

The University of Jordan School of Engineering Electrical Engineering Department

2nd Semester - A.Y. 2020/2021

Course:	Electronics (II) – 090336	61 (3 Cr.	. – Required	Course)		
Instructor:	Dr. Hani Jaml Office: E301, Office Hours:	Hani Jamleh ice: E301, Telephone: 06/5355000 ext 22848, Email: jamleh@ju.edu.jo ice Hours: Will be posted soon					
Course	http://elearning.ju.edu.jo/						
website: Catalog description:	Amplification. Biasing of transistor (BJT and FET). Single-stage amplifier. Cascaded BJT and FET amplifiers. Composite transistor stages. Operational amplifiers and Applications: Differential amplifier. Operational amplifier architectures. Gain with active load. DC level shifting. Output stage. Offset voltages and currents. Frequency response of amplifiers. The high-frequency response of all amplifier configurations. The low-frequency response of all amplifier configurations. The low-frequency response of all amplifiers. Properties of negative-feedback amplifiers. Properties of feedback amplifiers.						
Prerequisites by course:	EE	0903261	Electron	ics (I)		(pre-requisite)	
Prerequisites by topic:	Students are a • Two • Semiconduc diode circuits,	assumed to Electrical port net tor fundam BJT & FET	have a ba works, entals: p-r transisto	ackground in circuit frequency n junction pri r circuits DC	the following top analysis response, nciple of operatio analysis and low	ics: techniques. and Bode plot. on and circuit analysis, frequency model.	
Textbook:	Microelectron Education, 41	nics Circui th edition, :	t Analysis 2009.	s and Desig	n by Donald A N	eamen, McGraw-Hill	
References:	1.	Microelec University	tronic Circ Press, 7t	uits by Adel h edition, 20	S. Sedra and Ker 15.	nneth C. Smith, Oxford	
	2.	Electronic Nashelsky	Devices a y, 11th edi	and Circuit Tl ition, Pearso	neory by Robert L n, 2012.	Boylestad and Louis	
	3.	Microelec 5th editior	tronic Circ n, Pearsor	cuit Design b n, 2015.	y Richard C Jaeg	er and Travis Blalock,	
	4.	Electronic and David	s Fundam M. Buchl	nentals: A Sys la, 1st editior	stems Approach I ,Pearson, 2013.	by by Thomas L. Floyd	

- 5. Schaum's Outline of Electronic Devices and Circuits by Jimmie J. Cathey, McGraw-Hill Education, 2nd Edition, 2002.
- 6. Semiconductor Physics And Devices: Basic Principles by Donald A. Neamen, McGraw-Hill, 4th Edition, 2011.
- 7. The Art of Electronics by Paul Horowitz and Winfield Hill, Cambridge University Press, 3rd edition, 2015.
- Schedule: 16 Weeks, 42 lectures (50 minutes each) plus exams.
- **Course goals:** The overall objective is to introduce the student to amplifier analysis and design (including frequency response analysis) using various types of transistors and the Op-Amp.

Course learning outcomes (CLO) and relation to ABET student outcomes (SO):

Upon	successful completion of this course, a student will:	[SO]
1.	Be able to analyze and design single and multistage BJT & FET amplifiers.	[1, 2]
2.	Be able to predict the frequency response of different amplifier types and its major influencing factors.	[1]
3.	Be able to analyze and utilize operational amplifiers and differential amplifiers in various applications.	[1]
4.	Recognize and be able to analyze the various feedback topologies.	[1]
Cours	Se s:	Hrs
1.	BJT Amplifiers: AC equivalent circuit of BJT transistors, linear analysis of BJT amplifier circuits, BJT amplifier configurations: common emitter, common collector, common base, multistage BJT amplifiers configurations: cascaded stages.	6
2.	FET Amplifiers: AC equivalent circuit of FET transistors, linear analysis of FET amplifier circuits, FET amplifier configurations: common drain, common source, common gate, multistage FET amplifiers configurations: cascaded stages.	6
3.	Frequency Response: Open circuit and short circuit time constants, Bode plot, lower and upper 3 dB corner frequencies, mid-band band-width, coupling capacitors effect, load capacitors effect, bypass capacitors effect, combined capacitors effect, frequency response of BJT amplifier circuits, frequency response of FET amplifier circuits.	9
4.	Operational Amplifiers: Ideal Op-Amp parameters and operation, inverting Op-Amp, summing amplifier, non-inverting Op-Amp, Op-Amp applications: current-to-voltage converter, voltage-to-current converter, difference amplifier, integrator and differentiator, non-linear circuit applications.	8
5.	Differential and Multistage Amplifiers: Definition of differential amplifiers, basic BJT & FET differential pair: DC transfer characteristics, small signal equivalent circuit and analysis, differential and common-mode gains, Common-Mode Rejection Ratio (CMRR).	6
6.	Feedback and Stability: Concepts of negative and positive feedback, Feedback topologies, Feedback effects on amplifier gain, bandwidth, input and output resistance, feedback and amplifier stability.	7

Ground rules: Attendance is required and highly encouraged. To that end, attendance will be taken every lecture. Eating and drinking are not allowed during class, and cell phones must be set to silent mode. All exams (including the final exam) should be considered cumulative. Exams are closed book. No scratch paper is allowed. You will be held responsible for all reading material assigned, even if it is not explicitly covered in lecture notes.

			Total	100%
	Final Exam	40%	Presentation	0%
	Midterm Exam	30%	Lab Reports	0%
grading policy:	First Exam	30%	Projects	0%
Assessment &	Assignments	0%	Quizzes	0%

Last Revised:

March 2021