NC STATE UNIVERSITY

MAE208 Course Syllabus

Engineering Dynamics

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INSTRUCTOR INFORMATION

Name	Office Phone	Email	Office Location
Katherine Saul, PhD	919-515-1273	ksaul@ncsu.edu	EB3 3162
Luke Joyce	336-529-0900	rljoyce@ncsu.edu	EB3 3201

Virtual Office Hours

Virtual office hours with Luke will be held on Mondays and Thursdays from 11:00 AM to 12:00 PM, on Wednesdays from 4:30 PM to 6:00 PM, and by scheduled appointment. See the Zoom link in Moodle. If students are unavailable during these times, office hours can be moved or additional blocks made open each week.

Preferred Method of Communication

My preferred mode of communication is 1) general questions in the Student Help Forum on Moodle or 2) individual questions by email (rljoyce@ncsu.edu). If you use email, please put MAE 208 and your section number in the subject heading.

Response Time

I will typically respond to emails within 24 hours during the week. For Sunday due dates, please email prior to 5pm Friday for guaranteed response. If you contact me by phone, please leave a voicemail.

Announcements

I will post weekly announcements in the announcement area of our Moodle classroom. Each announcement will summarize what you should read, watch, and complete; it also will include any assignments due. All announcements will be sent to your NCSU email account.

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COURSE INFORMATION

Course Website: https://wolfware.ncsu.edu/courses/my-wolfware/
Course Credit Hours: 3

Meeting Time and Tool Used

Asynchronous only
Lectures are recorded and posted for review on Moodle.

Prerequisites/Corequisites

Passed the C-wall associated with MAE 206, MA 242

General Education Program (GEP) Information

none

GEP Category Fulfilled

none

GEP Corequisites

none

COURSE OVERVIEW

Catalog Description

An introduction to 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.

Structure

- This course delivers learning materials, activities, and assignments, through **Moodle**, a secure and easy-to-use online learning platform.
- The course has **asynchronous** learning content and assessments. Asynchronous lectures should be watched within 24 hours.
- The course is organized into 5 Modules, or topic areas, that each has supportive material and practice activities to develop your skills. All deadlines and expectations are outlined in more detail below.

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LEARNING OUTCOMES

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

1. Analyze accelerated particle motion along with a variety of paths using multiple coordinate systems
2. Develop the principle of work and energy and apply it for problems involving force and displacement
3. Develop the principles of linear and angular momentum and impulse and apply them to solve problems involving force and time.
4. Implement conservation of linear momentum and analyze the mechanics of impact
5. Analyze the motion associated with 2D rigid-body translation and rotation
6. Analyze the motion associated with 3D rigid-body translation and rotation
7. Design and analyze a system using principles from dynamics

COURSE MATERIALS

Required Textbook and/or Software

Moodle: http://wolfware.ncsu.edu
Realizeit software license: **Purchase at Shopify**

Other Materials

Hibbeler, R.C., Engineering Mechanics: Dynamics. Prentice Hall (any recent edition). Readings from the textbook align with the lecture material and example problems, and the textbook is a resource for additional practice problems and explanations beyond that provided in class and in RealizeIt.

Course handouts

There will be a course handout associated with each lecture. The course handout will be available in Wolfware/Moodle. It is each student's responsibility to download/print out the handout before coming to lecture. Handouts will include important class information and will have drawings and problem statements associated with example problems to be worked in lecture– you will be at a disadvantage in lecture without the handout.

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**

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Exams

There will be two (2) midterm tests and a final exam. These tests will be timed, using the resources designated in class, including equation sheets provided by the instructor. You should document your process. This should include:

- Sketching the system and the givens.
- Remember BREAD (body, reactions, external forces, axes, dimensions) when drawing free body diagrams.
- State what you are solving for.
- State your assumptions.
- Solve completely and box your answer.
- Document your units

The final exam is cumulative and will occur during the final exam period.

GRADING

Grading Policy

- 30%: **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.
- 40%: **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.
- 30%: **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

This course uses this grading scale with no rounding:

A+	A	A-	B+	B	B-	C+	C	C-	D+	D	D-
>97	93	90	87	83	80	77	73	70	67	63	60

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COURSE SCHEDULE

Week	Date	Topic	Reading	SUNDAY Due Dates
1	M, 6/23	1 Introduction		
	T, 6/24	**Module 1: Particle Kinematics/Kinetics:** 2 Straight line	12.1-12.3	6/24: Moodle and RealizeIt M0
	W, 6/25	3 Curved path	12.4-12.8	
	Th, 6/26	4 Relative and dependent motion	12.9-12.10	
	F, 6/27	5 EOM: straight line	13.1-13.4	
2	M, 6/30	6 EOM: curved path, normal&tangential	13.5	
	T, 7/1	7 EOM: curved path, cylindrical	13.5	
	W, 7/2	8 Exam review		7/2: RealizeIt M1
	Th, 7/3	**Midterm 1**		
	F, 7/4	**JULY 4th - HOLIDAY**		
3	M, 7/7	**Module 2: Particle Energy/Momentum:** 9 Work and energy		
	T, 7/8	10 Power, efficiency, energy conservation	14.4-14.6	
	W, 7/9	11 Linear impulse and momentum	15.1-15.3	
	Th, 7/10	12 Impact	15.4	
	F, 7/11	13 Angular impulse and momentum	15.5-15.7	
4	M, 7/14	**Module 3: 2D Rigid Body Kinematics:** 15 translation, rotation, velocity	16.1-16.3	7/14: RealizeIt M2
	T, 7/15	16 acceleration	16.4	
	W, 7/16	17 relative motion between points	16.5-16.8	
	Th, 7/17	Exam review		7/17: RealizeIt M3
	F, 7/18	**Midterm 2**		
5	M, 7/21	**Module 4: 2D rigid body kinetics** 18 Moment of inertia	17.1	
	T, 7/22	19 EOM	17.2-17.3	
	W, 7/23	20 Roll/slip and slip/tip	17.4-17.5	
	Th, 7/24	21 2D work energy, impulse momentum		
	F, 7/25	Final review		7/25: RealizeIt M4
6	M, 7/28	**Final Exam**		

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.

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SYLLABUS MODIFICATION STATEMENT

The schedule is the anticipated plan for the semester. **Please note the due dates now!** 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.

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TECHNOLOGY REQUIREMENTS

Hardware

NC State's Online and Distance Education provides technology requirements and recommendations for computer hardware.

Software

- Moodle and Wolfware
  - Moodle Accessibility Statement
  - Moodle Privacy Policy
  - NC State Privacy Policy
- Adobe Reader (for reading PDF files)
  - Accessibility Statement
  - Adobe Privacy Policy
- Zoom:
  - Zoom Accessibility Statement
  - Zoom Privacy Policy
- Panopto
  - Accessibility Features
  - Privacy Policy
- G Suite
  - Accessibility Statement
  - Privacy Policy
- Office 365
  - Accessibility Statement
  - Privacy Policy
- RealizeIt
  - Accessibility Statement
  - Privacy Policy
- Headsets with microphone

Minimum Computer and Digital Literacy Skills

- Obtain regular access to a reliable internet connection
- Proficient typing and word processing skills (MS Word, text editors, Google Docs)
- Ability to use online communication tools, such as email (create, send, receive, reply, print, send/receive attachments), discussion boards (read, search, post, reply, follow threads), chats, and messengers.
- Download and upload attachments
- Knowledge of copy/paste and use of spell check
- Use computer networks to locate and store files or data
- Understanding of Excel or Matlab for mathematical analysis and plotting
- Internet skills and ability to perform online research using various search engines and library databases. Visit Distance Learning Services at NC State Libraries for more information.

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NETIQUETTE

Netiquette is the term used to describe guidelines for respectful online communication. Students should be aware that their behavior impacts other people, even online. I hope that we will all strive to develop a positive and supportive environment and will all be courteous to peers and instructors.

- Follow the same standards of behavior that you subscribe to offline. Be respectful to your peers and the instructor. Keep in mind that all online communication is documented and therefore permanent.
- Consider your surroundings for synchronous Zoom sessions. Please participate as much as possible as though you were in person. Lectures will be recorded.
- Use proper grammar and professional language in discussion forums or email messages to instructors or classmates.
- Ensure you are responding to forums or Flipgrid by the due date to leave time for peers to comment on your response. Feel free to offer help to your peers in the Student Help Forum as well.

COURSE POLICIES

Attendance and Late Assignments

For attendance and excused absence policies, see NC State's Attendance Policy: https://policies.ncsu.edu/regulation/reg-02-20-03-attendance-regulations/ and the Withdrawal Process: https://studentservices.ncsu.edu/your-classes/withdrawal/process/ Excuses for unanticipated absences must be reported to the instructor no more than one week after the return to class.

Late homework will only be accepted with a valid excused absence. Makeup exams will be permitted only with a valid excused absence. See the above referenced policy. Advanced notice of an absence is preferred when possible to facilitate scheduling of a makeup exam.

Incomplete Grades

If an extended deadline is not authorized by the instructor or department, an unfinished incomplete grade will automatically change to an F after either (a) the end of the next regular semester in which the student is enrolled (not including summer sessions), or (b) the end of 12 months if the student is not enrolled, whichever is shorter. Incompletes that change to F will count as an attempted course on transcripts. The burden of fulfilling an incomplete grade is the responsibility of the student. The university policy on incomplete grades is located at http://policies.ncsu.edu/regulation/reg-02-50-3.

UNIVERSITY POLICIES

Academic Integrity and Honesty

Students are required to comply with the university policy on academic integrity found in the Code of Student Conduct. Therefore, students are required to uphold the university pledge of honor and exercise honesty in completing any assignment.

Please refer to the Academic Integrity web page for a detailed explanation of the University's policies on academic integrity and some of the common understandings related to those policies.

Privacy and Policies, Regulations, and Rules

Students may be required to disclose personally identifiable information to other students in the course, via electronic tools like email or web-postings, where relevant to the course. Examples include online discussions of class topics and posting of student coursework. All students are expected to respect the privacy of each other by not sharing or using such information outside the course. Students are responsible for reviewing the NC State University PRR's which pertains to their course rights and responsibilities:

- Equal Opportunity and Non-Discrimination Policy Statement and additional references
- Code of Student Conduct
- Grades and Grade Point Average
- Credit-Only Courses
- Audits

Students with Disabilities

Reasonable accommodations will be made for students with verifiable disabilities. In order to take advantage of available accommodations, students must register with the Disability Resource Office at Holmes Hall, Suite 304,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)

Trans-Inclusive Statement

In an effort to affirm and respect the identities of transgender students in the classroom and beyond, please contact me if you wish to be referred to using a name and/or pronouns other than what is listed in the student directory.

Basic Needs Security

Any student who faces challenges securing their food or housing or has other severe adverse experiences and believes this may affect their performance in the course is encouraged to notify the professor if you are comfortable in doing so. Alternatively, you can contact the Division of Academic and Student Affairs to learn more about the Pack Essentials program https://dasa.ncsu.edu/pack-essentials/

Wellness

As a student you may experience a range of personal issues that can impede learning, such as strained relationships, increased anxiety, alcohol/drug concerns, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance and may impact your ability to participate in daily activities. It is very important that you have a support system and that you ask for help when you are struggling. The Counseling Center at NC State offers confidential mental health services for full time NC State students, including same-day emergency services. Please visit https://counseling.dasa.ncsu.edu/ to get connected. See https://wellness.ncsu.edu/resources/ for additional campus resources.

COURSE EVALUATIONS

ClassEval is the end-of-semester survey for students to evaluate instruction of all university classes. The current survey is administered online and includes 12 closed-ended questions and 3 open-ended questions. Deans, department heads, and instructors may add a limited number of their own questions to these 15 common-core

questions. Each semester students' responses are compiled into a ClassEval report for every instructor and class. Instructors use the evaluations to improve instruction and include them in their promotion and tenure dossiers, while department heads use them in annual reviews. The reports are included in instructors' personnel files and are considered confidential. Online class evaluations will be available for students to complete during the last two weeks of the semester for full semester courses and the last week of shorter sessions. Students will receive an email directing them to a website to complete class evaluations. These become unavailable at 8am on the first day of finals.

- Contact ClassEval Help Desk: classeval@ncsu.edu
- ClassEval website
- More information about ClassEval