هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

2023
TP-153

Course Specification
(Bachelor)

Course Title:	Electronics
Course Code:	2034104-4
Program:	Bachelor of Physics
Department:	Physics Department
College:	College of Sciencex
Institution:	Taif University
Version:	3
Last Revision Date:	2 October 2022

Table of Contents

A. General information about the course:

1. Course Identification

1. Credit hours: (4)					
2. Course type					
A.	☐University	☐College	☒ Department	☐Track	☐Others
B.	☒ Required		☐Elective		
3. Level/year at which this course is offered: (7th level / 4th year)					
4. Course general Description:					
This course includes to semiconductors, p-n junction, diode circuits such as: rectifiers, filters, Zener diode and voltage stabilizer. In addition, bipolar transistor, voltage Amplifier, differential Amplifier, operational amplifier, oscillators, field effect transistor, and digital electronics.					
5. Pre-requirements for this course (if any):					
Solid State Physics (1) (2033201-4)					
6. Co-requisites for this course (if any):					
None					
7. Course Main Objective(s):					
- Define the semiconductor material (typically silicon) and associated basic devices, such as diode, bipolar transistor, field effect transistor. - Illustrate their functions as electronic components in different electronic circuits, such as rectifiers, amplifiers, oscillators and digital circuits. Thus providing the physics student with the basic knowledge of electronics.					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	7	100%
2	E-learning		
3	Hybrid • Traditional classroom • E-learning		

No	Mode of Instruction	Contact Hours	Percentage
4	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	45
2.	**Laboratory/Studio**	45
3.	**Field**	
4.	**Tutorial**	
5.	**Others (specify)**	
Total		90

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	Define the basic concepts and theories of semiconductors and p-n Junction.	K1	Lecture Discussion	Written exam
1.2	Describe diode and transistor operations, and their applications such as: rectifiers, filters, Zener diode, and voltage stabilizer.	K3	Lecture Discussion	Written exam
2.0	**Skills**			
2.1	Apply the main theories to solve problems of electronic circuits.	S2	Problem solving	Written exam Activities
2.2	Develop a skill versatility in solving problems in diodes and transistors circuits, and	S3	Problem solving	Written exam Activities

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
	related topics.			
3.0	Values, autonomy, and responsibility			
3.1	Work effectively in groups even when performing experiments in electronic circuits.	V2	Practical	Lab reports Lab exam Activities
3.2	Act responsibly and be able to prepare a written scientific report.	V3	Practical	Lab reports Lab exam

C. Course Content

No	List of Topics	Contact Hours
1.	Unit1: **Introduction to Electronics**	3
2.	Unit2: **Semiconductors:** **Semiconductor, p-n junction, Diode and characteristic curves**	6
3.	Unit3: **Diode Types:** **Structures, Circuits Characteristic curves and their Applications**	4
4.	Unit4: **Rectifier and Filter using semiconductor diodes:** **Half-wave rectifier, Full-wave rectifier, Half-wave filter, Full-wave filter**	6
5.	Unit5: **Bipolar Transistor:** **Bias, Working principle, Common emitter current amplifier, Characteristic curves**	3
6.	Unit6: **Bipolar Transistor:** **Load line and Quiescent point (working point)**	3
7.	Unit7: **Bipolar Transistor:** **Bias techniques, Voltage amplifier**	3
8.	Unit8: **Field Effect Transistor (FET)**	4
9.	Unit9: **Differential Amplifier**	4

10.	Unit10: Inverting and Non-inverting operational amplifiers	4
11.	Unit11: Oscillators	4
12.	Unit12: Digital electronics: Binary and Decimal Numbers, Logic Ports and Digital Circuits	6
	Part 2	
1.	Experiment 1: Diode I-V characteristics	2
2.	Experiment 2: Light Emitting Diode (LED) I-V characteristics	2
3.	Experiment 3: Rectifier circuit (half wave signal)	2
4.	Experiment 4: Rectifier circuit (full wave signal)	2
5.	Experiment 5: Filter circuit	2
6.	Experiment 6: Voltage stabilizer circuit	2
7.	Experiment 7: Field Effect Transistor (FET) (output characteristics)	2
8.	Experiment 8: Field Effect Transistor (FET) (transfer characteristics)	2
9.	Experiment 9: Bipolar junction transistor (BJT) (output characteristics)	2
10.	Reports evaluation and practical exam	2
	Total	**70**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	The 1st Periodic exam	8th	20%
2.	The 2nd Periodic exam	13th	10%
3.	Activities	Periodically	10%
4.	Lab (reports & exam)	Weekly/ 14th	20%

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
5.	Final exam	15th	40%

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	- A.P. Malvino, Electronic Principles, 6th edition, McGraw-Hill International editions, 1999.
Supportive References	- P. Horowitz and W. Hill "The Art of Electronics" Cambridge University Press, 2nd Edition, 1994. - D.C. Green, Electronics II ELBS, 1981. R. A. Smith, Semiconductors, 2nd edition, Cambridge Univ. Press, 1978.
Electronic Materials	http://hyperphysics.phy-astr.gsu.edu/hbase/hframe.html
Other Learning Materials	Lecture notes and PowerPoints presentations prepared by the lecturer.

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	• Classrooms • Electronics laboratory
Technology equipment (projector, smart board, software)	• Data show • Laptop • Smart board
Other equipment (depending on the nature of the specialty)	None

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	• lecturer • Program coordinator • Departmental council • Faculty council	Indirect
Effectiveness of Students assessment	Students	Indirect
Quality of learning resources	• Students • Lecturer • Faculty	Indirect
The extent to which CLOs have been achieved	• Program leaders • lecturer	Direct

Assessment Areas/Issues	Assessor	Assessment Methods
Course effectiveness and planning for improvement	• Program leaders • lecturer	Indirect

Assessors (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	PHYSICS DEPARTMENT COUNCIL
REFERENCE NO.	NO. 4-45
DATE	27/09/2023 (12/03/1445)

قسم الفيزياء
Physics Department
TU
جامعة الطائف
TAIF UNIVERSITY