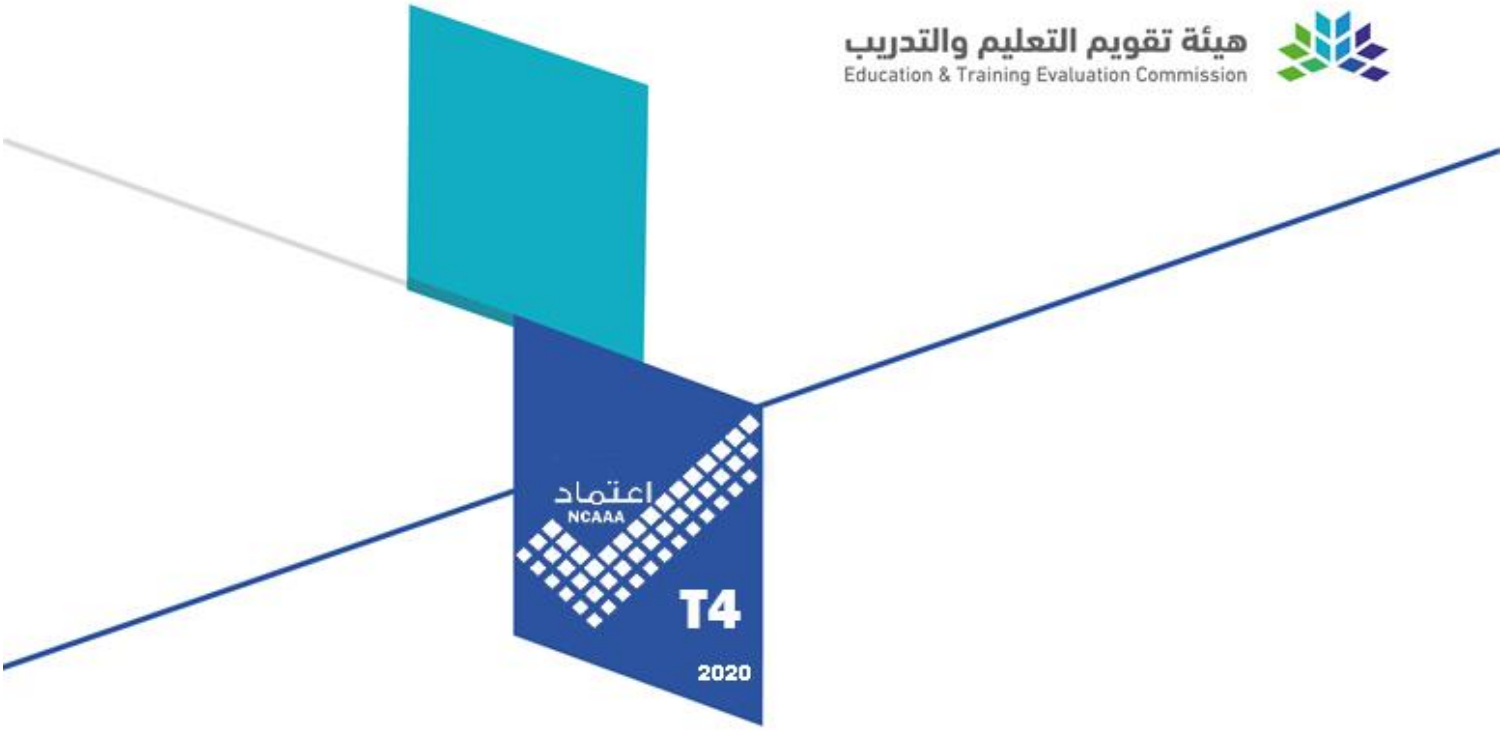
هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission



Course Specifications

Course Title:	Electronic Circuits 1
Course Code:	112 CNET - 3
Program:	Bachelor in Computer and Network Engineering
Department:	Computer and Network Engineering
College:	College of Computer Science and Information Technology
Institution:	Jazan University

Table of Contents

A. Course Identification

1. Credit hours: 3
2. Course type **a.** University ☐ College ☐ Department ☑ Others ☐ **b.** Required ☑ Elective ☐
3. Level/year at which this course is offered: Level – 5 / Year - 2
4. Pre-requisites for this course (if any)**:** None
5. Co-requisites for this course (if any)**:** None

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	52	100
2	**Blended**	--	--
3	**E-learning**	--	--
4	**Distance learning**	--	--
5	**Other**	--	--

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	22
2	**Laboratory/Studio**	22
3	**Tutorial**	--
4	**Others** (specify)	8
	Total	52

B. Course Objectives and Learning Outcomes

1. Course Description

This course introduces fundamentals of electrical and electronics. It introduces the semiconductor diode and its energy level, resistance level, equivalent circuits, Zener diode, light-emitting diode. It covers diode load line analysis and series/parallel configuration. It deals with various application of diode as Half-wave rectifier, Full-wave rectifier, clippers, clampers, Zener diode circuits, voltage multiplier circuits, AND/OR gate using diode. This course also introduces bipolar junction transistor (BJT) construction, operation, configurations and transistor amplification action.

2. Course Main Objective

Upon successful completion of the course the students will be able to:

1. Describe fundamental electric quantities and components: voltage, current, resistors, inductors and capacitors.
2. Classify application circuits utilizing diodes, transistors.
3. Identify the differences of Diode, BJT and Amplifiers with VI Characteristics.
4. Examine the currents and voltages in resistive circuits using Ohm's law, KCL, KVL, reduction of series and parallel resistances, voltage and current divisions.
5. Analyze Diode and Transistor circuits using ideal and linear methods
6. Execute experiments to measure and verify Electronic circuits
7. An ability to design and conduct experiments, as well as to analyze and interpret data

3. Course Learning Outcomes

	CLOs	Aligned PLOs
1	**Knowledge and Understanding:**	
1.1	**Describe** the fundamentals of electrical components.	K1
1.2	**Classify** application circuits with all active and passive components.	K1
1.3	**Identify** the differences between Diode, BJT and Amplifiers with VI Characteristics.	K1
2	**Skills :**	
2.1	**Examine** the currents and voltages in resistive circuits using Ohm's law, KCL, KVL, reduction of series and parallel resistances, voltage and current divisions.	S1
2.2	**Implement** Diode and Transistor circuits using ideal and linear methods.	S2
2.3	**Execute** the output waveforms to measure and verify the electrical circuits.	S1
3	**Values:**	
3.1	**Perform** the experiments and projects with various data to measure the response of electrical circuits.	V1

C. Course Content

No	List of Topics	Contact Hours

1	**Chapter – 1: Electrical Circuit Analysis**
	➢ What is Electronic?
	➢ What is Electrical?
	➢ Definition
	  ➢ Voltage
	  ➢ Current
	➢ Circuit Components
	  ➢ Resistance
	  ➢ Ohm's Law
	  ➢ Color Coding of Resistor
	  ➢ Series and Parallel Circuits
	  ➢ Capacitor
	  ➢ Inductor
	➢ Kirchhoff's Laws
	  ➢ Kirchhoff's Current Law
	  ➢ Kirchhoff's Voltage Law
	  ➢ Numerical Examples
		6T + 6P

2	**Chapter – 2: Semiconductor Physics**
	➢ Materials
	  ➢ Conductor
	  ➢ Insulator
	  ➢ Semiconductor
	➢ Energy Band Diagram of Materials
	➢ The Silicon/Germanium Atomic Structure
	➢ Covalent Bonding
	➢ Intrinsic Semiconductor Material
	➢ Extrinsic Semiconductor Material
		4T + 4P

	➢ Definition ➢ Doping ➢ N-Type Semiconductors ➢ P-Type Semiconductors ➢ Electron versus Hole Flow ➢ Majority and minority charge carrier	
3	**Chapter – 3: Diode** ➢ Introduction of PN Junction ➢ Diode Construction ➢ V-I Characteristics ➢ Forward Bias Characteristics ➢ Circuit configuration ➢ Reverse Bias Characteristics ➢ Circuit configuration ➢ Breakdown region ➢ Diode equivalent circuits ➢ Practical Diode ➢ Ideal Diode ➢ Zener diode ➢ Circuit diagram ➢ VI characteristics ➢ Light Emitting Diode (LED) ➢ Circuit diagram ➢ VI characteristics	4T + 4P
4	**Chapter – 4: Applications of Diode** • Rectifier o Definition • Half wave rectifier o Circuit diagram o Output response o Peak Inverse Voltage • Full wave rectifier o Center-Tapped Transformer Rectifier ➢ Circuit diagram ➢ Output response ➢ Peak Inverse Voltage o Bridge Rectifier ➢ Circuit diagram ➢ Output response ➢ Peak Inverse Voltage	4T + 4P
5	**Chapter – 5: Transistors** • Introduction to Bipolar junction transistor (BJT) ➢ Definition ➢ Types ➢ Terminals • Working of BJT • BJT Configuration ➢ Common Base (CB) Configuration ➢ Circuit Diagram ➢ Input/output Characteristics ➢ Common Emitter (CE) Configuration	4T +4P

	➢ Circuit Diagram ➢ Input/output Characteristics ➢ Common Collector (CC) Configuration ➢ Circuit Diagram ➢ Input/output Characteristics • Regions of operation ➢ Active Region ➢ Cutoff Region ➢ Saturation Region	
6	Final Exam	4T + 4P
Total		52

Online Study Topics
• Clipper Circuits o Series Clipper Circuits o Parallel Clipper Circuits o Numerical Examples • Clamper Circuits o Biased Clampers o Numerical Examples • Voltage Multiplier Circuits. o Voltage Doubler o Voltage Tripler o Voltage Quadrupler • Amplifiers

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	**Knowledge and Understanding**		
1.1	**Describe** the fundamentals of electrical components.	➢ Lectures ➢ Classroom Discussions ➢ Lab Exercises	Mid-Term Exam Assignment 1 Final Exam
1.2	**Classify** application circuits with all active and passive components.	➢ Lectures ➢ Classroom Discussions ➢ Lab Exercises	Mid-Term Exam Assignment 1 Lab Exam Final Exam
1.3	**Identify** the differences between Diode, BJT and Amplifiers with VI Characteristics.	➢ Lectures ➢ Classroom Discussions ➢ Lab Exercises	Assignment 2 Lab Exam Final Exam
2.0	**Skills**		
2.1	**Examine** the currents and voltages in resistive circuits using Ohm's law, KCL, KVL, reduction of series and parallel	➢ Lectures ➢ Classroom Discussions	Mid-Term Exam Assignment 1 Final Exam

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
	resistances, voltage and current divisions.	➢ Lab Exercises	
2.2	**Implement** Diode and Transistor circuits using ideal and linear methods.	➢ Lectures ➢ Classroom Discussions ➢ Lab Exercises	Mini Project Lab Exam Final Exam Assignment 2
2.3	**Execute** the output waveforms to measure and verify the electrical circuits.	➢ Lectures ➢ Lab Exercises	Mini Project Lab Exam Final Exam Assignment 2
3.0	**Values**		
3.1	**Perform** the experiments and projects with various data to measure the response of electrical circuits.	➢ Lectures ➢ Classroom Discussions ➢ Lab Exercises	Mini Project Lab Exam

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Assignments / Mini Project	4th Week	20%
2	Midterm Exam	6th Week	20%
3	Lab Exam	11th Week	20%
4	Final Theory Exam	12th Week	40%

***Assessment task** (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :

Department have an arrangement for "Academic Counseling and Support" for each student. The academic advising committee nominates faculty members as "Student Academic Advisor" every semester. These "Academic Advisors" are responsible for student counseling and advising to a group of fix number of students (around 15 students) and maintaining students' files. At the beginning of semester and at time of course registration all students take counseling from Academic Advisor according to his previous grades and coverage of pre-requisite course and follow-up.

Also students with GPA below 2.00 are remained under deep observation and continuous meetings with respective course teachers about their performance are arranged to help and support the students. The course teacher is to be associated with this course provide a proper guidance for students who are looking to focus on their future career based on their intellectual interests, identify better opportunities related to this course and connections in their academic fields.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	Electronic Devices (Conventional Current Version), Thomas L. Floyd, 10th Edition, Pearson, 2018, ISBN-13: 978-0134414447, ISBN-10: 9780134414447
Essential References Materials	• Electronic Principles Albert Malvino and David Bates and Patrick Hoppe,9th Edition, McGraw Hill, 2021, ISBN10: 1259852695, ISBN10: 1259852695 • Electronic Devices and Circuit Theory Robert L. Boylestad, Louis Nashelsky, 11th edition, Pearson, 2013, ISBN-13: 9780133109047
Electronic Materials	• **Blackboard:-** https://lms.jazanu.edu.sa/webapps/portal/execute/tabs/tabAction?tab_tab_group_id=_1_1 • http://www.electronics-tutorials.ws/ • http://www.pennfosterglobal.com/ • http://www.learnabout-electronics.org/ https://en.wikipedia.org/wiki/Encyclopedia
Other Learning Materials	---

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Classroom equipped with projector and whiteboard and sufficient seating arrangements. Lab with required devices and Kits for each student.
Technology Resources (AV, data show, Smart Board, software, etc.)	Circuit Maker 2.0
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	---

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Sufficiency of resources and facilities for students	Students	Course evaluation survey form
Effectiveness of teaching / learning process	Students	Course evaluation survey form
Effectiveness of teaching / learning process	CRC / QAU / HOD	Course reports / result analysis
Quality of learning Resources	Track leaders / CRC	Review meetings and star rating with suggestions for further modification and improvements
Verifying standards of student achievement / evaluation	HOD / committee nominated by HOD	Random re-checking of evaluated answer sheets

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Achievement of course learning outcomes	Course Teachers / QAU	CLO assessment template that is further verified at course coordinator, Track leader and QAU level.

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)
Evaluators (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)
Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	
Reference No.	
Date	