Course Specification

Course Code: PHM2211 **Course Title: mathematics (6)**

1. Basic information

Program Title	Electrical Power Engineering Depart.			
Department offering the program	Electrical Power Engineering Depart.			
Department offering the course	Engineering Mathematics and Physics department			
Course Code	PHM 2211			
Prerequisites	PHM1111-PHM1211			
Year/level	Second year /Third Level (2^{nd} Semester)			
Specialization	**Major**			
Teaching Hours	Lectures	Tutorial	Practical	Total
	3	2	0	5

2. Course Aims

No.	Aim
1	Use the techniques, skills, and appropriate engineering tools, necessary for special functions, linear programming, numerical methods for ordinary and partial differential equation, roots of non-linear equations and system of linear equations. (AM3)

3. Course Learning Outcomes (CLOs)

CLO22	Analyze numerical methods to solve differential equations, and Identify the basic ideas and techniques of linear programming and find the roots of non-linear equations.
CLO23	Implement numerical methods to solve system of non-linear and linear equations
CLO24	Implement elements to translate given engineering problem into a mathematical model and Identify the basic ideas and Identify the essential knowledge about special functions.

4. Course Contents

Topics	Week
- Bessel Functions (part1)	1
- Bessel Functions (part 2)	2
- Legendre polynomials (part1)	3
- Legendre polynomials (part2)	4
- Roots of nonlinear equations i) Bisection method ii) Secant method	5
- Method of iteration - Newton's method	6
- System of non- linear equations	7
- Systems of linear equations i) Inverse matrix method ii) Gauss elimintion method	8
- Midterm exam	9
- Systems of linear equations	10

iii) Gauss – Jordan- elimintion **iv)** **Jacopi**	
- Numerical methods for ordinary differential equations - Euler method Improved Eular method	11
- Numerical methods for ordinary differential equations - Modified Euler method	12
- Runge kutta method	13
- Numerical methods for partial differential equations	14
- Linear programming (geometric solution –simplex method)	15

5. Teaching and Learning methods

Course learning Outcome	**Teaching and Learning Methods**

s (LOs)	Lectures (face to face / online)	Presentation / Movies	Discussions	Tutorials	Practical and lab. experiments	Problem Solving	Brain Storming	Projects and Team Working	Site Visits	Research / Reports	Self-learning	Modeling and Simulation
CLO22	√		√	√		√					√	
CLO23	√	√		√		√	√			√	√	
CLO24	√	√		√		√	√			√	√	

6. Teaching and Learning methods of Disabled Students

No.	Teaching Method	Reason
1	Additional Tutorials	√
2	Online lectures and assignments	√

7.Students' Assessment

7.1 Students' Assessment Method

No.	Assessment Method	Los
1	Attendance	CLO22
2	Reports	CLO23
3	Sheets	CLO22, CLO24
4	Quizzes	CLO22, CLO24
5	Mid-term Exam	CLO22, CLO24

6	Final Exam	CLO22, CLO23, CLO24

7.2 Assessment Schedule

No.	Assessment Method	Weeks
1	Attendance	Weekly
2	Reports	Bi-weekly
3	Sheets	Weekly
4	Quizzes	Bi- weekly
5	Mid-term Exam	9
6	Final Exam	16

7.3 weighting of Assessment

	Assessment Method	Weights%	Weights
Teacher Opinion	Reports / sheets	10%	15
	Attendance	6.665%	10
	Quizzes	6.665%	10
	Mid-term exam	26.67%	40
Final Exam		50%	75
Total		100%	150

8. List of References

[1] Erwin Kreyszig, "Advanced Engineering Mathematics" John Wiley & Sons Inc., 10th Edition, (2010).

[2] E.W.Swokowski,M.Olinick and others," calculus "2018

9. Facilities required for teaching and learning

Lecture/Classroom

White board
Lecture room equipped with e-learning tools (computer, internet, mike, headphones, etc.)

10. Matrix of Course Content with Course LO's

Week No.	Topics	Aim	LO's
1	- Bessel Functions (part 1)	1	CLO24
2	- Bessel Functions (part 2)	1	CLO24
3	- Legendre polynomials (part 1)	1	CLO24
4	- Legendre polynomials(part 2)	1	CLO24
5	- Roots of nonlinear equations iii) Bisection method iv) Secant method -	1	CLO22
6	- Method of iteration - Newton's method	1	CLO22
7	- System of non- linear equations	1	CLO23
8	- Systems of linear equations v) Inverse matrix method vi) Gauss elimintion method	1	CLO23
10	- Systems of linear equations **vii)** Gauss – Jordan- elimintion **viii)** **Jacopi**	1	CLO23

11	- Numerical methods for ordinary differential equations - Euler method Improved Eular method	1	CLO23
12	- Numerical methods for ordinary differential equations - Modified Euler method	1	CLO22
13	- Runge kutta method	1	CLO22
14	- Numerical methods for partial differential equations	1	CLO22
15	- Linear programming (geometric solution –simplex method)	1	CLO22

11. Matrix of Program LOs with Course Los

Program LOs		Course Los	
PL12	Design, model and analyze an electrical/electronic/digital system or component for a specific application; and identify the tools required to optimize this design.	CLO22	Analyze numerical methods to solve differential equations, and Identify the basic ideas and techniques of linear programming and find the roots of non-linear equations.
PL13	Design and implement: elements, modules, sub-systems or systems in electrical/electronic/digital engineering using technological and professional tools.	CLO23	Implement numerical methods to solve system of non-linear and linear equations
		CLO24	Implement elements to translate given engineering problem into a mathematical model and Identify the basic ideas and

			Identify the essential knowledge about special functions.

Title	Name	Signature
Course coordinator	**Dr. Wafaa Diab**	
Program coordinator	**Dr. Hend Abd-Elmonem Salama**	
Head of Department	**Ass.Prof.Dr.Osama Elgandour**	
Date of Approval	**3/9/2023**	

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Course Specification

Course Code: PHM 2111 **Course Title: mathematics (5)**

6. Basic information

Program Title	Electrical Power Engineering Depart.
Department offering the program	Electrical Power Engineering Depart.

Department offering the course	Engineering Mathematics and Physics department			
Course Code	PHM 2111			
Prerequisites	PHM1111, PHM1211			
Year/level	Second year / Third level (1st Semester)			
Specialization	**Major**			
Teaching Hours	Lectures	Tutorial	Practical	Total
	3	2	0	5

7. Course Aims

No.	Aim
1	Use the techniques, skills, and appropriate engineering tools, necessary for the concepts and applications of complex analysis, series solution of differential equations, special functions and probability. (AM3)

8. Course Learning Outcomes (CLOs)

CLO14	Use creative, innovative, and flexible thinking to the solution of ordinary differential equations using series and reviewing the theories and concepts used in the Special functions, and functions of complex variable and probability
CLO21	Model engineering problems and solve differential equations by series, probability problems, evaluation real integrals using complex integrals and special functions.

9. Course Contents

Topics	Week
Special functions: (Gamma function)	1
Special functions: (Beta function)	2
Functions of complex variable	3
Limits and continuity of complex variables	4
Derivatives and analytics functions.	5
Harmonic functions	6
Elementary functions of complex variables	7
Elementary transformations	8
Complex integral and Cauchy integral theorem	10
Complex series and Laurent theorem. Singular points and residue theorem.	11
Series solutions of differential equations	12
Probability.	13
Baye's Rule	14
Application of probability using random variables. Binomial distribution , Poisson distribution	15

10. Teaching and Learning methods

Course learning Outcomes (LOs)	Teaching and Learning Methods											
	Lectures (face to face / online)	Presentation / Movies	Discussions	Tutorials	Practical and lab. experiments	Problem Solving	Brain Storming	Projects and Team Working	Site Visits	Research / Reports	Self-learning	Modeling and Simulation
CLO14	√		√	√		√					√	
CLO21	√	√		√		√	√			√	√	

6. Teaching and Learning methods of Disabled Students

No.	Teaching Method	Reason
1	Additional Tutorials	√
2	Online lectures and assignments	√

7.Students' Assessment

7.1 Students' Assessment Method

No.	Assessment Method	Los
1	Attendance	CLO14
2	Reports	CLO21
3	Sheets	CLO14, CLO21
4	Quizzes	CLO14, CLO21
5	Mid-term Exam	CLO21
6	Final Exam	CLO14, CLO21

7.2 Assessment Schedule

No.	Assessment Method	Weeks
1	Attendance	Weekly
2	Reports	Bi-weekly
3	Sheets	Weekly
4	Quizzes	Bi- weekly
5	Mid-term Exam	9
6	Final Exam	16

7.3 weighting of Assessment

	Assessment Method	Weights%	Weights
Teacher Opinion	Reports / sheets	10%	15
	Attendance	6.665%	10
	Quizzes	6.665%	10
	Mid-term exam	26.67%	40
Final Exam		50%	75
Total		100%	150

11.List of References

[1] Erwin Kreyszig, "Advanced Engineering Mathematics" John Wiley & Sons Inc., 10th Edition, (2010).

[2]E.W.Swokowski,M.Olinick and others," calculus "2018

12. Facilities required for teaching and learning

Lecture/Classroom
White board
Lecture room equipped with e-learning tools (computer, internet, mike, headphones, etc.)

13. Matrix of Course Content with Course LO's

No.	Topics	Aim	LO's
1	Special functions: (Gamma function)	1	CLO13
2	Special functions: (Beta function)	1	CLO13
3	Functions of complex variable	1	CLO13
4	Limits and continuity of complex variables	1	CLO13
5	Derivatives and analytics functions.	1	CLO13, CLO21
6	Harmonic functions	1	CLO13, CLO21
7	Elementary functions of complex variables	1	CLO13, CLO21
8	Elementary transformations	1	CLO13, CLO21
10	Complex integral and Cauchy integral theorem	1	CLO13, CLO21
11	Complex series and Laurent theorem. Singular points and residue theorem.	1	CLO13, CLO21
12	Series solutions of differential equations	1	CLO13, CLO21
13	Probability.	1	CLO13
14	Baye's Rule	1	CLO13
15	Application of probability using random variables. Binomial distribution , Poisson distribution	1	CLO13

11. Matrix of Program LOs with Course Los

Program LOs		Course Los	
PLO9	Use creative, innovative, and flexible thinking and acquire entrepreneurial and leadership skills to anticipate and respond to new situations.	CLO14	Use creative, innovative, and flexible thinking to the solution of ordinary differential equations using series and reviewing the theories and concepts used in the Special functions, and functions of complex variable and probability
PLO12	Design, model and analyze an electrical/electronic/digital system or component for a specific application; and identify the tools required to optimize this design.	CLO21	Model an engineering problems and solve differential equations by series, probability problems, evaluate the real integrals using complex integrals and special functions.

Title	Name	Signature
Course coordinator	**Dr. Wafaa Diab**	
Program coordinator	**Dr. Hend Abd-Elmonem Salama**	
Head of Department	**Ass.Prof.Dr.Osama Elgandour**	
Date of Approval	**3/9/2023**	

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Course Specification

Course Code: MCE2111 **Course Title: Mechanical Engineering**

11. Basic information

Program Title	Electrical Power Engineering Department.
Department offering the program	Electrical Power Engineering Department.
Department offering the course	Mechanical Engineering Department.
Course Code	MCE 2111
Prerequisite	---
Year/level	Second year / Third level (1st Semester)

Specialization	Minor			
Teaching Hours	Lectures	Tutorial	Practical	Total
	3	2	0	5

12. Course Aims

No.	Aim
1	Apply knowledge of mathematics , science and engineering concepts to the solution of power and machines problem (AM1)

13. Course Learning Outcomes (CLOs)

CLO1	Identify complex engineering problems by applying engineering fundamentals, basic science, and mathematics.
CLO3	Solve complex engineering problems by applying engineering fundamentals, basic science, and mathematics.
CLO19	Analyze electrical power systems applicable to the specific discipline by applying the concepts of generation, transmission and distribution of electrical power systems.

14. Course Contents

Topics	Week
Definitions and Introduction to thermodynamics	1
Energy, work, heat in closed and open systems	2
The working fluids; water vapors and ideal gases	3
The first law of thermodynamics	4
Applications on the first law of thermodynamics	5
Reversible and irreversible thermodynamically processes	6

The second law of thermodynamics and entropy	7
The second law of thermodynamics and entropy	8
The standard air cycles (Diesel and Duel)	10
The standard air cycles (Carnot and Otto)	11
Steam power plants (Rankine cycle)	12
Steam power plant (Reheat cycle)	13
Modes of Heat transfer	14
Heat transfer in electrical and electronics equipment	15

15. Teaching and Learning methods

Course learning Outcomes (LOs)	Teaching and Learning Methods											
	Lectures (face to face / online)	Presentation / Movies	Discussions	Tutorials	Practical and lab. experiments	Problem Solving	Brain Storming	Projects and Team Working	Site Visits	Research / Reports	Self-learning	Modeling and Simulation
CLO1	√		√	√			√			√		
CLO3	√			√						√		
CLO19	√		√	√			√			√		

16. Teaching and Learning methods of Disabled Students

No.	Teaching Method	Reason
1	Additional Tutorials	X
2	Online lectures and assignments	X

17. Students' Assessment

7.1 Students' Assessment Method

No.	Assessment Method	LOs
1	Attendance	CLO1,CLO3
2	Reports	CLO3, CLO19
3	Sheets	CLO1, CLO3, CLO19
4	Quizzes	CLO3, CLO19
5	Mid-term Exam	CLO1, CLO3
6	Final Exam	CLO1, CLO3, CLO19

7.2 Assessment Schedule

No.	Assessment Method	Weeks
1	Attendance	Weekly
2	Reports / Sheets	Bi-weekly
3	Quizzes	Bi-weekly
4	Mid-term Exam	9
5	Final Exam	16

7.3 Weighting of Assessments					
	Assessment Method	**Weights%**	**Weights**	**Weights%**	**Weights**
Teacher Opinion	Reports / sheets / Activities	40%	40	5%	5
	Attendance			%5	5
	Quizzes			%10	10
	Mid-term exam			20%	20
Final Exam				%60	60
Total				%100	100

18. List of References

[1] Fundamentals of Engineering Thermodynamics,E.Ratakrisnan,2005
[2] Basic Engineering Thermodynamics 5ed, Rayner Joel,2011
[3] Bejan, Adrian. Advanced engineering thermodynamics. John Wiley & Sons, 2016

19. Facilities required for teaching and learning

Lecture/Classroom
White board
Lecture room equipped with e-learning tools (computer, internet, mike, headphones, etc.)
Data show

20. Matrix of Course Content with Course LO's

Week No.	Topics	Aim	LO's
1	Definitions and Introduction to thermodynamics	1	CLO1
2	Energy, work, heat in closed and open systems	1	CLO1, CLO3
3	The working fluids; water vapors and ideal gases	1	CLO3
4	The first law of thermodynamics	1	CLO1, CLO3
5	Applications on the first law of thermodynamics	1	CLO3
6	Reversible and irreversible thermodynamically processes	1	CLO1, CLO3
7	The second law of thermodynamics and entropy	1	CLO1, CLO3
8	The second law of thermodynamics and entropy	1	CLO1, CLO3
10	The standard air cycles (Carnot and Otto)	1	CLO1, CLO3,
11	The standard air cycles (Diesel and Duel)	1	CLO1, CLO3
12	Steam power plant (Rankine)	1	CLO1, CLO3, CLO19
13	Steam power plant (Reheat Recycle)	1	CLO1, CLO3, CLO19
14	Modes of Heat transfer	1	CLO1, CLO3
15	Heat transfer in electrical and electronics equipment	1	CLO1, CLO3, CLO19

21. Matrix of Program LOs with Course LOs

Program LOs		Course LOs	
PLO1		CLO1	Identify, complex engineering problems by applying engineering fundamentals, basic science, and mathematics.

	Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science, and mathematics	CLO3	Solve complex engineering problems by applying engineering fundamentals, basic science, and mathematics.
PLO11	Select, model and analyze electrical power systems applicable to the specific discipline by applying the concepts of: generation, transmission and distribution of electrical power systems	CLO19	Analyze electrical power systems applicable to the specific discipline by applying the concepts of generation, transmission and distribution of electrical power systems.

Title	Name	Signature
Course coordinator	**Dr. Abdelnabi zaghloul**	
Program coordinator	**Dr. Hend Abd-Elmonem Salama**	
Head of Department	**Assoc. Prof. Dr. Osama ELghandour**	
Date of Approval		**3/09/2023**

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Course Specification

Course Code: EPE2212 **Course Title: Energy Conversion**

22. Basic information

Program Title	Electrical Power Engineering Depart.			
Department offering the program	Electrical Power Engineering Depart.			
Department offering the course	Electrical Power Engineering Depart.			
Course Code	EPE2212			
Prerequisite	------			
Year/level	second year / Third Level (2nd Semester)			
Specialization	**Major**			
Teaching Hours	Lectures	Tutorial	Practical	Total
	4	2	0	6

23. Course Aims

No.	Aim
1	Adapt successfully to apply and develop technologies of producing the magnetic flux which is used in electrical system and different methods due to establish the linear force and mechanical torque. (AM6)

24. Learning Outcomes (LOs)

CLO8	practice the magnetic circuit in electrical system and electromechanical system
CLO17	Select the scientific rules in linear electromechanical system
CLO18	model the basic since in studding the electro mechanical system
CLO19	Analyze the different techniques of electro mechanical system

25. Course Contents

Topics	Week
Introduction of Conventional methods of energy conversion	1
Sources of energy	2
Electromechanical energy conversion and magnetic circuits	3
The benefit of magnetic field in Electrical power systems and it application	4
Analysis of Electrical transformer and its application.	5
Electromechanical system and its application.	6
Electric motors and generators, Faraday's law, Lorenz forces,	7
the basic electric generator, the basic electric motor	8
magnetically single excited systems, magnetically multi-excited systems	10
Dynamic energy conversion equations	11
Conservative fields, coupled magnetic fields, Torque and stored energy in magnetic fields,	12
multi-fed rotating systems.	13
Electrostatic systems and its application.	14
Application of Electrostatic systems in the industry	15

26. Teaching and Learning methods

Course learning Outcome	Teaching and Learning Methods

s (LOs)	Lectures (face to face / online)	Presentation / Movies	Discussions	Tutorials	Practical and lab. experiments	Problem Solving	Brain Storming	Projects and Team Working	Site Visits	Research / Reports	Self-learning	Modeling and Simulation
CLO8	√	√	√									
CLO17	√	√	√	√		√						
CLO18	√	√	√	√		√				√	√	
CLO19	√	√	√	√		√				√	√	√

27. Teaching and Learning methods of Disabled Students

No.	Teaching Method	Reason
1	Additional Tutorials	√
2	Online lectures and assignments	-------

28. Students' Assessment

7.1 Students' Assessment Method		
No.	**Assessment Method**	**Los**
1	Reports	CLO8, CLO17, CLO18
2	Sheets	CLO8, CLO17, CLO18, CCLO19
3	Quizzes	CLO8, CLO17, CLO18
4	Mid-term Exam	CLO17, CLO18
5	Final Exam	CLO8, CLO17, CLO18, CLO19

7.2 Assessment Schedule		
No.	**Assessment Method**	**Weeks**
1	Reports	Bi-weekly
2	Sheets	Weekly
3	Quizzes	Bi-weekly
4	Mid-term Exam	9
5	Final Exam	16

7.3 Weighting of Assessments			
	Assessment Method	**Weights%**	**Weights**
Teacher Opinion	Reports / sheets	10%	15
	Quizzes	10%	15

	Mid-term exam	20%	30
Final Exam		60%	90
Total		100%	150

29. List of References

[1] D. Yogi Goswami, Frank Kreith, "Energy Conversion, "2nd Edition, 2017.
[2] A. E. Fitzgerald, Charles Kingsley, Jr, Stephen D. Umans,"Electric Machinery",MCGraw Hill, Six Edition, 2003.

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30. Facilities required for teaching and learning

Lecture/Classroom
White board
Lecture room equipped with e-learning tools (computer, internet, mike, headphones, etc.)
Data show

31. Matrix of Course Content with Course LO's

Week No.	Topics	Aim	LO's
1	Introduction of Conventional methods of energy conversion	1	CLO8
2	Sources of energy	1	CLO8

3	Electromechanical energy conversion and magnetic circuits	1	CLO8, CLO17
4	The benefit of magnetic field in Electrical power systems and it application	1	CLO8, CLO17
5	Analysis of Electrical transformer and its application.	1	CLO17, CLO18
6	Electromechanical system and its application.	1	CLO8, CLO19
7	Electric motors and generators, Faraday's law, Lorenz forces,	1	CLO18
8	the basic electric generator, the basic electric motor	1	CLO8, CLO17
10	magnetically single excited systems, magnetically multi-excited systems	1	CLO8, CLO18
11	Dynamic energy conversion equations	1	CLO8, CLO17, CLO18
12	Conservative fields, coupled magnetic fields, Torque and stored energy in magnetic fields,	1	CLO8, CLO19
13	multi-fed rotating systems.	1	CLO8, CLO119
14	Electrostatic systems and its application.	1	CLO8, CLO17
15	Application of Electrostatic systems in the industry	1	CLO8, CLO17

32. Matrix of Program LOs with Course Los

Program LOs		Course Los	
PL5	Practice research techniques and methods of investigation as an inherent part of learning.	CLO8	practice the magnetic circuit in electrical system and electromechanical system
PL11	Select, model and analyze electrical power systems	CLO17	Select the scientific rules in linear electromechanical system

	applicable to the specific discipline by applying the concepts of generation, transmission and distribution of electrical power systems.	CLO18	model the basic since in studding the electro mechanical system
		CLO19	Analyze the different techniques of electro mechanical system

Title	Name	Signature
Course coordinator	**Dr. Mohamed Farouk**	
Program coordinator	**Dr. Hend Abd-Elmonem Salama**	
Head of Department	**Assoc.Prof. Dr. Osama ELghandour**	
Date of Approval	**3/09/2023**	

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Course Specification

Course Code: EPE 2211 **Course Title: Electrical testing (2)**

33. Basic information

Program Title	Electrical Power Engineering Depart.			
Department offering the program	Electrical Power Engineering Depart.			
Department offering the course	Communication and Electronics Engineering Depart.			
Course Code	EPE 2211			
Prerequisite	--			
Year/level	Second year / Second Semester			
Specialization	**Major**			
Teaching Hours	Lectures	Tutorial	Practical	Total
	--	--	3	3

34. Course Aims

No.	Aim
1	Design and conduct experiments laboratory instrumentation to perform electrical, electronic, and digital experiments, and analyze and interpret the results (AM2).

35. Learning Outcomes (LOs)

CLO.12	Function efficiently as an individual and as a member of multi-disciplinary and multi-cultural teams
CLO.25	Estimate the performance of an electrical/electronic/digital system and circuit under specific input excitation.
CLO.26	Measure the performance of an electrical/electronic/digital system and circuit under specific input excitation.

36.	Course Contents
Topics	**Week**
Design of combinational logic circuits: Decoder – Encoder	1
Design of combinational logic circuits: Multiplexers– De-multiplexers	2
Design of combinational logic circuits: Full adder- Half adder	3
Application of sequential logic circuits: Synchronous counters	4
Application of sequential logic circuits: Asynchronous counters	5
Measurement devices: Oscillators - Function generator	6
Electronic experiment: Diode characteristic, Clipper- Clamper	7
Electronic experiments: Half wave rectifier – Full wave rectifier	8
Computer organization experiment: MARIE CPU simulator	10
Application of Combinational logic circuits in computer organization (Arithmetic and Logic Unit)	11
Application of Combinational logic circuits in computer organization: (ADDER/SUBTRACTOR circuit)	12
Application in control: Matlab analysis of Dynamic systems	13
Application in control: Transient response analysis	14
Practical Exam	15

37. Teaching and Learning methods

Course learning Outcomes (LOs)	Teaching and Learning Methods											
	Lectures (face to face / online)	Presentation / Movies	Discussions	Tutorials	Practical and lab. experiments	Problem Solving	Brain Storming	Projects and Team Working	Site Visits	Research / Reports	Self-learning	Modeling and Simulation
CLO.12					√							

CLO.25			√				√			√		
CLO.26			√		√		√					√

38. Teaching and Learning methods of Disabled Students

No.	Teaching Method	Reason
1	Additional Tutorials	√
2	Online lectures and assignments	√

39. Students' Assessment

7.1 Students' Assessment Method

No.	Assessment Method	Los
1	Attendance	CLO.25
2	Reports	CLO.25
3	Simulations	CLO.12, CLO.26
4	Practical Exam	CLO.26
5	Final Exam	CLO.12, CLO.25, CLO.26

7.2 Assessment Schedule

No.	Assessment Method	Weeks
1	Attendance	Weekly
2	Reports	4, 6, 9, 12
3	Simulations	10,14
4	Practical Exam	15
5	Final Exam	16

7.3 Weighting of Assessments

	Assessment Method	Weights%	Weights	Weights%	Weights
Practical	Practical Attendance	60%	60	10%	10
	Lab. Reports			20%	20

	Simulations			10%	10
	Practical exam			20%	20
Final Exam		40%	40	40%	40
Total		%100	100	%100	100

40. List of References

[1] M. Morris Mano, Charles Kime, et al. "Logic & Computer Design Fundamentals"Mar 4, 2015
[2] D.K. Kaushik. "Digital Electronics", January 2005
[3] Jason Nyugen, Saurabh Joshi and Eric Jiang "Introduction to MARIE, A Basic CPU Simulator" 2016 Second Edition
[4] Cesar Lopez. "MATLAB Control Systems Engineering"· 2014
[5] R. Prasad, "Analog and Digital Electronic Circuits Fundamentals, Analysis, and Applications", 2021
[6] Julia Lobur, "Essentials of Computer Organization and Architecture", 2018.

41. Facilities required for teaching and learning

White board
Data show
Laboratory Usage

42. Matrix of Course Content with Course LO's

Week No.	Topics	Aim	LO's
1	Design of combinational logic circuits: Decoder – Encoder	1	CLO.12, CLO.25, CLO.26

2	Design of combinational logic circuits: Multiplexers– De-multiplexers	1	CLO.12, CLO.25, CLO.26
3	Design of combinational logic circuits: Full adder- Half adder	1	CLO.12, CLO.25, CLO.26
4	Application of sequential logic circuits: Synchronous counters	1	CLO.12, CLO.25, CLO.26
5	Application of sequential logic circuits: Asynchronous counters	1	CLO.12, CLO.25, CLO.26
6	Measurement devices: Oscillators - Function generator	1	CLO.12, CLO.25, CLO.26
7	Electronic experiment: Diode characteristic, Clipper-Clamper	1	CLO.12, CLO.25, CLO.26
8	Electronic experiments: Half wave rectifier – Full wave rectifier	1	CLO.12, CLO.25, CLO.26
10	Computer organization experiment: MARIE CPU simulator	1	CLO.12, CLO.25, CLO.26
11	Application of Combinational logic circuits in computer organization (Arithmetic and Logic Unit)	1	CLO.12, CLO.25, CLO.26
12	Application of Combinational logic circuits in computer organization: (ADDER/SUBTRACTOR circuit)	1	CLO.12, CLO.25, CLO.26
13	Application in control: Matlab analysis of Dynamic systems	1	CLO.12, CLO.25, CLO.26

14	Application in control: Transient response analysis	1	CLO.12, CLO.25, CLO.26
15	Practical Exam	1	CLO.26

43. Matrix of Program LOs with Course LOs

Program LOs		Course LOs	
PL7	Function efficiently as an individual and as a member of multi-disciplinary and multi-cultural teams.	CLO.12	Function efficiently as an individual and as a member of multi-disciplinary and multi-cultural teams
PL14	Estimate and measure the performance of an electrical/electronic/ and circuit under specific input excitation, and evaluate its suitability for a specific application.	CLO.25	Estimate the performance of an electrical/electronic/digital system and circuit under specific input excitation.
		CLO.26	Measure the performance of an electrical/electronic/digital system and circuit under specific input excitation.

Title	Name	Signature
Course coordinator	**Dr. Enas Mahmoud Elgbbas**	
Program coordinator	**Dr. Hend Abd-Elmonem Salama**	
Head of Department	**Assoc. Prof. Dr. Osama ELghandour**	
Date of Approval	**3/09/2023**	

Course Specification

Course Code: EPE 2112 **Course Title: Electromagnetic Fields**

44. Basic information

Program Title	Electrical Power Engineering Depart.			
Department offering the program	Electrical Power Engineering Depart.			
Department offering the course	Electrical Power Engineering Depart.			
Course Code	EPE 2112			
Prerequisite	----------			
Year/level	Second year / Third Level (1st Semester)			
Specialization	**Major**			
Teaching Hours	Lectures	Tutorial	Practical	Total
	4	2	0	6

45. Course Aims

No.	Aim
1	Apply the knowledge of mathematics, science and engineering concepts to the solution of Electric field of static charge and magnetic field of moving charge (AM1).

46. Learning Outcomes (LOs)

CLO1	Identify the vector analysis, formulate the location and vector in Cartesian and cylindrical coordinate
CLO2	formulate the electric field of different static charge with illustrative examples.
CLO3	Solve the mathematical problems of magnetic field for different cases.

47. Course Contents

Topics	Week
Vector analysis	1
Coulomb's law, Electric field intensity.	2
Electric flux, Gauss's law, Divergence.	3
Electric energy and potential,	4
Electric conductors, Electrical resistance.	5
Dielectric materials, Electrical capacitance	6
Electric field plotting.	7
Poisson's equation, Laplace's equation.	8
Steady magnetic fields, Ampere's law.	10
Magnetic forces, Magnetic materials, Magnetic circuits.	11
Inductance. Time varying magnetic fields,	12

Maxwell's equations, Plane electromagnetic waves in free space,	13
Propagation of electromagnetic waves in matter	14
Reflection and refraction of electromagnetic waves in matter	15

48. Teaching and Learning methods

Course learning Outcome	Teaching and Learning Methods

s (LOs)	Lectures (face to face / online)	Presentation / Movies	Discussions	Tutorials	Practical and lab. experiments	Problem Solving	Brain Storming	Projects and Team Working	Site Visits	Research / Reports	Self-learning	Modeling and Simulation
CLO1	√	√				√	√					√
CLO2	√	√	√	√		√				√		
CLO3	√	√	√	√		√				√		

49. Teaching and Learning methods of Disabled Students

No.	Teaching Method	Reason
1	Additional Tutorials	√
2	Online lectures and assignments	---

50. Students' Assessment

7.1 Students' Assessment Method

No.	Assessment Method	Los
1	Attendance	CLO1
2	Reports	CLO1, CLO2, CLO3
3	Sheets	CLO1, CLO2, CLO3
4	Quizzes	CLO1, CLO2, CLO3

5	Mid-term Exam	CLO1, CLO2
6	Final Exam	CLO1, CLO2, CLO3

7.2 Assessment Schedule

No.	Assessment Method	Weeks
1	Reports	Bi-weekly
2	Sheets	weekly
3	Quizzes	Bi-weekly
4	Mid-term Exam	9
5	Final Exam	16

7.3 Weighting of Assessments

	Assessment Method	Weights%	Weights
Teacher Opinion	Reports / sheets / Activities	10%	15
	Attendance	-	0
	Quizzes	10%	15
	Mid-term exam	20%	30
Final Exam		60%	90
Total		100%	150

51. List of References

[1] *William H. Hayt, Jr. . John A. Buck," Engineering Electromagnetics, Sixth Edition",2001*

[2] *David M. Pozar," Microwave Engineering",WILEY, Fourth Edition, 2013.*

52. Facilities required for teaching and learning

Lecture/Classroom
White board
Lecture room equipped with e-learning tools (computer, internet, mike, headphones, etc.)
Data show

53. Matrix of Course Content with Course LO's

Week No.	Topics	Aim	LO's
1	Vector analysis	1	CLO1
2	Coulomb's law, Electric field intensity.	1	CLO1, CLO2
3	Electric flux, Gauss's law, Divergence.	1	CLO1, CLO2
4	Electric energy and potential,	1	CLO1, CLO2
5	Electric conductors, Electrical resistance.	1	CLO1, CLO2

6	Dielectric materials, Electrical capacitance	1	CLO1, CLO2
7	Electric field plotting.	1	CLO1, CLO2
8	Poisson's equation, Laplace's equation.	1	CLO1, CLO3
10	Steady magnetic fields, Ampere's law.	1	CLO1, CLO3
11	Magnetic forces, Magnetic materials, Magnetic circuits.	1	CLO2, CLO3
12	Inductance. Time varying magnetic fields,	1	CLO2, CLO3
13	Maxwell's equations, Plane electromagnetic waves in free space,	1	CLO2, CLO3
14	Propagation of electromagnetic waves in matter, Reflection and refraction.	1	CLO1, CLO2, CLO3
15	Reflection and refraction of electromagnetic waves in matter,	1	CLO1, CLO2, CLO3

54. Matrix of Program LOs with Course Los

Program Los		Course Los	
PL1	Identify, formulate, and solve complex engineering problems by applying engineering	CLO1	Identify the vector analysis, formulate the location and vector in Cartesian and cylindrical coordinate

	fundamentals, basic science, and mathematics.	CLO2	formulate the electric field of different static charge with illustrative examples.
		CLO3	Solve the mathematical problems of magnetic field for different cases.

Title	Name	Signature
Course coordinator	**Dr. Mohamed Farouk**	
Program coordinator	**Dr. Hend Abd-Elmonem Salama**	
Head of Department	**Assoc.Prof. Dr. Osama ELghandour**	
Date of Approval	**3/09/2023**	

برنامج هندسة القوى الكهربية
المعهد العالي للهندسة والتكنولوجيا
بالتجمع الخامس

Course Specification

Course Code: EPE 2111 **Course Title: Electric testing 1**

55. Basic information

Program Title	Electrical Power Engineering Depart.

Department offering the program	Electrical Power Engineering Depart.			
Department offering the course	Electrical Power Engineering Depart.			
Course Code	EPE2111			
Year/level	Second year / 3 rd level (1st Semester)			
Prerequisite	None			
Specialization	**Major**			
Teaching Hours	Lectures	Tutorial	Practical	Total
	0	0	3	3

56. Course Aims

No.	Aim
1	Design and conduct experiments for theories verification of realistic electric circuits as well as analyzing and interpreting data to work effectively within multi-disciplinary teams. (AM2)

57. Learning Outcomes (LOs)

CLO4	Develop appropriate experimentation to select meters and instruments of appropriate ranges and ratings for specific experimental tests
CLO5	Conduct appropriate experimentation to analyze and interpret data, for specific experiments and use statistical analyses and objective engineering judgment to draw conclusions.
CLO22	Analyze the used components for specific experiments; identifying the tools required to carry out the experiments.

4.Course Contents	
Topics	**Week**
Introduction to meters and experiments	1
Resistors	2
Connection of resistors	3
Ohm's Law	4
Kirchoffs current law and current divider circuit	5
Kirchoffs voltage law and voltage divider circuit	6
The superposition theorem	7
The thevenin theorem	8
Norton theorem	10
Star and delta connection	11
The counter circuit	12
Project	13
Revision	14
Practical Exam	15

58. Teaching and Learning methods

Course learning Outcome	Teaching and Learning Methods

s (LOs)	Lectures (face to face / online)	Presentation / Movies	Discussions	Tutorials	Practical and lab. experiments	Problem Solving	Brain Storming	Projects and Team Working	Site Visits	Research / Reports	Self-learning	Modeling and Simulation
CLO4			√		√							
CLO5			√		√							
CLO22					√			√				

59. Teaching and Learning methods of Disabled Students

No.	Teaching Method	Reason
1	Additional Tutorials	√
2	Online lectures and assignments	√

60. Students' Assessment

7.1 Students' Assessment Method

No.	Assessment Method	LOs
1	Attendance	CLO4

2	Prelab	CLO5
3	project	CLO22
4	Practical exam	CLO5, CLO22
5	Final Exam	CLO4 , CLO5, CLO22

7.2 Assessment Schedule

No.	Assessment Method	Weeks
1	Attendance	Weekly
2	Prelab	weekly
3	Project	15
4	Practical Exam	15
5	Final Exam	16

7.3 Weighting of Assessments

	Assessment Method	Weights%	Weights	Weights%	Weights
Practical / Oral	Practical Attendance	60%	60	10	10
	Prelab			10	10
	Lab. Activities / Projects			15	15
	Final practical exam			25	25
Final Exam				40	40
Total				100%	100

61. List of References

[1] Tony R.Kuphaldt., lessons in electric circuits, 1st edition, Nov. 2021.

62. Facilities required for teaching and learning

Lecture/Classroom
White board
Moodle and Microsoft teams
Data show
laboratory

63. Matrix of Course Content with Course LO's

Week No.	Topics	Aim	LO's
1	Introduction to meters and experiments	1	CLO4
2	Resistors	1	CLO4
3	Connection of resistors	1	CLO4, CLO5
4	Ohm's Law	1	CLO22
5	Kirchoffs current law and current divider circuit	1	CLO5, CLO22
6	Kirchoffs voltage law and voltage divider circuit	1	CLO5, CLO22
7	The superposition theorem	1	CLO5, CLO22
8	The thevenin theorem	1	CLO5, CLO22
10	Norton theorem	1	CLO5, CLO22
11	Star and delta connection	1	CLO5, CLO22

12	The counter circuit	1	CLO22
13	Project	1	CLO22
14	Revision	1	CLO4, CLO5, CLO22
15	Practical Exam	1	CLO5, CLO22

64. Matrix of Program LOs with Course LOs

Program LOs		Course LOs	
PLO2	Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess, and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.	CLO4	Develop appropriate experimentation to select meters and instruments of appropriate ranges and ratings for specific experimental tests
		CLO5	Conduct appropriate experimentation to analyze and interpret data, for specific experiments and use statistical analyses and objective engineering judgment to draw conclusions.
PLO12	Design, model and analyze an electrical/electronic/digital system or component for a specific application; and identify the tools required to optimize this design.	CLO22	Analyze the used components for specific experiments; identifying the tools required to carry out the experiments.

Title	Name	Signature
Course coordinator	**Dr.**Riham Hosny Salem	Riham Hosny

Program coardinator	**Dr. Hend abdelmonem**	
Head of Department	**Prof. Dr. Osama elghandour**	
Date of Approval	**3/09/2023**	

Course Specification

Course Code: ECE 2211 **Course Title: Signals processing**

65. Basic information

Program Title	Electrical Power Engineering Depart.			
Department offering the program	Electrical Power Engineering Depart.			
Department offering the course	Communication and Electronics Engineering Depart.			
Course Code	**ECE 2211**			
Prerequisite	--			
Year/level	Second year / Third level (2nd Semester)			
Specialization	**Major**			
Teaching Hours	Lectures	Tutorial	Practical	Total

	3	2	0	5

66. Course Aims

No.	Aim
1	Use the techniques, skills to Identify, analyze, and solve practical problems, making use of appropriate engineering tools, programs and techniques. (AM3)

67. Course Learning Outcomes (CLOs)

CLO1	Identify, complex engineering problems by applying engineering fundamentals, basic science, and mathematics.
CLO2	Formulate complex engineering problems by applying engineering fundamentals, basic science, and mathematics.
CLO3	Solve complex engineering problems by applying engineering fundamentals, basic science, and mathematics.
CLO9	Plan research techniques and methods of investigation as an inherent part of learning.

68. Course Contents

Topics	Week
Introduction to signals	1
Siganl oprtations	2
Systems clasfication	3
Convolution	4

Fourier Series (Trignometric Series)	5
Fourier Series (Polar Series)	6
Fourier Transform	7
Inverse Fourier Transform	8
Z Transform	10
Inverse Z Transform	11
Laplace Transform	12
Inverse Laplace Transform	13
Revision	14
Research Discussion	15

69. Teaching and Learning methods

Course learning Outcomes (LOs)	Teaching and Learning Methods											
	Lectures (face to face / online)	Presentation / Movies	Discussions	Tutorials	Practical and lab. experiments	Problem Solving	Brain Storming	Projects and Team Working	Site Visits	Research / Reports	Self-learning	Modeling and Simulation
CLO1	√		√	√						√	√	
CLO2	√		√	√							√	
CLO3	√	√	√	√							√	
CLO8	√	√	√	√						√	√	

No.	Teaching Method	Reason
1	Additional Tutorials	√
2	Online lectures and assignments	x

70. Students' Assessment

7.1 Students' Assessment Method		
No.	**Assessment Method**	**CLOS**
1	Attendance	CLO9,
2	Sheets	CLO1, CLO2,CLO3,
3	Quizzes	CLO2,CLO3,
4	Mid-term Exam	CLO1, CLO2, CLO3
5	Research discussion	CLO9
6	Final Exam	CLO1, CLO2,CLO3, CLO9

7.2 Assessment Schedule		
No.	**Assessment Method**	**Weeks**
1	Attendance	Weekly
2	Sheets	Bi-weekly
3	Quizzes	Bi-weekly
4	Mid-term Exam	9
5	Research discussion	15
6	Final Exam	16

7.3 Weighting of Assessments					
	Assessment Method	**Weights%**	**Weights**	**Weights%**	**Weights**
Teacher Opinion	Attendance	40%	40	5%	5
	Quizzes			5%	5
	Mid-term exam			20%	20
	sheets			5%	5
	Research discussion			5%	5
Final Exam		60%	60	60%	60
Total		100%	100	100%	100

71. List of References

[1] M. mandal and A. Asif "Continuous and discrete time signals and systems" Cambridge University Press, 2007.
[2] Haykin, Simon and Van Veen, Barry "Signals and systems" john Wiley \& Sons,2007
[3] Wagdy R. Anis," SIGNALS & SYSTEMS" Dar Al-Hakim, Cairo Egypt,2016.

72. Facilities required for teaching and learning

Lecture/Classroom
White board
Data show

73. Matrix of Course Content with Course LO's

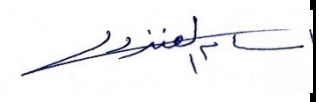
Week No.	Topics	Aim	CLO's
1	Introduction to signals	1	CLO1
2	Siganl oprtations	1	CLO2, CLO3
3	Systems clasfication	1	CLO1, CLO2, CLO3
4	Convolution	1	CLO2, CLO3
5	Fourier Series (Trignometric Series)	1	CLO1, CLO2, CLO3
6	Fourier Series (Polar Series)	1	CLO2, CLO3
7	Fourier Transform	1	CLO2, CLO3

8	Inverse Fourier Transform	1	CLO2, CLO3
10	Z Transform	1	CLO2, CLO3
11	Inverse Z Transform	1	CLO1, CLO2, CLO3
12	Laplace Transform	1	CLO2, CLO3
13	Inverse Laplace Transform	1	CLO1, CLO2, CLO3
14	Revision	1	CLO9
15	Research discussion	1	CLO9

74. Matrix of Program LOs with Course Los

Program Los		Course Los	
PL.1	Identify, formulate ,solve complex engineering problems by applying engineering fundamentals, basic science, and mathematics.	CLO1	Identify, complex engineering problems by applying engineering fundamentals, basic science, and mathematics.
		CLO2	Formulate complex engineering problems by applying engineering fundamentals, basic science, and mathematics.
		CLO3	Solve complex engineering problems by applying engineering fundamentals, basic science, and mathematics.
PL.6	Plan, supervise and monitor implementation of engineering projects, taking into consideration other trades requirements.	CLO9	Plan research techniques and methods of investigation as an inherent part of learning

Title	Name	Signature

Course coordinator	**Dr. Ahmed Fawzy**	
Program coordinator	**Dr. Hend Abd-Elmonem Salama**	
Head of Department	**Assoc. Prof. Dr. Osama ELghandour**	
Date of Approval	**3/09/2023**	

Course Specification

Course Code: ECE 2111 **Course Title: Electronic Circuit (1)**

75. Basic information

Program Title	Electrical Power Engineering Depart.
Department offering the program	Electrical Power Engineering Depart.
Department offering the course	Communication and Electronics Engineering Depart.
Course Code	ECE2111
Prerequisite	ECE1211
Year/level	Second year / Third level (1st Semester)
Specialization	**Major**

Teaching Hours	Lectures	Tutorial	Practical	Total
	4	2	0	6

76. Course Aims

No.	Aim
1	Address operation and characterization of electronic circuits.(AM7)

77. Learning Outcomes (LOs)

CLO22	Analyze an electronic system for a specific application.
CLO20	Design an electronic system for a specific application.
CLO23	Design sub-systems.
CLO24	Implement sub-systems.

78. Course Contents

Topics	Week
BJT amplifiers: BJT small signal models, Common emitter amplifier.	1
BJT amplifiers: Common collector amplifier, Common base amplifier.	2
BJT amplifiers: Multistage amplifiers.	3
Operational amplifier: Op-amp basics, Op-amp applications (Inverting amp, non-inverting amp, adder, subtractor)	4
Operational amplifier: Op-amp applications (differentiator, integrator, instrumentation, nonlinear circuits)	5
Operational amplifier: Op-amp applications (schmitt trigger, square wave generator)	6
Oscillators: positive feedback basics, Wien bridge	7
Oscillators: Phase Shift oscillator	8
Oscillators: Colpits, Hartly	10
Power Amplifiers	11
Multivibrators: 555 timer circuit: basics and operations, applications (Astable circuit, Monostable)	12
Filters: passive filters	13
Filters: Active filters	14
Practical Exam	15

79. Teaching and Learning methods

Course learning Outcomes (LOs)	Teaching and Learning Methods											
	Lectures (face to face / online)	Presentation / Movies	Discussions	Tutorials	Practical and lab. experiments	Problem Solving	Brain Storming	Projects and Team Working	Site Visits	Research / Reports	Self-learning	Modeling and Simulation
CLO22	√	√								√		
CLO20	√	√								√		√
CLO23	√	√								√		√
CLO24	√	√								√		

80. Teaching and Learning methods of Disabled Students

No.	Teaching Method	Reason

1	Additional tutorials	√
2	Online tutorials	**x**

81. Students' Assessment

7.1 Students' Assessment Method

No.	Assessment Method	Los
1	Attendance	CLO20
2	Sheets	CLO20,CLO22,CLO23,CLO24
3	Mid-term Exam	CLO22,CLO23,CLO24
4	Simulation	CLO20,CLO23
5	Final Exam	CLO20,CLO22,CLO23,CLO24

7.2 Assessment Schedule

No.	Assessment Method	Weeks
1	Attendance	Weekly
2	Sheets	weekly
3	Mid-term Exam	9
4	Simulation	15
5	Final Exam	16

7.3 Weighting of Assessments

	Assessment Method	Weights%	Weights	Weights%	Weights

Teacher Opinion	sheets	40%	40	5%	5
	Attendance			5%	5
	Simulation			10%	10
	Mid-term exam			20%	20
Final Exam		60%	60		60
Total			100		100

82. List of References

[1] D. A. Neamen, Microelectronics: Circuit Analysis and Design, F. Edition, Ed., New York: Raghothaman Srinivasan, 2010.
[2] T. L. Floyd, ELECTRONIC DEVICES, Electron Flow Version, Ninth Edition ed., New Jersey: Prentice Hall,, 2012.
[3] B. Razavi, Fundamentals of microelectronics, Review Edition ed., 2007.
[4] K. C. S. Adel S. Sedra, Microelectronic Circuits, s. edition, Ed., New York:Oxford University Press, 2015.
[5] J. M. Fiore, Operational Amplifiers & Linear Integrated Circuits: Theory and Application / 3E, dissidents, 2021.

83. Facilities required for teaching and learning

Lecture
White board

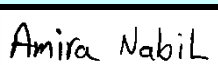
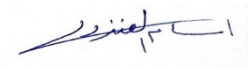
84. Matrix of Course Content with Course LO's

Week No.	Topics	Aim	LO's
1	BJT amplifiers: BJT small signal models, Common emitter amplifier.	1	CLO22
2	BJT amplifiers: Common collector amplifier, Common base amplifier.	1	CLO22

3	BJT amplifiers: Multistage amplifiers.	1	CLO22
4	Operational amplifier: Op-amp basics, Op-amp applications (Inverting amp, non-inverting amp, adder, subtractor)	1	CLO22, CLO20, CLO23
5	Operational amplifier: Op-amp applications (differentiator, integrator, instrumentation, nonlinear circuits)	1	CLO22, CLO20, CLO23
6	Operational amplifier: Op-amp applications (schmitt trigger, square wave generator)	1	CLO22, CLO20, CLO23
7	Oscillators: positive feedback basics, Wien bridge	1	CLO22
8	Oscillators: Phase Shift oscillator	1	CLO22
10	Oscillators: Colpits, Hartly	1	CLO22
11	Power Amplifiers	1	CLO22
12	Multivibrators: 555 timer circuit: basics and operations, applications (Astable circuit, Monostable)	1	CLO20, CLO23
13	Filters: passive filters	1	CLO22,CLO23, CLO24
14	Filters: Active filters	1	CLO22,CLO23, CLO24

85. Matrix of Program LOs with Course Los

Program LOs		Course Los	
PL12	Design model and analyze an electrical/electronic/digital system or component for a specific application; and identify the tools required to optimize this design.	CLO22	Analyze an electronic system for a specific application.
		CLO20	Design an electronic system for a specific application.
PL13	Design and implement elements, modules, sub-systems or systems using technological and professional tools.	CLO23	Design sub-systems.
		CLO24	Implement sub-systems.

Title	Name	Signature
Course coordinator	**Dr. Amira Nabil**	
Program coordinator	**Dr. Hend abdelmonem**	
Head of Department	**Assoc. Prof. Dr. Osama ELghandour**	
Date of Approval	**3/09/2023**	

Course Specification

Course Code: CSE2212 **Course Title: Process dynamics and control components**

86. Basic information

Program Title	Electrical Power Engineering Depart.
Department offering the program	Electrical Power Engineering Depart.
Department offering the course	Electrical Power Engineering Depart.

Course Code	CSE2212			
Prerequisties	CSE2111			
Year/level	Second year / First Semester (3rd Level)			
Specialization	**Major**			
Teaching Hours	Lectures	Tutorial	Practical	Total
	4	2	0	6

87. Course Aims

No.	Aim
1	Derive input-output relations of feedback electrical and mechanical systems to check stability, transient response properties of feedback system and block modeling diagram. (AM3)

88. Learning Outcomes (LOs)

CLO7	Utilize the concepts of system dynamics and control components showing different systems.
CLO17	Select the criterion of solution to different systems using computer programs.
CLO18	Model the analysis of different systems including mathematical representation and analogy between them.
CLO19	Analyze the methodologies of different control systems, response and control actions.

89. Course contents	
Topics	**Week**
Introduction to System Dynamics.	1
Principles of Modeling and Simulation.	2
Electrical System.	3
Translational Mechanical System.	4
Rotational Mechanical System.	5
Fluid Systems.	6
Thermal Systems.	7
Introduction to State Space Representation Model.	8
State Space Representation Model to different systems.	10
Input/output Equation for Different Systems.	11
Analogy between electrical and mechanical system.	12
Block Diagram Reduction.	13
Transient analysis in control systems.	14
Basic Control Actions and Response of Control Systems.	15

90. Teaching and Learning methods

Course learning Outcomes (LOs)	Teaching and Learning Methods											
	Lectures (face to face / online)	Presentation / Movies	Discussions	Tutorials	Practical and lab. experiments	Problem Solving	Brain Storming	Projects and Team Working	Site Visits	Research / Reports	Self-learning	Modeling and Simulation
CLO7	√		√	√							√	
CLO17	√	√		√		√	√			√		

CLO18	√	√		√			√			√	√	
CLO19	√		√	√		√						

91. Teaching and Learning methods of Disabled Students

No.	Teaching Method	Reason
1	Additional Tutorials	√
2	Online lectures and assignments	√

92. Students' Assessment

7.1 Students' Assessment Method

No.	Assessment Method	LOs
1	Attendance	CLO18, CLO19.
2	Reports	CLO17, CLO19.
3	Sheets	CLO7, CLO17,

		CLO18, CLO19.
4	Quizzes	CLO17, CLO19.
5	Mid-term Exam	CLO7, CLO18.
6	Final Exam	CLO7, CLO17, CLO18, CLO19.

7.2 Assessment Schedule

No.	Assessment Method	Weeks
1	Attendance	Weekly
2	Reports	Bi-weekly
3	Sheets	Weekly
4	Quizzes	Bi-weekly
5	Mid-term Exam	9
6	Final Exam	16

7.3 weighting of Assessment

	Assessment Method	Weights %	Weights
Teacher Opinion	Reports / sheets	5%	5
	Attendance	5%	5
	Quizzes	10%	10
	Mid-term exam	20%	20
Final Exam		60%	60
Total		100%	100

93. List of References

[1] ''Automatic Control Systems'', 7th Edition, B.Kuo,Prentice-Hall, 1995.
[2] ''Modern Control Engineering'', 2nd Edition, K.Ogata, Prentice-Hall, 1995.
[3] ''Control System Engineering'', 2nd Edition, N. Nise, Addison Wesley, 1995.
[4]'' Process Dynamics and Control'', 4th Edition, Dale E. Seborg, Thomas F. Edgar, Duncan A. Mellichamp, Francis J. Doyle , 2016.

94. Facilities required for teaching and learning

Lecture/Classroom
White board
Lecture room equipped with e-learning tools (computer, internet, mike, headphones, etc.)
Data show

95. Matrix of Course Content with Course LO's

Week No.	Topics	Aim	LO's
1	Introduction to System Dynamics.	1	CLO7
2	Principles of Modeling and Simulation.	1	CLO18
3	Electrical System.	1	CLO18
4	Translational Mechanical System.	1	CLO18
5	Rotational Mechanical System.	1	CLO18
6	Fluid Systems.	1	CLO17
7	Thermal Systems.	1	CLO17
8	Introduction to State Space Representation Model.	1	CLO7
10	State Space Representation Model to different systems.	1	CLO19
11	Input/output Equation for Different Systems.	1	CLO19
12	Analogy between electrical and mechanical system.	1	CLO18
13	Block Diagram Reduction.	1	CLO17
14	Transient analysis in control systems.	1	CLO19
15	Basic Control Actions and Response of Control Systems.	1	CLO17

96. Matrix of Program LOs with Course LOs

Program LOs		Course LOs	
PL4	Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues, and risk management principles..	CLO7	Utilize the concepts of system dynamics and control components showing different systems.
PL11	Select, model and analyze electrical power systems applicable to the specific discipline by applying the concepts of generation, transmission and distribution of electrical power systems.	CLO17	Select the criterion of solution to different systems using computer programs.
		CLO18	Model the analysis of different systems including mathematical representation and analogy between them.
		CLO19	Analyze the methodologies of different control systems, response and control actions.

Title	Name	Signature
Course coordinator	**Dr. Zeinab Gamal Hassan**	زينب جمال

Program coordinator	**Dr. Hend Abd-Elmonem Salama**	
Head of Department	**Assoc.Prof. Dr. Osama ELghandour**	
Date of Approval	**3/9/2023**	

Course Specification

Course Code: CSE2211 **Course Title: Computer Organization**

97. Basic information

Program Title	Electrical power Engineering Depart.			
Department offering the program	Electrical power Engineering Depart.			
Department offering the course	Communication and Electronics Engineering Depart			
Course Code	CSE2211			
Prerequisite	CSE2111			
Year/level	Second Year / Third Level			
Specialization	**Major**			
Teaching Hours	Lectures	Tutorial	Practical	Total

	3	2	0	5

98. Course Aims

No.	Aim
1	Use the techniques, skills to identify Central Possessing Unit, Memory unit, Arithmetic and Logic Unit, Bus system and Arithmetic and Logic Unit. And become familiar with the technology of implementing these units (AM3)

99. Learning Outcomes (LOs)

CLO.15	Acquire new knowledge in computer organization.
CLO.16	Apply new knowledge in computer organization.
CLO.23	Design sub-systems in digital engineering.

100. Course Contents

Topics	Week
Definitions of Computer Architecture and Computer Organization. Functional organization of computer hardware: Input units, Output units, Arithmetic and Logic unit, and Control unit.	1
Types of Information in Computer: Data, and Instructions. Types of computer buses: Data bus, Address bus, Status bus and control bus.	2
Storage elements: Flip/Flop, Register and memory.	3
Memory Organization: Word and Byte addressable, Big and Little Endian.	4
Memory Organization: Memory Interleaving and Memory hierarchy.	5
Basic Microprocessor Architecture. Data coding, Instructions and Operation codes in computer.	6

Instruction set: Word format, Instruction format, and Instruction types.	
CPU organization: Single Accumulator- General Registers-Stack. Structure and behavior of digital computers at several levels of abstraction (high-level, assembly/machine code)	7
Addressing modes. Instruction sequencing and timing: Fetch and Execute Cycles (Micro operation, Microinstruction).	8
Micro Operations: Register Transfer Operations - Arithmetic and logical operations - Shift Operations.	10
Design of ALU.	11
Bus structure: Bus implementation and Memory Transfer- Bus and Registers Transfer	12
Function of control unit: Hardwired implementation.	13
Function of control unit: Micro programmed control unit.	14
Revision	15

101. Teaching and Learning methods

Course learning Outcomes (LOs)	Teaching and Learning Methods											
	Lectures (face to face /	Presentation / Movies	Discussions	Tutorials	Practical and lab. experiments	Problem Solving	Brain Storming	Projects and Team Working	Site Visits	Research / Reports	Self-learning	Modeling and Simulation
CLO.15	√			√						√		
CLO.16	√		√	√			√			√		
CLO.23	√		√	√			√			√		

102. Teaching and Learning methods of Disabled Students

No.	Teaching Method	Reason
1	Additional Tutorials	√

2	Online lectures and assignments	√

103. Students' Assessment

7.1 Students' Assessment Method

No.	Assessment Method	LOs
1	Sheets	CLO.16, CLO.23
2	Quizzes	CLO.16
3	Mid-term Exam	CLO.16, CLO.23
4	Final Exam	CLO.15, CLO.16, CLO.23

7.2 Assessment Schedule

No.	Assessment Method	Weeks
1	Sheets	6,10,13
2	Quizzes	4,5
3	Mid-term Exam	9
4	Final Exam	16

7.3 Weighting of Assessments

	Assessment Method	Weights%	Weights	Weights%	Weights
Teacher Opinion	Sheets	40%	40	%15	15
	Quizzes			%5	5
	Mid-term exam			%20	20
Final Exam		60%	60	60%	60
Total		100%	100	100%	100

104. List of References

[1] Carl Hamacher, Zvonko Vranesic and Safwat Zaky, "Computer Organization", Tata McGraw Hill, Fifth Edition, 2002.
[2] Julia Lobur, "Essentials of Computer Organization and Architecture", 2018.

105. Facilities required for teaching and learning

Lecture
White board
Data show

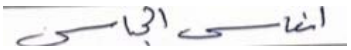
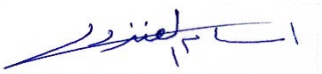
106. Matrix of Course Content with Course LO's

Week No.	Topics	Aim	LO's
1	Definitions of Computer Architecture and Computer Organization. Functional organization of computer hardware: Input units, Output units, Arithmetic and Logic unit, and Control unit.	1	CLO.15
2	Types of Information in Computer: Data, and Instructions. Types of computer buses: Data bus, Address bus, Status bus and control bus.	1	CLO.15
3	Storage elements: Flip/Flop, Register and memory.	1	CLO.15
4	Memory Organization: Word and Byte addressable, Big and Little Endian.	1	CLO.15, CLO.16
5	Memory Organization: Memory Interleaving and Memory hierarchy.	1	CLO.15, CLO.16
6	Basic Microprocessor Architecture. Data coding, Instructions and Operation codes in computer. Instruction set: Word format, Instruction format, and Instruction types.	1	CLO.15, CLO.16
7	CPU organization: Single Accumulator- General Registers-Stack. Structure and behavior of digital computers at several levels of abstraction (high-level, assembly/machine code).	1	CLO.15, CLO.16
8	Addressing modes. Instruction sequencing and timing: Fetch and Execute Cycles (Micro operation, Microinstruction).	1	CLO.15, CLO.16

10	Micro Operations: Register Transfer Operations - Arithmetic and logical operations - Shift Operations.	1	CLO.15
11	Design of ALU.	1	CLO.16, CLO.23
12	Bus structure: Bus implementation and Memory Transfer- Bus and Registers Transfer.	1	CLO.16, CLO.23
13	Function of control unit: Hardwired implementation.	1	CLO.16, CLO.23
14	Function of control unit: Micro programmed control unit.	1	CLO.16, CLO.23
15	Revision	1	CLO.16, CLO.23

107. Matrix of Program LOs with Course Los

Program LOs		Course Los	
PL.10	Acquire and apply new knowledge; and practice self, lifelong and other learning strategies.	CLO.15	Acquire new knowledge in computer organization.
		CLO.16	Apply new knowledge in computer organization.
PL.13	Design and implement: elements, modules, sub-systems or systems in digital engineering using technological and professional tools.	CLO.23	Design sub-systems in digital engineering.

Title	Name	Signature
Course coordinator	**Dr. Enas Mahmoud Elgbbas**	
Program coordinator	**Dr. Hend abdelmonem**	
Head of Department	**Assoc. Prof. Dr. Osama ELghandour**	
Date of Approval	**3/09/2023**	

Course Specification

Course Code: CSE2111 **Course Title: Logic Circuits**

108. Basic information

Program Title	Electrical Power Engineering Depart.
Department offering the program	Electrical Power Engineering Depart.
Department offering the course	Communication and Electronics Engineering Depart.
Course Code	CSE2111

Prerequisite	--			
Year/level	Second Year / First Semester			
Specialization	**Major**			
Teaching Hours	Lectures	Tutorial	Practical	Total
	3	2	--	5

109. Course Aims

No.	Aim
1	Use the techniques skills to identify combinational circuits (decoders, encoders, multiplexer, De-multiplexer, and Half Adders and Full Adders, seven segments, code conversion, …..), and sequential circuits (counters). Become familiar with the technology of implementing logic circuits, and be able to optimize logic circuits. (AM2)

110. Learning Outcomes (LOs)

CLO.6	Apply Boolean algebra and Karnaugh simplification method to design logic circuits with minimum number of logic gates.
CLO.20	Design digital components (Combinational or Sequential circuits) and identify the tools required to optimize this design.

111. Course Contents

Topics	Week
Number systems: Decimal- Binary- Octal -Hexadecimal numbers. Negative numbers in binary system one's and two's complement.	1
Codes: Binary coded decimal, Gray code, Excess 3 code, Code Conversions	2
Codes: Ascii code- Parity bit code and **Logic gates:** AND-OR-NAND-NOR-XOR-XNOR	3
Draw a logic expression and create the truth table	4
Logic simplification using Boolean Algebra. Demorgan's Theorems.	5
Logic simplification using Karnaugh –map. Design using NOR and NAND gates (Sum of product – Product of sum).	6
Design Combinational circuits: Full adder- half adder.	7
Design Combinational circuits: Full sub tractor- half-subtractor.	8
Design Combinational circuits: Decoder- Encoder, Odd ever parity circuit - Seven Segments.	10
Design Combinational circuits: Multiplexers- De Multiplexers.	11
Design Sequential circuits: Latch- Flip flops- registers.	12
Design Sequential circuits: Synchronous counters.	13
Design Sequential circuits: Asynchronous counters	14
Revision	15

112. Teaching and Learning methods

Course learning Outcomes (LOs)	Teaching and Learning Methods											
	Lectures (face to face / online)	Presentation / Movies	Discussions	Tutorials	Practical and lab. experiments	Problem Solving	Brain Storming	Projects and Team Working	Site Visits	Research / Reports	Self-learning	Modeling and Simulation
CLO.6	√		√	√			√			√		
CLO.20	√		√	√			√			√		

113. Teaching and Learning methods of Disabled Students

No.	Teaching Method	Reason
1	√	
2	√	

114. Students' Assessment

7.1 Students' Assessment Method

No.	Assessment Method	Los
1	Attendance	CLO.6
2	Sheets	CLO.6, CLO.20
3	Mid-term Exam	CLO.20
4	Final Exam	CLO.6, CLO.20

7.2 Assessment Schedule

No.	Assessment Method	Weeks
1	Attendance	Weekly
2	Sheets	Biweekly
3	Mid-term Exam	9
4	Final Exam	16

7.3 Weighting of Assessments

	Assessment Method	Weights%	Weights	Weights%	Weights
Teacher Opinion	Sheets	40%	40	15%	15
	Attendance			%5	5
	Mid-term exam			%20	20
Final Exam		60%	60	60%	60
Total		%100	100	%100	100

115. List of References

[1] M. Morris Mano, Charles Kime, et al ,"Logic & Computer Design Fundamentals" Mar 4, 2015
[2] D.K. Kaushik, "Digital Electronics", January 2005
[3] R. Prasad , "Analog and Digital Electronic Circuits Fundamentals, Analysis, and Applications", 2021

116. Facilities required for teaching and learning

Lecture
White board

117. Matrix of Course Content with Course LO's

Week No.	Topics	Aim	LO's
1	**Number systems:** Decimal- Binary- Octal -Hexadecimal numbers. Negative numbers in binary system one's and two's complement.	1	CLO.20
2	**Codes:** Binary coded decimal, Gray code, Excess 3 code, Code Conversions	1	CLO.20
3	**Codes:** Ascii code- Parity bit code and **Logic gates:** AND-OR-NAND-NOR-XOR-XNOR	1	CLO.20
4	**Draw a logic expression and create the truth table**	1	CLO.6
5	**Logic simplification** using Boolean Algebra. Demorgan's Theorems.	1	CLO.6.
6	**Logic simplification** using Karnaugh –map. Design using NOR and NAND gates (Sum of product – Product of sum).	1	CLO.6.
7	**Design Combinational circuits:** Full adder- half adder.	1	CLO.20
8	**Design Combinational circuits:** Full sub tractor- half-subtractor.	1	CLO.20
10	**Design Combinational circuits**: Decoder- Encoder, Odd ever parity circuit - Seven Segments.	1	CLO.20
11	**Design Combinational circuits:** Multiplexers- De Multiplexers.	1	CLO.20
12	**Design Sequential circuits:** Latch- Flip flops- registers.	1	CLO.20
13	**Design Sequential circuits:** Synchronous counters.	1	CLO.20
14	**Design Sequential circuits:** Asynchronous counters	1	CLO.20
15	**Revision**	1	CLO.6 , CLO.20

118. Matrix of Program LOs with Course Los

Program LOs		Course Los	
PL.3	Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global, cultural, social, economic, environmental, ethical, and other aspects as appropriate to the discipline and within the principles and contexts of sustainable design and development.	CLO.6	Apply Boolean algebra and Karnaugh simplification method to design logic circuits with minimum number of logic gates.
PL.12	Design model and analyze an electrical/electronic/digital system or component for a specific application; and identify the tools required to optimize this design.	CLO.20	Design a digital component (Combinational or Sequential circuits) and identify the tools required to optimize this design.

Title	Name	Signature
Course coordinator	**Dr. Enas Mahmoud Elgbbas**	
Program coordinator	**Dr. Hend abdelmonem**	
Head of Department	**Assoc. Prof. Dr. Osama ELghandour**	
Date of Approval	**3/09/2023**	

برنامج هندسة القوى الكهربية
المعهد العالي للهندسة والتكنولوجيا
بالتجمع الخامس