

Dr. Cameron W Coates
cameron.coates@armstrong.edu

Office Phone:	(912) 344-2693		
Office Fax:	(912) 344-3414		
Office Hrs	M 1300-1500, T1300-1400 W1500-1700		
Office Loc.	UH245		
Class Schedule:	<u>Days</u>	<u>Time</u>	<u>Building</u>
	TR	1500-1615	UH 120
Required Text:	<i>Engineering Mechanics, Statics and Dynamics, 5th Ed.</i> Bedford and Fowler		
Required Course:	ENGR2202		
Course Credit Hours:	3		
Grade Type:	Whole Letter Grade (A - F)		
Grade Percentage:	26% - Final Exam		
	30% - Tests (3 @10% each)		
	20% - Quizzes (5 @ 4% each)		
	24% - Group Projects (2@12% each)		

ENGR2202 Section 21431
Jan 9, 2018 through April 27, 2018

Course Description

Kinematics and dynamics of particles and rigid bodies in one, two, and three dimensions. Work-energy and impulse-momentum concepts.

Website: http://engineering.armstrong.edu/cameron/courses_fall2017.html
 Be sure to visit the website and utilize the tools available to enhance your expertise.

Dynamics Course Outline

- | | |
|---|--|
| 1. Particle motion | 8. Angular momentum |
| 2. Planar kinematics of rigid bodies | 9. Inertia properties |
| 3. Newton-Euler analysis of planar rigid body systems | 10. Principal moments and axes of inertia |
| 4. Angular velocity in three dimensions | 11. Euler equations |
| 5. Angular acceleration in three dimensions | 12. Impact; Impulse-momentum relations for rigid bodies |
| 6. Euler angles | 13. Work-Energy analysis of conservative and non-conservative rigid body systems |
| 7. Rotation matrices | |

Course Outcomes:

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

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.

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

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.

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

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.

Attendance

Consistent class attendance is expected but not mandatory, students are responsible for all material covered in class. The material taught is extremely dependent on previous material, therefore it is highly recommended that you do not skip any class. I will NOT tutor you to make up material you missed unless you have a valid excuse (preferably with proof i.e. medical, family emergency) for missing class.

Exams

Exams, quizzes will be closed book and closed notes and are to be individual effort. Exams will cover all course material (lectures, handouts, reading assignments, etc.) as provided on the course schedule. You are expected to abide by the exam dates. No makeup exams will be given except for a medical or family emergency (documented proof required).

Academic Integrity Policy:

Violations of the Armstrong State University Academic Integrity Policy (including cheating and plagiarism) are taken very seriously. Any violation of this policy will become part of the student's permanent educational record. More information on the Academic Integrity policy and procedure can be found at www.armstrong.edu/studentintegrity.

Title IX Clause:

Armstrong is dedicated to providing a safe and equitable learning environment for all students. Discrimination, sexual assault, and harassment are not tolerated by the university. You are encouraged to report any incidents to the Title IX Office in Victor Hall Room 245 or by email: diversity@armstrong.edu. This is important for the safety of the whole Armstrong community. Another member of the university community – such as a friend, classmate, advisor, or faculty member – can help initiate the report, or can initiate the report on behalf of another person. The University Counseling Center provides 24/7 confidential support, and the http://www.armstrong.edu/counseling_center describes reporting options and other resources.

Disability Related Accommodations

Armstrong State University is committed to providing reasonable accommodations to students with documented disabilities, as required under federal law. Disabilities may include learning disabilities, ADD, psychological disorders, brain injury, Autism Spectrum Disorders, serious chronic medical illnesses, mobility impairment, communication disorders, vision or hearing loss or temporary injuries. The purpose of disability accommodation is to provide equal access to the academic material and equal access to demonstrate mastery of the material. Students with disabilities must meet all the academic requirements and standards of the class, including the attendance policy. If you have a disability and need accommodations, please contact the Office of Disability Services, located on the second floor of Memorial College Center, room 208. You will need to meet with Disability Services Staff, who can help you gather documentation of your disability or refer you to an appropriate resource for assessment. Once documentation of the disability is gathered and approved, Disability Staff will provide you with an Accommodation Letter, detailing the appropriate, approved accommodations, which you should present to me so we can discuss and implement your accommodations. Disability accommodations work best starting at the beginning of the semester, but can be approved and started at any point in the semester. Accommodations start at the time the Accommodation Letter is presented to faculty, within reasonable timelines. Accommodations are not given retroactively. Accommodations are not part of your academic transcript.

Office Hours

If topics are unclear after class attendance or you genuinely attempted assigned problems, come by during office hours for additional help. If you cannot make it at these times, email me to make an appointment. Do NOT bother to come by the day before the test if you have not been doing the homework problems (i.e. be able to show attempts made at the majority of problems) If you stop by my office with questions outside of office hours or without an appointment, it's highly unlikely I will be able to see you, even if you only need a minute of my time. You may email Mrs. Kimberley Gaither at kimberly.gaither@armstrong.edu to make an appointment.

Campus Carry

It is the responsibility of every individual who would like to carry a concealed weapon to first verify that the area where they are carrying it meets the requirements of HB 280. If you intend to carry a conceal weapon, it is essential that you visit <http://www.usg.edu/hb280> and follow ALL USG rules for this activity.

Additional Tutoring

The ES program has free tutoring specifically for engineering students, located in University Hall room 240, Monday through Thursday 9 a.m. - 5 p.m. The CST tutoring center also provides free tutoring for most lower level mathematics and science courses. <https://www.armstrong.edu/science-technology/cst-tutorial-center>

Assignments

Readings and projects are assigned as per the schedule given. Projects should be done in groups of 2 or 3. The addition OR removal of names is NOT allowed once the project is turned in. All group members will receive the same grade. Assignments are due at the beginning of class on the specified dates in the syllabus. Late assignments will be accepted with the following penalties: submitted <1 day =-20%, 1 day < submitted <2 days=-30%, 2< submitted <3 days=-40%. Homework on the syllabus sheet will not be collected, however quizzes and

TESTS ARE STRONGLY INFLUENCED BY THE HOMEWORK PROBLEMS AND IT IS HIGHLY RECOMMENDED THAT ALL HOMEWORK PROBLEMS BE ATTEMPTED. NO PROJECTS WILL BE ACCEPTED 3 DAYS AFTER THE DUE DATE AND TIME WITHOUT PROOF OF A MEDICAL OR FAMILY EMERGENCY.

IMPORTANT DATES

Tests/Quizzes: See schedule

First day of classes: Monday, Jan 8

Last day to withdraw without automatic academic penalty of WF: Wed, Feb 28

Last day of classes: Friday, April 27

No class: Monday, Jan 15, MLK Day

No class: Mar 12-16 Spring Break

Final Exam: T May 1st, 1400-1600, UH120