Course Specification

Course Code: ECE 3101 **Course Title: Communication System I**

1. Basic information

Program Title	Electronics and Communication Engineering.			
Department offering the program	Electronics and Communication Engineering Depart.			
Department offering the course	Electronics and Communication Engineering Depart.			
Course Code	ECE 3101			
Prerequisite	---			
Year/level	Third year / First Semester (1st Semester)			
Specialization	**Major**			
Prerequired Course	**----**			
Teaching Hours	Lectures	Tutorial	Practical	Total
	3	2	0	5

2. Course Aims

No.	Aim
1	Identify, formulate, and solve complex electric communications problems by applying electric engineering fundamentals, basic science, and mathematics. (AM1)
2	Use appropriate mathematical methods or IT tools for modelling and analysing electronic and communication systems. (AM5)

3. Learning Outcomes (LOs)

CLO.1	Identify, complex engineering problems by applying engineering fundamentals, basic science, and mathematics.
CLO.2	Formulate complex engineering problems by applying engineering fundamentals, basic science, and mathematics.
CLO.28	Use appropriate mathematical methods or IT tools for modeling.
CLO.29	analyzing electronic and communication systems

4. Course Contents

Topics	Week
Analog Communication – Introduction. Parts of a Communication System, and Types of Signals.	1
Analog Communication – Modulation. What is Modulation, Need for Modulation, Advantages of Modulation, Types of Modulation, Continuous -wave Modulation "Amplitude / Angle Modulation", and Pulse Modulation.	2
Amplitude Modulation. Mathematical Expressions, Modulation Index, under -modulated wave, over-modulated wave, Bandwidth of AM Wave, Power Calculations of AM Wave, and Numerical problems.	3
AM Modulators. Square Law Modulator, Switching Modulator, amplitude sensitivity, and mathematical presentation.	4
AM Demodulators. Square Law Demodulator, and Envelope Detector, Demodulator.	5
Double Sideband Suppressed Carrier (DSBSC), Mathematical Expressions, Power Calculations of DSBSC Wave.	6
Midterm Exam	7
DSBSC Modulators, Balanced Modulator, Ring Modulator, and mathematical presentation.	8
Single Sideband Suppressed Carrier Modulators (SSBSC), Mathematical Expressions, and Bandwidth of SSBSC Wave. Power Calculations of SSBSC Wave. SSBSC Modulators.	9
Frequency discrimination method, and Phase discrimination method. SSBSC Demodulator, Coherent Detector Demodulator. Vestigial Side Band Suppressed Carrier (VSBSC) technique.	10
Angle Modulation, Frequency Modulation mathematical representation and derivation. Phase Modulation mathematical representation and derivation.	11
Phase Modulation/Demodulation, PLL, Power estimation. Frequency Modulation/Demodulation, Power estimation. Narrow/Wide FM. Mixer and Phase locked loop, Automatic gain controller	12
What is Noise, Types of Noise, Effects of Noise, Signal-to-Noise Ratio (SNR), Figure of Merit. SNR Calculations of different communication systems.	13
Revision	14
Final Exam	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 simulations	Site Visits	Presentation	Discussion
CLO.1	√	√		√								
CLO.2	√	√		√								
CLO.28	√	√		√			√					√
CLO.29	√	√		√			√					√

6. Teaching and Learning methods of Disabled Students

No.	Teaching Method	Reason
1	Additional Tutorials	√

7. Students' Assessment

7.1 Students' Assessment Method

No.	Assessment Method	LOs
1	Written exam	CLO.1, CLO.2, CLO28
2	Quizzes and reports	CLO.1, CLO.2
3	Project applied on a practical field problem	CLO.28, CLO.29
4	Self-Learning	CLO.29
5	Simulations	CLO.28, CLO.29

7.2 Assessment Schedule		
No.	**Assessment Method**	**Weeks**
1	Attendance	Weekly
2	Sheets	Weekly
3	Quizzes	4 & 10
4	Mid-term Exam	5
5	Oral/ Practical Exam	
6	Final Exam	15

7.3 Weighting of Assessments

	Assessment Method	**Weights%**	**Weights**	**Weights%**	**Weights**
Teacher Opinion	Reports / sheets / Activities	%10	40	%10	10
	Attendance	%10		%10	10
	Quiz 1 / Quiz 2	%10		%10	10
	Mid-term exam	%10		%10	10
Final Exam		%60	60		60
Total		%100	100		100

8. List of References

[1] Haykin, "COMMUNICATION SYSTEMS", 4TH ED, 2006.
[2] Couch, "Digital and Analog Communication Systems", Seventh Edition ©2007.
[3] Sunil Bhooshan, "Fundamentals of Analogue and Digital Communication Systems", 2022

9. Facilities required for teaching and learning

Lecture/Classroom
White board
Data show

10. Matrix of Course Content with Course LO's

No.	Topics	Aim	LO's
1	Analog Communication – Introduction. Parts of a Communication System, and Types of Signals.	1	CLO.1, CLO.2
2	Analog Communication – Modulation. What is Modulation, Need for Modulation, Advantages of Modulation, Types of Modulation, Continuous -wave Modulation "Amplitude / Angle Modulation", and Pulse Modulation.	1	CLO.1, CLO.2
3	Amplitude Modulation. Mathematical Expressions, Modulation Index, under -modulated wave, over-modulated wave, Bandwidth of AM Wave, Power Calculations of AM Wave, and Numerical problems.	1	CLO.1, CLO.2, CLO.29
4	AM Modulators. Square Law Modulator, Switching Modulator, amplitude sensitivity, and mathematical presentation.	1, 2	CLO.1, CLO.2, CLO.29
5	AM Demodulators. Square Law Demodulator, and Envelope Detector, Demodulator.	1, 2	CLO.1, CLO.2, CLO.29
6	DSBSC Modulators, Balanced Modulator, Ring Modulator, and mathematical presentation.	1, 2	CLO.1, CLO.2, CLO.28, CLO.29
7	Midterm		
8	DSBSC Demodulators, Coherent Detector Demodulators, and Costas Loop Demodulators.	1, 2	CLO.1, CLO.2, CLO.29
9	Single Sideband Suppressed Carrier Modulators (SSBSC), Mathematical Expressions, and Bandwidth of SSBSC Wave. Power Calculations of SSBSC Wave. SSBSC Modulators.	1, 2	CLO.1, CLO.2, CLO.28, CLO.29
10	Frequency discrimination method, and Phase discrimination method. SSBSC Demodulator, Coherent Detector Demodulator. Vestigial Side Band Suppressed Carrier (VSBSC) technique.	1, 2	CLO.1, CLO.2, CLO.28, CLO.29
11	Angle Modulation, Frequency Modulation mathematical representation and derivation. Phase Modulation mathematical representation and derivation.	1	CLO.1, CLO.2
12	Phase Modulation/Demodulation, PLL, Power estimation. Frequency Modulation/Demodulation, Power estimation. Narrow/Wide FM. Mixer and Phase locked loop, Automatic gain controller	1, 2	CLO.1, CLO.2, CLO.29
13	What is Noise, Types of Noise, Effects of Noise, Signal-to-Noise Ratio (SNR), Figure of Merit. SNR Calculations of different communication systems.	1	CLO.1, CLO.2
14	Revision		
15	Final Term Exam		

11. 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.	CLO.1	Identify, complex engineering problems by applying engineering fundamentals, basic science, and mathematics.
		CLO.2	Formulate complex engineering problems by applying engineering fundamentals, basic science, and mathematics.
PL16	Use appropriate mathematical methods or IT tools for modeling and analyzing electronic and communication systems.	CLO.28	Use appropriate mathematical methods or IT tools for modeling
		CLO.29	analyzing electronic and communication systems

Title	Name	Signature
Course coordinator	**Dr. Osama Elmowafy**	
Head of Department	**Assoc. Prof. Dr. Ahmed Fawzy**	
Date of Approval	**16/9/2024**	

Course Specification

Course Code: ECE3102 **Course Title: Measurements and Electronics Testing(1)**

12. Basic information

Program Title	Electronics and Communication Engineering Depart.			
Department offering the program	Electronics and Communication Engineering Depart.			
Department offering the course	Electronics and Communication Engineering Depart.			
Course Code	**ECE3102**			
Prerequisite	**-----**			
Year/level	Third year / First Semester (1st Semester)			
Specialization	**Major**			
Teaching Hours	Lectures	Tutorial	Practical	Total
	2	--	1	3

13. Course Aims

No.	Aim
1	Acquire the required skills to perform laboratory and field experiments and interpret their results (AM4)

14. Learning Outcomes (LOs)

CL.1	Understand the concepts of Communication systems and Evaluate various electrical systems.
CL.2	Develop and conduct appropriate experimentation to solve technical problems related to communication system.
CL.3	Use the appropriate tools and equipment in the communication system to measure system performance and analyze the results correctly.
CL.4	Analyze and discuss the results of the experiment correctly.

15. Course Contents

No.	Topics	Week
1	Types of Oscillators	1
2	AM modulator	2
3	AM demodulators	3
4	FM modulator.	4
5	FM demodulator.	5
6	Double sideband suppressed carrier (DSB-SC)	6
7	Mid Term Exam.	7
8	Single sideband suppressed carrier (SSB-SC).	8
9	Types of Filters.	9
10	Analog-to-Digital converter (ADC).	10
11	Digital-to-Analog converter (DAC)	11
12	Vestigial sideband modulation (VSB)	12
13	Encoder and Decoder Simulation for LBC	13
14	Practical Exam	14
15	Final Exam	15

16. Teaching and Learning methods

	Teaching and Learning Methods

Course learning Outcomes (LOs)	Interactive lectures	Tutorials	Practical	Projects	Assignment	Research\reports	Self-Learning	Brain Storming	Modeling and simulations	Site Visits	Presentation	Discussion
CL.1	√										√	
CL.2					√	√	√					√
CL.3		√	√	√								
CL.4		√	√	√								

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	Attendance	-------
2	Reports / Sheets	CL.1, CL.2
3	Quiz 1 / Quiz 2	---------
4	Mid-term Exam	CL.1, CL.2
5	Oral/ Practical Exam	CL.3, CL.4
6	Final Exam	CL.1, CL.2

7.2 Assessment Schedule

No.	Assessment Method	Weeks
1	Reports / Sheets	5,11,13

2	Mid-term Exam	7
3	Oral/ Practical Exam	15
4	Final Exam	16

7.3 Weighting of Assessments

	Assessment Method	Weights%	Weights	Weights%	Weights
Teacher Opinion	Mid-term exam	%20	20	20%	20
Practical / Oral	Lab. Reports	%40	40	20%	20
	Final oral / practical exam			20%	20
Final Exam			40	40%	40
Total			100	100%	100

19. List of References

[1] Communication Lab Kit experiment Book.

20. 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
Laboratory Usage

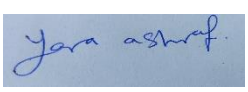
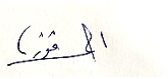
21. Matrix of Course Content with Course LO's

No.	Topics	Aim	LO's
1	Types of Oscillators	1	CL.1, CL.3,CL.4
2	AM modulator	1	CL.1
3	AM demodulators	1	CL.1, CL.3, CL.4

4	FM modulator.	1	CL.1, CL.3, CL.4
5	FM demodulator.	1	CL.1, CL.3, CL.4
6	Double sideband suppressed carrier (DSB-SC)	1	CL.1, CL.3, CL.4
7	Mid Term Exam.	1	CL.1, CL.2
8	Single sideband suppressed carrier (SSB-SC).	1	CL.1, CL.3, CL.4
9	Types of Filters.	1	CL.1, CL.3, CL.4
10	Analog-to-Digital converter (ADC).	1	CL.1, CL.2
11	Digital-to-Analog converter (DAC)	1	CL.1, CL.2
12	Vestigial sideband modulation (VSB)	1	CL.1, CL.2
13	Encoder and Decoder Simulation for LBC	1	CL.1, CL.2
14	Practical Exam		
15	Final Exam		

22. Matrix of Program Los with Course Los

Program Los		Course Los	
PLO.2	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	CL.1	Understand the concepts of Communication systems and Evaluate various electrical systems
		CL.2	Develop and conduct conduct appropriate experimentation to solve technical problems related to communication system.
PLO.18	Use the appropriate tools and equipment to measure system performance and analyze the results correctly	CL.3	Use the appropriate tools and equipment in the communication system to measure system performance and analyze the results correctly
		CL.4	Analyze and discuss the results of the experiment correctly

Title	Name	Signature
Course coordinator	Dr. Yara Ashraf Kamel	
Head of Department	**Ass. Prof. Ahmed Fawzy**	

Date of Approval	**16/09/2024**

Course Specification

Course Code: ECE 3103 **Course Title: Electronic Devices**

23. Basic information

Program Title	Electronic and Communication Engineering Depart.			
Department offering the program	Electronic and Communication Engineering Depart.			
Department offering the course	Electronic and Communication Engineering Depart.			
Course Code	ECE3103			
Prerequisite	ECE1211			
Year/level	Third year / First Semester (1st Semester)			
Specialization	**Major**			
Teaching Hours	Lectures	Tutorial	Practical	Total
	4	2	0	6

24. Course Aims

No.	Aim
1	Identify Engineering fundamentals based on physical science. (AM1)
2	Identify the electronic devices.(AM5)

25. Learning Outcomes (LOs)

CLO.21	Model an electronic component for a specific application
CLO.22	Analyze an electronic system or component for a specific application;
CLO.8	Practice research techniques and methods of investigation as an inherent part of learning.

26. Course Contents

Topics	Week
Semiconductor physics: Semiconductor material and Energy band theory	1
Semiconductor physics: Electron motion and Generation and recombination	2
Highly doped diodes. Bipolar junction transistor	3
Electronics devices: Physics of Metal-Oxide-Semiconductor FET (MOSFET)	4
Electronics devices: Short Channel MOSFETs	5
Electronics devices: MESFET	6
Midterm Exam	7
Other semiconductor devices: TFET part 1	8
Other semiconductor devices: TFET part 2	9
Other semiconductor devices: FinFET part 1	10
Other semiconductor devices: FinFET part 2	11
Other semiconductor devices: OrganicFET, HEMT	12
Other semiconductor devices: Solar Cells	13
Revision	14
Final Exams	15

27. 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
CLO.21	√	√			√							
CLO.22	√	√			√							
CLO.8						√					√	

28. Teaching and Learning methods of Disabled Students

No.	Teaching Method	Reason
1	Additional tutorials	√

29. Students' Assessment

7.1 Students' Assessment Method

No.	Assessment Method	LOs
1	Written exam	CLO.21, CLO.22
2	Presentation	CLO.8
3	Assignments	CLO.21, CLO.22
4	Researches	CLO.8

7.2 Assessment Schedule

No.	Assessment Method	Weeks
1	Attendance	Weekly
2	Assignments	6-13
3	Presentation	14
4	Researches	6
5	Mid-term Exam	7
6	Final Exam	15

7.3 Weighting of Assessments

	Assessment Method	Weights%	Weights	Weights%	Weights
Teacher Opinion	Ass.	40%	40	5%	5
	Research and Presentation			15%	15
	Mid-term exam			20%	20
Final Exam		60%	60		60
Total			100		100

30. List of References

[1] Edward Yang, Microelectronic Devices, 1988
[2] Colinge, FinFETs and Other Multi-Gate Transistors, 2008
[3] Sneh Saurabh, Fundamentals Of Tunnel Field-Effect Transistors, 2017
[4] D. Nirmal and J. Ajayan, Handbook for III-V High Electron Mobility Transistor Technologies, Taylor & Francis Group, 2019

31. Facilities required for teaching and learning

Lecture

White board

32. Matrix of Course Content with Course LO's

No.	Topics	Aim	LO's
1	Semiconductor physics: Semiconductor material and Energy band theory	1	CLO.21, CLO.22
2	Semiconductor physics: Electron motion and Generation and recombination	1	CLO.21, CLO.22
3	Highly doped diodes. Bipolar junction transistor	2	CLO.21, CLO.22
4	Electronics devices: Physics of Metal-Oxide-Semiconductor FET (MOSFET)	1,2	CLO.21, CLO.22
5	Electronics devices: Short Channel MOSFETs	1	CLO.21, CLO.22
6	Electronics devices: MESFET	2	CLO.21, CLO.22
7	Other semiconductor devices: TFET part 1	2	CLO.21, CLO.22
8	Other semiconductor devices: TFET part 2	2	CLO.21, CLO.22
9	Midterm Exam		
10	Other semiconductor devices: FinFET part 1	2	CLO.21, CLO.22
11	Other semiconductor devices: FinFET part 2	2	CLO.21, CLO.22
12	Other semiconductor devices: OrganicFET, HEMT	2	CLO.21, CLO.22
13	Other semiconductor devices: Solar Cells	2	CLO.21, CLO.22

33. 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.	CLO.21	Model an electronic component for a specific application
		CLO.22	Analyze an electronic system or component for a specific application;
PL5	Practice research techniques and methods of investigation as an inherent part of learning.	CLO.8	Practice research techniques and methods of investigation as an inherent part of learning.

Title	Name	Signature
Course coordinator	**Dr. Amira Nabil**	Amira Nabil
Head of Department	**Ass. Prof. Ahmed Fawzy**	
Date of Approval	**16/09/2024**	

Course Specification

Course Code: ECE 3104 **Course Title: Digital Circuits**

34. Basic information

Program Title	Electronic and Communication Engineering Depart.			
Department offering the program	Electronic and Communication Engineering Depart.			
Department offering the course	Electronic and Communication Engineering Depart.			
Course Code	ECE3104			
Prerequisite	-----			
Year/level	Third year / First Semester (1st Semester)			
Specialization	**Major**			
Teaching Hours	Lectures	Tutorial	Practical	Total
	3	2	0	5

35. Course Aims

No.	Aim
1	Characterization and Implementing of digital Logics systems. (AM5)

36. Learning Outcomes (LOs)

CLO.22	Analyze an electronic/digital system for a specific application
CLO.20	Design an electronic/digital system for a specific application

37. Course Contents

Topics	Week
Introduction to Digital circuits: Voltage transfer Characteristics, Fan out, Power dissipation, Transient analysis, Delay and Logic families	1
Resistor transistor family (RTL)	2
Diode Logic Family (DTL)	3
Transistor-transistor logic family (TTL)	4
NMOS family: Inverter (static analysis)	5
NMOS family: Inverter (Dynamic analysis)	6
Midterm Exam	7
NMOS family: Logic gates	8
CMOS family: Inverter (static analysis)	9
CMOS family: Inverter (Dynamic analysis)	10
CMOS family: Logic gates	11
Combinational circuits: Design	12
Sequential Circuits: Design (1)	13
Revision	14
Final Exams	15

38. 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
CLO.22	√	√			√				√			
CLO.20	√	√			√							

39. Teaching and Learning methods of Disabled Students

No.	Teaching Method	Reason
1	Additional tutorials	√

40. Students' Assessment

7.1 Students' Assessment Method

No.	Assessment Method	LOs
1	Written exam	CLO.22, CLO.20
2	Assignments	CLO.22, CLO.20
3	Simulation	CLO.22

7.2 Assessment Schedule

No.	Assessment Method	Weeks
1	Attendance	Weekly
2	Assignments	6-13
3	Simulations	14
4	Mid-term Exam	7
5	Oral/ Practical Exam	----
6	Final Exam	15

7.3 Weighting of Assessments					
	Assessment Method	**Weights%**	**Weights**	**Weights%**	**Weights**
Teacher Opinion	Assignment	40%	40	10%	10
	simulation			10%	10
	Mid-term exam			20%	20
Final Exam		60%	60		60
Total			100		100

41. List of References

[1] Sung Kang, CMOS Digital Integrated Circuits Analysi, 2003
[2] Ayers, John E. Digital integrated circuits: analysis and design. CRC Press, 2018.

42. Facilities required for teaching and learning

Lecture

White board

43. Matrix of Course Content with Course LO's

No.	Topics	Aim	LO's
1	Introduction to Digital circuits: Voltage transfer Characteristics, Fan out, Power dissipation, Transient analysis, Delay and Logic families	1	CLO.22
2	Resistor transistor family (RTL)	1	CLO.22
3	Diode Logic Family (DTL)	1	CLO.22
4	Transistor-transistor logic family (TTL)	1	CLO.22
5	NMOS family: Inverter (static analysis)	1	CLO.22
6	NMOS family: Inverter (Dynamic analysis)	1	CLO.22
7	Midterm Exam		
8	NMOS family: Logic gates	2	CLO.20
9	CMOS family: Inverter (static analysis)	1	CLO.22
10	CMOS family: Inverter (Dynamic analysis)	1	CLO.22
11	CMOS family: Logic gates	2	CLO.20
12	Combinational circuits: Design	2	CLO.20
13	Sequential Circuits: Design	2	CLO.20

44. 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.	CLO.22	Analyze an electronic/digital system for a specific application
		CLO.20	Design an electronic/digital system for a specific application

Title	Name	Signature
Course coordinator	**Dr. Amira Nabil**	Amira Nabil
Head of Department	**Ass. Prof. Ahmed Fawzy**	
Date of Approval	**16/09/2024**	

Course Specification

Course Code: ECE 3105 **Course Title: Electromagnetic Waves**

45. Basic information

Program Title	Electronics and Communication Engineering Depart.			
Department offering the program	Electronics and Communication Engineering Depart.			
Department offering the course	Electronics and Communication Engineering Depart.			
Course Code	**ECE 3105**			
Perquisite	**------**			
Year/level	third year / First Semester (1st Semester)			
Specialization	**Major**			
Teaching Hours	Lectures	Tutorial	Practical	Total
	4	2	0	6

46. Course Aims

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

47. Course Learning Outcomes (LOs)

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.
CLO.3	Solve complex engineering problems by applying engineering fundamentals, basic science, and mathematics.
CLO.25	Estimate the performance of an electrical/electronic/digital system and circuit under specific input excitation and evaluate its suitability for a specific application.
CLO.26	Measure the performance of an electrical system and circuit under specific input excitation and evaluate its suitability for a specific application

48. Course Contents

Topics	Week
Introduction to Electromagnetics waves	1
Transverse Elecromagantiec waves along a parallel palte Transmission line	2
General Transmission Line Equations	3
Tl as circuit Elements	4
Analytical method of TL solution	5
Transient on TL	6
Mid Term Exam	7
Pulse Excition on TL	8
The Smith Chart	9
Trasnsmssion Impdence Matching	10
General wave behaviours	11
Parallel plate WaveGuide	12
Rectangular Waveguide	13
Practical exam	14
Final exam	15

49. 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
CLO.1	√	√										
CLO.2	√	√			√						√	
CLO.3	√	√			√							
CLO.25	√	√			√						√	√
CLO.26	√	√			√						√	√

50. Teaching and Learning methods of Disabled Students

No.	Teaching Method	Reason
1	Additional tutorials	√

51. Students' Assessment

7.1 Students' Assessment Method

No.	Assessment Method	CLOS
1	Written exam	CLO.1, CLO.2,CLO.3, CLO.25,CLO.26
2	Assignments	CLO.1, CLO.2,CLO.3, CLO.25,CLO.26

7.2 Assessment Schedule

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

7.3 Weighting of Assessments

	Assessment Method	Weights%	Weights	Weights%	Weights
Teacher Opinion	Attendance	40%	40	0%	0
	Quizzes			5%	5
	Mid-term exam			30%	30
	sheets			5%	5
Final Exam		60%	60	60%	60
Total				100%	100

52. List of References

[1] D. M. Pozar; Microwave Engineering, 3rd Ed.; John Wiley & Sons Inc.
[2] Lehpamer, H; Microwave Transmission Network; McGraw-Hill Professional,2010
[3] Cameron, Richard J and Kudsia, Chandra M and Mansour; Microwave filters for communication systems; John Wiley \& Sons
[4] Merill Skolnik; Introduction to Radar Systems, 3rd Edition; Tata McGraw Hill
[5] East, Peter W; Microwave System Design Tools and EW Applications; Artech House;2008
[6] Saber. M. Aly, Electromagnatic Waves Engineering, 2015.
[7] Micheal steer, Microwave and RF Design Transmission Lines, NC State University,2019

53. Facilities required for teaching and learning

Lecture/Classroom
White board
Data show

54. Matrix of Course Content with Course LO's

No.	Topics	Aim	CLO's
1	Introduction to Electromagnetics waves	2	CLO.1, CLO.3, CLO.2
2	Transverse Elecromagantiec waves along a parallel palte Transmission line	2,1	CLO.1, CLO.3, CLO.2
3	General Transmission Line Equations	2	CLO.1, CLO.3, CLO.2
4	Tl as circuit Elements	2,1	CLO.1, CLO.3, CLO.2
5	Analytical method of TL solution	2	CLO.25, CLO.26 ,CLO.1, CLO.3, CLO.2
6	Transient on TL	1	CLO.1, CLO.3
7	Mid Term Exam	2,1	CLO.26, CLO.25 ,CLO.1, CLO.3, CLO.2
8	Pulse Excition on TL	1	CLO.3, CLO.2
9	The Smith Chart	1	CLO.1, CLO.3
10	Trasnsmssion Impdence Matching	1	CLO.1, CLO.3, CLO.2
11	General wave behaviours	1	CLO.1, CLO.3, CLO.2
12	Parallel plate WaveGuide	1	CLO.25, CLO.26, CLO.1, CLO.3,
13	Rectangular Waveguide, Circular Waveguide	1	CLO.1, CLO.3,CLO.25, CLO.26
14	Practical exam		
15	Final exam		

55. 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.
PL14	Estimate and measure the performance of an electrical/electronic/digital system and circuit under specific input excitation and evaluate its suitability for a specific application.	CL.25	Estimate the performance of an electrical/electronic/digital system and circuit under specific input excitation and evaluate its suitability for a specific application.
		CL.26	Measure the performance of an electrical/electronic/digital system and circuit under specific input excitation and evaluate its suitability for a specific application.

Title	Name	Signature
Course coordinator	**Assoc. Prof. Ahmed Fawzy**	
Head of Department	**Assoc. Prof. Ahmed Fawzy**	
Date of Approval	**16/09/2024**	

Course Specification

Course Code: HUM 3204 **Course Title:** Feasibility study and project management

56. Basic information

Program Title	Electronic and communication Engineering Department			
Department offering the program	Electronic and communication Engineering Department			
Department offering the course	Engineering Mathematics and Physics department			
Course Code	HUM 3204			
Prerequisites	None			
Year/level	Third year / first Semester (4th level)			
Specialization	**Minor**			
Teaching Hours	Lectures	Tutorial	Practical	Total
	2	2	0	4

57. Course Aims

No.	Aim
1	Identify the project management methods, and efficiently utilize available resources and learn design management techniques. And Manage time efficiently by assigning specific tasks within designated time schedules to accomplish work within the specified deadlines .(AM6)

58. Learning Outcomes (LOs)

CLO4	Develop appropriate to analyze different types for planning projects and identify the productivity and types of costs.
CLO14	Use creative, innovative, and flexible thinking and acquire entrepreneurial and leadership skills to analyze the types of tenders and contracts to explain quality control and safety

4-Course contents	
Topics	**Week**
Introduction to project management	1
Review of statistics	2
Probabilistic time estimate	3
Time crashing	4
Production cost	5
Material requirement planning	6
Supply and demand theory	8
Cost concepts and design economics	9
Fore casting	10
Bonds	11
Financial decision making	12
Production management	13
revision	14
Final Exam	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 simulations	Site Visits	Presentation	Discussion
CLO4	√	√			√			√				
CLO14	√	√			√			√				

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 / Sheets	CLO4,CLO14
2	Quizzes	CLO4,CLO14
3	Mid-term Exam	Clo4
4	Final Exam	CLO4,CLO14

7.2 5Assessment Schedule

No.	Assessment Method	Weeks
1	Reports / Sheets	Biweekly
2	Quizzes	Biweekly
3	Mid-term Exam	7
4	Final Exam	15

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

8. List of References

1. Krishnamurthy & Ravindra, (2017), Construction And Project Management, Second edition (PB 2017).
[2] Gould, Frederick E., and Nancy Nancy Eleanor Joyce, (2003), Construction Project Management, publisher: Pearson Prentice Hall, Third edition.https://lccn.loc.gov/2008007792/
[3] NUNNALLY and Stephens, (2007). Construction Methods and Management, publisher: Prentice Hall, eighth edition. https://lccn.loc.gov/00039179/
[4] Keith Potts and Ankrah Nii (2014). Construction cost management: learning from case studies. Routledge, 2014

9. Facilities required for teaching and learning

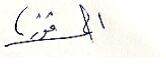
Lecture/Classroom
White board
Lecture room equipped with e-learning tools (computer, internet, mike, headphones, etc.)

10. Matrix of Course Content with Course LO's

Topics	Aim	LO's
Introduction to project management	1	CLO4
Review of statistics	1	CLO4
Probabilistic time estimate	1	CLO4
Time crashing	1	CLO4
Production cost	1	CLO4,CLO14
Material requirement planning	1	CLO4,CLO14
Mid Term	1	CLO4
Supply and demand theory	1	CLO4,CLO14
Cost concepts and design economics	1	CLO4,CLO14
Fore casting	1	CLO4,CLO14
Bonds	1	CLO4,CLO14
Financial decision making.	1	CLO4,CLO14
Production management	1	CLO4,CLO14
revision	1	CLO4,CLO14
Final Exam	1	CLO4,CLO14

11. Matrix of Program LOs with Course LOs

Program LOs		Course LOs	
PL2	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 to analyze different types for planning projects and identify the productivity and types of costs.
PL9	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 and acquire entrepreneurial and leadership skills to analyze the types of tenders and contracts to explain quality control and safety

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

Course Specification

Course Code: ECE 3201 **Course Title: Communication System II**

1. Basic information

Program Title	Electronics and Communication Engineering.			
Department offering the program	Electronics and Communication Engineering Depart.			
Department offering the course	Electronics and Communication Engineering Depart.			
Course Code	ECE 3201			
Prerequisite	ECE 3101			
Year/level	Third year / Second Semester (2^{st} Semester)			
Specialization	**Major**			
Prerequired Course	ECE 3101			
Teaching Hours	Lectures	Tutorial	Practical	Total
	3	2	0	5

2. Course Aims

No.	Aim
1	Identify, formulate, and solve complex electric communications problems by applying electric engineering fundamentals, basic science, and mathematics. (AM1)
2	Use appropriate mathematical methods or IT tools for modelling and analyzing electronic and communication systems. (AM5)

3. Learning Outcomes (LOs)

CLO.20	Design, an electrical/electronic/digital system or component for a specific application; and identify the tools required to optimize this design.
CLO.21	Model an electrical/electronic/digital system or component for a specific application; and identify the tools required to optimize this design.
CLO.28	Use appropriate mathematical methods or IT tools for modeling

4. Course Contents

Topics	Week
Analog to Digital, Necessity of Digitization, and Types of Signals.	1
Elements of Digital Communication, Input/output Transducer, source Encoder, channel Encoder, Digital Modulator, source Decoder, channel decoder, and Digital Demodulator.	2
Basic Elements of Pulse code modulation PCM, Encoding, and reconstruction.	3
Sampling process, and its different types. Sampling rate, and Nyquist rate. Sampling Theorem.	4
Quantization process, and quantization error. COMPANDING techniques.	5
Differential Pulse code modulation (DPCM). DPCM Transmitter, Delta Modulation/ Demodulation, and Adaptive Delta modulation/ demodulation.	6
Midterm Exam	7
Multiplexing systems. Frequency division multiplexing, Time division multiplexing, and Quadratic-carrier modulation/multiplexing.	8
Pulse width modulation signal generation, and PWMS Demodulation.	9
Pipeline Photography black and white screens. And, Transmitter and receivers for the black and white TV and its circuits.	10
Black and white TV Screen, Color TV screen and signals.	11
Encoders colored television systems (PAL \ SECAM\NTSC). And, transmitter and receivers for the colored TV.	12
High-Definition TV, Data compression, and transmission.	13
Revision	14
Final Term	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 simulations	Site Visits	Presentation	Discussion
CLO.1	√	√		√								
CLO.2	√	√		√								
CLO.28	√	√		√			√					√

6. Teaching and Learning methods of Disabled Students

No.	Teaching Method	Reason
1	Additional Tutorials	√

7. Students' Assessment

7.1 Students' Assessment Method

No.	Assessment Method	LOs
1	Written exam	CLO.20, CLO.21
2	Quizzes and reports	CLO.20, CLO.21
5	Project applied on a practical field problem	CL.20, CL.21, CLO.28
9	Self-Learning	CLO.28

7.2 Assessment Schedule		
No.	**Assessment Method**	**Weeks**
1	Attendance	Weekly
2	Reports / Sheets	Bi-weekly
3	Quizzes	4 & 10
4	Mid-term Exam	7
5	Final Exam	15

7.3 Weighting of Assessments					
	Assessment Method	**Weights%**	**Weights**	**Weights%**	**Weights**
Teacher Opinion	Reports / sheets / Activities	%10	40	%10	10
	Attendance	%10		%10	10
	Quiz 1 / Quiz 2	%10		%10	10
	Mid-term exam	%10		%10	10
Final Exam		%60	60		60
Total		%100	100		100

8. List of References

[1] Haykin, "COMMUNICATION SYSTEMS", 4TH ED, 2006.
[2] Couch, "Digital and Analog Communication Systems", Seventh Edition ©2007.
[3] Kennedy & Davis, "Electronic Communication System", 4th Edition 1992.
[4] Sunil Bhooshan, "Fundamentals of Analogue and Digital Communication Systems", 2022

9. Facilities required for teaching and learning

Lecture/Classroom
White board
Data show

10. Matrix of Course Content with Course LO's

No.	Topics	Aim	LO's
1	Analog to Digital, Necessity of Digitization, and Types of Signals.	1	CLO.20, CLO.21
2	Elements of Digital Communication, Input/output Transducer, source Encoder, channel Encoder, Digital Modulator, source Decoder, channel decoder, and Digital Demodulator.	1	CLO.20, CLO.21
3	Basic Elements of Pulse code modulation PCM, Encoding, and reconstruction.	1, 2	CLO.20, CLO.21
4	Sampling process, and its different types. Sampling rate, and Nyquist rate. Sampling Theorem.	1	CLO.20, CLO.21
5	Quantization process, and quantization error. COMPANDING techniques.	1	CLO.20, CLO.21
6	Differential Pulse code modulation (DPCM). DPCM Transmitter, Delta Modulation/ Demodulation, and Adaptive Delta modulation/ demodulation.	1, 2	CLO.20, CLO.21, CLO.28
7	**Midterm Exam**	1	CLO.20, CLO.21
8	Multiplexing systems. Frequency division multiplexing, Time division multiplexing, and Quadratic-carrier modulation/multiplexing.	1	CLO.20, CLO.21
9	Pulse width modulation signal generation, and PWMS Demodulation.	1, 2	CLO.20, CLO.21
10	Pipeline Photography black and white screens. And, Transmitter and receivers for the black and white TV and its circuits.	1	CLO.20, CLO.21
11	Black and white TV Screen, Color TV screen and signals.	1	CLO.20, CLO.21
12	Encoders colored television systems (PAL \ SECAM\NTSC). And, transmitter and receivers for the colored TV.	1	CLO.20, CLO.21
13	High-Definition TV, Data compression, and transmission.	1	CLO.20, CLO.21
14	Revision	1	CLO.20, CLO.21
15	Final Term		

11. Matrix of Program LOs with Course Los

Program LOs		Course LOs	
PL.12	Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science, and mathematics.	CLO.20	Design, an electrical/electronic/digital system or component for a specific application; and identify the tools required to optimize this design.
		CLO.21	Model an electrical/electronic/digital system or component for a specific application; and identify the tools required to optimize this design.
PL.16	Use appropriate mathematical methods or IT tools for modeling and analyzing electronic and communication systems.	CLO.28	Use appropriate mathematical methods or IT tools for modeling

Title	Name	Signature
Course coordinator	**Dr. Osama Elmowafy**	
Head of Department	**Assoc. Prof. Dr. Ahmed Fawzy**	
Date of approval	**16 /9/2024**	

Course Specification

Course Code: ECE 3202 **Course Title: Measurements and Electronics Testing(2)**

1. Basic information

Program Title	Electronics and Communication Engineering Depart.			
Department offering the program	Electronics and Communication Engineering Depart.			
Department offering the course	Electronics and Communication Engineering Depart.			
Course Code	ECE 3202			
prerequisite	----			
Year/level	Third year / Second Semester (2nd Semester)			
Specialization	**Major**			
Teaching Hours	Lectures	Tutorial	Practical	Total
	2	1	1	4

2. Course Aims

No.	Aim
1	Acquire the required skills to perform laboratory and field experiments and interpret their results (AM4)

3. Learning Outcomes (LOs)

CL.1	Understand the concepts of Communication systems and evaluate various electrical systems
CL.2	Develop and conduct appropriate experimentation to solve technical problems related to communication system.
CL.3	Use the appropriate tools and equipment in the communication system to measure system performance and analyze the results correctly
CL.4	Analyze and discuss the results of the experiment correctly

4. Course Contents

No.	Topics	Week
1	BJT characteristic behavior	1
2	OP-AMP applications (inverters)	2

3	OP-AMP applications (non-inverters)	3
4	. OP-AMP applications(subtraction)	4
5	OP-AMP applications (Adder)	5
6	Logic Family	6
7	Mid Term Exam.	7
8	J-FET characteristics behavior	8
9	MOS-FET Characteristics	9
10	Filters characteristics (LPF)	10
11	Filters characteristics (HPF)	11
12	OP-AMP applications (integration)	12
13	OP-AMP applications (differential)	13
14	**Practical Exam**	14
15	Final Exam	15

5. Teaching and Learning methods

Course learning Outcomes	Teaching and Learning Methods

(LOs)	Interactive lectures	Tutorials	Practical	Projects	Assignment	Research\reports	Self-Learning	Brain Storming	Modeling and simulations	Site Visits	Presentation	Discussion
CL.1	√										√	
CL.2					√	√	√					√
CL.3		√	√	√								
CL.4		√	√	√								

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	-------
2	Reports / Sheets	CL.1, CL.2
3	Quiz 1 / Quiz 2	---------
4	Mid-term Exam	CL.1, CL.2
5	Oral/ Practical Exam	CL.3, CL.4
6	Final Exam	CL.1, CL.2

7.2 Assessment Schedule

No.	Assessment Method	Weeks
1	Attendance	Weekly
2	Reports / Sheets	5,11,13
3	Quiz 1 / Quiz 2	------
4	Mid-term Exam	7

5	Oral/ Practical Exam	14
6	Final Exam	15

7.3 Weighting of Assessments

	Assessment Method	Weights%	Weights	Weights%	Weights
Teacher Opinion	Reports / sheets / Activities	يتم وضع نسبة مئوية للدرجة من اجمالي درجة المقرر	درجة اعمال السنة	10%	درجة البند
	Attendance				
	Quiz 1 / Quiz 2			------	
	Mid-term exam			0%	
Practical / Oral	Practical Attendance				
	Lab. Reports			10%	
	Lab. Activities / Projects			20%	
	Final oral / practical exam			20%	
Final Exam				40%	
Total				100%	

8. List of References

[1] Communication Lab Kit experiment Book.

9. 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
Laboratory Usage

10. Matrix of Course Content with Course LO's

No.	Topics	Aim	LO's
1	BJT characteristic behavior	1	CL.1, CL.3, CL.4
2	OP-AMP applications (inverter s)	1	CL.1, CL.1
3	OP-AMP applications (non-inverters)	1	CL.1, CL.3, CL.4
4	. OP-AMP applications(subtraction)	1	CL.1, CL.3, CL.4
5	OP-AMP applications (Adder)	1	CL.1, CL.3, CL.4
6	Logic Family	1	CL.1, CL.2

7	Mid Term Exam.	1	CL.1, CL.2
8	J-FET characteristics behavior	1	CL.1, CL.2
9	MOS-FET Characteristics	1	CL.1, CL.3, CL.4
10	Filters characteristics (LPF)	1	CL.1, CL.3, CL.4
11	Filters characteristics (HPF)	1	CL.1, CL.3, CL.4
12	OP-AMP applications (integration)	1	CL.1, CL.2
13	OP-AMP applications (differential)	1	CL.1, CL.2
14	**Practical Exam**		
15	**Final Exam**		

11. Matrix of Program Los with Course Los

Program Los		Course Los	
PLO.2	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	CL.1	Understand the concepts of Communication systems and evaluate various electrical systems
		CL.2	Develop and conduct appropriate experimentation to solve technical problems related to communication system.
PLO.18	Use the appropriate tools and equipment to measure system performance and analyze the results correctly	CL.3	Use the appropriate tools and equipment in the communication system to measure system performance and analyze the results correctly
		C3.2	Analyze and discuss the results of the experiment correctly

Title	Name	Signature
Course coordinator	**Dr. Osama Elmowafy**	Osama Elmowafy
Head of Department	**Ass. Prof. Ahmed Fawzy**	
Date of Approval		**16/09/2023**

Course Specification

Course Code: ECE 3203 **Course Title: Opto-Electronics**

12. Basic information

Program Title	Electronics and Communication Engineering Depart.			
Department offering the program	Electronics and Communication Engineering Depart.			
Department offering the course	Electronics and Communication Engineering Depart.			
Course Code	ECE 3203			
Prerequisite	ECE 1211			
Year/level	Third year / Second Semester (2nd Semester)			
Specialization	**Major**			
Teaching Hours	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)

CLO.8	Explain the concept of optoelectronics with discussing its theories and applications
CLO.12	How to steer a circuit? Function efficiently as an individual and as a member of multi-disciplinary and multi- cultural teams.

15. Course Contents

Topics	Week
Introduction to Optoelectronics.	1
Properties of Light.	2

Wave matter interaction.	3
Einstein Coefficient prove.	4
Light Amplification for Stimulated Emission (LASER)	5
Fabri Perot Resonator	6
Midterm	7
Comb Drive Actuator.	8
Optical Cavity	9
External Cavity Tunable Laser.	10
Temporal Coherence and Spatial Coherence.	11
Project discussion.	12
Discussing, presenting and test the project.	13
Practical Exams	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
CLO.8	√		√	√						√		
CLO.12		√				√	√				√	

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	CLO.8, CLO.12
2	Assignments	CLO.8, CLO.12

7.2 Assessment Schedule

No.	Assessment Method	Weeks
1	Attendance	Weekly
2	Reports / Sheets	Bi-weekly
3	Quiz	4 & 10
4	Mid-term Exam	7
5	Oral/ Practical Exam	14
6	Final Exam	15

7.3 Weighting of Assessments

	Assessment Method	Weights%	Weights	Weights%	Weights
Teacher Opinion	Reports / sheets / Activities	35%	35	10%	10
	Attendance			0%	0
	Quiz			5%	5
	Mid-term exam			20%	20

Practical / Oral	Practical Attendance	5%	5		
	Lab. Reports				
	Lab. Activities / Projects			5%	5
	Final oral / practical exam				
Final Exam				60%	60
Total				100%	100

19. List of References

[1] S. O. Kasap, "Optoelectronics and Photonics: Principles and Practices," SECOND EDITION, 2013
[2] Sedra/Smith Microelectronic Circuits, Seventh Edition, Adel S. Sedra university of Waterloo, Kenneth C. Smith university of Toronto, 2015
[3] Kumar, "Principles Of Optical Communications & Opto Electronics", SECOND EDITION, 2007.
[4] Yeh, "Photonics Optical Electronics in Modern Communications", SIXTH EDITION, 2007.

20. 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

21. Matrix of Course Content with Course LO's

No.	Topics	Aim	LO's
1	Introduction to Optoelectronics.	1	CLO.8
2	Properties of Light.	1	CLO.8
3	Wave matter interaction.	1	CLO.8
4	Einstein Coefficient prove.	1	CLO.8
5	Light Amplification for Stimulated Emission (LASER)	1	CLO.8
6	Fabri Perot Resonator	1	CLO.8
8	Optical Cavity	1	CLO.8
9	Comb Drive Actuator.	1	CLO.8
10	External Cavity Tunable Laser.	1	CLO.8
11	Temporal Coherence and Spatial Coherence.	1	CLO.8
12	Project discussion.	1	CLO.12
13	Discussing, presenting and test the project.	1	CLO.12

22. Matrix of Program LOs with Course Los

Program LOs		Course Los	
PL7	Practice research techniques and methods of investigation as an inherent part of learning.	CLO.8	Explain the concept of optoelectronics with discussing its theories and applications.
PL5	Function efficiently as an individual and as a member of multi-disciplinary and multi-cultural teams.	CLO.12	How to steer a circuit? Function efficiently as an individual and as a member of multi-disciplinary and multi- cultural teams.

Title	Name	Signature
Course coordinator	**Assoc. Prof. Dr. Ahmed Fawzy**	
Head of Department	**Assoc. Prof. Dr. Ahmed Fawzy**	
Date of Approval	**16/09/2024**	

Course Specification

Course Code: ECE 3204 **Course Title: Electronic Circuit (2)**

23. Basic information

Program Title	Electronics and Communication Engineering Depart.			
Department offering the program	Electronics and Communication Engineering Depart.			
Department offering the course	Electronics and Communication Engineering Depart.			
Course Code	ECE3204			
Prerequisite	ECE2111			
Year/level	Third year / Second Semester (2nd Semester)			
Specialization	**Major**			
Teaching Hours	Lectures	Tutorial	Practical	Total
	4	2	0	6

24. Course Aims

No.	Aim
1	Analyse and solve electronic circuits based on specific application (AM3)

25. Learning Outcomes (LOs)

CLO.22	Analyze an electronic system
CLO.21	Model an electronic system for a specific application.

26. Course Contents

Topics	Week
Frequency response of BJT amplifiers: Introduction and frequency response of C.E amplifier	1

Frequency response of BJT amplifiers: frequency response of C.C and C.B amplifiers.	2
Frequency response of MOSFET amplifiers	3
Power amplifiers: Class A amplifiers	4
Power amplifiers: Class B amplifiers, Class C and D amplifiers	5
Negative Feedback amplifiers Configurations, Feedback gain. input and output impedance	6
Midterm Exam	7
Negative Feedback amplifiers: Voltage-series Configuration, Voltage-shunt Configuration, examples	8
Negative Feedback amplifiers: Current-series Configuration, current-shunt Configuration, examples	9
Power Supply:Parallel,Series, Feedback Full power supply	10
Oscillators: positive feedback basics, Wien bridge	11
Oscillators: Phase Shift oscillator, Colpits, Hartly	12
Nanometer design	13
Practical Exams	14
Final Exams	15

27. 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
CLO.22	√	√			√				√			
CLO.21	√	√			√							

28. Teaching and Learning methods of Disabled Students

No.	Teaching Method	Reason
1	Additional tutorials	√

29. Students' Assessment

7.1 Students' Assessment Method

No.	Assessment Method	LOs
1	Written exam	CLO.22, CLO.21
2	Simulation	CLO.22
7	Assignments	CLO.22, CLO.21

7.2 Assessment Schedule

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

7.3 Weighting of Assessments

	Assessment Method	Weights%	Weights	Weights%	Weights

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

30. List of References

[1] B. Razavi, "Fundamentals of Microelectronics," third edition, 2021.
[2] T. L. Floyd, "Electronic devices: electron flow version", 9th edition ed., New Jersey: Prentice Hall, 2012.

31. Facilities required for teaching and learning

Lecture
White board

32. Matrix of Course Content with Course LO's

No.	Topics	Aim	LO's
1	Frequency response of BJT amplifiers: Introduction and frequency response of C.E amplifier	1	CLO.22
2	Frequency response of BJT amplifiers: frequency response of C.C and C.B amplifiers.	1	CLO.22
3	Frequency response of MOSFET amplifiers	1	CLO.22
4	Power amplifiers: Class A amplifiers	1	CLO.21
5	Power amplifiers: Class B amplifiers, Class C and D amplifiers	1	CLO.21
6	Negative Feedback amplifiers Configurations, Feedback gain. input and output impedance	1	CLO.22
7	Midterm Exam		
8	Negative Feedback amplifiers: Voltage-series Configuration, Voltage-shunt Configuration, examples	1	CLO.22
9	Negative Feedback amplifiers: Current-series Configuration, current-shunt Configuration, examples	1	CLO.22
10	Power Supply:Parallel,Series, Feedback Full power supply	1	CLO.22
11	Oscillators: positive feedback basics, Wien bridge	1	CLO.22
12	Oscillators: Phase Shift oscillator, Colpits, Hartly	1	CLO.22
13	Nanometer design	1	CLO.21

33. 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.	CLO.22	Analyze an electronic system
		CLO.21	Model an electronic system for a specific application.

Title	Name	Signature
Course coordinator	**Dr. Amira Nabil**	Amira Nabil
Head of Department	**Ass. Prof. Ahmed Fawzy**	
Date of Approval	**16/09/2024**	

Course Specification

Course Code: ECE 3261 **Course Title:** Microprocessors and Applications

34. Basic information

Program Title	Communication and Electronics Engineering.			
Department offering the program	Communication and Electronics Engineering Depart.			
Department offering the course	Communication and Electronics Engineering Depart.			
Course Code	ECE 3261			
Prerequisite	----			
Year/level	Fourth year / Second Semester (2nd Semester)			
Specialization	**Major**			
Prerequired Course	----			
Teaching Hours	Lectures	Tutorial	Practical	Total
	3	2	0	5

35. Course Aims

No.	Aim
1	Understand of design and implementation of optimum microprocessor /microcontroller circuit used for general control (AM3)
2	Use creative, innovative and flexible thinking for find solutions of robotics and machine controls. (AM3)

36. Learning Outcomes (LOs)

CLO.27	Adopt suitable national and international standards and codes to design, build, operate, inspect, and maintain electrical/electronic/digital equipment, systems and services.
CLO.30	Practice computer programs for the design and diagnostics of digital and analog communication, mobile communication, coding and decoding systems

37. Course Contents

Topics	Week
The Structure of Microprocessor and microcomputer.	1
Arduino boards types as examples of microcontroller.	2

Arduino programing pins assignments and functions.	3
Analog input and digital input/outputs pins.	4
Pull-down input and pull-up outputs concept and applications.	5
Arduino microcontroller instruction sets.	6
Arduino microcontroller instruction sets. ...continue.	7
Midterm	8
Arduino - Data Types, and, Arduino - Variable Scope.	9
Pulse width modulation pins control.	10
Different types of Loops. And If/ switch control code.	11
Servo motor control, Rs232 Communication	12
Microcontroller communications protocols USAC, SPI.	13
Revision	14
Final Exam	15

38. 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
CLO.27	√	√		√								
CLO.30	√	√		√								√

39. Teaching and Learning methods of Disabled Students

No.	Teaching Method	Reason
1	Additional Tutorials	√

40. Students' Assessment

7.1 Students' Assessment Method		
No.	**Assessment Method**	**LOs**
1	Written exam	CLO.27, CLO.30
2	Quizzes and reports	CLO.27, CLO.30
3	Oral exams	
4	Practical	
5	Project applied on a practical field problem	CLO.27, CLO.30
6	Presentation	
7	Assignments	
8	Researches	
9	Self-Learning	
10	Simulations	

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

7.3 Weighting of Assessments					
	Assessment Method	**Weights%**	**Weights**	**Weights%**	**Weights**
Teacher Opinion	Reports / sheets / Activities	%10	40	%10	10
	Attendance	%10		%10	10
	Quiz 1 / Quiz 2	%10		%10	10
	Mid-term exam	%10		%10	10
Final Exam		%60	60		60
Total		%100	100		100

41. List of References

[1] Dhanapal, "Microprocessor & Its Applications", 2010.
[2] Muhammad El.Saba, "Introduction To Microcontrollers & Embedded Systems" 2017.
[3] Giuliano Donzellini, "Introduction to Microprocessor-Based Systems Design", 2022

42. Facilities required for teaching and learning

Lecture/Classroom
White board
Data show

43. Matrix of Course Content with Course LO's

No.	Topics	Aim	LO's
1	The Structure of Microprocessor and microcomputer.	1	CLO.27
2	Arduino boards types as examples of microcontroller.	1	CLO.27
3	Arduino programing pins assignments and functions.	1	CLO.27
4	Analog input and digital input/outputs pins.	1, 2	CLO.27
5	Pull-down input and pull-up outputs concept and applications.	1	CLO.27
6	Arduino microcontroller instruction sets.	1	CLO.27
7	Arduino microcontroller instruction sets. ...continue.	1	CLO.27
8	Midterm	1	CLO.27
9	Arduino - Data Types, and, Arduino - Variable Scope.	1	CLO.27
10	Pulse width modulation pins control.	1	CLO27, CLO.30
11	Different types of Loops. And If/ switch control code.	1	CLO.27
12	Servo motor control, Rs232 Communication	1	CLO.27
13	Microcontroller communications protocols USAC, SPI.	1, 2	CLO27, CLO.30
14	Revision	1	CLO27
15	Final Exam		

44. Matrix of Program LOs with Course Los

Program LOs		Course Los	
PLO.15	Understand of design and implementation of optimum microprocessor /microcontroller circuit used for general control	CLO.27	Adopt suitable national and international standards and codes to design, build, operate, inspect, and maintain electrical/ electronic/ digital equipment, systems and services.
PLO.17	Use creative, innovative and flexible thinking for find solutions of robotics and machine controls	CLO.30	Practice computer programs for the design and diagnostics of digital and analog communication, mobile communication, coding and decoding systems

Title	Name	Signature
Course coordinator	**Dr. Osama Elmowafy**	
Head of Department	**Associate Prof. Dr. Ahmed Mohamed Fawzy**	
Date of Approval	**16/9/2024**	

Course Specification

Course Code: ECE3262 **Course Title: Digital signal processing**

45. Basic information

Program Title	Electronics and Communication Engineering Depart.			
Department offering the program	Electronics and Communication Engineering Depart.			
Department offering the course	Electronics and Communication Engineering Depart.			
Course Code	ECE 3262			
Prerequisites	----			
Year/level	Fourth year / Second Semester (2st Semester)			
Specialization				
Teaching Hours	Lectures	Tutorial	Practical	Total
	3	1		4

46. Course Aims

No.	Aim
1	Understand Digital Filter Design, Adaptive Digital Filters, Speech Encoders, Image Processing (AM3).

47. Learning Outcomes (LOs)

CLO.20	Design, an electrical/electronic/digital system or component for a specific application; and identify the tools required to optimize this design.
CLO.21	Model an electrical/electronic/digital system or component for a specific application; and identify the tools required to optimize this design.

48. Course Contents

Topics	Week
Digital Filter Design	1

Microfilter Response	2
Infinite Impulse Response	3
Adaptive Digital Filters: Basic Concepts Algorithms	4
Adaptive Digital Filters: Applications	5
Adaptive Digital Filters: Applications	6
Midterm exam	7
Speech Encoders: Speech Signal Analysis	8
Speech Encoders: Waveform Encoders	9
Speech Encoders: Audio Encoders	10
Hybrid Encoders Image Processing: Image encoding and decoding	11
Hybrid Encoders Image Processing: Image Enhancement and Compression	12
Advanced Image Compression	13
Practical Exams	14
Final Exams	15

49. 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
CLO.20	√	√		√		√						
CLO.21	√	√		√		√						

50. Teaching and Learning methods of Disabled Students

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

51. Students' Assessment

7.1 Students' Assessment Method

No.	Assessment Method	Los
1	Written exam	CLO.20
2	Quizzes and reports	CLO.20, CLO.21
3	Oral exams	
4	Practical	
5	Project applied on a practical field problem	CLO.21
6	Presentation	
7	Assignments	CLO.20, CLO.21
8	Researches	CLO.20, CLO.21
9	Self-Learning	
10	Simulations	

7.2 Assessment Schedule

No.	Assessment Method	Weeks
1	Attendance	Weekly
2	Reports / Sheets	Weekly
3	Quiz 1 / Quiz 2	
4	Mid-term Exam	7
5	Oral/ Practical Exam	
6	Final Exam	15

7.3 Weighting of Assessments

	Assessment Method	Weights%	Weights	Weights%	Weights
Teacher Opinion	Reports / sheets / Activities	%40	40	%10	10
	Attendance			0%	0
	Quizes			15%	10
	Mid-term exam			20%	20
Final Exam		%60	60		
Total		100	100		

52. Facilities required for teaching and learning

Lecture
White board
Data show

53. List of References

54. Matrix of Course Content with Course LO's

No.	Topics	Aim	LO's
1	Digital Filter Design	1	CLO.20
2	Microfilter Response	1	CLO.20
3	Infinite Impulse Response	1	CLO.20, CLO.21
4	Adaptive Digital Filters: Basic Concepts Algorithms	1	CLO.20
5	Adaptive Digital Filters: Applications	1	CLO.20, CLO.21
6	Adaptive Digital Filters: Applications	1	CLO.20
8	Speech Encoders: Speech Signal Analysis	1	CLO.20, CLO.21
9	Speech Encoders: Waveform Encoders	1	CLO.20

10	Speech Encoders: Audio Encoders	1	CLO.20
11	Hybrid Encoders Image Processing: Image Coding and decoding	1	CLO.20
12	Hybrid Encoders Image Processing: Image Enhancement and Compression	1	CLO.20
13	Image convolution filters	1	CLO.20

55. Matrix of Program LOs with Course Los

Program LOs		Course Los	
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, an electrical/electronic/digital system or component for a specific application; and identify the tools required to optimize this design.
		CLO.21	Model an electrical/electronic/digital system or component for a specific application; and identify the tools required to optimize this design.

Title	Name	Signature
Course coordinator		
Head of Department	**Ass. Prof. Ahmed fawzy**	
Date of Approval	**16/09/2024**	

Course Specification

Course Code: ECE 3263 **Course Title: Electromagnetic Waves applications**

56. Basic information

Program Title	Electronic and Communication Engineering			
Department offering the program	Electronic and Communication Engineering Depart.			
Department offering the course	Electronic and Communication Engineering Depart.			
Course Code	**ECE 3263**			
Prerequisite	--			
Year/level	Third year / second Semester (2nd Semester)			
Specialization	**Major**			
Teaching Hours	Lectures	Tutorial	Practical	Total
	2	2	0	4

57. Course Aims

No.	Aim
1	Identify, analyze, and solve practical problems, making use of appropriate engineering tools, programs and techniques. (AM3)
2	Identify the latest components and electronic devices, and become familiar with the technology of implementing electronic systems using these electronic components. (AM5)

58. Learning Outcomes (LOs)

CLO.25	Estimate the performance of an electrical/electronic/digital system and circuit under specific input excitation and evaluate its suitability for a specific application.
CLO.26	Measure the performance of an electrical/electronic/digital system and circuit under specific input excitation and evaluate its suitability for a specific application.
CLO.31	Use the appropriate tools and equipment to measure system performance

59. Course Contents

Topics	Week
Equivalent circuits for wave guides	1
input circuits, description of circuits	2

dispersion coefficients	3
excitation of guides, linking guides by gaps	4
passive devices, attenuated ends	5
angle shifters, directed linkage	6
Mid Term Exam	7
hybrid connections, resonance circuit theory	8
Fabry Pro and optical resonance	9
micrometric and optical measurements	10
optical power detection	11
microwave detection and measurement	12
wavelength measurement, fiber coefficient measurement	13
Practical exam	14
Final exam	15

60. 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
CLO.25	√	√				√	√					
CLO.26	√	√										
CLO.31			√				√					√

61. Teaching and Learning methods of Disabled Students

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

62. Students' Assessment

7.1 Students' Assessment Method

No.	Assessment Method	Los
1	Attendance	-------
2	Reports / Sheets	CLO.25, CLO.26, CLO.31
3	Quiz 1 / Quiz 2	CLO.25, CLO.26
4	Mid-term Exam	CLO.25, CLO.26
5	Oral/ Practical Exam	
6	Final Exam	CLO.25, CLO.26

7.2 Assessment Schedule

No.	Assessment Method	Weeks
1	Attendance	Weekly
2	Reports / Sheets	Bi-weekly
3	Quiz 1 / Quiz 2	5&11
4	Mid-term Exam	7
5	Oral/ Practical Exam	14
6	Final Exam	15

7.3 Weighting of Assessments

	Assessment Method	Weights%	Weights	Weights%	Weights
Teacher Opinion	Attendance	30%	30	0%	0
	Quizes			10%	10
	Mid-term exam			20%	20
Practical / Oral	Final oral / practical exam	10%	10	10%	10
Final Exam		60%	60	60%	60
Total				100%	100

63. List of References

[1] M. mandal and A. Asif "Continuous and discrete time signals and systems" Cambridge University Press, 2007.

64. Facilities required for teaching and learning

Lecture/Classroom
White board
Data show
Laboratory Usage

65. Matrix of Course Content with Course LO's

No.	Topics	Aim	LO's
1	Introduction to signals	2	CLO.25, CLO.26,
2	input circuits, description of circuits	2,1	CLO.25, CLO.26,
3	dispersion coefficients	2	CLO.25, CLO.26,
4	excitation of guides, linking guides by gaps	2,1	CLO.25, CLO.26,
5	passive devices, attenuated ends	2	CLO.25, CLO.26,
6	angle shifters, directed linkage	1	CLO.25, CLO.26,
7	Mid Term Exam		
8	hybrid connections, resonance circuit theory	1	CLO.25, CLO.26,
9	Fabry Pro and optical resonance	1	CLO.25, CLO.26,
10	micrometric and optical measurements	1	CLO.25, CLO.26,
11	optical power detection	1	CLO.25, CLO.26,

12	microwave detection and measurement	1	CLO.25, CLO.26,
13	wavelength measurement, fiber coefficient measurement	1	CLO.25, CLO.26,
14	Practical exam		CLO.25, CLO.26, CLO.31
15	Final exam		

66. Matrix of Program LOs with Course Los

Program LOs		Course Los	
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 and evaluate its suitability for a specific application.
		CLO.26	Measure the performance of an electrical/electronic/digital system and circuit under specific input excitation and evaluate its suitability for a specific application.
PL18	Use the appropriate tools and equipment to measure system performance and analyze the results correctly	CLO.31	Use the appropriate tools and equipment to measure system performance

Title	Name	Signature
Course coordinator		
Head of Department	**Assoc. Prof. Dr. Ahmed Fawzy**	
Date of Approval	**16/09/2024**	