Philadelphia University
Faculty of Engineering
Department of Computer Engineering

First Semester, 2012/2013

Course Syllabus

Course Title: Dynamics and Vibration	**Course code**: 0640233
Course Level: 2nd Year	**Course prerequisite(s):** 0620211
Lecture Time: 11:15-12:45 Mon. & Wed.	**Credit hours:** 3

Academic Staff Specifics

Name	Rank	Office No.	Office Hours	E-mail Address
Dr. Mohammad Al-Shabi	Assistant Prof.	406	11:00-13:00 Sun, Tues and Thu	mshabi@philadelphia.edu.jo

Course module description:

This course is intended to strengthen the students' capabilities in analyzing forces and torques and their effects on rigid bodies including velocity and acceleration polygons of links and mechanisms, Coriolos acceleration, center of percussion, impact, moment of inertia and free body diagrams. This course will also introduce the student to the vibration phenomenon and its importance in mechatronics and mechanical engineering as well as in structural systems. This course will introduce to the student the mathematical modeling of dynamic systems, vibration systems, its analysis and control.

Course module objectives:

The primary objective in teaching mechanics is to help the student develop his ability to apply the principles of force and acceleration, work and energy, impulse and momentum and conservation of angular momentum to analyze the motion of rigid bodies under the effect of forces and torques, in addition to study free and forced vibrations of mechanical systems.

Course/ module components:

- **Books (title , author (s), publisher, year of publication):**
  - Engineering Mechanics (Dynamics), By: R.C. Hibbeler, 13th edition, 2012, ISBN-10: **0132911272,** Prentice hall..
- **Support material (s) (vcs, acs, etc).**
- **Study guide (s) (if applicable)**
- **Homework and laboratory guide (s) if (applicable).**

Teaching methods:

Lectures, discussion groups, tutorials, problem solving, etc.

Learning outcomes:

- Knowledge and understanding: Understanding the Kinetics of particles and rigid bodies. Understanding the principles of vibration.
- Cognitive skills (thinking and analysis): Modeling the system behavior, and deriving it mathematical equations.
- Communication skills (personal and academic).
- Practical and subject specific skills (Transferable Skills).

Assessment instruments

- **Homework**. Two Assignments are needed. The first is to be submitted by the last lecture just before the first exam. The second is to be submitted by the last lecture just before the second exam. The Assignments is submitted by group of students that does not exceed 3 members. The group should propose a printed copy of the Assignments.
- **Quizzes**. Three 10-minute quizzes will be given to the students throughout the semester. These quizzes will cover material discussed during the previous lecture. These quizzes will be counted as bonus to the exams.
- **Final examination**: 40 marks

Allocation of Marks	
Assessment Instruments	**Mark**
1st examination	**20%**
2nd examination	**20%**
Assignments	**20%**
Final Examination:	**40%**
Total	**100%**

Documentation and academic honesty

- Documentation style (with illustrative examples)
- Protection by copyright
- Avoiding plagiarism.
- **Ethics and Disability Act:**
  - Students may consult with one another on solutions, but copying another student's code is strictly prohibited.
  - Students should write their own code. Using code found on books or internet is prohibited.
  - The Instructor follows general university "Academic Dishonesty/Cheating Policy".

Course/module academic calendar

week	Basic and support material to be covered	Homework
(1)	Kinematic of a Particle: Rectilinear and curvilinear motion.	
(2)	Kinematic of a Particle: System of coordinates: Normal and Tangential and cylindrical components.	
(3)	Kinematic of a Particle: Projectile motion.	
(4)	Kinetics of a particle: Newton's laws. Work and energy.	
(5)	Kinetics of a particle: Impulse and momentum principles. Impact.	
(6)	Kinetics of a particle: Relative motion. Angular momentum. Angular impulse principle.	
(7)	Kinematics of rigid bodies:	HW1
(8)	Rotation, absolute motion, relative velocity, instantaneous center, velocity triangle and acceleration polygon.	
(9)	Kinetics of rigid bodies:	
(10)	Force and acceleration, work and energy, and momentum and impulse principle.	
(11)	Kinetics of rigid bodies:	
(12)	General equations of motion, general plane motion, angular impulse and angular momentum principle, eccentric impact, center of percussion.	
(13)	Free undamped and free damped vibration, natural frequency.	HW2
(14)	Forced undamped and forced damped vibration, vibration measurement, vibration control, and shock absorbers.	
(15)		

Expected workload:

On average students need to spend 3 hours of study and preparation for each 75-minute lecture/tutorial.

Attendance policy:

Absence from lectures 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.

The student is responsible for all assignments on a weekly basis.

No make-up will be given for missed quizzes, tests or assignments, unless a case is made in advance with Instructor's approval.

Module references

- "Engineering Mechanics: Dynamics" J. Meriam and L. Kraige, 2006, ISBN-10: 0471739316, 6th edition.
- "Vector Mechanics for Engineers: Dynamics" F. Beer, Jr. Jonhnston, E. Eisenberg and P. Cornwell, 2009, ISBN-10: 0077295498 , 9th edition.
- "Schaum's Outline of Engineering Mechanics Dynamics" E. Nelson, C. Best, W. McLean and M. Potter, 2010, ISBN-10: 0071713603 , 1st edition.