SAN JOSÉ STATE UNIVERSITY
Department of Mechanical Engineering

ME 101 Dynamics
Fall 2018

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 (41576)	TR 1330-1445	Room ENG 327: Prof. R. Agarwal, Office: E310 D
Section 2 (42875)	TR 1500-1615	Room ENG 327 Prof. R. Agarwal, Office: E310 D
Section 3 (42876)	MW 1330-1445	Room ENG 327 V. Viswanathan
Section 4 (44459)	MW 1030-1145	Room ENG 303 B. Furman
Section 5 (44845)	MW 1500-1615	Room ENG 303 P. Boylan-Ashraf/K. Youssefi
Section 6 (47074)	MW 1630-1745	Room ENG 303 P. Boylan-Ashraf/K. Youssefi
Section 7 (47166)	TR 1500-1615	Room ENG 303 R TSOU

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. R. Tsou E348, email: rctsou123@gmail.com
Prof. V. Viswanathan, E 310A, email:vimal.viswanathan@sjsu.edu
Prof. P. Boylan-Ashraf, E 233I, email**:** peggy.boylan-ashraf@sjsu.edu
Prof. K Youssefi, E348, email: kourosh.youssefi@sjsu.edu

Dr. Agarwal's Office hours: T Th 16:30 to 18:00 room E310D

(Check with your own instructor for the Office Hours if you are not in Dr. Agarwal's section)

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

Required Text: Vector Mechanics for Engineers, 12th Edition, McGraw Hill Education, by Beer, Johnston, Cornwell, and Self

Grading Metrics:	Homework	10%
	Midterms 1	15%
	Midterm 2	15%
	Pre-class Assignment	15%
	30-minutes Concept Quizzes (2)	5%
	Class Participation	5%
	Final Exam	35% (Comprehensive)

Grading Scale
95-100 A+, 90-94 A, 87-89 A-, 85-86 B+, 80-84 B, 77-79 B-, 75-76 C+,70-74 C,
67-69 C-, 65-66 D+, 60-64 D, 57-59 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 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-2016-2017/.

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; application of energy method for 2-D rigid bodies in motion.
7. Apply vector mechanics, differential equations and integral calculus as needed in modeling and solving dynamics of engineering systems.

University Policies:

Office of Graduate and Undergraduate Programs **maintains university-wide policy information relevant to all courses, such as academic integrity, accommodations, etc.**"
You may find all syllabus related University Policies and resources information listed on GUP's Syllabus Information web page at http://www.sjsu.edu/gup/syllabusinfo/

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. The online Canvas/McGraw Hill Connect pre-class activities are 15% of your total grades and an integral part of this course. You must complete the assigned activities to pass this course successfully.

3. Success in this course is also 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 for every lecture, with 1 of the hours used for lecture). Since Dynamics is much more challenging, you would need to spend more time, depending on your fundamental understanding of math and physics courses.

4. There are four ME 180 Workshops scheduled to provide extra help in this course. The attendance is mandatory for those who have failed this course once before. The workshops are open to all sections. You are strongly encouraged to register and attend any one or more scheduled workshops that fit into your schedule. The add code for the workshops are available in the ME office.

5. 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.

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

Overview of the Course Structure: This course has three main components:

a. Pre-class Activities

To be successful in this course (and in general, any course), you must come prepared in the regularly scheduled classes; you will better understand the material being covered in the class. The pre-class activities will require you to spend up to **an hour** of reading and working on the quiz (depending on your math and physics background, it may take less or more time). You will be asked to read the assigned material, before coming to the class and answer some simple quiz questions. You are not expected to learn everything on the assignment but get familiar with the basic concepts outlined in the material. The quizzes are mostly consisting of the conceptual questions from your Dynamics textbook, and some additional questions added by your instructor. The questions are very simple and designed to quiz your basic understanding of the material, which will be covered in the class. You are not required to obtain 100% correct answer to be eligible for full credit but must score at least 60% on a given assignment to receive credit for it, otherwise the assignment will be considered as incomplete and no credit will be given.

The overall grade for the pre-class activities is: 15%

To be eligible for the 15% grade, you must complete all the reading assignments. The grade will be prorated based on the number of completed assignments and your performance on the reading quizzes. To be eligible for the full 15% grade, you need to complete all the reading quizzes and obtain 80% or more on each assignment.

b. In-class Activities

The goal of the in-class activities is to discuss and clarify the basic concepts and apply the theory by working on problems individually and in small groups. You will complete most of your homework assignment in this session. This session also includes the scheduled Quizzes and midterm exams.

3. Post Class Activities

You will be assigned one or two problems to be worked on individually. You can get help on this homework or for any other questions by attending one of the scheduled Dynamics workshops.

ME 101 Dynamics

Course Schedule Fall 2018

(The weekly schedule is tentative and subject to change)

Homework will be assigned through the McGraw Hill Connect website. Access code must be purchased to use the website.

Lectures: Week of	**Topic**	**Homework Assignment**
August 20	Chapter 11.1: Rectilinear Motion of Particles	
August 27	Chapter 11.2: Uniformly Accelerated Motion	
	Chapter 11.2: Motion of Pulleys	
Sept 3 Sep3: NC	Chapter 11.3: Graphical Method	
Sept 10	Chapter 11.4: Curvilinear Motion - Motion of Projectiles Chapter 11.5: Tangential and Normal Coordinates	
	QUIZ 1	
Sept 17	Chapter 11.5: Radial and Transverse Coordinates	
Sept 24	Chapter 12.1: Newton's 2nd Law, Rect Motion	
	Chapter 12.1: Newton's 2nd Law, Curved Motion	
October 1	Chapter 12.2: Angular Momentum	
	EXAM 1	
October 8	Chapter 13.1: Energy method	
	Chapter 13.2: Conservation of Energy method	
October 15	Chapter 13.3: Impulse and Momentum	
	Chapter 13.4: Impact, Direct Central Impact	
October 22	Chapter 13.4: Impact, Oblique Impact	
	Chapter 14.1: System of Particles	
October 29	Chapter 14.2: System of Particles, Energy and Momentum **QUIZ 2**	
Nov 5	Chapter 15.1: Translation and Rotation of Rigid Bodies	
	Chapter 15.2: Absolute and Relative motion of Rigid Bodies	
Nov 12	Chapter 15.2: Absolute and Relative motion of Rigid Bodies	
Nov 19 11/22- NC	Chapter 15.3: Instantaneous Center	
Nov 26	**EXAM 2**	
	Chapter 15.4: General Plane Motion, Acceleration	
Dec 3	Chapter 16: Kinetics of Rigid Bodies	
	Chapter 16: Kinetics of Rigid Bodies	
December 10	Chapter 16: Constrained Plane Motion	
December 19	**Final Examinations**	Dec 19, 8:00 – 10:15

IMPORTANT NOTE: The Final Exam is common to all the sections and is scheduled for December 19, 2018

Important Dates:
August 21: First Day of Instructions
September 3: Labor Day, campus closed
September 10: Last day to add a course
November 12: Veteran Day, campus closed
November 22-23: Thanksgiving Holiday – Campus closed
December 10: Last day of instructions
December 19: Final Exam

NOTE 1: In addition to the midterms and final exam, there would be reading quizzes

NOTE 2: The final exam is common to all sections and will be given on the Final Exam Make-up day: December 19, 2018.

NOTE 3: **Extra Help**: There are four workshops scheduled to help you learn the fundamental concepts of dynamics and help you with your homework assignments. You can attend any one of the four workshops, and also, get help on one-on-one with the tutors by making an appointment.

NOTE 4: You must satisfy the pre-requisites listed above. Submit a hardcopy of the courses that satisfy the requirement. Make sure to highlight the courses.