Course Specification

1-	Basic Information

Code	Course Title					Bylaw
EEI 120	**Control System Components** مكونات نظم تحكم					2011
Program	Electrical Engineering and Computers Engineering BSc.			**Category**		Core Course (Mandatory)
Delivered by	Electrical Engineering and Computers Engineering Dept.			**Prerequisite**		-
Course Units	**Lectures**	2	**hr.**	**Stage**		Diploma
	Tutorials	2	**hr.**	**Level**		02 Elec.
	Practical	-	**hr.**	**Semester**		1st. 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. (46) 19/9/2022		
		Dept. council		5/9/2022		

2-	Course Aims

The aim of this course to:
- Know open and close loop systems and transfer function.
- Understand operational amplifier operation and circuits.
- Analyze electrical circuits under transient conditions.
- Realize the state and output differential equations.
- Use Matlab/Simulink program for circuit and control systems analysis.

3-	Course Subject Area

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

4- Competencies of Learning Outcomes from the Course

Program competencies that the course contributes in achieving it		Course competencies in detail	
A5	Practice research techniques and methods of investigation as an inherent part of learning, as appropriate to the EECE discipline.	a5.1	Identify the elementary science underlying operational amplifier realization, analysis of electrical circuits under transient conditions, state and output differential equations.
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 operational amplifier applications, MATLAB/Simulink program application on circuit analysis and control systems.
		a8.2	Compile proper technical reports and present them orally or in written forms to illustrate information related to operational amplifier realization, analysis of electrical circuits under transient conditions, state and output differential equations.
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 operational amplifier and/or MATLAB/Simulink program.
		b2.2	Use numerical modeling methods and/or appropriate computational techniques to solve problems related to operational amplifier circuits, analysis of electrical circuits under transient conditions, state and output differential equations.
		b2.3	Utilize MATLAB/Simulink program for the design and diagnostics of different electrical circuits under transient conditions and control systems.
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 circuits, analysis of electrical circuits under transient conditions, state and output differential equations.
		b4.2	Employ the appropriate specifications for control systems.
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 circuits, electrical circuits under transient conditions, and control systems.
		c1.2	Evaluate, organize and utilize information and knowledge from different sources to construct a proper design or solution for control systems.
		c1.3	Identify principles of analyzing and designing of operational amplifier circuits and control systems, while considering the constraints of applying inappropriate technology and the needs of commercial risk evaluation.

5-	**Course Content**

Operational amplifier realization - Analysis of Electrical circuits under transient conditions. State and output differential equations - Matlab/Simulink Program Fundamentals and its application on circuit analysis and control systems.

6-	**Course Topics / Timeline**

	Topic	No. of Weeks
Topic (1)	Operational amplifier realization	Weeks (1-4)
Topic (2)	Analysis of Electrical circuits under transient conditions.	Weeks (5-6)
Topic (3)	State and output differential equations	Weeks (7-10)
Topic (4)	Matlab/Simulink Program Fundamentals and its application on circuit analysis and control systems.	Weeks (11-12)

7-	**Course Topics / Competencies**

Competencies	Course Topics			
	Topic (1)	Topic (2)	Topic (3)	Topic (4)
a5.1	X	X	X	X
a8.1			X	X
a8.2			X	X
b2.1	X	X		
b2.2			X	X
b2.3	X	X		
b4.1			X	X
b4.2	X	X		
c1.1			X	X
c1.2			X	X
c1.3	X	X		

8- Teaching and Learning Methods

Competencies	Lecture	Presentations	Discussions	Tutorials	Lab experiments	Problem solving	Brain storming	Projects	Site visits and scientific trips	Reporting	Group working	Self-reading	Distance Learning
a5.1	X	X		X						X		X	X
a8.1	X	X	X	X			X			X	X	X	X
a8.2	X	X	X	X			X			X	X	X	X
b2.1	X	X		X						X			X
b2.2	X	X		X						X			X
b2.3	X	X		X						X			X
b4.1	X		X	X						X	X	X	X
b4.2	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	X	X
c1.3	X	X	X	X						X	X	X	X

9- Assessment Methods

Competencies	Written Exams	Oral Exam	Projects	Report	Quiz	Presentation	Practical Test	Observations	Dissertation	Online quiz
a5.1	X	X				X				
a8.1		X		X		X		X		
a8.2		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		
c1.1	X	X		X		X				
c1.2	X	X		X		X				
c1.3	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	Lecture presentations used for data show and explanation to students during lecture sessions.
Essential Books	"Modern control engineering", by Katsuhiko Ogata, Fifth Edition, 2017. **Published by:** Prentice Hall "Schaum's outlines of electric circuits", by Mahmood Nahvi & Joseph A. Edminister, seventh edition, 2018. **Published by:** MsGraw-Hill
Recommended Books	"Automatic control systems", by Farid Golnaraghi & Benjamin C. Kuo, Wiley, 16th Edition, 2018.
Periodicals, Websites, etc.	IEEE Journals and IEE Journals

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 Mored salama   **Date:** 5/9/2022

Head of Electrical Engineering and Computers Engineering Department

Name: Dr. Omar Makram Kamel

Signature: O. M. Kamel   **Date:** 5/9/2022