



Philadelphia University
Faculty of Engineering
Department of mechanical engineering
First Semester, 2016/2017

Course Syllabus

| | |
|--|--|
| Course Title: machine design -2 | Course code: (620435) |
| Course Level: forth Year | Course prerequisite (s) and/or corequisite (s): Machine design – 1, 0620434 |
| Class Time:11:10 –12:00 Sun-Tue-Thu | Credit hours: 3 |

Academic Staff
Specifics

| Name | Rank | Office Number and Location | Office Hours | E-mail Address |
|----------------------|---------------------|-----------------------------------|--|--|
| Dr. Muhammad gogazeh | Assistant professor | E61208 | 14.10:00-15:00 (Sun-Tue-Thu) | mgogazeh@philadelphia.edu.jo |

Course description:

After completion of the course the student should:

- Have knowledge about and be able to analyze different engineering elements , mechanisms and members in accordance of mechanical engineering design .
- Be able to carry out economic calculations and assess the profitability of production and investments within the field of mechanical engineering design .
- Be knowledgeable about the different fields usage and different applications of mechanical engineering design so .

Course objectives:

To provide an understanding of the mechanical engineering design, solid mechanics of different elements , members and components using basic engineering sciences .
 To understand the main principles of mechanical engineering design and mechanics of materials .

To develop critical thinking process by applying analytical and computational methods for solving mechanical engineering design problems .

Course components

- **Books (title , author (s), publisher, year of publication)**
 1. (Text Book) , mechanical engineering design, shigley ,richard budynas ,j.keith nisbett.2012 .
- **Support material (s) (Course website: Includes reference books and Course Notes, and Power Point Slides).**
- **Study guide (s)**
- **Home works.**

Teaching methods:

Lectures, tutorials, reports, and problem solving.

Learning outcomes: upon completing this course, the student should have: -

- Knowledge and understanding
 - Basic Understanding of main Concepts of mechanical engineering design .
 - material science , uncertainty , design factor of safety .
 - Basic understanding of solid mechanics concepts.
 - Understanding of the main parameters affecting the design of mechanical elements such as , hardness toughness and numbering systems .
 - How to solve the mech.eng.design problems .
 - Understanding and analyzing Load analysis problems such as shear force bending moments problems an equations .
- Understanding of the **deflection and stiffness equations of different mech.eng. design problems mainly shaft and shaft design .**
- Practical and subject specific skills (Transferable Skills) .
 - Understanding how to compute and analyze general compression members .
 - Understanding the failures resulting from static loading of screws , fasteners ,and non permanent joints .
 - understanding the failures resulting from variable and dynamic loading of bolts springs, gears, welding joints .
 - understanding the main design concepts of mechanical elements such as shaft and shaft components , bolts springs, gears, rolling contact bearings , journal bearings .

| Course Intended Learning Outcomes | | | | | | | | |
|--|-----|-----|-----|-----|-----|-----|-----|-----|
| A - Knowledge and Understanding | | | | | | | | |
| A1. | A2. | A3. | A4. | A5. | A6. | A7. | A8. | |
| | | | | | | | | |
| B - Intellectual Skills | | | | | | | | |
| B1. | B2. | B3. | B4. | B5. | B6. | B7. | B8. | B9. |

| | | | | | | | | | |
|--------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|------|
| C - Practical Skills | | | | | | | | | |
| C1. | C2. | C3. | C4. | C5. | C6. | C7. | C8. | C9. | C10. |
| D - Transferable Skills | | | | | | | | | |
| D1. | D2. | D3. | D4. | D5. | D6. | D7. | | | |

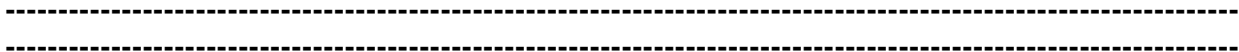
Assessment instruments

- Short reports and/ or presentations, and/ or Short research projects
- Quizzes.
- Home works
- Final examination: 50 marks

| <u>Allocation of Marks</u> | |
|--|-------------|
| Assessment Instruments | Mark |
| First exam | 20% |
| Second exam | 20% |
| Final examination: | 40% |
| Reports, research projects, Quizzes, Assignments, Projects | 20% |
| Total | 100% |

Documentation and academic honesty

- Documentation style (with illustrative examples)



- Protection by copyright
- Avoiding plagiarism.

Course academic calendar

| week | Basic and support material to be covered | Homework/reports and their due dates |
|------|--|--------------------------------------|
| (1) | Introduction and Basic Concepts of mechanical engineering design | Week 1 |
| (2) | Introduction to shaft design and shaft components | Report1 Week 2 ,3 |
| (3) | Introduction to limits and fitting | Week 4 ,Assingment1 |

| | | |
|--|--|------------------------|
| | | |
| (4) | Design of screws, fasteners and non permanent joints, | Assingment2 Week 5 |
| (5) | Welding , bonding , and design of permanent joints | Assingment3 Week 6 |
| (6) | Tutorials, review and study guide of first exam material | Report2 Week 7 |
| (7) First examination 16-24/11/2016 | Introduction to design of mechanical springs | |
| (8) | Spring design | Assingment4 Week 9 |
| (9) | Rolling contact bearings | Assingment5 Week 10 |
| (10) | Lubrication and journal bearings | Report3 Week 11 |
| (11) | Lubrication and journal bearings | Assingment6 Week 12 |
| (12) Second examination 21/12/2016- 2/1/2017 | Introduction to gears – general, fundamentals | Assingment7 Week 13 |
| (13) | Bevel and helical gear design | Assingment8 Week 14 |
| (14) | Force analysis of spur gear, worm gear ,helical and bevel gear | Assingment9 Week 15 |
| (15) | Force analysis of spur gear, worm gear ,helical and bevel gear | Report4 Week 15 |
| (16) Final Examination 28/1-5/2/2017 | Tutorials, review and study guide of final exam material | |

Expected workload:

On average students need to spend 2 hours of study and preparation for each 50-minute class/tutorial.

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.

Course references

Books

1. (References) mechanics of materials ,ninth edition , r.c.hebbler , pearsonapac.com, 2014.
2. (References) machine design by R,S KHURMI.
3. Machine design S.I units , R.S .KHURMI AND J.K GUPTA .
4. MACHINE DESIGN BY V,B BY BHANDARI , 2013

Web sites

<https://simple.wikipedia.org/wiki/mechanical> engineering design .

<http://www.learnengineering.org/2013/01/> MACHINE DESIGN .

<http://machinedesign.com/motorsdrives/formulae-handbook-design-engineers>