



JOHN CABOT UNIVERSITY

COURSE CODE: "ENGR 240"
COURSE NAME: "Dynamics"
SEMESTER & YEAR: **Summer Session II 2021**

SYLLABUS

INSTRUCTOR: Jon-Michael Hardin
EMAIL: jhardin@johncabot.edu
HOURS: MTWTH 9:00-10:50 AM
TOTAL NO. OF CONTACT HOURS: 45
CREDITS: 3
PREREQUISITES: Prerequisites: ENGR 210, MA 495
OFFICE HOURS:

COURSE DESCRIPTION:

This course provides an introduction to the fundamental concepts of dynamic behavior of particles and rigid bodies. Students will understand the need for different coordinate systems and different frames of reference, as well as their relation to position, velocity, and acceleration. The concepts of work and energy, and impulse and momentum will be discussed, with an emphasis on how to make a proficient use of them.

SUMMARY OF COURSE CONTENT:

Fundamentals of the motion of particles and rigid bodies including kinematics and kinetics.

LEARNING OUTCOMES:

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

1. Write and solve the appropriate scalar and vector equations for particles in rectilinear and curvilinear motion.
2. Write and solve the appropriate scalar and vector equations for rigid bodies in translation, rotation, and planar motion.
3. Write and solve the appropriate equations for motion using the Newton's 2nd law, work-energy, and momentum methods.
4. Use vector algebra to solve dynamics problems.
5. Begin to solve open-ended problems.

TEXTBOOK:

Book Title	Author	Publisher	ISBN number	Library Call Number	Comments
Vector Mechanics for Engineers: Dynamics	Beer and Johnson (Cornwell, Self, Mazurek)	McGraw Hill	9781259977305		Be sure to get the 12th Edition!

TEXTBOOK:

NONE

REQUIRED RESERVED READING:

NONE

RECOMMENDED RESERVED READING:

NONE

GRADING POLICY

-ASSESSMENT METHODS:

Assignment	Guidelines	Weight
Homework	Homework will be assigned and graded. Homework will count for 15% of the course grade.	15%
Exams	Three in-class exams will be given. The exam average will count for 50% of the course grade.	50%
Final Exam	The Final Exam is comprehensive and optional. For those who choose to take the Final Exam, it will count for 35% of the course grade.	35%

-ASSESSMENT CRITERIA:

A Work of this quality directly addresses the question or problem raised and provides a coherent argument displaying an extensive knowledge of relevant information or content. This type of work demonstrates the ability to critically evaluate concepts and theory and has an element of

novelty and originality. There is clear evidence of a significant amount of reading beyond that required for the course.

BThis is highly competent level of performance and directly addresses the question or problem raised. There is a demonstration of some ability to critically evaluate theory and concepts and relate them to practice. Discussions reflect the student's own arguments and are not simply a repetition of standard lecture and reference material. The work does not suffer from any major errors or omissions and provides evidence of reading beyond the required assignments.

CThis is an acceptable level of performance and provides answers that are clear but limited, reflecting the information offered in the lectures and reference readings.

DThis level of performance demonstrates that the student lacks a coherent grasp of the material. Important information is omitted and irrelevant points included. In effect, the student has barely done enough to persuade the instructor that s/he should not fail.

FThis work fails to show any knowledge or understanding of the issues raised in the question. Most of the material in the answer is irrelevant.

-ATTENDANCE REQUIREMENTS:

Attendance is not taken in the course. However, students that miss even a single day of lecture are likely to fall behind in the course material. Each concept introduced in the course builds on mastery of previous concepts. The best strategy for success in this course is to attend every single lecture diligently.

Please refer to the university catalog for the attendance and absence policy.

ACADEMIC HONESTY

As stated in the university catalog, any student who commits an act of academic dishonesty will receive a failing grade on the work in which the dishonesty occurred. In addition, acts of academic dishonesty, irrespective of the weight of the assignment, may result in the student receiving a failing grade in the course. Instances of academic dishonesty will be reported to the Dean of Academic Affairs. A student who is reported twice for academic dishonesty is subject to summary dismissal from the University. In such a case, the Academic Council will then make a recommendation to the President, who will make the final decision. **STUDENTS WITH LEARNING OR OTHER DISABILITIES**

John Cabot University does not discriminate on the basis of disability or handicap. Students with approved accommodations must inform their professors at the beginning of the term. Please see the website for the complete policy.

SCHEDULE

SCHEDULE			
Session	Session Focus	Reading Assignment / Other Assignment	Meeting Place/Exam Dates
Week 1	<u>Chapter 11: Particle Motion</u> Rectilinear motion Curvilinear motion: - Rectangular components - Tangential & Normal components - Radial & Transverse components <u>Ch. 15: Rigid Body Motion</u> Translation & Rotation	HW	
Week 2	<u>Ch. 15: Rigid Body Motion (cont'd)</u> General Plane Motion-Velocity General Plane Motion – Acceleration Velocity & Acceleration with respect to a moving frame	HW	Quiz 1
Week 3	<u>Ch. 12: Kinetics of a Particle</u> Newton's 2 nd Law <u>Ch. 16: Kinetics of Rigid Bodies</u> Newton's 2 nd Law	HW	Quiz 2

	Constrained plane motion <u>Ch. 13: Particle: Work-Energy Principles</u> Potential Energy & Conservation of Energy		
Week 4	<u>Ch. 17: Rigid Bodies: Work-Energy Principles</u> <u>Chs 12&13: Particle-Impulse & Momentum</u> <u>Ch. 17: Rigid Bodies: Impulse Momentum</u>	HW	Quiz 3
Week 5	<u>Ch. 17: Rigid Bodies: Impulse Momentum (cont)</u> <u>Ch. 13: Particles: Impact</u> <u>Ch. 17: Rigid Bodies: Impact</u>	HW	Final Exam COMPREHENSIVE

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