Master Course Syllabus

For additional course information, including prerequisites, corequisites, and course fees, please refer to the Catalog: https://catalog.uvu.edu/

Semester: Spring
Year: 2025
Course Prefix: ENGR
Course and Section #: 2010-001
Course Title: Engineering Statics
Credits: 3

Course Description

This course covers the methods of engineering analyses of bodies at rest.

Course Attributes

This course has the following attributes:
☒ General Education Requirements
☐ Global/Intercultural Graduation Requirements
☐ Writing Enriched Graduation Requirements
☐ Discipline Core Requirements in Program
☐ Elective Core Requirements in Program
☐ Open Elective
Other: *Click here to enter text.*

Instructor Information

Instructor Name: Mohamed Shwani, Ph.D.

Student Learning Outcomes

- Explain the difference between scalar and vector quantities.
- Use vectors to represent forces and moments in static equilibrium problems.
- Perform mathematical operations on vector quantities and equations.
- Explain Newton's law for static equilibrium.
- Establish conditions for static equilibrium of rigid bodies.
- Solve structural analysis problems.
- Analyze internal forces in structural members to draw shear and moment diagrams.
- Solve static equilibrium problems that involve friction forces.
- Calculate centroid, center of gravity, and Moment of Inertia of an object.

Course Materials and Texts

- Vector Mechanics for Engineers: Statics, by F. P. Beer, E. R. Johnston, D. F. Mazurek, 12th Edition
- Calculator

Course Requirements

Course Assignments, Assessments, and Grading Policy

1. **Homework:** An important part of learning to solve statics problems is to practice solving statics problems. Doing problems will help you become proficient with the many principles we will learn. The homework is also an opportunity to practice your technical communication skills through the calculations you will perform.
- Problems will be assigned each class. Most, if not all, will use the online interactive McGraw-Hill Connect component available with this textbook and accessed through Canvas.
- If there are any questions that need to submit a file then all work should be completed on engineering computation (graph) paper, one side only, which will be submitted as PDF file on McGraw-Hill Connect for credit. See attached Sample Homework Layout sheet for an example of the expectations for completed hand work to be turned in.
- All solutions should represent your own work and must be complete and clear.
- It is strongly encouraged to find a partner or group to study with for this course.
- Complete all work by the assigned deadline.
  - Late homework will be accepted but penalized 10% per day to a maximum of 50%.
  - The last day to complete/submit all homework is the last day of classes, Tuesday, April 22.

2- **Exams:** It is expected there will be 3 mid-term exams and one final comprehensive exam to help you determine if you have achieved the course learning objectives.

Final grades are rounded to the nearest tenth and assigned the corresponding letter grade:

A = 93-100	B - = 80-82.9	D+ = 67-69.9
A - = 90-92.9	C+ = 77-79.9	D = 63-66.9
B+ = 87-89.9	C = 73-76.9	D - = 60-62.9
B = 83-86.9	C - = 70-72.9	F = 0-59.9

Required or Recommended Reading Assignments

A part of being prepared for class is reading the section/topic material before it is covered in class. Reading quizzes will be given to be completed prior to the day that material will be covered in class. This will typically consist of a short comprehension quizzes that will be completed with the online McGraw-Hill Connect resource. Quizzes cannot be made up or submitted late.

General Description of the Subject Matter of Each Lecture or Discussion

Chapter 1: Introduction
1.1-1.6: Mechanics, Fundamental Concepts and Principles, System of Units, Converting Between Two Systems of Units, Methods of Solving Problems and Numerical Accuracy.

Chapter 2: Statics of Particles:

2.1-2.5: Addition of Planar Forces, Adding Vectors/Forces by Components, Forces and Equilibrium in a Plane and Adding Forces and Equilibrium in Space.

Chapter 3: Rigid Bodies: Equivalent Systems of Forces:
3.1-3.4: Forces and Moments, Moment of A Force about an Axis, Couples and Force-Couple Systems and Simplifying Systems of Forces.

Chapter 4: Equilibrium of Rigid Bodies:
4.1-4.3: Equilibrium in Two Dimensions, Two Special Cases and Equilibrium in Three Dimensions.

Chapter 5: Distributed Forces: Centroids and Centers of Gravity:
5.1-5.4: Planar Centers of Gravity and Centroids, Further Considerations, Additional Applications of Centroids and Centers of Gravity and Centroids of Volumes.

Chapter 6: Analysis of Structures:
6.1-6.4: Analysis of Trusses, Other Truss Analyses and Frames & Machines.

Chapter 7: Internal Forces and Moments:
7.1-7.3: Internal Forces in Members, Beams and Relations Among Load, Shear, and Bending Moment.

Chapter 8: Friction:
8.1: The Laws of Dry Friction

Chapter 9: Distributed Forces: Moments of Inertia:
9.1-9.2: Moments of Inertia of Areas & Parallel-Axis Theorem and Composite Areas.

Required Course Syllabus Statements

Generative AI
AI programs are not a replacement for your human creativity, originality, and critical thinking. Writing, thinking, and researching are crafts that you must develop over time to develop your own individual voice. At the same time, you should learn how to use AI and in what instances AI can be helpful to you. The use of generative AI tools (e.g. ChatGPT, Google Bard, etc.) is permitted in this course for the following activities:

- Brainstorming and refining your ideas.
- Fine tuning your research questions.
- Finding information on your topic.
- Drafting an outline to organize your thoughts.

Using Remote Testing Software
☐ This course does not use remote testing software.

☒ This course uses remote testing software. Remote test-takers may choose their remote testing locations. Please note, however, that the testing software used for this may conduct a brief scan of remote test-takers' immediate surroundings, may require use of a webcam while taking an exam, may require the microphone be on while taking an exam, or may require other practices to confirm academic honesty. Test-takers therefore shall have no expectation of privacy in their test-taking location during, or immediately preceding, remote testing. If a student strongly objects to using test-taking software, the

student should contact the instructor at the beginning of the semester to determine whether alternative testing arrangements are feasible. Alternatives are not guaranteed.

Required University Syllabus Statements

Accommodations/Students with Disabilities
Students needing accommodations due to a permanent or temporary disability, pregnancy or pregnancy-related conditions may contact UVU Accessibility Services at accessibilityservices@uvu.edu or 801-863-8747.

Accessibility Services is located on the Orem Campus in BA 110.

Deaf/Hard of Hearing students requesting ASL interpreters or transcribers can contact Accessibility Services to set up accommodations. Deaf/Hard of Hearing services can be contacted at DHHservices@uvu.edu

DHH is located on the Orem Campus in BA 112.

Academic Integrity
At Utah Valley University, faculty and students operate in an atmosphere of mutual trust. Maintaining an atmosphere of academic integrity allows for free exchange of ideas and enables all members of the community to achieve their highest potential. Our goal is to foster an intellectual atmosphere that produces scholars of integrity and imaginative thought. In all academic work, the ideas and contributions of others must be appropriately acknowledged and UVU students are expected to produce their own original academic work.

Faculty and students share the responsibility of ensuring the honesty and fairness of the intellectual environment at UVU. Students have a responsibility to promote academic integrity at the university by not participating in or facilitating others' participation in any act of academic dishonesty. As members of the academic community, students must become familiar with their rights and responsibilities. In each course, they are responsible for knowing the requirements and restrictions regarding research and writing, assessments, collaborative work, the use of study aids, the appropriateness of assistance, and other issues. Likewise, instructors are responsible to clearly state expectations and model best practices.

Further information on what constitutes academic dishonesty is detailed in UVU Policy 541: *Student Code of Conduct*.

Equity and Title IX
Utah Valley University does not discriminate on the basis of race, color, religion, national origin, sex, sexual orientation, gender identity, gender expression, age (40 and over), disability, veteran status, pregnancy, childbirth, or pregnancy-related conditions, citizenship, genetic information, or other basis protected by applicable law, including Title IX and 34 C.F.R. Part 106, in employment, treatment, admission, access to educational programs and activities, or other University benefits or services. Inquiries about nondiscrimination at UVU may be directed to the U.S. Department of Education's Office for Civil Rights or UVU's Title IX Coordinator at 801-863-7999 – TitleIX@uvu.edu – 800 W University Pkwy, Orem, 84058, Suite BA 203.

Religious Accommodation

UVU values and acknowledges the array of worldviews, faiths, and religions represented in our student body, and as such provides supportive accommodations for students. Religious belief or conscience broadly includes religious, non-religious, theistic, or non-theistic moral or ethical beliefs as well as participation in religious holidays, observances, or activities. Accommodations may include scheduling or due-date modifications or make-up assignments for missed class work.
To seek a religious accommodation, a student must provide written notice to the instructor and the Director of Accessibility Services at accessibilityservices@uvu.edu. If the accommodation relates to a scheduling conflict, the notice should include the date, time, and brief description of the difficulty posed by the conflict. Such requests should be made as soon as the student is aware of the prospective scheduling conflict.

While religious expression is welcome throughout campus, UVU also has a specially dedicated space for meditation, prayer, reflection, or other forms of religious expression.