Engineering Mechanics - Dynamics

EGM 3401, Section 4453
Class Periods: MWF, Period 7, 1:55 PM – 2:45 PM
Location: RNK 0110
Academic Term: Spring 2024

Instructor:
Jessica L. Allen, Ph.D.
jessal@ufl.edu
Office Location: WERT 461
Office Hours: M Periods 8-9 (3:00-5:00 PM) or by appointment

Teaching Assistant/Peer Mentor/Supervised Teaching Student:
Please contact through the Canvas website

- Names, office hours, and locations will be posted on Canvas.

Course Description
Extended coverage of kinematics and dynamics of particles and rigid bodies in one, two, and three dimensions.

Course Pre-Requisites / Co-Requisites
Pre-requisites: EMG 2511 or EGM 2500, and MAC 2313.

Course Objectives
To provide a thorough and systematic introduction to the subject of dynamics of particles and rigid bodies using a Newton-Euler approach. To develop a deep understanding of the kinematics of particles and rigid bodies, the kinetics of a particle, the kinetics of a system of particles, and the kinetics of a rigid body. Many examples will provide insight into the underlying physical processes.

Materials and Supply Fees. None.

Relation to Program Outcomes (ABET):

Outcome	Coverage*
1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics	High
2. 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	Low
3. An ability to communicate effectively with a range of audiences	Low
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts	
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives	
6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions	
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies	Low

*Coverage is given as high, medium, or low. An empty box indicates that this outcome is not covered or assessed in the course.

Required Textbooks and Software

- MATLAB may be required for some assignments. The version on UF Apps is sufficient if you don't have a version installed on your computer.

Recommended Materials

- Title: Dynamics of Particles and Rigid Bodies: A Systematic Approach
- Author: Anil Rao
- Publication date and edition: Cambridge University Press, 2006
- ISBN number: 978-0-521-18790-9

Note: This book is dense, but thorough. Dr. Rao (the author) also has videos on his YouTube page.

Course Schedule

See the course website for a more detailed and up to date schedule, including tentative homework and exam dates.

Week 1: Course Introduction and Fundamentals
Week 2-5: Kinematics of Particles and Rigid Bodies
Week 6-9: Kinetics of Particles
Week 10-12: Kinetics of a System of Particles
Week 13-15: Kinetics of Rigid Bodies

Attendance Policy, Class Expectations, and Make-Up Policy

CLASS*:* Regular attendance and participation in class is expected and encouraged. You are responsible for all information disseminated during lectures. The general course structure is that Mondays and Wednesdays will be devoted to lectures on new material and Fridays will be problem solving sessions.

HOMEWORK: Homework assignments provide students an opportunity to apply concepts learned in class and affirm their understanding of the course material. Some homework assignments may require you to use Matlab. Your well-commented code and associated answers must be turned in along with any written work. Students are encouraged to work together to understand the concepts in each homework; however, submitted assignments should reflect your own work. Assignments that are obviously copied will receive no credit and be subject to academic dishonesty policies. *Grading:* Some problems will be graded for correctness while others will be graded for completeness. Completeness means a good, honest effort at solving the problem. If you are not sure if you have demonstrated a good, honest effort or not, that means you have not. The lowest homework grade will be dropped. *Submission Policy:* Homework assignments will typically be due one week after assigned (refer to course website for most up-to-date deadlines). All assignments should be turned in electronically via the course website as a single PDF document. You must use the following convention when naming your submission: LastName_HW_X.pdf (replace "LastName" with your last name and "X" with the assignment number). *Makeup and Late Policy*: There will be no make-up homework assignments. Since difficult weeks will arise during the semester, students will be allowed to turn in two homework assignments up to 48 hours late (two days). The instructor need not be notified ahead of time. No other late homework assignments will be accepted.

MIDTERM EXAMS: There will be three in-class midterm exams given during the semester. These exams are an opportunity for students to demonstrate their mastery of course concepts. Students will be permitted to use one 8.5 x 11-inch handwritten sheet of notes (front and back). All notes must be turned in with the exam. If you are caught cheating, you will receive a zero on the exam and be subject to academic dishonest policies. *Makeup policy:* No makeup exams are allowed except for rare instances with documentation and pre-approval by the instructor per University policy. See course website for tentative exam schedule.

FINAL-EXAM: The final exam will be cumulative. Students will be permitted to use up to two 8.5 x 11-inch handwritten sheets of notes (front and back). All notes must be turned in with the exam. If you are caught cheating, you will receive a zero on the exam and be subject to academic dishonest policies. In accordance with the university-dictated final exam schedule, the final exam for this course will be held on Wednesday, May 1, 2024 from 10:00 AM – 12:00 PM in RNK 0110.

RE-GRADE POLICY: All grading appeals must be received *in writing* within 1 week after the assignment is graded and/or returned. If a student feels that an assignment was graded incorrectly, they should return the assignment and a written description of the grading error within 1 week of receiving the graded assignment. The instructor will evaluate the request and adjust the grade if an error was made. Any request for re-grading where the student has altered the assignment after it was returned to gain a grade benefit will be considered a violation of the University honor code.

Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies. Click here to read the university attendance policies: https://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/

Evaluation of Grades

Assignment	Percentage of Final Grade
Homework Sets (10)	10%
Midterm Exams (3 x 20% each)	60%
Final Exam	30%
	100%

Your grade will be calculated according to the above weights. The grade shown on Canvas is likely different than your actual grade.

Grading Policy

Percent	Grade	Grade Points
93.4 - 100	A	4.00
90.0 - 93.3	A-	3.67
86.7 - 89.9	B+	3.33
83.4 - 86.6	B	3.00
80.0 - 83.3	B-	2.67
76.7 - 79.9	C+	2.33
73.4 - 76.6	C	2.00
70.0 - 73.3	C-	1.67
66.7 - 69.9	D+	1.33
63.4 - 66.6	D	1.00
60.0 - 63.3	D-	0.67
0 - 59.9	E	0.00

More information on UF grading policy may be found at:
https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx

Students Requiring Accommodations
Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the disability Resource Center by visiting https://disability.ufl.edu/students/get-started/. It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester.

Course Evaluation
Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at https://gatorevals.aa.ufl.edu/students/. Students will be notified when the

evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via https://ufl.bluera.com/ufl/. Summaries of course evaluation results are available to students at https://gatorevals.aa.ufl.edu/public-results/.

In-Class Recording
Students are allowed to record video or audio of class lectures. However, the purposes for which these recordings may be used are strictly controlled. The only allowable purposes are (1) for personal educational use, (2) in connection with a complaint to the university, or (3) as evidence in, or in preparation for, a criminal or civil proceeding. All other purposes are prohibited. Specifically, students may not publish recorded lectures without the written consent of the instructor.

A "class lecture" is an educational presentation intended to inform or teach enrolled students about a particular subject, including any instructor-led discussions that form part of the presentation, and delivered by any instructor hired or appointed by the University, or by a guest instructor, as part of a University of Florida course. A class lecture does not include lab sessions, student presentations, clinical presentations such as patient history, academic exercises involving solely student participation, assessments (quizzes, tests, exams), field trips, private conversations between students in the class or between a student and the faculty or lecturer during a class session.

Publication without permission of the instructor is prohibited. To "publish" means to share, transmit, circulate, distribute, or provide access to a recording, regardless of format or medium, to another person (or persons), including but not limited to another student within the same class section. Additionally, a recording, or transcript of a recording, is considered published if it is posted on or uploaded to, in whole or in part, any media platform, including but not limited to social media, book, magazine, newspaper, leaflet, or third party note/tutoring services. A student who publishes a recording without written consent may be subject to a civil cause of action instituted by a person injured by the publication and/or discipline under UF Regulation 4.040 Student Honor Code and Student Conduct Code.

University Honesty Policy
UF students are bound by The Honor Pledge which states, "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment." The Honor Code (https://sccr.dso.ufl.edu/process/student-conduct-code/) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

Commitment to a Safe and Inclusive Learning Environment
The Herbert Wertheim College of Engineering values varied perspectives and lived experiences within our community and is committed to supporting the University's core values, including the elimination of discrimination. It is expected that every person in this class will treat one another with dignity and respect regardless of race, creed, color, religion, age, disability, sex, sexual orientation, gender identity and expression, marital status, national origin, political opinions or affiliations, genetic information, and veteran status.

If you feel like your performance in class is being impacted by discrimination or harassment of any kind, please contact your instructor or any of the following:
- Your academic advisor or Undergraduate Program Coordinator
- HWCOE Human Resources, 352-392-0904, student-support-hr@eng.ufl.edu
- Curtis Taylor, Associate Dean of Student Affairs, 352-392-2177, taylor@eng.ufl.edu
- Toshikazu Nishida, Associate Dean of Academic Affairs, 352-392-0943, nishida@eng.ufl.edu

Software Use
All faculty, staff, and students of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

Student Privacy
There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments. For more information, please see: https://registrar.ufl.edu/ferpa.html

Campus Resources:

Health and Wellness

U Matter, We Care:
Your well-being is important to the University of Florida. The U Matter, We Care initiative is committed to creating a culture of care on our campus by encouraging members of our community to look out for one another and to reach out for help if a member of our community is in need. If you or a friend is in distress, please contact umatter@ufl.edu so that the U Matter, We Care Team can reach out to the student in distress. A nighttime and weekend crisis counselor is available by phone at 352-392-1575. The U Matter, We Care Team can help connect students to the many other helping resources available including, but not limited to, Victim Advocates, Housing staff, and the Counseling and Wellness Center. Please remember that asking for help is a sign of strength. In case of emergency, call 9-1-1.

Counseling and Wellness Center: https://counseling.ufl.edu, and 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

Sexual Discrimination, Harassment, Assault, or Violence
If you or a friend has been subjected to sexual discrimination, sexual harassment, sexual assault, or violence contact the **Office of Title IX Compliance**, located at Yon Hall Room 427, 1908 Stadium Road, (352) 273-1094, title-ix@ufl.edu

Sexual Assault Recovery Services (SARS)
Student Health Care Center, 392-1161.

University Police Department at 392-1111 (or 9-1-1 for emergencies), or http://www.police.ufl.edu/.

Academic Resources

E-learning technical suppor*t*, 352-392-4357 (select option 2) or e-mail to Learning-support@ufl.edu. https://lss.at.ufl.edu/help.shtml.

Career Connections Center, Reitz Union, 392-1601. Career assistance and counseling; https://career.ufl.edu.

Library Support, http://cms.uflib.ufl.edu/ask. Various ways to receive assistance with respect to using the libraries or finding resources.

Teaching Center, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring. https://teachingcenter.ufl.edu/.

Writing Studio, 302 Tigert Hall, 846-1138. Help brainstorming, formatting, and writing papers. https://writing.ufl.edu/writing-studio/.

Student Complaints Campus*:* https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/;https://care.dso.ufl.edu.

On-Line Students Complaints*:* https://distance.ufl.edu/getting-help/; *https://distance.ufl.edu/state-authorization-status/#student-complaint*.