

ME 101 Dynamics
Spring 2016

Prerequisites: CE 95 or CE 99 and Math 32 (with a grade of C- or better in each)

Credit Units: 3 units

Instructors and Meeting Rooms:

Section 1 (25516)	TTH 16:30 – 17:45	Room ENG 341: Prof. R. Agarwal, Office 310 D
Section 2 (23813)	MW 10:30 – 11:45	Room ENG 486: Prof. S. Bashash, Office: E310 I
Section 3 (29755)	MW 1:30 – 2:45	Room 232, Prof. Katelyn Cahill-Rowley: E 248
Workshop, ME 180	MW 6:00 - 7:20 PM	Room E135, Michael Signorelli

Course Coordinator: Prof. R. Agarwal, E 310D, email: raghu.agarwal@sjsu.edu

Instructors Contact Information

Prof. R. Agarwal, E 310D, email: raghu.agarwal@sjsu.edu

Prof. S Bashash, E 310I, email: saeid.bashash@sjsu.edu

Prof. K. Cahill, Office: TBA: kcct@stanford.edu

Michael Signorelli: Office: TBA: michael.p.signorelli@gmail.com

Office hours: Check with your instructor

COURSE DESCRIPTION: Vector Mechanics. Motion of particles and rigid bodies. Force, energy, and momentum principles.

Required Text: Engineering Mechanics: Dynamics, 7 the Edition, by J. L Meriam, L. G. Kraige, and J. N. Bolton

Grading Metrics:	Homework	10%
	Midterms	45%
	Daily Quizzes	5%
	Final Exam	40%
	Extra Credits	4%

Grading Scale

95.0-100 A+, 90.0-94.9 A, 87.0-89.8 A-, 85-86.9 B+, 80-84.9 B, 77-79.9 B-, 75-76.9 C+, 70-74.9, C 67-69.9 C-, 65-66.9 D+, 60-64.9 D, 57-59.9 D-, Below 57 F

Course Goals

1. To learn fundamental concepts and principles of particle and rigid body motion
2. To learn fundamental concepts and principles of particle and rigid body kinetics
3. Application of Newton's second law to solve problems in particle and rigid body dynamics
4. Application of energy and momentum methods to solve problems in particle and rigid body dynamics.
5. In the context of B.S. Mechanical Engineering program assessment, this course is intended to help students achieve ABET Student Outcome 3a: "an ability to apply knowledge of mathematics, science, and engineering." For more information on ABET Student Outcomes, please see <http://www.abet.org/eac-criteria-2015-2016/>.

Student Learning Objectives

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

1. Distinguish kinematics and kinetics in dynamics of solids
2. Develop analytical models for a given dynamic situation using particle and rigid body dynamics theories.
3. Characterize a motion to be rectilinear, curvilinear, planar rigid body dynamics.
4. Describe the motion of a particle in terms of kinematics for general curvilinear motion as well as in moving reference frames.
5. Apply Newton's Second Law in solving particle and rigid body dynamics problems.
6. Apply principle of energy and momentum principles in solving problems involving particles and 2-D rigid bodies in motion and subject to impact.
7. Apply vector mechanics, differential equations and integral calculus as needed in modeling and solving dynamics of engineering systems.

Academic Integrity

Students in this course are expected to maintain high ethical standards in all matters pertaining to the course, including, but not limited to, examinations, homework, and course assignments. Cheating and plagiarism are violations of the SJSU Policy on Academic Dishonesty (S98-1) and will not be tolerated in the class. Students are expected to have read the Policy, which is available at:

<http://www.sjsu.edu/senate/docs/S07-2.pdf>

Campus Policy on Disability

If you need course adaptation or accommodation because of a disability, or if you need to make special arrangements in case of building evacuation, please make an appointment with the Accessibility Education Center (AEC) or visit their web site at: <http://www.sjsu.edu/aec/> Presidential Directive 97-03 requires that students with disabilities requesting accommodation must register with the AEC at:

<http://www.sjsu.edu/aec/>

Other Useful Information

1. The passing grade in this course, for students majoring in Mechanical Engineering, is a C-. Those receiving a grade lower than C- will be placed on probation and will be allowed another attempt to pass the course with a grade of C- or better. Failure to pass this course in two successive attempts will result in disqualification from the ME program.

2. You are encouraged to visit your instructor during his/her Office Hours to discuss any problems or to get extra help in the course.

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 (normally 3 hours per unit per week with 1 of the hours used for lecture) for instruction or preparation/studying or course related activities including but not limited to internships, labs, clinical practice. Other course structures will have equivalent workload expectations as described in the syllabus

4. **Bonus Points:** In addition to the assigned homework, there are pre-lecture extra credit problems on the Wileyplus web site. You can earn up to 4% of bonus points, which will be added to your semester grade, giving you an opportunity to improve your course grade.

5. There are two ME 180 Workshops scheduled to provide extra help with the homework problems. The attendance is not mandatory and the workshops are open to all sections and you can attend either or both workshops as your schedule permits.

6. College of Engineering Student Success Center is a good source for getting advice on learning and career opportunities. You can get more information on their web site at:
<http://engineering.sjsu.edu/students/success-center>.

7. Schedule is subject to change with fair notice via announcement in class or via course website.

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Course Schedule Spring 2016

(The weekly schedule is tentative and subjected to change)

Wk. No.	Subject	Reading Assignment	Homework
Week 1	Enrollment and Course organization, Introduction to dynamics Kinematics (motion) of a particle - Straight line		
Week 2	Chapter 2: Kinematics of a particle. Curvilinear motion Rotational (angular) motion - normal & tangential components.		
Week 3	Chapter 2: Polar and cylindrical coordinates.		
Week 4	Chapter 3: Kinetics of a particle, Newton's Second Law. Equation of motion – rectangular coordinates. Equation of motion – normal & tangential coordinates. Equation of motion – Polar coordinates.		
Week 5	Chapter 3: Work & Energy – work done by a force. Principle of work and energy, Potential energy, Conservative forces, conservation of energy.		
Week 6	Chapter 3: Principle of linear impulse and momentum, Conservation of linear momentum, Impact.		
Week 7	Chapter 4: Kinetics of System of Particles.		
	Midterm Exam (After end of chapter 4)	Date: TBA	
Week 8	Chapter 5: Kinematics of Rigid Bodies. Absolute, and relative velocity and acceleration		
Week 9	Chapter 5: Kinematics of a Rigid Bodies; Relative Velocity.		
Week 10	Chapter 5: Kinematics of a Rigid Bodies; Relative Acceleration.		
Week 11	Chapter 6: Planar Kinetics of Rigid bodies:		

	Newton's Second Law.		
Week 12	Chapter 6: Planar Kinetics of a Rigid bodies: Work & Energy		
Week 13	Chapter 6: Planar Kinetics of a Rigid bodies: Impulse and Momentum		
Week 14	Chapter 6: Planar Kinetics of a Rigid bodies: Impulse and Momentum		
Monday, May 16	Last Day of Classes		
Wednesday, May 25, 2016	Common Final Exam: 9:45 – 12:00		

NOTE 1: In addition to the midterm and final exam, there would be several weekly quizzes

NOTE 2: The final exam is common to all sections and will be given on the Final Exam Make-up day:
May 25, 2016

NOTE 3: **Extra Help:** There are two workshops scheduled to help you with the homework assignments. You can attend either or both the workshops.

Note 4: You can earn some extra credits, up to 4%, which will be added to your course grades. All you need to do is to work on the Reading Quizzes before you come to the first lecture each week. Reading quizzes are designed for learning the basic concepts of the material that will be covered during the week. The quizzes are simple and easy and based on the conceptual questions that you can easily answer by reading the textbook.

Important Dates:

January 28: First Day of Instructions

February 9: Last Day to drop a class

February 16: Last day to add a course

March 28 – April 1: Spring recess

March 31: Cesar Chavez Day – Campus closed

May 16: Last day of instructions

May 18 – May 24: Final Exams

May 25: Final Exam Make up day

May 27: Grades due

Midterm 1: Week of March 1

Midterm 2: Week of April 4

Final Exam: May 25