



Faculty of
Engineering
at Shoubra

Model No.12

Course Specifications : Advanced Electronic Measurements

University : Benha university

Faculty : Faculty of Engineering at Shoubra

Department : Electrical Engineering Department

1- Course Data

Course Code : ECE342	Course Title : Advanced Electronic Measurements	Study Year : Third Year
Specialization :		
Teaching Hours: Lecture : 4	Tutorial : 2	Practical :

2- Course Aim

For students undertaking this course, the aims are to:

- 2.1- Build the student background and basic knowledge in the field of Electronic Measurements.
- 2.2- demonstrate the principle of operation of most common type sensor and transducers
- 2.3- Select a suitable analog or digital signal conditioning technique for different sensors
- 2.4- Build-up a computer-based data acquisition systems.

3- Intended Learning Outcomes of Course (ILOS)

a- Knowledge and Understanding

On completing this course, students will be able to:

- a.1) Understand the bridges usage in electronic measurements. “a9”
- a.2) Understand the operation instrumentation amplifier “a9”
- a.3) Understand the principle of operation different types of transducers and sensors “a9”
- a.4) Explain the importance of the analog and digital signal conditioning in the electronic measurement system “a15”
- a.5) Define the main components of the data acquisition system. “a6”

b- Intellectual Skills

At the end of this course, the students will be able to:

- b.1) Select suitable solutions for electronics engineering problems based on analytical thinking. “b3”
- b.2) Synthesize and integrate electronic systems such as comparators and Schmitt trigger for certain function by using the correct equipment “b18”

c- Professional Skills

On completing this course, the students are expected to be able to:

- c.1) Apply knowledge of Amplifiers, sensors, transducers, filters, and components of data acquisition systems to solve electronic problems “c1”
- c.2) Professionally collect the electronic engineering knowledge, understanding, and feedback to enhance electronic design. “c2”
- c.3) Establish and/or re-design a process, component or system such as amplifier and filters and perform specialized electronic engineering designs. “c3”
- c.4) Use suitable tools such as components of data acquisition systems to measure the performance of electronic system. “c19”

d- General Skills

At the end of this course, the students will be able to:

- d.1) Work in stressful environment and within constraints. “d2”

4- Course Contents

No.	Topics	hours
1	Integrated measurement Amplifiers	4
2	Integrated measurement and instrumentation Amplifiers	4
3	Comparators and Schmitt trigger	4
4	Sensors and transducers (resistive and capacitive)	4
5	Sensors and transducers (inductive and other types)	4
6	Analog signal conditioning (signal level change- linearization- signal conversion)	4
7	Analog signal conditioning (voltage divider- bridges)	4
8	Digital signal conditioning	4
9	Digital to Analog converters (binary weighted resistor - R/2R Ladder)	4
10	Analog to digital converters (Ramp- successive approximation - flash)	4
11	Sample and hold circuits	4
12	Filters (LPF, HPF, BPF, BSF)	4
13	Components of data acquisition systems	4

5- Teaching and Learning Methods

- 5.1- modified Lectures
- 5.2- Practical training / laboratory
- 5.3- Term project
- 5.4- Tutorial
- 5.5- Computer based work

6- Teaching and Learning Methods of Disables

Nothing.

7- Student Assessment

a- Student Assessment Methods

1	Assignments to assess Apply Contemporary engineering topics.
2	Quiz to assess Investigate the failure of components, systems, and processes.
3	Mid-term exam to assess Apply knowledge of mathematics, science, information technology, design, business context .
4	Final exam to assess Solve engineering problems, often on the basis of limited and possibly contradicting information.
5	Design Project to assess Use a wide range of analytical tools, techniques, equipment, and software packages pertaining to the advanced electronic measurement and develop required computer programs.
6	Report to assess Write technical reports and presentation.

b- Assessment Schedule

Assessment	Week
Assignments on weeks	2,4,6,12
Quizzes on weeks	1,5,7
Mid-term exam on week	8
term project presentation on week	12
Final exam on week	15
Report on weeks	2,6,10,12

c- Weighting of Assessments

Assessment	Weight
Mid_Term Examination	13 %
Final_Term Examination	67 %
Oral Examination	0 %
Practical Examination	0 %

Semester work	5 %
Other types of assessment	15 %
Total	100 %

8- List of References

a- Books

1- "Measurement and Instrumentation Principles by: AlanS.Morris" Oxford :2001 ISBN0750650818

b- Recommended Books

1- Brignell, J.and White "Intelligent Sensor Systems" Institute of Physics Publishing: 1994

c- Web Sites

1- IEEE Instrumentation and Control

2- IEEE Circuits and Systems



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Model No.11A

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University : Benha university

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atShoubra

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Matrix of Knowledge and Skills of the course

No.	Topics	week	Basic Knowledge	Intellectual Skills	Professional Skills	General Skills
1	Integrated measurement Amplifiers	1	a.1	b1		
2	Integrated measurement Amplifiers	2	a.1	b1		
3	Comparators and Schmitt trigger	3	a.1	b1		
4	Sensors and transducers (resistive and capacitive)	4	a.3	b1	c2,c4	
5	Sensors and transducers (inductive and other types)	5	a.3	b1	c2,c4	
6	Analog signal conditioning (signal level change- linearization- signal conversion)	6	a.2	b1, b2		
7	Analog signal conditioning (voltage divider- bridges)	7	a.2,a.4	b1, b2		
8	Midterm exam	8	a.1,a.2,a.3	b1, b2		d1
9	Digital signal conditioning	9	a.4		c3,c4	
10	Digital to Analog converters (binary weighted resistor - R/2R Ladder)	10	a.4	b1	c3	
11	Analog to digital converters (Ramp- successive approximation - flash)	11	a.4	b1	c3	
12	Sample and hold circuits	12	a.4	b1		
13	Filters (LPF, HPF, BPF, BSF)	13	a.4	b1		
14	Components of data acquisition systems	14	a.5	b1,b2	c1,c2,c3,c4	
15	Final exam	15	a.1,a.2,a.3,a.4,a.5	b1, b2		d1

Matrix of course aims and ILO's

Course Title: Advanced Electronic Measurements **Code:** ECE342
Lecture: 4 **Tutorial:** 2 **Practical:** - **Total:**6
Program on which the course is given: B.Sc. Electrical Engineering (Communications)
Major or minor element of program: Major
Department offering the program: Electrical Engineering Department
Department offering the course: Electrical Engineering Department
Academic year / level: **Third**Year / **First** Semester
Date of specifications approval: 20/6/2010

Course content	a1	a2	a3	a4	a5	b1	b2	c1	c2	c3	c4	d1
Build the student background and basic knowledge in the field of Electronic Measurements	✓			✓		✓	✓					
Understand the principle of operation of most common type sensor and transducers		✓			✓	✓	✓				✓	
Select a suitable analog or digital signal conditioning technique for different sensors	✓		✓	✓			✓			✓		
Build-up a computer-based data acquisition systems	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓

Course coordinator: Ass. Prof. AbdallahHammad
Course instructor Ass. Prof. AbdallahHammad
Head of department: Prof. Dr.Sayed Abu-Elsood Ward
Date: //