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## ***Course Specifications of: Measuring and Control Devices MEP 508***

**Program(s) on which the course is given:** Diploma in Power Engineering  
(Refrigeration and Air Conditioning Technology)

**Compulsory or Elective element of program:** Elective

**Department offering the program:** Mechanical Engineering/ Power

**Academic year / Level:** year 2014/2015

**Date of specification approval:** 2012

### **A. Basic Information**

**Title:** *Measuring and Control Devices*

**Code:** *MEP 508*

**Credit Hours:** 3

**Lecture:** 3

**Tutorial:**

**Practical:**

**Total;** 3

### **B- Professional Information**

#### **1- Overall aims of course:**

This course introduces students to:

1. Recognize a fundamental background in the theory of engineering measurements.
2. Convey the principles and practice for the design of measurement systems and measurement test plans, including the role of statistics and uncertainty analyses.
3. Establish the physical principles and practical techniques most important to engineering applications in measuring and control instrument.

#### **2- Intended learning outcomes of course (ILOs)**

By completion of the course, the student should be able to:

##### **a- Knowledge and understanding**

a.1 review theories and specialized knowledge in measuring and control instrument.(2.1.1)

a.2 List the principles and fundamentals of quality in measuring and control instrument.(2.1.2)

a.3 Demonstrate methodologies and computer tools available for analysis, design and operation of measuring systems.(2.1.5)

##### **b- Intellectual skills**

b.1 Analyze and assess information in measuring and control instrument. (2.2.1)

b.2 Assess the risks in refrigeration and air conditioning practices in case of fault measuring and control systems. (2.2.4)

b3 Evaluate data sources in the absence of complete measuring and control system (2.2.6)

**c- Professional and practical skills**

c1 Apply professional skills to solve problems in the area of refrigeration and air conditioning (2.3.1)

c.2 Prepare professional reports. (2.3.2)

**d- General and transferable skills**

d.1 Communicate effectively using different means with different audiences..(2.4.1)

d.2 Assess him/her self and identify his/her own personal learning needs. (2.4.3)

d.3 Lead a team in familiar professional contexts.( 2.4.6)

**3- Contents**

Topic No.	Topic	No. of weeks	Total no. of hours
1	Basics of measurement - classification of measurement methods	1	3
2	Factors affecting the accuracy of measurement - measurement errors	2	6
2	Assess the results statistically - classification of measurement equipment - measurement of fluid speed by hot wire and hot strip - pressure measurement	3	9
3	Temperature measurement - moisture measurement - flow rate measurement- Robust control	1	3
4	The performance of measurement equipment at static and dynamic condition	2	6
5	Automatic control of compressors and other equipment	2	6
6	Introduction to intelligent control	3	9
7	Exam	1	3
	Total	15	45

**4- Course Matrix**

ILO's code number	Teaching/learning methods and strategies	Assessment methods and strategies
2.1.1 2.1.2 2.1.5	Formal lectures	Individual coursework assignments, quizzes, oral discussions and reports. Mid year and /or final written examination is given.
2.2.1 2.2.4 2.2.6	Analysis and problem-solving skills are developed through tutorial/problem sheets and small group exercises. Research skills are developed through a small subject oriented research project.	Analysis and problem-solving skills are assessed through oral and written examinations. Design and research skills are assessed through project write-ups, coursework and project reports.



2.3.1 2.3.2	Experiments demonstrations, practical work, laboratory visits.	Practical skills are assessed through laboratory experimental write-ups, coursework exercises and reports, project reports and presentations.
2.4.1 2.4.3 2.4.6	Those skills are not explicitly taught; however, along the course of study the student will acquire those skills to be able to perform his obligations. Attendance of seminars, workshops or conferences will help the student in developing those skills. Presentation by students (either group or individual) will train students for those skills.	Project presentation

**5- Assessment schedule**

Assessment 1	Assignments	on weeks	1, 3, 6
Assessment 2	Quizzes	on weeks	2, 4, 9, 13
Assessment 3	Mid-term exam	on weeks	8
Assessment 3	Oral exam	on week	14
Assessment 4	Final exam	on week	15

**6- Weighting of assessments**

05%	Home assignments
05%	Quizzes
20%	Mid-term examination
10%	Oral examination
60%	Final-term examination
100%	Total

**7- List of References****7.1 Text books**

- \* Course notes Prepared by the instructor
- \* Theory and Design for mechanical Measurements-second edition  
By R.S. Figliola and D.E. Beasley

**7.2 Websites**

- \* [www.4shared.com](http://www.4shared.com)
- \* Yahoo mail group
- \* [www.sciencedirect.com](http://www.sciencedirect.com)

**8- Facilities required for teaching and learning**

Presentation board, computer and data show  
Laboratory

Prepared by: Prof. Dr. Maher Hegazy

Head of department: Prof. Dr. Osama Ezzat Abdellatif

**Matrix of course content and ILO's**

**Course Title:** Measuring and Control Devices **Code:** MEP 508  
**Lecture:** 3 . **Tutorial:** **Practical:** ---- **Total:** 3  
**Program on which the course is given:** Diploma in Power Engineering  
**Major or minor element of program:** Elective  
**Department offering the program:** Mechanical Engineering / Power  
**Department offering the course:** Mechanical Engineering / Power  
**Academic year / level:** 2014/2015. **Date of specifications approval:** 2012

<b>Course content</b>	<b>ILO's A</b>	<b>ILO's B</b>	<b>ILO's C</b>	<b>ILO's D</b>
Basics of measurement - classification of measurement methods	a1,a2	b1	c1	
Factors affecting the accuracy of measurement - measurement errors	a2	b1,b2	c2	
Assess the results statistically - classification of measurement equipment - measurement of fluid speed by hot wire and hot strip - pressure measurement	a3	b2		d2
Temperature measurement - moisture measurement - flow rate measurement- Robust control	a2			d1,d3
The performance of measurement equipment at static and dynamic condition	a1	b3	c1	
Automatic control of compressors and other equipment		b1,b2	c1	d1
Introduction to intelligent control	a2	b1		d3



## Matrix of course aims and ILO's

**Course Title:** Measuring and Control Devices **Code: MEP 508**  
**Lecture:** 3 **Tutorial:** **Practical:** ---- **Total:** 3  
**Program on which the course is given:** Diploma in Power Engineering  
**Major or minor element of program:** Elective  
**Department offering the program:** Mechanical Engineering / Power  
**Department offering the course:** Mechanical Engineering / Power  
**Academic year / level:** 2014/2015. **Date of specifications approval:** 2012

Course aims	ILO's	ILO's	ILO's	ILO's
	A	B	C	D
1. Know a fundamental background in the theory of engineering measurements.	a1,a2	b1		d1
2. Convey the principles and practice for the design of measurement systems and measurement test plans, including the role of statistics and uncertainty analyses.	a2,a3		c2	d3
3. Establish the physical principles and practical techniques most important to engineering applications in measuring and control instrument.	a2	b3	c2	d2