

**Wheeling Jesuit University**  
**Department of Engineering**  
**ENGR 244, Engineering Mechanics Dynamics**  
**Spring 2019**

**Instructor:** Neetika Sharma

**Office:** Donahue Hall, Room 110

**Email:** [nsharma@wju.edu](mailto:nsharma@wju.edu)

**Office Hours:** MWF 12 p.m. - 1 p.m., or by appointment

**Course Description:** This course introduces the concepts of engineering based on forces in equilibrium. Topics include concentrated forces, distributed forces, shear and moment forces, and forces due to friction and inertia as they apply to systems, structures, and machines. Pre-requisite: PHY 110. Co-requisite: MAT 112.

**Textbook:** Vector Mechanics for Engineers, Dynamics, 11<sup>th</sup> Edition Beer, Johnston, Cornwell, Self

Wheeling Jesuit University Primary Educational Goals: This course develops critical thinking and creative skills in the discipline of engineering mechanics, specifically the motion of particles, rigid bodies and systems of rigid bodies. Upon completion of this course, students will be able to apply fundamental engineering principles, and analyze and evaluate systems in motion using various techniques.

**Learning outcomes:** Upon successful completion of this course:

1. Students will be able to apply kinematics to the motion of particles, rigid bodies and systems of rigid bodies and demonstrate an ability to:
  - a. Solve the problems related to rectilinear and curvilinear motions of particles problems
  - b. Apply energy and momentum methods to kinetics of particles problems
  - c. Analyze motion with respect to a rotating axis
2. Students will be able to apply Newton's fundamental law of motion to particles, rigid bodies and systems of rigid bodies and demonstrate an ability to:
  - a. Draw complete and correctly label free-body diagrams of particles, rigid bodies, and systems of rigid bodies
  - b. Write appropriate equations from free-body diagrams
  - c. Solve linear and angular momentum kinetics problems

3. Students will be able to apply dynamics to mechanical vibration and demonstrate an ability to:
- a. Define, compare, and contrast simple harmonic motion, undamped free and forced vibrations, and damped free and forced vibrations.
  - b. Use Newton's second law to determine the differential equation of motion of a particle or rigid body undergoing vibratory motion.
  - c. Calculate natural circular frequency, period, and natural frequency for simple harmonic motion
  - d. Calculate the maximum amplitude and the magnification factor for a body undergoing forced vibrations.

---

**Last Date to Drop the Course:** The last day of the Add/Drop Period for this semester is Friday, January 11, 2018. The last day to withdraw from this course with a grade of a W is Tuesday, March 26, 2018.

**Academic Integrity Statement:** Students are advised that WJU's Academic Integrity Policy will strictly be enforced in this course (see [www.wju.edu/studenthandbook](http://www.wju.edu/studenthandbook)). Questions regarding the policy may be directed to the Office of the Academic Vice-President Official E-mail: An official WJU e-mail is established for each registered student, each faculty member, and each staff member. All university communications sent via e-mail will be sent to this WJU e-mail address.

All Campus Life Policies apply. Specifically, the Campus Life: Academic Dishonesty & Integrity Policy ([http://www.wju.edu/about/hr/policies/cl\\_academicdishonesty.asp](http://www.wju.edu/about/hr/policies/cl_academicdishonesty.asp)).

- Collaboration is encouraged for all out-of-class assignments

- In-class evaluations are individual effort ... open textbook (WCO) and a calculator

**The Academic Resource Center:** The Academic Resource Center (ARC) is a totally free academic-support service available to all enrolled Wheeling Jesuit University students and staffed almost exclusively by WJU students recommended for employment by WJU faculty. The ARC is located in Bishop Hodges Library and is open five days a week:

Sundays 6:00-8:00 p.m.  
Mondays-Thursdays 1:00-9:00 p.m.

Please visit the ARC's website (readily accessible on the Cardinal homepage under "Quick Links" or as the first listing under "Student Services") [www.wju.edu/arc](http://www.wju.edu/arc) to learn about the ARC's services (emphasizing writing, math, and the sciences) and to schedule appointments. Disability Statement: Wheeling Jesuit University offers students with documented disabilities individual accommodations on a case-by case basis with confidentiality in compliance with the American with Disabilities Act and Section 504 of the Rehabilitation Act of 1973.

In order to receive academic or physical accommodations, students with disabilities must provide current (within three years) and comprehensive documentation concerning the nature and extent of the disability and communicate their needs to the Disability Services Director, located in Ignatius Hall Room G 24 or call 304-243-4484. Students are required to meet with the director to develop accommodation plans that they will present to their course instructors at the beginning of each semester. Students with disabilities that require specific housing accommodations must contact both the Director of Residence Life and the Disability Services Director. Ultimately, all students with disabilities are responsible for their own academic achievement. They must attend classes, complete course assignments, and fulfill all university requirements for their chosen field of study. It is up to students with disabilities to seek out available assistance on campus and to utilize individualized accommodations that promote academic success.

---

**Title IX Statement:** Wheeling Jesuit University seeks to provide an environment that is free of bias, discrimination, and harassment. If you have been the victim of sexual harassment, misconduct, or assault we encourage you to report this. If you report this to a faculty member, she or he must notify our college's Title IX coordinator about the basic facts of the incident (you may choose whether you or anyone involved is identified by name). For more information about your options at WJU, please go to <http://wju.edu/titleix/>

**Course grading:**

Out-of-class assignments <sup>1</sup>	15%
Exams (4 x 15% each) <sup>2</sup>	60%
Final Exam <sup>2</sup>	25%

1. Students are required to submit a minimum of one problem per assignment as identified by the syllabus. Students are encouraged to submit more than one problem, as the Exams will all closely resemble out-of-class assignments. In the event more than one problem is submitted, the best problem score will be recorded.

2. Exams will closely resemble out-of-class assignments.

**Course Grade Assignments:**

A	93% and above	C+	77-79%
A-	90-92%	C	73-76%
B+	87-89%	C-	70-72%
B	83-86%	D+	67-69%
B-	80-82%	D	60-66%
		F	59% and below

**Course Outline:**

Chapter 11

1<sup>st</sup> exam, last week of January

Chapter 12 and 13

2<sup>nd</sup> exam, last week of February

Chapter 14 and 15

3<sup>rd</sup> exam, last week of March

Chapter 16, 17 and 19

4<sup>th</sup> exam, mid April

Final exam (cumulative), Wednesday May 1<sup>st</sup>, 2:00 p.m. - 4:30 p.m.