

## COURSE SPECIFICATION

### A- Administrative Information

<b>Course Title</b>	<b>: Electronic circuits and its design</b>
<b>Code</b>	<b>: EEC 312</b>
<b>Department(s) offering the course</b>	<b>: Electrical Engineering</b>
<b>Program (s) on which the course is given</b>	<b>: Undergraduate level</b>
<b>Department offering the program (s)</b>	<b>: Electrical Engineering</b>
<b>Academic year/level</b>	<b>: 3<sup>rd</sup> Year</b>
<b>Semester</b>	<b>: First semester</b>
<b>Date of specification/revision</b>	<b>: 2004</b>
<b>Date of approval by Departmental/Faculty</b>	<b>: 2013-2014</b>

#### **Taught hours:**

**Lecture:**3 hrs/week    **Tutorial:**1 hr/week    **Practical:** 0hr/week    **others:**  
**Total:** 4 hrs/week

### B-Professional Information

#### **1-1 Overall Aims of the Course**

The course is designed to:

understand characteristics, operation, and limitations of semiconductor devices. Provide understanding of small signal BJT and MOSFET amplifiers. To develop computer added design programs using SPICE software to model and simulate electronic devices.

#### **1.2-Intended Learning Outcomes of the course (ILOs):**

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

Upon completing this course, the student should be able to:

- a1-Understand the structure and characterization of the bipolar junction transistor and MOSFET.
- a2-Understand the performance of small signal amplifiers.
- a3- Understand the computer added design of the electronic devices.

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

Upon completing this course, the student should be able to:

- b1- Design and analyze the semiconductor devices.
- b2- Specify of design of small signal amplifiers.
- b3- Demonstrate of producing computer codes to model the electronics devices.

##### **c- Professional and practical skills**

Upon completing this course, the student should be able to:

- c1- understand and analyze the electronic equipment.
- c2- improve and update the electronic circuits.
- c3- adopt new circuits that help solving of the traditional problems.

**d- General and transferable skills**

Upon completing this course, the student should be able to:

- d1-Give technical presentations.
- d2-Work in stressful environment and within constraints .
- d3-Use current technology in laboratories.
- d4- To present students with applications of digital circuits to computer systems.
- d5- Be capable of applying both traditional and new concepts and skills.

**2 Syllabus**

CHAPTERS	CONTENTS
Topic (1)	Diode circuits, <b>Diode models, Diode limiter</b>
Topic (2)	Comparator
Topic (3)	Amplifiers, classifications of amplifiers, Distortion in amplifiers
Topic (4)	amplifiers with feedback
Topic (5)	Noise, Reverse bias
Topic (6)	Oscillators
Topic (7)	Operational transconductance amplifiers
Topic (8)	power supply circuits and regulators
Topic (9)	Tuned amplifiers, stability and offset of amplifiers
Topic (10)	sinusoidal oscillators
Topic (11)	Amplitude modulation and demodulation circuits
Topic (12)	Phase and frequency modulation and demodulation circuits
Topic (13)	Analog multipliers
Topic (14)	Design of radio and television transmissions circuits

**3-Teaching and Learning Methods**

- 3.1-Lectures
- 3.2- Tutorial activities
- 3.3- Discussions
- 3.4- Reports
- 3.5 Office meetings

**4-Students Assessment Methods**

- Tutorial assignments
- Written mid-term exam
- Oral examination
- Written final exam

**4.1- Assessment schedule:**

Assignment 1	Week # 3 (1 <sup>st</sup> semester)
Assignment 2	Week # 6 (1 <sup>st</sup> semester)
Assignment 3	Week # 11(1 <sup>st</sup> semester)
Assignment 4	Week # end of Term (1 <sup>st</sup> semester)

**4.2- Weighing of assessments:**

Mid-Term Exam	20 %
Oral Exam	10 %
Final Exam	60 %
Tutorial assignments	10 %
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Total	100 %

## 6-List of References

**6.1-Course notes:-** notes prepared by the lecturer and his private power point templates.

### 6.2-Essential books (textbooks):

Donald A. Neamen, Semiconductor Physics and Devices, McGraw-Hill, New York, 2003.

Sedra and Smith, Microelectronic Circuits, Oxford University Press, Inc., New York, 2004.

### 6.3-Recommended books:

6-3-1 S.M. Sze, Physics of Semiconductor Devices, John Willey & Sons, New York, 1981.

6.3.2 Sorab K. Ghandhi, VLSI Fabrication Principles, John Willey & Sons, New York, 1994

### 6.4-Periodicals, websites, etc.:

- IEEE, IEE journal
- Periodicals, Web sites, etc ...

## 7-Other Resources/ Facilities required for teaching and learning to achieve the above ILOs .

7.1- Computer and data show in the lecture room.

7.2- Computer and Internet access for the students.

7.3- Many text books available in the departmental library.

7.4- Previous student projects.

## 8- We certify that all of the information required to deliver this course is contained in the above specification and will be implemented.

**Course Coordinator:**

**Name: Dr. ---- .....**

**Signature:..... Date: Dec. 2013**

**Head of Department of: .....**

**Name: Prof. Dr. ---- .....**

**Signature:..... Date:... Dec. 2013.....**

**5- Course Curriculum Map**

**Course title: Electronic circuits and its design**

**Code: EEC 312**

**Course aim:** understand characteristics, operation, and limitations of semiconductor devices. Provide understanding of small signal BJT and MOSFET amplifiers. To develop computer added design programs using SPICE software to model and simulate electronic devices.

S	Week #	Intended Learning Outcomes (ILOs)				Topics	Teaching Methods	Assessment Methods	Evidences
		Knowledge and understanding	Intellectual skills	Professional and practical skills	General and transferable skills				
1	1	a1 + a3				Diode circuits, Diode models, Diode limiter	<b>3.1 - Lectures</b> <b>3.2- Tutorial activities</b> <b>3.3- Discussions</b> <b>3.4- Reports</b> <b>3.5 Office meetings</b>	4.1 Tutorial assignments 4.2 Written mid-term exam 4.3 Oral examination 4.4 Written final exam	Course file, Exam samples, Regular reports,
2	2	a1 + a3	b1 + b2	c1	d1+ d2 + d3	Comparator			
3	3	a1 + a3		C2		Amplifiers, classifications of amplifiers, Distortion in amplifiers			
4	4	a2 + a3			d1+ d2 + d3	amplifiers with feedback			
5	5	a2 + a3			d1+ d2 + d3	Noise, Reverse bias			
6	6	a2 + a3	b1 + b2		d1+ d3 + d4	Oscillators			
7	7	a1 + a3	b1 + b3		d1+ d3 + d5	Operational transconductance amplifiers			
8	8	a1 + a3	b1 + b2	C3		power supply circuits and regulators			
9	9	a1 + a2			d1+ d4 + d5	Tuned amplifiers, stability and offset of amplifiers			
10	10	a1 + a2		C1	d1+ d2 + d3	sinusoidal oscillators			
11	11	a1 + a3			d1+ d4 + d5	Amplitude modulation and demodulation circuits			
12	12	a1 + a3	b1 + b3	C2		Phase and frequency modulation and demodulation circuits			
13	13	a1 + a2	b1 + b2			Analog multipliers			
14	14	a1 + a3	b1 + b3			Design of radio and television transmissions circuits			

**Course coordinator: Dr. ....**

**Department Head: Dr.**