



Dynamics

ENGS 220 - Spring 2023

3 Credits

Instructor Info



Masoud Masoumi



Office Hrs: Tue & Fri, 1pm-2pm



Office: RLC 204



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Course Info



Prereq: ENGS 206



Tuesdays & Fridays



11am-12:15pm



Classroom: LEO 235

Overview

Kinematics of particles and rigid bodies in planar motion, work and energy, impulse and momentum; introduction to mechanical vibration.

Learning Objectives

By the end of the course, students will be able to:

- Analyze particles and systems of particles using kinematic and kinetic and/or energy and momentum methods.
- Analyze rigid bodies using kinematic and kinetic and/or energy and momentum methods.

Material

Texts

Engineering Mechanics: Dynamics by Anthony M. Bedford, Wallace Fowler, 5th Edition, Pearson (2007)

Dynamics: Analysis and Design of Systems in Motion by Benson H. Tongue, 2nd Edition, Wiley (2009)

Other

Any handouts, required journal articles and additional book chapters will be provided.

Grading Scheme

10%	Quizzes (every other Friday)	A	Grade \geq 93%
		A ⁻	90% \leq Grade < 93%
		B ⁺	87% \leq Grade < 90%
25%	Midterm Exam I	B	83% \leq Grade < 87%
		B ⁻	80% \leq Grade < 83%
25%	Midterm Exam II	C ⁺	77% \leq Grade < 80%
		C	73% \leq Grade < 77%
30%	Final Exam	C ⁻	70% \leq Grade < 73%
		D ⁺	65% \leq Grade < 70%
10%	Projects	D	60% \leq Grade < 65%
		F	Grade < 60%

ABET Outcomes

- An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
- An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors

Class Policy & Attendance

Due to the nature of the materials covered in this course, regular attendance is highly recommended. Students are required to fulfill all course requirements as detailed in the course syllabi for their registered courses. Implicit in these requirements is completion of all course assignments and attendance in all classes. Also, if I believe that a student's failure to attend class is substantially affecting his/her course grade, I am obligated to report the situation to the dean of the school in which the student is matriculated. The dean will address the situation with the student. In case you miss a class, it is your responsibility to keep up with the class work and be informed of all announcements in class such as homework assignments, quizzes, etc. Cell phones and all other forms of electronic communication devices, if carried into the classroom, must be turned off. The use of computers and other electronic devices during class is restricted to classroom activities and course applications.

FAQs

? What if my schedule does not allow me to attend office hours?

! You are more than welcome to make an appointment whenever you have a question or concern by contacting me via email.

? What are the projects for the course?

! Throughout the semester, you will be assigned 5 or 6 projects. These projects will involve performing hand calculations, applying the theories covered in class, and utilizing a video analysis software called Tracker. You can find more information about *Tracker* at this link: <https://physlets.org/tracker>.

? What kinds of calculators can we use for exams?

! You are permitted to use calculators that are approved for the Fundamentals of Engineering exam. A list of approved calculators can be found at the following link: <https://ncees.org/exams/calculator>.

? What is your advice for performing well in this course?

! Be an active listener, take good notes, and read all assigned materials. Don't just read the solutions to the problems and examples, solve them! Be organized and manage your time appropriately.

Academic Integrity

The college Community Standards & Student Code of Conduct is central to the ideals of this course. Students are expected to be independently familiar with the code and to recognize that their work in the course is to be their own original work that truthfully represents the time and effort applied. Violations of the Academic Policies of the Community Standards & Student Code of Conduct are most serious and will be handled in a manner that fully represents the extent of the Code and that befits the seriousness of its violation. See the code here <https://inside.manhattan.edu/student-life/dean-of-students/code-conduct.php#academicintegrity> for more information.

Diversity and Inclusivity

I consider this classroom to be a place where you will be treated with respect, and I welcome individuals of all ages, backgrounds, beliefs, ethnicities, gender identities, national origins, religious affiliations, sexual orientations, ability, and other visible and non-visible differences. All members of this class are expected to contribute to a respectful, welcoming and inclusive environment for every other member of the class.

Accommodations for Students with Special Needs

If you are a student with learning needs that require special accommodation, contact the Accommodation Administrator in Specialized Resource Center (SRC) located in Thomas Hall, Room 3.15 as soon as possible to make an appointment to discuss your special needs. Once your Academic Adjustment/ Auxiliary Form is approved, please meet with me during my office hours and bring the form. You can find more information about SRC and the procedure on their website <https://inside.manhattan.edu/academic-resources/specialized-resource-center/index.php>.

Academic Assistance

The Center for Academic Success (CAS) has two locations - the Learning Commons & the Leo Learning Center. These offices, conveniently spread across campus, will provide students with a quiet space to study with a peer tutor, or engage in small group study sessions. The services offered include individual peer tutoring in most 100-200 level and select 300-600 level courses. All services are free of charge. Appointments are preferred but drop-ins are also welcome. To make an appointment contact the CAS at (718) 862-7414, email success@manhattan.edu or visit Thomas Hall, 3rd floor. For more information please visit their website at <https://inside.manhattan.edu/academic-resources/center-for-academic-success/index.php>

Class Schedule

The course will tentatively follow this schedule :

Week	Topic	Reading	Date
Week 1	Introduction	sec 12.1	Jan 20 th
Week 2	Motion of a Particle - Straight Line Motion	secs 13.1-13.3	Jan 24 th
	Motion of a Particle - Curvilinear Motion	secs 13.4-13.6	Jan 27 th
Week 3	Motion of a Particle - Curvilinear Motion	secs 13.4-13.6	Jan 31 st
	Motion of a Particle - Absolute Dependent Motion -		Feb 3 rd
	Force, Mass, and Acceleration	secs 14.1-14.2	Feb 7 th , Feb 10 th
Week 5	Force, Mass, and Acceleration	secs 14.2-14.3	Feb 14 th , Feb 17 th
Week 6	Exam I (tentative)	-	Feb 21 st
	Energy Methods	secs 15.1-15.3	Feb 24 th
Week 7	Energy Methods	secs 15.1-15.3	Feb 28 th , Mar 3 rd
Week 8	Energy Methods	sec 15.3	Mar 7 th
	Momentum Methods	sec 16.1	Mar 10 th
Spring Break			
Week 9	Momentum Methods	secs 16.1-16.2	Mar 21 st , Mar 24 th
Week 10	Momentum Methods	secs 16.2-16.3	Mar 28 th , Mar 31 st
Week 11 ^E	Exam II (tentative)	-	Apr 4 th
Week 12	Kinematics of Rigid Bodies	secs 17.1-17.3	Apr 11 th , Apr 14 th
Week 13	Kinematics of Rigid Bodies	secs 17.5, 17.7	Apr 18 th , Apr 21 st
Week 14	Dynamics of Rigid Bodies	18.2:Appendix, 18.2	Apr 25 th , Apr 28 th
Week 15	Dynamics of Rigid Bodies	18.2	May 2 nd , May 5 th
Week 16	Final Exam	-	May 11 th

^E April 6th-10th - Easter Holiday (No Classes)