Jordan University of Science and Technology

Faculty of Engineering

Biomedical Engineering Department

BME313 Medical Electronics 1
First Semester 2023-2024

Course Catalog
3 Credit Hours. Introduction to Semiconductors, Diode types, circuits and applications, Bipolar Junction Transistors (BJT) types and biasing circuits, Field effect transistors (FET) types and biasing circuits, Small-signal BJT and FET amplifiers, Multistage amplifiers, Frequency response of amplifiers, Introduction to differential ampli?ers, Medical applications of diode circuits and transistor amplifiers.

Text Book	
Title	MicroElectronics Circuit Analysis and Design
Author(s)	Donald A. Neamen
Edition	4th Edition
Short Name	Ref#1
Other Information	...

Course References

Short name	Book name	Author(s)	Edition	Other Information
Ref #2	Electronic Circuits, Discrete and integrated	D. L. Schilling and C. Belove.	1st Edition	
Ref #3	Microelectronics circuits	Adel Sedra and Kenneth Smith	1st Edition	

Instructor	
Name	**Prof. Nedal Al-Ababneh**
Office Location	E1L2

Office Hours	Sun : 08:00 - 08:15 Mon : 08:30 - 10:00 Mon : 10:00 - 11:30 Tue : 08:00 - 08:15 Wed : 08:30 - 10:00 Wed : 10:00 - 11:30
Email	nedalk@just.edu.jo

Class Schedule & Room
Section 1: Lecture Time: Mon, Wed : 11:30 - 13:00 Room: C5023

Prerequisites		
Line Number	**Course Name**	**Prerequisite Type**
282120	BME212 Electric Circuit Analysis	Prerequisite / Pass

Tentative List of Topics Covered		
Weeks	**Topic**	**References**
Weeks 1, 2	Introduction to Semiconductors: Semiconductor materials; Carriers, N- and P-types, Conductivity and Drift Current, P-N Junctions; Forward and Reverse Biasing.	
Week 3	Diode Circuits: Large signal applications: rectification, filtering, peak detectors, clipping and clamping circuits. Small signal analysis and dynamic resistance.	
Weeks 4, 5, 6	Bipolar Junction Transistor: Structure, symbol and types I-V characteristics. Biasing circuits and types of biasing: Common Base (CB), Common Emitter (CE), and Common Collector (CC). Small signal analysis. Small signal model for CE, CB and CC amplifiers. Specifications of BJT amplifiers	
Weeks 7, 8, 9	Field Effect Transistor: Structure, symbol and types. I-V characteristics Biasing circuits of FET. Small signal analysis of CH 3 & 4: FET amplifiers (Common Gate (CG), Common Source (CS), and Common Drain (CD)). Specifications of FET amplifiers	
Weeks 10, 11	Multistage Amplifiers: Multistage Amplifiers. Methods of coupling. RC and DC coupling. Cascade BJT, FET and BiFET amplifiers. Darlington amplifiers.	
Weeks 12, 13, 14	Frequency Response Low and high frequency response of: 1. Single stage amplifiers 2. Multistage amplifiers	
Weeks 15, 16	Differential Amplifiers Basic BJT differential pair Basic FET differential pair Analysis of differential amplifier.	

Mapping of Course Outcomes to Program Outcomes	Course Outcome Weight (Out of 100%)	Assessment method
Understand semiconductor materials and operation of semiconductor devices [1SO1, 1SO2, 1SO6]	15%	

Analyze diode circuits (small-signal and large-signal applications) [1SO1, 1SO2, 1SO4, 1SO6]	15%	
Design and analysis of bipolar junction transistor (BJT) circuits and amplifiers [1SO1, 1SO2, 1SO4, 1SO6, 1SO7]	25%	
Analysis and design of Field Effect transistor (FET) circuits and amplifiers. [1SO1, 1SO2, 1SO4, 1SO6]	20%	
Study of Frequency Response of Electronic Circuits [1SO1, 1SO4, 1SO6]	15%	
Analysis and design of differential amplifiers [1SO1, 1SO2, 1SO4, 1SO6]	10%	

Relationship to Program Student Outcomes (Out of 100%)						
SO1	SO2	SO3	SO4	SO5	SO6	SO7
26.25	21.25		21.25		26.25	5

Evaluation	
Assessment Tool	**Weight**
First Midterm	30%
Second Midterm	30%
Final exam	40%

Policy	
Grading Policy	10% of your grade will be determined by Homework and quizzes. 50% of your grade will be determined by 2 in-class midterm exams (25% each). 40% of your grade will be determined by the Final exam.
Attendance:	Class attendance is required and applied according to the university regulations (Student's Guide). Data support the idea that class attendance improves learning. It is very difficult as well as uninspiring for me to help a student who does not attend lectures. What is created in the classroom cannot be reenacted. Make-up tests will be done according to the university regulations (please see the student's guide).
Student Conduct	It is the responsibility of each student to adhere to the principles of academic integrity. Academic integrity means that a student is honest with him/herself, fellow students, instructors, and the University in matters concerning his or her educational endeavors. Cheating will not be tolerated in this course. University regulations will be pursued and enforced on any cheating student

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