Course Specification

1- Basic Information

Code	Course Title				Bylaw
EEL 187	**Electronic Lab (3)**				2011
Program	Electrical Engineering and Computers Engineering BSc.			**Category**	Elective (Technology) course
Delivered by	Electrical Engineering and Computers Engineering Dept.			**Prerequisite**	Electronic Eng. Lab. EEL 122
Course Units	**Lectures**	-	**hr.**	**Stage**	Diploma
	Tutorials	-	**hr.**	**Level**	02 Elec.
	Practical	3	**hr.**	**Semester**	2nd. Semester
	Total Units	1	**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 conduct testing on trainers of advanced electronic system. This course is designed to qualify the graduates to be able to:

- Familiar with advanced electronic Lab.
- Familiar with basic construction and operation of op-amp.
- Employ op-amp circuits for basic technology.
- Familiar with basic construction and operation of IC 555 timer.
- Employ IC 555 timer circuits for basic technology.

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	
A2	Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics, as appropriate to the EECE discipline.	a2.1	Be aware of current production technologies of electronic products and current technologies of operational amplifier, inverting and non-inverting op-amp, op-amp applications (comparator - summing ampl. - differentiator – integrator), oscillating and timing circuits (vibrators , astable, and monostable circuits), and timing integrated circuit IC 555.
		a2.2	Recognize basic concepts of computer programming and techniques applied in computer communication networks related to operational amplifier applications, oscillating, and timing circuits.
		a2.3	Be aware of terms of technical language and rules of writing reports related to operational amplifier familiarities, verification of op-amp characteristics, feedback op-amp, inverting and non-inverting op-amp, op-amp applications (comparator - summing ampl. - differentiator – integrator), oscillating and timing circuits (vibrators , astable, and monostable circuits), and timing integrated circuit IC 555.
A4	Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues and risk management principles.	a4.1	Recognize topics related to humanitarian interests and moral issues associated with operational amplifier, oscillating, and timing circuits applications.
		a4.2	Identify the standards, quality assurance systems, codes of practices, health and safety regulations, and environmental preservation precautions regarding operational amplifier, oscillating, and timing circuits.
B3	Design and implement: elements, modules, sub-systems or systems in electrical/electronic/digital engineering using technological and professional tools.	b3.1	Create the required operational amplifier, oscillating, and timing circuits via utilizing various analytical tools, simulation techniques, measuring equipment, and proper software packages.
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 operational amplifier familiarities, op-amp characteristics, op-amp circuits, oscillating, and timing circuits.
		b4.2	Employ the appropriate specifications for operational amplifier, oscillating, and timing circuits.
B5	Adopt suitable national and international standards and codes to: design, build, operate, inspect and maintain electrical/electronic/digital equipment, systems and services.	b5.1	Apply standards, quality assurance manuals, and codes for operational amplifier, oscillating, and timing circuits.
		b5.2	Deals with risk management at work and applying safety regulations relevant to operational amplifier, oscillating, and timing circuits technologies
C1	Basics of design and analyzing electrical and computer engineering systems, while considering the constraints of applying inappropriate technology and the needs of commercial risk evaluation.	c1.1	Evaluate the performance of operational amplifier, oscillating, and timing circuits
		c1.2	Evaluate, organize and utilize information and knowledge from different sources to construct a proper design or solution for operational amplifier, oscillating, and timing circuits.
		c1.3	Identify principles of analyzing and designing of operational amplifier, oscillating, and timing circuits, while considering the constraints of applying inappropriate technology and the needs of commercial risk evaluation.

5- Course Content

Operational amplifier familiarities – Verification of OP-amp. Characteristics – Feedback inverting and non-inverting op-amp – Op-amp applications: comparator amplifier, summing amplifier, differentiator and integrator. Oscillating and Timing circuits: vibrators, astable and monostable circuits – Timing integrated circuit IC555.

6- Course Topics / Timeline

Topic		No. of Weeks
Topic (1)	Operational amplifier familiarities. Verification of OP-amp. Characteristics	Week 1
Topic (2)	Feedback inverting and non-inverting op-amp.	Weeks 2 - 3
Topic (3)	Op-amp applications: comparator amplifier.	Week 4
Topic (4)	Summing amplifier.	Week 5
Topic (5)	Differentiator and integrator.	Week 6
Topic (6)	Oscillating and Timing circuits: vibrators.	Week 7
Topic (7)	Astable circuit.	Week 8
Topic (8)	Monostable circuit.	Week 9
Topic (9)	Timing integrated circuit IC555.	Week 10

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)
a2.1	X	X	X	X	X	X	X	X	X
a2.2	X	X	X	X	X	X	X	X	X
a2.3			X	X	X		X	X	
a4.1	X	X	X	X	X	X	X	X	X
a4.2	X	X	X	X	X	X	X	X	X
b3.1	X	X	X	X	X	X	X	X	X
b4.1			X	X	X		X	X	
b4.2			X	X	X		X	X	
b5.1	X	X	X	X	X	X	X	X	X
b5.2	X	X	X	X	X	X	X	X	X
c1.1		X	X	X	X	X	X	X	X
c1.2				X	X	X	X	X	X
c1.3				X	X	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
a2.1	X						X			X	X		X
a2.2	X						X			X	X		X
a2.3	X						X			X	X		X
a4.1	X			X		X		X		X		X	X
a4.2	X			X		X		X		X		X	X
b3.1	X	X		X	X	X		X		X			X
b4.1	X		X	X	X			X		X	X	X	X
b4.2	X		X	X	X			X		X	X	X	X
b5.1	X			X	X		X			X	X	X	X
b5.2	X			X	X		X			X	X	X	X
c1.1	X	X	X		X			X		X	X	X	X
c1.2	X	X	X		X			X		X	X	X	X
c1.3	X	X	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
a2.1	X		X	X	X	X	X	X		
a2.2	X		X	X	X	X	X	X		
a2.3	X		X	X	X	X	X	X		
a4.1	X		X	X						
a4.2	X		X	X						
b3.1	X		X	X	X	X				
b4.1	X	X	X	X		X	X	X		
b4.2	X	X	X	X		X	X	X		
b5.1		X	X	X		X	X	X		
b5.2		X	X	X		X	X	X		
c1.1	X	X	X	X		X	X			
c1.2	X	X	X	X		X	X			
c1.3	X	X	X	X		X	X			

10- Assessment Methods Weight

Assessment Method	Percentage
Final Exam (Lab Test + Theoretical Written Exam)	40 %
Mid-term Exam (Lab Test + Theoretical Written Exam)	30 %
Semester Work	30 %
Total	**100 %**

11- List of References

Course Notes	It is prepared by coordinator
Essential Books	1- "Electronic devices", Thomas L. Floyd, 10th edition, 2018, Published by Pearson Education Limited.
Recommended Books	1- "Microwave Engineering", David M. Pozar, 4th edition., 2012, Published by John Wiley and Sons, Inc.
Periodicals, Websites, etc.	IEEE Explorer

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

Course Coordinator

Name: 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