Engineering Mechanics - Dynamics

EGM 3401 (Section 3281)
Class Periods: MWF, Period 4, 10:40 AM – 11:30 AM
Location: FLG 260
Academic Term: Spring 2026

Instructor:
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Office Location: WERT 461
Office Hours: TBD, see Canvas

Teaching Assistant/Peer Mentor/Supervised Teaching Student: *TBD,*

- Name, office hours, and location 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 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 or Python will be required for some assignments. The MATLAB version on UF Apps is sufficient if you don't have it 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.

Required Computer

Recommended Computer Specifications: https://it.ufl.edu/get-help/student-computer-recommendations/
HWCOE Computer Requirements: https://www.eng.ufl.edu/students/advising/fall-semester-checklist/computer-requirements/

All MAE students are required to have a laptop/mobile computer in accordance with HWCOE policy. Information on this policy is available at this link https://www.eng.ufl.edu/students/resources/computer-requirements/

Course Schedule

See the course website for a more detailed and up to date schedule, including tentative homework and quiz dates.
Week 1-5: Dynamics of a Single Particle (Rao Ch. 2 and 3)
Week 6-10: Dynamics of a System of Particles (Rao Ch. 2 and 4)
Week 11-14: Dynamics of Rigid Bodies (Roa Ch. 2 and 5)

Important Dates

Mid February	*Midterm Exam 1 (in class)*
Late March	*Midterm Exam 2 (in class)*
Friday, May 1	*Final Exam (7:30 – 9:30 am)*

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. While lecture notes will be posted after class, they may not include all the material covered during in-class discussions.

HOMEWORK: Homework assignments provide students with an opportunity to apply concepts learned in class and affirm understanding of the course material. Most homework assignments will require you to use Matlab or Python to interpret results. 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:* Answers to most problems will be provided. Thus, homework will generally 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. *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.

QUIZZES: Quizzes are another opportunity to apply concepts learned in class. You can think of them as an extension of the related homework assignment and, similarly, most quizzes will require you to use Matlab or Python to interpret results. In contrast to homework, though, quizzes are intended to be solved independently. You are not

permitted to work with other students or utilize generative AI. Quizzes that do not follow this policy will receive no credit and be subject to academic dishonesty policies. *Grading:* Quizzes will be graded for correctness; your lowest quiz grade will be dropped. *Submission Policy:* Quizzes will typically be assigned the same week as their associated homework and administered via the course website. *Makeup and Late Policy*: There will be no make-up quizzes. No late quiz submissions are allowed.

MIDTERM EXAMS: There will be two midterm exams given during the semester. Note that midterm exams will be in given in class. Midterm 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). 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.

FINAL-EXAM: The final exam will be cumulative and in-person. Students will be permitted to use up to two 8.5 x 11-inch handwritten sheets of notes (front and back). 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 **Friday, May 1, 2026, from 7:30 AM – 9:30 AM.**

RE-GRADE POLICY: All grading appeals must be received *in writing* via the course website 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	7%
Quizzes	13%
Midterm 1	25%
Midterm 2	25%
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
92.0 - 100	A	4.00
89.0 - 91.9	A-	3.67
86.0 - 88.9	B+	3.33
82.0 - 85.9	B	3.00
79.0 - 81.9	B-	2.67
76.0 - 78.9	C+	2.33
72.0 - 75.9	C	2.00
69.0 - 71.9	C-	1.67
66.0 - 68.9	D+	1.33
62.0 - 65.9	D	1.00

59.0 - 61.9	D-	0.67
0 - 58.9	E	0.00

Academic Policies & Resources

To support consistent and accessible communication of university-wide student resources, instructors must include this link to academic policies and campus resources: https://go.ufl.edu/syllabuspolicies. Instructor-specific guidelines for courses must accommodate these policies.

Commitment to a Positive 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.

If you feel like your performance in class is being impacted, please contact your instructor or any of the following:

- Your academic advisor or Undergraduate Coordinator
- HWCOE Human Resources, 352-392-0904, student-support-hr@eng.ufl.edu
- Pam Dickrell, Associate Dean of Student Affairs, 352-392-2177, pld@ufl.edu