Philadelphia University

Faculty of Engineering and Technology
Department of Mechanical Engineering

Course Information

Course Title: **Dynamics (620212)**

Prerequisite: Statics (620211)

Credit Hours: credit hours (16 weeks per semester, approximately 44 contact hours)

Textbook: Engineering Mechanics-Dynamics-14th edition by R. C. Hibbeler

References: Dynamics-7th edition by J. Meriam and L. Kraig

Course Description: The study of plane motion and force systems on particle, system of particles and rigid bodies. It will be an overview of the application of Newton's Laws to rectilinear and curvilinear motions. Work-energy principle, and impulse-momentum, will also be studied.

Course requirements: Computer, internet connection and webcam

Instructor: Laith R. Batarseh, MSc
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Course Topics:

Week	Topic
1	-Introduction -Rectilinear Kinematics: Continuous Motion
2	- General Curvilinear Motion of Particles - Rectangular Components -Motion of a Projectile
3	-Normal and Tangential Components -Absolute Dependent Motion of Two Particles
4	-Relative motion of two Particles using Translating axes.
5	-Kinetics of Particles: Newton's 2nd Law -Equation of Motion: Rectangular Coordinates, Equation of Motion for a System of Particles
6	-Equation of Motion: Normal and Tangential Coordinates
7,8	-The Work of a Force -Principle of Work and Energy -Principle of Work and Energy for a System of Particles
9	-Conservative Forces and Potential Energy -Conservation of Energy
10	-Kinematics of rigid bodies: rotation, absolute motion, relative velocity method
11,12, 13	-Planer Kinematics of rigid bodies: instantaneous center method, velocity triangle and acceleration polygon.
14, 15	-Planar Kinetics of rigid bodies -Moment of inertia, Planar kinetic of motion, Equation of motion: translation -Equation of motion: rotation about fixed axis. Equation of motion: general plane motion.
16	Review, and final exam

ABET Student Outcomes (SOs)

1	An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2	An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3	An ability to communicate effectively with a range of audiences
4	An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5	An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6	An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7	An ability to acquire and apply new knowledge as needed, using appropriate learning strategies

Course Learning Outcomes and Relation to ABET Student Outcomes:

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

1.	Perform kinematic analysis on particles undergoes a rectilinear or curvilinear motion	1
2.	Perform kinematic analysis on rigid bodies based on relative motion principle	1
3.	Perform kinetic analysis on particles using **Newton's second law of motion**, "**work and energy**" principle and "**impulse and momentum**" principle	1
4.	Perform kinetic analysis on rigid bodies using equations of motion	1

Teaching methodology: Online, Blended or both

Electronic platform: Microsoft-teams

Evaluation methods:

Evaluation of student's performance (final grade) will be based on the following categories:

Mid-term exam: Shall be given at the end of the seventh week of the course in the form of multiple choice questions and (or) specific problems to be solved and uploaded by the student using the University electronic platform.

Quizzes: A number of 10-minute quizzes in the form of multiple choice questions or an assignment using the University electronic platform. will be given to the students during the semester. These quizzes will cover material discussed during the previous lecture(s).

Homework: Problem sets will be given to students in the form of assignments using the University Electronic platform. Homework should be solved by each student individually and submitted using the platform before the due date.

Copying homework is forbidden, any student caught copying the homework or any part of the homework will receive zero mark for that homework

Participation: Questions will be asked during the online session (lecture) and the student is assessed based on his/her response

Final Exam: The final exam will cover all the class material.

Grading policy:

Mid-term Exam.	30%
Home works, Quizzes and participation	30%
Final Exam	40%
Total:	100%

Attendance policy:

Absence from classes and/or tutorials shall not exceed 15%. Students who exceed the 15% limit without a medical or emergency excuse, acceptable to and approved by the Dean of the relevant college/faculty, shall not be allowed to take the final examination and shall receive a mark of zero for the course. If the excuse is approved by the Dean, the student shall be considered to have withdrawn from the course.