University: *Fayoum University*
Faculty: *Computers and Information*
Department: *Computer Science*

Course Specification 2015/2016

1- Basic Information

Code: GEN 127	**Course Title:** Electronics	**Year/Level:** First year – Second term
Programme: B.Sc degree in Computer Science	**Number of units:**	**Lecture:** 3 hrs/ week **Tutorial:** 2 hrs/ week **Practical:** 2 hrs/ week

2- Aims of Course:

1. This course introduces the student to electric and electronic circuit analysis. This is done first with DC circuits. Here analysis theorems are presented and used to predict circuit response. Software is also used to analyze more complicated circuits. Next circuit response versus time is introduced by exploring the transient response of inductor and capacitor circuits. Lastly, AC steady-state circuits are explained using a transformation into the frequency domain.
2. Determination of the modes of operation of the PN junction and calculation of the voltages and currents in a diode circuit.
3. Determination of the modes of operation of the BJTs and calculation of the voltages and currents in a BJT dc circuit.
4. Course project which collects all of the above information.

3- Intended Learning Outcomes

A- Knowledge and Understanding:	**A3- Demonstrate the essential mathematics and physics relevant to computer science.** **A7. Demonstrate Essential facts, concepts, principles and theories relating to computing and information and computer applications as appropriate to the program of study.** **A10. Identify and explain the fundamental concepts, principles, and techniques needed for the analysis, development, validation, verification, deployment, and operations of computer-based systems.** a1) The basic concept of electronic components and basic laws. The principles of circuit-analysis a2) The Maximum power-transfer, the impedance concept, magnitude and phase-shift of RLC circuits. a3) The characteristics of transistor, types, basic configuration, biasing and load line. a4) The Field Effect Transistors
B- Intellectual Skills:	B1.Analyze real problems, and appropriate problem solving

	methods that satisfy commercial or industrial constraints and analyze results. B7. Determine goals for problem solving and test the result of the solution of the problems b1) Utilize theories, rules, and electronic science b2) Solve problems in physics using appropriate mathematical tools. b3) Identify the relevant physical principles and make approximations necessary to obtain solutions.
C- Professional and Practical Skills:	C1. Analyze and improve organizational processes from an ICT perspective. C8. Deploy appropriate tools for the construction and documentation of computer-based systems that are used to solve practical problems **C11.** Develop a range of fundamental research skills that enable the graduate to continuously increase his knowledge, advance his career and pursue graduate studies. c1) Being able to solve problem sheets related to the material course. c2) Collect and record data and information from libraries and summarize it in suitable forms. c3) The student would be able to apply some experiments related to the course contents.
D- General and transferable Skills	D2. Use effective information-retrieval skills (including the use of browsers, search engines and catalogues) and general IT facilities. D4. Demonstrate independent critical thinking and problem solving skills. d1) Graduate should be able to access data and information from the Internet related to the course subjects. d2) Graduate should develop self professional, scientific, and personal attitude towards continuous education. d3) Graduate should be able to cooperate in teams.

4-Course Content:	1. Electronic components and basic laws. 2. Principles of circuit-analysis: Dividers, equivalent sources, methods of solutions, circuits with nonlinear resistance, maximum power-transfer, 3. sinusoidal excitation and impedance concept, magnitude and phase-shift of RLC circuits. 4. Frequency response of linear circuits, passive filter types and characteristics. Diode-circuits: half and full-wave rectifiers, Zener regulators and limiters. 5. Transistor circuits: BJT characteristics, types, basic configuration, biasing and load line, equivalent circuits, 6. voltage gain, input and output impedance, coupling, practical circuits, FET circuits: Characteristics, types, basic

	configuration, switching modes. 7. Operational amplifiers: Principles, basic circuits: adder, follower, 8. differentiator, integrator, comparator, schmitt-circuit, 9. special circuits. Active filters: types, characteristics. 10. Oscillators: Relaxation, feedback, RC, LC, and Voltage controlled oscillators. 11. Display elements: Light-emitting-diodes, liquid-crystal displays, and cathode-ray tubes.

5- Teaching and Learning Methods:	1. Lectures 2. Tutorials 3. Computer-lab Sessions 4. Practical lab work 5. Class discussions 6. Internet searches 7. Problem-based Learning

6- Teaching and Learning Methods for handicapped students :	-

7- Student Assessment	
A- Assessment Methods:	1. Assignments and Quizzes 2. Midterm written exam 3. Oral exam 4. Practical exam 5. Final written exam
B- Assessment schedule:	Midterm Examination: Week 7 Practical examination: Week 13 Oral Examination: Week 14 Final Examination: Week 15
C- Weighting of assessments:	Assignments and Quizzes: 0% Mid-Term Examination: 16% Oral Examination: 8% Practical Examination : 16% Final-term Examination: 60%

8- Books and References	
A- Notes:	Handouts and notes prepared by the instructor
B- Essential Books (Text Books):	▪ All New Electronics Self-Teaching Guide (Wiley Self Teaching Guides) by Harry Kybett and Mr. Earl Boysen (Paperback - May 12, 2008)
C- Recommended Books:	1- C. Alexander and M.Sadiku, Fundamental of Electric circuits, Mc Graw-Hill, 2013. 2- T. Floyd, Electronic Devices, Prentice Hall, 2012

D- Periodicals, Web sites, … etc	

Course Professor: Mohamed Hamdy **Department Head: Amira Edres**

Course Content Intended Learning Outcomes Matrix

Course Title: Electronics
Course Code: GEN 127

Course Content	Week	Knowledge & Understanding				Intellectual Skills			Professional & Practical Skills			General & Transferable Skills		
		a1	a2	a3	a4	b1	b2	b3	c1	c2	c3	d1	d2	d3
1. Electronic components and basic laws.	1	x				x	x	x	x	x	x	x	x	x
2. Principles of circuit-analysis: Dividers, equivalent sources, methods of solutions, circuits with nonlinear resistance, maximum power-transfer,	2	x	x			x	x	x	x	x	x	x	x	x
3. sinusoidal excitation and impedance concept, magnitude and phase-shift of RLC circuits.	3	x	x			x	x	x	x	x	x	x	x	x
4. Frequency response of linear circuits, passive filter types and characteristics. Diode-circuits: half and full-wave rectifiers, Zener regulators and limiters.	4	x				x	x	x	x	x	x	x	x	x
5. Transistor circuits: BJT characteristics, types, basic configuration, biasing and load line, equivalent circuits,	5	x		x	x	x	x	x	x	x	x	x	x	x
voltage gain, input and output impedance, coupling, .6 practical circuits, FET circuits: Characteristics, types, basic configuration, switching modes.	6	x	x	x		x	x	x	x	x	x	x	x	x
Operational amplifiers: Principles, basic circuits: adder, .7 follower,	7	x				x	x	x	x	x	x	x	x	x
differentiator, integrator, comparator, schmitt-circuit, .8	8	x				x	x	x	x	x	x	x	x	x
special circuits. Active filters: types, characteristics. .9	9	x				x	x	x	x	x	x	x	x	x
10. Oscillators: Relaxation, feedback, RC, LC, and Voltage controlled oscillators.	10		x			x	x	x	x	x	x	x	x	x
11. Display elements: Light-emitting-diodes, liquid-crystal displays, and cathode-ray tubes.	11	x				x	x	x	x	x	x	x	x	x

Course coordinator: Mohamed Hamdy Head of Department: Amira Edres.