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 #: 2030-001
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. Sean S. Tolman

Student Learning Outcomes

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

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.

This course utilizes Inclusive Access to provide you with reduced cost access to the textbook and Connect homework software package from day 1 of the semester. The cost of the textbook and Connect access was included in your tuition, so you do not have any additional costs for course materials.

Course Requirements

Course Assignments, Assessments, and Grading Policy
Assignments:
Reading:
There will be a reading assignment to complete before attending each class. Additionally, there will be a study activity using the SmartBook in Connect. This will help you evaluate and improve your own understanding of the material. If you have questions about what your read, make sure to ask in class or in a Discussion board in Canvas.
Connect Online Homework Tool:
We will be using the McGraw Hill Connect online homework tool in this course, which you automatically received access to Connect 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 & Final Examination:
Each module will have one end-of-chapter quiz. 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. 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 and you will be provided with an equation sheet. You will also 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.
The Comprehensive Final will be offered in-person during our scheduled final exam time. The exam will be closed book but you will be provided with an equation sheet. (See University Final Exam Schedule for details)

The following grading standards will be used in this class:

Grading Scale

Grade	Percent
A	94-100
A-	90-93

B+	87-89
B	83-86
B-	80-82
C+	77-79
C	73-76
C-	70-72
D+	67-69
D	63-66
D-	60-62
E	0-59

Assignment Categories

Activity	**Percent**
Homework	55%
Quizzes	30%
Comprehensive Final Exam	10%
Professionalism	5%
Total	100%

Late Work Statement:

- Submit all work by the assigned deadline.
    - Late work will be accepted but penalized 10% per day.
    - The last day to submit all homework is the last day of classes.

- Makeup quizzes will be offered if prior arrangements are made with the instructor or in the case of an emergency. In the case of an emergency, it is expected that the student will contact the instructor as soon as possible to explain the situation.

Required or Recommended Reading Assignments
All required readings use chapters from the course text that align with the lectures below.

General Description of the Subject Matter of Each Lecture or Discussion
11.1: Rectilinear Motion of Particles
11.2: Special Cases
11.3: Graphical Solutions
11.4: Curvilinear Motion of Particles
12.1: Newton's 2nd Law and Linear Momentum
12.2: Angular Momentum and Orbital Motion
13.1: Work and Energy
13.2: Conservation of Energy
13.3: Impulse and Momentum
13.4: Impacts
14.1: 2nd Law & Systems of Particles
14.2: Energy/Momentum & Systems of Particles
15.1: Translation & Fixed-Axis Rotation
15.2: General Plane Motion-Velocity
15.3: Instantaneous Center
15.4: General Plane Motion-Acceleration
15.5: Rotating Frame
16.1: Kinetics of a Rigid Body
16.2: Constrained Plane Motion
17.1: Energy Methods for a Rigid Body
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 problem solving are crafts that you must learn 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. For this course, AI tools may be helpful to check your work and in explaining a problem solution process once you have an answer. However, you should not rely on AI tools to solve problems for you.

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.