


	Ministry of Higher Education	
	Higher Institute of Engineering and technology, fifth district	
	Electronic and Communication Eng. Department	
Course Specification- 2023-2024		

<b>Course Specification</b>	
<b>Course Code: CSE2111</b>	<b>Course Title: Logic Circuits</b>

<b>1. Basic information</b>				
<b>Program Title</b>	Electronics and Communication Engineering Depart.			
<b>Department offering the program</b>	Electronics and Communication Engineering Depart.			
<b>Department offering the course</b>	Electronics and Communication Engineering Depart..			
<b>Course Code</b>	CSE2111			
<b>Prerequisite</b>	--			
<b>Year/level</b>	Second Year / First Semester			
<b>Specialization</b>	<b>Major</b>			
<b>Teaching Hours</b>	Lectures	Tutorial	Practical	Total
	3	2	--	5

<b>2. Course Aims</b>	
No.	Aim
1	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. (AM5).

<b>3. Learning Outcomes (LOs)</b>	
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.

	Ministry of Higher Education	
	Higher Institute of Engineering and technology, fifth district	
	Electronic and Communication Eng. Department	
Course Specification- 2023-2024		

4. Course Contents	
Topics	Week
<b>Number systems:</b> Decimal- Binary- Octal -Hexadecimal numbers. Negative numbers in binary system one's and two's complement.	1
<b>Codes:</b> Binary coded decimal, Gray code, Excess 3 code, Code Conversions	2
<b>Codes:</b> Ascii code- Parity bit code and <b>Logic gates:</b> AND-OR-NAND-NOR-XOR-XNOR	3
<b>Draw a logic expression and create the truth table</b>	4
<b>Logic simplification</b> using Boolean Algebra. Demorgan's Theorems.	5
<b>Logic simplification</b> using Karnaugh –map. Design using NOR and NAND gates (Sum of product – Product of sum).	6
<b>Midterm</b>	7
<b>Design Combinational circuits:</b> Full adder- half adder.	8
<b>Design Combinational circuits:</b> Decoder- Encoder, Odd even parity circuit - Seven Segments.	9
<b>Design Combinational circuits:</b> Multiplexers- De Multiplexers.	10
<b>Design Sequential circuits:</b> Latch- Flip flops- registers.	11
<b>Design Sequential circuits:</b> Synchronous counters.	12
<b>Design Sequential circuits:</b> Asynchronous counters	13
<b>Open discussion</b>	14
<b>Final Exam</b>	15

## 5. Teaching and Learning methods

Course learning Outcomes (LOs)	Teaching and Learning Methods											
	Interactive lectures	Tutorials	Practical	Projects	Assignment	Research\reports	Self-Learning	Brain Storming	Modeling and	Site Visits	Presentation	Discussion
CLO.6	√	√			√			√				√
CLO.20	√	√			√			√				√

## 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	Quizzes	CLO.6, CLO.20
2	Sheets	CLO.6, CLO.20
3	Mid-term Exam	CLO.6
4	Final Exam	CLO.6, CLO.20

### 7.2 Assessment Schedule

No.	Assessment Method	Weeks
1	Attendance	-
2	Sheets	4, 6,9,11,13
3	Quizzes	4,10,12
4	Mid-term Exam	7
5	Final Exam	15

	Ministry of Higher Education	
	Higher Institute of Engineering and technology, fifth district	
	Electronic and Communication Eng. Department	
Course Specification- 2023-2024		

### 7.3 Weighting of Assessments

	Assessment Method	Weights%	Weights	Weights%	Weights
<b>Teacher Opinion</b>	Sheets	40%	40	10%	10
	Quizzes			10%	10
	Mid-term exam			20%	20
<b>Final Exam</b>		60%	60		
<b>Total</b>		%100	100		



### 8. List of References

- [1] M. M. Mano, C. R. Kime, and T. Martin, “Logic and computer design fundamentals,” fifth edition, Prentice hall, 2015.
- [2] R. Prasad, “Analog and Digital Electronic Circuits: Fundamentals, Analysis, and Applications,” Springer Nature, 2021.
- [3] R. G. Plantz, Introduction to Computer Organization: An Under the Hood Look at Hardware and x86-64 Assembly. No Starch Press, 2022.
- [4] S. William, “Computer organization and architecture designing for performance,” eleventh edition, Pearson, 2022.

### 9. Facilities required for teaching and learning

Lecture

White board



	Ministry of Higher Education	
	Higher Institute of Engineering and technology, fifth district	
	Electronic and Communication Eng. Department Course Specification- 2023-2024	

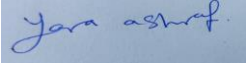
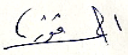
### 10. Matrix of Course Content with Course LO's



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

### 11. 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.

	Ministry of Higher Education	
	Higher Institute of Engineering and technology, fifth district	
	Electronic and Communication Eng. Department	
Course Specification- 2023-2024		

Title	Name	Signature
Course coordinator	Dr. Yara Ashraf	
Head of Department	Ass. Prof. Ahmed Fawzy	
Date of Approval	16-9-2024	

	Ministry of Higher Education	
	Higher Institute of Engineering and technology, fifth district	
	Electronic and Communication Eng. Department	
Course Specification- 2023-2024		

### Course Specification

Course Code: ECE 2111

Course Title: Electronic Circuit (1)

#### 12. Basic information



<b>Program Title</b>	Electronics and Communication Engineering Depart.			
<b>Department offering the program</b>	Electronics and Communication Engineering Depart.			
<b>Department offering the course</b>	Electronics and Communication Engineering Depart.			
<b>Course Code</b>	ECE2111			
<b>Prerequisite</b>	ECE1211			
<b>Year/level</b>	Second year / First Semester			(1 <sup>st</sup> Semester)
<b>Specialization</b>	<b>Major</b>			
<b>Teaching Hours</b>	Lectures	Tutorial	Practical	Total
	4	2	0	6

#### 13. Course Aims

No.	Aim
1	Dealing and characterization of electronic circuits.(AM5)

#### 14. 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.

	Ministry of Higher Education	
	Higher Institute of Engineering and technology, fifth district	
	Electronic and Communication Eng. Department	
Course Specification- 2023-2024		

<b>15. Course Contents</b>	
<b>Topics</b>	<b>Week</b>
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
Midterm Exam	7
Oscillators: positive feedback basics, Wien bridge	8
Oscillators: Phase Shift oscillator	9
Oscillators: Colpits, Hartly	10
Power Amplifiers	11
Multivibrators: 555 timer circuit: basics and operations, applications (Astable circuit, Monostable)	12
Filters: passive filters, Active filters	13
Revision	14
Final Exam	15



## 16. Teaching and Learning methods

Course learning Outcomes (LOs)	Teaching and Learning Methods											
	Interactive lectures	Tutorials	Practical	Projects	Assignment	Research\reports	Self-Learning	Brain Storming	Modeling and simulations	Site Visits	Presentation	Discussion
CLO22	√	√			√							
CLO20	√	√			√				√			
CLO23	√	√			√				√			
CLO24	√	√		√	√							



## 17. Teaching and Learning methods of Disabled Students

No.	Teaching Method	Reason
1	Additional tutorials	√

## 18. Students' Assessment

### 7.1 Students' Assessment Method

No.	Assessment Method	Los
1	Written exam	CLO20,CLO22,CLO23,C LO24
2	Assignments	CLO20,CLO22,CLO23,C LO24
3	Simulations	CLO20,CLO23

	Ministry of Higher Education	
	Higher Institute of Engineering and technology, fifth district	
	Electronic and Communication Eng. Department Course Specification- 2023-2024	

### 7.2 Assessment Schedule

No.	Assessment Method	Weeks
1	Attendance	Weekly
2	Sheets	6-13
4	Mid-term Exam	7
5	Simulation	14
6	Final Exam	15

### 7.3 Weighting of Assessments

	Assessment Method	Weights%	Weights	Weights%	Weights
<b>Teacher Opinion</b>	Ass.	40%	40	5%	5
	Simulation and project			15%	15
	Mid-term exam			20%	20
<b>Final Exam</b>		60%	60		60
<b>Total</b>			100		100

## 19. List of References



- [1] D. A. Neamen, Microelectronics: Circuit Analysis and Design, F. Edition, Ed., New York: Raghathan 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.

## 20. Facilities required for teaching and learning

Lecture

White board

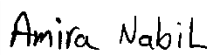
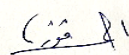
## 21. Matrix of Course Content with Course LO's



	Ministry of Higher Education	
	Higher Institute of Engineering and technology, fifth district	
	Electronic and Communication Eng. Department	
Course Specification- 2023-2024		

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	Midterm Exam		
8	Oscillators: positive feedback basics, Wien bridge	1	CLO22
9	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, Active filters	1	CLO22, CLO23, CLO24

## 22. 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	
Head of Department	Ass. Prof. Ahmed Fawzy	
Date of Approval	16/09/2024	



	Ministry of Higher Education	
	Higher Institute of Engineering and technology, fifth district	
	Electronic and Communication Eng. Department	
Course Specification- 2023-2024		

<b>Course Specification</b>	
<b>Course Code: EPE 2111</b>	<b>Course Title: Electric testing 1</b>

<b>23. Basic information</b>				
<b>Program Title</b>	Electronics and Communication Engineering Depart.			
<b>Department offering the program</b>	Electronics and Communication Engineering Depart.			
<b>Department offering the course</b>	Electrical Power Engineering Depart.			
<b>Course Code</b>	EPE2111			
<b>Year/level</b>	Second year / 3 rd level (1 <sup>st</sup> Semester)			
<b>Prerequisite</b>	None			
<b>Specialization</b>	<b>Major</b>			
<b>Teaching Hours</b>	Lectures	Tutorial	Practical	Total
	0	0	3	3

<b>24. Course Aims</b>	
No.	Aim
1	Acquire the required skills to perform laboratory and field experiments and interpret their results (AM4)

<b>25. Learning Outcomes (LOs)</b>	
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.

	Ministry of Higher Education	
	Higher Institute of Engineering and technology, fifth district	
	Electronic and Communication Eng. Department Course Specification- 2023-2024	

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	8
The thevenin theorem	9
Norton theorem	10
Star and delta connection	11
The counter circuit	12
Project	13
Practical Exam	14
Final Exam	15

## 26. 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
CLO4			√		√							
CLO5			√		√							
CLO22					√			√				

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

### 7.2 Assessment Schedule

No.	Assessment Method	Weeks
1	Prelab	weekly

	Ministry of Higher Education	
	Higher Institute of Engineering and technology, fifth district	
	Electronic and Communication Eng. Department Course Specification- 2023-2024	

2	Project	15
3	Practical Exam	15
4	Final Exam	16

### 7.3 Weighting of Assessments

	Assessment Method	Weights%	Weights	Weights%	Weights
<b>Practical/oral</b>	prelab			20	20
	Lab. Activities / Projects			15	15
	Final practical exam			25	25
<b>Final Exam</b>				40	40
<b>Total</b>				100%	100

### 29. List of References

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

### 30. Facilities required for teaching and learning

Lecture/Classroom

White board



Moodle and Microsoft teams

Data show

laboratory

### 31. Matrix of Course Content with Course LO's


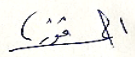
Week No.	Topics	Aim	LO's
1	Introduction to meters and experiments	1	CLO4
2	Resistors	1	CLO4
3	Connection of resistors	1	CLO4, CLO5
4	Ohm's Law	1	CLO22
5	Kirchoffs current law and current divider circuit	1	CLO5, CLO22
6	Kirchoffs voltage law and voltage divider circuit	1	CLO5, CLO22
8	The superposition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

	Ministry of Higher Education	
	Higher Institute of Engineering and technology, fifth district	
	Electronic and Communication Eng. Department Course Specification- 2023-2024	



11	Star and delta connection	1	CLO5, CLO22
12	The counter circuit	1	CLO22
13	Project	1	CLO22
14	Practical Exam	1	CLO5, CLO22
15	Final exam	1	CLO4, CLO22

### 32. 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	
Head of Department	Ass. Prof. Ahmed Fawzy	
Date of Approval	16/9/2024	



	Ministry of Higher Education	
	Higher Institute of Engineering and technology, fifth district	
	Electronic and Communication Eng. Department	
Course Specification- 2023-2024		



<b>Course Specification</b>	
<b>Course Code: EPE 2112</b>	<b>Course Title: Electromagnetic Fields</b>

<b>33. Basic information</b>				
<b>Program Title</b>	Electronics and Communication Engineering Depart.			
<b>Department offering the program</b>	Electronics and Communication Engineering Depart.			
<b>Department offering the course</b>	Electrical Power Engineering Depart.			
<b>Course Code</b>	EPE 2112			
<b>Prerequisite</b>	-----			
<b>Year/level</b>	Second year / Third Level			(1 <sup>st</sup> Semester)
<b>Specialization</b>	<b>Major</b>			
<b>Teaching Hours</b>	Lectures	Tutorial	Practical	Total
	4	2	0	6

<b>34. Course Aims</b>	
<b>No.</b>	<b>Aim</b>
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).

<b>35. Learning Outcomes (LOs)</b>	
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.

<b>36. Course Contents</b>
----------------------------

	Ministry of Higher Education	
	Higher Institute of Engineering and technology, fifth district	
	Electronic and Communication Eng. Department Course Specification- 2023-2024	

Week	Topics
1	Vector analysis
2	Coulomb's law, Electric field intensity.
3	Electric flux, Gauss's law, Divergence.
4	Electric energy and potential,
5	Electric conductors, Electrical resistance, Dielectric materials,.
6	Electrical capacitance, Electric field plotting., Poisson's equation, Laplace's equation.
8	Steady magnetic fields, Ampere's law.
9	Magnetic forces, Magnetic materials, Magnetic circuits.
10	Inductance. Time varying magnetic fields,
11	Maxwell's equations, Plane electromagnetic waves in free space,
12	Propagation of electromagnetic waves in matter.
13	Reflection and refraction of electromagnetic waves in matter.
14	Revision

### 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
CLO1	√	√				√	√					√
CLO2	√	√	√	√		√				√		
CLO3	√	√	√	√		√				√		

### 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	Reports	CLO1, CLO2, CLO3
2	Sheets	CLO1, CLO2, CLO3
3	Quizzes	CLO1, CLO2, CLO3
4	Mid-term Exam	CLO1, CLO2
5	Final Exam	CLO1, CLO2, CLO3

#### 7.2 Assessment Schedule

No.	Assessment Method	Weeks
1	Reports	Bi-weekly
2	Sheets	weekly

	Ministry of Higher Education	
	Higher Institute of Engineering and technology, fifth district	
	Electronic and Communication Eng. Department Course Specification- 2023-2024	

3	Quizzes	Bi-weekly
4	Mid-term Exam	7
5	Final Exam	15

7.3 Weighting of Assessments			
	Assessment Method	Weights%	Weights
<b>Teacher Opinion</b>	Reports / sheets / Activities	10%	15
	Quizzes	10%	15
	Mid-term exam	20%	30
<b>Final Exam</b>		60%	90
<b>Total</b>		100%	150

#### 40. List of References



- [1] P. K. . D. BASU HRISHIKESH, Electromagnetic Theory. S.I.: SPRINGER INTERNATIONAL PU, 2023
- [2] N. Ida, Engineering Electromagnetics. Cham: Springer, 2021.
- [3] W. H. Hayt and J. A. Buck, Engineering Electromagnetics. New York, NY: McGraw-Hill Education, 2019.
- [4] H. Knoepfel, Magnetic Fields. New York: Wiley, 2000.
- [5] D. M. POZAR, Microwave Engineering. S.I.: JOHN WILEY & SONS, 2013.

#### 41. Facilities required for teaching and learning

Lecture/Classroom

White board

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

	Ministry of Higher Education	
	Higher Institute of Engineering and technology, fifth district	
	Electronic and Communication Eng. Department	
Course Specification- 2023-2024		



Data show

#### 42. Matrix of Course Content with Course LO's


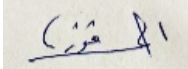
Week No.	Topics	Aim	LO's
1	Vector analysis	1	CLO1
2	Coulomb's law, Electric field intensity.	1	CLO1, CLO2
3	Electric flux, Gauss's law, Divergence.	1	CLO1, CLO2
4	Electric energy and potential,	1	CLO1, CLO2
5	Electric conductors, Electrical resistance, Dielectric materials,.	1	CLO1, CLO2
6	Electrical capacitance, Electric field plotting., Poisson's equation, Laplace's equation.	1	CLO1, CLO2
8	Steady magnetic fields, Ampere's law.	1	CLO1, CLO3
9	Magnetic forces, Magnetic materials, Magnetic circuits.	1	CLO1, CLO3
10	Inductance. Time varying magnetic fields,	1	CLO2, CLO3
11	Maxwell's equations, Plane electromagnetic waves in free space,	1	CLO2, CLO3
12	Propagation of electromagnetic waves in matter.	1	CLO2, CLO3
13	Reflection and refraction of electromagnetic waves in matter.	1	CLO1, CLO2, CLO3
14	Revision	1	CLO1, CLO2, CLO3



#### 43. 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

	Ministry of Higher Education	
	Higher Institute of Engineering and technology, fifth district	
	Electronic and Communication Eng. Department	
Course Specification- 2023-2024		

	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 Dr.Ehab Issa El-Sayed	
Head of Department	Ass.Prof. Ahmed Fawzy	
Date of Approval	16/09/2023	

	Ministry of Higher Education	
	Higher Institute of Engineering and technology, fifth district	
	Electronic and Communication Eng. Department	
Course Specification- 2023-2024		



<b>Course Specification</b>	
<b>Course Code: MCE2111</b>	<b>Course Title: Mechanical Engineering</b>

<b>44. Basic information</b>				
<b>Program Title</b>	Electronics and Communication Engineering Depart.			
<b>Department offering the program</b>	Electronics and Communication Engineering Depart.			
<b>Department offering the course</b>	Engineering Depart.			
<b>Course Code</b>	MCE 2111			
<b>Prerequisite</b>	---			
<b>Year/level</b>	Third year / First Semester			(1 <sup>st</sup> Semester)
<b>Specialization</b>	<b>Minor</b>			
<b>Teaching Hours</b>	Lectures	Tutorial	Practical	Total
	3	2	0	5

<b>45. Course Aims</b>	
<b>No.</b>	<b>Aim</b>
1	Solve and analysis communication and electronic engineering problems based on laws of thermodynamics (AM1)

<b>46. Course Learning Outcomes (CLOs)</b>	
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.

<b>47. Course Contents</b>	
<b>Topics</b>	<b>Week</b>
Definitions and Introduction to thermodynamics	1
First law of thermodynamics	2

	Ministry of Higher Education	
	Higher Institute of Engineering and technology, fifth district	
	Electronic and Communication Eng. Department Course Specification- 2023-2024	



Second law of thermodynamics	3
The carnot Heat engine, refrigerators and heat pump	4
Reversible and irreversible thermodynamically processes	5
Entropy	6
Modes of heat transfer: conduction and convection	7
Modes of heat transfer: Radiation	8
Midterm Exam	9
Vapor and combined power cycles	10
The standard air cycles ( Carnot and Otto)	11
Gas power cycles	12
Stirling and Ericsson cycles	13
Brayton cycle	14
Term Exam	15

#### 48. Teaching and Learning methods

Course learning Outcomes (LOs)	Teaching and Learning Methods											
	Interactive lectures	Tutorials	Practical	Projects	Assignment	Research reports	Self-Learning	Brain Storming	Modeling and simulations	Site Visits	Presentation	Discussion
CLO1	√	√			√			√				√
CLO3	√	√			√							
CLO19	√	√			√			√				√

#### 49. Teaching and Learning methods of Disabled Students



	Ministry of Higher Education	
	Higher Institute of Engineering and technology, fifth district	
	Electronic and Communication Eng. Department	
Course Specification- 2023-2024		

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

## 50. Students' Assessment

### 7.1 Students' Assessment Method

No.	Assessment Method	LOs
1	Written exam	CLO1,CLO3,CLO19
2	Assignments	CLO1, CLO3, CLO19

### 7.2 Assessment Schedule



No.	Assessment Method	Weeks
1	Attendance	Weekly
2	Reports / Sheets	Bi-weekly
3	Mid-term Exam	9
4	Final Exam	15

### 7.3 Weighting of Assessments

	Assessment Method	Weights%	Weights	Weights%	Weights
<b>Teacher Opinion</b>	Reports / sheets / Activities	40%	40	10%	10
	Attendance			%10	10
	Mid-term exam			%20	20
<b>Final Exam</b>				%60	60
<b>Total</b>				%100	100

## 51. List of References

- [1] "A Heat Transfer Textbook", Fifth Edition, John H. Lienhard, Phlogiston Press, 2022.
- [2] "Fundamentals of Thermodynamics", Claus Borgnakke and Richard E. Sonntag, John Wiley & Sons, Inc., 2013.
- [3] Bejan, Adrian. Advanced engineering thermodynamics. John Wiley & Sons, 2016
- [4] <https://0810ergp-1105-y-https-onlinelibrary-wiley-com.mplbci.ekb.eg/doi/book/10.1002/9781119245964>

	Ministry of Higher Education	
	Higher Institute of Engineering and technology, fifth district	
	Electronic and Communication Eng. Department Course Specification- 2023-2024	

## 52. Facilities required for teaching and learning

Lecture/Classroom

White board

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

Moodle and Microsoft teams



Data show

## 53. Matrix of Course Content with Course LO's

No.	Topics	Aim	LO's
1	Definitions and Introduction to thermodynamics	1	CLO1
2	First law of thermodynamics	1	CLO1, CLO3
3	Second law of thermodynamics	1	CLO1,CLO3
4	The Carnot Heat engine, refrigerators and heat pump	1	CLO1, CLO3
5	Reversible and irreversible thermodynamically processes	1	CLO1,CLO3
6	Entropy	1	CLO1, CLO3
7	Modes of heat transfer: conduction and convection	1	CLO1, CLO3, CLO19
8	Modes of heat transfer: radiation	1	CLO1, CLO3, CLO19
9	Midterm	1	
10	Vapor and combined power cycles	1	CLO1, CLO3
11	The standard air cycles ( Carnot and Rankine)	1	CLO1, CLO3
12	Gas power cycles	1	CLO1, CLO3, CLO19
13	Stirling and Ericsson cycles	1	CLO1, CLO3, CLO19
14	Brayton cycle	1	CLO1, CLO3,CLO19
15	Final Exam	1	CLO1, CLO3, CLO19



## 54. Matrix of Program LOs with Course LOs

Program LOs		Course LOs	
PL1	Identify, formulate, and 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.
		CLO3	Solve complex engineering problems by applying engineering fundamentals, basic science, and mathematics.

	Ministry of Higher Education	
	Higher Institute of Engineering and technology, fifth district	
	Electronic and Communication Eng. Department	
Course Specification- 2023-2024		

<b>PL11</b>	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. Yasser Zakaria	
Program coordinator		
Head of Department		
Date of Approval	15/09/2023	

	Ministry of Higher Education	
	Higher Institute of Engineering and technology, fifth district	
	Electronic and Communication Eng. Department	
Course Specification- 2023-2024		



**Course Specification**

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



<b>55. Basic information</b>				
<b>Program Title</b>	Electronic and Communication Eng. Department			
<b>Department offering the program</b>	Electronic and Communication Eng. Department			
<b>Department offering the course</b>	Engineering Mathematics and Physics department			
<b>Course Code</b>	PHM 2111			
<b>Prerequisites</b>	Math3, math4			
<b>Year/level</b>	Second year / level 3 (1 <sup>st</sup> Semester)			
<b>Specialization</b>	<b>Major</b>			
<b>Teaching Hours</b>	Lectures	Tutorial	Practical	Total
	3	2	0	5

<b>56. Course Aims</b>	
<b>No.</b>	<b>Aim</b>
1	Solve and analysis communication and electronic engineering problems based on physical sciences and mathematics. (AM1

<b>57. Course Learning Outcomes (CLOs)</b>	
CLO13	Communicate effectively to identify 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	Solve differential equations by series, probability problems; evaluate real integrals using complex integrals and special functions.

	Ministry of Higher Education	
	Higher Institute of Engineering and technology, fifth district	
	Electronic and Communication Eng. Department	
Course Specification- 2023-2024		

<b>58. Course Contents</b>	
<b>Topics</b>	<b>Week</b>
Special functions: ( Gamma function )& Functions of complex variable	1
Limits and continuity of complex variables	2
Special functions: ( Beta function) & Derivatives and analytics function	3
Harmonic functions	4
Elementary functions of complex variables& Series solutions of differential equations	5
Elementary transformations	6
Complex integral and Cauchy integral theorem& Introduction of Probability.	8
Complex series and Laurent theorem.	9
Singular points and residue theorem& Baye's Rule	10
Evaluation of real integrals.	11
Application of probability using random variables.	12
Binomial distribution , Poisson distribution,...etc	13
Revision	14
Final Exam	15

	Ministry of Higher Education	
	Higher Institute of Engineering and technology, fifth district	
	Electronic and Communication Eng. Department	
Course Specification- 2023-2024		

## 59. Teaching and Learning methods

Course learning Outcomes (LOs)	Teaching and Learning Methods											
	Interactive lectures	Tutorials	Practical	Projects	Assignment	Research\reports	Self-Learning	Brain Storming	Modeling and simulations	Site Visits	Presentation	Discussion
CLO13	√	√			√							
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	Reports	CLO21
2	Sheets	CLO13, CLO21
3	Quizzes	CLO13, CLO21
4	Mid-term Exam	CLO21
5	Final Exam	CLO13, CLO21



	Ministry of Higher Education	
	Higher Institute of Engineering and technology, fifth district	
	Electronic and Communication Eng. Department	
Course Specification- 2023-2024		

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 Assessment			
	Assessment Method	Weights%	Weights
<b>Teacher Opinion</b>	Reports / sheets / Activities	10%	15
	Quizzes	6.665%	20
	Mid-term exam	13.33%	40
<b>Final Exam</b>		50%	75
<b>Total</b>		100%	150



8. List of References
[1] Erwin Kreyszig, "Advanced Engineering Mathematics" John Wiley & Sons Inc., 10 <sup>th</sup> Edition, (2010).
[2] J.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.)



	Ministry of Higher Education	
	Higher Institute of Engineering and technology, fifth district	
	Electronic and Communication Eng. Department	
Course Specification- 2023-2024		



<b>10. Matrix of Course Content with Course LO's</b>			
<b>No.</b>	<b>Topics</b>	<b>Aim</b>	<b>LO's</b>
1	Special functions: ( Gamma function )& Functions of complex variable	1	CLO13
2	Limits and continuity of complex variables	1	CLO13
3	Special functions: ( Beta function) & Derivatives and analytics function	1	CLO13
4	Harmonic functions	1	CLO13, CLO21
5	Elementary functions of complex variables & Series solutions of differential equations	1	CLO13, CLO21
6	Elementary transformations	1	CLO13, CLO21
7	Mid Term	1	CLO13, CLO21
8	Complex integral and Cauchy integral theorem & Introduction of Probability.	1	CLO13, CLO21
9	Complex series and Laurent theorem.	1	CLO13, CLO21
10	Singular points and residue theorem & Baye's Rule	1	CLO13, CLO21
11	Evaluation of real integrals.	1	CLO13
12	Application of probability using random variables.	1	CLO13
13	Binomial distribution , Poisson distribution, ...etc	1	CLO13
14	Revision	1	CLO13, CLO21
15	Final Exam	1	CLO13, CLO21

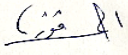




	Ministry of Higher Education	
	Higher Institute of Engineering and technology, fifth district	
	Electronic and Communication Eng. Department	
Course Specification- 2023-2024		

11. Matrix of Program LOs with Course Los			
Program LOs		Course Los	
PLO8	Communicate effectively – graphically, verbally and in writing – with a range of audiences using contemporary tools.	CLO13	Communicate effectively to identify the solution of ordinary differential equations using series, review 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	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 Dr . Tarek Adel	 

	Ministry of Higher Education	
	Higher Institute of Engineering and technology, fifth district	
	Electronic and Communication Eng. Department	
Course Specification- 2023-2024		

<b>Head of Department</b>	<b>Ass. Prof. Ahmed Fawzy</b>	
<b>Date of Approval</b>	<b>16/9/2024</b>	

	Ministry of Higher Education	
	Higher Institute of Engineering and technology, fifth district	
	Electronic and Communication Eng. Department	
Course Specification- 2024-2025		



<b>Course Specification</b>	
<b>Course Code: CSE2211</b>	<b>Course Title: Computer Organization(1)</b>

<b>1. Basic information</b>				
<b>Program Title</b>	Electronic and Communication Engineering Depart.			
<b>Department offering the program</b>	Electronic and Communication Engineering Depart.			
<b>Department offering the course</b>	Communication and Electronics Engineering Depart			
<b>Course Code</b>	CSE2211			
<b>Prerequisite</b>	CSE2111			
<b>Year/level</b>	Second Year / Third Level			
<b>Specialization</b>	<b>Major</b>			
<b>Teaching Hours</b>	Lectures	Tutorial	Practical	Total
	3	2	0	5

<b>2. Course Aims</b>	
<b>No.</b>	<b>Aim</b>
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)

<b>3. Learning Outcomes (LOs)</b>	
CLO.15	Acquire new knowledge in computer organization.
CLO.16	Apply new knowledge in computer organization.
CLO.23	Design sub-systems in digital engineering.

<b>4. Course Contents</b>	
<b>Topics</b>	<b>Week</b>
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



	Ministry of Higher Education	
	Higher Institute of Engineering and technology, fifth district	
	Electronic and Communication Eng. Department	
Course Specification- 2024-2025		

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 $\mu$ computer. Instruction set: Word format, Instruction format, and Instruction types.	6
CPU organization: Single Accumulator- General Registers-Stack. Structure and behavior of digital computers at several levels of abstraction (high-level, assembly/machine code)	8
Addressing modes. Instruction sequencing and timing: Fetch and Execute Cycles (Micro operation, Microinstruction).	9
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. Function of control unit: Micro programmed control unit.	13
Revision	14

## 5. 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	√		√	√			√			√		

## 6. Teaching and Learning methods of Disabled Students

	Ministry of Higher Education	
	Higher Institute of Engineering and technology, fifth district	
	Electronic and Communication Eng. Department	
Course Specification- 2024-2025		
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	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	7
4	Final Exam	15

### 7.3 Weighting of Assessments

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

## 8. 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.



## 9. Facilities required for teaching and learning

Lecture  
White board

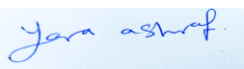
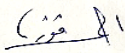
Data show



<b>10. Matrix of Course Content with Course LO's</b>			
<b>Week No.</b>	<b>Topics</b>	<b>Aim</b>	<b>LO's</b>
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
8	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
9	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 & Function of control unit: Micro programmed control unit	1	CLO.16, CLO.23
14	Revision	1	CLO.15, CLO.16, CLO.23

<b>11. Matrix of Program LOs with Course Los</b>	
<b>Program LOs</b>	<b>Course Los</b>

	Ministry of Higher Education	
	Higher Institute of Engineering and technology, fifth district	
	Electronic and Communication Eng. Department	
Course Specification- 2024-2025		

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. Yara Ashraf	
Head of Department	Ass. Prof. Ahmed Fawzy	
Date of Approval	16-9-2024	

	Ministry of Higher Education	
	Higher Institute of Engineering and technology, fifth district	
	Electronic and Communication Eng. Department	
Course Specification- 2024-2025		

<b>Course Specification</b>	
<b>Course Code: CSE2212</b>	<b>Course Title: Process dynamics and control components</b>

<b>12. Basic information</b>
------------------------------

<b>Program Title</b>	Electronic and Communication Engineering Depart.			
<b>Department offering the program</b>	Electronic and Communication Engineering Depart.			
<b>Department offering the course</b>	Electrical Power Engineering Depart.			
<b>Course Code</b>	CSE2212			
<b>Prerequisites</b>	CSE2111			
<b>Year/level</b>	Second year / Second Semester			(3 <sup>rd</sup> Level)
<b>Specialization</b>	<b>Major</b>			
<b>Teaching Hours</b>	Lectures	Tutorial	Practical	Total
	4	2	0	6

<b>13. Course Aims</b>
------------------------

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)

<b>14. Learning Outcomes (LOs)</b>
------------------------------------

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.

<b>15. Course contents</b>
----------------------------





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

<b>16. Teaching and Learning methods</b>

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	√		√	√		√						

17. Teaching and Learning methods of Disabled Students		
No.	Teaching Method	Reason
1	Additional Tutorials	√
2	Online lectures and assignments	√

18. Students' Assessment		
7.1 Students' Assessment Method		
No.	Assessment Method	LOs
1	Reports	CLO17, CLO19.
2	Sheets	CLO7, CLO17, CLO18, CLO19.
3	Quizzes	CLO17, CLO19.

	Ministry of Higher Education	
	Higher Institute of Engineering and technology, fifth district	
	Electronic and Communication Eng. Department	
Course Specification- 2024-2025		

4	Mid-term Exam	CLO7, Clo17, CLO18.
5	Final Exam	CLO7, 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	7
5	Final Exam	15

### 7.3 weighting of Assessment

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



## 19. List of References

- [1] N. Manring and R. Fales, Hydraulic Control Systems. Hoboken, NJ: Wiley, 2020.
- [2] D. E. Seborg, T. F. Edgar, D. A. Mellichamp, and F. J. Doyle, Process Dynamics and Control. Hoboken, NJ: Wiley, 2017.
- [3] C. M. Close, D. K. Frederick, and J. C. Newell, Modeling and Analysis of Dynamic Systems. New York: Wiley, 2002.
- [4]. K. Ogata, Modern Control Engineering. Englewood Cliffs, N.J: Prentice-Hall, 1995.

## 20. Facilities required for teaching and learning



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

## 21. Matrix of Course Content with Course LO's


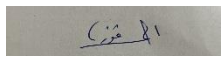
	Ministry of Higher Education	
	Higher Institute of Engineering and technology, fifth district	
	Electronic and Communication Eng. Department	
Course Specification- 2024-2025		



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& Thermal Systems.	1	CLO17
7	Midterm Exam	1	CLO7,Clo17, CLO18
8	Introduction to State Space Representation Model.& State Space Representation Model to different systems.	1	CLO7, CLO19
9	Input/output Equation for Different Systems.	1	CLO19
10	Analogy between electrical and mechanical system.	1	CLO18
11	Block Diagram Reduction.	1	CLO17
12	Transient analysis in control systems.	1	CLO19
13	Basic Control Actions and Response of Control Systems.	1	CLO17
14	Revision	1	CLO7, CLO17 , CLO18,CLO19
15	Final Exam	1	CLO7, CLO17 , CLO18,CLO19

<b>22. Matrix of Program LOs with Course LOs</b>			
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.

	Ministry of Higher Education	
	Higher Institute of Engineering and technology, fifth district	
	Electronic and Communication Eng. Department	
Course Specification- 2024-2025		

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. Ehab Issa El-sayed	
Head of Department	Dr. Ahmed Fawzy	
Date of Approval	16/9/2024	

	Ministry of Higher Education	
	Higher Institute of Engineering and technology, fifth district	
	Electronic and Communication Eng. Department	
Course Specification- 2024-2025		

<b>Course Specification</b>	
<b>Course Code: ECE 2211</b>	<b>Course Title: Signals processing</b>

<b>23. Basic information</b>
------------------------------

<b>Program Title</b>	Electronic and Communication Engineering Depart.			
<b>Department offering the program</b>	Electronic and Communication Engineering Depart.			
<b>Department offering the course</b>	Electronic and Communication Engineering Depart.			
<b>Course Code</b>	<b>ECE 2211</b>			
<b>Prerequisite</b>	--			
<b>Year/level</b>	Second year / Third level			(2 <sup>nd</sup> Semester)
<b>Specialization</b>	<b>Major</b>			
<b>Teaching Hours</b>	Lectures	Tutorial	Practical	Total
	3	2	0	5

<b>24. Course Aims</b>
------------------------

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

<b>25. Course Learning Outcomes (CLOs)</b>
--

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.

<b>26. Course Contents</b>
----------------------------

Topics	Week
Introduction to signals	1
Signal operations	2
Systems classification	3
Convolution	4
Fourier Series (Trigonometric Series)	5
Fourier Series (Polar Series)	6
Fourier Transform	8
Inverse Fourier Transform	9
Z Transform	10
Inverse Z Transform	11
Laplace Transform	12
Inverse Laplace Transform	13
Revision	14

<b>27. Teaching and Learning methods</b>	
<b>Course learning Outcomes (LOs)</b>	<b>Teaching and Learning Methods</b>

	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

## 28. Students' Assessment

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

7.2 Assessment Schedule		
No.	Assessment Method	Weeks
1	Sheets	Bi-weekly





	Ministry of Higher Education	
	Higher Institute of Engineering and technology, fifth district	
	Electronic and Communication Eng. Department	
Course Specification- 2024-2025		
2	Quizzes	Bi-weekly
3	Mid-term Exam	7
4	Research discussion	14
5	Final Exam	15

7.3 Weighting of Assessments					
	Assessment Method	Weights%	Weights	Weights%	Weights
<b>Teacher Opinion</b>	Quizzes	40%	40	10%	10
	Mid-term exam			20%	20
	sheets			5%	5
	Research discussion			5%	5
<b>Final Exam</b>		60%	60	60%	60
<b>Total</b>		100%	100	100%	100

29. 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.

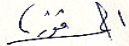
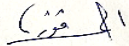
30. Facilities required for teaching and learning
Lecture/Classroom
White board
Data show



31. Matrix of Course Content with Course LO's			
Week No.	Topics	Aim	CLO's
1	Introduction to signals	1	CLO1
2	Signal operations	1	CLO2, CLO3
3	Systems classification	1	CLO1, CLO2, CLO3
4	Convolution	1	CLO2, CLO3



	Ministry of Higher Education		
	Higher Institute of Engineering and technology, fifth district		
	Electronic and Communication Eng. Department		
Course Specification- 2024-2025			
5	Fourier Series (Trigonometric Series)	1	CLO1, CLO2, CLO3
6	Fourier Series (Polar Series)	1	CLO2, CLO3
8	Fourier Transform	1	CLO2, CLO3
9	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	CLO1 , CLO2 , CLO3

### 32. 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	
Head of Department	Ass. Prof. Ahmed Fawzy	
Date of Approval	16-9-2024	

	<p>Ministry of Higher Education Higher Institute of Engineering and technology, fifth district Electronic and Communication Eng. Department Course Specification- 2024-2025</p>	
---	---	---

	Ministry of Higher Education	
	Higher Institute of Engineering and technology, fifth district	
	Electronic and Communication Eng. Department	
Course Specification- 2024-2025		

### Course Specification

**Course Code: EPE 2211**

**Course Title: Electrical testing (2)**

#### 1. Basic information



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

#### 2. 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).

#### 3. 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.



	Ministry of Higher Education	
	Higher Institute of Engineering and technology, fifth district	
	Electronic and Communication Eng. Department	
Course Specification- 2024-2025		

<b>4. Course Contents</b>	
<b>Topics</b>	<b>Week</b>
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	8
Electronic experiments: Half wave rectifier – Full wave rectifier	9
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 Application in control: Transient response analysis	13
Practical Exam	14

	Ministry of Higher Education	
	Higher Institute of Engineering and technology, fifth district	
	Electronic and Communication Eng. Department	
Course Specification- 2024-2025		

5. 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			√		√		√					√

6. Teaching and Learning methods of Disabled Students		
No.	Teaching Method	Reason
1	Additional Tutorials	√
2	Online lectures and assignments	√

	Ministry of Higher Education	
	Higher Institute of Engineering and technology, fifth district	
	Electronic and Communication Eng. Department	
Course Specification- 2024-2025		

## 7. Students' Assessment

### 7.1 Students' Assessment Method



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

### 7.2 Assessment Schedule

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

### 7.3 Weighting of Assessments

	Assessment Method	Weights%	Weights	Weights%	Weights
<b>Practical</b>	Practical Attendance	60%	60	10%	10
	Lab. Reports			20%	20
	Simulations			10%	10
	Practical exam			20%	20
<b>Final Exam</b>		40%	40	40%	40
<b>Total</b>		% 100	100	% 100	100

	Ministry of Higher Education	
	Higher Institute of Engineering and technology, fifth district	
	Electronic and Communication Eng. Department	
Course Specification- 2024-2025		

### 8. 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.

### 9. Facilities required for teaching and learning

White board



Data show

Laboratory Usage



### 10. Matrix of Course Content with Course LO's

Week No.	Topics	Aim	LO's
1	Design of combinational logic circuits: Decoder – Encoder	1	CLO.1 CLO.2 CLO.26
2	Design of combinational logic circuits: Multiplexers– De-multiplexers	1	CLO.1 CLO.2 CLO.26





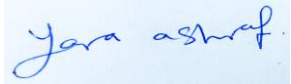
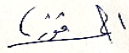
	Ministry of Higher Education	
	Higher Institute of Engineering and technology, fifth district	
	Electronic and Communication Eng. Department	
Course Specification- 2024-2025		



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
8	Electronic experiment: Diode characteristic, Clipper- Clamper	1	CLO.12, CLO.25, CLO.26
9	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 Application in control: Transient response analysis	1	CLO.12, CLO.25, CLO.26
14	Practical Exam	1	CLO.26

	Ministry of Higher Education	
	Higher Institute of Engineering and technology, fifth district	
	Electronic and Communication Eng. Department	
Course Specification- 2024-2025		

<b>11. Matrix of Program LOs with Course LOs</b>			
<b>Program LOs</b>		<b>Course LOs</b>	
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.

	Ministry of Higher Education	
	Higher Institute of Engineering and technology, fifth district	
	Electronic and Communication Eng. Department	
Course Specification- 2024-2025		

Title	Name	Signature
Course coordinator	Dr. Yara Asharaf	
Head of Department	Ass. Prof. Ahmed Fawzy	
Date of Approval	16/9/2024	

	Ministry of Higher Education	
	Higher Institute of Engineering and technology, fifth district	
	Electronic and Communication Eng. Department	
Course Specification- 2024-2025		

<b>Course Specification</b>	
<b>Course Code: EPE2212</b>	<b>Course Title: Energy Conversion</b>

<b>33. Basic information</b>				
<b>Program Title</b>	Electronic and Communication Engineering Depart.			
<b>Department offering the program</b>	Electronic and Communication Engineering Depart.			
<b>Department offering the course</b>	Electrical Power and Machines Engineering Depart.			
<b>Course Code</b>	EPE2212			
<b>Prerequisite</b>	-----			
<b>Year/level</b>	second year / Third Level			(2 <sup>nd</sup> Semester)
<b>Specialization</b>	<b>Major</b>			
<b>Teaching Hours</b>	Lectures	Tutorial	Practical	Total
	4	2	0	6

<b>34. Course Aims</b>	
<b>No.</b>	<b>Aim</b>
1	Apply knowledge of mathematics, science and engineering concepts of producing the magnetic flux which is used in electrical system and different methods due to establish the linear force and mechanical torque. (AM1)

<b>35. Learning Outcomes (LOs)</b>	
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



<b>36. Course Contents</b>	
<b>Topics</b>	<b>Week</b>
Introduction of Conventional methods for energy conversion and Sources of energy	1
Electromechanical energy conversion and magnetic circuits	2
The benefit of magnetic field in Electrical power systems and its application	3
Analysis of Electrical transformer and its application.	4
Electromechanical system and its application.	5
Electric motors and generators, Faraday's law, Lorenz forces,	6
the basic electric generator, the basic electric motor	8
magnetically single excited systems, magnetically multi-excited systems	9
Dynamic energy conversion equations	10
Conservative fields, coupled magnetic fields, Torque and stored energy in magnetic fields,	11
multi-fed rotating systems.	12
Electrostatic systems and its application in the industry	13
Revision	14





### 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
CLO8	√	√	√									
CLO17	√	√	√	√		√						
CLO18	√	√	√	√		√				√	√	
CLO19	√	√	√	√		√				√	√	√

### 38. Teaching and Learning methods of Disabled Students

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

### 39. Students' Assessment

	Ministry of Higher Education	
	Higher Institute of Engineering and technology, fifth district	
	Electronic and Communication Eng. Department	
Course Specification- 2024-2025		

### 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, CCLO19

### 7.2 Assessment Schedule



No.	Assessment Method	Weeks
1	Reports	Bi-weekly
2	Sheets	Weekly
3	Quizzes	Bi-weekly
4	Mid-term Exam	7
5	Final Exam	15

### 7.3 Weighting of Assessments

	Assessment Method	Weights%	Weights
<b>Teacher Opinion</b>	Reports / shets / Activities	15%	15
	Quizzes	15%	15
	Mid-term exam	20%	30
<b>Final Exam</b>		75%	90
<b>Total</b>		100%	150

## 40. List of References

[1] D. Yogi Goswami, Frank Kreith, "Energy Conversion, "2<sup>nd</sup> Edition, 2017.

	Ministry of Higher Education	
	Higher Institute of Engineering and technology, fifth district	
	Electronic and Communication Eng. Department	
Course Specification- 2024-2025		

[2] A. E. Fitzgerald, Charles Kingsley, Jr, Stephen D. Umans, "Electric Machinery", McGraw Hill, Six Edition, 2003.

#### 41. Facilities required for teaching and learning

Lecture/Classroom

White board

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



Data show

#### 42. Matrix of Course Content with Course LO's


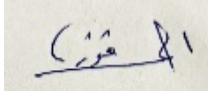
Week No.	Topics	Aim	LO's
1	Introduction of Conventional methods for energy conversion and Sources of energy	1	CLO8
2	Electromechanical energy conversion and magnetic circuits	1	CLO8, CLO17
3	The benefit of magnetic field in Electrical power systems and its application	1	CLO8, CLO17
4	Analysis of Electrical transformer and its application.	1	CLO17, CLO18
5	Electromechanical system and its application.	1	CLO8, CLO19
6	Electric motors and generators, Faraday's law, Lorenz forces,	1	CLO18
8	the basic electric generator, the basic electric motor	1	CLO8, CLO17
9	magnetically single excited systems, magnetically multi-excited systems	1	CLO8, CLO18
10	Dynamic energy conversion equations	1	CLO8, CLO17, CLO18
11	Conservative fields, coupled magnetic fields, Torque and stored energy in magnetic fields,	1	CLO8, CLO19
12	multi-fed rotating systems.	1	CLO8, CLO19
13	Electrostatic systems and its application in the industry	1	CLO8, CLO17
14	Revision	1	CLO8, CLO17, CLO18, CLO19



#### 43. Matrix of Program LOs with Course Los



	Ministry of Higher Education	
	Higher Institute of Engineering and technology, fifth district	
	Electronic and Communication Eng. Department	
Course Specification- 2024-2025		

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 applicable to the specific discipline by applying the concepts of generation, transmission and distribution of electrical power systems.	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

Title	Name	Signature
Course coordinator	Dr. Mohamed Farouk	
Head of Department	Dr. Ahmed Fawzy	
Date of Approval	16/09/2024	

	Ministry of Higher Education	
	Higher Institute of Engineering and technology, fifth district	
	Electronic and Communication Eng. Department	
Course Specification- 2024-2025		

### Course Specification



**Course Code:** PHM2211

**Course Title:** mathematics (6)

44. Basic information				
<b>Program Title</b>	Electronic and Communication Engineering Depart.			
<b>Department offering the program</b>	Electronic and Communication Engineering Depart.			
<b>Department offering the course</b>	Engineering Mathematics and Physics department			
<b>Course Code</b>	PHM 2211			
<b>Prerequisites</b>	Math3, math4			
<b>Year/level</b>	Second year / Level 3 (2 <sup>nd</sup> Semester)			
<b>Specialization</b>	<b>Major</b>			
<b>Teaching Hours</b>	Lectures	Tutorial	Practical	Total
	3	2	0	5

45. Course Aims	
No.	Aim
1	Solve and analysis communication and electronic engineering problems based on physical sciences and mathematics. (AM1)

46. Course Learning Outcomes (CLOs)	
CLO14	Use 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.

	Ministry of Higher Education	
	Higher Institute of Engineering and technology, fifth district	
	Electronic and Communication Eng. Department	
Course Specification- 2024-2025		

<b>47. Course Contents</b>	
<b>Topics</b>	<b>Week</b>
- 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	8
- Systems of linear equations i) Inverse matrix method ii) Gauss elimination method	9
- Systems of linear equations <b>iii) Gauss – Jordan- elimination</b> <b>iv) Jacobi</b>	10
- Numerical methods for ordinary differential equations - Euler method - Improved Euler method & Modified Euler method	11
- Runge kutta method	12
Linear programming ( geometric solution –simplex method)	13
- Revision	14
- Final Exam	15

#### 48. Teaching and Learning methods

Course learning Outcomes (LOs)	Teaching and Learning Methods											
	Interactive lectures	Tutorials	Practical	Projects	Assignment	Research/reports	Self-Learning	Brain Storming	Modeling and simulations	Site Visits	Presentation	Discussion
CLO14	√	√			√							
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	Reports	CLO23
2	Sheets	CLO14, CLO24
3	Quizzes	CLO14, CLO24
4	Mid-term Exam	CLO14, CLO24
5	Final Exam	CLO14, CLO23, CLO24

##### 7.2 Assessment Schedule

No.	Assessment Method	Weeks
1	Reports	Bi-weekly

	Ministry of Higher Education	
	Higher Institute of Engineering and technology, fifth district	
	Electronic and Communication Eng. Department	
Course Specification- 2024-2025		

2	Sheets	Weekly
3	Quizzes	Bi- weekly
4	Mid-term Exam	7
5	Final Exam	15

### 7.3 weighting of Assessment

	Assessment Method	Weights%	Weights
<b>Teacher Opinion</b>	Reports / sheets / Activities	10%	15
	Quizzes	13.33%	20
	Mid-term exam	26.67%	40
<b>Final Exam</b>		50%	75
<b>Total</b>		100%	150

## 8. List of References



- [1] Erwin Kreyszig, "Advanced Engineering Mathematics" John Wiley & Sons Inc., 10<sup>th</sup> 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.)

	Ministry of Higher Education	
	Higher Institute of Engineering and technology, fifth district	
	Electronic and Communication Eng. Department	
Course Specification- 2024-2025		



10. Matrix of Course Content with Course LO's			
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	CLO14
6	- Method of iteration - Newton's method	1	CLO14
7	- Miterm exam		CLO14, CLO24
8	- System of non- linear equations	1	CLO23
9	- Systems of linear equations v) Inverse matrix method vi) Gauss elimination method	1	CLO23
10	- Systems of linear equations <b>vii) Gauss – Jordan- elimination</b> <b>viii) Jacobi</b>	1	CLO23
11	- Numerical methods for ordinary differential equations - Euler method - Improved Euler method & Modified Euler method	1	CLO23, CLO14
12	- Runge kutta method	1	CLO14
13	- Linear programming ( geometric solution –simplex method)	1	CLO14



	Ministry of Higher Education	
	Higher Institute of Engineering and technology, fifth district	
	Electronic and Communication Eng. Department	
Course Specification- 2024-2025		

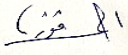
14	- General revision	1	CIO14,CLO23,CLO24
15	- Final exam	1	CIO14,CLO23,CLO24

### 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 numerical methods to solve differential equations, and Identify the basic ideas and techniques of linear programming and find the roots of non-linear equations.
PLO13	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 Dr . Tarek Adel	 

	Ministry of Higher Education	
	Higher Institute of Engineering and technology, fifth district	
	Electronic and Communication Eng. Department	
Course Specification- 2024-2025		

<b>Head of Department</b>	<b>Ass. Prof. Ahmed Fawzy</b>	
<b>Date of Approval</b>	<b>16/9/2024</b>	