Zarqa University
Faculty of Engineering Technology
Mechanical Engineering Department

<table>
<tr><td rowspan="5">Course Information</td><td colspan="3">0905430 Machine Design (1) (3-0-3)</td></tr>
<tr><td>3 Credits</td><td>Compulsory</td><td>Fall 2014</td></tr>
<tr><td colspan="3">Prerequisites by Course: Mechanics of materials (0905210)*</td></tr>
<tr><td colspan="3">Co-requisites by Course: -</td></tr>
<tr><td colspan="3">Prerequisites for: Statics , Mechanics of materials .

Schedule: Lecture, 13:00-14:00, STTh, L123</td></tr>
<tr><td>Instructor</td><td colspan="3">Dr . Nazzal Slem</td></tr>
<tr><td>Contact Information</td><td colspan="3">Nazzal_Salem@yahoo.com, Office L134, Phone: 05-3821100-2041</td></tr>
<tr><td>Office hours</td><td colspan="3">10:00-11:00, STTH; 10:00-11:00, MW, or by appointment</td></tr>
<tr><td>Textbook</td><td colspan="3">SHIGLEY’S MECHANICAL ENGINEERING DESIGN, NINTH EDITION .</td></tr>
<tr><td>References and Resources</td><td colspan="3">R.C.Hebbler,Mechanics of Materials , 9th edition. 1. Statics and Dynamics .</td></tr>
<tr><td rowspan="5">Evaluation Criteria</td><td>Activity</td><td colspan="2">Percent (%)</td></tr>
<tr><td>Quizzes and Homework</td><td colspan="2">10</td></tr>
<tr><td>First Exam</td><td colspan="2">20</td></tr>
<tr><td>Second Exam</td><td colspan="2">20</td></tr>
<tr><td>Final Exam</td><td colspan="2">50</td></tr>
<tr><td>Course Description</td><td colspan="3">Introduction and Definitions. Standards and codes. Review of stress and strain in mechanical elements under the action of different types of loads. Deflection of mechanical elements including energy methods. Buckling of Columns. Static theories of failure. Fatigue and dynamic theories of failure. Design of shafts.</td></tr>
<tr><td rowspan="6">Intended Learning Outcomes</td><td>Course Outcome</td><td colspan="2">[%]</td></tr>
<tr><td>1. Master the application of basic structural mechanics learned in previous courses to the analysis and design of machine components, including fasteners, shafts, bearings, seals and gears.</td><td colspan="2">45%</td></tr>
<tr><td>2.This includes static and dynamic (impact and fatigue) failure analysis and factors of safety.</td><td colspan="2">20%</td></tr>
<tr><td>3. Become proficient in the oral communication of technical concepts.</td><td colspan="2">15%</td></tr>
<tr><td>4. Become proficient in proper professional written documentation, including design journals, formal engineering reports and engineering drawings.</td><td colspan="2">15%</td></tr>
<tr><td>5. Gain an appreciation for and familiarity with engineering as a profession.</td><td colspan="2">5%</td></tr>
<tr><td>Relationships to Program Outcomes</td><td colspan="3">a Ability to apply knowledge of mathematics, science, and engineering (H)
e Ability to identify, formulate, and solve mechanical engineering problems (H)
k Ability to use the techniques, skills, and modern engineering tools necessary for engineering practice (L)</td></tr>
<tr><td rowspan="2">Contribution to the Professional</td><td colspan="2">Mathematics and Basic Sciences</td><td>-</td></tr>
<tr><td>Engineering Topics</td><td>Engineering Sciences</td><td>90%</td></tr>
</table>

<table>
<tr><td rowspan="2">Components</td><td></td><td>Engineering Design</td><td>10%</td></tr>
<tr><td colspan="2">General Education</td><td>-</td></tr>
<tr><td rowspan="9">Course Outline</td><td colspan="2">Subject</td><td>Hours</td></tr>
<tr><td colspan="2">Introduction and Definitions. Standards and codes</td><td>12</td></tr>
<tr><td colspan="2">Review of stress and strain in mechanical elements under the action of different types of loads
Exam I (up to end of week 5)</td><td>11</td></tr>
<tr><td colspan="2">Deflection of mechanical elements including energy . methods</td><td>7</td></tr>
<tr><td colspan="2">Buckling of Columns</td><td>6</td></tr>
<tr><td colspan="2">Static theories of failure
Exam II (up to end of week 11)</td><td>6</td></tr>
<tr><td colspan="2">.Fatigue and dynamic theories of failure. Design of shafts</td><td>3</td></tr>
<tr><td colspan="2">Review, Final Exam</td><td>3</td></tr>
<tr><td>Policies:</td><td colspan="3">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.

Homework
- Homework assignment are due at the beginning of class the day they are due.
- No late homework will be accepted unless prior arrangement have been made with the instructor
- No make-up allowed on homework.
- You can consult each other regarding homework solution s 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.</td></tr>
</table>

Week	Date	Sec	Topic	Homework	Due date
1	12/10/2014	**12** 12.1 12.2	**Kinematics of a Particle** Introduction Rectilinear Kinematics: Continuous Motion		
2	19/10/2014	12.4 12.5 12.6	General Curvilinear Motion Curvilinear Motion: Rectangular Components Motion of Projectile		
3	26/10/2014	12.7 12.8	Curvilinear Motion: Normal and Tangential Components Curvilinear Motion: Cylindrical Components		
4	2/11/2014	12.9 12.10	Absolute Dependent Motion Analysis of Two Particles Relative-Motion Analysis of Two Particles Using Translating Axes		
5	9/11/2014	**16** 16.1 16.2 16.3	**Planar Kinematics of a Rigid Body** Rigid-body Motion Translation Rotation about a Fixed Axis		
6	16/11/2014	16.4 16.5 16.6	Absolute Motion Analysis Relative-Motion Analysis: Velocity Instantaneous Center of Zero Velocity		
7	23/11/2014	 16.7	**Exam I (up to end of week 5)** Relative-Motion Analysis: Acceleration		
8	30/11/2014	16.8 **17** 17.1	Relative-Motion Analysis using Rotating Axes **Planar Kinetics of a Rigid Body: Force and Acceleration** Moment of Inertia		
9	7/12/2014	17.2 17.3	Planar Kinetic Equations of Motion Equations of Motion: Translation		
10	14/12/2014	17.4 17.5	Equations of Motion: Rotation about a Fixed Axis Equations of Motion: General Plane Motion		
11	21/12/2014	**18** 18.1 18.2 18.3	**Planar Kinetics of a Rigid Body: Work and Energy** Kinetic Energy The Work of a Force The Work of a Couple		
12	28/12/2014	18.4 18.5	Principle of Work and Energy Conservation of Energy **Exam II (up to end of week 12)**		
13	4/01/2014	**19**	**Planar Kinetics of a Rigid Body:**		

		19.1 19.2	**Impulse and Momentum** Linear and Angular Momentum Principle of Impulse and momentum		
14	11/01/2014	19.3 15.4 19.4	Conservation of Momentum Impact Eccentric Impact		
15	18/01/2014	**22** 22.1 22.3	**Vibrations** Undamped Free Vibration Undamped Forced Vibration		
16	25/01/2014		Final Exam		