



1- Basic Information

Code	Course Title				Bylaw
EET 232	Wave Shaping Circuits				2011
Program	Electrical Engineering and Computers Engineering BSc.			Category	Mandatory (Compulsory) Course
Delivered by	Electrical Engineering and Computers Engineering Dept.			Prerequisite	Switching Circuits EET 205
Course Units	Lectures	2	hr.	Stage	BSc.
	Tutorials	2	hr.	Level	03 Elec.
	Practical	-	hr.	Semester	2 nd . Semester
	Total Units	3	Cr.h.	Academic Year	2022/2023
Approval Date	Program	Academic council		No. (46) 19/9/2022	
		Dept. council		5/9/2022	
	Course	Academic council		No. (50) 16/1/2023	
		Dept. council		2/1/2023	

2- Course Aims

The main aim of this course is to generate wave shaping with the aid of passive or active circuit by using linear or non-linear mathematical process. This course is designed to qualify the students to be able to:

- Understanding linear wave shaping using passive and active circuits. .
- Know different types of oscillators.
- Understand nonlinear wave shaping.

3- Course Subject Area

A	B	C	D	E	F	G	Total
Humanities and Social Sciences	Mathematics and Basic Sciences	Basic Engineering Sciences	Applied Engineering and Design	Computer Applications and ICT	Projects and Practice	Discretionary Subjects	
			100 %				100 %

4- Competencies of Learning Outcomes from the Course

Program competencies that the course contributes in achieving it		Course competencies in detail	
A8	Communicate effectively – graphically, verbally and in writing – with a range of audiences using contemporary tools.	a8.1	Cooperate with engineering community and industry via exchange knowledge and skills related to linear wave shaping (passive wave shaping “RC, LC, RLC” circuits), active wave shaping (op-amp circuits), diode wave shaping (voltage clipper and voltage clamps).
		a8.2	Compile proper technical reports and present them orally or in written forms to illustrate information related to oscillators (negative resistance oscillators, VNR and RL oscillators), feedback oscillators (RC and RL oscillators, op-amp RC oscillators, Wien bridge oscillators, and phase shift oscillators), non-linear wave shaping (non-linear amplifiers, precision rectifiers, precision peak detectors, precision clamping circuits).
A10	Acquire and apply new knowledge; and practice self, lifelong and other learning strategies.	a10.1	Adopt creative and innovative thinking in solving problems, and designing products related to linear wave shaping, active wave shaping, diode wave shaping, oscillators, non-linear wave shaping circuits.
		a10.2	Search for information and engage in lifelong self-learning discipline to acquire information related to linear wave shaping, active wave shaping, diode wave shaping, oscillators, and non-linear wave shaping circuits.
B2	Design, model and analyze an electrical/electronic/digital system or component for a specific application; and identify the tools required to optimize this design.	b2.1	Devise specialized engineering designs and/or re-design a process, component or system using passive wave shaping, op-amp circuits, diode circuits, feedback oscillators, non-linear wave shaping circuits.
		b2.2	Use numerical modeling methods and/or appropriate computational techniques to solve problems related to wave shaping circuits.
		b2.3	Utilize appropriate computer programming for the design and diagnostics of different wave shaping circuits.
B4	Estimate and measure the performance of an electrical/electronic/digital system and circuit under specific input excitation, and evaluate its suitability for a specific application.	b4.1	Use relevant laboratory equipment and analyze the results correctly to verify passive wave shaping circuits, op-amp circuits, diode circuits, oscillator circuits, and non-linear wave shaping circuits.
		b4.2	Employ the appropriate specifications for passive, op-amp, diode, oscillator, and non-linear circuits.

5- Course Content

Linear wave shaping (Passive wave shaping (RC, LC, RLC Circuits). Active wave shaping (Op Amp circuits) – Diode wave shaping: voltage clipper and voltage clamps – Oscillators (negative resistance oscillators, VNR and RL oscillators - Feedback oscillators (RC and RL oscillators, Op Amp RC oscillators, Wien bridge oscillators – Phase shift oscillators). Non-linear wave shaping (non-linear amplifiers, Precision rectifiers, Precision peak detectors, Precision clamping circuits.

6- Course Topics/Timeline

Topic		No. of Weeks
Topic (1)	Linear wave shaping (Passive wave shaping (RC, LC, RLC Circuits)).	Week (1-2)
Topic (2)	Diode wave shaping : voltage clipper and voltage clamps	Week (3)
Topic (3)	Active wave shaping (Op Amp circuits)	Week (4)
Topic (4)	Oscillators (negative resistance oscillators, VNR and RL oscillators).	Week (5-6)
Topic (5)	Feedback oscillators (RC and RL oscillators)	Week (7)
Topic (6)	Op Amp RC oscillators, Wien bridge oscillators	Week (8)
Topic (7)	Phase shift oscillators	Week (9)
Topic (8)	Nonlinear wave shaping (nonlinear amplifiers, Precision rectifiers)	Week (10)
Topic (9)	Precision peak detectors, Precision clamping circuits.	

7- Course Topics / Competencies

Competencies	Course Topics								
	Topic (1)	Topic (2)	Topic (3)	Topic (4)	Topic (5)	Topic (6)	Topic (7)	Topic (8)	Topic (9)
a8.1	X							X	X
a8.2	X								
a10.1		X							
a10.2			X						
b2.1				X	X				
b2.2			X						
b2.3						X	X	X	X
b4.1				X			X	X	X
b4.2					X		X	X	X

8- Teaching and Learning Methods

Competencies	Teaching and Learning Methods												
	Lecture	Presentations	Discussions	Tutorials	Lab experiments	Problem solving	Brain storming	Projects	Site visits and scientific trips	Reporting	Group working	Self-reading	Distance Learning
a8.1	X	X	X			X	X			X	X	X	X
a8.2	X	X	X			X	X			X	X	X	X
a10.1	X	X		X		X	X			X	X	X	X
a10.2	X	X		X		X	X			X	X	X	X
b2.1	X	X		X		X				X			X
b2.2	X	X		X		X				X			X
b2.3	X	X		X		X				X			X
b4.1	X		X	X						X	X	X	X
b4.2	X		X	X						X	X	X	X

9- Assessment Methods

Competencies	Assessment Methods									
	Written Exams	Oral Exam	Projects	Report	Quiz	Presentation	Practical Test	Observations	Dissertation	Online quiz
a8.1		X		X		X		X		
a8.2		X		X		X		X		
a10.1	X	X				X		X		
a10.2	X	X				X		X		
b2.1	X			X		X				
b2.2	X			X		X				
b2.3	X			X		X				
b4.1	X	X		X		X		X		
b4.2	X	X		X		X		X		

10- Assessment Methods Weight

Assessment Method	Percentage
Final Exam	40 %
Mid-term Exam	40 %
Semester Work	20 %
Total	100 %

11- List of References

Course Notes	It is prepared by coordinator
Essential Books	1-"Principles of electric circuits - conventional current", Thomas L. Floyd and David M. Buchla, 10 th edition, 2020, Published by Pearson Education. 2-"Electronic devices", Thomas Floyd, 9 th edition 2012-2016, 10 th edition 2018, Published by Pearson Education International-New Jersey,
Recommended Books	1- "Noise-shaping all-digital phase-locked Loops: Modeling, simulation, analysis and design", Francesco Brandonisio & Michael Peter Kennedy), 2014, Published by Springer.
Periodicals, Websites, etc.	IEEE.xplore.ieee.org

We certify that all of the information required to deliver this course is contained in the above specification and will be implemented.

Course CoordinatorName: **Dr. Mohammed Morad Salama**Signature: *Dr. Mohammed Morad Salama*

Date: 1/1/2023

Head of Electrical Engineering and Computers Engineering Department

Name: **Dr. Omar Makram Kamel**Signature: *O.M. Kamel*

Date: 1/1/2023