Course Information:

Listing:	ME101, Section 03	Time:	MW 4:30-5:45pm
Code:	46297	Room:	Industrial Studies 113
Website:	www.adamleeper.com/teaching/me101	Final Exam:	Thursday, December 12, 2:45-5:00pm

Description: Vector mechanics. Two and three dimensional motion of particles and rigid bodies. Force, energy and momentum principles.

Prerequisites: CE 095 or 099; and MATH 032; with a grade of "C-" or better in each.
These are MINIMUM requirements. Dynamics is about relating forces (statics) and motion (vector calculus) and hence requires firm foundations in both. Borderline performance in either of these prerequisites correlates with significant risk of having a miserable time in this course (a.k.a. not passing). If needed, deliberate attention to reinforcing such fundamentals is highly recommended.

→ **Tuesday Sept. 3 is the last day to drop. Tuesday Sept. 10 is the last day to add.**

Course Staff:

Instructor:	Dr. Adam Leeper	Student Assistant:	Joy Franco
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Email/G+:	adamleeper@gmail.com	Email:	joy.franco@sjsu.edu
Office Hours:	MW 6:00-6:30pm+ in E-348	Problem Sessions:	TBD

Course Website, Materials, and Discussions

This course uses the Canvas learning management system (LMS), accessible to enrolled students at https://sjsu.instructure.com/. Successful completion of course requirements will require accessing the online materials multiple times per week. Technical support is available at http://www.sjsu.edu/at/ec/canvas/.

Questions about course material should be posted to the forums on Canvas so that all students can contribute and learn from the discussion. The personal emails listed above are for issues of a personal nature only (e.g. specific grading appeals); questions about course material directed to the personal emails above will **not** be answered.

Announcements and other messages regarding this class may be sent to student email addresses listed in MySJSU and/or in Canvas, so each student is required to maintain an up-to-date email address in both systems.

Required Textbook

We will use the **August 2013 edition** of *Dynamics of Mechanical, Aerospace, and Biomechanical Systems*, by Paul Mitugy. Available by direct order from Motion Genesis at www.tinyurl.com/mgdynamics (for pick-up in class). The course is designed and presented in close alignment with this book, using notational conventions, reading assignments, and page references therein, so it is indeed essential.

Workload

Consistent with university policy S12-3, success in this course is based on the expectation that students will spend, for each unit of credit, a **MINIMUM** of forty-five hours over the length of the course for course-related activities. This means a minimum of 3 x 45 = 135 dedicated hours, averaging at least 9.0 hours per week, of which you will spend 2.5 hours in class. This class will also have high expectations for active engagement in online learning.

Assignments and Grading Policy

Your grade will be determined based on a weighted average of:		
	Participation and Quizzes	10%
	Homework	20%
	Midterms (3)	45% total
	Final Exam	25%

Homework: Homework exercises should be done on clean 8.5x11" plain white or engineering graph paper, and kept neatly organized in a 1/2" three-ring binder. Homework binders will be submitted for grading on the day of each midterm and the final exam; each submission is worth 5% of the course grade. Grades for each submission will be based on a small number (2-3) of **random** problems. Hence, it is in your best interest to do all problems thoroughly; with 3-4 weeks between exams, you have plenty of time to ask questions, and there is simply no reason to be doing homework at the last minute.

Collaborating with others on approach and strategy is encouraged. However, all homework must still be freshly prepared and submitted individually. Merely copying from classmates or prior solution sets constitutes cheating (for **both** parties involved).

Professionalism: Engineering is **not** about "getting the right answer;" it is about **communicating** your results (to me, or to your boss, or a client). *I will not grade what I must struggle to read.*

Examples of good communication include having clear given/find statements, stating major assumptions, and annotating key intermediate steps. Good document professionalism includes starting longer problems on separate sheets, and writing on only the front side of each sheet.

Participation: Participation will be assessed through group activities or pop-quizzes in class, and through tasks to be done online through Canvas. Some online tasks may require response within 24-hours, so please make sure your email notification settings in Canvas are set appropriately.

Exam Policy: All students are expected to complete exams in class as scheduled. There are no make-up exams or alternative dates. Alternative accommodations or extended time will be considered only if so prescribed by the Accessible Education Center. Truly unavoidable and extenuating circumstances will be considered for alternative weighting (i.e. greater weight on the Final Exam) only if justified by firm documentation (e.g. physician memo, jury duty, military orders).

Appeals: Any case-specific grading issues must be petitioned promptly in writing (email is ok). Late homework will normally be recorded with zero credit in the grade roster, but may be submitted promptly for partial consideration in context with all other exceptions class-wide. Such evaluation would normally happen only at the very end of the semester. Special consideration of truly unavoidable and extenuating circumstances will depend on expeditious timing and supporting documentation (e.g. doctor's note, jury summons, military orders).

Academic Integrity

The MINIMUM penalty for cheating (or plagiarizing) on any assignment or exam is an **F** in the course; University sanctions may follow. This **includes** allowing other students to copy your work. One day you will be designing bridges, skyscrapers, airplanes, machinery, and other things that have the capacity to kill people. Such work is no place for dishonesty and corner-cutting. Yes, I have enforced this policy.

For this class, collaborative discussion on concepts and even specific problems is important to gain mastery of the material. However, all assignments should represent your own individual work. Exceptions (e.g. team projects) will be clearly specified. If you would like to include your assignment or any material you have submitted, or plan to submit for another class, please note that SJSUs Academic Policy S07-2 requires approval of all instructors.

If you have questions or concerns, please speak to me or see the University's Academic Integrity policy at http://www.sjsu.edu/senate/S07-2.htm. Please note that faculty members are required to report all infractions to the office of Student Conduct and Ethical Development.

Registration Policies and Academic Calendar

You are responsible for understanding the university registration policies available at http://info.sjsu.edu/static/catalog/policies.html.
The Late Drop policy is available at http://www.sjsu.edu/aars/policies/latedrops/policy/.
Academic deadlines are listed at http://www.sjsu.edu/provost/services/academic_calendars/.
Students should be aware of the current deadlines and penalties for dropping classes.
Information about the latest changes and news is available at the Advising Hub at http://www.sjsu.edu/advising/.

Campus Policy in Compliance with the American Disabilities Act

If you need course adaptations or accommodations, or if you need to make special arrangements in case the building must be evacuated, please inform me as soon as possible. Presidential Directive 97-03 requires that students requesting accommodations must register with the Accessible Education Center (AEC) http://www.sjsu.edu/drc/ to establish a record of their needs.

Course Goals

- To learn fundamental concepts and principles of particle dynamics and rigid-body dynamics.
- To learn how to apply force, energy, and momentum principles to solve problems in dynamics.
- To develop modeling skills for analysis of engineering systems involving dynamics.

Student Learning Objectives

Upon successful completion of this course, the student should be able to:

- Apply vector calculus to perform engineering analysis of physical scenarios involving the motion of particles and rigid bodies.
- Model a physical system involving involving the motion of particles and rigid bodies, and reasonably justify engineering assumptions.
- Solve problems involving the dynamics of particles and rigid-bodies using Newtons Second Law.
- Solve problems involving the dynamics of particles and rigid-bodies using principles of energy and momentum.

Tentative Schedule (subject to change with fair notice)

Date	Readings	Topics
8/21	1.1-7	What is "dynamics." MIPSI problem solving method. Distribute textbooks.
8/26	2.0-11	Math and Vector review. Vector math, dot product and cross product.
8/28	3.1-4, 4.0-3	Vector Geometry.
9/2		**Labor Day. No class.**
9/4	4.0-3	Vector basis; expressing vectors. Basis conventions in different fields. Extracting scalar equations from vector equations.
9/9	5.0-4	Basis conversions via rotation matrices.
9/11	10.2-3, 11.0-6, 16.3-5, 17.0-3, 19.2-3, 19.8-9	Working with vector quantities (examples with center of mass, force, moment).
9/16		Additional review and examples
9/18		**Midterm 1:** Vector Geometry and Vector Equations.
9/23	6.0-5, 8.1, 8.3, pages 333-334	Calculus review; position, velocity, and acceleration. Vector differentiation.
9/25	7.0-7.4, 8.0-2, 8.5-7	Angular velocity and angular acceleration; velocity and acceleration.
9/30	8.3-8.5	Simple dynamics examples via Calculus. See Hibbeler 12.2 for more examples.
10/2	10.5-6, 23.1-23.3.1	Intro to Newton's law (for particles). See Hibbeler 12.5-7 for more examples.
10/7	9.7-9.9	Kinematic constraints 1 (rolling and gears)
10/9	Hibbeler 12.9	Kinematic constraints 2 (ropes and linkages)
10/14		Review for midterm.
10/16		**Midterm 2:** Kinematics.
10/21	10.0-6, 19.7-14	Particle dynamics (with force models).
10/23	10.0-6, 19.7-14	Particle dynamics (2nd-order systems examples).
10/28	12.0-1, 13.1.3, 13.2, 14.1-2, page 325-329	Moments/Products of inertia and inertia matrix.
10/30	15.1-4	**HW3 DUE.** Dynamics of rigid bodies 1
11/4	23.3.2-23.5, 24.12	Dynamics of rigid bodies 2.
11/6	20.0-20.5, 20.7	**HW4 DUE.** Systems and Roadmaps 1
11/11		**Veterans Day. No class.**
11/13		**HW5 DUE.** Systems and Roadmaps 2
11/18	20.3.1-2, 21.0-5, 22.0-3	**HW6 DUE.** Power, work, impulse, and potential energy for particles.
11/20		**Midterm 3:** Particle and Rigid Body Dynamics
11/25	17.4, 20.4.1-2	Power, work, impulse, and potential energy for rigid bodies.
11/27	page 323-324	**HW7 DUE.** Advanced Topics 1
12/2		Advanced Topics 2
12/4		**HW8 DUE.** MIPSI / Catch up as needed.
12/9	pages 333-339	**MIPSI DUE.** Course review.
12/12		Final Exam, 2:45-5:00pm. Comprehensive.