ME2202 A – Dynamics of Rigid Bodies Syllabus – Fall 2026

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Textbook: You should obtain a dynamics textbook. I recommend one of the following

An Introduction to Dynamics, McGill and King, 4th edition 2003.

Engineering Mechanics: Dynamics, Meriam, Kraig, and Bolton, 9th edition 2018. (Suggested reading from this book)

Course Description

In this course, we will be learning how to write, apply, and solve equations that describe how rigid objects move in engineering dynamics problems. (Because moving systems are cool!)

Course Objectives

Objective 1: To teach students the basic principles underlying the dynamics of rigid bodies in planar and 3D motion.

Objective 2: To educate students to identify, formulate and solve engineering problems in rigid body dynamics.

Objective 3: To introduce students to the concepts of work-energy and impulse-momentum for rigid body systems.

Learning Outcomes

Corresponding to Objective 1

1.1 Students will demonstrate an understanding of Newtonian-Eulerian physics and basic equations underlying kinematics and kinetics of rigid bodies in 2D and 3D motion.

Corresponding to Objective 2

2.1 Students will demonstrate the ability to isolate rigid bodies and to draw clear and appropriate free body diagrams.

2.2 Students will demonstrate an ability to identify kinematic and kinetic knowns and unknowns.

2.3 Students will demonstrate an ability to identify and effectively account for kinematic constraints such as rolling and/or sliding, and their kinetic consequences.

2.4 Students will demonstrate that they can apply the appropriate principles referred to in Objective 1 to the solution of problems.

2.5 Students will demonstrate that they can combine the appropriate principles referred to in Objective 1 in the solution of problems.

2.6 Students will demonstrate that they can determine the mass moments and products of inertia for arbitrary rigid bodies.

2.7 Students will demonstrate that they can calculate the principal coordinates and the principal moments of inertia for arbitrary rigid bodies.

Corresponding to Objective 3

3.1 Students will demonstrate an understanding of work-energy principles as applied to rigid bodies in 2D and 3D motion.

3.2 Students will be able to evaluate the kinetic energy of rigid bodies as well as the potential energy associated with gravity and spring forces.

3.3 Students will demonstrate an understanding of conservation laws for momentum and energy.

3.4 Students will demonstrate an ability to apply impulse-momentum relations where appropriate.

3.5 Students will demonstrate that they can utilize coefficient of restitution data in the solution of impact problems in rigid-body dynamics.

Grading:

Homework (12 equally weighted assignments): 10%
Quizzes: 6% (3 equally weighted)
Exam 1: 22%
Exam 2: 26%
Final: 36%

*If there are problems the class struggled on, I will offer credit back to re-submit them. Re-submission grading is binary: I will either award 0 or full credit.

Examinations:

All exams will be closed book and closed notes. However, you may bring one 8.5"x11" sheet of your own notes (both sides). **No calculator** (**most exam problems will be parametric!**). Phone must be turned in if leaving the room during the exam for any reason. All exams will be cumulative of all material covered so far.

If you think I may have made an error in grading your exam, feel free to re-submit it. However, I will not discuss any grading issues until the end of the class period following the return of your exam. Further, if you do decide to resubmit your exam for re-grading, I will re-grade the entire exam.

Homework:

Homework will typically be assigned on Wednesday and due the following Wednesday. I will drop your lowest homework assignment grade. If you cannot turn in the assignment on the due date, you must arrange to complete the problems before the homework due date. Homework problems will be graded by our course grader. Please check with the grader if you think a homework problem may have been incorrectly graded.

Note: I strongly encourage you to work the homework problems parametrically, then substitute numbers at the end. This will make it much easier to troubleshoot your solution, and will better prepare your for the exams and quizzes. I also encourage you to try to work out the problems separately, then meet in study groups or come to office hours to compare your answers, and to combine forces in trying to solve some of the more difficult problems.

Citing Your References:

You must document any assistance that you received from any person or any reference to complete your homework assignments. I encourage you to try to work out the problems separately, then meet in study groups to compare your answers, and to combine forces in trying to solve some of the more difficult problems. But you must document the resources you used. For example, if you worked with your friend Joe to get the answer for Problem 1.06, and used the text and worked in a study group to get answers to 1.26, 1.45, and 1.60, you would write the following on your homework cover sheet:

"References: I worked with Joe Smith on 1.06. I worked in a study group with Joe Smith and Jane Schmidt, and referred to Meriam for 1.26, 1.45, 1.60."

- **While you can and should work with others as part of a team, the homework assignment you turn in must be your own write-up!**
- **You must include references to receive credit for your assignment.**

Academic Misconduct:

I expect all students to comply with the Georgia Tech Honor Code. I will refer any evidence of cheating or other violations to the Dean of Students with a recommendation that the penalty be an award of zero points for the graded requirement, and a one letter grade reduction in the course. Cheating includes, but is not limited to: using unauthorized references or notes (**it is NOT appropriate to copy your homework from the official solution manual or anywhere else**); copying directly from any source, including friends, classmates, tutors, or a solutions manual; allowing another person to copy your work; taking an exam or handing in a graded requirement in someone else's name, or having someone else take an exam or hand in a graded requirement in your name; or asking for a re-grade of a submission that has been altered from its original form.

Resources:

Dynamics is a challenging subject! Taking advantage of all of the class resources will give you the best ability to succeed in this class:

- ***Work homework in groups and study in groups!*** If you need to find a group, let me know.
- Extended office hours. I can't stress enough how valuable these tutorial office hours will be, not just for getting assistance from me, but from your classmates. Discussing problems together is where much of the learning happens!
- Grader office hours. In case you need additional help.
- Ask me questions! In class or one-on-one. Even if your question is simply "I don't get it," we can trace back and determine what we missed. More than likely if you don't get it, someone else won't either!
- If you have a documented disability and require additional assistance, please contact me.

Final Grading:

The following grades for % final averages are guaranteed: A = 90+, B = 80+, C = 70+, D = 60+. Further, at the end of the semester I will list the final averages in descending order, look for natural breaks, and make adjustments if warranted. If your final class average is right at the break between letter grades I will re-examine your work for the semester, including class participation, to decide which side of the break you belong on. By doing all of your homework assignments, being present for quizzes and being prepared for the exams you can ensure that you have all the possible advantages.

Classroom Policy:

Above all else, I want you to treat this class as a professional setting. Be respectful to me and to your classmates.

- Be courteous in how you address me and your fellow students.
- Don't be texting throughout class! Keep your phone put away.
- You can use your computer or tablet for taking notes, but if you are clearly distracted or are distracting me or your classmates, I will ask you to put it away.
- Prepare for class: reading and lecture notes

What you can expect from me:

You can expect that I will be respectful in how I address you and answer your questions. If I can't answer your question right away, I will think on it and get back to you. I will return your graded assignments to you as quickly as possible. Usually, one week after they were turned in. If you have constructive ideas for the class, I will be happy to consider them (cool dynamic videos we might want to watch in class, for example!).