SAN JOSÉ STATE UNIVERSITY
Department of Mechanical Engineering

ME 101 Dynamics
Fall 2022

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 (41516)	TTH 1:30-2:45	HYBRID: Prof. Agarwal
Section 3 (42505)	TTH 9:00-10:15	SEMINAR: Prof. Syed Zaidi
Section 5 (51083)	TTH 10:30-11:45	HYBRID: Prof. Agarwal
Section 81 (44911)	TR 10::30 – 11:45 AM	SEMINAR: Prof. Rex Tsou
Section 82 (44912)	TR 1::30 – 2:45 PM	SEMINAR: Prof. Rex Tsou

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

Instructors Contact Information
Prof. R. Agarwal, email: raghu.agarwal@sjsu.edu
Prof. R. Tsou, email: rctsou123@gmail.com
Prof. Syed Zaidi, email: syed.zaidi@sjsu.edu

Dr. Agarwal's Office hours: Tuesdays and Thursdays: 3:00 –4:00 PM and by appointment

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

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

Grading Metrics:

Homework	5% (from Connect)
Reading Quizzes	20% (Reading, Quizzes)
Weekly Quizzes	20%
Group Problems Solving	10% (Problem Solving)
Book Smart Reading	4% (On Connect)
Pre-Class Videos	1% (watch video and take a quiz)
Midterm	20% (Particle Dynamics)
Final Exam	20% (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 kinematics
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. 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 motion.
7. Apply vector mechanics, differential equations and integral calculus as needed in modeling and solving dynamics of engineering systems.

University Policies

Per University Policy S16-9 *(http://www.sjsu.edu/senate/docs/S16-9.pdf)*, relevant university policy concerning all courses, such as student responsibilities, academic integrity, accommodations, dropping and adding, consent for recording of class, etc. and available student services (e.g. learning assistance, counseling, and other resources) are listed on Syllabus Information web page (http://www.sjsu.edu/gup/syllabusinfo), which is hosted by the Office of Undergraduate Education. Make sure to visit this page to review and be aware of these university policies and resources

Course Requirements and Assignment

For students majoring in Mechanical Engineering, the passing grade in this course is a C-. Any ME major 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. Non-ME majors do not have this requirement.

This class uses the proven effective method of learning a difficult subject. It uses the flipped class mode, in which you learn the subject by an active participation in class and a pre-class preparation by reading and working on simple quizzes.

To help you with the homework, pre-class quizzes, and any conceptual questions, a tutor has been appointed. You can contact him by phone or email. The contact information is given at the end of this syllabus.

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

a. Pre-class Activities

To be successful in this 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 **one to two hours** of reading and working on the quiz (depending on your math and physics background, it may take less or more time) and sometimes watching a short video lecture.

You will be asked to read the assigned material via McGraw Hill's Book Smart System 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 pre-class quizzes are mostly consisting of the conceptual questions from your Dynamics textbook and some additional work problems. The questions are simple and

designed to quiz your basic understanding of the material, which will be covered in the class. The quizzes will be posted on Canvas; you will work them within CANVAS.

You will also be assigned to watch in CANVAS some technical videos and answer the associated questions. All the videos will have embedded quizzes and these quizzes will be graded. Please note that if you skip a certain part of the video, you may also miss a question embedded in there. To obtain 100% grade for watching the videos, you must obtain 100% on the embedded quizzes. You can re-watch the videos and attempt the quiz again before submission.

Recommendation on How to Score High Grades on Pre-Class Quizzes:

1. Complete the Book Smart Assignment
2. Review the Book Smart material in your textbook one more time and rework the example problems without looking at the solution
3. Watch the video, if assigned
4. Complete the Reading Quiz. Contact the tutor if you need any help with the quiz.
5. Make a list of questions to be asked when the class starts.

b. In-class Activities

The goal of the in-class activities is to answer any questions you might have from your pre-class assignments, discuss the complex concepts, and alternately, work on problems in small groups and with the help of the instructor and take a short weekly quiz. You will submit an individual pdf copy of the group problem solution for credit. The weekly quiz answers will be submitted in Canvas. (All the lecture activities will be conducted on Zoom video).

3. Post Class Activities

Additionally, homework problems will be assigned from Connect to be worked individually after the class.

Lectures Schedule Fall 2022

(The weekly schedule is tentative and subject to change)

Homework will be assigned from the McGraw Hill Connect website. Access code must be purchased to use the website. All the homework assignments will be posted in CANVAS

Week #	Date	Lec #	Topic	
1	**Aug 23**		Syllabus and Course Overview	
	Aug 25	1	Chapter 11.1: Kinematics of a Particle	
2	**Aug 30**	2	Chapter 11. 2: Uniform Acceleration	
	Sep 1	3	Chapter 11.2C: Interconnected particle Motion: Pulleys	
3	**Sep 6**	4	Chapter 11.3: Graphical Solution	
	Sep 8	5	Chapter 11.4: Motion of a Projectile	
4	**Sep 13**	6	Chapter 11.5A: Tangential and Normal Components	
	Sep 15	7	Chapter 11.5B: Radial and Transceivers Components	
5	**Sep 20**	8	Chapter 12.1: Newton's Second Law of Motion	
	Sep 22	9	Chapter 12.1: Newton's Second Law of Motion	
6	**Sep 27**	10	Chapter 12.1: Newton's Second Law of Motion	
	Sep 29	11	Chapter 13.1: Work and Energy Methods	
7	**Oct 4**	12	Chapter 13.2: Power and Efficiency, Potential Energy	
	Oct 6	13	Chapter 13.2: Conservation of Energy Method	
8	**Oct 11**	14	Chapter 13.3: Impulse and Momentum Method	
	Oct 13	15	Chapter 13.3: Conservation of Momentum Method	
9	**Oct 18**	16	Chapter 13.4: Impact - Central	
	Oct 20	17	Chapter 13.4: Impact – Oblique	
10	**Oct 25**		**Review**	
	Oct 27		**Midterm**	
11	**Nov 1**	18	Chapter 15.1: Kinematics of Rigid Bodies	
	Nov 3	19	Chapter 15.2: General Plane Motion	
12	**Nov 8**	20	Chapter 15.2: Relative Velocity	
	Nov 10	21	Chapter 15.3: Instantaneous Center of Rotation	
13	**Nov 15**	22	Chapter 15.4: Absolute and Relative Acceleration	
	Nov 17	23	Chapter 15.4: Acceleration - Review	
14	**Nov 22**	24	Chapter 16.1: Kinetics of a Rigid Body, Translation	
	Nov 24		**Thanksgiving Holiday**	
15	**Nov 29**	25	Chapter 16.1: Rigid Body Rotation	
	Dec 1	26	Chapter 16.2: Moment of Inertia	
16	**Dec 6**	27	Chapter 16.2: Kinetics: Rotation	
	Thursday, Dec 15	**12/15/22**	**Final Exam: 10:15 – 12:30**	

Important Dates

Friday, August19: First day of Instructions
Monday, September 5: Labor Day – Campus closed
Friday, November 11: Veteran's Day, Campus Closed
Thursday, Nov 24: Thanksgiving Holiday
Tuesday, Dec 6: Last Day of Instructions

Tutor

Raj Singh (by appointment)
Phone: (408) 876-8406
email: Raj.singh@sjsu.edu

Connect Tech Support

Phone: (800) 331-5094