كلية الهندسة – جامعة قناة السويس	وحدة ضمان الجودة	

Course Specification	
Course Code: CCE 436	**Course Title:** Computers and Control Lab

(1).Basic information				
Program Title	Computer and Control Engineering.			
Department offering the program	Electrical Engineering Dept.			
Department offering the course	Electrical Engineering Dept.			
Course Code	CCE436			
Year/level	second term- 2022/2023 / 5th level			
Specialization	major			
Teaching Hours	Totals	Practical	Tutorial	Lectures
	3	2	0	2
Date of approval of Bylaw	2008			

(2).Course Aims	
No.	**Aims**
1.	Apply knowledge of engineering concepts and basic science as well as analytical, critical and systematic thinking abilities to identify and solve real engineering problems in control systems.

(3). Learning Outcomes of Course (LOs)	
Level B	
B.2	Plan, manage and carry out designs of power, communications, electronics new and renewable energy and machine elements using appropriate materials both traditional means and computer-aided tools and software contemporary to the electrical engineering field.
B.4	Adopt suitable national and international standards and codes; and integrate legal, economic and financial aspects to: design, build, operate, inspect and maintain electrical equipment and systems.
LEVEL C	
C.1	Demonstrate a high level of competence in identifying, defining and solving Computers and Systems Engineering problems

C.3	Evaluate different techniques and strategies for solving Computers and Systems Engineering problems.
C.4	Maintain a sound theoretical approach in dealing with new and advancing technology

(4). Course Contents

Week No.	Topics	Lecture	Tutorial	Practical	Total
1	Introduction	2			2
2	Instrumentation and software	2	2		4
3	Analog simulation	2	2		4
4	Gain compensation and feedback	2	2		4
5	Lag compensation	2	2		4
6	Lead compensation	2		2	4
7	Compensation for sampled data systems	2		2	4
8	Midterm exam				
9	Tuning an analog PID controller	2		2	4
10	Tuning a digital PID controller				
11	State variable approaches-Eigen structure assignment	2		2	4
12	Computer –aided analysis and design of control systems	2	2		4
13	Applications of control systems	2	2		4
15	Practical exam				
16	Final exam				
	total	26	16	8	50

(5). Teaching and Learning methods

No.	Teaching Method
1.	Interactive Lectures
2.	Discovery, investigation and Self-Readings
3.	Problem Solving
4.	Collaborating Learning (Team Project)
5.	Case Study Discussion/Research
6.	Online Lectures/ Smart Class
7.	laboratory training

(6). Teaching and Learning methods of Disabled Students

No.	Teaching Method	Reason
1.	Additional tutorial	
2.	On line lectures	

(7). Students Assessment

)7.1(Students Assessment Method		
No.	**Assessment Method**	**Los**
1	Attendance	
2	Reports	B.2, B.4
3	Quiz 1 / Quiz 2	B.2, B.4
4	mini project	B.2, B.4 C.1, C.2, C.3
5	Mid-term Exam	C.3
6	Final Practical Exam	B.2, B.4, C.3
7	Final Exam	B.2, B.4, C.3

)7.2(Assessment Schedule		
No.	**Assessment Method**	**Weeks**
1	Attendance	Weekly
2	Reports/ Sheets	Bi-weekly
3	Quiz 1 / Quiz 2	4& 10
4	Mini project	15
5	Mid-term Exam	8
6	Final Practical Exam	15
7	Final Exam	16

)7.3 (Weighting of Assessments				
No.	**Assessment Method**	**Weights %**	**Weights**	
1	Attendance	5%	5	40
3	Quiz 1 / Quiz 2	5%	5	
4	mini project	5%	5	
5	Mid-term Exam	15%	15	
6	Final Practical Exam	10 %	10	
7	Final Exam	60%	60	
Total		100%	100	

(8). List of References

- G. F. Franklin, J. D. Powell, and M. Workman, “Digital Control of Dynamic Systems,” 4 th Ed. , Addison-Wesley, 2012.
- J. R. Leigh, “Applied Digital Control: Theory, Design and Implementation,” 2nd Ed., Dover Publications, 2006.
- Kannan Moudgalya, “Digital Control,” 2 nd Ed., Wiley-Interscience, 2009.
- Gene F. Franklin, Abbas Emami-Naeini and J. Da Powell, "Feedback Control of Dynamic Systems," 7 th Ed., Prentice Hall, 2020.

(9). Facilities required for teaching and learning	
1.	Lecture room equipped with e-learning tools (computer, internet, mike, headphones, etc.)
2.	Moodle and Microsoft teams
3.	Data show
4.	Lab Facilities and simulation Software(CST)

(10).Matrix of Aims and LOs of the Course			
No.	Topics	Aims	LOs
1.	Introduction	1	B,2, B.4, C.2
2.	Instrumentation and software		
3.	Analog simulation		
4.	Gain compensation and feedback		
5.	Lag compensation		
6	Lead compensation	1	B.4 C.1, C.3
7	Compensation for sampled data systems		
8	Tuning an analog PID controller		
9	Tuning a digital PID controller		
10	State variable approaches-Eigen structure assignment	1	,B.4, C.3
11	Computer –aided analysis and design of control systems		
12	Applications of control systems		

(11). Matrix of Competencies/ Program LOs with Course LOs			
No.	**Competences/ Program LOs**	**No.**	**Course LOs**
B2.1	Plan, manage and carry out designs of power, communications, electronics new and renewable energy and machine elements using appropriate materials both traditional means and computer-aided tools and software contemporary to the electrical engineering field.	**B2.1**	Identify the tools required for instrumentation and software in control system
B4.1	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**	Identify analog simulation and lag compensation
C1.1	Demonstrate a high level of competence in identifying, defining and solving Computers and Systems Engineering problems	**C1.1**	Carry out design, development, and testing the code for sampled data systems
C3.1	Design and simulate of the communication systems and electronic circuits using computers.	**C3.1**	Demonstrate additional abilities related to the field of control system.
C4.1	Maintain a sound theoretical approach in dealing with new and advancing technology	**C4.1**	Maintain an approach in dealing withnew technology in control system

Title	Name	Signature
Course Coordinator	Dr. Marwa Gamal	
Head of Department	Ass.Prof. Ayad Oada	
Date of Approval	2022/ 2023	