames and Machines	6.4 - 6.6	Assign 25 Chapt 7 Problem 7-2
	Internal Loadings, Distributed Loads, Cables		Assign 26 Chapt 7 Problems 7-71, 7-75
Week 10			Assign 27 Chapt 8 Problems F8-7, 8-14
4-Nov	Shear and Moment Diagrams	7.1 - 7.3	Assign 28 Chapt 8 Problem 8-66
	Dry Friction, Friction on Wedges		Assign 29 Chapt 8 Problem 8-85
Week 11			Assign 30 Chapt 9 Problem F9-1
12-Nov	Friction on Flat Belts		Assign 31 Chapt 9 Problem 9-6
	Center of Mass/Gravity, Centroid of a Body	8.1 - 8.3	Assign 32 Chapt 9 Problem F9-8
Week 12			Assign 33 Chapt 9 Problem F9-59
18-Nov	Composite Bodies	8.5	Assign 34 Chapt 9 Problem 9-60
	Moments of Inertia		Assign 35 Chapt 9 Problem F9-15
Week 13			Assign 36 Chapt 10 Problem F10-1
25-Nov	Parallel-Axis Theorem	9.1	Assign 37 Chapt 10 Problem F10-7
	Moments of Inertia for Composite Areas	9.2 – 9.3	Assign 38 Chapt 10 Problem 10-29
Week 14			Assign 39 Chapt 10 Problem 10-37
2-Dec	Product of Inertia	10.1 – 10.2	Assign 40 Chapt Problem 10-64
	Radius of Gyration	10.3 – 10.4	Assign 41 Chapt Problems 10-82, 10-83 Mohr's Circle
Week 15			Assign 42 Chapt 9 Problem 9-120 Fluid Statics
9-Dec	Fluid Statics	10.5 - 10.6	
	Mohr's Circle		
Week 16	Finals Week Th Dec 12 to W Dec 18		
11-Dec	Final Exam Due Tues June 11 by 11:59 PM		
			Always consider solving extra problems in engineering
	Holidays Sep 2, Nov 11, Nov 28 - 30 No Class		