





29. Course Specification of Electronics 2

]	I. Course Identification and General Information:								
1.	Course Title:	Electronics 2							
2.	Course Code & Number:	PME214							
		С.Н			Total				
3.	Credit hours:	Th.	Tu.	Pr.	Tr.	Total			
		2	2	2	-	4			
4.	Study level/ semester at which this course is offered:	Level 3- Semester 1							
5.	Pre –requisite (if any):	Electronics 1(PME113)							
6.	Co –requisite (if any):	None.							
7.	Program (s) in which the course is offered:	Electrical Eng. Dept							
8.	Language of teaching the course:	English & Arabic							
9.	Location of teaching the course:	Inside the University, Faculty of Engineering Electrical Engineering Department							
10.	Prepared By:	Asst. Prof. Dr. Abdulkafi Al-Eriany							
11.	Date of Approval	Decer	mber 2020						

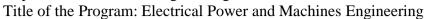
II. Course Description:

This course is a continuation of Electronic Circuits 1 for advanced applications. The topics include BJTs and FETs frequency response. The course also discusses the main properties and parameters of different classes of power amplifiers including the solution of power efficiency of each class & Analog-to- Digital Converters (A/D) & Digital-to-Analog Converters (D/A). The course has an associated Laboratory experiments set, which will require use of simulation software and hardware equipment. Later, the course will introduce a basic definition, concepts, and design of digital logic circuits such as DTL, TTL. ECL, MOS & CMOS etc.

	III. Course Intended learning outcomes (CILOs) of the course	Referenced PILOs
	Demonstrate knowledge of developed characteristics, operations,	
a1	fundamental laws and analysis, and engineering applications related to	A1
	electronic circuits and systems.	

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a2	Define principles of design including elements, processes and/or systems related to electronic program.	A2
b1	Solve electronics systems using appropriate methods and modeling techniques.	B1
b2	Analyze the electronics engineering in the field of industrial products.	В3
c1	Employ the international standards and technical specifications of analog electronics components while designing and integrating electronic systems.	C2
c2	Conduct laboratory experiments safely to verify theoretical concepts related to electronics components and devices.	C3
d1	Assess personal commitment to electronics engineering tasks and effectively manage time and resources.	D3

(A) Alignment Course Intended Learning Outcomes of Knowledge and Understanding to Teaching Strategies and Assessment Strategies:							
a1-	Demonstrate knowledge and understanding of developed characteristics, operations, fundamental laws and analysis, engineering applications d to electronic circuits and ms.	 Teaching strategies Lectures. Tutorials. Laboratory. Seminar. Interactive class discussion. 	Assessment Strategies Quizzes, Testes, Written Exams, Homework, Practical Testes.				
a2-	Understand principles of design including elements, processes and/or systems related to Electronic program.	 Lectures. Tutorials. Laboratory. Seminar. Interactive class discussion. 	Quizzes,Testes,Written Exams,Homework,Practical Testes.				

(B) Alignment Course Intended Learning Outcomes of Intellectual Skills to Teaching Strategies and Assessment Strategies:				
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies		

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Shakiri

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Department: Electrical Engineering

Title of the Program: Electrical Power and Machines Engineering









b1- using	Solve electronics systems appropriate methods and modeling techniques.	 Lectures. Tutorials. Laboratory. Seminar. Interactive class discussion.	 Quizzes, Testes, Written Exams, Homework, Practical Testes.
b2-	Analyze the electronics engineering in the field of industrial products	 Lectures. Tutorials. Laboratory. Seminar. Interactive class discussion.	Quizzes, Testes, Written Exams, Homework, Practical Testes.

(C) Alignment Course Intended Learning Outcomes of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:						
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies				
c1- Employ the international standards and technical specifications of analog electronics components while designing and integrating electronic systems.	 Lectures. Tutorials. Laboratory. Seminar. Interactive class discussion. 	Quizzes,Testes,Written Exams,Homework,Practical Testes.				
c2- Conduct laboratory experiments safely to verify theoretical concepts related to electronics components and devices.	 Lectures. Tutorials. Laboratory. Seminar. Interactive class discussion. 	 Quizzes, Testes, Written Exams, Homework, Practical Testes. 				

(D) Alignment Course Intended Learning Outcomes of Transferable Skills to Teaching Strategies and Assessment Strategies:				
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies		

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- d1- Assess personal commitment to electronics engineering tasks and effectively manage time and resources.
- Laboratory.
- Seminar.
- Interactive class discussion.
- Reports Short Essays.
- Presentations

IV. Course Content:

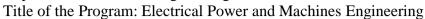
A – Theoretical Aspect:

A – The	A – Theoretical Aspect:						
Order	Units/Topics List	Learning Outcomes	Sub Topics List	Number of Weeks	Contact hours		
1.	BJT Frequency response	a1, a2, b1, b2, c1, c2, d1	General Frequency Consideration.Types of Coupling.	1	2		
2.	BJT Frequency response	a1, a2, b1, b2, c1, c2, d1	 R-C Circuits. Logarithms and Decibel Concepts. Low Frequency analysis. Bode plot 	1	2		
3.	FET Frequency analysis	a1, a2, b1, b2, c1, c2, d1	 Low Frequency Analysis. Bode Plot.	1	2		
4.	BJT and FET Frequency Response	a1, a2, b1, b2, c1, c2, d1	Miller Effect.Input & output Miller Capacitances.High Frequency Analysis.	1	2		
5.	Power amplifiers	a1, a2, b1, b2, c1, c2, d1	 Main properties and Characteristics of power amplifiers. 	1	2		
6.	Power amplifiers	a1, a2, b1, b2, c1, c2, d1	 Classes of Power Amplifier. Power Efficiency. Series-Fed Class A Power Amplifier. Class B Power Amplifier Power Efficiency. 	1	2		

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7.	Power amplifiers	a1, a2, b1, b2, c1, c2, d1	 Class AB Power Amplifier. Class C and Class D Power Amplifiers. Main properties and utilization. 	1	2
8.	Analog-to digital converters (A/D)	a1, a2, b1, b2, c1, c2, d1	 Successive Approximation A/D Converter. Dual-Slop (Dual-Ramp) A/D Converter. Parallel A/DE Converter (Flash Adder) 	1	2
9.	Digital-to analog converters (D/A)	a1, a2, b1, b2, c1, c2, d1	 D/A Converter using Binary Weighted Resistor. D/A Converter using R-2R Resistance Ladder. 	1	2
10.	Logic circuits	a1, a2, b1, b2, c1, c2, d1	Introduction to logic circuits.Review of Boolean Algebra.Timing Diagrams.	1	2
11.	Noise margin analysis Power consumption of logic gates	a1, a2, b1, b2, c1, c2, d1	 Dynamic Response of Logic Gates. Rise Time and Fall Times Propagation Time. Propagation Delay. Noise immunity. 	1	2
12.	DTL & TTL circuits	a1, a2, b1, b2, c1, c2, d1	 Diode Resistor OR Gate. Diode Resistor AND Gate. Diode Transistor Logic (DTL). Transistor Transistor Logic (TTL). 	1	2
13.	Other types of logic circuits.	a1, a2, b1, b2, c1, c2, d1	 ECL Logic Gate. MOC & CMOS Logic Gates.	1	2
14.	Overview	a1, a2, b1, b2, c1, c2, d1	• All Topics	1	2
Numbe	r of Weeks /and	emester	14	28	

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B – Tı	itorial Aspect:				
Order	Units/Topics List	Learning Outcomes	Sub Topics List	Number of Weeks	Contact hours
1.	BJT Frequency response	a1, a2, b1, b2, c1, c2, d1	General Frequency Consideration.Types of Coupling.	1	2
2.	BJT Frequency response	a1, a2, b1, b2, c1, c2, d1	 R-C Circuits. Logarithms and Decibel Concepts. Low Frequency analysis. Bode plot 	1	2
3.	FET'S Frequency analysis	a1, a2, b1, b2, c1, c2, d1	Low Frequency Analysis.Bode Plot.	1	2
4.	BJT and FETS Frequency Response	a1, a2, b1, b2, c1, c2, d1	 Miller Effect. Input & output Miller Capacitances. High Frequency Analysis. 	1	2
5.	Power amplifiers	a1, a2, b1, b2, c1, c2, d1	 Main properties and Characteristics of power amplifiers. 	1	2
6.	Power amplifiers	a1, a2, b1, b2, c1, c2, d1	 Classes of Power Amplifier. Power Efficiency. Series-Fed Class a Power Amplifier. Class B Power Amplifier Power Efficiency. 	1	2
7.	Power amplifiers	a1, a2, b1, b2, c1, c2, d1	Class AB Power Amplifier.Class C and Class D Power Amplifiers.	1	2

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		1			I
			Main properties and		
			utilization.		
8.	Analog-to digital converters (A/D)	a1, a2, b1, b2, c1, c2, d1	 Successive Approximation A/D Converter. Dual-Slop (Dual-Ramp) A/D Converter. Parallel A/DE Converter (Flash Adder) 	1	2
9.	Digital-to analog converters (D/A)	a1, a2, b1, b2, c1, c2, d1	 D/A Converter using Binary Weighted Resistor. D/A Converter using R- 2R Resistance Ladder. 	1	2
10.	Logic circuits	a1, a2, b1, b2, c1, c2, d1	 Introduction to logic circuits. Review of Boolean Algebra. Timing Diagrams. 	1	2
11.	Noise margin analysis Power consumption of logic gates	a1, a2, b1, b2, c1, c2, d1	 Dynamic Response of Logic Gates. Rise Time and Fall Times Propagation Time. Propagation Delay. Noise immunity. 	1	2
12.	DTL & TTL circuits	a1, a2, b1, b2, c1, c2, d1	 Diode Resistor OR Gate. Diode Resistor AND Gate. Diode Transistor Logic (DTL). Transistor Transistor Logic (TTL). 	1	2
13.	Other types of logic circuits.	a1, a2, b1, b2, c1, c2, d1	ECL Logic Gate.MOC & CMOS Logic Gates.	1	2

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Department
Asst. Prof. Dr.
Adel Ahmed Al-
Shakiri

Quality Assurance Unit Assoc. Prof. Dr. Mohammad Algorafi

Dean of the Faculty Prof. Dr. Mohammed AL-Bukhaiti Academic
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14.	Overview	a1, a2, b1, b2, c1, c2, d1	■ All Topics	1	2
Numbe	Number of Weeks /and Units Per Semester		16	32	

C – Pr	actical Aspect:			
Order	Tasks/ Experiments	Number of Weeks	Contact hours	Learning Outcomes
1.	BJT – Frequency response	1	2	a1, a2, b1, b2, c1, c2, d1
2.	FET – Frequency response	1	2	a1, a2, b1, b2, c1, c2, d1
3.	BJT and FET's Frequency response	1	2	a1, a2, b1, b2, c1, c2, d1
4.	BJT and FET's Frequency response	1	2	a1, a2, b1, b2, c1, c2, d1
5.	Series-Fed Class a Power amplifier. Input power, output power and power efficiency	1	2	a1, a2, b1, b2, c1, c2, d1
6.	Class B power Amplifier, input power, output power and power efficiency	1	2	a1, a2, b1, b2, c1, c2, d1
7.	Class AB Power Amplifier	1	2	a1, a2, b1, b2, c1, c2, d1
8.	Class C and Class D Power Amplifiers	1	2	a1, a2, b1, b2, c1, c2, d1
9.	Analog-to- Digital Converters (A/D) & Digital-to-Analog Converters (D/A)	1	2	a1, a2, b1, b2, c1, c2, d1
10.	Determination of Dynamic Characteristics of Logic Circuits Determination of Margin Time of Logic Circuits	1	2	a1, a2, b1, b2, c1, c2, d1
11.	DRL & DTL (Input & Output Measurement) Rise- Time and Fall-Time Logic Circuits	1	2	a1, a2, b1, b2, c1, c2, d1

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	er of Weeks /and Units Per Semester	14	28	c1, c2, d1
14.	Review	1	2	a1, a2, b1, b2,
13.	Final Hand-Work or Project	1	2	a1, a2, b1, b2, c1, c2, d1
12.	Design of TTL & ECL Logic Circuits Design of MOS & CMOS Logic Circuits	1	2	a1, a2, b1, b2, c1, c2, d1

V. Teaching strategies of the course:

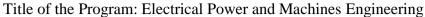
- Lectures.
- Tutorials.
- Laboratory.
- Seminar.
- Interactive class discussion.

	VI. Assignments:			
No	Assignments	Aligned CILOs (symbols) Week Due		Mark
1.	BJT & FET (Low frequency response).	a1, a2, b1, c1, c2	3 th & 4 th	4
2.	BJT & FET (High frequency response).	a1, a2, b1, c1, c2	5 th & 6 th	4
3.	Series Fed class A power amplifier	a1, a2, b1, b2, c1, c2, d1	8 th & 9 th	4
4.	Class B power amplifier. Class AB, C, D	a1, a2, b1, b2, c1, c2, d1	10 th & 11 th	4
5.	Logic Circuits	a1, a2, b1, b2, c1, c2, d1	12 th & 13 th	4
		Total		20

VII. Schedule of Assessment Tasks for Students During the Semester:					
No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes

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1.	Assignments& Homework	3 rd to 13 th	20	10%	a1, a2, b1, b2, c1, c2, d1
2.	Lab work and experiments reports	4 th to 13 th	20	10%	a1, a2, b1, b2, c1, c2, d1
3.	Practical Term-Project and Presentation	3 rd to 14 th	20	10%	a1, a2, b1, b2, c1, c2, d1
4.	Mid-Term Exam (Theoretically)	8 th	20	10%	a1, a2, b1, b2, c1, c2, d1
5.	Final-Term Exam (Practically)	15 th	20	10%	a1, a2, b1, b2, c1, c2, d1
6.	Final-Term Exam (Theoretically)	16 th	100	50%	a1, a2, b1, b2, c1, c2, d1
T	Total Assessments Mark/Percentage			100%	

VIII. Learning Resources:

Written in the following order: (Author - Year of publication – Title – Edition – Place of publication – Publisher).

1- Required Textbook(s) (maximum two).

- **1.** Robert L. Boylestad, Louis Nashelsky, 2013, Electronic Devices and Circuit Theory, Prentice Hall, 11th Edition.
- 2. Thomas L. Floyd, 2012, Electronic devices, 9th Ed, USA, Pearson Prentice Hall.

2- Essential References.

- **1.** Robert T. Paynter, 2006, Introductory to Electronic Devices and Circuits, Printice Hall.
- 2. J. Millman & A. Garbel -1978 "Microelectronics", McGraw Hill.
- 3. S. H. Grove 1997 "Semiconductor physics and devices", John Wiley.
- **4.** Sedra & K. Smith 1998 "Microelectronic Circuits", Holt, Rinehart and Winston.
- **5.** Richard C. Jaeger and Travis N. Blalock 2011 Microelectronic 1 NIC circuit Design 4/Edition McGraw Hill Companies, USA New York.

3- Electronic Materials and Web Sites etc.

- 1. http://www.ocw.mit.edu/courses.
- **2.** https://www.youtube.com/playlist?list=PLww54WQ2wa5rOJ7FcXxi-CMNgmpybv7ei
- 3. Lectures will be prepared by lecturer.
- 4. Faculty Electronic Library.

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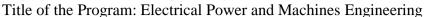


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J	IX. Course Policies:
	Class Attendance:
1.	A student should attend not less than 75 % of total hours of the subject; otherwise he will
1.	not be able to take the exam and will be considered as exam failure. If the student is
	absent due to illness, he/she should bring an approved statement from university Clinic
	Tardy:
2.	For late in attending the class, the student will be initially notified. If he repeated lateness
	in attending class he will be considered as absent.
	Exam Attendance/Punctuality:
3.	A student should attend the exam on time. He is Permitted to attend an exam half one
Э.	hour from exam beginning, after that he/she will not be permitted to take the exam and
	he/she will be considered as absent in exam-
	Assignments & Projects:
4.	The assignment is given to the students after each chapter; the student has to submit all
	the assignments for checking on time-
	Cheating:
5.	For cheating in exam, a student will be considered as failure. In case the cheating is
	repeated three times during his/her study the student will be disengaged from the Faculty-
	Plagiarism:
	Plagiarism is the attending of a student the exam of a course instead of another student.
6.	If the examination committee proved a plagiarism of a student, he will be disengaged
	from the Faculty. The final disengagement of the student from the Faculty should be
	confirmed from the Student Council Affair of the university.
	Other policies:
	- Mobile phones are not allowed to use during a class lecture. It must be closed, otherwise
7.	the student will be asked to leave the lecture room
1	- Mobile phones are not allowed in class during the examination.

Reviewed	Vice Dean for Academic Affairs and Post Graduate Studies: Asst. Prof. Dr. Tarek					
By	A. Barakat					
	President of Quality Assurance Unit: Assoc. Prof. Dr. Mohammed Algorafi					
	Name of Reviewer from the Department: Asst. Prof. Dr. Yahya Al-Naggar					
Deputy Rector for Academic Affairs Asst. Prof. Dr. Ibrahim AlMutaa						
	Assoc. Prof. Dr. Ahmed Mujahed					

Lecture notes and assignments my given directly to students using soft or hard copy

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Asst. Prof. Dr. Munasar Alsubri

29. Template for Course Plan of Electronics 2

I. Information about Faculty Member Responsible for the							
Course:							
Name of Faculty Member	Asst. Prof. Dr. Abdulkafi Al-Eriany Office Hours						
Location & Telephone No.		SAT SUN MON TUE WED THU					
E-mail							

II. Course Identification and General Information:							
1.	Course Title:	Electro	nics 2				
2.	Course Number & Code:	PME21	4				
			C.F	I		Total	
3.	Credit hours:	Th.	Tu.	Pr.	Tr.	Total	
		2	2	2	-	4	
4.	Study level/year at which this course is offered:	Level 3- Semester 1					
5.	Pre –requisite (if any):	Electro	nics 1(PM	(E113)			
6.	Co –requisite (if any):	None.					
7.	Program (s) in which the course is offered	Electric	cal Engine	eering D)epartm	ent	
8.	Language of teaching the course:	English	ı & Arabi	С			
9.	System of Study:	Regular					
10.	Mode of delivery:	Semesters					
11.	Location of teaching the course:	Inside the University, Faculty of Engineering Electrical Engineering Department					

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III. **Course Description:**

This course is a continuation of Electronic Circuits 1 for advanced applications. The topics include BJTs and FETs frequency response. The course also discusses the main properties and parameters of different classes of power amplifiers including the solution of power efficiency of each class & Analog-to- Digital Converters (A/D) & Digital-to-Analog Converters (D/A). The course has an associated Laboratory experiments set, which will require use of simulation software and hardware equipment. Later, the course will introduce a basic definition, concepts, and design of digital logic circuits such as DTL, TTL. ECL, MOS & CMOS etc.

IV.Intended learning outcomes (ILOs) of the course:

- Brief summary of the knowledge or skill the course is intended to develop:
 - 1. Demonstrate knowledge of developed characteristics, operations, fundamental laws and analysis, and engineering applications related to electronic circuits and systems.
 - 2. Define principles of design including elements, processes and/or systems related to electronic program.
 - 3. Solve electronics systems using appropriate methods and modeling techniques.
 - **4.** Analyze the electronics engineering in the field of industrial products.
 - 5. Employ the international standards and technical specifications of analog electronics components while designing and integrating electronic systems.
 - **6.** Conduct laboratory experiments safely to verify theoretical concepts related to electronics components and devices.
 - 7. Assess personal commitment to electronics engineering tasks and effectively manage time and resources.

Title of the Program: Electrical Power and Machines Engineering









V. Course Content:

A – The	A – Theoretical Aspect:						
Order	Units/Topics List	Sub Topics List	Number of Weeks	Contact hours			
1.	BJT Frequency response	General Frequency Consideration.Types of Coupling.	1 st	2			
2.	BJT Frequency response	 R-C Circuits. Logarithms and Decibel Concepts. Low Frequency analysis. Bode plot 	2 nd	2			
3.	FET Frequency analysis	 Low Frequency Analysis. Bode Plot.	3 rd	2			
4.	BJT and FET Frequency Response	 Miller Effect. Input & output Miller Capacitances. High Frequency Analysis.	4 th	2			
5.	Power amplifiers	 Main properties and Characteristics of power amplifiers. 	5 th	2			
6.	Power amplifiers	 Classes of Power Amplifier. Power Efficiency. Series-Fed Class A Power Amplifier. Class B Power Amplifier Power Efficiency. 	6 th	2			
7.	Power amplifiers	 Class AB Power Amplifier. Class C and Class D Power Amplifiers. Main properties and utilization. 	7 th	2			
8.	Midterm exam	• All previous topics	8 th	2			

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Shakiri

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15.	Overview	• All Topics	15 th 16 th	2 2
14.	Other types of logic circuits.	 ECL Logic Gate. MOC & CMOS Logic Gates.	14 th	2
13.	DTL & TTL circuits	 Diode Resistor OR Gate. Diode Resistor AND Gate. Diode Transistor Logic (DTL). Transistor Transistor Logic (TTL). 	13 th	2
12.	Noise margin analysis Power consumption of logic gates	 Dynamic Response of Logic Gates. Rise Time and Fall Times Propagation Time. Propagation Delay. Noise immunity. 	12 th	2
11.	Logic circuits	Introduction to logic circuits.Review of Boolean Algebra.Timing Diagrams.	11 th	2
10.	Digital-to analog converters (D/A)	 D/A Converter using Binary Weighted Resistor. D/A Converter using R-2R Resistance Ladder. 	10 th	2
9.	Analog-to digital converters (A/D)	 Successive Approximation A/D Converter. Dual-Slop (Dual-Ramp) A/D Converter. Parallel A/DE Converter (Flash Adder) 	9 th	2

B – Tutorial Aspect:							
Order	Units/Topics List	Sub Topics List	Number of Weeks	Contact hours			

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Shakiri

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	ВЈТ	Ī		
1.	Frequency	 General Frequency Consideration. 	1 st	2
1.	response	■ Types of Coupling.	1	2
	BJT	R-C Circuits.		
	Frequency	Logarithms and Decibel Concepts.	,	
2.	response	Low Frequency analysis.	2 nd	2
		■ Bode plot		
	FET'S	I ovy Fraguency Analysis		
3.	Frequency	Low Frequency Analysis.Bode Plot.	3^{rd}	2
	analysis	- Bode 1 lot.		
	BJT and FETS	■ Miller Effect.	_	
4.	Frequency	Input & output Miller Capacitances.	4^{th}	2
	Response	High Frequency Analysis.		
5.	Power amplifiers	Main properties and Characteristics	5 th	2
	1	of power amplifiers.		
		Classes of Power Amplifier.		
	Power amplifiers	Power Efficiency.	6 th	2
6.		Series-Fed Class a Power Amplifier.	6	2
		Class B Power AmplifierPower Efficiency.		
		■ Class AB Power Amplifier.		
	Power amplifiers	Class C and Class D Power		
7.		Amplifiers.	7^{th}	2
		Main properties and utilization.		
8.	Midterm exam	All previous topics	8 th	2
		Successive Approximation A/D		
		Converter.		
•	Analog-to digital	■ Dual-Slop (Dual-Ramp) A/D	9 th	2
9.	converters (A/D)	Converter.	9	2
		■ Parallel A/DE Converter (Flash		
		Adder)		
		■ D/A Converter using Binary		
10.	Digital-to analog	Weighted Resistor.	10 th	2
10.	converters (D/A)	■ D/A Converter using R-2R	10	2
		Resistance Ladder.		

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Department: Electrical Engineering

Title of the Program: Electrical Power and Machines Engineering







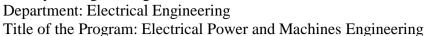


11.	Logic circuits	 Introduction to logic circuits. Review of Boolean Algebra. Timing Diagrams. 	11 th	2
12.	Noise margin analysis Power consumption of logic gates	 Dynamic Response of Logic Gates. Rise Time and Fall Times Propagation Time. Propagation Delay. Noise immunity. 	12 th	2
13.	DTL & TTL circuits	 Diode Resistor OR Gate. Diode Resistor AND Gate. Diode Transistor Logic (DTL). Transistor Transistor Logic (TTL). 	13 th	2
14.	Other types of logic circuits.	ECL Logic Gate.MOC & CMOS Logic Gates.	14 th	2
15.	Overview	■ All Topics	15 th	2
16.	Final exam	■ All Topics	16 th	2
Number of Weeks /and Units Per Semester			16	32

C – Practical Aspect:					
Order	Tasks/ Experiments	Number of Weeks	Contact hours		
1.	BJT – Frequency response	1 st	2		
2.	FET – Frequency response	2 nd	2		
3.	BJT and FET's Frequency response	3 rd	2		
4.	BJT and FET's Frequency response	4 th	2		
5.	Series-Fed Class a Power amplifier. Input power, output power and power efficiency	5 th	2		
6.	Class B power Amplifier, input power, output power and power efficiency	6 th	2		
7.	Class AB Power Amplifier	7 th	2		
8.	Class C and Class D Power Amplifiers	8 th	2		
9.	Analog-to- Digital Converters (A/D) & Digital-to-Analog Converters (D/A)	9 th	2		
10.	Determination of Dynamic Characteristics of Logic Circuits	10 th	2		

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	Determination of Margin Time of Logic Circuits		
11.	DRL & DTL (Input & Output Measurement) Rise- Time and Fall-Time Logic Circuits	11 th	2
12.	Design of TTL & ECL Logic Circuits Design of MOS & CMOS Logic Circuits	12 th	2
13.	Final Hand-Work or Project	13 th	2
14.	Review	14 th	2
15.	Final Practical Exam	15 th	2
Numbe	r of Weeks /and Units Per Semester	15	30

VI. Teaching strategies of the course:

- Lectures.
- Tutorials.
- Laboratory.
- Seminar.
- Interactive class discussion.

	VII.Assignments:					
No	Assignments	Aligned CILOs (symbols)	Week Due	Mark		
1.	BJT & FET (Low frequency response).	a1, a2, b1, c1, c2	3 th & 4 th	4		
2.	BJT & FET (High frequency response).	a1, a2, b1, c1, c2	5 th & 6 th	4		
3.	Series Fed class A power amplifier	a1, a2, b1, b2, c1, c2, d1	8 th & 9 th	4		
4.	Class B power amplifier. Class AB, C, D	a1, a2, b1, b2, c1, c2, d1	10 th & 11 th	4		
5.	Logic Circuits	a1, a2, b1, b2, c1, c2, d1	12 th & 13 th	4		
Total						

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100

200



50%

100%





VIII.Schedule of Assessment Tasks for Students During the Semester:					
No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	
1.	Assignments& Homework	3 rd to 13 th	20	10%	
2.	Lab work and experiments reports	4 th to 13 th	20	10%	
3.	Practical Term-Project and Presentation	3 rd to 14 th	20	10%	
4.	Mid-Term Exam (Theoretically)	8 th	20	10%	
5.	Final-Term Exam (Practically)	15 th	20	10%	

IX. **Learning Resources:**

Final-Term Exam (Theoretically)

Total Assessments Mark/Percentage

Written in the following order: (Author - Year of publication – Title – Edition – Place of publication – Publisher).

1- Required Textbook(s) (maximum two).

1. Robert L. Boylestad, Louis Nashelsky, 2013, Electronic Devices and Circuit Theory, Prentice Hall, 11th Edition.

16th

2. Thomas L. Floyd, 2012, Electronic devices, 9th Ed, USA, Pearson Prentice Hall.

2- Essential References.

- 1. Robert T. Paynter, 2006, Introductory to Electronic Devices and Circuits, Printice Hall.
- 2. J. Millman & A. Garbel -1978 "Microelectronics", McGraw Hill.
- 3. S. H. Grove 1997 "Semiconductor physics and devices", John Wiley.
- **4.** Sedra & K. Smith 1998 "Microelectronic Circuits", Holt, Rinehart and Winston.
- 5. Richard C. Jaeger and Travis N. Blalock 2011 Microelectronic 1 NIC circuit Design – 4/Edition – McGraw Hill Companies, USA – New York.

3- Electronic Materials and Web Sites etc.

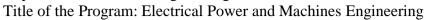
- 1. http://www.ocw.mit.edu/courses.
- 2. https://www.youtube.com/playlist?list=PLww54WQ2wa5rOJ7FcXxi-CMNgmpybv7ei
- **3.** Lectures will be prepared by lecturer.

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4. Faculty Electronic Library.

\mathbf{X}	. Course Policies:
	Class Attendance:
1.	A student should attend not less than 75 % of total hours of the subject; otherwise he will
	not be able to take the exam and will be considered as exam failure. If the student is
	absent due to illness, he/she should bring an approved statement from university Clinic
2.	Tardy:
	For late in attending the class, the student will be initially notified. If he repeated lateness
	in attending class he will be considered as absent.
3.	Exam Attendance/Punctuality:
	A student should attend the exam on time. He is Permitted to attend an exam half one
	hour from exam beginning, after that he/she will not be permitted to take the exam and
	he/she will be considered as absent in exam-
	Assignments & Projects:
4.	The assignment is given to the students after each chapter; the student has to submit all
	the assignments for checking on time-
	Cheating:
5.	For cheating in exam, a student will be considered as failure. In case the cheating is
	repeated three times during his/her study the student will be disengaged from the Faculty-
	Plagiarism:
	Plagiarism is the attending of a student the exam of a course instead of another student.
6.	If the examination committee proved a plagiarism of a student, he will be disengaged
	from the Faculty. The final disengagement of the student from the Faculty should be
	confirmed from the Student Council Affair of the university.
	Other policies:
7.	- Mobile phones are not allowed to use during a class lecture. It must be closed, otherwise
	the student will be asked to leave the lecture room
	- Mobile phones are not allowed in class during the examination.
	Lecture notes and assignments my given directly to students using soft or hard copy

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Head of

Department

Asst. Prof. Dr.

Adel Ahmed Al-

Shakiri

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