



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

**Course Syllabus**

<b>Course Title: Measurement and Instrumentation</b>	<b>Course code: 610351</b>
<b>Course Level: 4th year</b>	<b>Course prerequisite (s) and/or co requisite (s): Electronic 2</b>
<b>Lecture Time: 12:10-1:10 S,T,F</b>	<b>Credit hours: 3</b>

**Academic Staff**  
**Specifics**

<b>Name</b>	<b>Rank</b>	<b>Office Number and Location</b>	<b>Office Hours</b>	<b>E-mail Address</b>
<b>Dr Munther N. Baker</b>	<b>Prof.</b>	<b>E713 Department of Mechatronics</b>	<b>9:00-10:00 &amp; 1:00-2:00</b>	<a href="mailto:munther_baker44@yahoo.co.uk">munther_baker44@yahoo.co.uk</a>

**Course module description:**

**This course provides an introduction to measurement techniques and instrumentation design and operation.**

**Course module objectives:**

**At completing this module the student should know:**

- **The basic concept of units, measurement error and accuracy.**
- **The construction and design of measuring devices and circuits.**
- **Introduction to advanced measuring instruments and their applications.**
- **Using different measuring techniques.**
- **Measurement of different physical parameters using different transducers.**

**Course/ module components**

- **Books (title, author (s), publisher, year of publication)**  
**Title: Modern Electronic Instrumentation and Measurement Techniques.**  
**Author: Albert D. Helfrick & William D. Cooper**  
**Publisher: Prentice Hall International Inc.**

- **Support material (s) (ves, acs, etc).**
- **Study guide (s) (if applicable)**
- **Homework and laboratory guide (s) if (applicable). Provide sheets of home work and discuss the problems with the interested students in tutorial hours.**

**Teaching methods:**

- 3 Lectures a week
- 1-2 Appointments for tutorials and problem solving after each chapter

**Learning outcomes:**

- Knowledge and understanding  
The theoretical back grounds of measurements and instrumentation.
- Cognitive skills (thinking and analysis).  
The use of measuring devices effectively, and analysis results and errors.
- Communication skills (personal and academic). Not applicable
- Practical and subject specific skills (Transferable Skills).  
The ability to design some basic measuring devices and the ability to carry out some meaningful measurements.

**Assessment instruments**

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

<b><u>Allocation of Marks</u></b>	
<b>Assessment Instruments</b>	<b>Mark</b>
First examination	<b>20</b>
Second examination	<b>20</b>
Final examination: 50 marks	<b>50</b>
Reports, research projects, Quizzes, Home works, Projects	<b>20</b>
<b>Total</b>	<b>100</b>

**Documentation and academic honesty**

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

**Course/module academic calendar**

<b>week</b>	<b>Basic and support material to be covered</b>	<b>Homework/reports and their due dates</b>
<b>(1)</b>	<b>Introduction to units and SI units system.</b>	
<b>(2)</b>	<b>Fundamental &amp; derived units Multiple and sub multiple units.</b>	<b>Hand out home work sheet no. 1.</b>
<b>(3)</b>	<b>Errors in measurement &amp; types of errors</b>	<b>Quiz no. 1.</b>
<b>(4)</b>	<b>Statistical analysis &amp; probability of errors.</b>	<b>Hand out home work sheet no. 2.</b>
<b>(5)</b>	<b>Electromechanical instruments, Dc ammeters &amp; voltmeters</b>	<b>Quiz no. 2.</b>
<b>(6)</b>	<b>AC ammeters &amp; Voltmeters</b>	<b>Hand out home work sheet no. 3.</b>
<b>(7)</b>	<b>Electrodynamometers in power measurements.</b>	<b>Quiz no.3.</b>
<b>(8)</b>	<b>Bridge DC measurements.</b>	
<b>(9)</b>	<b>Bridge AC measurements.</b>	<b>Hand out home work sheet no. 4.</b>
<b>(10)</b>	<b>Transducers Concepts and types.</b>	<b>Quiz no.4.</b>
<b>(11)</b>	<b>Transducers applications.</b>	
<b>(12)</b>	<b>Transducers applications.</b>	<b>Hand out home work sheet no. 5.</b>
<b>(13)</b>	<b>Oscilloscope principles of operation.</b>	<b>Quiz no. 5</b>

(14)	Oscilloscope applications in measurements.	Hand out home work sheet no. 6.
(15)	Oscilloscope applications	Quiz no. 6.
(16)	Revision and 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**

- Principles of Electronic Instrumentation and Measurement, by Howard M. Berlin & Frank C. Getz
- Elements of Electronic Instrumentation and Measurement, by Joseph J. Carr, Pearson Education.

**Journals**

**Websites**

**<http://www.amazon.com/Engineering-Fundamentals>.**