North Carolina State University
Department of Mechanical and Aerospace Engineering

MAE208: Engineering Dynamics

Dr. Henry Oliver T. Ware
Spring 2026 (Section 001 and 002**)**

Classrooms: 02124 Eng. Building 3 (Sec. 001) 02207 Eng. Building 3 (Sec. 002)	**Office:** 03411 Eng. Building 3
Class Time: Mon./Wed. 1:30-2:45 pm (Sec. 001) Mon./Wed. 3:00-4:15 pm (Sec. 002)	**Physical Office Hours:** Tues./Thurs. 1:30 – 3:00pm **Distance Office Hours:** Thurs. 3:00pm – 4:00pm **Zoom Room:** 934 617 1273 (Otherwise, Available by Appointment)

Website: wolfware.ncsu.edu
Email: howare@ncsu.edu (Please include MAE208 in the subject line)

Course Description: Kinematics and kinetics of particles in rectangular, cylindrical, and curvilinear coordinate systems; energy and momentum methods for particles; kinetics of systems of particles; kinematics and kinetics of rigid bodies in two and three dimensions; motion relative to rotating coordinate systems.

Course Objective: To provide students with a fundamental understanding of the theory and applications of engineering dynamics.

Prerequisites: MA 242 and C- or better in MAE 206 or CE 214.

Required Texts:

R.C. Hibbeler, ***Engineering Mechanics Dynamics***, **any recent edition (14th or 15th Edition)**, Pearson-Prentice-Hall

Resources:

Lecture Recordings for this class can be found at the following URLs:

- Section 001: HERE
- Section 002: HERE

Course Website: wolfware.ncsu.edu

Grading:

Midterm Exams (2)	42.5%
Homework	25%
Final Exam	30%
Participation	2.5%

Midterm Exams: 2 midterm exams throughout the course. Multiple choice, short answer, and numerical problem solving. The exams will be graded with a rubric for potential partial credit. Feedback will be provided within about two weeks.

Homework--RealizeIt Learning Activities and Capstones: One (1) Learning Activity with concept quiz and One (1) Capstone Module with multiple problems per Module (6 total including orientation). Each part

is equally weighted. Multiple attempts permitted - see Module 0 orientation to Adaptive Learning for detailed information about the automatic grading scheme.

Final Exam: Final exam administered during the final exam period. Multiple choice, short answer, and numerical problem solving. The exam will be graded with a rubric for potential partial credit.

Grading Scale (Required Percentages):

A+	A	A-	B+	B	B-	C+	C	C-	D+	D	D-
97.50	91.50	89.50	87.50	81.50	79.50	77.50	71.50	69.50	67.50	61.50	59.50

***Tentative* Schedule:**

Week	Date	Topic	Reading	Due Dates
1	Mon. 1/12	**Class Introduction**		
		Module 1: Particle Kinematics / Kinetics	12.1-12.3	
	Wed. 1/14	Straight Line Path Motion	12.1-12.3	1/18: Moodle & RealizeIt M0
2	Mon. 1/19	**Martin Luther King, Jr. Day (No Classes)**		
	Wed. 1/21	Curved Path Motion	12.4-12.8	
3	Mon. 1/26	Relative and Dependent Motion	12.9-12.10	
	Wed. 1/28	**Particle Kinetics: Newton's Laws of Motion**		
		Equations of Motion (EOM): Straight Line	13.1-13.4	
4	Mon. 2/02	EOM: Curved Path – Normal and Tangential	13.5	
	Wed. 2/04	EOM: Curved Path--Cylindrical	13.5	
5	Mon. 2/09	Exam Review		2/09: RealizeIt M1
	Wed. 2/11	***Midterm 1***	14.1-14.3	
6	Mon. 2/16	**Module 2: Particle Energy / Momentum** Work and Energy		
	Wed. 2/18	Power and Efficiency		
7	Mon. 2/23	Conservation of Energy	14.4-14.6	
	Wed. 2/25	**Particle Kinetics: Impulse and Momentum**		
8	Mon. 3/02	Linear Impulse and Momentum	15.1-15.3	
	Wed. 3/04	Impact	15.4	
9	Mon. 3/09	Angular Impulse and Momentum	15.5-15.7	
	Wed. 3/11	**Module 3: 2D Rigid Body Kinematics** Translation, rotation, & velocity	16.1-16.3	3/13: RealizeIt M2
10	Mon. 3/16	**Spring Break (No Class)**		
	Wed. 3/18			
11	Mon. 3/23	Acceleration	16.4	
	Wed. 3/25	Relative Motion: Velocity and Acceleration	16.5-16.8	
12	Mon. 3/30	Exam 2 Review		3/30: RealizeIt M3
	Wed. 4/01	***Midterm 2***		
13	Mon. 4/06	**Module 4: 2D Rigid Body Kinetics** Moment of Inertia	17.1	
	Wed. 4/08	EOM	17.2-17.3	
		Translation, Rotation, and General Planar Motion	17.4-17.5	

14	Mon. 4/13	Roll / Slip and Slip / Tip	17.4-17.5	
	Wed. 4/15	2D Work and Energy	Ch. 18	
15	Mon. 4/20	2D Impulse and Momentum	Ch. 19	
	Wed. 4/22	**3D Rigid Body Kinematics:** Multiple Rotations	20.1-20.4	
16	Mon. 4/27	Final Exam Review		4/27: RealizeIt M4
	Wed. 5/06	**Final Exam (12:00 - 2:30 pm, Section 001)** **Final Exam (3:30 - 6:00 pm, Section 002)**		

Note: I recommend completing the Learning Activity lesson that corresponds to lecture immediately after watching the video - they will not take long. Each capstone "node" has problems of a certain type, often corresponding to a lecture topic. Don't try to do all the capstones in one sitting. You may want to work problems / a node more than once to improve your mastery.

Syllabus Modification Statement

The schedule is the anticipated plan for the semester. Please note the due dates and Midterm dates now, especially anyone with Accommodations for extra time! We will stick as close to this schedule and plan as possible. Dates, topics, and assignments are subject to change to meet educational requirements or accommodate unexpected events during the semester. Any changes will be clearly communicated in synchronous lecture, by Moodle announcements, and/or an updated syllabus. Be sure you are subscribed to and receiving Moodle announcements as this will be an important mode of communication.

RealizeIt adaptive learning

Online adaptive learning lessons are posted in Moodle, and will include learning objectives, summary notes, and some interactive activities to help you master the content. Each lesson will have concept quizzes to help you evaluate if you understand the material concepts. Each RealizeIt Module will also have Capstone Questions, which are like a problem set. All RealizeIt content is due according to a single Module deadline, but *you are encouraged* to follow the weekly schedule recommended below to keep on pace. Late completion will not be accepted. After the module deadline, you can revisit modules to review materials or retry problems to study and prepare for exams. You will be asked for a license: Purchase here

Academic conduct and collaboration:

- Academic dishonesty rules, as outlined in the NCSU Code of Student Conduct, will be strictly enforced. **Any suspected act of academic misconduct will be immediately referred to the NCSU Office of Student Conduct.** http://policies.ncsu.edu/policy/pol-11-35-01
- Note: copying figures, equations, or text from other sources without properly referencing these sources is **plagiarism: a violation of the NCSU Code of Student Conduct that will be referred to the NCSU Office of Student Conduct.**

Students are encouraged to work cooperatively on the homework. This means that it is OK to ask a fellow classmate for clarification on a problem or direction on its solution after a good-faith effort. Ultimately each student is individually responsible for the solution of every homework problem turned in. Students who regularly rely on classmates to help them start the solution process are more likely to struggle on exams. Straight copying work of other students and submitting it as your own will be considered a violation of the NCSU Code of Student Conduct.

Missed Test Policy:
If circumstances do not allow you to take a test on the scheduled date, you must notify me with enough advanced notice to make arrangements to take the test **before** the scheduled test date, at my discretion. In the event of a day-of-test emergency that prevents you from taking a test, you must contact me as soon as possible. Make-up tests will only be permitted under exceptional circumstances. Make-ups, when permitted, will only be allowed once per semester. A second missed test will result in a zero.

Disability:
Reasonable accommodations will be made for students with verifiable disabilities. In order to take advantage of available accommodations, students must register with Disability Services for Students at 1900 Student Health Center, Campus Box 7509, 919-515-7653. For more information on NC State's policy on working with students with disabilities, please see the **Academic Accommodations for Students with Disabilities Regulation (REG02.20.01)** Any student with a disability who is registered with the NCSU Disability Services Office (DSO) should schedule an appointment with Dr. Saul at the beginning of the semester to discuss academic accommodations.

Supporting Fellow Students in Distress:
As members of the NC State Wolfpack community, we each share a personal responsibility to express concern for one another and to ensure that this classroom and the campus as a whole remains a safe environment for learning. Occasionally, you may come across a fellow classmate whose personal behavior concerns or worries you. When this is the case, I would encourage you to report this behavior to the NC State Students of Concern website: http://studentsofconcern.ncsu.edu/. Although you can report anonymously, it is preferred that you share your contact information so they can follow-up with you personally.

Evaluations:
Online class evaluations will be available for students to complete during the last two weeks of the fall term. Students will receive an email message directing them to a website where they can login using their Unity ID and complete evaluations.

- Evaluation website: https://classeval.ncsu.edu/
- Student help desk: classeval@ncsu.edu
- More information about ClassEval: http://www.ncsu.edu/UPA/classeval/

Health and Well-Being Resources:

These are difficult times, and academic and personal stress are natural results. Everyone is encouraged to take care of themselves and their peers. If you need additional support, there are many resources on campus to help you:

- Counseling Center (NCSU Counseling Center)
- Student Health Services (Health Services | Student)
- If the personal behavior of a classmate concerns or worries you, either for the classmate's well-being or yours, we encourage you to report this behavior to the NC State CARES team: (Share a Concern).
- If you or someone you know are experiencing food, housing or financial insecurity, please see the Pack Essentials Program (Pack Essentials).

Community Standards:

- **Course Attendance**: NC State attendance policies can be found at: REG 02.20.03 – Attendance Regulations – Policies, Regulations & Rules. Please refer to the course's attendance, absence, and deadline policies for additional details. If you are quarantined or otherwise need to miss class because you have been advised that you may have been exposed to COVID-19, you should not be penalized regarding attendance or class participation. However, you will be expected to develop a plan to keep up with your coursework during any such absences. If you become ill with COVID-19, you should follow the steps outlined in the health and participation section above. COVID 19-related absences will be considered excused; documentation need only involve communication with your instructor.
- **Technology Requirements:** This course may require particular technologies to complete coursework. Be sure to review the syllabus for these expectations, and see the syllabus technical requirements for your course. If you need access to additional technological support, please contact the Libraries' Technology Lending Service: (Technology Lending).

Need Help?

If you find yourself in a place where you need help, academically or otherwise, please review these Step-by-Step Help Topics.

Other Important Resources:

- **Keep Learning:** Keep Learning
- **Protect the Pack FAQs:** Frequently Asked Questions | Protect the Pack
- **NC State Protect the Pack Resources for Students:** Resources for Students | Protect the Pack
- **Academic Success Center** (tutoring, drop in advising, career and wellness advising): Academic Success Center.
- **NC State Keep Learning, tips for students opting to take courses remotely:** Keep Learning Tips for Remote Learning
- **Introduction to Zoom for students:** https://youtu.be/5LbPzzPbYEw
- **Learning with Moodle, a student's guide to using Moodle:** https://moodle-projects.wolfware.ncsu.edu/course/view.php?id=226
- **NC State Libraries** Technology Lending Program