29. Course Specification of Electronics 2

I. Course Identification and General Information:						
1.	Course Title:	Electronics 2				
2.	Course Code & Number:	PME214				
3.	Credit hours:	C.H				Total
		Th.	Tu.	Pr.	Tr.	
		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	December 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
a1	Demonstrate knowledge of developed characteristics, operations, fundamental laws and analysis, and engineering applications related to electronic circuits and systems.	A1

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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.	B3
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:		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
a1- Demonstrate knowledge and understanding of developed characteristics, operations, fundamental laws and analysis, and engineering applications related to electronic circuits and systems.	▪ Lectures. ▪ Tutorials. ▪ Laboratory. ▪ Seminar. ▪ Interactive class discussion.	▪ 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

b1- Solve electronics systems using 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

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:

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

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
Number of Weeks /and Units Per Semester				**14**	**28**

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B – Tutorial 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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			▪ 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

14.	Overview	a1, a2, b1, b2, c1, c2, d1	▪ All Topics	1	2
Number of Weeks /and Units Per Semester				**16**	**32**

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

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	3th & 4th	4
2.	BJT & FET (High frequency response).	a1, a2, b1, c1, c2	5th & 6th	4
3.	Series Fed class A power amplifier	a1, a2, b1, b2, c1, c2, d1	8th & 9th	4
4.	Class B power amplifier. Class AB, C, D	a1, a2, b1, b2, c1, c2, d1	10th & 11th	4
5.	Logic Circuits	a1, a2, b1, b2, c1, c2, d1	12th & 13th	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	3rd to 13th	20	10%	a1, a2, b1, b2, c1, c2, d1
2.	Lab work and experiments reports	4th to 13th	20	10%	a1, a2, b1, b2, c1, c2, d1
3.	Practical Term-Project and Presentation	3rd to 14th	20	10%	a1, a2, b1, b2, c1, c2, d1
4.	Mid-Term Exam (Theoretically)	8th	20	10%	a1, a2, b1, b2, c1, c2, d1
5.	Final-Term Exam (Practically)	15th	20	10%	a1, a2, b1, b2, c1, c2, d1
6.	Final-Term Exam (Theoretically)	16th	100	50%	a1, a2, b1, b2, c1, c2, d1
Total Assessments Mark/Percentage			**200**	**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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IX. Course Policies:	
1.	**Class Attendance:** 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-
4.	**Assignments & Projects:** The assignment is given to the students after each chapter; the student has to submit all the assignments for checking on time-
5.	**Cheating:** 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-
6.	**Plagiarism**: Plagiarism is the attending of a student the exam of a course instead of another student. 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.
7.	**Other policies:** - 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

Reviewed By	**Vice Dean for Academic Affairs and Post Graduate Studies: Asst. Prof. Dr. Tarek 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**

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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:	Electronics 2				
2.	Course Number & Code:	PME214				
3.	Credit hours:	C.H				Total
		Th.	Tu.	Pr.	Tr.	
		2	2	2	-	4
4.	Study level/year 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 Engineering Department				
8.	Language of teaching the course:	English & Arabic				
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				

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.

V. Course Content:

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.	1st	2
2.	BJT Frequency response	• R-C Circuits. • Logarithms and Decibel Concepts. • Low Frequency analysis. • Bode plot	2nd	2
3.	FET Frequency analysis	• Low Frequency Analysis. • Bode Plot.	3rd	2
4.	BJT and FET Frequency Response	• Miller Effect. • Input & output Miller Capacitances. • High Frequency Analysis.	4th	2
5.	Power amplifiers	• Main properties and Characteristics of power amplifiers.	5th	2
6.	Power amplifiers	• Classes of Power Amplifier. • Power Efficiency. • Series-Fed Class A Power Amplifier. • Class B Power Amplifier • Power Efficiency.	6th	2
7.	Power amplifiers	• Class AB Power Amplifier. • Class C and Class D Power Amplifiers. • Main properties and utilization.	7th	2
8.	Midterm exam	• All previous topics	8th	2

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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)	9th	2
10.	Digital-to analog converters (D/A)	• D/A Converter using Binary Weighted Resistor. • D/A Converter using R-2R Resistance Ladder.	10th	2
11.	Logic circuits	• Introduction to logic circuits. • Review of Boolean Algebra. • Timing Diagrams.	11th	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.	12th	2
13.	DTL & TTL circuits	• Diode Resistor OR Gate. • Diode Resistor AND Gate. • Diode Transistor Logic (DTL). • Transistor Transistor Logic (TTL).	13th	2
14.	Other types of logic circuits.	• ECL Logic Gate. • MOC & CMOS Logic Gates.	14th	2
15.	Overview	• All Topics	15th	2
16.	Final exam	• All Topics	16th	2
Number of Weeks /and Units Per Semester			**16**	**32**

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

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1.	BJT Frequency response	▪ General Frequency Consideration. ▪ Types of Coupling.	1st	2
2.	BJT Frequency response	▪ R-C Circuits. ▪ Logarithms and Decibel Concepts. ▪ Low Frequency analysis. ▪ Bode plot	2nd	2
3.	FET'S Frequency analysis	▪ Low Frequency Analysis. ▪ Bode Plot.	3rd	2
4.	BJT and FETS Frequency Response	▪ Miller Effect. ▪ Input & output Miller Capacitances. ▪ High Frequency Analysis.	4th	2
5.	Power amplifiers	▪ Main properties and Characteristics of power amplifiers.	5th	2
6.	Power amplifiers	▪ Classes of Power Amplifier. ▪ Power Efficiency. ▪ Series-Fed Class a Power Amplifier. ▪ Class B Power Amplifier ▪ Power Efficiency.	6th	2
7.	Power amplifiers	▪ Class AB Power Amplifier. ▪ Class C and Class D Power Amplifiers. ▪ Main properties and utilization.	7th	2
8.	Midterm exam	▪ All previous topics	8th	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)	9th	2
10.	Digital-to analog converters (D/A)	▪ D/A Converter using Binary Weighted Resistor. ▪ D/A Converter using R-2R Resistance Ladder.	10th	2

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11.	Logic circuits	▪ Introduction to logic circuits. ▪ Review of Boolean Algebra. ▪ Timing Diagrams.	11th	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.	12th	2
13.	DTL & TTL circuits	▪ Diode Resistor OR Gate. ▪ Diode Resistor AND Gate. ▪ Diode Transistor Logic (DTL). ▪ Transistor Transistor Logic (TTL).	13th	2
14.	Other types of logic circuits.	▪ ECL Logic Gate. ▪ MOC & CMOS Logic Gates.	14th	2
15.	Overview	▪ All Topics	15th	2
16.	Final exam	▪ All Topics	16th	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	1st	2
2.	FET – Frequency response	2nd	2
3.	BJT and FET's Frequency response	3rd	2
4.	BJT and FET's Frequency response	4th	2
5.	Series-Fed Class a Power amplifier. Input power, output power and power efficiency	5th	2
6.	Class B power Amplifier, input power, output power and power efficiency	6th	2
7.	Class AB Power Amplifier	7th	2
8.	Class C and Class D Power Amplifiers	8th	2
9.	Analog-to- Digital Converters (A/D) & Digital-to-Analog Converters (D/A)	9th	2
10.	Determination of Dynamic Characteristics of Logic Circuits	10th	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	11th	2
12.	Design of TTL & ECL Logic Circuits Design of MOS & CMOS Logic Circuits	12th	2
13.	Final Hand-Work or Project	13th	2
14.	Review	14th	2
15.	Final Practical Exam	15th	2
Number 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	3th & 4th	4
2.	BJT & FET (High frequency response).	a1, a2, b1, c1, c2	5th & 6th	4
3.	Series Fed class A power amplifier	a1, a2, b1, b2, c1, c2, d1	8th & 9th	4
4.	Class B power amplifier. Class AB, C, D	a1, a2, b1, b2, c1, c2, d1	10th & 11th	4
5.	Logic Circuits	a1, a2, b1, b2, c1, c2, d1	12th & 13th	4
Total				**20**

VIII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment
1.	Assignments& Homework	3rd to 13th	20	10%
2.	Lab work and experiments reports	4th to 13th	20	10%
3.	Practical Term-Project and Presentation	3rd to 14th	20	10%
4.	Mid-Term Exam (Theoretically)	8th	20	10%
5.	Final-Term Exam (Practically)	15th	20	10%
6.	Final-Term Exam (Theoretically)	16th	100	50%
Total Assessments Mark/Percentage			**200**	**100%**

IX. 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.

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4.	Faculty Electronic Library.

X. Course Policies:

1.	**Class Attendance:** 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-
4.	**Assignments & Projects:** The assignment is given to the students after each chapter; the student has to submit all the assignments for checking on time-
5.	**Cheating:** 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-
6.	**Plagiarism**: Plagiarism is the attending of a student the exam of a course instead of another student. 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.
7.	**Other policies:** - 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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