**Philadelphia University**
**Faculty of Engineering**
**Department of Mechatrinics Engineering**
**Second semester, 2008/2009**

# Course Syllabus

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|---|---|
| **Course Title: Pneumatic and Hydraulic Systems** | **Course code: 640444** |
| **Course Level: 4th year** | **Course prerequisite (s) and/or corequisite (s): Thermo-fluid 2 (640345)** |
| **Lecture Time: 9:10-10:00 S, T, and T** | **Credit hours: 3** |

## Academic Staff Specifics

| Name | Rank | Office Number and Location | Office Hours | E-mail Address |
|---|---|---|---|---|
| **Dr. A. Saleh** | **Assist. Prof.** | **E732 Department of Mechatronics** | **10:30-12:30** | **asaleh@philadelphia.edu.j** |

**Course module description:**
The course aims to teach the students concepts of fluid power control, the components of hydraulic circuits, and hydraulic circuits' analysis and design. It also aims to teach the students pneumatic circuits and electro-pneumatic circuit analysis and design

**Course module objectives:**
At completing this course the student should be able to:

- Understanding the basic concepts hydraulic and pneumatic control
- understanding the different types and components of hydraulic and pneumatic systems
- understanding the design concepts of hydraulic and pneumatic circuits and their maintenance

**Course/ module components**

- Books (title , author (s), publisher, year of publication)

Title: Fluid power with applications
Author: Anthony Esposito
Publisher: Printice Hall
Edition : 6th, 2007

- Support material (s) (vcs, acs, etc).
- Study guide (s) (if applicable)
- Homework and laboratory guide (s) (if applicable).

**Teaching methods:**

- 3 Lectures a week
- 2-3 Appointments for tutorials and problem solving after each chapter

**Learning outcomes:**

- Knowledge and understanding
  The student should know the basic principles of hydraulic and pneumatic systems design
- Cognitive skills (thinking and analysis).
  Some projects assigned aim to develop the thinking and analysis capability of the students
- Communication skills (personal and academic).
  Not applicable
- Practical and subject specific skills (Transferable Skills).
  Some practical projects assigned aim to develop the practical capability of the students:
  Be familiar with some related software

**Assessment instruments**

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

| **Allocation of Marks** | |
|---|---|
| **Assessment Instruments** | **Mark** |
| First examination | **20** |
| Second examination | **20** |
| Final examination: 50 marks | **50** |
| Reports, research projects, Quizzes, Home works, Projects | **10** |
| Total | **100** |

**Documentation and academic honesty**

- Documentation style (with illustrative examples)
- Protection by copyright
- Avoiding plagiarism.

**Course/module academic calendar**

| week | Basic and support material to be covered | Homework/reports and their due dates |
|---|---|---|
| (1) | Introduction to fluid power and Physical properties of hydraulic fluids | |
| (2) | Energy and power in hydraulic systems | |
| (3) | Distribution system and Flow in pipes | |
| (4) | Tutorial and problem solving | Selected typical Problems |
| (5) | Hydraulic pumps- part I | |
| (6) | Hydraulic pumps- part II | |
| (7) | Hydraulic actuators I and motors- part | |
| (8) | Hydraulic actuators and motors- part II | |
| (9) Mid Examination | Tutorial and problem solving | Selected typical Problems |
| (10) | Valves (Pressure, Directional, and flow | |
| (11) | Hydraulic circuit design and analysis | |
| (12) | Tutorial and problem solving | Project: simulation design of hydraulic system |
| (13) | Pneumatic components, and pneumatic circuits | |
| (14) | fluid logic control and Electrical controls for fluid power circuits | Report about fluid logic control and Electrical controls for fluid power circuits |
| (15) | Tutorial and problem solving | Selected typical Problems |
| (16) Final Examination | | |

**Expected workload:**

**On average students need to spend 2 hours of study and preparation for each 50-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.**

**Module references**

**Books**

- **Power Hydraulics, J. Ashby, Printice Hall, 3rd edition**
- **Hydraulics for Engineering technology, By J. E. Johnson, Edited by Prentice Hall**
- **Hydraulics and Pneumatics, B A. Parr, Edit. Butterworth Heinemann**

**Journals**

- Journal of Fluids Engineering
- Journal of Engineering for Gas Turbines and Power

**Websites**