Zarqa University
Faculty of Engineering Technology
Mechanical Engineering Department

<table>
<tr><td rowspan="5">Course Information</td><td colspan="3">0905362 Dynamics and Vibrations Laboratory</td></tr>
<tr><td>1 Credits</td><td>Compulsory</td><td>Fall 2014</td></tr>
<tr><td colspan="3">Prerequisites by Course: 0905361*: Mechanical Vibrations*</td></tr>
<tr><td colspan="3">Co-requisites by Course: -</td></tr>
<tr><td colspan="3">Prerequisites for:</td></tr>
<tr><td></td><td colspan="3">Schedule: Lecture, 14:00-16:00, Sunday, L314</td></tr>
<tr><td>Instructor</td><td colspan="3">Prof. Dr.-Ing. Mohammed Abu-Hilal</td></tr>
<tr><td>Contact Information</td><td colspan="3">mabuhilal@zu.edu.jo, Office L321, Phone: 05-3821100-2098</td></tr>
<tr><td>Office hours</td><td colspan="3">10:00-11:00, STTH; 8:00-9:30, MW, or by appointment</td></tr>
<tr><td>Textbook</td><td colspan="3">Laboratory Manual</td></tr>
<tr><td>References and Resources</td><td colspan="3">S.S. Rao, Mechanical Vibrations, 4th edition, Pearson Education International, 2004.</td></tr>
<tr><td rowspan="5">Evaluation Criteria</td><td>Activity</td><td colspan="2">Percent (%)</td></tr>
<tr><td>Pre-Quiz</td><td colspan="2">10</td></tr>
<tr><td>Reports</td><td colspan="2">40</td></tr>
<tr><td>Mid Exam</td><td colspan="2">20</td></tr>
<tr><td>Final Exam</td><td colspan="2">30</td></tr>
<tr><td>Course Description</td><td colspan="3">Mathematical, physical and reversible pendulums. Mass moment of inertia and radius of gyration. Center of percussion. Filar suspension. Torsional oscillation of single and two rotor systems. Transverse vibration of beams. Mass spring system (measurement of spring constant, damping ratio and amplification factor). Static and dynamic balance. Measurement of natural frequencies of different systems. Vibration absorber</td></tr>
<tr><td rowspan="4">Intended Learning Outcomes (ILO,s)</td><td colspan="2">Course Outcome</td><td>[%]</td></tr>
<tr><td colspan="2">1. Ability to conduct experiments, analyze and interpret data related to mechanical vibration and machine dynamics.</td><td>50%</td></tr>
<tr><td colspan="2">2. Ability to work in teams.</td><td>20%</td></tr>
<tr><td colspan="2">3. Ability to use devices of the laboratory properly and write scientific reports.</td><td>30%</td></tr>
<tr><td>Relationships to Program Outcomes</td><td colspan="3">b Ability to design and conduct experiments, as well as to analyze and interpret data (H)
d Ability to function on multidisciplinary teams (L)
k Ability to use the techniques, skills, and modern engineering tools necessary for engineering practice (M)
H: High L: Low M: Medium</td></tr>
<tr><td rowspan="4">Contribution to the Professional Components</td><td colspan="2">Mathematics and Basic Sciences</td><td>-</td></tr>
<tr><td rowspan="2">Engineering Topics</td><td>Engineering Sciences</td><td>50%</td></tr>
<tr><td>Engineering Design</td><td>30%</td></tr>
<tr><td colspan="2">General Education</td><td>20%</td></tr>
<tr><td rowspan="2">Course Outline</td><td colspan="2">Subject</td><td>Hours</td></tr>
<tr><td colspan="2">Introduction and Pendulums</td><td>4</td></tr>
</table>

	Centre of percussion	1
	Filar Suspension	1
	Mass-Spring system	1
	Torsional Vibrations	2
	Balancing, Gyroscope	3
	Beam Vibration, Vibration Absorber	2
	Midterm and Final Exam	2
Policies:	**Attendance** Attendance will be checked each class. *Students are expected to attend each lecture*. University regulations will be strictly followed for students exceeding the maximum number of absences. **Reports** - Reports are due at the beginning of class the day they are due. - No late reports will be accepted unless prior arrangement have been made with the instructor - *No make-up allowed on Experiments and reports*. - You can consult each other regarding reports; however, each assignment must be your own solution. Verbatim or duplicates assignments will be *regarded as cheating*. **Class participation and behavior** - Classroom participation is a part of learning; it is only by asking questions and talking through ideas that you can come to fully understand the material - Please do not engage in behavior which detracts from the ability of other students to learn. Such behaviors include arriving at class late, speaking or whispering while the instructor and students are discussing ideas or asking questions, reading messages newspapers in class, cell-phones ringing, etc.	

Course Outline

Week	Date	Topic/ Experiment
1	12/10/2014	Introduction
2	19/10/2014	Simple Pendulum
3	26/10/2014	Physical Pendulum
4	2/11/2014	Center of Percussion, radius of gyration
5	9/11/2014	Kater's Reversible Pendulum
6	16/11/2014	Bifilar and Trifilar Suspension
7	23/11/2014	Mass spring system
8	30/11/2014	Midterm Exam
9	7/12/2014	Torsional Oscillations of a Single Rotor
10	14/12/2014	Torsional Oscillations of Tow Rotors
11	21/12/2014	Transverse Vibrations of beams
12	28/12/2014	Vibration Absorber
13	4/01/2014	Static balancing
14	11/01/2014	Dynamic Balancing
15	18/01/2014	Gyroscopic Effect
16	25/01/2014	Final Exam