



Introduction to Dynamics

CV_ENG 2080

Instructor Info



Oliver Giraldo-Londoño



Office Hrs: Fri 2–3 pm



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Course Info



Prereq: ENGINR 1200



Mon, Wed, & Fri



1:00 pm–1:50 pm



Ellis Library Gallery 88

Course Description

This course is an introduction to the study of bodies in motion as applied to engineering systems and structures. Basic fundamentals of particle and rigid body dynamics will be examined. This will consist of both the kinematics and kinetics of motion. Kinematics deals with the geometrical aspects of motion describing position, velocity, and acceleration, all as a function of time. Kinetics is the study of forces acting on these bodies and how they affect their motion.

Book

Required Text

R. C. Hibbeler, Engineering Mechanics – Dynamics, 14th Edition, Prentice-Hall, Upper Saddle River, New Jersey, 07458.

Other

Any additional material will be provided on Canvas.

Grading

20%	Homework
20%	Quizzes
40%	Midterm Exams, 20% each
20%	Final Exam

Grades will follow the following scale:

A 93-100%	B 83-86%	C 73-76%	D 63-66%
A- 90-92%	B- 80-82%	C- 70-72%	D- 60-62%
B+ 87-89%	C+ 77-79%	D+ 67-79%	F <59%

Academic Dishonesty

Academic integrity is fundamental to the activities and principles of a university. All members of the academic community must be confident that each person's work has been responsibly and honorably acquired, developed, and presented. Any effort to gain an advantage not given to all students is dishonest whether or not the effort is successful. The academic community regards breaches of the academic integrity rules as extremely serious matters. Sanctions for such a breach may include academic sanctions from the instructor, including failing the course for any violation, to disciplinary sanctions ranging from probation to expulsion. When in doubt about plagiarism, paraphrasing, quoting, collaboration, or any other form of cheating, consult the course instructor.

University of Missouri Notice of Nondiscrimination

The University of Missouri System is an Equal Opportunity/ Affirmative Action institution and is nondiscriminatory relative to race, religion, color, national origin, sex, sexual orientation, age, disability or status as a Vietnam-era veteran. Any person having inquiries concerning the University of Missouri-Columbia's compliance with implementing Title VI of the Civil Rights Act of 1964, Title IX of the Education Amendments of 1972, Section 504 of the Rehabilitation Act of 1973, the Americans With Disabilities Act of 1990, or other civil rights laws should contact the Assistant Vice Chancellor, Human Resource Services, University of Missouri-Columbia, 1095 Virginia Avenue, Columbia, MO 65211, (573) 882-4256, or the Assistant Secretary for Civil Rights, U.S. Department of Education.

Make-up Policy

Make-up exams or assignments will only be allowed for students who have a substantiated excuse approved by the instructor *before the due date*. Leaving a phone message or sending an e-mail without confirmation is not acceptable.

ADA Statement

If you anticipate barriers related to the format or requirements of this course, if you have emergency medical information to share with me, or if you need to make arrangements in case the building must be evacuated, please let me know as soon as possible.

If disability related accommodations are necessary (for example, a note taker, extended time on exams, captioning), please register with the Office of Disability Services (<http://disabilityservices.missouri.edu>), S5 Memorial Union, (573)882-4696, and then notify me of your eligibility for reasonable accommodations. For other MU resources for persons with disabilities, click on "Disability Resources" on the MU homepage.

Intellectual Pluralism Statement

The University community welcomes intellectual diversity and respects student rights. Students who have questions or concerns regarding the atmosphere in this class (including respect for diverse opinions) may contact the Departmental Chair or Divisional Director; the Director of the Office of Students Rights and Responsibilities or the MU Equity Office or by email at equity@missouri.edu. All students will have the opportunity to submit an anonymous evaluation of the instructor(s) at the end of the course.

Grievance Policy

Information concerning student grade appeal procedures and non-academic grievances and appeals may be found in the Student Handbook.

FE Exam

The Fundamentals of Engineering Exam (FE) is a national exam administered by the National Council of Examiners for Engineering and Surveying (NCEES) (<https://ncees.org/engineering/fe/>). The exam is the first step in the process to becoming a licensed professional engineer (PE). PE license is required to fully participate in the Civil Engineering profession (able to sign, seal, and submit works to a public authority). A license will give you prestige, enhances your career stature, give you authority, opens career options, and increases your salary. You should consider taking the FE exam the before your capstone semester and after you have taken most of your fundamentals courses. One of the 18 topics covered by the Civil FE exam is Dynamics. In the FE exam you will need to know particle and rigid body dynamics. We will cover all of these topics in this class.

Recording

University of Missouri System Executive Order No. 38 lays out principles regarding the sanctity of classroom discussions at the university. The policy is described fully in Section 200.015 of the Collected Rules and Regulations. In this class, students may make audio or video recordings of course activity unless specifically prohibited by the faculty member. However, the redistribution of audio or video recordings of statements or comments from the course to individuals who are not students in the course is prohibited without the express permission of the faculty member and of any students who are recorded. Students found to have violated this policy are subject to discipline in accordance with provisions of Section 200.020 of the Collected Rules and Regulations of the University of Missouri pertaining to student conduct matters.

Technical Communication Toolbox

Technical communication skills are critical to your success as an engineer. The Civil Engineering Department at Mizzou has developed a Technical Communication Toolbox (<https://engineering.missouri.edu/tech-toolbox-2019/>) that highlights how to create high quality and effective technical communications. The technical communication skills highlighted in the toolbox will be used across all your Civil Engineering courses and in your professional career.

Class Schedule

Week	Dates	Topics covered
Week 1	1/18–1/22	Introduction; Review of vector analysis (Appendix B)
Week 2	1/25–1/29	Rectilinear kinematics (Chapter 12, pp 5–33)
Week 3	2/01–2/05	Curvilinear motion (Chapter 12, pp 34–84)
Week 4	2/08–2/12	Motion of two particles (Chapter 12, pp 95–112) Kinetics of a particle: Newton's second law of motion (Chapter 13, pp 113–115)
Week 5	2/15–2/19	EOM: coordinate systems (Chapter 13, pp 116–163)
Week 6	2/22–2/26	Kinetics of a particle: principles of work and energy (Chapter 14, pp 179–203) Review EXAM I
Week 7	3/01–3/05	Kinetics of a particle: conservation of energy (Chapter 14, pp 204–236)
Week 8	3/08–3/12	Kinetics of a particle: principles of impulse and momentum (Chapter 15, pp 237–265)
Week 9	3/15–3/19	Impact (Chapter 15, pp 266–279)
Week 10	3/22–3/26	Planar kinematics of a rigid body: introduction (Chapter 16, pp 319–337)
Week 11	3/29–4/02	Spring break
Week 12	4/05–4/09	Planar kinematics of a rigid body: motion analysis (Chapter 16, pp 338–408) Review EXAM II
Week 13	4/12–4/16	Planar kinetics of a rigid Body: mass moment of inertia and equations of motion (Chapter 17, pp 409–472)
Week 14	4/19–4/23	Planar kinetics of a rigid body: principles of work and energy (Chapter 18, pp 473–516)
Week 15	4/26–4/30	Introduction to vibrations (Chapter 22, pp 643–681)
Week 16	5/03–5/07	Introduction to structural dynamics Review
Week 17	5/10	FINAL EXAM: Tuesday, May 11, 12:30-2:30 pm @ Ellis Library Gallery 88