Course Specifications

General Information

Course name	Electronic(1)
Course number	PHYS3313
Faculty	
Department	
Course type	Major Needs
Course level	3
Credit hours (theoretical)	3
Credit hours (practical)	0
Course Prerequisites	

Course Objectives

1 - Gain the basic knowledge and understanding of the physical phenomena in a semiconductor

2 - Become acquainted with skills and attitude necessary to understand the concepts of energy band diagrams of metals, semiconductors and insulators and the principles of carriers transport in semiconductors

3 - An understanding of basic electronic abstractions on which analysis and design of electronic circuits and systems

4 - The capability to use abstractions to analyze and design simple electronic circuits.

5 - An understanding of how complex devices such as semiconductor diodes and transistors are modeled and how the models are used in the design and analysis of useful circuits.

Intended Learning Outcomes

Knowledge and Understanding	* Learn how to develop and employ circuit models for elementary electronic components, e.g., resistors, sources, inductors, capacitors, diodes and transistors; * Become adept at using various methods of circuit analysis, including simplified methods such as series-parallel reductions, voltage and current dividers, and the node method; * Gain an intuitive understanding of the Design and applications of simple electroinc circuitss;
Intellectual Skills	* Gain an intuitive understanding of the role of power flow and energy storage in electronic circuits; * Gain an intuitive understanding how to manipulate the characteristic curves to design electronic circuit
Professional Skills	* Acquire experience in building and trouble-shouting simple electronic circuits.

Course Contents

1 - Chapter 1: Review to Electric Circuits: voltages and current sources, Ohms Law, Kirchhoffs Laws, Resistors in series and parallel, voltage and current divider circuits, Thévenin equivalent circuits
2 - Chapter 2: Semiconductor Diodes: Semiconductor materials, Energy Levels, n-type and p-type extrinsic materials, Semiconductor diode, Resistance level, Diode Equivalent Circuit
3 - Chapter 3: Diode Applications Load Line analysis, Diode Approximation, Series Diode Configurations with DC input, parallel and series-parallel configuration, Sinusoidal input: half wave rectification, Full Wave Rectification with filter,
4 - Chapter 4: Bipolar Junction Transistors (BJTs) Transistor construction, transistor operation, Common-base configuration, Transistor amplifying action, Common-Emitter configuration, limits of operation,
5 - Chapter 5: DC Biasing of BJTs Operating Point, Fixed Bias Circuit, Emitter Stabilizer Bias Circuit, Voltage Divider Circuit, Voltage Divider Bias, Design Operation, Transistor Switching Networks (Not Gate),
6 - Chapter 6: BJT Modeling BJT Transistor Modeling, the Important Parameters: Zi, Zo, Av, Ai, the re Transistor Model,
7 - Chapter 7: BJT Small Signal Analysis Common-Emitter Fixed-Bias Configuration, Voltage-Divider Bias,

Teaching and Learning Methods for the Disabled Students

1 - It is not applicable to this course

Students Assessment

Assessment Method	TIME	MARKS
assignments	at the end of each chapter	10
Attendance		5
quizzes		5
Midterms	after chapter 2 and chapter 4	30
Final Exam	end of the semester	50

Books and References

Essential books	Boylestad and Nashelsky, “Electronic Devices and Circuit Theory”, Prentice Hall, 10th edition (July 31, 2008)
Recommended books	Microelectronic Circuits, Sixth Edition, by Adel S. Sedra and Kenneth C. Smith, 2009
	Electronics Fundamentals: Circuits, Devices & Applications (8th Edition) by Thomas L. Floyd