Kingdom of Saudi Arabia
Ministry of Education
Jazan University
Faculty of Science -Physics Department

المملكـة العربيـة السعوديـة
وزارة التعليم
جـــامـعـة جـازان
كلية العلوم ـ قسم الفيزياء

Course Title	Course Code	Number of Study Houres			Year	Level	Prerequesits
		Theoritical	Laboratory	Credit			
Electronics 2	411PHYS	3	3	4	4th	7th	311PHYS

(1)   Brief Course Description

This course is a continuation of Electronics 1 course. It covers different types of transistors, amplifier circuits, four layer devices, Silicon-controlled rectifiers, diac, triac, silicon-controlled switch, operational amplifiers, digital logic circuits and their applications.

(2)   Course Objectives

This course is designed to provide students with :

- Physical background of different analog and digital electronic devices.
- Develop knowledge and skills of using electronic devices in electronic circuits.
- Analyze the electronic devices circuits.
- Applications of different electronic circuits.
- Apply the knowledge of the electronic devices to characterize, design and operate different electronic device circuits in the lab.

(3) Course Contents

Theoretical Part:

- **Bipolar junction transistor:** Transistor structure, basic operations, characteristics and parameters, transistor as a switch, transistor as amplifier.
- **Transistor bias circuits:** D.C operating point, voltage-divider bias, other bias methods.
- **Bipolar junction transistor amplifier:** Amplifier operations, amplifier circuits, CE, CB,CC amplifiers, multistage amplifiers.
- **Field effect transistors:** Junction field effect transistor (JFET), JFET characteristics and parameters, metal oxide semiconductor field effect transistor (MOSFET), MOSFET characteristics and parameters, MOSFET biasing.
- **Thyristors and other devices:** Four layer devices, silicon controlled rectifier (SCR), SCR applications, Diac and Triac, silicon controlled switch (SCS), unijunction transistor (UJT).
- **Operational amplifier:** Introduction to operational amplifier (Op-Amps), Op-Amps modes and parameters, Op-Amps with negative feedback.
- **Logic gates:** Inverter, AND gate, OR gate, NAND gate, NOR gate, Exclusive-OR and Exclusive- NOR gates, applications of the gates.
- **Bollean Algebra and logic simplifications:** Boolean operations and expressions, lows and rules of Boolean algebra,DeMorgans theorem, Boolean analysis of logic circuits.
- **Combinational logic analysis:** Basic combinational logic circuits, combinational logic using NAND and NOR gates, logic circuits with pulse input waveforms.

Experimental Part:

- Cathode ray oscilloscope measurements of D.C voltage, A.C voltage and frequency.
- R,L,C and R.C A.C. circuits and applications.
- Series resonance circuits and applications.
- Forward and reverse characteristics of PN junction diodes.
- Half-wave and full wave rectification.
- Zener diode characteristics and applications as voltage regulator.
- Bipolar junction transistor characteristics (BJT).
- Junction field effect transistors (JFET) characteristics .
- Operation amplifier circuits.
- Logic gates and applications.

(4) Assessment Criteria

- Periodic Exams: 15%
- Oral, Student Activity and Essay: 10%
- Laboratory Work: 25%
- Final Exam:50%

(5) Course Teaching Strategies

- Lectures, Reports and Essay Assignments, Homework, and Web-based Assignments.

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(6) <u>**Text Books**</u>
- Electronic Devices, T.L Floyd, Pearson Prentice Hall, Inc., 7th Ed., 2005.
- Digital Fundamentals, T.L Floyd, Pearson Prentice Hall, Inc., 9th Ed., 2006.

(7) <u>**Reference Books**</u>
- Ralph J. Smith, Electronics: Circuits and Devices, John-Wiley and Sons, Inc., 3rd Ed., 1987.
- James W. Nilsson, Electric Circuit, Addison-Wesley Publishing Company, Inc., Ed., 2007.
- James J. Brophy, Basic Electronics For scientists, McGraw-Hill Kogakusha, Ltd., 1990