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 #: 2030 X02
Course Title: Engineering Dynamics
Credits: 3

Course Description

Teaches principles of engineering mechanics as applied to bodies in motion. Studies kinematics and kinetics of particles and rigid bodies. Develops the concepts of force and acceleration, work, energy, impulse, momentum, impact, and vibration. Utilizes theory and methodology developed in the solution of practical engineering problems.

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: Dr. Matt Jensen

Student Learning Outcomes

1. Utilize Newton's Laws of motion
2. Formulate equations of motion of particles and rigid bodies
3. Calculate work and energy of a system of particles and/or rigid bodies
4. Solve particle dynamics problems using force analysis or work and energy analysis
5. Solve rigid body dynamic problems using force analysis or work and energy analysis
6. Predict the motion of a spring-mass-damping system based on the system parameters
7. Solve dynamic problems using rectangular, cylindrical, and polar coordinate systems

Course Materials and Texts

Beer, Johnston, Cornwell, *Self, Vector Mechanics for Engineers: Dynamics*, 12th Edition, McGraw Hill, 2019

Course Requirements

Course Assignments, Assessments, and Grading Policy
Assignments:
Connect Online Homework Tool:
We will be using the McGraw Hill Connect online homework tool in this course, which you automatically received access to once you registered for this course. You can access Connect directly through Canvas by using the McGraw Hill Connect tab on the left side menu of the Canvas course page. Additional resources for Connect can be found hereLinks to an external site..
Assessments:
Quizzes, Mid-Term Exams & Final Examination:
Each module will have one end-of-module exam and one or more quizzes assigned. The quizzes will be proctored via Proctorio in Canvas and graded by the instructor to allow for partial credit to be given. You will be required to work through the quiz problem on your own paper (or simply print off the quiz and work on that paper). Once you have completed the quiz, you will need to scan your quiz and submit a pdf file to Canvas. Every student will be required to have access to a computer with internet and webcam in order to complete the quizzes and exams. Each student will also need to install the Proctorio web browser extension for the Google Chrome web browser, which can be found at getproctorio.com Links to an external site.. The quizzes should be considered a formative assessment, meaning you should view them as a gauge of your current understanding for that particular topic. All quizzes will be closed book, but you will be allowed one (1) 8.5" x 11" one-sided page of notes for consultation, which will be scanned and turned in with your work for the quiz.
For each end-of-module exam and the final exam, you will be allowed to use your book and notes; however, excessive use of the book may cause you to become strained for time on the exam. It is **strongly recommended you create a note sheet** summarizing the module and allowing for you to be better prepared for the exam.
The Comprehensive Final will be available during the weekend of Finals and may be completed anytime during those two days.

All questions and problems regarding grades must be presented in writing (email counts) within one week (i.e., 7 calendar days) after the quiz or assignment has been returned. It is the student's responsibility to seek timely discussions with the instructor for re-evaluation of the assigned grade. After that time period, special circumstances must exist for consideration. Grades will be assigned based on all the work you have completed during the semester. No pluses or minuses are used for letter grades. No rounding of final course percentage will be done.

Grade	Percent
A	90.000-100.
B	80.000-89.999
C	70.000-79.999

D	60.000-69.999
E	0-59.999

Assignment Categories

Activity	**Percent**
Homework (Connect)	20%
Quizzes (all quizzes equally weighted)	30%
Exams (all exams equally weighted)	30%
Comprehensive Final Exam	20%
Total	100%

Late Work Statement:

Each module will have suggested deadlines that will keep you on track to complete the semester on time. There are only two hard deadlines for the entire semester. Because Modules 5-7 rely heavily on content covered int he first four modules, all work related to **Modules 1-4** (homework, quizzes, exams) must be completed prior to **March 16th 2025**. The other hard deadline is all work related to Modules 5-7 must be completed prior to taking the comprehensive exam, so all homework, quizzes and exams for **Modules 5-7** must be completed no later than **Wednesday April 23rd**. Assignments submitted after the suggested deadline may be marked "late" in the gradebook, but there is no penalty for completing assignments after the suggested deadline. The Comprehensive Final will be available the first two days of finals, **Thursday April 23rd and Friday April 24th** and may be completed anytime during those two days.

Required or Recommended Reading Assignments

All required readings use chapters from the course text that align with the modules below.

General Description of the Subject Matter of Each Lecture or Discussion

Module 1 - Chapter 11: Kinematics of Particles
- 11.1 Rectilinear Motion
- 11.2 & 3 Special Cases
- ` 11.4 & 5 Curvilinear Motion

Module 2 - Chapter 12: Kinetics of Particles
- 12.1 Newton's Second Law
- 12.2 Angular Momentum

Module 3 - Chapter 13: Kinetics of Particles
- 13.1 Energy and Momentum Methods
- 13.2 Conservation of Energy
- 13.3 Impulse and Momentum
- 13.4 Impacts

Module 4 – Chapter 14: Systems of Particles
- 14.1 Systems of Particles

Module 5 – Chapter 15: Kinematics of Rigid Bodies
- 15.1 Kinematics of Rigid Bodies
- 15.2 General Plane Motion: Velocity
- 15.3 Instantaneous Center of Rotation
- 15.4 General Plane Motion: Acceleration
- 15.5 Analyzing Motion with Respect to a Rotating Frame

Module 6 – Chapter 16: Plane Motion of Rigid Bodies
- 16.1 Plane Motion of Rigid Bodies: Forces and Accelerations
- 16.2 Constrained Plane Motion

Module 7 – Chapter 17: Plane Motion of Rigid Bodies
- 17.1 Plane Motion of Rigid Bodies: Energy and Momentum Methods
- 17.2 Momentum Methods for a Rigid Body
- 17.3 Eccentric Impact

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;
- Finding information on your topic;
- Drafting an outline to organize your thoughts; and
- Checking grammar and style.

The use of generative AI tools is not permitted in this course for the following activities:

- Solving any assigned problems such as HW, Quizzes and Exams

You are responsible for the information you submit based on an AI query (for instance, that it does not violate intellectual property laws, or contain misinformation or unethical content). Your use of AI tools must be properly documented and cited in order to stay within university policies on academic honesty. Also know you are responsible for any incorrect information included within AI generated text.

Any student work submitted using AI tools should clearly indicate what work is the student's work and what part is generated by the AI. In such cases, no more than 50% of the submitted work should be generated by AI. If any part of this is confusing or uncertain, please reach out to me for a conversation before submitting your work.

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.