فصول دراسية

Mathematics 1
(BAS011)

1- Basic Information:

Program Title	All programs
Department Offering the Program	Basic Science and Engineering Department
Department Responsible for the Course	Basic Science and Engineering Department
Course Title	Mathematics1
Course Code	BAS011
Year/Level	Level: 0
Specialization	Major
Authorization Date of Course Specification	-

Teaching hours	**Lectures**	**Lab.**	**Exercise**	**Contact**	**Student load**
	2	-	**2**	**4**	**4**

2- Course Aims

No.	Aims
1	Master a broad range of Mathematics engineering knowledge and specialized skills of Algebra and Calculus, as well as the ability to apply acquired knowledge of Algebra and Calculus in real-world situations by applying theories and abstract thinking in analytic critical and systemic thinking to identify, diagnose, and solve mathematical engineering problems of varying systems models.

3- Competencies:

Competencies	Learning Outcomes (LO'S)
A1. Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.	**1** Explain the relevant mathematical engineering principles and theories in the Algebra and Calculus. **2** Use the mathematical engineering principles and theories that apply in the most fundamental problems. **3** Explain the basic concepts of derivative and algebra.

4. Course Contents:

No.	Topics	Lecture	Tutorial	Practical
1	Algebra: vectors algebra - partial fractions - equations theo - vectors - mathematical deduction	4	4	-
2	numerical solutions methods (simple repetitive method - Newton and modified Newton's method	2	2	-
3	Intersection method - False position method - arrays - linear equations systems - Gauss Jordan method for deletion.	4	4	-

4	Derivation: function (definition - theories) - basic trigonometric functions and its inverse - exponential and logarithmic functions - hyperbolic functions and its inverse - connection (definition - theories) - limits (definition - theories) - derivatives (definition - theories - higher order types) - curves drawing - mathematical and engineering derivative applications	4	4	-
5	undefined formulas	4	4	-
6	The Taylor series	4	4	-
7	Maclaurin expansion	4	4	-
8	approximation - introduction in partial derivation.	2	2	-
Total		**28**	**28**	-

5. Teaching and learning methods:

Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab
Vectors - Vectors Algebra- partial fractions	X				X	X								
The Concept of functions	X				X	X								
Equation’s theory – Mathematical Deduction	X				X	X								
• Basic Trigonometric functions and its inverse • Exponential and Logarithmic functions • Hyperbolic functions and its inverse • Connection (definition – theories) • Maclaurin expansion The Taylor series	X				X	X								

Numerical solutions methods	X				X	X								
Limits, derivatives and curves drawing	X				X	X								
Introduction of Partial Derivatives	X				X	X								
Linear equations systems – Gauss Jordan method for deletion.	X				X	X								

6. Teaching and Learning Methods of Disable Students:

6.1. Teaching and Learning Methods of Disable Students:	
1	Additional Tutorials
2	Online lectures and assignments

6.2. Teaching and learning method for low capacity and outstanding Student	
For low capacity students	-Assign a portion of the office hours for those students. -Give them specific tasks. -Repeat the explanation of some of the material and tutorials. - Assign a teaching assistance to follow up the performance of these group of students
For outstanding Students	-Hand out project assignments to those students. -Give them some research topics to be searched using the internet and conduct presentation. Encourage them to take parts in the running research projects.

7**. Student Evaluation:**

7.1 Student Evaluation method:

No.	**Evaluation Method**	**Competencies**	**LO's**
1	Periodic exam	A1	1,2
2	Student load (quizzes, sheets, report)	A1	2
3	Final term examination	A1	1,2,3

7.2 Evaluation Schedule:

No.	**Evaluation Method**	**Weeks**
1	Periodic exam	8^{th}
2	Student load	7^{th} - 9^{th}
3	Final term examination	15^{th}

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	37.3%
2	Student load	2.7%
3	Final term examination	60%
Total		**100%**

8. List of References:

No.	Reference List
1	Richard W. Fisher "No-Nonsense Algebra, 2nd Edition" Math Essentials; 2nd edition (2020).
2	Sherman K. Stein " Calculus in the First Three Dimensions" Dover Publications; Second Edition, (2020).

9. Facilities required for teaching and learning:

Facility			
1	Lecture classroom	3	White board
2	Seminar	4	Data Show system

10. Matrix of Competencies and LO's:

No	Topic	Aims	A1		
			1	2	3
1	Algebra: vectors algebra - partial fractions - equations theory - vectors - mathematical deduction	1	x	x	
2	numerical solutions methods (simple repetitive method - Newton and modified Newton's method	1	x	x	
3	intersection method - False position method - arrays - linear equations systems - Gauss Jordan method for deletion.	1	x	x	
4	Derivation: function (definition - theories) - basic trigonometric functions and its inverse - exponential and logarithmic functions - hyperbolic functions and its inverse - connection (definition - theories) - limits (definition - theories) - derivatives (definition - theories - higher order types) - curves drawing - mathematical and engineering derivative applications	1	x	x	
5	undefined formulas	1	x	x	
6	The Taylor series	1		x	x
7	Maclaurin expansion	1		x	x
8	approximation - introduction in partial derivation.	1	x	x	

Course Coordinator: Dr / Reda Abdo
Head of Department: Asso.prof.Amal Bahiry
Date of Approval: 2023

Mechanics 1

(BAS012**)**

1- Basic Information:

Program Title	All programs
Department Offering the Program	Basic Science and Engineering Department
Department Responsible for the Course	Basic Science and Engineering Department
Course Title	Mechanics 1
Course Code	BAS012
Year/Level	Level: 0
Specialization	Major
Authorization Date of Course Specification	-

Teaching hours	**Lectures**	**Lab.**	**Exercise**	**Contact**	**Student load**
	2	-	**2**	**4**	**4**

2- Course Aims:

No.	Aims
1	Master a broad range of statics knowledge to apply it on force system, distributed forces and moment of inertia.
3	Use the techniques, skills, and current engineering tools required for engineering practice of Statics applications by taking full responsibility for one's own learning and development, participating in lifelong learning and consider the impact of statics study in real world, and its strong relation with environment and almost of all the technology fields upgrades.

3-Competencies:

Competencies	Learning Outcomes (LO'S)
A1. Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.	**1** Define concepts and theories of space vectors, momentums, equivalent couples, and equation of equilibrium for rigid body. **2** Recognize methodologies of solving equilibrium under the effect of forces. **3** Solve engineering problems, such as finding the center of mass (group of particles – flat surfaces).

4. Course Contents:

MNo.	Topics	Lectures	Tutorial	Practical
1	• Applications of space vectors • results of group of Forces • momentums	6	6	-
2	• equivalent groups • equations of equilibrium for rigid bodies	6	6	-
3	• Supports and pivots types • equilibrium under the effect of forces and the space couples	8	8	-

4	• center of mass (groups of particles - flat surfaces) • moment of inertia (mean axes- equal surfaces).	8	8	-
Total		**28**	**28**	**-**

5. Teaching and learning methods:

Topics	**Face-to-Face Lecture**	**Online Lecture**	**Flipped Classroom**	**Presentation and movies**	**Discussion**	**Problem solving**	**Brain storming**	**Projects**	**Site visits**	**Self-learning and Research**	**Cooperative**	**Discovering**	**Modeling**	**lab**
Introduction to statics. Fundamental concept Basic quantities of unit dimension- System of units Space, Trigonometry and U.S. Customary units, Force. Statics of particle, Statics of Rigid Body, Free body diagrams. Types of forces, Types of system of forces	**X**				**X**									
Statics of particles Forces on a particle, Addition of vectors, Resultant of several concurrent forces.	**X**					**X**								
Resolution of a forces into components Rectangular	**X**						**X**							

components of a forces, (unit vectors). Addition of forces by summing X and Y components. Equilibrium of a particle, and Newton's first law of motion.														
Problem involving the equilibrium of a practice- free body diagram. Rectangular components of a forces in space, force defined by its magnitude and two points on its line of action. Addition of concurrent forces in space, equilibrium of a particle in space.	**X**				**X**									
Rigid bodies: equivalent systems of forces. External and internal forces, principle of transmissibility and equivalent forces, vector product of two vectors, vector product expressed in terms of rectangular components	**X**				**X**	**X**								
Moment of a force about a point. Varignon's theorem, rectangular components of the moment of a force, equivalent systems of	**X**				**X**									

forces.														
Equilibrium of rigid bodies Free- body diagram. Equilibrium of a rigid body in two dimensions.	**X**				**X**									
Equilibrium of three-dimension force body. Reduction of a system of forces to one force and one couple. Equilibrium of a rigid body in three dimensions. Reactions at supports and connections for a two- dimensional and for a three-dimensional structure.	**X**					**X**								
Centroids and centers of gravity. Centre of gravity of a two- dimensional body, centroids of area and lines, first moments of areas and lines, composite plates and wires.	**X**				**X**	**X**								
Analysis of structures Definition of truss Simple trusses Analysis of trusses by the method of join	**X**				**X**									

6. Teaching and Learning Methods of Disable Students:

6.1. Teaching and Learning Methods of Disable Students:	
1	Additional Tutorials
2	Online lectures and assignments

6.2. Teaching and learning method for low capacity and outstanding Student	
For low capacity students	-Assign a portion of the office hours for those students. -Give them specific tasks. -Repeat the explanation of some of the material and tutorials. - Assign a teaching assistance to follow up the performance of these group of students
For outstanding Students	-Hand out project assignments to those students. -Give them some research topics to be searched using the internet and conduct presentation. Encourage them to take parts in the running research projects.

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Periodic exam	A1	1,2
2	Student load (quizzes, sheets, report)	A1	1,2
3	Final term examination	A1	1,2,3

7.2 Evaluation Shedule:

No.	Evaluation Method	Weeks
1	Periodic exam	8th
2	Student load	2nd -7th - 9th -14th
3	Final term examination	15th

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	36%
2	Student load	4%
3	Final term examination	60%
Total		**100%**

8. List of References:

No.	Reference List
1	M. Abdullah Al Faruque, Bahar Zoghi, Sylvester A. Kalevela “Engineering statics" 1st edition, CRC Press (2019).
2	Bogachev, V., Smolyanov, Oleg G. "Topological Vector Spaces and Their Applications" Springer International Publishing (2017).

9. Facilities required for teaching and learning:

No.	Facility
1	Lecture classroom
2	Seminar
3	White board
4	Data Show system

10. Matrix of Competencies and LO's:

No.	Topic	Aims	Competencies A1

			1	2	3
1	• Applications of space vectors • Results of group of Forces • momentums	1	x		
2	• Equivalent groups • Equations of equilibrium for rigid bodies	1	x		
3	• Supports and pivots types • Equilibrium under the effect of forces and the space couples	3			x
4	• Center of mass (groups of particles – flat surfaces) • Moment of inertia (mean axes-equal surfaces).	3		x	

Course Coordinator: Dr / Moataz Mostafa
Head of Department: Asso.prof.Amal Bahiry
Date of Approval: 2023

Physics1
(BAS013**)**

1- Basic Information:

Program Title	All programs
Department Offering the Program	Basic Science and Engineering Department
Department Responsible for the Course	Basic Science and Engineering Department
Course Title	Physics1
Course Code	BAS013
Year/Level	level 0
Specialization	Major
Authorization Date of Course Specification	-

Teaching hours	**Lectures**	**Lab.**	**Exercise**	**Contact**	**Student load**
	3	2	**2**	**6**	**4**

2- Course Aims:

No.	**Aims**
1	Mastery of a broad range of engineering physics knowledge and specialized skills, as well as the ability to apply acquired knowledge in real-world situations by applying theories in critical and systemic analytical thinking to identify, diagnose, and solve engineering

	problems of varying complexity and variance.
4	Use the experimental techniques, skills, and current engineering tools required for engineering practice by taking full responsibility for one's own learning and development, participating in lifelong learning, and demonstrating the ability to pursue postgraduate and research studies.

3- Competencies :

Competencies	Learning Outcomes (LO'S)
A1. Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.	**1** Explain concepts and theories of mathematics for physical quantities, unit's dimensional analysis, and basics of thermodynamics. **2** Recognize methodologies of solving problems for stress-strain diagram, and fluids study. **3** Select the appropriate solutions for properties of materials through Brittle and Ductile material.
A2. 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.	**1** Describe quality assurance systems, codes of practice and standards, health and safety requirements, and environmental issues.
A3 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.	1. Collaborate effectively within multidisciplinary team. 2. Work in stressful environment and within constraints.
A6. Plan, supervise and monitor implementation of engineering projects, taking into consideration other trades requirements.	1 Conduct troubleshooting in chemical engineering plants.

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	Material properties - Physical quantities - Standard units and dimensions	4	4	2
2	frequency motion, mechanical properties for materials - fluid properties	4	4	2
3	viscosity - surface tension - sound waves - waves in elastic media.	4	4	2

4	Heat and thermodynamics: heat transfer - Gas motion theory	2	2	4
5	First law of thermodynamics - entropy and second law of thermodynamics	4	4	4
6	temperature measurements and thermometers.	2	2	6
Total		**28**	**28**	**28**

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab
1	Physics and Measurement Practical: measurement methods	**X**					**X**								**X**
2	Mechanical properties for materials Practical: Hooks' Law	**X**				**X**									**X**
3	Oscillations Practical: simple pendulum.	**X**						**X**							**X**

4	Sounds. Practical: Resonance in the Air columns.	X					X								X
5	Fluids. Practical: Viscosity.	X						X							X
6	Heat transfer Practical: Heat& Specific Heat& thermo-electrical equivalent& the latent heat of melting ice.	X				X									X
7	The kinetic theory of gases and the work in thermodynamics Practical: melting point of solid materials.	X													X
8	The laws of thermodynamic Practical: heating and cooling curves.	X					X								X
9	Temperature and thermal expansion Practical: coefficient of linear thermal expansion.	X						X							X

6. Teaching and Learning Methods of Disable Students:

6.1. Teaching and Learning Methods of Disable Students:	
1	Additional Tutorials
2	Online lectures and assignments
6.2. Teaching and learning method for low capacity and outstanding Student	
For low capacity students	-Assign a portion of the office hours for those students. -Give them specific tasks.

	-Repeat the explanation of some of the material and tutorials. - Assign a teaching assistance to follow up the performance of these group of students
For outstanding Students	-Hand out project assignments to those students. -Give them some research topics to be searched using the internet and conduct presentation. Encourage them to take parts in the running research projects.

7. Student evaluation:

7.1 Student evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Periodic exam	A1,A2, A6	A1(1,2),A2(1),A6(1)
2	Student load (quizzes, sheets, report)	A1, A3 A2, A6	A1(1,2),A2(1),A3(1),A6(1)
3	Practical exam	A1 A3	A3(1,2),A6(1)
4	Final term examination	A1,A6	A1(3), A6(1)

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	8^{th}
2	Student load	7^{th},9^{th}
3	Practical examination	14^{th}
4	Final term examination	15^{th}

7.3 weighting of Evaluation:

No.	Evaluation method	Weights
1	Periodic exam	37.3%
2	final examination	50%
3	Practical examination	10%
4	Student load	2.7%
	Total	**100%**

8. List of References:

No.	Reference List
1	Peter J. Williams ; Firas Mansour ; Robert L. Hawkes ; (Nuclear physicist) Javed Iqbal ; Marina Milner-Bolotin. Physics for scientists and engineers : an interactive approach, Nelson Education Ltd., Year: 2019
2	David Halliday, Robert Resnick, Jearl Walker. Fundamentals of Physics, 9th Edition, Binder Ready Version,2019
3	Serway, Raymond A., and John W. Jewett. Physics for scientists and engineers. Cengage learning, 2020.
4	Hibbeler, Russell C. "Mechanics of materials." (2020).

9. Facilities required for teaching and learning:

No.	Facility

1	Lecture classroom
2	Laboratory
3	
4	White board
5	Data show system

10. Matrix of Competencies and LO's:

No.	Topic	Aims	A1			A2	A3		A6
			1	**2**	**3**	**1**	**1**	**2**	**1**
1	Material properties - Physical quantities - Standard units and dimensions	1,4	x	x	x	x	x		
2	frequency motion, mechanical properties for materials - fluid properties	1,4	x		x	x		x	x
3	viscosity - surface tension - sound waves - waves in elastic media.	1,4	x	x		x	x	x	x
4	Heat and thermodynamics: heat transfer - Gas motion theory	1,4		x	x		x	x	
5	First law of thermodynamics - entropy and second law of thermodynamics	1,4		x		x		x	x
6	temperature measurements and thermometers.	1,4			x	x	x		x

Course Coordinator: Dr. Ahmed Lotfy and Assoc.prof.Amal Behery
Head of Department: Asso.prof.Amal Bahiry
Date of Approval: 2023

Engineering Chemistry
(BAS014)

1- Basic Information:

Program Title	All programs
Department Offering the Program	Basic Science and Engineering Department
Department Responsible for the Course	Basic Science and Engineering Department
Course Title	General Chemistry
Course Code	BAS014
Year/Level	Level:0
Specialization	Major
Authorization Date of Course Specification	-

Teaching hours	**Lectures**	**Lab.**	**Exercise**	**Contact**	**Student load**
	2	2	--	**4**	**4**

2- Course Aims:

No.	Aims
1	Master a wide spectrum of engineering knowledge and specialized skills for applying acquired knowledge using theories and abstract thinking in real life situations.
8	Consider the impact of chemical process industries on society, economics, and the environment using fundamental knowledge of chemical process industries.

3- Competencies :

Competencies	Learning Outcomes (LO'S)
A1. Identify, formulate, and solve complex engineering problems by applying engineering fundamentals and basic science.	**1.** Describe the relevant Chemical principles and theories in the discipline. **2.** Identify the chemical engineering principles and theories that apply to the topic. **3.** Solve chemical engineering problems by applying chemical engineering fundamentals.
A2. 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.	1. Describe quality assurance systems, codes of practice and standards, health and safety requirements, and environmental issues.
A3 Apply engineering design	1. Collaborate effectively within multidisciplinary team.

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.	2. Work in stressful environment and within constraints.
A6. Plan, supervise and monitor implementation of engineering projects, taking into consideration other trades requirements.	**1.** Conduct troubleshooting in chemical engineering plants.
A10. Acquire and apply new knowledge; and practice self, lifelong and other learning strategies.	1. Acquire chemical engineering principles for professionally merge , understanding, and feedback to improve design, products for many chemical engineering industries.

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	Gaseous status - substantial and heat balance in fuel burning operations and chemical operations	4	-	4
2	properties of solutions - dynamic balance in physical and chemical operations	4	-	4
3	kinetic chemical interactions - electric chemistry - introduction to chemical corrosion	4	-	4
4	water processing - building materials pollution and its treatment.	2	-	2
5	Selected chemical industries: chemical manures - dyes - polymers - sugar - petrochemicals - semiconductors - oil, greases and industrial detergents.	4	-	4
Total		**28**	**-**	**28**

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab
1	Gaseous status. Practical: Chemistry Laboratory Equipment, Titrimetric Analysis.	x				X									X
2	Chemical thermodynamics. Practical: Preparation of standard solution of Na_2CO_3 (0.1N), Determination of normality of Hcl by using standard solution of oxalic acid.	x					X								X
3	Properties of solutions. Practical: Determination of normality of acetic acid by using standard solution of sodium hydroxide, Determination of	x						x							X

	normality of sodium carbonate by using standard solution of Hcl.														
4	Material balance in combustion processes. Practical: Standardization of potassium permanganate with oxalic acid.	x					X								X
5	Dynamic balance in physical and chemical operations. Practical: Determination of nitrites, precipitation titrations.	x				X									X
6	Kinetic chemical interactions. Practical: Preparation of 0.05N of sodium chloride.	x				X									X
7	Electrochemistry, corrosion and corrosion control. Practical: Determination of chloride ion by using Mohr method.	x					X								X
8	Fertilizers. Practical: Determining Molecule Weight by Freezing Point Depression Method.	x					X								X

9	Manufacturing and chemistry of Cement. Practical: Determining Molecule Weight by Freezing Point Depression Method.	x				X									X
10	Water processes. Practical: determination of water hardness by complex metric titration.	x				X									X

6. Teaching and Learning Methods of Disable Students:

6.1. Teaching and Learning Methods of Disable Students:	
1	Additional Tutorials
2	Online lectures and assignments

6.2. Teaching and learning method for low capacity and outstanding Student	
For low capacity students	-Assign a portion of the office hours for those students. -Give them specific tasks. -Repeat the explanation of some of the material and tutorials. - Assign a teaching assistance to follow up the performance of these group of students
For outstanding Students	-Hand out project assignments to those students. -Give them some research topics to be searched using the internet and conduct presentation. Encourage them to take parts in the running research projects.

7**. Student Evaluation:**

7.1 Student Evaluation Method:

No.	**Evaluation Method**	**Competencies**	**LO's**
1	Periodic exam	A1, A3 A2, A6	A1(1,2,3),A2(1),A3(1,2),A6(1)
2	Student load (quizzes, sheets, report)	A1, A3 A2, A6	A1(1,2,3),A2(1),A3(1,2),A6(1)
3	Practical Examination	A1,A10, A3 A2, A6	A1(1,2,3),A2(1),A3(1,2),A6(1),A10(1)
4	Final term examination	A1,A10	A1(1,2,3), A10(1)

7.2 Evaluation Schedule:

No.	**Evaluation Method**	**Weeks**

1	Periodic exam	8th
2	Student load	2nd -7th - 9th
3	Practical Examination	14th
4	Final term examination	15th

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	36.8%
2	Student load	3.2%
3	Practical Examination	12%
4	Final term examination	48%
Total		**100%**

8. List of References:

No.	Reference List
1	Theodore L. Brown, et al, Chemistry the Central Science, Prentice Hall Int. (Pearson International 14 edition), 2017.
2	Shriver and Atkins', Inorganic Chemistry, Oxford University Press, 2010.
3	Peter Atkins , Julio de Paula, James Keeler " Atkins' Physical Chemistry 11ed" Oxford University Press; 11th edition (2020)

9. Facilities required for teaching and learning:

No.	Facility	No.	Facility
1	Lecture classroom	4	Data show system
2		5	Sound system

10. Matrix of Competencies and LO's:

No.	Topic	Aims	A1			A2	A3		A6	A10
			1	2	3	1	1	2	1	1
1	Gaseous status - substantial and heat balance in fuel burning operations and chemical operations	1	x	x	x	x	x		x	
2	properties of solutions - dynamic balance in physical and chemical operations	1	x		x	x		x		
3	kinetic chemical interactions - electric chemistry - introduction to chemical corrosion	1	x	x		x	x	x	x	
4	water processing - building materials pollution and its	1		x	x		x	x		

	treatment.									
5	Selected chemical industries: chemical manures - dyes - polymers - sugar - petrochemicals - semiconductors - oil, greases and industrial detergents.	1								x

Course Coordinator: Asso.prof. Khaled Samir and Dr.Soher Abo Bakr
Head of Department: Asso.prof. Hend Elsayed Gadow
Date of Approval: 2023

Engineering Drawing and Projection
(BAS015)

1- Basic Information:

Program Title	All programs
Department Offering the Program	Basic Science and Engineering Department
Department Responsible for the Course	Basic Science and Engineering Department
Course Title	Engineering Drawing and Projection
Course Code	BAS015
Year/Level	level 0
Specialization	Major
Authorization Date of Course Specification	-

Teaching hours	Lectures	Lab.	Exercise	Contact	Student load
	1	4	---	**5**	**4**

2- Course Aims:

No.	Aims
1	Master a broad range of engineering drawing knowledge and specialized skills, as well as the ability to apply acquired knowledge in real-world situations.
2	Work in and manage a diverse team of professionals from various engineering disciplines, taking responsibility for own and team performance; and Behave professionally and adhere to engineering ethics and standards.
4	Use the techniques, skills, and current engineering tools required for engineering practice by taking full responsibility for one's own learning and development, participating in lifelong learning, and demonstrating the ability to pursue postgraduate and research studies.

3- Competencies :

Competencies	Learning Outcomes (LO'S)
A1. Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.	**1** Explain the basic principles of engineering drawing. **2** Explain the scientific principles and theories that apply to the topic. **3** Using scientific concepts and tools that are relevant to the profession. **4** Applying engineering drawing basics that are relevant to the subject.

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	Techniques and skills of engineering drawing	1	-	4
2	Engineering operations	1	-	4
3	Orthogonal projection – Secondary orthogonal	2	-	8
4	solid bodies – Intersections (cutters for solid bodies - intersections of surfaces)	1	-	4
5	personals - projections of simple bodies	1	-	4
6	rules of writing dimensions- drawing of perspectives	1	-	4
7	Deduction of missing projections	1	-	4
8	Drawing of engineering sections.	1	-	4
9	Drawing Steel frames- binding and fixing devices - the assembled drawing for some mechanical steel components	2	-	8
10	Introduction to AutoCAD Fundamentals of engineering drafting by way of computer aided drawing (CAD) software. Basic features and capabilities of CAD software and drafting fundamentals including orthographic projection, and isometric pictorials, part dimensioning in 2 dimensional drawings.	3	-	12
Total		**14**		**56**

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	lab
1	Techniques and skills of engineering drawing	x													
2	Engineering operations					x									
3	Orthogonal projection – Secondary orthogonal	x				x									
4	Intersections	x				x									
5	Projections of simple bodies	X				X									
6	Rules of writing dimensions	x				x									
7	Deduction of missing projections	x				x									
8	Drawing of engineering sections.	x				X									
9	Steel frames	x				X									
10	Introduction to AutoCAD Fundamentals of engineering drafting by way of computer aided drawing	X													x

	(CAD) software. Basic features and capabilities of CAD software and drafting fundamentals including orthographic projection, and isometric pictorials, part dimensioning in 2 dimensional drawings.															

6. Teaching and Learning Methods of Disable Students:

6.1. Teaching and Learning Methods of Disable Students:	
1	Additional Tutorials
2	Online lectures and assignments

6.2. Teaching and learning method for low capacity and outstanding Student	
For low capacity students	-Assign a portion of the office hours for those students. -Give them specific tasks. -Repeat the explanation of some of the material and tutorials. - Assign a teaching assistance to follow up the performance of these group of students
For outstanding Students	-Hand out project assignments to those students. -Give them some research topics to be searched using the internet and conduct presentation. Encourage them to take parts in the running research projects.

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Periodic exam	A1	1,2,3
2	Student load (quizzes, sheets, report)	A1	1,2
3	Final exam	A1	3,4

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Student load	2^{nd} -7^{th} - 9^{th}
2	Periodic exam	8^{th}

3	Practical examination	14th
4	Final term exam	15th

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	36.8%
2	Practical examination	0%
3	Student load	3.2%
4	Final-term examination	50%
Total		**100%**

8. List of References:

No.	Reference List
1	K. V. NATARAJAN "ENGINEERING GRAPHICS Paperback" DHANALAKSHMI PUBLISHERS (2020)
2	Lakhwinder Pal Singh, Harwinder Singh "Engineering Drawing: Principles and Applications" Cambridge University Press; First edition (2019)

9. Facilities required for teaching and learning:

No.	Facility
1	Lecture classroom
2	Computer lab
3	Seminar
4	White board
5	Data Show system

10. Matrix of Competencies and LO's:

No.	Topic	Aims	A1			
			1	2	3	4
1	Techniques and skills of engineering drawing	1	x			
2	Engineering operations	1,4		x		
3	Orthogonal projection – Secondary orthogonal	1,4	x			
4	solid bodies – Intersections (cutters for solid bodies - intersections of surfaces)	1	x			
5	personals - projections of simple bodies	1		x		
6	rules of writing dimensions- drawing of perspectives	1,2			x	

7	Deduction of missing projections	1			x	
8	Drawing of engineering sections.	1				x
9	Drawing Steel frames- binding and fixing devices - the assembled drawing for some mechanical steel components	1				x
10	Introduction to AutoCAD Fundamentals of engineering drafting by way of computer aided drawing (CAD) software. Basic features and capabilities of CAD software and drafting fundamentals including orthographic projection, and isometric pictorials, part dimensioning in 2 dimensional drawings.	1,4			x	x

Course Coordinator: Dr / Moataz Mostafa
Head of Department: Asso.prof.Amal Bahiry
Date of Approval: 2023

Introductions to Computer Systems
(BAS016**)**

1- Basic Information:

Program Title	All programs
Department Offering the Program	Basic Science and EngineeringDepartment
Department Responsible for the Course	Basic Science and Engineering Department
Course Title	Introductions to Computer Systems
Course Code	BAS016
Year/Level	Level 0
Specialization	Major
Authorization Date of Course Specification	-

Teaching hours	**Lectures**	**Lab.**	**Exercise**	**Contact**	**Student's load**
	2	**2**	**----**	**4**	**3**

2- Course Aims:

No.	**Aims**

1	Master a wide range of engineering knowledge and specialized skills, as well as the ability to apply that information in real-world situations using theories and analytical thinking.
6	Dealing with the computer's hardware, software, operating systems, and interfaces will show that you have a working knowledge of modern engineering issues.

3- Competencies :

Competencies	Learning Outcomes (LO'S)
A1. Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.	1 Identify the concepts and theories of science necessary for engineering system 2 Applying engineering basics that are relevant to the subject.
A5. Practice research techniques and methods of investigation as an inherent part of learning.	1 Assess different ideas, views, and knowledge from a range of sources.

4. Course Contents:

No.	Topics	Lecture	Practical	Tutorial
1	Computer architecture.	2	2	-
2	Computer systems	4	4	-
3	Files systems	2	2	-
4	Computer networks	4	4	-
5	Internet networks	4	4	-
6	Data systems and information technology	4	4	-
7	Computer graphics – Multimedia systems	4	2	-
8	Methods of solving problems -logical design for the programs and matrices.	4	4	-
9	applications in programming using one structured or visual languages- using this language in solving the engineering problems.	4	2	-
Total		**28**	**28**	**-**

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	lab
1	Computer architecture. practical: Visual Studio C# Interface Writing simple statements	X		x											X
2	Computer systems Practical: Variables, Data type	X				x									X
3	Files systems Practical: Input & Output	X				x									X
4	Computer networks Practical: Conditional Statements	X		X											X
5	Internet networks Practical:Arrays	X													X
6	Data systems and information technology Practical: Loop Statement (For, while & do -while)	X													X
7	Computer graphics – Multimedia systems Practical: Loop Statement (For, while & do -while)	X				x									X
8	Methods of solving problems and logical design for the programs and matrices. Practical: Nested loop	X					X								X

9	Engineering applications in programming using one structured programming language. Practical: Engineering Case Study.	x													X

6. Teaching and Learning Methods of Disable Students:

6.1. Teaching and Learning Methods of Disable Students:	
1	Additional Tutorials
2	Online lectures and assignments

6.2. Teaching and learning method for low capacity and outstanding Student	
For low capacity students	-Assign a portion of the office hours for those students. -Give them specific tasks. -Repeat the explanation of some of the material and tutorials. - Assign a teaching assistance to follow up the performance of these group of students
For outstanding Students	-Hand out project assignments to those students. -Give them some research topics to be searched using the internet and conduct presentation. Encourage them to take parts in the running research projects.

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Periodic exam	A1	1,2
2	Student load (quizzes, sheets, report)	A5	1
3	Practical Examination	A1,A5	A1(1,2,),A5(1)
4	Final term examination	A1,A5	A1(1,2),A6(1)

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	8^{th}
2	Student load	2^{nd} ,7^{th},9^{th},13^{th}
3	Practical Examination	14^{th}
4	Final term examination	15^{th}

7.3 weighting of Evaluation:

No.	EvaluationMethod	Weights
1	Periodic exam	37%
2	final examination	50%
3	Practical examination	10%
4	Student load	3%
	Total	**100%**

8. List of References:

No.	Reference List
1	Daniel A. O'Leary,, Timothy J. O'Leary, "Computing Essentials 2021",McGraw-Hill Education,2020
2	Daniel A. O'Leary, Timothy J. O'Leary, Linda I. O'Leary Computing Essentials 2019, McGraw-Hill Education,2020
3	Computing essentials timothy, O' leary and linda, 2015.
4	Darrell Hajek , Cesar Herrera "Introduction to Computers" CreateSpace Independent Publishing Platform (May 8, 2020).
5	Ludwik Czaja "Introduction to Distributed Computer systems: Principles and features" Springer; 1st ed. 2020.

9. Facilities required for teaching and learning:

No.	Facility
1	Lecture classroom
2	Computer lab
4	White board
5	Data show system
6	Wireless internet
7	Sound system

10. Matrix of Competencies and LO's :

No.	Topic	Aims	A1		A5
			1	2	1
1	Computer architecture.	1	x		x
2	Computer systems	1	x		x
3	Files systems	1		x	
4	Computer networks	1		x	
5	Internet networks	1		x	x
6	Data systems and information technology	1,7		x	x
7	Computer graphics – Multimedia systems	1,7		x	x
8	Methods of solving problems - logical design for the programs and matrices.	7			x
9	applications in programming using one structured or visual languages-	7			x

	using this language in solving the engineering problems.				

Course Coordinator: Dr. Amira Elsonbaty
Head of Department: Prof. Mohamed Fouad
Date of Approval: 2023

Mathematics 2
(BAS021**)**

1- Basic Information:

Program Title	All programs
Department Offering the Program	Basic Science and Engineering Department
Department Responsible for the Course	Basic Science and Engineering Department
Course Title	Mathematics 2
Course Code	BAS021
Year/Level	Level: 0
Specialization	Major
Authorization Date of Course Specification	-

Teaching hours	**Lectures**	**Lab.**	**Exercise**	**Contact**	**Student load**
	2	-	**2**	**4**	**4**

2- Course Aims:

No.	**Aims**
1	Master a broad range of fundamental Mathematical engineering knowledge and specialized skills of Analytical geometry and Integration, as well as the ability to apply acquired knowledge of Analytical geometry and Integration in real-world situations as determine the plain areas , circular volumes, plain technical length and circular surfaces by applying theories and abstract thinking in analytic critical and systemic thinking to identify, diagnose, and solve mathematical engineering problems by using different methods.

3- Competencies:

Competencies	**Learning Outcomes (LO'S)**
A1. Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.	1. Explain the relevant mathematical engineering principles and theories in the Analytical geometry and Integration. 2. Use the mathematical engineering principles and theories that apply in the most fundamental problems . 3. Explain the basic concepts of Analytical geometry and Integration 4. Use the basics of integration and Geometry

	that are applicable to the field.

4. Course Contents:

No.	Topic	Lecture	Tutorial	Practical
1	• Analytical geometry: equations of second degree and double equation for two straight lines • Movement and rotation of axes	4	4	-
2	• groups of unified axes circles - conical sectors (properties of conical sectors - parabola - ellipse - hyperbola)	6	6	-
3	• Analytical geometry in space • Cartesian coordinates • Cylindrical-spherical -plane in space	2	2	-
4	• Equations of surfaces in second order – rotation and movement of axes in space.	2	2	-
5	• Indefinite integration (basic functions – theories) – method of integration (direct - indirect)	6	6	-
6	• Definite integration (definition – properties -theories) • Applications of definite integration (plain areas – circular volumes – plain technical length)	4	4	-
7	• Areas – Circular surfaces	2	2	-
8	• Numerical integration.	2	2	-
Total		**28**	**28**	-

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	lab
1	• Basic concepts- equations of second degree	x				x									

	and double equation for two straight lines Movement and rotation of axes														
2	Circle– conical sectors	x					X								
3	• Analytical geometry in space • Cartesian coordinates Cylindrical-spherical - plane in space	x						X							
4	Equations of surfaces in second order – rotation and movement of axes in space.	x				x		X							
5	Indefinite integration (basic functions – theories) – method of integration	x				x	X								
6	• Definite integration (definition – properties -theories) Applications of definite integration (plain areas – circular volumes – plain technical length)	x				x									
7	Areas – Circular surfaces	x					X	x							
8	Numerical integration.	x				X									

6. Teaching and Learning Methods of Disable Students:

6.1. Teaching and Learning Methods of Disable Students:	
1	Additional Tutorials
2	Online lectures and assignments

6.2. Teaching and learning method for low capacity and outstanding Student	
For low capacity students	-Assign a portion of the office hours for those students. -Give them specific tasks. -Repeat the explanation of some of the material and tutorials.

	- Assign a teaching assistance to follow up the performance of these group of students
For outstanding Students	-Hand out project assignments to those students. -Give them some research topics to be searched using the internet and conduct presentation. Encourage them to take parts in the running research projects.

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Periodic exam	A1	1,2
2	Student load (quizzes, sheets, report)	A1	3,4
3	Final term examination	A1	1,2,3,4

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	8^{th}
2	Student load	7^{th} - 9^{th}
3	Final term examination	15^{th}

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	37.3%
2	Student load	2.7%
3	Final term examination	60%
Total		**100%**

8. List of References:

No.	Reference List
1	P.N.Chatterjee "Analytical Geometry Paperback"Anu Books (2019)
2	Gerardus Blokdyk "System Integration A Complete Guide" 5STARCooks (2019).
3	Chris McMullen " Essential Calculus Skills Practice Workbook with Full Solutions" Zishka Publishing (2020).

9. Facilities required for teaching and learning:

Facility			
1	Lecture classroom	3	White board
2	Seminar	4	Data Show system

10. Matrix of Competencies and LO's :

No	Topic	Aims	A1			
			1	2	3	4
1	• equations of second degree and double equation for two straight lines	1	x		x	

	• Movement and rotation of axes					
2	• groups of unified axes circles - conical sectors (properties of conical sectors - parabola - ellipse - hyperbola)	1	x		x	
3	• Analytical geometry in space • Cartesian coordinates • Cylindrical-spherical -plane in space	1	x		x	
4	• Equations of surfaces in second order – rotation and movement of axes in space.	1	x		x	
5	• Indefinite integration (basic functions – theories) – method of integration (direct - indirect)	1	x		x	
6	• Definite integration (definition – properties -theories) • Applications of definite integration (plain areas – circular volumes – plain technical length)	1	x		x	
7	• Areas – Circular surfaces	1		x		x
8	• Numerical integration.	1		x		x
9	• equations of second degree and double equation for two straight lines • Movement and rotation of axes	1		x		x
10	• groups of unified axes circles - conical sectors (properties of conical sectors - parabola - ellipse - hyperbola)	1		x		x

Course Coordinator: Dr / Reda Abdo
Head of Department: Asso.prof.Amal Bahiry
Date of Approval: 2023

Mechanics 2
(BAS022**)**

1- Basic Information:

Program Title	All programs
Department Offering the Program	Basic Science and Engineering Department
Department Responsible for the Course	Basic Science and Engineering Department
Course Title	Mechanics 2
Course Code	BAS022
Year/Level	Level: 0
Specialization	Major
Authorization Date of Course Specification	-

Teaching hours	**Lectures**	**Lab.**	**Exercise**	**Contact**	**Student load**
	2	-	**2**	**4**	**4**

2- Course Aims:

No.	**Aims**
1	Master a broad range of Mechanics knowledge and specialized skills, as well as the ability to apply acquired knowledge in real-world situations by applying theories in analytic critical and systemic thinking to identify, diagnose, and solve engineering problems of varying complexity and variation.

3- Competencies :

Competencies	**Learning Outcomes (LO'S)**
A1. Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.	**1** Define position, velocity and acceleration of particles and principles of conversation of mechanical energy **2** Recognize methodologies of solving engineering problems including principles of work and energy **3** Solve engineering problems to determine the velocity and position of projectile **4** Apply knowledge of principle of work and principle of work and energy of motion and principle of conservation of mechanical energy and momentum of rigid body.

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	Position, Displacement, Velocity, and Acceleration of particle	4	4	-
2	Plane Motion Path of Particle	2	2	-
3	Description of plane motion using Cartesian axes	2	2	-
4	Projectiles	2	2	-
5	tied motion for particle in straight path	2	2	-
6	motion in fixed axes -motion in polar axes	2	2	-
7	Newton's second law of motion	4	4	-
8	elative motion between particles - tied motion for particle in circular path	4	4	-
9	principle of work and energy of motion - principle of conservation of mechanical energy	2	2	-
10	principle of impulse and momentum of rigid body	4	4	-
Total		**28**	**28**	**-**

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	lab
1	Position, Displacement, Velocity, and Acceleration of Particle	x				X									
2	Plane Motion path of Particle	x				X									
3	Description of plane Motion using Cartesian axes	x		x											
4	Projectiles	x						x							

5	Relative motion between particles	x				X									
6	Motion for particle in circular path	x				X									
7	Newton's second law of motion	x					X								
8	Principle of work and energy of motion	x		x											
9	Principle of conservation of mechanical energy	x				X									
10	Principle of impulse and momentum of rigid body	x					X								

6. Teaching and Learning Methods of Disable Students:

6.1. Teaching and Learning Methods of Disable Students:	
1	Additional Tutorials
2	Online lectures and assignments

6.2. Teaching and learning method for low capacity and outstanding Student	
For low capacity students	-Assign a portion of the office hours for those students. -Give them specific tasks. -Repeat the explanation of some of the material and tutorials. - Assign a teaching assistance to follow up the performance of these group of students
For outstanding Students	-Hand out project assignments to those students. -Give them some research topics to be searched using the internet and conduct presentation. Encourage them to take parts in the running research projects.

7**. Student Evaluation:**

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Periodic exam	A1	1,2,3
2	Student load (quizzes, sheets, report)	A1	3,4
3	Final term examination	A1	1,2,3,4

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	8^{th}
2	Student load	2^{nd} -7^{th} - 9^{th} -14^{th}
3	Final term examination	15^{th}

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	36%
2	Student load	4%
3	Final term examination	60%
Total		**100%**

8. List of References:

No.	Reference List
1	Marcelo R. M. Crespo da Silva "Fundamentals of Dynamics and Analysis of Motion" 2nd edition, Dover Publications; (2019).
2	C. Hibbeler, Russell "Engineering Mechanics: Dynamics in SI Units, Global Edition" 14th edition, P&C ECS; 15th edition 2020).

9. Facilities required for teaching and learning:

Facility			
1	Lecture classroom	3	White board
2	Seminar	4	Data Show system

10. Matrix of Competencies and LO's :

No	Topic	Aims	A1			
			1	2	3	4
1	Position, Displacement, Velocity, and Acceleration of particle	1	x			
2	Plane Motion Path of Particle	1	x			
3	Description of plane motion using Cartesian axes	1		x		
4	Projectiles	1			x	
5	tied motion for particle in straight path	1			x	
6	motion in fixed axes -motion in polar axes	1		x		
7	Newton's second law of motion	1			x	
8	elative motion between particles - tied motion for particle in circular path	1		x		
9	principle of work and energy of motion - principle of conservation of mechanical energy	1	x			
10	principle of impulse and momentum of rigid body	1				x

Course Coordinator: Dr / Motaz Mostafa
Head of Department: Asso.prof.Amal Bahiry
Date of Approval: 2023

Physics 2
(BAS023**)**

1- Basic Information:

Program Title	All programs
Department Offering the Program	Basic Science and Engineering Department
Department Responsible for the Course	Basic Science and Engineering Department

Course Title	Physics 2
Course Code	BAS023
Year/Level	level 0
Specialization	Major
Authorization Date of Course Specification	-

Teaching hours	**Lectures**	**Lab.**	**Exercise**	**Contact**	**Student load**
	2	2	**2**	**6**	**4**

2- Course Aims:

No.	Aims
1	Master a broad range of engineering physics knowledge and specialized skills, as well as the ability to apply acquired knowledge in real-world situations by applying theories in analytic critical and systemic thinking to identify, diagnose, and solve engineering problems of varying complexity and variation.

3- Competencies :

Competencies	Learning Outcomes (LO'S)
A1. Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.	1. Define concepts and theories of physics necessary for engineering system analysis. 2. Study solving engineering problems including Einstein's quantum hypothesis, laws of reflection and refraction, interference and diffraction. 3. Define measurement devices in electrical conductivity, basic characteristics, and properties. 4. Select the appropriate solutions for engineering problems including Newton's Rings and design of optical fibers.
A2. 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.	1. Describe quality assurance systems, codes of practice and standards, health and safety requirements, and environmental issues.
A3 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	1.Collaborate effectively within multidisciplinary team. 2.Work in stressful environment and within constraints.

appropriate to the discipline and within the principles and contexts of sustainable design and development.	
A6. Plan, supervise and monitor implementation of engineering projects, taking into consideration other trades requirements.	1 Conduct troubleshooting in chemical engineering plants.

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	Electricity and magnetism: charge and substance- electric field- column's law	2	2	4
2	electric flux- Gauss law- electric volt- condenser and insulation materials-current , resistance and electric force	4	4	2
3	ohm's law and simple circuits- magnetic field- Babot and Savart laws	2	2	2
4	magnetic flux and gauss law- Faraday law - Magnetic impedance	4	4	10
5	engineering light - light properties for spherical surfaces - lenses and mirrors	4	4	2
6	wave properties for light and Hygen's principle - interference - polarization- and diffraction	4	4	2
7	Nuclear physics: nuclear construction - Bohar theorem - principle of quantum theory- laser - optical - electric phenomenon	2	2	2
Total		**28**	**28**	**28**

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	lab

1	Basic of electricity. Practical: measurement devices in electrical conductivity.	x				X									X
2	Column's law and Gauss's law. Practical: sensitivity of galvanometer.	x					X								X
3	capacitors and capacitance. Practical: capacitors and capacitance	x						X							X
4	Currents and Resistance. Practical: ohm's law - series connection &parallel connection& resistance colour code& meter bridge - voltmeter resistance.	x				X	X								X
5	Magnetic field and magnetic force. Practical: the inverse square law in magnetism.	x				x									x

6	The nature and propogation of light. Practical: the glass prism.	x					X									x
7	Optical fiber. Practical: the glass prism.	x						X								x
8	Introduction to Quantum theory.	x					X									x
9	Laser. Practical:	x						x								x
10	Lenses and mirrors. Practical: spherometer- mirrors and lenses.	x					X									x

6. Teaching and Learning Methods of Disable Students:

6.1. Teaching and Learning Methods of Disable Students:	
1	Additional Tutorials
2	Online lectures and assignments

6.2. Teaching and learning method for low capacity and outstanding Student	
For low capacity students	-Assign a portion of the office hours for those students. -Give them specific tasks. -Repeat the explanation of some of the material and tutorials. - Assign a teaching assistance to follow up the performance of these group of students
For outstanding Students	-Hand out project assignments to those students. -Give them some research topics to be searched using the internet and conduct presentation. Encourage them to take parts in the running research projects.

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's

1	Periodic exam	A1,A2, A6	A1(1,2,3),A2(1),,A6(1)
2	Student load (quizzes, sheets, report)	A1, A3 A2, A6	A1(1,2,3),A2(1),A3(1,2),A6(1)
3	Final term examination	A1 A3	A1(1,2,3),A2(1),A3(1,2),A6(1)
4	Practical exam	A1,A6	A1(1,2,3,4),A2(1),A3(1,2),A6(1)

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	8^{th}
2	Student load	5^{th},7^{th},14^{th}
3	Final term examination	15^{th}

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	37.3%
2	final examination	50%
3	Practical examination	10%
4	Student load	2.7%
Total		**100%**

8. List of References:

No.	Reference List
1	Shankar, Ramamurti. Fundamentals of Physics II. Yale University Press, 2020.
2	Peter J. Williams ; Firas Mansour ; Robert L. Hawkes ; (Nuclear physicist) Javed Iqbal ; Marina Milner-Bolotin. Physics for scientists and engineers : an interactive approach, Nelson Education Ltd., Year: 2019
3	David Halliday, Robert Resnick, Jearl Walker. Fundamentals of Physics, 9th Edition, Binder Ready Version,2019
4	Serway, Raymond A., and John W. Jewett. Physics for scientists and engineers. Cengage learning, 2020.

9. Facilities required for teaching and learning:

No.	Facility
1	Lecture classroom
2	Laboratory
3	
4	White board
5	Data show system

10. Matrix of Competencies and LO's:

No.	Topic	Aims	A1			A2	A3		A6
			1	2	3	1	1	2	1
1	Electricity and magnetism: charge and substance- electric field- column's law	1		x	x		x		
2	electric flux- Gauss law- electric volt- condenser and insulation materials-current , resistance and electric force	1	x		x	x		x	x
3	ohm's law and simple circuits- magnetic field- Babot and Savart laws	1	x	x			x		
4	magnetic flux and gauss law- Faraday law - Magnetic impedance	1	x	x	x				
5	engineering light - light properties for spherical surfaces - lenses and mirrors	1	x		x	x	x	x	x
6	wave properties for light and Hygen's principle - interference - polarization- and diffraction	1		x	x				
7	Nuclear physics: nuclear construction - Bohar theorem - principle of quantum theory- laser - optical - electric phenomenon	1	x		x	x	x		x

Course Coordinator: Asso.prof. Amal Bahiry and Dr. Ahmed lotfy
Head of Department: Asso.prof. Amal Bahiry
Date of Approval: 2023

Production Engineering
(BAS024**)**

1- Basic Information:

Program Title	All Programs
Department Offering the Program	Basic Science and Engineering Department

Department Responsible for the Course	Basic Science and Engineering Department
Course Title	Production Engineering
Course Code	BAS024
Year/Level	Level 0
Specialization	Major
Authorization Date of Course Specification	-

Teaching hours	Lectures	Lab.	Exercise	Contact	Student load
	3	2	---	**5**	**4**

2- Course Aims:

No.	Aims
1	Master a broad range of production engineering knowledge and specialized skills, as well as the ability to apply acquired knowledge in real-world situations.
2	Work in and manage a diverse team of professionals from various engineering disciplines, taking responsibility for own and team performance; and Behave professionally and adhere to engineering ethics and standards.
3	Use the techniques, skills, and current engineering tools required for engineering practice by taking full responsibility for one's own learning and development, participating in lifelong learning, and demonstrating the ability to pursue postgraduate and research studies.

3- Competencies :

Competencies	Learning Outcomes (LO'S)
A1. Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.	1. Explain the basic principles of production engineering. 2. List the characteristics of engineering materials related to production engineering. 3. Evaluate the characteristics and performance of engineering materials related to production engineering
A3. Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global, cultural, social, economic and environmental.	1. Apply engineering knowledge to improve products of modern tools, systems and procedure, to make the engineering process more balanced costs, benefits, safety, quality and reliability and environmental impact. 2. Apply safe systems including the use laboratory and field equipment competently
A6. Plan, supervise and monitor of	1. Show the conventional procedures and

production process, taking into consideration other trades requirements.	characterization of common engineering materials and components. 2. Acquire production skills.

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	The engineering substances and its properties - heating and cooling diagrams - heating equilibrium diagrams	3	-	2
2	alloys - casting operation (sand casting and the preparation of the mold)	3		2
3	forming processes (cold and hot forming: forging - rolling - wire drawing - blanking and piercing - deep drawing - the extrusion)	3	-	2
4	processes of metal connections (the riveting - welding with its types sticking)	6	-	4
5	cutting processes (cutting elements - processes - hand machining - automatic cutting machining: lathing - shaping - drilling - milling - grinding - work piece fixation - cutting tools fixation - specifications of the operating machine)	6	--	4
6	measuring tools (venire caliper - micrometers and its types) - engineering specifications	6	--	2
7	production cycle - production efficiency - industrial safety - practical training in the different workshops	6	-	2
Total		**42**	**-**	**28**

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	lab

1	The engineering substances and its properties Practical: engineering materials	x				x									x
2	Heating and cooling diagrams Practical: iron and steel production	x													x
3	Heating equilibrium diagrams Practical : heat treatment	x		x											x
4	Alloys - Casting operation (sand casting and the preparation of the mold) Practical: metal casting & mold for a sand casting& carpenter workshop	x													x
5	Forming processes (cold and hot forming: forging rolling – Wire drawing – Blanking and piercing -	X													x

	Deep drawing - The extrusion) Practical: metal forming														
6	Processes of metal connections (the riveting – welding with its types sticking) Practical: metal joining process	x													x
7	Cutting machining: Lathing - Shaping – Drilling – Milling - Grinding – Work Piece fixation - Cutting tools fixation - Specifications of the operating machine) Practical: carpenter workshop	x													x
8	Methods of solving problems Practical: metal machining	x				x	x								x

9	M**e**asuring tools (venire caliper – micrometers and its types) Practical: measurement tools	**x**	**x**												**x**
10	Production cycle production efficiency - Industrial safety Practical training in the different workshops	**x**	**x**			**x**									**X**

6. Teaching and Learning Methods of Disable Students:

6.1. Teaching and Learning Methods of Disable Students:	
1	Additional Tutorials
2	Online lectures and assignments

6.2. Teaching and learning method for low capacity and outstanding Student	
For low capacity students	-Assign a portion of the office hours for those students. -Give them specific tasks. -Repeat the explanation of some of the material and tutorials. - Assign a teaching assistance to follow up the performance of these group of students
For outstanding Students	-Hand out project assignments to those students. -Give them some research topics to be searched using the internet and conduct presentation. Encourage them to take parts in the running research projects.

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Periodic exam	A1,A3	A1(1,2,3),A3(1,2)
2	Student load (quizzes, sheets, report)	A1,A3	A1(1,2,3),A3(1,2)
3	Practical Exam	A3,A6	A1(1,2,3),A6(1,2)
4	Final term examination	A1,A3,A6	A1(1,2,3),A3(1,2),A6(1,2)

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	8^{th}
2	Student load	7^{th},9^{th} ,14^{th}
3	Final term examination	15^{th}

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	36.8%
2	final examination	48%
3	Practical examination	10%
4	Student load	3.2%
	Total	**100%**

8. List of References:

No.	Reference List
1	Shanker, Kripa, Shankar, Ravi, Sindhwani, Rahu "Advances in Industrial and Production Engineering" 1st edition, Springer Nature Singapore Pte Ltd. (2020).
2	Jeff Hansen "Manufacturing and Production Engineering: Planning and Control" Willford Press (2020).

9. Facilities required for teaching and learning:

No.	Facility
1	Lecture classroom
2	Production engineering workshops
2	
3	White board
4	Data show system
5	Sound system

10. Matrix of Competencies and LO's:

No.	Topic	Aims	A1			A3		A6	
			1	2	3	1	2	1	2
1	The engineering substances and its properties - heating and cooling diagrams - heating equilibrium diagrams	1	x	x					
2	alloys - casting operation (sand casting and the preparation of the mold)	1		x					
3	forming processes (cold and hot forming: forging - rolling - wire drawing - blanking and piercing - deep drawing - the extrusion)	1			x				
4	processes of metal connections (the riveting - welding with its types sticking)	1,3				x	x		
5	cutting processes (cutting elements - processes - hand machining - automatic cutting machining: lathing - shaping - drilling - milling - grinding - work piece fixation - cutting tools fixation - specifications of the operating machine)	1,2				x	x		

No.	Topic	Aims	A1			A3		A6	
			1	2	3	1	2	1	2
6	measuring tools (venire caliper - micrometers and its types) - engineering specifications	1,3				x	x		
7	production cycle - production efficiency - industrial safety - practical training in the different workshops	1,2,3						x	x

Course Coordinator: Dr. Abdu El-Naquib
Head of Department: Asso.prof. Amal Bahiry
Date of Approval: 2023

Introduction to Engineering and Environment
(BAS025**)**

1- Basic Information:

Program Title	All programs
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Basic Science and Engineering Department
Course Title	Introduction to Engineering and Environment
Course Code	ENG106
Year/Level	level 1
Specialization	Basics
Pre- request	-

Teaching hours	Lectures	Lab.	Exercise	Contact	Student's load
	2	**----**	**---**	**2**	**2**

2- Course Aims:

No.	Aims
3	Recognize his or her role in promoting engineering and contributing to the profession's and community's development; by appreciating the importance of the environment, both physical and natural, and working to promote sustainability concepts

3- Competencies :

Competencies	Learning Outcomes (LO'S)
A1. Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.	**1** Explain the scientific principles and theories that apply to the topic. **2** Explain the basic principles of engineering. **3** Use scientific concepts and theories that are relevant to the profession. **4** Solve complex engineering problems by

	applying engineering fundamentals.
A3. 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.	**1** Understand the professional ethics and impacts of engineering solutions on society and environment. **2** Recognizes the environmental and economic impact of various industries, waste minimization, and industrial facility remediation. **3**Judge engineering decisions considering balanced costs, benefits, safety, quality, reliability, and environmental impact. **4** Incorporate economic, societal, global, environmental, and risk management factors into design.

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	Engineering concepts: What is engineering – international classification for the engineering jobs – Relation between engineering development and environment economic and social development – Engineering branches – Ethics of the engineering jobs.	10	-	-
2	Introduction to environmental science: the importance of studying environmental science	2	-	-
3	Modern technology and its effect on the environment – Quality of the environment and development elements	4	-	-
4	Sources of environmental pollution and method of control (air pollution – water pollution – solid wastes pollution – economics of environmental pollution control – legislations for the environment protection.	12	-	-
Total		**28**	**-**	**-**

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	lab
1	Engineering concepts: What is engineering – international classification for the engineering jobs – relation between engineering development and environment economic and social development – engineering branches – ethics of the engineering jobs.	x									X				
2	Introduction to environmental science: the importance of studying environmental science	x									X				
3	Modern technology and its effect on the environment – quality of the environment and development elements	x		X							X				
4	Sources of environmental pollution and method of control (air pollution – water pollution – solid wastes pollution –noise) – economics of environmental pollution	x		x							X				

	control – legislations for the environment protection.																	

6. Teaching and Learning Methods of Disable Students:

6.1. Teaching and Learning Methods of Disable Students:	
1	Additional Tutorials
2	Online lectures and assignments

6.2. Teaching and learning method for low capacity and outstanding Student	
For low capacity students	-Assign a portion of the office hours for those students. -Give them specific tasks. -Repeat the explanation of some of the material and tutorials. - Assign a teaching assistance to follow up the performance of these group of students
For outstanding Students	-Hand out project assignments to those students. -Give them some research topics to be searched using the internet and conduct presentation. Encourage them to take parts in the running research projects.

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Mid Term Examination	A1,A3	A1(1,2,3),A3(1,2)
2	Semester work(quizzes, sheets, report)	A3	A3(1,2,3,4)
3	Final Term Examination	A1,A3	A1(1,2,3,4),A3(1,2,3,4)

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Semester work (Sheets, Quiz and Reports)	2^{nd}, 7^{th} , 9^{th}
2	Mid Term Examination	8^{th}
3	Final Term Examination	15^{th}

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
2	Semester work	33.3%
3	Final-term examination	66.7%
Total		**100%**

8. List of References:

No.	Reference List
1	د. جمال صالح السلامة من الكوارث الطبيعية والمخاطر البشرية، دار الشروق، 2019

2	Raju, Fundamental of air pollution, Oxyford&IBH, 2019.

9. Facilities required for teaching and learning:

No.	Facility
1	Seminar
2	Lecture Classroom
3	White Board
4	Data Show system

10. Matrix of Competencies and LO's:

No.	Topic	Aims	A1				A3			
			1	2	3	4	1	2	3	4
1	Engineering concepts: What is engineering – international classification for the engineering jobs – relation between engineering development and environment economic and social development – engineering branches – ethics of the engineering jobs.	3	X	X						
2	Introduction to environmental science: the importance of studying environmental science	3		X	X					
3	Modern technology and its effect on the environment – quality of the environment and development elements	3							X	X
4	Sources of environmental pollution and method of control (air pollution – water pollution – solid wastes pollution –noise) – economics of environmental pollution control – legislations for the environment protection.	3			X	X				

Course Coordinator: prof. Osamy Rageh / Assoc. Prof. Dr. Ramadan Elkateb
Head of Department: Asso.prof.Amal Bahiry
Date of Approval: July 2023

Technical English Language 1
(BAS026**)**

1- Basic Information:

Program Title	All Programs
Department Offering the Program	Basic Science and Engineering Department
Department Responsible for the Course	Basic Science and Engineering Department
Course Title	Technical English Language 1
Course Code	BAS026
Year/Level	level 0

Specialization	Major
Authorization Date of Course Specification	-

Teaching hours	**Lectures**	**Lab.**	**Exercise**	**Contact**	**Student load**
	2	2	**--**	**4**	**3**

2- Course Aims:

No.	Aims
5	Communicate effectively with a variety of audiences using a variety of forms, methods, and languages; cope with academic and professional issues in a critical and creative manner; and display leadership, business administration, and entrepreneurial abilities.

3- Competencies :

Competencies	Learning Outcomes (LO'S)
A8. Communicate effectively – graphically, verbally and in writing – with a range of audiences using contemporary tools.	1. Communicate effectively with a range of audiences using contemporary tools.

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	Intensive guided practice in reading and analyzing expository and argumentative prose and in writing and revising essays that demonstrate coherent logical development	14	-	14
2	an ability to employ effective strategies of argument and persuasion, and a command of written English appropriate for college-level work.	14	-	14
Total		**28**	**-**	**28**

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	lab
1	Engineering Lab. : skills in English Lesson 1 Bob's day at work & Lesson 2 Bob returns home with bad news	x			x										x
2	A private flat Lab. : skills in English Lesson 3 Ted's day at school	x													x
3	Book shelves Lab. : skills in English Lesson 4 Nicole's day at school	x													x
4	Bridges Lab. : skills in English Lesson 5 Ted goes out for the	x			x										x

	evening Grammar Topics														
5	Reinforced concrete Lab. : skills in English Lesson 6 Susan stays home and bake cookies & Lesson 7 Susan hires Bob to run her own business	x			x										x
6	Surveying Lab. : skills in English Lesson 8 Ted forms a rock band & Lesson 9 Nicole for president	x													x
7	Hydraulic works Lab. : skills in English Lesson 10 Bob visits the village market	x													x
8	Soil mechanics and foundations Lab. : skills in English Grammar topics	x													X

6. Teaching and Learning Methods of Disable Students:

6.1. Teaching and Learning Methods of Disable Students:	
1	Additional Tutorials
2	Online lectures and assignments

6.2. Teaching and learning method for low capacity and outstanding Student	
For low capacity students	-Assign a portion of the office hours for those students. -Give them specific tasks. -Repeat the explanation of some of the material and tutorials. - Assign a teaching assistance to follow up the performance of these group of students
For outstanding Students	-Hand out project assignments to those students. -Give them some research topics to be searched using the internet and conduct presentation. Encourage them to take parts in the running research projects.

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Periodic exam	A8	1
2	Student load (quizzes, sheets, report)	A8	1
3	Practical exam	A8	1
4	Final term examination	A8	1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	8^{th}
2	Student load	7^{th},9^{th}
3	Practical examination	14^{th}
4	Final term examination	15^{th}

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	37%
2	Practical examination	10%
3	Student load	3%
4	Final-term examination	50%
Total		**100%**

8. List of References:

No.	Reference List
1	David Bonamy "Technical English" Longman Publishing Group 2020
2	Paul J. Hamel "English for Better Jobs 1: Language for Working and Living" Create Space Independent Publishing Platform; 1st edition (2019)
3	Mahmood Reza Atai, Alireza Zaré Alanagh, Morteza Nasiri and Reza Taherkhani

	"English for The Students of Engineering" 1st edition, SAMT Publication (2023).

9. Facilities required for teaching and learning:

No.	Facility
1	Lecture classroom
2	Computer lab.
3	Seminar
4	White board
5	Data Show system

10. Matrix of Competencies and LO's:

No.	Topic	Aims	A1
			1
1	Intensive guided practice in reading and analyzing expository and argumentative prose and in writing and revising essays that demonstrate coherent logical development.	3	X
2	an ability to employ effective strategies of argument and persuasion, and a command of written English appropriate for college-level work.	3	X

CourseCoordinator: Dr / Doaa El-shrbiny
Head of Department: Asso.prof.Amal Behriy
Date of Approval: 2023

Mathematics 3
(BAS111)

1- Basic Information:

Program Title	Communication and Electronics Engineering program
Department Offering the Program	Communication and Electronics Engineering Department
Department Responsible for the Course	Basic Science and Engineering Department
Course Title	Mathematics 3
Course Code	BAS111
Year/Level	Level: 1
Specialization	Major
Authorization Date of Course Specification	-

Teaching hours	**Lectures**	**Lab.**	**Exercise**	**Contact**	**Student load**
	3	-	**2**	**4**	**4**

2- Course Aims:

No.	Aims
1	Master a broad range of fundamental Mathematical engineering knowledge and solve of ordinary differential equations and partial differentiation applications , as well as the ability to apply acquired knowledge of ordinary differential equations and partial differentiation applications in real-world situations by applying theories and abstract thinking in analytic critical and systemic thinking to identify, diagnose, and solve multi integrations of mathematical engineering .

3- Competencies :

Competencies	Learning Outcomes (LO'S)
A1. Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics**.**	1. Understand the relevant engineering mathematical of ordinary differential equations and applications of Partial differentiation equations. 2. Describe the effect of mathematical engineering principles and theories that apply in the most fundamental problems . 3. Define the basic concepts of ordinary differential equations and Partial differentiation equations 4. Applying the basics of ordinary differential equations and applications of Partial differentiation equations in engineering problems.

4. Course Contents:

No.	Topic	Lectures	Tutorial	Practical
1	Partial differentiation applications: maximum and minimum values in more than one variable	2	4	-
2	directional analysis - the directional differential effects - the multi integrations and its applications (the curved and the orthogonal axis)	4	4	-
3	Gauss- Stokes theory - the endless series and function expansion – basic concepts for the convergence and divergence.	10	4	-
4	Ordinary differential equations: The first order (the equations which can be separated, homogeneous, exact and linear)	4	2	-
			4	-
			2	-
			4	-
5	the ordinary differential equations from the second order and higher orders (with constant and variable coefficients), systems from the ordinary differential equations	4	2	-
6	Laplace transfer and its applications in the solution of differential equations.	4	2	-
Total		**28**	**28**	**-**

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	lab

1	• Functions of several variables • Limits of functions of several variables. • Continuity in multivariable functions	x				X	X								
2	• Partial derivatives of higher order extreme for functions of two variables	x				X		X							
3	• Double integral • Triple integral • Line integral in space, Green's theorem • Surface integral • Gauss and stokes's theory	x				X	X								
4	• Basic concepts Formation of the differential equations • Separable differential equations • Homogenous differential equations • Exact differential equation • linear differential equation • Bernoulli's equation the linear differential operator	x				X		X							
5	• Second order homogeneous differential equations with constant coefficients • Non-homogeneous linear differential equations	x				X	X								
6	• Convergence of la-place transform • Important properties of la-place transform	x				X		x							

	• Laplace transform of derivatives • Inverse la-place transform															

6. Teaching and Learning Methods of Disable Students:

6.1. Teaching and Learning Methods of Disable Students:	
1	Additional Tutorials
2	Online lectures and assignments

6.2. Teaching and learning method for low capacity and outstanding Student	
For low capacity students	-Assign a portion of the office hours for those students. -Give them specific tasks. -Repeat the explanation of some of the material and tutorials. - Assign a teaching assistance to follow up the performance of these group of students
For outstanding Students	-Hand out project assignments to those students. -Give them some research topics to be searched using the internet and conduct presentation. Encourage them to take parts in the running research projects.

7**. Student Evaluation:**

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Periodic exam	A1	1,2
2	Student load (quizzes, sheets, report)	A1	2,3
3	Final term examination	A1	1,2,3,4

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	8^{th}
2	Student load	2^{nd} -7^{th} - 14^{th}
3	Final term examination	15^{th}

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	37.3%
2	Student load	2.7%
3	Final term examination	60%
Total		**100%**

8. List of References:

No.	Reference List
1	Harumi Hattori " Partial Differential Equations: Methods, Applications and Theories" WSPC; 2nd edition (2019).
2	Schaeffer, David, Cain, John Wesley "Ordinary Differential Equations: Basics and Beyond" 2 nd edition, Springer-Verlag New York (2020).
3	Yuefan Deng "Lectures, Problems and Solutions for Ordinary Differential Equations" 2nd edition, WSPC; Second Edition (2017).

9. Facilities required for teaching and learning:

Facility			
1	Lecture classroom	3	White board
2	Seminar	4	Data Show system

10. Matrix of Competencies and LO's methods:

No.	Topic	Aims	A1			
			1	2	3	4
1	Partial differentiation applications: maximum and minimum values in more tl one variable	1	X	X	X	X
2	directional analysis - the directional differential effects - the multi integrations and its applications (the curved and the orthogonal axis)	1	X	X	X	X
3	Gauss- Stokes theory - the endless series and function expansion – basic concepts for the convergence and divergence.	1	X	X	X	X
4	Ordinary differential equations: The first order (the equations which can be separated, homogeneous, exact and linear)	1	X	X	X	X

5	the ordinary differential equations from the second order and higher orders (with constant and variable coefficients), systems from the ordinary differential equations	1	X	X	X	X
6	Laplace transfer and its applications in the solution of differential equations.	1	X	X	X	X

Course Coordinator: Dr / Samar Mohammed
Head of Department: Asso.prof.Amal Behiry
Date of Approval: 2023

Electronics 1
(CEE111**)**

1- Basic Information:

Program Title	Communications and Electronics Engineering program
Department Offering the Program	Communications and Electronics Engineering Department
Department Responsible for the Course	Communications and Electronics Engineering Department
Course Title	Electronics 1
Course Code	CEE111
Year/Level	Level 1
Specialization	Major
Authorization Date of Course Specification	-

Teaching hours	**Lectures**	**Lab.**	**Exercise**	**Contact**	**Student's load**
	3	**-**	**2**	**5**	**5**

2- Course Aims:

No.	Aims
2	**Apply analytic critical and systemic thinking to discover, analyze, and solve a wide range of engineering problems.**
11	**Computer systems in Electronics and Communication engineering can be used to design a system, component, and process to meet recent technological advances.**

3- Cometencies (LO'S):

Competency	Learning Outcomes (LO'S)
B2	1: Assess and evaluate the characteristics and performance of components, systems and processes.
C2	1: Select appropriate solutions for engineering problems based on analytical thinking.

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	**SEMICONDUCTOR BASICS:** (doping n type and p type materials, pn junction, depletion region, barrier potentials)	9	6	-
2	**SEMICONDUCTOR DIODE:** (pn junction diode, current equations, diffusion and drift current densities, forward and reverse bias characteristics, switching characteristics)	12	8	-
3	**SPECIAL SEMICONDUCTOR DIODE:** (Schottky barrier diode, Zener diode, Varactor diode, Tunnel diode, LASER diode, LED, LCD, Photo transistor and solar cell).	6	4	-
4	**BIPOLAR JUNCTION:** (PNP-NPN junctions, Early effect, current equations, input and output characteristics of CE, CB and CC)	9	6	-
5	**FIELD EFFECT TRANSISTORS:** (JFETs, drain and transfer characteristics, current equations, pinch-off voltage and its significance, MOSFET characteristics, threshold voltage, channel length modulation, D- MOSFET, E- MOSFET, current equations, equivalent circuit model and its parameters).	6	4	-
Total		**48**	**28**	**-**

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	lab
1	SEMICONDUCTOR BASICS: (doping n type and p type materials, pn junction, depletion region, barrier potentials)	x			x	x	x		x						x
2	SEMICONDUCTOR DIODE: (pn junction diode, current equations, diffusion and drift current densities, forward and reverse bias characteristics, switching characteristics)	x			x	x		x	x		x				x
3	SPECIAL SEMICONDUCTOR DIODE: (Schottky barrier diode, Zener diode, Varactor diode, Tunnel diode, LASER diode, LED, LCD, Photo transistor and solar cell).	x			x	x	x					x			x

4	BIPOLAR JUNCTION: (PNP-NPN junctions, Early effect, current equations, input and output characteristics of CE, CB and CC)	x			x		x	x			x				x
5	FIELD EFFECT TRANSISTORS: (JFETs, drain and transfer characteristics, current equations, pinch-off voltage and its significance, MOSFET characteristics, threshold voltage, channel length modulation, D-MOSFET, E- MOSFET, current equations, equivalent circuit model and its parameters).	x			x	x	x		x			x			x

6. Teaching and Learning Methods of Disable Students:

6.1. Teaching and Learning Methods of Disable Students:	
1	Additional Tutorials
2	Online lectures and assignments

6.2. Teaching and learning method for low capacity and outstanding Student	
For low capacity students	-Assign a portion of the office hours for those students. -Give them specific tasks. -Repeat the explanation of some of the material and tutorials. - Assign a teaching assistance to follow up the performance of these group of students
For outstanding Students	-Hand out project assignments to those students. -Give them some research topics to be searched using the internet and conduct presentation. Encourage them to take parts in the running research projects.

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Los
1	Periodic exam	B2(1),C2(1)
2	Student load	B2(1),C2(1)
3	Final term examination	B2(1),C2(1)

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	8^{th}
2	Student load	14^{th}
3	Final term examination	15^{th}

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	36%
2	Student load	4%
3	Practical/oral	12%
4	final examination	48%
Total		**100%**

8. List of References:

No.	Reference List
1	Adel Sedra, Smith, " Microelectronic Circuits ", seven Edition Oxford, New york, 2019
2	Thomas L. Floyd, " Electronic devices ", Ninth Edition, Prentice Hall Boston Columbus Indianapolis New York San Francisco,2020
3	Adel, Sedra " Microelectronic devices and Circuits", Ninth Edition, Boston Columbus Indianapolis New York San Francisco, 2020

9. Facilities required for teaching and learning:

No.	Facility
1	Lecture classroom
2	
3	White board
4	Data show system

10. Matrix of knowledge and skills of the course:

No.	Topic	Aims	B2	C2
			1	1
1	**SEMICONDUCTOR BASICS:** (doping n type and p type materials, pn junction, depletion region, barrier potentials)	2	x	x
2	**SEMICONDUCTOR DIODE:** (pn junction diode, current equations, diffusion and drift current densities, forward and reverse bias characteristics, switching characteristics)	2,11	x	x

3	**SPECIAL SEMICONDUCTOR DIODE:** (Schottky barrier diode, Zener diode, Varactor diode, Tunnel diode, LASER diode, LED, LCD, Photo transistor and solar cell).	2	x	x
4	**BIPOLAR JUNCTION:** (PNP-NPN junctions, Early effect, current equations, input and output characteristics of CE, CB and CC)	2,11	x	x
5	**FIELD EFFECT TRANSISTORS:** (JFETs, drain and transfer characteristics, current equations, pinch-off voltage and its significance, MOSFET characteristics, threshold voltage, channel length modulation, D- MOSFET, E- MOSFET, current equations, equivalent circuit model and its parameters).	2,11	x	x

Course Coordinator: Dr. Ahmed Kabeel
Head of Department: Prof. Mohamed fouad
Date of Approval: 2023

Computer Programming
(BAS115**)**

1- Basic Information:

Program Title	Communication and Electronics Engineering program
Department Offering the Program	Communication and Electronics Engineering Department
Department Responsible for the Course	Basic science and Engineering Department
Course Title	Computer Programming
Course Code	BAS 115
Year/Level	Level2
Specialization	Major
Authorization Date of Course Specification	-
Pre- request	-

Teaching hours	**Lectures**	**Lab.**	**Exercise**	**Contact**	**Student's load**
	2	**2**	**----**	**4**	**4**

2- Course Aims:

No.	**Aims**
2	Apply analytic critical and systemic thinking to identify, diagnose and solve engineering problems with a wide range of complexity and variation;

3- Learning Outcomes (LO'S):

A1	**1.** Applying engineering basics that are relevant to the computer programing (java) **2.** Solve engineering problems by applying different engineering algorithms . **3.** Identify, formulate, and solve complex engineering problems by applying engineering fundamentals.
A2	1 Describe & Design an appropriate system by applying " java " language programming. 2. Analyze and interpret data problems to identify java programs 3. Choose relevant computer-based software for modelling and analysis java programs

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	**Lecture:** Basic concepts of programming. **Practical:** problem analysis& Developing the programs charts& Structured programming	2	-	2
2	**Lecture**: Introduction Java Applications **Practical:** Form of the Program& fundamentals of Java programming language and its syntax& Primitive data types, operators, variables & Joptionpane& scanner Classes.	4	-	4
3	**Lecture:** Branching[Control Statements]. **Practical**: programs about (If statement, If -Else, Nested IF, Switch)	2	-	2
4	**Lecture:** [Iterations] Control Statements. **Practical:** solved problems about (Repetition statements: for, while, do-while& Nested loop &Continue, Break.)	4	-	4
5	**Lecture:** Concepts of object-Oriented programming **Practical:** Examples of Classes, Inheritance Concept.	2	-	2
6	**Lecture:** Methods in java. **Practical**: problems of (Declare method& Message passing& Method overloading)	2	-	2
7	**Lecture:** Arrays and Array list **Practical**: Create Array& Matrix& Array List.	4	-	4
8	**Lecture:** Introduction to java Applets. **Practical**: java Applets programs.	4	-	4
9	**Lecture:** Graphical user interface (GUI). **Practical:** GUI exercises.	4	-	4
Total		**28**	**-**	**28**

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	lab
1	**Lecture:** Basic concepts of programming. **Practical:** problem analysis& Developing the programs charts& Structured programming	x			x		x					x			x
2	**Lecture**: Introduction Java Applications **Practical:** Form of the Program& fundamentals of Java programming language and its syntax& Primitive data types, operators, variables & Joptionpane& scanner Classes.	x			x			x	x						x

3	**Lecture:** Branching[Control Statements]. **Practical**: programs about (If statement, If - Else, Nested IF, Switch)	x			x			x				x			x
4	**Lecture:** [Iterations] Control Statements. **Practical:** solved problems about (Repetition statements: for, while, do-while& Nested loop &Continue, Break.)	x			x		x		x			x			x
5	**Lecture:** Concepts of object-Oriented programming **Practical:** Examples of Classes, Inheritance Concept.	x			x		x		x						x
6	**Lecture:** Methods in java. **Practical**: problems of (Declare method& Message passing& Method overloading)	x			x			x					x		x

7	**Lecture:** Arrays and Array list **Practical**: Create Array& Matrix& Array List.	x			x		x		x				x		x
8	**Lecture:** Introduction to java Applets. **Practical**: java Applets programs.	x			x			x							x
	Lecture: Graphical user interface (GUI). **Practical:** GUI exercises.	x			x		x		x				x		x
9	**Lecture:** Graphical user interface (GUI). **Practical:** GUI exercises.	x			x			x							x

6. Teaching and Learning Methods of Disable Students:

6.1. Teaching and Learning Methods of Disable Students:	
1	Additional Tutorials
2	Online lectures and assignments

6.2. Teaching and learning method for low capacity and outstanding Student	
For low capacity students	-Assign a portion of the office hours for those students. -Give them specific tasks. -Repeat the explanation of some of the material and tutorials. - Assign a teaching assistance to follow up the performance of these group of students
For outstanding Students	-Hand out project assignments to those students. -Give them some research topics to be searched using the internet and conduct presentation. Encourage them to take parts in the running research projects.

7. Student Evaluation:

7.1 Student Evaluation methods:

No.	Evaluation Method	LO's
1	Periodic exam	A1(1,2)
2	Student load (report, quizzes)	A1(3),A2(1,2)
3	Final term examination	A1(1,2,3),A2(1,2)
4	Practical	A2(3)

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	8th
2	Student load	14th
3	Final term examination	15th

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	40%
2	final examination	50%
3	Practical examination	10%
Total		100%

8. List of References:

No.	**Reference List**
1	E Balagurusamy,"Programming with Java," McGraw-Hill Education · 2019
2	Andreas Göransson, Eric Foster-Johnson, David Cuartielles," **The Java Workshop: Learn object-oriented programming:,** Packt Publishing Ltd, 2019
3	Raymond Gallardo, Sharon Zakhour, et al, "Th,e Java Tutorials", Addison-Wesley Professional, 6 editions,2020
4	David J. Eck, "Introduction to Programming Using JAVA",2017
5	Patrick Niemeyer, Daniel Leuck", Learning Java, 4th Edition", O'Reilly Media; 4 edition (July 2, 2020)

9. Facilities required for teaching and learning:

No.	Facility
1	Lecture Classrooms with Sound Systems.
2	Computer Laboratories
3	
4	White board
5	Data show system
6	Wire and Wireless Internet Connections
7	Moodle

10. Matrix of competences of the course:

No.	Topic	Aims	A1			A2		
			1	2	3	1	2	3
1	Basic concepts of programming: problem analysis and developing the programs charts	2		X	X			
2	structured programming with one programming language	2	X				X	X
3	Concepts of object Oriented	2				X	X	X

	programming: Classes, inheritance and message passing, fundamentals of Java programming language and its syntax							
4	fundamentals of Java programming language and its syntax	2	X	X			X	X
5	major class libraries in Java	2	X		X		X	
6	Java applets	2	X				X	
7	Graphic User Interface programming	2	X					
8	practice on Java programming language	2	X					

Course Coordinator: Dr. Amira Elsonbaty
Head of Department: prof. Mohamed Fouad
Date of Approval: 2023

Engineering Thermodynamics
(BAS113**)**

1- Basic Information:

Program Title	Communication and Electronics Engineering program
Department Offering the Program	Communication and Electronics Engineering Department
Department Responsible for the Course	Basic Science and Engineering Department
Course Title	Engineering Thermodynamics
Course Code	BAS113
Year/Level	level 1
Specialization	Major
Authorization Date of Course Specification	-

Teaching hours	**Lectures**	**Lab.**	**Exercise**	**Contact**	**Student load**
	3	-	**2**	**5**	**4**

2- Course Aims:

No.	**Aims**
1	Master a broad range of engineering thermodynamics knowledge and specialized skills, as well as the ability to apply acquired knowledge in real-world situations by applying thermodynamics laws to identify, diagnose, and solve engineering problems of varying complexity and variation.

3- Competencies :

Competencies	Learning Outcomes (LO'S)
A1. Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.	1. Demonstrate the thermodynamics laws that apply to the engineering problems. 2. Explain the basic principles of engineering thermodynamics. 3. Study the concepts and theories of mathematical, science necessary for engineering thermodynamic properties for different types of systems. 4. Select the appropriate solutions for engineering problems and system design, gas power cycles, vapor cycles. 5. Using scientific concepts and thermodynamics laws that are relevant to the real life. 6. Modify engineering knowledge and understanding to improve design, products and services, gas power cycles, vapor cycles. 7. Solve complex engineering problems by applying the concepts and the thermodynamics laws.

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	Fundamental concepts - Properties of a pure substance	3	2	-
2	Equation of state - thermodynamic systems - Work and heat	3	2	-
3	First law of thermodynamics; Applications to Systems and Control Volumes	9	6	-
4	Second Law of Thermodynamics; Principle of Carnot cycles	6	4	-
5	Heat engines, Refrigerators and heat pumps - Principle of the increase of entropy	6	4	-
6	Applications to systems and control volumes - Irreversibility and availability	9	6	-
7	Power and refrigeration cycles	6	4	-
Total		**42**	**28**	**-**

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	lab
1	Fundamental concepts - Properties of a pure substance	x				X									
2	Equation of state - thermodynamic systems - Work and heat	x				X	x								
3	First law of thermodynamics; Applications to Systems and Control Volumes	x				X	x								
4	Second Law of Thermodynamics; Principle of Carnot cycles	x				X	x								
5	Heat engines, Refrigerators and heat pumps - Principle of the increase of entropy	x				X									
6	Applications to systems and control volumes - Irreversibility and availability	x				X									
7	Power and refrigeration cycles	x				X									

6. Teaching and Learning Methods of Disable Students:

6.1. Teaching and Learning Methods of Disable Students:

1	Additional Tutorials
2	Online lectures and assignments

6.2. Teaching and learning method for low capacity and outstanding Student	
For low capacity students	-Assign a portion of the office hours for those students. -Give them specific tasks. -Repeat the explanation of some of the material and tutorials. - Assign a teaching assistance to follow up the performance of these group of students
For outstanding Students	-Hand out project assignments to those students. -Give them some research topics to be searched using the internet and conduct presentation. Encourage them to take parts in the running research projects.

7**. Student evaluation:**

7.1 Student evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Periodic exam	A1	1,2,3
2	Student load (quizzes, sheets, report)	A1	4,5
3	Final term examination	A1	6,7

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	8th
2	Student load	2nd ,7th,9th,14th
3	Final term examination	15th

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	36.8%
2	final examination	48%
3	Student load	3.2%
4	Practical/oral	12%
	Total	**100%**

8. List of References:

No.	Reference List
1	P. K. Nag "Engineering Thermodynamics | 6th Edition" McGraw Hill Education; Sixth edition (2017).
2	Michael J. Moran, Howard N. Shapiro, Daisie D. Boettner, Margaret B. Bailey "Fundamentals of Engineering Thermodynamics" 9th edition Wiley (2020)

9. Facilities required for teaching and learning:

No.	Facility
1	Lecture classroom
2	
3	White board
4	Data show system

10. Matrix of Competencies and LO's:

No.	Topic	Aims	A1						
			1	2	3	4	5	6	7
1	Fundamental concepts - Properties of a pure substance	1	X	X	X				
2	Equation of state - thermodynamic systems - Work and heat	1				X	X	X	
3	First law of thermodynamics; Applications to Systems and Control Volumes	1					X	X	X
4	Second Law of Thermodynamics; Principle of Carnot cycles	1	X	X	X				
5	Heat engines, Refrigerators and heat pumps - Principle of the increase of entropy	1			X	X	X		
6	Applications to systems and control volumes - Irreversibility and availability	1				X	X	X	
7	Power and refrigeration cycles	1	X	X	X				

Course Coordinator: Dr. A. E. Kabeel
Head of Department: Asso.prof.Amal Behiry
Date of Approval: 2023

Electrical Engineering Fundamentals
(BAS112**)**

1- Basic Information:

Program Title	Communication and Electronics Engineering program
Department Offering the Program	Communication and Electronics Engineering Department

Department Responsible for the Course	Basic Science and Engineering Department
Course Title	Electrical Engineering Fundamentals
Course Code	BAS112
Year/Level	Level 1
Specialization	Major
Authorization Date of Course Specification	-

Teaching hours	Lectures	Lab.	Exercise	Contact	Student load
	3	-	2	5	4

2- Course Aims:

No.	Aims
2	Apply analytic critical and systemic thinking to discover, analyze, and solve a wide range of electrical engineering problems;
7	Proper utilization of modern electrical engineering techniques, skills, and tools
11	Computer systems in Electrical, Electronics and Communication engineering can be used to design a system, component, and process to meet recent technological advances.

4- Cometencies (LO'S):

Cometency	Learning Outcomes (LO'S)
A1.	**1** Identify the mathematical principles and theories that are relevant to the electrical circuit. **2** Solve engineering problems by applying mathematics and science concepts and theories appropriate to the discipline to identify, formulate and solve complex electrical engineering problems. **3** Identify, formulate, and solve complex engineering problems by applying engineering fundamentals electrical
A2	1. Analyze and interpret dat
B1.	1. Describe principles of design including elements design, process and/or a system related to specific disciplines 2. Recognize methodologies of solving engineering problems 3. Use a wide range of analytical tools, techniques, equipment, and software packages pertaining to the discipline and develop required computer programs.

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	Direct Current	3	2	-
2	Theory of electric circuits	6	4	-
3	Delta and Star connections	3	2	-
4	Sine A.C and D.C circuits	9	6	-

5	Time vectors diagram	3	2	-
6	Electric power and power factor in A.C circuits	3	2	-
7	3-Phase current - Electric machines - D.C machines	6	4	-
8	Transformers	3	2	-
9	Induction and synchronous machines	3	2	-
10	Fractional power machine	3	2	-
Total		**42**	**28**	**-**

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	lab
1	Direct Current	×			×	×		×				×			
2	Theory of electric circuits	×			×		×								
3	Delta and Star connections	×			×	×	×					×			
4	Sine A.C and D.C circuits	×			×		×	×				×			
5	Time vectors diagram	×			×	×		×							
6	Electric power and power factor in A.C circuits	×			×	×	×					×			
7	3-Phase current - Electric machines - D.C machines	×			×		×	×				×			
8	Transformers	×			×	×									
9	Induction and synchronous machines	×			×	×	×	×				×			
10	Fractional power machine	×			×			×				×			

6. Teaching and Learning Methods of Disable Students:

6.1. Teaching and Learning Methods of Disable Students:	
1	Additional Tutorials
2	Online lectures and assignments

6.2. Teaching and learning method for low capacity and outstanding Student	
For low capacity students	-Assign a portion of the office hours for those students. -Give them specific tasks. -Repeat the explanation of some of the material and tutorials. - Assign a teaching assistance to follow up the performance of these group of students
For outstanding Students	-Hand out project assignments to those students. -Give them some research topics to be searched using the internet and conduct presentation. Encourage them to take parts in the running research projects.

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	LO's
1	Periodic exam	$A_{1(}$1-2-3),A_2(3)
2	Student load (quizzes, sheets, report)	A2(1)
3	Final term examination	A_2(1).B_1(1,2,3)

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	8^{th}
2	Student load	2^{nd} ,7^{th},9^{th},14^{th}
3	Final term examination	15^{th}

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	2.6%
2	Student load	37.3%
3	final examination	60%
	Total	**100%**

8. List of References:

No.	Reference List
1	Fundamentals of electric circuits' alexander sadiku 4th edition.2019.
2	Fundamentals of Electrical Circuit Analysis, March 2020

9. Facilities required for teaching and learning:

No.	Facility
1	Lecture classroom
2	
3	White board
4	Data show system
5	Wireless internet
6	Sound system

10. Matrix of knowledge and skills of the course:

No.	Topic	Aims	A1			A2	B1		
			1	2	3	1	1	2	3
1	Direct Current	2	X			X			
2	Theory of electric circuits	2	X	X		X		X	
3	Delta and Star connections	7		X		X		X	
4	Sine A.C and D.C circuits	7			X	X		X	
5	Time vectors diagram	11		X				X	
6	Electric power and power factor in A.C circuits	7		X		X		X	
7	3-Phase current - Electric machines - D.C machines	7	X		X	X		X	
8	Transformers	7		X		X		X	
9	Induction and synchronous machines	7	X	X		X		X	
10	Fractional power machine	11	X		X	**X**		X	

Course Coordinator: Dr. Rabab Reda
Head of Department: Prof Mohamed Foud
Date of Approval: 2023

Technical English Language 2
(BAS114)

1- Basic Information:

Program Title	Communication and Electronics Engineering program
Department Offering the Program	Communication and Electronics Engineering Department
Department Responsible for the Course	Basic Science and Engineering Department
Course Title	Technical English Language 2
Course Code	BAS114
Year/Level	level 1
Specialization	Major
Authorization Date of Course Specification	-

Teaching hours	**Lectures**	**Lab.**	**Exercise**	**Contact**	**Student's load**
	2	**2**	**----**	**4**	**3**

2- Course Aims:

No.	**Aims**
5	Communicate effectively with a variety of audiences using a variety of forms, methods, and languages; cope with academic and professional issues in a critical and creative manner; and display leadership, business administration, and entrepreneurial abilities.

3- Competencies :

Competencies	**Learning Outcomes (LO'S)**
A8. Communicate effectively – graphically, verbally and in writing – with a range of audiences using contemporary tools.	1. Communicate effectively. 2. Demonstrate efficient IT capabilities.
A10. Acquire and apply new knowledge; and practice self, lifelong and other learning strategies.	1. Search for information to engage in lifelong self-learning discipline. 2. Professionally merge the language skills in self learning

4. Course Contents:

No	**Content**	**Lecture**	**Tutorial**	**Practical**
1	Introduction to academic research and writing through intensive investigation of an issue or topic	8	-	8

	specified by the instructor			
2	Students will be required to develop and organize a substantial research project related to the topic of the course and to demonstrate the information literacy skills required to find, evaluate	10	-	10
3	make appropriate use of primary and secondary materials relevant to their project.	8	-	8
Total		**28**	**-**	**28**

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	lab
1	Water Lab skills in English : Lesson 1 Bob drives a hard bargain & Lesson 2 Bob's big coolie order & grammar topics	x			X										x
2	Chemical and physical properties. Lab skills in English Lesson 3 Amber comes over to bake cookies & Lesson 4Amber and Ted heat up the kitchen & grammar topics	x			X										x
3	Water cycle Lab skills in English lesson 5 Nicole practices her election speech & grammar topics	x													x

4	Human uses Lab skills in English : Grammar topics	x													X
5	Heat transfer Lab skills in English lesson 6 Bob brings the cookies to the village market& lesson 7 Carol tells Bob the good news & grammar topics	x													x
6	Graphic language Lab skills in English : lesson 8 Every one bakes cookies & lesson 9 Nicole's close election & grammar topics	x													X
7	Energy Lab Skills in English lesson 10 Bob gets any angry call from Carol & Grammar topics	x													x
8	Automatic Control Lab Skills in English Grammar topics	x													x

6. Teaching and Learning Methods of Disable Students:

6.1. Teaching and Learning Methods of Disable Students:	
1	Additional Tutorials
2	Online lectures and assignments

6.2. Teaching and learning method for low capacity and outstanding Student	
For low capacity students	-Assign a portion of the office hours for those students. -Give them specific tasks. -Repeat the explanation of some of the material and tutorials. - Assign a teaching assistance to follow up the performance of these group of students
For outstanding Students	-Hand out project assignments to those students. -Give them some research topics to be searched using the internet and conduct presentation. Encourage them to take parts in the running research projects.

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Periodic exam	A8,A10	A8(1,2,),A10(1,2)
2	Student load (quizzes, sheets, report)	A8	A8(1,2,),A10(1,2)
3	Practical exam	A8,A10	A8(1,2,),A10(1,2)
4	Final term examination	A10	1,2

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	8^{th}
2	Student load	7^{th},9^{th}
3	Practical examination	14^{th}
4	Final term examination	15^{th}

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	37%
2	Student load	3%
3	Practical examination	10%
4	Final term examination	50%
Total		**100%**

8. List of References:

No.	Reference List
1	David Bonamy "Technical English" Longman Publishing Group 2020
2	Paul J. Hamel "English for Better Jobs 1: Language for Working and Living" Create Space Independent Publishing Platform; 2^{nd} st edition (2020)
3	Mahmood Reza Atai, Alireza Zaré Alanagh, Morteza Nasiri and Reza Taherkhani "English for The Students of Engineering" 2ndedition, SAMT Publication (2019).

9. Facilities required for teaching and learning:

No.	Facility
1	Lecture classroom
2	Computer lab.
3	Seminar
4	White board
5	Data Show system

10. Matrix of Competencies and LO's:

No.	Topic	Aims	A8	
			1	2

1	Introduction to academic research and writing through intensive investigation of an issue or topic specified by the instructor	5	x	x
2	Students will be required to develop and organize a substantial research project related to the topic of the course and to demonstrate the information literacy skills required to find, evaluate	5	x	x
3	make appropriate use of primary and secondary materials relevant to their project.	5	x	x

Course Coordinator: Dr / Doaa El-shrbiny
Head of Department: Asso.prof.Amal Behery
Date of Approval: 2023

Mathematics4
(BAS121**)**

1- Basic Information:

Program Title	Communications and Electronics Engineering program
Department Offering the Program	Communications and Electronics Engineering Department
Department Responsible for the Course	Basic Science and Engineering Department
Course Title	Mathematics 4
Course Code	BAS121
Year/Level	Level: 1
Specialization	Major
Authorization Date of Course Specification	-

Teaching hours	**Lectures**	**Lab.**	**Exercise**	**Contact**	**Student's load**
	2	**----**	**2**	**4**	**4**

2- Course Aims:

No.	Aims
1	Master a broad range of fundamental Mathematical engineering knowledge and specialized skills of Complex Analysis and Special functions, as well as the ability to apply acquired knowledge of Complex Analysis and Special functions in real-world situations as Heat equation and Wave equation by applying theories and abstract thinking in analytic critical and systemic thinking to identify, diagnose, and solve mathematical engineering problems as by using complex series and Fourier series .

3- Competencies :

Competencies	Learning Outcomes (LO'S)
A1. Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.	1. Learn the general principles of differential equations and series and it's applications in mathematical engineering. 2. Describe the effect of mathematical engineering principles and theories that apply in the most fundamental problems. 3. Define the basic concepts of series and analytic functions. 4. Use the basics of Complex Analysis and Special functions to solve engineering problems. 5. Apply the methods of solving partial differential equations to generate solutions for heating and wave equations.

4. Course Contents:

No.	Topics	Lecture	Tutorial	Practical
1	Special functions – Fourier series	4	4	-
2	periodic functions and Euler's laws	2	2	-
3	Fourier's integrations	4	4	-
4	solutions of the differential equations by series	2	2	-
5	solving the partial differential equations using variables separation	2	2	-
6	Functions with complex variables	2	2	-
7	complex quantities algebra	2	2	-
8	multiple values functions	2	2	-
9	the analytical functions and Koshi'stheorem	2	2	-
10	the complex series and Taylor and Lorant series	2	2	-
11	the zeros, unique points and the rest	2	2	-
12	the infinite series	2	2	-
Total		**28**	**28**	**-**

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	lab
1	Special functions Fourier series	x				x	x	X							
2	periodic functions and Euler's laws	x				x	x	X							
3	Fourier's integrations	x				x	x	X							
4	solutions of the differential equations by series	x				x	x	X							
5	solving the partial differential equations using variables separation	x				x	x	X							
6	Functions with complex variables	x				x	x	X							
7	complex quantities algebra	x				x	x	X							
8	multiple values functions	x				x	x	X							
9	the analytical functions and Koshi'stheorem	x				x	x	X							
10	the complex series and Taylor and Lorant series	x				x	x	X							
11	the zeros, unique points and the rest	x				x	x	X							
12	the infinite series	x				x	x	X							

6. Teaching and Learning Methods of Disable Students:

6.1. Teaching and Learning Methods of Disable Students:	
1	Additional Tutorials
2	Online lectures and assignments

6.2. Teaching and learning method for low capacity and outstanding Student	
For low capacity students	-Assign a portion of the office hours for those students. -Give them specific tasks. -Repeat the explanation of some of the material and tutorials. - Assign a teaching assistance to follow up the performance of these group of students
For outstanding Students	-Hand out project assignments to those students. -Give them some research topics to be searched using the internet and conduct presentation. Encourage them to take parts in the running research projects.

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Periodic exam	A1	1,2,3,4
2	Student load (quizzes, sheets, report)	A1	1,5
3	Final term examination	A1	3,4,5

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	8^{th}
2	Student load	2^{nd} -7^{th} -14^{th}
3	Final term examination	15^{th}

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	2.7%
2	Student load	37.3%
3	Final term examination	60%
Total		**100%**

8. List of References:

No.	Reference List
1	Brett Borden and James Luscombe "Fourier series and integrals" Morgan & Claypool Publishers (2017).
2	Chris McMullen " Essential Calculus Skills Practice Workbook with Full Solutions" Zishka Publishing (2020).

9. Facilities required for teaching and learning:

Facility	
1	Lecture classroom
2	Seminar
3	White board
4	Data Show system

10. Matrix of Competencies and LO's:

No.	Topic	Aims	A1				
			1	2	3	4	5
1	Special functions Fourier series	1	x			x	
2	periodic functions and Euler's laws	1	x	x			
3	Fourier's integrations	1			x		
4	solutions of the differential equations by series	1					x
5	solving the partial differential equations using variables separation	1					x
6	Functions with complex variables	1				x	
7	complex quantities algebra	1				x	
8	multiple values functions	1				x	
9	the analytical functions and Koshi'stheorem	1			x		
10	the complex series and Taylor and Lorant series	1				x	
11	the zeros, unique points and the rest	1					x
12	the infinite series	1			x		

Course Coordinator: Dr . Samar Maden
Head of Department: Asso.prof.Amal Behery
Date of Approval:

Electronics and Electrical Measurements
(CEE 123)

1- Basic Information:

Program Title	Communications and Electronics Engineering program
Department Offering the Program	Communications and Electronics Engineering Department
Department Responsible for the Course	Communications and Electronics Engineering Department
Course Title	Electronics and Electrical Measurements
Course Code	CEE 123
Year/Level	Level 1

Specialization	Major
Authorization Date of Course Specification	-

Teaching hours	**Lectures**	**Lab.**	**Exercise**	**Contact**	**Student load**
	3	-	**2**	**5**	**4**

2- Course Aims:

No.	Aims
4	Work as part of and manage a diverse team of professionals from various engineering specializations, taking responsibility for individual and team performance

3- Cometencies (LO'S):

Cometency	Learning Outcomes (LO'S)
A2	1. Describe principles of design, including elements of design, a process, and/or a system related to a specific discipline or fields of knowledge. 2. Develop suitable experimentation and/or simulation
A4.	1. Define contemporary engineering technologies and their applications in relation to disciplines. 2. Create methodical approaches when dealing with new and advancing technology.
A7	**1.** Motivate individuals.
A8.	**1. Effectively manage tasks, time, and resources.**
B2.	1. Assess and evaluate the characteristics and performance of components, systems and processes. 2. Identify appropriate specifications for required devices. 3. Use relevant laboratory equipment and analyze the results correctly
B3.	1. Merge engineering knowledge and understanding to improve design, products and/or services. 2. Demonstrates basic organizational and project management skills.
B4.	1. Troubleshoot, maintain and repair almost all types of electronic systems using the standard tools. 2. Use appropriate tools to measure system performance.
C1.	1. : Recognize engineering problems to identify the best solutions 2: Use computational facilities, measuring instruments, workshops and laboratories equipped to design experiments to collect, analyze and interpret results

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical

وحدة ضمان الجودة

وزارة التعليم العالى
المعهد العالى للهندسة والتكنولوجيا
بدمياط الجديدة

1	DC MACHINES: Three phase circuits, a review. Construction of DC machines – Theory of operation of DC generators	3	2	-
2	Characteristics of DC generators- Operating principle of DC motors – Types of DC motors and their characteristics – Speed control of DC motors- Applications.	6	4	-
3	TRANSFORMER: Introduction – Single phase transformer construction and principle of operation – EMF equation of transformer-Transformer no–load phasor diagram	6	4	-
4	Transformer on–load phasor diagram –– Equivalent circuit of transformer – Regulation of transformer –Transformer losses and efficiency-All day efficiency – auto transformers	6	4	-
5	INDUCTION MACHINES AND SYNCHRONOUS MACHINES : Principle of operation of three-phase induction motors – Construction –Types – Equivalent circuit – Construction of single-phase induction motors	6	4	-
6	Types of single phase induction motors – Double revolving field theory – starting methods - Principles of alternator – Construction details – Types –Equation of induced EMF – Voltage regulation. Methods of starting of synchronous motors – Torque equation – V curves – Synchronous motors	6	4	-
7	BASICS OF MEASUREMENT AND INSTRUMENTATION: Static and Dynamic Characteristics of Measurement – Errors in Measurement - Classification of Transducers – Variable resistive	3	2	-
8	Strainguage, thermistor RTD – transducer - Variable Capacitive Transducer – Capacitor Microphone - Piezo Electric Transducer – Variable Inductive transducer –LVDT, RVDT	3	2	

9	ANALOG AND DIGITAL INSTRUMENTS: DVM, DMM–Storage Oscilloscope. Comparison of Analog and Digital Modes of operation, Application of measurement system, Errors. Measurement of R, L and C, Wheatstone, Kelvin, Maxwell, Anderson, Schering and Wien bridges Measurement of Inductance, Capacitance, Effective resistance at high frequency, Q-Meter.	3	2	
Total		**42**	**28**	**-**

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	lab
1	DC MACHINES: Three phase circuits, a review. Construction of DC machines – Theory of operation of DC generators	X			X			X							

2	Characteristics of DC generators- Operating principle of DC motors – Types of DC motors and their characteristics – Speed control of DC motors- Applications..	X			X	X	X						X		
3	TRANSFORMER: Introduction – Single phase transformer construction and principle of operation – EMF equation of transformer- Transformer no–load phasor diagram	X			X	X		X					X		
4	Transformer on–load phasor diagram –– Equivalent circuit of transformer – Regulation of transformer – Transformer losses and efficiency-All day efficiency – auto transformers	X			X	X	X	X							

5	INDUCTION MACHINES AND SYNCHRONOUS MACHINES : Principle of operation of threephase induction motors – Construction – Types – Equivalent circuit – Construction of single-phase induction motors	X			X	X	X						X		
6	Types of single phase induction motors – Double revolving field theory – starting methods - Principles of alternator – Construction details – Types – Equation of induced EMF – Voltage regulation. Methods of starting of synchronous motors – Torque equation – V curves – Synchronous Motors	X			X	X	X	X					X		

7	BASICS OF MEASUREMENT AND INSTRUMENTATION: Static and Dynamic Characteristics of Measurement – Errors in Measurement - Classification of Transducers – Variable resistive	⤫			⤫	⤫	⤫	⤫							
8	Strainguage, thermistor RTD – transducer - Variable Capacitive Transducer – Capacitor Microphone - Piezo Electric Transducer – Variable Inductive transducer – LVDT, RVDT	⤫			⤫	⤫		⤫					⤫		

9	ANALOG AND DIGITAL INSTRUMENTS: DVM, DMM– Storage Oscilloscope. Comparison of Analog and Digital Modes of operation, Application of measurement system, Errors. Measurement of R, L and C, Wheatstone, Kelvin, Maxwell, Anderson, Schering and Wien bridges Measurement of Inductance, Capacitance, Effective resistance at high frequency, Q-Meter.	X	X		X	X	X	X							

6. Teaching and Learning Methods of Disable Students:

6.1. Teaching and Learning Methods of Disable Students:	
1	Additional Tutorials
2	Online lectures and assignments

6.2. Teaching and learning method for low capacity and outstanding Student	
For low capacity students	-Assign a portion of the office hours for those students. -Give them specific tasks. -Repeat the explanation of some of the material and tutorials. - Assign a teaching assistance to follow up the performance of these group of students
For outstanding Students	-Hand out project assignments to those students. -Give them some research topics to be searched using the internet and conduct presentation. Encourage them to take parts in the running research projects.

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	LO's
1	Periodic exam	A2(1,2),A4(2),B2(1,2,3)
2	Student load (quizzes, presentation, reports)	A4(1),A7(1),B2(1,2,3)
3	Final term examination	A8(1),B3(1,2),B4(1,2),C1(1,2)

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	8th
2	Student load	14th
3	Final term examination	15th

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	37.3%
2	final examination	60%
3	Student load	2.7%
	Total	**100%**

8. List of References:

No.	Reference List
1	Thomas L. Floyd, "Electronic devices ", Ninth Edition, Prentice Hall Boston Columbus Indianapolis New York San Francisco, 2020.
2	ELECTRONIC INSTRUMENTATION AND MEASUREMENTS BY DAVID A. BELL 2019.

9. Facilities required for teaching and learning:

No.	Facility
1	Lecture classroom
2	
3	White board
4	Data show system
5	Wireless internet
6	Sound system

10. Matrix of knowledge and skills of the course:

No.	Topic	Aims	A2		A4		A7	A8	B2			B3		B4		C1	
			1	2	1	2	1	1	1	2	3	1	2	1	2	1	2

1	DC MACHINES: Three phase circuits, a review. Construction of DC machines – Theory of operation of DC generators	4	X			X			X								
2	Characteristics of DC generators-Operating principle of DC motors – Types of DC motors and their characteristics – Speed control of DC motors-Applications..	4		X	X		X			X			X				
3	TRANSFORMER: Introduction – Single phase transformer construction and principle of operation – EMF equation of transformer-Transformer no–load phasor diagram	4		X		X	X	X		X			X				
4	Transformer on–load phasor diagram –– Equivalent circuit of transformer – Regulation of transformer – Transformer losses and efficiency-All day efficiency – auto transformers	7			X		X	X	X			X		X		X	
5	INDUCTION MACHINES AND SYNCHRONOUS	7				X	X			X		X				X	

	MACHINES : Principle of operation of three-phase induction motors – Construction – Types – Equivalent circuit – Construction of single-phase induction motors																
6	Types of single phase induction motors – Double revolving field theory – starting methods - Principles of alternator – Construction details – Types – Equation of induced EMF – Voltage regulation. Methods of starting of synchronous motors – Torque equation – V curves – Synchronous motors	7			X							X		X			
7	BASICS OF MEASUREMENT AND INSTRUMENTATION: Static and Dynamic Characteristics of Measurement – Errors in Measurement - Classification of	7									X				X		X

	Transducers – Variable resistive																
8	Strainguage, thermistor RTD – transducer - Variable Capacitive Transducer – Capacitor Microphone - Piezo Electric Transducer – Variable Inductive transducer – LVDT, RVDT																
9	ANALOG AND DIGITAL INSTRUMENTS: DVM, DMM– Storage Oscilloscope. Comparison of Analog and Digital Modes of operation, Application of measurement system, Errors. Measurement of R, L and C, Wheatstone, Kelvin, Maxwell, Anderson, Schering and Wien bridges Measurement of Inductance, Capacitance, Effective resistance at high frequency,																

	Q-Meter.																

Course Coordinator: Dr. Rabab Reda
Head of Department: Prof. Mohamed Fouad
Date of Approval: 2023

Electronics Tests 1
(CEE121**)**

1- Basic Information:

Program Title	Communications and Electronics Engineering program
Department Offering the Program	Communications and Electronics Engineering Department
Department Responsible for the Course	Communications and Electronics Engineering Department
Course Title	Electronics Tests 1
Course Code	CEE121
Year/Level	Level 1
Specialization	Major
Authorization Date of Course Specification	-

Teaching hours	**Lec.**	**Lab.**	**Exer.**	**Contact**	**Student load**
	2	2	-	4	4

2- Course Aims:

No.	**Aims**
7	**Proper utilization of modern engineering techniques, skills, and tools.** to Achieving the basic laws and theories of the electrical engineering, the properties of electronic components in practice ,studying, designing and implementing applications to use those components and test those with appropriate laboratory equipment.
13	Allocate projects creatively by analyzing data from intended tests and and using cad tools to optimize the intended design

3- COMETENCIES Learning Outcomes (LOs) :

Competency	Learning Outcomes (LOs)
A5	1. Define technical language and report writing. 2. Assess different ideas, views, and knowledge from a range of sources. 3. Prepare technical reports 4. Search for information to engage in lifelong self-learning discipline.
B2	1. Describe quality assurance systems, codes of practice and standards, health and safety requirements, and environmental issues. 2. Assess and evaluate the characteristics and performance of components, systems and processes. 3. Identify appropriate specifications for required devices. 4. Use relevant laboratory equipment and analyze the results correctly.
B4	1. Use relevant laboratory equipment and analyze the results correctly. 2. Use computational facilities, measuring instruments, workshops and laboratories equipment to design experiments and collect, analyze and interpret results.
B5	Adopt suitable national and international standards and codes to: design, build, operate, inspect and maintain electrical/electronic/digital equipment, systems and services.

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	An explanation how to use the laborotary with safty and purcations ,identfay and explain laboratory measuring devices and learn how to know the values of the basic components,	2		2
2	Conducting expermeints which cover basics of electronics circuits such as: Series and parallel resistors, voltage divider, Capacitor in dc circuit, DC block capacitor, RL circuits	6	-	6
3	Verifications of KVL & KCL, Verifications of Thevinin & Norton theorem, Verifications of Super Position Theorem, verifications of maximum power transfer theorem	6	-	6
4	Determination of resonance frequency,bandwidth,quality factor for Series & Parallel RLC Circuits	2	-	2
5	Characteristics of PN Junction and Diode Diode	4	-	4

	applications (half –and full wave rectifier-deign DC power supply- Diode clipper and clamper).			
6	Self and collected projects which covering the syllabus Such as design and implementation a DC powe supply and thowtooth generator,..attack using the basic components and timer 555	4		4
Total		**28**		**28**

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	lab
1	An explanation how to use the laborotary with safty and purcations, identfay and explain laboratory measuring devices and learn how to know the values of the basic components.	x			x		x	x							x
2	Conducting expermeints which cover basics of electronics circuits such as: Series and parallel resistors, voltage divider, Capacitor in dc circuit, DC block capacitor, RL circuits	x			x	x		x				x			x

3	Verifications of KVL & KCL, Verifications of Thevinin & Norton theorem, Verifications of Super Position Theorem, verifications of maximum power transfer theorem	x			x		x	x							x
4	Determination of resonance frequency of Series & Parallel RLC Circuits, Characteristics of PN Junction Diode	x			x	x	x					x			x
5	Diode applications (half –and full wave rectifier-deign DC power supply- Diode clipper and clamper).	x			x		x	x	x			x			x
6	Self and collected projects which covering the syllabus Such as design and implementation a DC powe supply and thowtooth generator,..attack using the basic components and timer 555 circuit	x			x	x	x	x	x			x			x

6. Teaching and Learning Methods of Disable Students:

6.1. Teaching and Learning Methods of Disable Students:	
1	Additional Tutorials
2	Online lectures and assignments
6.2. Teaching and learning method for low capacity and outstanding Student	
For low capacity students	-Assign a portion of the office hours for those students. -Give them specific tasks. -Repeat the explanation of some of the material and tutorials. - Assign a teaching assistance to follow up the performance of these group of students
For outstanding Students	-Hand out project assignments to those students. -Give them some research topics to be searched using the internet and conduct presentation. Encourage them to take parts in the running research projects.

7**. Student Evaluation:**

7.1 Student Evaluation method:

No.	Evaluation Method	ILO's
1	Periodic exam	B2(1-2-3), B4(1-2)
2	Student load (project-CAD tools-lab experiments)	B2(1-2)
3	Final term examination	B2(1-2-3-4), B4(1-2),B5

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	8^{th}
2	Student load	14^{th}
3	Final term examination	15^{th}

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	36%
2	Student load	4%
3	Practical examination	10%
4	final examination	50%
	Total	**100%**

8. List of References:

No.	Reference List
1	Fundamentals of Electric Circuits , by Charles k Alexander , Matthew N.O. Sadiku,McGraw hill 5^{th} edition 2023
2	Wasef Naem, Concepts in Electric Circuits, McGraw hill, 3rd, 2020.
3	Thomas L. Floyd, Electronic devices, electron flow version. Prentice Hall, 12^{th},2020
4	Robert L. Boylestad , Electronic Devices and Circuit Theory: International Edition, Springer, 12^{th}. edition ,2019
5	Maurizio Di Paolo Emilio , Microelectronics: From Fundamentals to Applied Design, , Springer;2^{th}.edition 2019

9. Facilities required for teaching and learning:

No.	Facility
1	Classroom
2	Computer and video data show
3	Lab
4	White board
5	Wireless internet
6	Sound system

10. Matrix of knowledge and skills of the course:

No.	Topic	aim	A5				B2				B5	B4	
			1	2	3	4	1	2	3	4	1	1	2
1	Identfay and explain the measuring devices and basic components,Conducting experiments which covers the basics of electronics and the logical circuits using testing and electronic measurement equipment's	7	x		x								
2	Methods of measurements such as: Series and parallel resistors, voltage divider, Capacitor in dc circuit, DC block capacitor, RL circuit	7,13			x				x				
3	Verifications of KVL & KCL, Verifications of Thevinin & Norton theorem, Verifications of Super Position Theorem, verifications of maximum power transfer theorem	13			x				x		x		
4	Determination of resonance frequency of Series & Parallel RLC Circuits, Characteristics of PN Junction Diode	13			x							x	

5	Diode applications (half –and full wave rectifier-deign DC power supply- Diode clipper and clamper).	13				x		x

Course Coordinator: Dr. Hossam Abde lfatah
Head of Department: Dr / Amr hussain
Date of Approval: 2023

Electronics 2
(CEE122**)**

1- Basic Information:

Program Title	Communications and Electronics Engineering program
Department Offering the Program	Communications and Electronics Engineering Department
Department Responsible for the Course	Communications and Electronics Engineering Department
Course Title	Electronics 2
Course Code	CEE122
Year/Level	Level 1
Specialization	Major
Authorization Date of Course Specification	-

Teaching hours	**Lectures**	**Lab.**	**Exercise**	**Contact**	**Student's load**
	3	**-**	**2**	**5**	**5**

2- Course Aims:

No.	**Aims**
2	**Apply analytic critical and systemic thinking to discover, analyze, and solve a wide range of engineering problems.**
11	**Computer systems in Electronics and Communication engineering can be used to design a system, component, and process to meet recent technological advances.**

3- Cometencies Learning Outcomes (LOs):

NO.	**Learning Outcomes (LO'S)**
B2	1: Assess and evaluate the characteristics and performance of components, systems and

	processes.
C2	1: Select appropriate solutions for engineering problems based on analytical thinking.

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	**The characteristics and processing of (JFET & MOSFET):**(The effect of the surfaces, effect of the narrow canal, different types for MOS, feeding circuits of FET)	12	8	-
2	**Digital and analog applications of FET:** (single circuits industry, elements of the mobile charge, the integrated circuits with high numbers, the testing of a correlation and assembling of the integrated circuits)	12	8	-
3	**The basic regular circuits (The transistors):** (nourishing an organizer, the resort the volt, PNPN valve)	9	4	-
4	**Design of power circuits**	6	4	-
5	**THYRISTOR applications:** (two directions equipment, the cell of the semi-conductive and its related equipment)	9	4	-
Total		**48**	**28**	**-**

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	lab
1	The characteristics and processing of (JFET & MOSFET)☹The effect of the surfaces, effect of the narrow canal, different types for MOS, feeding circuits of FET)	x			x		x					x			

2	Digital and analog applications of FET: (single circuits industry, elements of the mobile charge, the integrated circuits with high numbers, the testing of a correlation and assembling of the integrated circuits)	×			×		×	×							
3	The basic regular circuits (The transistors): (nourishing an organizer, the resort the volt, PNPN valve)	×			×			×				×			
4	Design of power circuits	×			×			×		×		×			
5	THYRISTOR applications: (two directions equipment, the cell of the semiconductive and its related equipment)	×			×		×	×				×			

6. Teaching and Learning Methods of Disable Students:

6.1. Teaching and Learning Methods of Disable Students:	
1	Additional Tutorials
2	Online lectures and assignments

6.2. Teaching and learning method for low capacity and outstanding Student	
For low capacity students	-Assign a portion of the office hours for those students. -Give them specific tasks. -Repeat the explanation of some of the material and tutorials. - Assign a teaching assistance to follow up the performance of these group of students
For outstanding Students	-Hand out project assignments to those students. -Give them some research topics to be searched using the internet and conduct presentation. Encourage them to take parts in the running research projects.

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	LOs
1	Periodic exam	B2(1),C2(1)
2	Student load	B2(1),C2(1)
3	Final term examination	B2(1),C2(1)

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	8^{th}
2	Student load	14^{th}
3	Final term examination	15^{th}

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	37.3%
2	Student load	2.7%
3	final examination	60%
	Total	**100%**

8. List of References:

No.	Reference List
1	Thomas L. Floyd, “Electronic devices ", tenth Edition, Prentice Hall Boston Columbus Indianapolis New York San Francisco,2023.
2	Adel, Sedra" Microelectronic devices and Circuits", tenth Edition, Boston Columbus Indianapolis New York San Francisco, 2020.
3	ROBERT B. L. NASHELSKY, "Electronic devices and Circuit Theory ", Ninth Edition Pearson Education, Inc., Upper Saddle River, New Jersey 07458. Pearson Prentice Hall, 2020.

9. Facilities required for teaching and learning:

No.	Facility
1	Lecture classroom
2	
3	White board
4	Data show system
5	Wireless internet
6	Sound system

10. Matrix of knowledge and skills of the course:

No.	Topic	Aims	B2	C2
			1	1
1	**The characteristics and processing of (JFET & MOSFET):**	2	x	X

	(The effect of the surfaces, effect of the narrow canal, different types for MOS, feeding circuits of FET)			
2	**Digital and analog applications of FET:** (single circuits industry, elements of the mobile charge, the integrated circuits with high numbers, the testing of a correlation and assembling of the integrated circuits)	2,11	x	X
3	**The basic regular circuits (The transistors):** (nourishing an organizer, the resort the volt, PNPN valve)	2	x	X
4	**Design of power circuits**	2,11	x	X
5	**THYRISTOR applications:** (two directions equipment, the cell of the semi-conductive and its related equipment)	2,11	x	X

Course Coordinator: Dr. Ahmed Kabeel
Head of Department: Prof. Mohamed Fouad
Date of Approval: 2023

Introductions to Information Technology
(BAS123**)**

1- Basic Information:

Program Title	Communication and electronics Engineering program
Department Offering the Program	Communication and electronics Engineering Department
Department Responsible for the Course	Basic Science and Engineering Department
Course Title	Introductions to Information Technology
Course Code	BAS123
Year/Level	Level 1
Specialization	Major
Authorization Date of Course Specification	-

Teaching hours	**Lectures**	**Lab.**	**Exercise**	**Contact**	**Student's load**
	2	**----**	**2**	**4**	**4**

2- Course Aims:

No.	**Aims**
7	Use the techniques, skills, and appropriate engineering tools, necessary for engineering practice web design project ,

3- Learning Outcomes (LO'S):

A_4	1. List the engineering-related business and management principles, websites 2. Define contemporary websites technologies and their applications in relation to engineering field 3. Utilize modern technologies, programs, applications related by websites 4. Search for information and engage in life-long self-learning .
A_8	**1. Communicate effectively.** 2. **Demonstrate efficient IT capabilities.**

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	**Lecture:** Introduction to information systems & information technology **Practical:** Introduction of html	2	-	2
2	**Lecture:** information systems & information technology (Fields- Applications -Examples) **Practical:** html structure code	2	-	2
3	**Lecture:** Computer systems **Practical:** Font Tags	2	-	2
4	**Lecture:** Hardware used in information systems **Practical:** Font Tags	2	-	2
5	**Lecture:** Software used in information systems **Practical: paragraph tags**	2	-	2
6	**Lecture:** Introduction of data communication system **Practical:** order lists	2	-	2
7	**Lecture:** Introduction of Computer Networking **Practical:** unorder lists	2	-	2
8	**Lecture:** The internet; the foundations, Resources and uses of the internet, **Practical:** Image tag	4	-	4
10	**Lecture:** Privacy Security and Ethics **Practical:** horizontal &vertical Rules	2	-	2
11	**Lecture:** Emphasizing practical skills for finding, Reading and authorizing materials **Practical:** Frames	2	-	2
12	**Lecture:** Introduction of Artificial Intelligence **Practical:** Tables	2	-	2
13	**Lecture:** introduction of cloud computing **Practical:** Hyper Links	2	-	2
14	**Lecture: Html Projects**	2	-	2
Total		**28**	**-**	**28**

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	lab
1	**Lecture:** Introduction to information systems & information technology **Practical:** Introduction of html	⌧			⌧		⌧	⌧							⌧
2	**Lecture:** information systems & information technology (Fields-Applications -Examples) **Practical:** html structure code	⌧			⌧			⌧			⌧	⌧			⌧
3	**Lecture:** Computer systems **Practical:** Font Tags	⌧			⌧		⌧					⌧			⌧
4	**Lecture:** Hardware used in information systems **Practical:** Font Tags	⌧			⌧		⌧	⌧			⌧	⌧			⌧

5	**Lecture:** Software used in information systems **Practical: paragraph tags**	X			X			X			X				X
6	**Lecture:** Introduction of data communication system **Practical:** order lists	X			X		X	X			X	X			X
7	**Lecture:** Introduction of Computer Networking **Practical:** unorder lists	X			X		X	X			X	X			X
8	**Lecture:** The internet; the foundations, Resources and uses of the internet, **Practical:** Image tag	X			X			X			X				X
10	**Lecture:** Privacy Security and Ethics **Practical:** horizontal &vertical Rules	X			X			X			X				X
11	**Lecture:** Emphasizing practical skills for finding, Reading and authorizing materials **Practical:** Frames	X			X		X	X			X	X			X

12	**Lecture:** Introduction of Artificial Intelligence **Practical:** Tables	×			×		×	×			×	×			×
13	**Lecture:** introduction of cloud computing **Practical:** Hyper Links	×			×		×	×			×	×			×
14	**Lecture: Html Projects**	×			×		×	×			×	×			×

6. Teaching and Learning Methods of Disable Students:

6.1. Teaching and Learning Methods of Disable Students:	
1	Additional Tutorials
2	Online lectures and assignments

6.2. Teaching and learning method for low capacity and outstanding Student	
For low capacity students	-Assign a portion of the office hours for those students. -Give them specific tasks. -Repeat the explanation of some of the material and tutorials. - Assign a teaching assistance to follow up the performance of these group of students
For outstanding Students	-Hand out project assignments to those students. -Give them some research topics to be searched using the internet and conduct presentation. Encourage them to take parts in the running research projects.

7**. Student Evaluation:**

7.1 Student Evaluation method:

No.	**Evaluation Method**	**LO's**
1	Periodic exam	A4.1,A4.2
2	Student load (quizzes, sheets, report)	A4.4,A8.1,A8.2

3	Practical Examination	A4.3
4	Final term examination	A4.2,A4.3, A4.4

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	8^{th}
2	Student load	2^{nd} ,7^{th},9^{th},13^{th}
3	Practical Examination	14^{th}
4	Final term examination	15^{th}

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	40%
2	final examination	50%
3	Practical examination	10%
Total		**100%**

8. List of References:

No.	Reference List
1	INFORMATION TECHNOLOGY : THEORY AND PRACTICE SINHA, PRADEEP K. SINHA, PRITI,2020
2	INFORMATION TECHNOLOGY LAW, IAN J. LLOYD ·,2019

9. Facilities required for teaching and learning:

No.	Facility
1	Lecture classroom
2	
3	Computer lab.
4	White board
5	Data show system
6	Wireless internet
7	Sound system
8	Moodle

10. Matrix of competences of the course:

No.	Topics	Aims	A4				A8	
			1	2	3	4	1	2
1	**Lecture:** Introduction to information systems & information technology **Practical:** Introduction of html	7	X	X				
2	**Lecture:** information systems & information technology (Fields-Applications -Examples)	7	X	X	X	X		

	Practical: html structure code							
3	**Lecture:** Computer systems **Practical:** Font Tags	**7**	**X**					**X**
4	**Lecture:** Hardware used in information systems **Practical:** Font Tags	**7**		**X**				**X**
5	**Lecture:** Software used in information systems **Practical: paragraph tags**	**7**			**X**			**X**
6	**Lecture:** Introduction of data communication system **Practical:** order lists	**7**	**X**	**X**				
7	**Lecture:** Introduction of Computer Networking **Practical:** unorder lists	**7**	**X**	**X**	**X**	**X**		
8	**Lecture:** The internet; the foundations, Resources and uses of the internet, **Practical:** Image tag	**7**	**X**					**X**
10	**Lecture:** Privacy Security and Ethics **Practical:** horizontal &vertical Rules	**7**		**X**				**X**
11	**Lecture:** Emphasizing practical skills for finding, Reading and authorizing materials **Practical:** Frames	**7**			**X**			**X**
12	**Lecture:** Introduction of Artificial Intelligence **Practical:** Tables	**7**	**X**	**X**				
13	**Lecture:** introduction of cloud computing **Practical:** Hyper Links	**7**	**X**	**X**	**X**	**X**		
14	**Lecture: Html Projects**	**7**	**X**					**X**

Course Coordinator: Dr. Amira Elsonbaty
Head of Department: Asso.Prof. Mohamed Fouad
Date of Approval: 2023

Technical Report Writing
(BAS122**)**

1- Basic Information:

Program Title	Communication and electronics Engineering

	program
Department Offering the Program	Communication and electronics Engineering Department
Department Responsible for the Course	Basic Science and Engineering Department
Course Title	Technical Report Writing
Course Code	BAS122
Year/Level	Level 1
Specialization	Major
Authorization Date of Course Specification	-

Teaching hours	**Lectures**	**Lab.**	**Exercise**	**Contact**	**Student's load**
	2	**2**	**----**	**4**	**4**

2- Course Aims:

No.	Aims
5	Communicate effectively with a variety of audiences using a variety of forms, methods, and languages; cope with academic and professional issues in a critical and creative manner; and display leadership, business administration, and entrepreneurial abilities.

3-Competencies :

Competencies	Learning Outcomes (LO'S)
A5. Practice research techniques and methods of investigation as an inherent part of learning.	1. Define technical language and report writing. 2.Write technical language and technical report writing through sequence steps (identify report section, present your report, cite reference and add figures and tables). 3. Assess different ideas, views, and knowledge from a range of sources. 4. Evaluate results of report models by analyzing percentage of plagiarism and rules of scientific report and rules of presentation. 5. Prepare technical reports 6. Search for information to engage in lifelong self-learning discipline.
A8. Communicate effectively – graphically, verbally and in writing – with a range of audiences using contemporary tools.	1. Communicate effectively. 2.Demonstrate efficient IT capabilities.

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	Writing the scientific reports by English language: The principles of report preparation	6	-	6
2	types of reports – formatting the reports – skills of figures and shapes – importing text	6	-	6

3	chart drawings – optical scanning for the pictures and documents – the border and notes operations in the reports	6	-	6
4	Saving and indexing the reports – searching for text	6	-	6
5	coping and safety of information – using the different computer programs packages for writing and demonstrating the reports.	4	-	4
Total		**28**	**-**	**28**

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	lab
1	Introduction to technical writing. ❖ Define a report, Types of reports, Aim ❖ Common concepts: clarity of Writing, Consistency ❖ Supporting Material ❖ Language rules (voice, tense) and Style	x			**x**	**X**									
2	Common components of a technical report ❖ Organization of report sections ❖ Sections function and content	x			**x**	**X**									

3	How to write a technical report ❖ Identify layout, Determine Audience ❖ Assign reference, add non text component ❖ Mechanics of report writing. ❖ Quantitative Writing	x				X									
4	Equations, Tables and Figures	x				X									
5	Literature citations	x				X									
6	Using word processing for Writing Report	x				x									
7	Creating slides with presentation graphics programs	x				x									
8	MS Excel Application and power view report command	x				x									
9	Database Report using MS SQL	x				X									

6. Teaching and Learning Methods of Disable Students:

6.1. Teaching and Learning Methods of Disable Students:	
1	Additional Tutorials
2	Online lectures and assignments

6.2. Teaching and learning method for low capacity and outstanding Student	
For low capacity students	-Assign a portion of the office hours for those students. -Give them specific tasks. -Repeat the explanation of some of the material and tutorials. - Assign a teaching assistance to follow up the performance of these group of students
For outstanding Students	-Hand out project assignments to those students. -Give them some research topics to be searched using the internet and conduct presentation.

	Encourage them to take parts in the running research projects.

7. **Student Evaluation :**

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Periodic exam	A5	1,2
2	Student load (quizzes, sheets, report, presentation)	A5,A8	A5(3),A8(1,2)
3	Practical Examination	A5,A8	A5(3),A8(1,2)
4	Final term examination	A5,A8	A5(1,2,3,4),A8(1,2)

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	8^{th}
2	Student load	2^{nd} ,7^{th},9^{th},13^{th}
3	Practical Examination	14^{th}
4	Final term examination	15^{th}

7.3 weighting of Evaluation:

No.	Evaluation method	Weights
1	Periodic exam	36%
2	final examination	50%
3	Practical examination	10%
4	Student load	4%
Total		**100%**

8. List of References:

No.	Reference List
1	How to write technical report, 2020 by lutezhering.

9. Facilities required for teaching and learning:

No.	Facility
1	Lecture classroom
2	
3	Computer lab.
4	White board
5	Data show system
6	Wireless internet
7	Sound system

10. Matrix of Competencies and LO's:

No	Topic	Aims	A5					
			1	2	3	4	5	6

1	Writing the scientific reports by English language: The principles of report preparation	5	**X**					
2	types of reports – formatting the reports – skills of figures and shapes – importing text	5		**X**				
3	chart drawings – optical scanning for the pictures and documents – the border and notes operations in the reports	5			**X**			
4	Saving and indexing the reports – searching for text	5			**X**			
5	coping and safety of information – using the different computer programs packages for writing and demonstrating the reports.	5	**X**				**X**	**X**

Course Coordinator: Dr / Hany Hashesh and Dr. Mohammed El_Bendary
Head of Department: Asso.prof.Amal Beherry
Date of Approval: 2023

Engineering Probability and Statistics
(BAS211**)**

1- Basic Information:

Program Title	Communication and electronics Engineering program
Department Offering the Program	Communication and electronics Engineering Department
Department Responsible for the Course	Basic Science and Engineering Department
Course Title	Engineering Probability and Statistics
Course Code	BAS211
Year/Level	Level: 2
Specialization	Major
Authorization Date of Course Specification	-

Teaching hours	**Lectures**	**Lab.**	**Exercise**	**Contact**	**Student's load**
	2	**----**	**2**	**4**	**4**

2- Course Aims:

No.	**Aims**
1	The ability to apply probability theories and hypothesis testing in analytic critical and

	systemic thinking to solve engineering problems of varying complexity and variation.
6	Analyze data from the intended tests to manage resources creatively

3- Competencies :

Competencies	Learning Outcomes (LO'S)
A1. Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.	1. Describe the relevant mathematical principles and theories in the discipline. 2. Explain the scientific principles and theories that apply to the topic. 3. Use math ideas and theories that are applicable to the field. 4. Applying engineering basics that are relevant to the subject. 5. Identify, formulate, and solve complex engineering problems by applying the concepts and the theories of sciences, appropriate to the discipline.
A2. 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.	1. Applying statistical analyses and objective engineering judgment to draw conclusions.

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	Probability theory	4	4	-
2	Discrete and continuous probability distributions	6	6	-
3	Statistics in engineering	4	4	-
4	Descriptive Statistics Sampling distributions	2	2	-
5	Estimation and confidence intervals	4	4	-
6	Hypothesis testing	4	4	-
7	Simple regression	4	4	-
Total		**28**	**28**	

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	lab
1	Probability theory	x				x	x								
2	Discrete and continuous probability distributions	x				x		x							
3	Statistics in engineering	x				x	x	x							
4	Descriptive Statistics Sampling distributions	x				x	x	x							
5	Estimation and confidence intervals	x				x	x	x							
6	Hypothesis testing	x				x	x	x							
7	Simple regression	x				x	x	x							

6. Teaching and Learning Methods of Disable Students:

6.1. Teaching and Learning Methods of Disable Students:	
1	Additional Tutorials
2	Online lectures and assignments

6.2. Teaching and learning method for low capacity and outstanding Student	
For low capacity students	-Assign a portion of the office hours for those students. -Give them specific tasks. -Repeat the explanation of some of the material and tutorials. - Assign a teaching assistance to follow up the performance of these group of students
For outstanding Students	-Hand out project assignments to those students. -Give them some research topics to be searched using the internet and conduct presentation. Encourage them to take parts in the running research projects.

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Periodic exam	A1,A2	A1(1,2,3),A2(1)
2	Student load (quizzes, sheets, report)	A1,A2	A1(1,2,3),A2(1)
3	Final term examination	A1,A2	A1(2,3,4,5),A2(1)

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	8^{th}
2	Student load	2^{nd} -7^{th} - 9^{th} -14^{th}
3	Final term examination	15^{th}

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	36%
2	Student load	4%
3	Final term examination	60%
Total		**100%**

8. List of References:

No.	Reference List
1	E. Kreyszig "Advanced Engineering Mathematics" 13th edition, John Wiley and Sons, Inc. 2020
2	Andrew Metcalfe, David Green, Tony Greenfield, Mayhayaudin Mansor, Andrew Smith, Jonathan Tuke " Statistics in Engineering With Examples in MATLAB" 2nd Edition, Chapman and Hall/CRC (2019).

9. Facilities required for teaching and learning:

No.	Facility
1	Lecture classroom
2	
3	White board
4	Data show system
5	Sound system

10. Matrix of Competencies and LO's:

No.	Topic	Aims	A1					A2
			1	2	3	4	5	1
1	Probability theory	1	x					x
2	Discrete and continuous probability distributions	6		x	x			x
3	Statistics in engineering	1			x	x		x
4	Descriptive Statistics Sampling	1				x	x	x

	distributions							
5	Estimation and confidence intervals	1	**x**	**x**				**x**
6	Hypothesis testing	6				**x**	**x**	**x**
7	Simple regression	6	**x**		**x**	**x**		**x**

Course Coordinator: Dr. Samar Mohammed
Head of Department: Asso.prof.Amal Behery
Date of Approval: 2023

Fundamentals of Electromagnetism
(CEE211)

1- Basic Information:

Program Title	Communications and Electronics Engineering program
Department Offering the Program	Communications and Electronics Engineering Department
Department Responsible for the Course	Communications and Electronics Engineering Department
Course Title	Fundamentals of Electromagnetism
Course Code	CEE211
Year/Level	Level 2
Specialization	Major
Authorization Date of Course Specification	-

Teaching hours	**Lec.**	**Lab.**	**Exe.**	**Contact**	**Student load**
	2	-	2	4	6

2- Course Aims:

No.	**Aims**
1	Master a wide range of engineering knowledge and specialized skills, as well as the ability to apply that information in real-world situations using theories and analytical thinking.

3- Cometencies (LO’S) :

Competency	**Competency**
C1	1. Apply knowledge of mathematics to asses theories of electromagnetics engineering. 2. Apply knowledge of science to asses theories of electromagnetics engineering. 3. apply the theories of electromagnetic engineering to asses the applications

4. Course Contents:

No.	Topics	**Lectures**	**Tutorial**	**Practical**
1	Vector Algebra, Coordinate Systems, Vector differential operator, Gradient, Divergence, Curl, Divergence theorem, Stokes theorem	4	4	

2	STATIC ELECTRIC FIELD: Coulombs law, Electric field intensity, Point, Line, Surface and Volume charge distributions, Electric flux density	4	4	-
3	Gauss law and its applications, Gauss divergence theorem, Absolute Electric potential, Potential difference, Calculation of potential differences for different configurations. Electric dipole, Electrostatic Energy and Energy density.	4	4	-
4	CONDUCTORS AND DIELECTRICS: Conductors and dielectrics in Static Electric Field, Current and current density, Continuity equation, Polarization, Boundary conditions, Method of images, Resistance of a conductor, Capacitance, Parallel plate,	2	2	-
5	Coaxial and Spherical capacitors, Boundary conditions for perfect dielectric materials, Poisson"s equation, Laplace"s equation, Solution of Laplace equation, Application of Poisson"s and Laplace"s equations.	2	2	-
6	STATIC MAGNETIC FIELDS: Biot - Savart Law, Magnetic field Intensity, Estimation of Magnetic field Intensity for straight and circular conductors, Ampere"s Circuital Law, Point form of Ampere"s Circuital Law	4	4	-
7	Stokes theorem, Magnetic flux and magnetic flux density, The Scalar and Vector Magnetic potentials, Derivation of Steady magnetic field Laws.	3	3	-
8	MAGNETIC FORCES AND MATERIALS: Force on a moving charge, Force on a differential current element, Force between current elements, Force and torque on a closed circuit, The nature of magnetic materials	1	1	-
9	Magnetization and permeability, Magnetic boundary conditions	1	1	-

	involving magnetic fields, The magnetic circuit, Potential energy and forces on magnetic materials, Inductance, Basic expressions for self and mutual inductances, Inductance evaluation for solenoid, toroid, coaxial cables and transmission lines, Energy stored in Magnetic fields			
10	TIME VARYING FIELDS AND MAXWELL'S EQUATIONS: Fundamental relations for Electrostatic and Magnetostatic fields, Faraday‟s law for Electromagnetic induction, Transformers, Motional Electromotive forces	2	2	
11	Differential form of Maxwell‟s equations, Integral form of Maxwell‟s equations, Potential functions, Electromagnetic boundary conditions, Wave equations and their solutions, Poynting‟s theorem, Time harmonic fields, Electromagnetic Spectrum.	1	1	
Total		**28**	**28**	

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	lab

1	Vector Algebra, Coordinate Systems, Vector differential operator, Gradient, Divergence, Curl, Divergence theorem, Stokes theorem	X			X	X		X			X	X			
2	STATIC ELECTRIC FIELD: Coulombs law, Electric field intensity, Point, Line, Surface and Volume charge distributions, Electric flux density	X			X	X		X			X	X			
3	Gauss law and its applications, Gauss divergence theorem, Absolute Electric potential, Potential difference, Calculation of potential differences for different configurations. Electric dipole, Electrostatic Energy and Energy density.	X			X		X		X		X				
4	CONDUCTORS AND DIELECTRICS: Conductors and dielectrics in Static Electric Field, Current and current density, Continuity equation, Polarization, Boundary conditions, Method of images, Resistance of a conductor, Capacitance, Parallel plate	X			X		X	X			X	X			

5	Coaxial and Spherical capacitors, Boundary conditions for perfect dielectric materials, Poisson‟s equation, Laplace‟s equation, Solution of Laplace equation, Application of Poisson‟s and Laplace‟s equations.	×			×		×		×		×			×	
6	STATIC MAGNETIC FIELDS: Biot – Savart Law, Magnetic field Intensity, Estimation of Magnetic field Intensity for straight and circular conductors, Ampere‟s Circuital Law, Point form of Ampere‟s Circuital Law	×			×	×	×		×		×	×		×	
7	Stokes theorem, Magnetic flux and magnetic flux density, The Scalar and Vector Magnetic potentials, Derivation of Steady magnetic field Laws.	×			×		×	×			×	×			
8	MAGNETIC FORCES AND MATERIALS: Force on a moving charge, Force on a differential current element, Force between current elements, Force and torque on a closed circuit, The nature of magnetic materials	×			×	×	×	×	×			×			

9	Magnetization and permeability, Magnetic boundary conditions involving magnetic fields, The magnetic circuit, Potential energy and forces on magnetic materials, Inductance, Basic expressions for self and mutual inductances, Inductance evaluation for solenoid, toroid, coaxial cables and transmission lines, Energy stored in Magnetic fields	X			X	X	X	X			X	X			
10	Magnetization and permeability, Magnetic boundary conditions involving magnetic fields, The magnetic circuit, Potential energy and forces on magnetic materials, Inductance, Basic expressions for self and mutual inductances, Inductance evaluation for solenoid, toroid, coaxial cables and transmission lines, Energy stored in Magnetic fields	X			X		X	X	X		X	X			

11	Differential form of Maxwell‟s equations, Integral form of Maxwell‟s equations, Potential functions, Electromagnetic boundary conditions, Wave equations and their solutions, Poynting‟s theorem, Time harmonic fields, Electromagnetic Spectrum.	X			X	X	X	X	X		X	X			

6. Teaching and Learning Methods of Disable Students:

6.1. Teaching and Learning Methods of Disable Students:	
1	Additional Tutorials
2	Online lectures and assignments

6.2. Teaching and learning method for low capacity and outstanding Student	
For low capacity students	-Assign a portion of the office hours for those students. -Give them specific tasks. -Repeat the explanation of some of the material and tutorials. - Assign a teaching assistance to follow up the performance of these group of students
For outstanding Students	-Hand out project assignments to those students. -Give them some research topics to be searched using the internet and conduct presentation. Encourage them to take parts in the running research projects.

7**. Student Evaluation:**

7.1 Student Evaluation method:

No.	Evaluation Method	LO’s
1	Periodic exam	C1(1,2)
2	Student load (quizzes –sheets-reports)	C1(2,3)
3	Final term examination	C1(1,2,3)

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	8^{th}
2	Student load	2^{nd} -7^{th} - 9^{th} – 14^{th}
3	Final term examination	15^{th}

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	36%
2	final examination	60%
3	Student load	4%
Total		**100%**

8. List of References:

No.	Reference List
1	W.H. Hayt, Jr.,"Engineering of Electromagnetics," Amazon, 9thEdition (2020).
2	Matthew N.O. *Sadiku*., J.Sagliocca and O.Soriyan " *Elements of Electromagnetics* ," 7th-edition –Oxford, 2021.
3	Nathan IDA, Engineering electromagnetic, 4th edition ,springer,2021

9. Facilities required for teaching and learning:

No.	Facility
1	Lecture classroom
2	
3	White board
4	Data show system
5	Wireless internet
6	Sound system

10. Matrix of knowledge and skills of the course:

No.	Topic	aim	C1		
			1	2	3
1	Vector Algebra, Coordinate Systems, Vector differential operator, Gradient, Divergence, Curl, Divergence theorem, Stokes theorem.	1	x		
1	STATIC ELECTRIC: , Coulombs law, Electric field intensity, Point, Line, Surface and Volume charge distributions, Electric flux density			x	
2	Gauss law and its applications, Gauss divergence theorem, Absolute Electric potential, Potential difference, Calculation of potential differences for different configurations. Electric dipole, Electrostatic Energy and Energy density.	1		x	

3	**CONDUCTORS AND DIELECTRICS:** Conductors and dielectrics in Static Electric Field, Current and current density, Continuity equation, Polarization, Boundary conditions, Method of images, Resistance of a conductor, Capacitance, Parallel plate,	1		x	
4	Coaxial and Spherical capacitors, Boundary conditions for perfect dielectric materials, Poisson"s equation, Laplace"s equation, Solution of Laplace equation, Application of Poisson"s and Laplace"s equations.	1			X
5	**STATIC MAGNETIC FIELDS:** Biot -Savart Law, Magnetic field Intensity, Estimation of Magnetic field Intensity for straight and circular conductors, Ampere"s Circuital Law, Point form of Ampere"s Circuital Law	1		x	
6	Stokes theorem, Magnetic flux and magnetic flux density, The Scalar and Vector Magnetic potentials, Derivation of Steady magnetic field Laws.	1		x	
7	**MAGNETIC FORCES AND MATERIALS:** Force on a moving charge, Force on a differential current element, Force between current elements, Force and torque on a closed circuit, The nature of magnetic materials	1			X
8	Magnetization and permeability, Magnetic boundary conditions involving magnetic fields, The magnetic circuit, Potential energy and forces on magnetic materials, Inductance, Basic expressions for self and mutual inductances, Inductance evaluation for solenoid, toroid, coaxial cables and transmission lines, Energy stored in Magnetic fields	1			x
9	**TIME VARYING FIELDS AND MAXWELL'S EQUATIONS:** Fundamental relations for Electrostatic and Magnetostatic fields, Faraday"s law for Electromagnetic induction, Transformers, Motional Electromotive forces				x
10	Differential form of Maxwell"s equations, Integral form of Maxwell"s equations, Potential functions, Electromagnetic boundary conditions, Wave				x

	equations and their solutions, Poynting‟s theorem, Time harmonic fields, Electromagnetic Spectrum.				

Course Coordinator: Dr. HosamAbdelfatah
Head of Department: Prof. Mohamed Fouad
Date of Approval: 2023

Logical and Digital circuits
(CEE212**)**

1- Basic Information:

Program Title	Communications and Electronics Engineering program
Department Offering the Program	Communications and Electronics Engineering Department
Department Responsible for the Course	Communications and Electronics Engineering Department
Course Title	Logical and Digital circuits
Course Code	CEE212
Year/Level	Level 2
Specialization	Major
Authorization Date of Course Specification	-

Teaching hours	**Lectures**	**Lab.**	**Exercise**	**Contact**	**Student's load**

	3	**----**	**2**	**4**	**6**

2- Course Aims:

No.	**Aims**
2	Apply analytic critical and systemic thinking to Identify **Logical and Digital circuits,** Diagnose **Logical and Digital circuits** ,and Design a **Logical and Digital circuits** .

3- Learning Outcomes (LO'S): By the end of this course, the student able to:

No.	Competency
A3	1. Describe principles of design including elements design, operations related to logic and digital circuits
A9	1. Think creatively in solving problems of design.
C1	1. Select a creative way to solve and design logic and digital circuits.
C2	1. Select appropriate solutions for engineering problems based on logic circuits concepts. 2. Create a process, component or system, to carry out logic and digital designs

4. Course Contents:

No.	**Topics**	**Lectures**	**Tutorial**	**Practical**
1	Boolean algebra – Logic gates – Logic Minimization _ Logic and digital units concepts	4	4	-
2	number systems and data representation – k-maps Boolean algebra–decision elements	6	6	-
3	combinational and sequential circuits – flip _ flops – minimization techniques, design and construction of logic subsystems	4	4	-
4	such as decoders, multiplexers, adders, and multipliers	6	6	-
5	Combinational logic circuits – sequential logic circuits	4	4	-
6	Introduction to AID and DIA converters – Introduction to digital Integrated circuits	4	4	-
Total		**28**	**28**	**-**

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	lab

1	Boolean algebra – Logic gates – Logic Minimization _ Logic and digital units concepts	⤫			⤫	⤫		⤫			⤫				
2	number systems and data representation – k-maps Boolean algebra–decision elements	⤫			⤫		⤫	⤫				⤫			
3	combinational and sequential circuits – flip _ flops – minimization techniques, design and construction of logic subsystems	⤫			⤫	⤫	⤫				⤫	⤫			
4	such as decoders, multiplexers, adders, and multipliers	⤫			⤫	⤫	⤫	⤫				⤫			
5	Combinational logic circuits – sequential logic circuits	⤫			⤫	⤫		⤫			⤫	⤫			
6	Introduction to AID and DIA converters – Introduction to digital Integrated circuits	⤫			⤫		⤫				⤫				

6. Teaching and Learning Methods of Disable Students:

6.1. Teaching and Learning Methods of Disable Students:	
1	Additional Tutorials
2	Online lectures and assignments
6.2. Teaching and learning method for low capacity and outstanding Student	
For low capacity students	-Assign a portion of the office hours for those students. -Give them specific tasks. -Repeat the explanation of some of the material and tutorials. - Assign a teaching assistance to follow up the performance of these

	group of students
For outstanding Students	-Hand out project assignments to those students. -Give them some research topics to be searched using the internet and conduct presentation. Encourage them to take parts in the running research projects.

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	LO's
1	Periodic works (Periodic exam + Student load)	A3.(1), A9 .(1)
3	Final term examination	A3(1), A9 (1),C1(1),C2(1,2)

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	2^{nd} -7^{th} - 8^{th} - 9^{th}
2	Student load (quiz-sheet-reports)	2^{nd} -7^{th} - 9^{th} – 14^{th}
3	Final term examination	15^{th}

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	35.2%
2	final examination	60%
3	Student load	4.8%
	Total	**100%**

8. List of References:

No.	Reference List
1	Jan Friso Groote, Rolf Morel, Julien Schmaltz, Adam Watkins, "Logic Gates, Circuits, Processors, Compilers and Computers", Springer Nature, 13 edition, 2021.
2	Thomas L. Floyed, Digital fundamentals, Pearson international edition, 11th Edition, 2019.
3	Stephen Bucaro, " Basic Digital Logic Design: Use Boolean Algebra, Karnaugh Mapping, or an Easy Free Open-Source Logic Gate Simulator", bucarotechelp.com, 2019

9. Facilities required for teaching and learning:

No.	Facility
1	Lecture classroom
2	
3	White board
4	Data show system
5	Wireless internet

10. Matrix of knowledge and skills of the course:

No.	Topic	Aims	A3	A9	C1	C2

			1	1	1	1	2
1	Boolean algebra – Logic gates – Logic Minimization _ Logic and digital units concepts	2	X			X	
2	number systems and data representation – k-maps Boolean algebra–decision elements	2	X		X		X
3	combinational and sequential circuits – flip _ flops – minimization techniques, design and construction of logic subsystems	2		X	X	X	
4	such as decoders, multiplexers, adders, and multipliers	2				X	X
5	Combinational logic circuits – sequential logic circuits	2	X		X	X	
6	Introduction to AID and DIA converters – Introduction to digital Integrated circuits	2	X	X	X		X

Course Coordinator: Dr. Rania Hamdy Elabd
Head of Department: Prof. Dr. Mohamed Fouad
Date of Approval: 2023

Fluid Mechanics
(BAS212**)**

1- Basic Information:

Program Title	Communications and Electronics Engineering program
Department Offering the Program	Communications and Electronics Engineering Department
Department Responsible for the Course	Basic Science and Engineering Department
Course Title	Fluid Mechanics
Course Code	BAS212
Year/Level	level 2
Specialization	Major
Authorization Date of Course Specification	-

Teaching hours	**Lec.**	**Lab.**	**Exe.**	**Contact**	**Student load**
	2	1	1	4	4

2- Course Aims:

No.	Aims
1	Master a broad range of Fluid Mechanics knowledge and specialized skills, as well as the ability to understand and apply physical concept knowledge in real-world situations by applying fluid mechanics basic theories. Also, to Apply knowledge of science and engineering concepts to study fluid properties, fluid statics and fluid dynamics and to abstract course knowledge that give him or her, the ability to think, identify, diagnose, and solve engineering problems of varying complexity and variation in real world as an engineer.
4	Use the techniques, skills, and current engineering tools required for engineering practice of fluid mechanics by taking full responsibility for one's own learning and development, participating in lifelong learning, and demonstrating the ability to pursue postgraduate and research studies.
8	Consider the impact of fluid mechanics study in real world, and its strong relation with environment and almost of all the technology fields upgrades.

3- Competencies

Competencies	Learning Outcomes (LO'S)
A1. Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.	1. Define concepts of energy, momentum equations and dimensional analysis (laminar and turbulent flow). 2. Explain the basic principles of fluid mechanics engineering. 3. Analyze various ideas and views for different forces on immersed bodies. 4. Using scientific concepts and theories that are relevant to the fluid mechanics. 5. Applying engineering basics that are relevant to the subject.
A2. 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.	1. Apply knowledge of Bernoulli and continuity equations for experiments of Venturi meter and losses in pipes. 2. Analyze data in laboratory and in pipes and pumps field. 3. Conduct basic experiments to learn about the basic characteristics and features of fluids for statics and dynamics branches.

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	Fluid properties, fluid statics, kinematics	2	2	2
2	Fluid dynamics including energy and Momentum equations	4	2	2
3	Dimensional analysis, Laminar flow, Turbulent flow and its applications	2	2	2
4	Forces on immersed bodies, Introduction to compressible flow	4	2	2
5	Applications to filtration and fluidization	4	2	2
6	Laboratory course in Fluid Mechanics includes experiments on venture-meter, friction losses in pipes	6	2	2
7	Center of pressure, Flow measuring apparatus, multi-pump test (Pump characteristics) and losses in piping systems	6	2	2
Total		**28**	**14**	**14**

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab
1	Fluid properties, fluid statics, kinematics	X				X									
2	Fluid dynamics including energy and Momentum equations	X				X	x								
3	Dimensional analysis, Laminar flow, Turbulent flow and its	X				X		x							

	applications														
4	Forces on immersed bodies, Introduction to compressible flow	**X**				**X**									
5	Applications to filtration and fluidization	**X**				**X**					**x**				
6	Laboratory course in Fluid Mechanics includes experiments on venture-meter, friction losses in pipes	**X**													**X**
7	Center of pressure, Flow measuring apparatus, multi-pump test (Pump characteristics) and losses in piping systems	**x**				**X**									

6. Teaching and Learning Methods of Disable Students:

6.1. Teaching and Learning Methods of Disable Students:	
1	Additional Tutorials
2	Online lectures and assignments

6.2. Teaching and learning method for low capacity and outstanding Student	
For low capacity students	-Assign a portion of the office hours for those students. -Give them specific tasks. -Repeat the explanation of some of the material and tutorials. - Assign a teaching assistance to follow up the performance of these group of students
For outstanding Students	-Hand out project assignments to those students. -Give them some research topics to be searched using the internet and conduct presentation. Encourage them to take parts in the running research projects.

7**. Student Evaluation :**

7.1 Student Evaluation method:

No.	**Evaluation Method**	**Competencies**	**LO's**
1	Periodic exam	A1	(1,2,3,4,5)

2	Student load (quizzes, sheets, report)	A1,A2	A1(1),A2(2)
3	Final term examination	A1,A2	A1(1,2,3,4,5),A2(1,2,3)

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	8^{th}
2	Student load	2^{nd} ,7^{th},9^{th},14^{th}
3	Final term examination	15^{th}

7.3 weighting of Evaluation :

No.	Evaluation method	Weights
1	Periodic exam	37.3%
2	final examination	50%
3	Practical examination	10%
4	Student load	2.7%
	Total	**100%**

8. List of References:

No.	Reference List
1	Gerhart, Philip M., Andrew L. Gerhart, and John I. Hochstein. Munson, Young and Okiishi's Fundamentals of Fluid Mechanics. John Wiley & Sons, 2020.
2	Schetz, J. A., & Fuhs, A. E. (Eds.). (2020). Fundamentals of fluid mechanics. John Wiley & Sons.
3	Young, D. F., Munson, B. R., Okiishi, T. H., & Huebsch, W. W. (2019). A brief introduction to fluid mechanics. John Wiley & Sons.

9. Facilities required for teaching and learning:

	Facility
1	Lecture classroom
2	Seminar
3	Computer lab.
4	White board
5	Data Show system

10. Matrix of Competencies and LO's:

No.	Topic	Aims	A1					A2		
			1	2	3	4	5	1	2	3
1	Fluid properties, fluid statics, kinematics	1	X	X						

2	Fluid Dynamics including Energy and Momentum equations	1	X							
3	Dimensional analysis, laminar flow, turbulent flow and its applications	1	X							
4	forces on immersed bodies, introduction to compressible flow	4			X					
5	Applications to filtration and fluidization	8				X	X			
6	Laboratory course in Fluid Mechanics includes experiments on venture-meter, friction losses in pipes	4,8							X	
7	Center of pressure, flow measuring apparatus, multi-pump test (Pump characteristics) and losses in piping systems	4,8						X		X

Course Coordinator: Assoc. Prof. Mohammed Gaber
Head of Department: Asso.prof.Amal Behery
Date of Approval: 2023

Engineering Economy
(BAS213**)**

1-Basic Information:

Program Title	Communications and Electronics Engineering program
Department Offering the Program	Communications and Electronics Engineering Department
Department Responsible for the Course	Basic Science and Engineering Department
Course Title	Engineering Economy
Course Code	BAS213
Year/Level	Level 2
Specialization	Major
Authorization Date of Course Specification	-

Teaching hours	**Lectures**	**Lab.**	**Exercise**	**Contact**	**Student's load**
	4	**----**	**1**	**3**	**4**

2-Course Aims:

No.	**Aims**

2	Work in and manage a diverse team of professionals from various engineering disciplines, taking responsibility for own and team performance; and Behave professionally and adhere to engineering ethics and standards.
10	Demonstrate leadership qualities, business management, and skill development.

3-Competencies :

Competencies	Learning Outcomes (LO'S)
A3.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.	1. List the economic concepts related to characteristics in engineering analysis to improve the engineering process. 2. Recognize business and management principles relevant to engineering for replacement and depreciation of equipment to reduce the cost of operations. 3. Combine different ideas, views, and knowledge from a range of sources to evaluate the characteristics of project economic. 4.Judge engineering decision considering balanced cost, benefits, safety, quality, reliability, and environmental impact. 5. Assess economic, societal, and environmental dimensions and risk management in engineering design.
A4. Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues and risk management principles.	1. List the engineering-related economy. 2. Innovate economy methodical approaches when dealing with new and advancing technology. 3. Use fundamental economy organizational abilities.

4. Course Contents:

No.	Topics	Lectures	Lab.	Exercise
1	Basic concepts of engineering economy as applied to the evaluation of capital investment alternatives in both the private and public sectors of our economy	6	---	3
2	Attention is given to the time value of money by showing the concepts and techniques for evaluating the worth of products, systems, structures, and services in relation to their cost	8	---	4

3	Economic and cost concepts: calculating economic equivalence, comparison of alternatives and replacement economy	8	---	4
4	Economic optimization in design and operations. Cost estimation of products and systems	6	---	3
Total		28	---	14

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	lab
1	Basic concepts of engineering economy as applied to the evaluation of capital investment alternatives in both the private and public sectors of our economy	x				x									

2	Attention is given to the time value of money by showing the concepts and techniques for evaluating the worth of products, systems, structures, and services in relation to their cost	**x**				**x**	**x**								
3	Economic and cost concepts: calculating economic equivalence, comparison of alternatives and replacement economy	**x**				**x**		**X**							
4	Economic optimization in design and operations. Cost estimation of products and systems	**x**				**x**	**x**								

6. Teaching and Learning Methods of Disable Students:

6.1. Teaching and Learning Methods of Disable Students:	
1	Additional Tutorials
2	Online lectures and assignments

6.2. Teaching and learning method for low capacity and outstanding Student	
For low capacity students	-Assign a portion of the office hours for those students. -Give them specific tasks. -Repeat the explanation of some of the material and tutorials. - Assign a teaching assistance to follow up the performance of these

	group of students
For outstanding Students	-Hand out project assignments to those students. -Give them some research topics to be searched using the internet and conduct presentation. Encourage them to take parts in the running research projects.

7. Student evaluation:

7.1 Student evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Periodic exam	A3	(1,2,3,4,5)
2	Student load (quizzes, sheets, report)	A3	1,2,3
3	Final term examination	A3,A4	A3(1,2,3,4,5),A4(1,2,3)

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Student load (quiz, report)	6^{th} , 11^{th}
2	Periodic exam	8^{th}
3	Final term examination	15^{th}

7.3 weighting of Evaluation:

No.	Evaluation method	Weights
1	Periodic exam	20%
2	Student load	20%
3	Final-term examination	60%
Total		**100%**

8. List of References:

No.	Reference List
1	Engineering Economic Analysis, Donald G. Newnan ‹Ted G. Eschenbach ‹Jerome P. Lavelle ‹Neal A. Lewis, 14th edition, 2020
2	Engineering Economics: Decisions and Solutions from Eurasian Perspective, Marek Vochozka ‹Svetlana Igorevna Ashmarina ‹Valentina Vyacheslavovna Mantulenko, Springer International Publishing, 2020.
3	Principles of Engineering Economics with Applications, Zahid A. Khan ‹Arshad N. Siddiquee ‹Brajesh Kumar ‹Mustufa H. Abidi, 2nd edition, Cambridge University Press, 2020.

9. Facilities required for teaching and learning:

No.	Facility
1	Lecture classroom
2	Seminar
3	White board

4	Data Show system

10. Matrix of Competencies and LO's :

No.	Topic	Aims	A3	
			1	2
1	Basic concepts of engineering economy as applied to the evaluation of capital investment alternatives in both the private and public sectors of our economy	2	X	
2	Attention is given to the time value of money by showing the concepts and techniques for evaluating the worth of products, systems, structures, and services in relation to their cost	2	X	
3	Economic and cost concepts: calculating economic equivalence, comparison of alternatives and replacement economy	2		X
4	Economic optimization in design and operations. Cost estimation of products and systems	2		X

Course Coordinator: Dr. Rania Hamdy and Dr. Hany hashish
Head of Department: Assoc. prof. Dr. Amal Bahiry
Date of Approval: 07 / 2023

Advanced Computer Programming
(BAS214**)**

1- Basic Information:

Program Title	Communications and Electronics Engineering program
Department Offering the Program	Communication and Electronics Engineering Department
Department Responsible for the Course	Basic science and Engineering Department
Course Title	Advanced Computer Programming
Course Code	BAS214

Year/Level	Level: 3
Specialization	Major
Authorization Date of Course Specification	-

Teaching hours	Lectures	Lab.	Exercise	Contact	Student's load
	2	**2**	**----**	**4**	**4**

2- Course Aims:

No.	Aims
1	Apply knowledge in the concepts of mathematics, science and engineering to solve engineering problems using concepts of programming languages and advanced visual programming languages
2	Identify, formulate and solve basic engineering problems by engaging in self-learning in programming languages, concepts and applications.

3- Learning Outcomes (LO'S): By the end of this course, the student able to:

A3	1.Describe principles of design including elements design, process related to advanced java programs. 2. Practice the neatness and aesthetics in design and approach. 3.Collaborate effectively within multidisciplinary team
B1	1. Recognize methodologies of solving engineering problems.
C2	1. Select appropriate solutions for engineering problems based on analytical thinking.
C1	1: Recognize engineering problems to identify the best solutions 2: Think creatively and innovatively in problem solving and design

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	Object Oriented Programming introduction: Working with Methods, Classes and Objects Java Advanced Class Design: Class designing -Controlling access to members, Constructor, -Scope of a Parameter Call by Value & Primitive Parameters Object Parameters Use the instance of operator and casting Use virtual method invocation -Encapsulation Practical: review (basics of java)	6		3
2	Object Oriented Programming Concepts Encapsulation and Visibility Modifiers, Formal and	3	-	6

	Actual Parameters -Working with Inheritance -Polymorphism Practical: -Exercises of structure class & method -Exercises of create object -Exercises of complete oop_ java program -Exercise of Encapsulation -Exercise of inheritance -Exercise of Polymorphism			
3	-Overloaded Constructor - Overload methods, -Override methods -Abstract classes, Use enumerated types Practical Exercises of - Overloaded Constructor - Overload methods, -Override methods -Abstract classes, Use enumerated types	3	-	3
4	JAVA Stream, File and I/O Fundamentals Practical Exercises of -I/O Basics Streams - Byte Streams and Character Streams - Read and write data from the console – Use streams to read and write files - Use the Path class to operate on file and directory paths – Use the Files class to check, delete, copy, or move a file or directory – - Read and change file and directory attributes	3		3
5	Multithreaded Programming: - What is a Process? - What is a Thread? - Where are Threads used in Java? - Defining a Thread - Instantiate a Thread - Start a Threads - Thread Life-cycle - Thread Priorities - Important methods for Threads - Multithreading	3		3
6	Software Reusability Package access Arrays Practical Exercises of	3	-	3

	Multithreaded Programming Arrays			
7	Design Graphical User Interface (GUI): Practical Exercises of -Event handler - text field, list - Multiple Selection lists - Panel, Radio buttons, Checkboxes, layout, Menus, Frames - Popup, Tabbed Pane.	6	-	6
	Total	**28**	**-**	**28**

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	lab

1	Object Oriented Programming introduction: Working with Methods, Classes and Objects Java Advanced Class Design: Class designing -Controlling access to members, Constructor, -Scope of a Parameter Call by Value & Primitive Parameters Object Parameters Use the instance of operator and casting Use virtual method invocation -Encapsulation Practical: review (basics of java)	X			X	X	X		X			X			X

2	Object Oriented Programming Concepts Encapsulation and Visibility Modifiers, Formal and Actual Parameters -Working with Inheritance -Polymorphism Practical: -Exercises of structure class & method -Exercises of create object -Exercises of complete oop_ java program -Exercise of Encapsulation -Exercise of inheritance -Exercise of Polymorphism	X			X	X	X	X	X		X				X
3	-Overloaded Constructor - Overload methods, - Override methods - Abstract classes, Use enumerated types Practical Exercises of - Overloaded Constructor - Overload methods, -Override methods -Abstract classes, Use enumerated types	X			X	X	X		X		X	X			X

4	JAVA Stream, File and I/O Fundamentals Practical Exercises of -I/O Basics Streams - Byte Streams and Character Streams - Read and write data from the console – Use streams to read and write files - Use the Path class to operate on file and directory paths – Use the Files class to check, delete, copy, or move a file or directory – - Read and change file and directory attributes	×			×	×	×	×	×		×	×			×
5	Multithreaded Programming: - What is a Process? - What is a Thread? - Where are Threads used in Java? - Defining a Thread - Instantiate a Thread - Start a Threads - Thread Life-cycle - Thread Priorities - Important methods for Threads - Multithreading	×			×	×	×	×	×		×	×			×
6	Software Reusability Package access Arrays Practical Exercises of Multithreaded Programming Arrays	×			×	×	×	×	×		×	×			×

7	Design Graphical User Interface (GUI): Practical Exercises of -Event handler - text field, list - Multiple Selection lists - Panel, Radio buttons, Checkboxes, layout, Menus, Frames - Popup, Tabbed Pane.	X			X	X	X	X	X		X	X			X

6. Teaching and Learning Methods of Disable Students:

6.1. Teaching and Learning Methods of Disable Students:	
1	Additional Tutorials
2	Online lectures and assignments

6.2. Teaching and learning method for low capacity and outstanding Student	
For low capacity students	-Assign a portion of the office hours for those students. -Give them specific tasks. -Repeat the explanation of some of the material and tutorials. - Assign a teaching assistance to follow up the performance of these group of students
For outstanding Students	-Hand out project assignments to those students. -Give them some research topics to be searched using the internet and conduct presentation. Encourage them to take parts in the running research projects.

7**. Student Evaluation:**

7.1 Student Evaluation method:

No.	**Evaluation Method**	**LO's**
1	Periodic works - periodic exam - Student load (Quiz & sheets, reports, projects)	A3.1,A3.2,A3.3
2	Practical Examination	B1.1,C1.1,C1.2
3	Final term examination	A3.1,A3.2,A3.3, B1.1,C1.1,C1.2,C2.1

7.2 Evaluation Schedule:

No.	**Evaluation Method**	**Weeks**
1	Periodic exam	8^{th}
2	Student load	2^{nd} -7^{th} - 9^{th}
3	Practical Examination	14^{th}
4	Final term examination	15^{th}

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	36.8%
2	final examination	48%
3	Practical examination	12%
4	Student load	3.2%
	Total	**100%**

8. List of References:

No.	Reference List
1	Anuradha A. Puntambekar," Advanced Java", Technical Publications,2023
2	**Dr. Muneer Ahmad Dar, "JAVA Programming Simplified: From Novice to Professional** ",BPB Publications,2023
3	Java: How to Program, 11th Edition (Deitel) 11th Edition by Paul Deitel, Harvey Deitel ,2020.
4	**JAVA the complete reference, 10th edition, herb schildt,2019.**

9. Facilities required for teaching and learning:

No.	Facility	No.	Facility
1	Lecture classroom	4	Data show system
2		5	Sound system
3	White board	6	Moodle

10. Matrix of competences of the course:

No.	Topic	Aims	A3			B1	C2	C1	
			1	2	3	1	1	2	1
1	Object Oriented Programming introduction: Working with Methods, Classes and Objects Java Advanced Class Design: Class designing -Controlling access to members, Constructor, -Scope of a Parameter Call by Value & Primitive Parameters Object Parameters Use the instance of operator and casting Use virtual method invocation -Encapsulation Practical: review (basics of java)	1	X			X		X	
2	Object Oriented Programming	1	X	X			X		X

	Concepts Encapsulation and Visibility Modifiers, Formal and Actual Parameters -Working with Inheritance -Polymorphism Practical: -Exercises of structure class & method -Exercises of create object -Exercises of complete oop_ java program -Exercise of Encapsulation -Exercise of inheritance -Exercise of Polymorphism								
3	-Overloaded Constructor - Overload methods, -Override methods - Abstract classes, Use enumerated types Practical Exercises of - Overloaded Constructor - Overload methods, -Override methods -Abstract classes, Use enumerated types	1,2		X		X	X		X
4	JAVA Stream, File and I/O Fundamentals Practical Exercises of -I/O Basics Streams - Byte Streams and Character Streams - Read and write data from the console – Use streams to read and write files - Use the Path class to operate on file and directory paths – Use the Files class to check, delete, copy, or move a file or directory – - Read and change file and directory attributes	1,2	X		X	X		X	
5	Multithreaded Programming: - What is a Process? - What is a Thread?	1,2	X		X		X	X	

	- Where are Threads used in Java? - Defining a Thread - Instantiate a Thread - Start a Threads - Thread Life-cycle - Thread Priorities - Important methods for Threads - Multithreading								
6	Software Reusability Package access Arrays Practical Exercises of Multithreaded Programming Arrays	1,2	X		X		X	X	
7	Design Graphical User Interface (GUI): Practical Exercises of -Event handler - text field, list - Multiple Selection lists - Panel, Radio buttons, Checkboxes, layout, Menus, Frames - Popup, Tabbed Pane.	1,2	X		X	X		X	

Course Coordinator: Dr. Amira Elsonbaty
Head of Department: prof. Mohamed Fouad
Date of Approval: 2023

Numerical Methods in Engineering
(BAS221**)**

1- Basic Information:

Program Title	Communications and Electronics Engineering program
Department Offering the Program	Communication and Electronics Engineering

	Department
Department Responsible for the Course	Basic Science and Engineering Department
Course Title	Numerical Methods in Engineering
Course Code	BAS221
Year/Level	Level: 2
Specialization	Major
Authorization Date of Course Specification	-

Teaching hours	**Lec.**	**Lab.**	**Exe.**	**Contact**	**Student load**
	2	-	2	4	4

2- Course Aims:

No.	Aims
1	Master a broad range of engineering knowledge and specialized skills, as well as the ability to apply acquired knowledge in real-world situations by applying numerical theories and abstract thinking in analytic critical and systemic thinking to identify, diagnose, and solve engineering problems of varying complexity and variation.

3- Competencies :

Competencies	Learning Outcomes (LO'S)
A1. Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.	1. Describe the relevant mathematical principles and theories in the discipline. 2. Explain the scientific principles and theories that apply to the topic. 3. Using math ideas and theories that are applicable to the field. 4. Using scientific concepts and theories that are relevant to the profession. 5. solve complex engineering problems by - applying the concepts and the theories of mathematics 6. Identify complex engineering problems by applying the concepts and the theories of sciences, appropriate to the discipline.
A2. Develop and conduct appropriate	1. Applying statistical analyses and objective

experimentation and/or simulation, analyze and interpret data, assess and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.	engineering judgment to draw conclusions.

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	Numerical solution of linear and nonlinear systems	4	4	-
2	Numerical differentiation and integration	6	6	-
3	Curve fitting and interpolation	10	10	-
4	Numerical solution of initial value problems	4	4	-
5	Boundary and Eigen value problems	4	4	-
Total		**28**	**28**	**-**

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	lab
1	Numerical solution of linear and nonlinear systems	X				X	x								
2	Numerical differentiation and integration	X				X		x							
3	Curve fitting and interpolation	X				X	x								
4	Numerical solution of initial value problems	X				X	x								
5	Boundary and Eigen value problems	X				X	X								

6. Teaching and Learning Methods of Disable Students:

6.1. Teaching and Learning Methods of Disable Students:	
1	Additional Tutorials
2	Online lectures and assignments

6.2. Teaching and learning method for low capacity and outstanding Student	
For low capacity students	-Assign a portion of the office hours for those students. -Give them specific tasks. -Repeat the explanation of some of the material and tutorials. - Assign a teaching assistance to follow up the performance of these group of students
For outstanding Students	-Hand out project assignments to those students.

	-Give them some research topics to be searched using the internet and conduct presentation. Encourage them to take parts in the running research projects.

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Periodic exam	A1	(1,2,3)
2	Student load (quizzes, sheets, report)	A1, A2	A1(2,3),A2(1)
3	Final term examination	A1,A2	A1(2,3,3),A2(1)

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	8^{th}
2	Student load	2^{nd} -7^{th} - 9^{th} -14^{th}
3	Final term examination	15^{th}

7.3 weighting of Evaluation :

No.	Evaluation Method	Weights
1	Periodic exam	36%
2	Student load	4%
3	Final term examination	60%
Total		**100%**

8. List of References:

No.	Reference List
1	Kiusalaas, Jaan. Numerical methods in engineering with Python 3. Cambridge university press, 2020.
2	B. S. Grewal "Numerical Methods in Engineering and Science" Mercury Learning and Information (2020).

9. Facilities required for teaching and learning:

No.	Facility
1	Lecture classroom
2	
3	White board
4	Data show system
5	Sound system

10. Matrix of Competencies and LO's:

No.	Topic	Aims	A1		A2		
			1	2	1	2	3
1	Numerical solution of linear and nonlinear systems	1	X				

No.	Topic	Aims	A1		A2		
			1	2	1	2	3
2	Numerical differentiation and integration	1		X			
3	Curve fitting and interpolation	1	X				
4	Numerical solution of initial value problems	1		X	X	X	X
5	Boundary and eigen value problems	1		X	X	X	

Course Coordinator: Dr. Samar maden
Head of Department: Asso.prof.Amal Behery
Date of Approval: 2023

Electronic Circuits 1
(CEE221**)**

1- Basic Information:

Program Title	Communications and Electronics Engineering program
Department Offering the Program	Communications and Electronics Engineering Department
Department Responsible for the Course	Communications and Electronics Engineering Department
Course Title	Electronic Circuits 1
Course Code	CEE221
Year/Level	Level 2
Specialization	Major
Authorization Date of Course	-

Specification	

Teaching hours	Lectures	Lab.	Exercise	Contact	Student's load
	2	----	2	4	4

2- Course Aims:

No.	Aims
11	Computer systems in Electronics and Communication engineering can be used to design a system, component, and process to meet recent technological advances

3- Competencies Learning Outcomes (LO'S):

Competency	Learning Outcomes (LO'S)
B3	1. Define basics of information and communication technology (ICT). 2. Recognize methodologies of solving engineering problems. 3. Merge engineering knowledge and understanding to improve design of electronic circuits, products and/or services. 4. Exchange knowledge and skills to engineering community and industry
C3	1: Judge engineering decision considering balanced cost, benefits, safety, quality, reliability, and environmental impact.
C5	1: Use a wide range of analytical tools, techniques, equipment, and software packages to simulate and design power electronic circuits.

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	POWER SUPPLIES AND BIASING OF DISCRETE BJT AND MOSFET: Rectifiers with filters- DC Load line, operating point, Various biasing methods for BJT –Design Stability-Bias compensation, Thermal stability, Design of biasing for JFET, Design of biasing for MOSFET.	6	6	-
2	BJT AMPLIFIERS: Small signal Analysis of Common Emitter-AC Load line, Voltage swing limitations, Common collector and common base amplifiers – Differential amplifiers- CMRR- Darlington Amplifier- Bootstrap technique - Cascaded stages - Cascode Amplifier-Large signal Amplifiers – Class A , Class B and Class C Power Amplifiers .	6	6	-
3	JFET AND MOSFET AMPLIFIERS: Small signal analysis of JFET amplifiers- Small signal Analysis of MOSFET and JFET, Common source	6	6	-

	amplifier, Voltage swing limitations, Small signal analysis of MOSFET and JFET Source follower and Common Gate amplifiers, - BiMOS Cascode amplifier.			
4	FREQUENCY ANALYSIS OF BJT AND MOSFET AMPLIFIERS: Low frequency and Miller effect, High frequency analysis of CE and MOSFET CS amplifier, Short circuit current gain, cut off frequency – fα and fβ unity gain and Determination of bandwidth of single stage and multistage amplifiers	4	4	-
5	IC MOSFET AMPLIFIERS: IC Amplifiers-IC biasing Current steering circuit using MOSFET-MOSFET current sources- PMOS and NMOS current sources. Amplifier with active loads - enhancement load, Depletion load and PMOS and NMOS current sources load- CMOS common source and source follower- CMOS differential amplifier- CMRR	6	6	-
Total		**28**	**28**	**-**

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	lab

1	POWER SUPPLIES AND BIASING OF DISCRETE BJT AND MOSFET: Rectifiers with filters- DC Load line, operating point, Various biasing methods for BJT –Design Stability-Bias compensation, Thermal stability, Design of biasing for JFET, Design of biasing forMOSFET.	X			X		X	X				X			
2	BJT AMPLIFIERS: Small signal Analysis of Common Emitter-AC Load line, Voltage swing limitations, Common collector and common base amplifiers – Differential amplifiers- CMRRDarlington Amplifier- Bootstrap technique – Cascaded stages – Cascode Amplifier-Large signal Amplifiers – Class A , Class B and Class C Power Amplifiers .	X			X	X	X				X	X			

3	JFET AND MOSFET AMPLIFIERS: Small signal analysis of JFET amplifiers- Small signal Analysis of MOSFET and JFET, Common source amplifier, Voltage swing limitations, Small signal analysis of MOSFET and JFET Source follower and Common Gate amplifiers, - BiMOS Cascode amplifier.	X			X	X	X		X			X			
4	FREQUENCY ANALYSIS OF BJT AND MOSFET AMPLIFIERS: Low frequency and Miller effect, High frequency analysis of CE and MOSFET CS amplifier, Short circuit current gain, cut off frequency – fα and fβ unity gain and Determination of bandwidth of single stage and multistage amplifiers	X			X	X	X		X		X				

5	IC MOSFET AMPLIFIERS: IC Amplifiers-IC biasing Current steering circuit using MOSFET current sources- PMOS and NMOS current sources. Amplifier with active loads – enhancement load, Depletion load and PMOS and NMOS current sources load- CMOS common source and source follower- CMOS differential amplifier-CMRR	X			X			X	X		X	X			

6. Teaching and Learning Methods of Disable Students:

6.1. Teaching and Learning Methods of Disable Students:	
1	Additional Tutorials
2	Online lectures and assignments

6.2. Teaching and learning method for low capacity and outstanding Student	
For low capacity students	-Assign a portion of the office hours for those students. -Give them specific tasks. -Repeat the explanation of some of the material and tutorials. - Assign a teaching assistance to follow up the performance of these group of students
For outstanding Students	-Hand out project assignments to those students. -Give them some research topics to be searched using the internet and conduct presentation. Encourage them to take parts in the running research projects.

7. Student Evaluation:

7.1 Student Evaluation methods:

No.	**Evaluation Method**	**LO's**
1	Periodic exam	B3(1,2,3,4), C3(**1**)
2	Student load (Quiz & sheets, reports)	C3(1), c5(1)
3	Final term examination	B3(1, 2,3,4), C3(**1**)

7.2 Evaluation Schedule:

No.	**Evaluation Method**	**Weeks**

1	Periodic exam	8th
2	Student load	14th
3	Final term examination	15th

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	37.3%
2	final examination	60%
3	Student load	2.7%
	Total	**100%**

8. List of References:

No.	Reference List
1	A.Sedra,"Microelectronic devices and Circuits", Ninth Edition, Boston Columbus Indianapolis New York San Francisco, 2020.
2	Fundamentals of Electric Circuits , by Charles k Alexander , Matthew N.O. Sadiku,McGraw hill 5th edition 2021
3	Thomas L. Floyd, Electronic devices, electron flow version. Prentice Hall, 12th,2020Robert L. Boylestad , Electronic Devices and Circuit Theory: International Edition, Springer, 12th ,2019
4	Maurizio Di Paolo Emilio , Microelectronics: From Fundamentals to Applied Design, , Springer;2nd ed. 2019 Edition

9. Facilities required for teaching and learning:

No.	Facility
1	Lecture classroom
2	
3	White board
4	Data show system
5	Wireless internet
6	Sound system

10. Matrix of knowledge and skills of the course:

No.	Topic	Aims	B3				C3	C5
			1	2	3	4	1	1
1	POWER SUPPLIES AND BIASING OF DISCRETE BJT AND MOSFET: Rectifiers with filters- DC Load line, operating point, Various biasing methods for BJT –Design Stability-Bias compensation, Thermal stability, Design of biasing for JFET, Design of biasing for MOSFET.	1,11	x	x		x	**x**	
2	BJT AMPLIFIERS: Small signal	1,11	x		x		**x**	

	Analysis of Common Emitter-AC Load line, Voltage swing limitations, Common collector and common base amplifiers – Differential amplifiers- CMRR- Darlington Amplifier-Bootstrap technique - Cascaded stages - Cascode Amplifier-Large signal Amplifiers – Class A , Class B and Class C Power Amplifiers .							
3	JFET AND MOSFET AMPLIFIERS: Small signal analysis of JFET amplifiers- Small signal Analysis of MOSFET and JFET, Common source amplifier, Voltage swing limitations, Small signal analysis of MOSFET and JFET Source follower and Common Gate amplifiers, - BiMOS Cascode amplifier.	1,11	x	x		x	**x**	**x**
4	FREQUENCY ANALYSIS OF BJT AND MOSFET AMPLIFIERS: Low frequency and Miller effect, High frequency analysis of CE and MOSFET CS amplifier, Short circuit current gain, cut off frequency – fα and fβ unity gain and Determination of bandwidth of single stage and multistage amplifiers	1,11	x		x		**x**	
5	IC MOSFET AMPLIFIERS: IC Amplifiers-IC biasing Current steering circuit using MOSFET- MOSFET current sources- PMOS and NMOS current sources. Amplifier with active loads - enhancement load, Depletion load and PMOS and NMOS current sources load- CMOS common source and source follower- CMOS differential amplifier-CMRR	1,11	x		x	x	**x**	

Course Coordinator: Assoc. prof. Osama Oraby
Head of Department: Prof. Dr. Mohamed Fouad
Date of Approval: 2023

Electronics Tests2
(CEE222)

1- Basic Information:

Program Title	Communications and Electronics Engineering program
Department Offering the Program	Communications and Electronics Engineering Department
Department Responsible for the Course	Communications and Electronics Engineering Department
Course Title	Electronics Tests2
Course Code	CEE222
Year/Level	Level 2
Specialization	Major
Authorization Date of Course Specification	-

Teaching hours	**Lec.**	**Lab.**	**Exer.**	**Contact**	**Student load**
	2	3	-	5	4

2- Course Aims:

No.	Aims
11	**Computer systems in Electronics and Communication engineering can be used to design a system, component, and process to meet recent technological advances. achieving** Achieving, the properties of electronic components in practice ,studying, designing and implementing applications to use those components and test those with appropriate laboratory equipment components
13	Allocate projects creatively by analyzing data from intended tests and optimize the intended design using cad tools

3. Cometencies (LO'S)

Competency	Learning Outcomes (LO'S)
A5	1. Define technical language and report writing. 2. Assess different ideas, views, and knowledge from a range of sources. 3. Prepare technical reports 4. Search for information to engage in lifelong self-learning discipline.
B2	1. Describe quality assurance systems, codes of practice and standards, health and safety requirements, and environmental issues. 2. Assess and evaluate the characteristics and performance of the electronic components , evaluate sub-systems , implementing and test applications to those components

	3. Identify appropriate specifications for required devices. 4. Use relevant laboratory equipment and analyze the results correctly.
B4	1. Use relevant laboratory equipment and analyze the results correctly. 2. Use computational facilities, measuring instruments, workshops and laboratories equipment to design experiments and collect, analyze and interpret results.
B5	Adopt suitable national and international standards and codes to: design, build, operate, inspect and maintain electrical/electronic/digital equipment, systems and services.

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	Conducting experiments which covers the way of using measuring devices and CAD tools	2		6
2	experiments such: Zener diode characteristic curves,Voltage regulation using Zener diodes	2		4
3	Clipping circuits using Zener diodes, Design DC power supply	4		6
4	Bipolar junction transistor characteristic curves,Bipolar junction transistor as a switch, Bipolar junction transistor as an Amplifier	6		8
5	Junction field effect transistor curves, Metal oxide field effect transistor characteristic curves, MOSFET as a switch	6		8
6	JFET as an amplifier, Troubleshooting (BJT and FET).	4		4
7	Individual and group projects such as design and implementation an audio amplifier	4		6
Total		**28**	**-**	**42**

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	lab
1	Conducting experiments which covers the way of using measuring devices and cda tools	X			X		X	X			X	X			x
2	experiments such: Zener diode characteristic curves,Voltage regulation using Zener diodes	X			X	X	X				X	X			x
3	Clipping circuits using Zener diodes, Design DC power supply, Bipolar junction transistor characteristic curves	X			X	X	X	X			X	X			x
4	Bipolar junction transistor as a switch, Bipolar junction transistor as an Amplifier	X			X		X				X	X			x
5	Design an audio amplifier,Junction field effect transistor curves, Metal oxide field effect transistor characteristic curves, MOSFET as a switch,	X			X	X		X			X	X			x

6	JFET as an amplifier,Troubleshooting (BJT and FET).	x			x		x	x			x	x			x
7	Individual and group projects	x			x	x			x			x	x	x	x

6. Teaching and Learning Methods of Disable Students:

6.1. Teaching and Learning Methods of Disable Students:	
1	Additional Tutorials
2	Online lectures and assignments

6.2. Teaching and learning method for low capacity and outstanding Student	
For low capacity students	-Assign a portion of the office hours for those students. -Give them specific tasks. -Repeat the explanation of some of the material and tutorials. - Assign a teaching assistance to follow up the performance of these group of students
For outstanding Students	-Hand out project assignments to those students. -Give them some research topics to be searched using the internet and conduct presentation. Encourage them to take parts in the running research projects.

7**. Student Evaluation:**

7.1 Student Evaluation method:

No.	Evaluation Method	LO's
1	Periodic exam	A5(1-2)B2(1-2-3), B4(1-2)
2	Student load (projects-lab experiment-CAD tools)	B2(1-2-3-4)
3	Final term examination	A5(1-2-3-4)B2(1-2-3-4), B4(1-2)

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	8^{th}
2	Student load	2^{nd} -7^{th} - 9^{th} - 14^{th}
3	Final term examination	15^{th}

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	28.8%

2	final examination	56%
3	Practical examination	12%
4	Student load	3.2%
	Total	**100%**

8. List of References:

No.	Reference List
1	A. C. Sedra and K. C. Smith, *Microelectronic Circuits*, Oxford University Press, 8 th Edition, 2020.
2	B. Razavi, *Fundamentals of Microelectronics*, Wiley, 4th. Edition, 2019.
3	Maurizio Di Paolo Emilio , Microelectronics: From Fundamentals to Applied Design, , Springer;3rd ed. 2023 Edition
4	Robert L. Boylestad, Electronic Devices and Circuit Theory: International Edition, Springer, 15th ,2020
5	Fundamentals of Electric Circuits, by Charles k Alexander, Matthew n.o.Sadiku, McGraw hill 7th edition 2023.
6	Thomas L. Floyd, Electronic devices, electron flow version. Prentice Hall**,** 11th,2020

9. Facilities required for teaching and learning:

No.	Facility
1	Classroom
2	Computer and video data show
3	Lab
4	White board
5	Wireless internet
6	Sound system

10. Matrix of knowledge and skills of the course:

No.	Topic	Aim	A5				B5	B2				B4	
			1	2	3	4		1	2	3	4	1	2
1	Conducting experiments which covers the way of using measuring devices and CAD	11			x			x	x			x	
2	experiments such: Zener diode characteristic curves, Voltage regulation using	13											x

	Zener diodes									
3	Clipping circuits using Zener diodes, Design DC power supply, Bipolar junction transistor characteristic curves	13	x			x				
4	Bipolar junction transistor as a switch, Bipolar junction transistor as an Amplifier	13				x				
5	Design an audio amplifier, Junction field effect transistor curves, Metal oxide field effect transistor characteristic curves, MOSFET as a switch,	13	x x			x				
6	JFET as an amplifier, Troubleshooting (BJT and FET).	11,13				x				x
7	Individual and group projects	11				x				x

Course Coordinator: Assoc.Prof. Amr Hesssian
Head of Department: Prof. Mohamed Fouad
Date of Approval: 2023

Automatic Control
(CEE223**)**

1- Basic Information:

Program Title	Communications and Electronics Engineering program

Department Offering the Program	Communication and Electronics Engineering Department
Department Responsible for the Course	Basic Science and Engineering Department
Course Title	Automatic Control
Course Code	CEE223
Year/Level	Level: 2
Specialization	Major
Authorization Date of Course Specification	-

Teaching hours	Lectures	Lab.	Exercise	Contact	Student load
	3	-	**2**	**5**	**5**

2- Course Aims:

No.	Aims
7	**Proper utilization of modern engineering techniques, skills, and tools**
8	**Acknowledge and accept personal responsibility for your education, personal development, as well as your ability to achieve post-graduation and research studies;**
12	**Communicate and work effectively within multiple teams in the field of communication and electronics engineering and consider the effects of engineering solutions on society and the environment.**

3. Cometencies (LO'S)

Competency	Learning Outcomes (LO'S)
A2	1. Describe principles of design, including elements of design, a process, and/or a system related to a specific discipline or fields of knowledge. 2. Develop suitable experimentation and/or simulation
B1.	1. Synthesis and integrate electronic systems for certain specific function using the right equipment. 2. Use a wide range of analytical tools, techniques, equipment, and software packages pertaining to the discipline and develop required computer programs.
B2.	1.Assess and evaluate the characteristics and performance of components, systems and processes.
B3	1. Recognize methodologies of solving engineering problems. 2. Exchange knowledge and skills to engineering community and industry
C1.	1: Use computational facilities, measuring instruments, workshops and laboratories equipped to design experiments to collect, analyze and interpret results.
C2.	1: Select appropriate solutions for engineering problems based on analytical thinking.

4. Course Contents:

No.	Topics	Lectures	Practical	Tutorial
1	CONTROL SYSTEM MODELING: Basic Elements of Control System – Open loop and Closed loop systems - Differential equation	3	-	2
2	Transfer function, Modeling of Electric systems, Translational and rotational mechanical systems - Block diagram reduction Techniques - Signal flow graph	6	-	4
3	TIME RESPONSE ANALYSIS: Time response analysis - First Order Systems - Impulse and Step Response analysis of second order systems	6	-	4
4	Steady state errors – P, PI, PD and PID Compensation, Analysis using MATLAB	6	-	4
5	FREQUENCY RESPONSE ANALYSIS: Frequency Response - Bode Plot, Polar Plot, Nyquist Plot - Frequency Domain specifications from the plots - Constant M and N Circles - Nichol"s Chart	3	-	4
6	Use of Nichol"s Chart in Control System Analysis. Series, Parallel, series-parallel Compensators - Lead, Lag, and Lead Lag Compensators, Analysis using MATLAB	6	-	4
7	STABILITY ANALYSIS: Stability, Routh-Hurwitz Criterion, Root Locus Technique, Construction of Root Locus, Stability, Dominant Poles, Application of Root Locus Diagram - Nyquist Stability Criterion - Relative Stability, Analysis using MATLAB.	3	-	2
8	STATE VARIABLE ANALYSIS: State space representation of Continuous Time systems – State equations – Transfer function from State Variable Representation – Solutions of the state equations	3	-	2
9	Concepts of Controllability and Observability–State space representation for Discrete time systems. Sampled Data control systems – Sampling Theorem – Sampler & Hold – Open loop & Closed loop sampled data systems	6	-	4
	Total	**42**	**-**	**28**

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	lab
1	CONTROL SYSTEM MODELING: Basic Elements of Control System – Open loop and Closed loop systems – Differential equation	X			X		X		X		X				
2	Transfer function, Modeling of Electric systems, Translational and Rotational mechanical systems –Block diagram reduction Techniques – Signal flow graph	X			X	X			X		X	X			
3	TIME RESPONSE ANALYSIS: Time response analysis – First Order Systems – Impulse and Step Response analysis of second order systems	X			X	X	X		X		X				
4	Steady state errors – P, PI, PD and PID Compensation, Analysis using MATLAB	X			X		X		X			X			

5	FREQUENCY RESPONSE ANALYSIS: Frequency Response – Bode Plot, Polar Plot, Nyquist Plot – Frequency Domain specifications from the plots – Constant M and N Circles – Nichol"s Chart	X			X	X			X		X	X			
6	Use of Nichol"s Chart in Control System Analysis. Series, Parallel,series-parallel Compensators – Lead, Lag, and Lead Lag Compensators,Analysis using MATLAB	X			X	X	X		X		X				
7	STABILITY ANALYSIS: Stability, Routh-Hurwitz Criterion, Root Locus Technique, Construction of Root Locus, Stability, Dominant Poles, Application of Root Locus Diagram – Nyquist Stability Criterion – Relative Stability, and Analysis using MATLAB.	X			X		X		X		X	X			
8	STATE VARIABLE ANALYSIS:State space representation of Continuous Time systems – State equations – Transfer function from State Variable Representation – Solutions of the state equations	X			X	X			X		X				

9	Concepts of Controllability and Observability–State space representation for Discrete time systems. Sampled Data control systems Sampling Theorem – Sampler & Hold – Open loop &Closed loop sampled data systems	X			X	X	X		X		X	X			

6. Teaching and Learning Methods of Disable Students:

6.1. Teaching and Learning Methods of Disable Students:	
1	Additional Tutorials
2	Online lectures and assignments

6.2. Teaching and learning method for low capacity and outstanding Student	
For low capacity students	-Assign a portion of the office hours for those students. -Give them specific tasks. -Repeat the explanation of some of the material and tutorials. - Assign a teaching assistance to follow up the performance of these group of students
For outstanding Students	-Hand out project assignments to those students. -Give them some research topics to be searched using the internet and conduct presentation. Encourage them to take parts in the running research projects.

7**. Student Evaluation:**

7.1 Student Evaluation method:

No.	Evaluation Method	LO's
1	Periodic exam	A2(1,2),B1(1,2),B2(1)
2	Student load (Quiz & sheets, reports)	B2(1),C1(1),C2(1)
3	Final term examination	C1(1),C2(1)

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	8^{th}
2	Student load	2^{nd} -7^{th} - 9^{th}
3	Final term examination	15^{th}

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights

1	Periodic exam	36%
2	Student load	4%
3	Final term examination	60%
Total		**100%**

8. List of References:

No.	Reference List
1	Process systems engineering: From Solvay to modern bio- and nanotechnology. A history of development, successes and prospects for the future, 2023.
3	Modern control Engineering, OGATA,2020

9. Facilities required for teaching and learning:

No.	Facility
1	Lecture classroom
2	
3	White board
4	Data show system
5	Sound system

10. Matrix of knowledge and skills of the course:

No.	Topic	Aims	A2		B1		B2	C1	C2
			1	2	1	2	2	1	1
1	CONTROL SYSTEM MODELING: Basic Elements of Control System – Open loop and Closed loop systems - Differential equation	7	X		X				
2	Transfer function, Modeling of Electric systems, Translational and rotational mechanical systems - Block diagram reduction Techniques - Signal flow graph	7				X			
3	TIME RESPONSE ANALYSIS: Time response analysis - First Order Systems - Impulse and Step Response analysis of second order systems	8			X		X	X	
4	Steady state errors – P, PI, PD and PID Compensation, Analysis using MATLAB	8				X	X		X
5	FREQUENCY RESPONSE ANALYSIS: Frequency Response - Bode Plot, Polar Plot, Nyquist Plot - Frequency Domain specifications from the plots - Constant M and N Circles - Nichol"s Chart	12		X	X			X	

6	Use of Nichol‟s Chart in Control System Analysis. Series, Parallel, series-parallel Compensators - Lead, Lag, and Lead Lag Compensators, Analysis using MATLAB	8	X				X	X	
7	STABILITY ANALYSIS: Stability, Routh-Hurwitz Criterion, Root Locus Technique, Construction of Root Locus, Stability, Dominant Poles, Application of Root Locus Diagram - Nyquist Stability Criterion - Relative Stability, Analysis using MATLAB.	12		X	X		X		X
8	STATE VARIABLE ANALYSIS: State space representation of Continuous Time systems – State equations – Transfer function from State Variable Representation – Solutions of the state equations	8					X	X	X
9	Concepts of Controllability and Observability–State space representation for Discrete time systems. Sampled Data control systems – Sampling Theorem – Sampler & Hold – Open loop & Closed loop sampled data systems	12			X	X		X	X

Course Coordinator: Dr. Rabab Reda
Head of Department: Prof. Mohamed Fouad
Date of Approval: 2023

Computer Organization
(BAS222)

1- Basic Information:

Program Title	Communications and Electronics Engineering program

Department Offering the Program	Communications and Electronics Engineering Department
Department Responsible for the Course	Basic science and Engineering Department
Course Title	Computer Organization
Course Code	BAS222
Year/Level	Level 2
Specialization	Major
Authorization Date of Course Specification	-

Teaching hours	**Lectures**	**Lab.**	**Exercise**	**Contact**	**Student's load**
	2	**----**	**2**	**4**	**4**

2- Course Aims:

No.	Aims
9	-Communicate effectively using different tools (computer hardware, and computer software) and languages (the machine, and assembly language) with various users Study the newest achievements in computer architecture to deal with challenges in a critical and creative manner;

3- Cometencies (LO'S):

By the end of this course, the student able to:

Competency	Learning Outcomes (LO'S)
B1	1. Assess and evaluate the characteristics and performance of components, systems and processes.
C2	1: Describe principles of design including elements design, and a system related to specific computer system. 2: Merge engineering knowledge and understanding to improve design related to specific computer system. 3: Design system to carry out designs related to specific computer system. 4: Acquire entrepreneurial skills

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	An Introduction to a Simple Computer: CPU Basics and Organization, Bus, Clocks, Input/output Subsystem, Memory Organization and Addressing, Interrupts	3	2	-
2	Marie Machine: The Architecture, Registers and Buses, Instruction Set Architecture, Register Transfer Notation, Instruction Processing, the Fetch	9	6	-
3	Decode-Execute Cycle, A Simple Program, What Do	6	4	-

	Assemblers Do, Extending Our Instruction Set, and A Discussion on Decoding			
4	Hardwired vs. Micro programmed Control. A Closer Look at Instruction Set Architectures: Instruction Formats, Design Decisions for Instruction Sets, Little versus Big Endian, Internal Storage in the CPU	9	4	-
5	Stacks versus Registers, Number of Operand+-s and Instruction Length, Instruction-Level Pipelining	6	4	-
6	Types of Memory: Memory Hierarchy, Locality of Reference, Cache Memory, Virtual Memory. Input/output and Storage Systems: Introduction, Amdahl's Law, I/O Architectures, I/O Control Methods, I/O Bus Operation, Magnetic Disk Technology, Rigid Disk Drives, Optical Disks	9	4	-
Total		42	28	-

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	lab

1	An Introduction to a Simple Computer: CPU Basics and Organization, Bus, Clocks,Input/output Subsystem,Memory Organization and Addressing,Interrupts	×			×	×		×			×	×			
2	Marie Machine: The Architecture,Registers and Buses,Instruction Set Architecture, Register Transfer Notation,Instruction Processing, the Fetch	×			×	×	×				×	×			
3	Decode-Execute Cycle, A Simple Program, What Do Assemblers Do,Extending Our Instruction Set, and A Discussion on Decoding	×			×	×		×			×	×			
4	Hardwired vs. Micro programmed Control. A Closer Look at Instruction Set Architectures: Instruction Formats, Design Decisions for Instruction Sets, Little versus Big Endian, Internal Storage in the CPU	×			×		×	×			×	×			
5	Stacks versus Registers, Number of Operand+-s and Instruction Length, Instruction-Level Pipelining	×			×	×	×	×			×	×			

6	Types of Memory: Memory Hierarchy, Locality of Reference, Cache Memory, Virtual Memory. Input/output and Storage Systems: Introduction, Amdahl's Law, I/O Architectures, I/O Control Methods, I/O Bus Operation, Magnetic Disk Technology, Rigid Disk Drives, Optical Disks	X			X	X	X				X	X			

6. Teaching and Learning Methods of Disable Students:

6.1. Teaching and Learning Methods of Disable Students:	
1	Additional Tutorials
2	Online lectures and assignments

6.2. Teaching and learning method for low capacity and outstanding Student	
For low capacity students	-Assign a portion of the office hours for those students. -Give them specific tasks. -Repeat the explanation of some of the material and tutorials. - Assign a teaching assistance to follow up the performance of these group of students
For outstanding Students	-Hand out project assignments to those students. -Give them some research topics to be searched using the internet and conduct presentation. Encourage them to take parts in the running research projects.

7. **Student Evaluation:**

7.1 Student Evaluation method:

No.	**Evaluation Method**	**LO's**
1	Periodic exam	C2.1, C2.3
2	Student load	B1.1
3	Final term examination	C2.1, C2.2, C2.3, C2.4

7.2 Evaluation Schedule:

No.	**Evaluation Method**	**Weeks**
1	Periodic exam	8^{th}
2	Student load (reports- quizzes-embedded system projects)	2^{nd} -7^{th} - 9^{th}-14^{th}
3	Final term examination	15^{th}

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	36%
2	final examination	60%
3	Student load	4%
Total		**100%**

8. List of References:

No.	Reference List
1	Jim Ledin , “Modern Computer Architecture and Organization”, Packt Publishing Ltd,2020
2	Julia Lobur ,Linda Null, “ Essentials of Computer Organization and Architecture”, Jones & Bartlett Learning,2020.
3	Hans w. Gschwind, “Design of Digital Computers: An Introduction”, Springer, 2019
4	Morse Mano "Digital Design", 7 Editions, Boston Columbus Indianapolis New York San Francisco, 2023.
5	Computer Organization and Architecture: Designing for Performance (8th Ed) by William Stallings, Prentice-Hall...2020.

9. Facilities required for teaching and learning:

No.	Facility
1	Lecture classroom
2	
3	White board
4	Data show system
5	Wireless internet
6	Sound system

10. Matrix of knowledge and skills of the course:

No	Topic	Aims	B1	C2			
			1	1	2	3	4
1	An Introduction to a Simple Computer: CPU Basics and Organization, Bus, Clocks, Input/output Subsystem, Memory Organization and Addressing, Interrupts	9	X	X			
2	Marie Machine: The Architecture, Registers and Buses, Instruction Set Architecture, Register Transfer Notation, Instruction Processing, the Fetch	9			X	X	
3	Decode-Execute Cycle, A Simple Program, What Do Assemblers Do, Extending Our Instruction Set, and A Discussion on	9	X	X	X		

	Decoding						
4	Hardwired vs. Micro programmed Control. A Closer Look at Instruction Set Architectures: Instruction Formats, Design Decisions for Instruction Sets, Little versus Big Endian, Internal Storage in the CPU	9	X	X	X	X	X
5	Stacks versus Registers, Number of Operand+-s and Instruction Length, Instruction-Level Pipelining	9		X	X		
6	Types of Memory: Memory Hierarchy, Locality of Reference, Cache Memory, Virtual Memory. Input/output and Storage Systems: Introduction, Amdahl's Law, I/O Architectures, I/O Control Methods, I/O Bus Operation, Magnetic Disk Technology, Rigid Disk Drives, Optical Disks	9			X	X	X

Course Coordinator: Dr. Amira Elsonbaty
Head of Department: Prof. Mohamed Fouad

Engineering Management
(BAS223**)**

1- Basic Information:

Program Title	Communications and Electronics Engineering program
Department Offering the Program	Communications and Electronics Engineering Department
Department Responsible for the Course	Basic Science and Engineering Department
Course Title	Engineering Management
Course Code	BAS223
Year/Level	Level: 2
Specialization	Major
Authorization Date of Course Specification	-

Teaching hours	**Lectures**	**Lab.**	**Exercise**	**Contact**	**Student's load**
	2	**----**	**1**	**3**	**4**

2. Course Aims:

No.	**Aims**
2	Work in and manage a diverse team of professionals from various engineering

	disciplines, taking responsibility for own and team performance; and Behave professionally and adhere to engineering ethics and standards.
5	Communicate effectively with a variety of audiences using a variety of forms, methods, and languages; cope with academic and professional issues in a critical and creative manner; and display leadership, business administration, and entrepreneurial abilities.
10	Demonstrate leadership qualities, business management, and skill development.

3- Competencies :

Competencies	Learning Outcomes (LO'S)
A3	1.Judge engineering decision considering balanced cost, benefits, safety, quality, reliability, and environmental impact.
A4	1.List the engineering-related business and management principles. 2. Create methodical project management when dealing with new and advancing technology. 3. Use fundamental organizational and project management abilities.
A6	1. Recognize business and management principles relevant to engineering; project planning and schedule, network based scheduling, critical path method (CPM), program evaluation and review technique (PERT), Probability aspect of project completion time, Project cost control, Resource allocation and forecasting funds requirements. 2 Judge engineering decisions considering balanced costs, benefits, time from project cost control and forecasting funds requirements.
A8	1. Communicate effectively.

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	Management: Principles of management theory – The environment of managemen	4	4	-
2	planning – individual and group decision making	4	4	-
3	organizational culture, structure and design of management – motivating employees	4	4	-
4	leadership – interpersonal and organizational communication	4	4	-

5	control techniques for enhancing organizational effectiveness	4	4	-
6	the human relationships and the organizational behavior.	4	4	-
Total		**28**	**28**	**-**

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab
1	Introduction to project management.	X				X		x							
2	Project planning and scheduling.	X				X		x							
3	Network based scheduling.	X				X	x	x							
4	Critical path method.	X				X	x	x							
5	Program evaluation& review technique (PERT)	X					x	x							
6	Probability aspects of project completion time.	X				X		X							
7	Project cost control.	X				X	x	x							
8	Resource allocation	X				X		x							
9	Forecasting funds requirement	X				X	x	X							

6. Teaching and Learning Methods of Disable Students:

6.1. Teaching and Learning Methods of Disable Students:	
1	Additional Tutorials
2	Online lectures and assignments

6.2. Teaching and learning method for low capacity and outstanding Student	
For low capacity students	-Assign a portion of the office hours for those students. -Give them specific tasks. -Repeat the explanation of some of the material and tutorials. - Assign a teaching assistance to follow up the performance of these group of students
For outstanding Students	-Hand out project assignments to those students. -Give them some research topics to be searched using the internet and conduct presentation. Encourage them to take parts in the running research projects.

7. Student Evaluation :

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Periodic exam	A6,A8	A6(1),A8(1)
2	Student load (quizzes, sheets, report)	A8	1
3	Final term examination	A6,A8	A6(1),A8(1)

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	8^{th}
2	Student load	2^{nd} -7^{th} - 9^{th} -14^{th}
3	Final term examination	15^{th}

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	36%
2	Student load	4%
3	Final term examination	60%
Total		**100%**

8. List of References:

No.	Reference List
1	"Project communication Handbook", Office of project management process, fourth edition- 2023
2	T.T. El-Midany, "Production Planning and Control", Mansoura University, 2020.
3	Gideon Halevi "Handbook of production Management Methods", Butterworth-Heinemann, 2020

4	Dennis Blumenfeld, "Operation research calculations handbook", CRC Press LLC, 2019
5	Harold Kerzner, "Project Management" John Wiley & Sons. 2020
6	Myer Kutz, "Mechanical Engineers Handbook: Manufacturing and managements", Volume 3, Third Edition, John Wiley & Sons, Inc, 2020.

9. Facilities required for teaching and learning:

No.	Facility
1	Lecture classroom
2	
3	White board
4	Data show system
5	Sound system

10. Matrix of knowledge and skills of the course:

No.	Topic	Aims	A3		A6	A8
			1	2	1	1
1	Management: Principles of management theory – The environment of managemen	2,5,10	X		X	
2	planning – individual and group decision making	2,5,10			X	
3	organizational culture, structure and design of management – motivating employees	2,5,10				X
4	leadership – interpersonal and organizational communication	2,5,10		X	X	
5	control techniques for enhancing organizational effectiveness	2,5,10		X	X	
6	the human relationships and the organizational behavior.	2,5,10		X	X	

Course Coordinator: Dr / Moataz Mostafa
Head of Department: Asso.prof.Amal Behery
Date of Approval: 2023

Signal analysis
(CEE311)

1- Basic Information:

Program Title	Communications and Electronics Engineering program
Department Offering the Program	Communications and Electronics Engineering Department
Department Responsible for the Course	Communications and Electronics Engineering Department
Course Title	Signal analysis
Course Code	CEE311
Year/Level	Level 3
Specialization	Major
Authorization Date of Course Specification	-

Teaching hours	**Lectures**	**Lab.**	**Exercise**	**Contact**	**Student's load**
	3	**----**	**2**	**5**	**4**

2- Course Aims:

No.	Aims
6	**Recognize and respect the importance of the environment, both physical and natural, and work to promote sustainable principles**

3- Cometencies Learning Outcomes (ILO'S)

Competency	Learning Outcomes (ILO'S)
C1	1: Recognize engineering problems to apply knowledge of mathematics, science and engineering concepts to the solution of engineering problemson society and environment for the representation of signals in the time and alternative range.
C3	1: Investigate the failure of components, system, and processes. 2: Judge engineering decision considering balanced cost, benefits, safety, quality, reliability, and environmental impact. 3: Apply safe systems at work and observe the appropriate steps to manage risks

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	CLASSIFICATION OF SIGNALS AND SYSTEMS: Continuous time signals (CT signals) - Discrete time signals (DT signals)	6	4	-
2	Step, Ramp, Pulse, Impulse, Sinusoidal, Exponential,	6	4	-

	Classification of CT and DT signals - Periodic & Aperiodic signals, Deterministic & Random signals, Energy & Power signals - CT systems and DT systems			
3	Classification of systems – Static & Dynamic, Linear & Nonlinear, Time-variant & Time-invariant, Causal & Noncausal, Stable & Unstable	6	4	-
4	ANALYSIS OF CONTINUOUS TIME SIGNALS: Fourier series analysis-spectrum of Continuous Time (CT) signals- Fourier and Laplace Transforms in CT Signal Analysis – Properties	6	4	-
5	LINEAR TIME INVARIANT- CONTINUOUS TIME SYSTEMS: Differential Equation-Block diagram representation-impulse response, convolution integrals-Fourier and Laplace transforms in Analysis of CT systems	6	4	-
6	ANALYSIS OF DISCRETE TIME SIGNALS: Baseband Sampling - DTFT – Properties of DTFT - Z Transform – Properties of Z Transform	6	4	-
7	LINEAR TIME INVARIANT-DISCRETE TIME SYSTEMS: Difference Equations-Block diagram representation-Impulse response - Convolution sum-Discrete Fourier and Z Transform Analysis of Recursive & Non-Recursive systems	6	4	-
Total		**42**	**28**	

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab

1	CLASSIFICATION OF SIGNALS AND SYSTEMS:Continuous time signals (CT signals) – Discrete time signals (DT signals)	×			×	×					×	×			
2	Step, Ramp, Pulse, Impulse, Sinusoidal, Exponential, Classification of CT and DT signals – Periodic &Aperiodic signals, Deterministic &Random signals, Energy & Power signals – CT systems and DT systems	×			×	×					×	×			
3	Classification of systems – Static & Dynamic, Linear & Nonlinear, Time-variant & Time-invariant, Causal & Noncausal, Stable & Unstable	×			×	×					×	×			
4	ANALYSIS OF CONTINUOUS TIME SIGNALS: Fourier series analysis- spectrum of Continuous Time (CT) signals- Fourier and Laplace Transforms in CT Signal Analysis – Properties	×			×	×					×	×			

5	LINEAR TIME INVARIANT-CONTINUOUS TIME SYSTEMS: Differential Equation-Block diagram representation-impulse response, convolution integrals- Fourier and Laplace transforms in Analysis of CT systems	X			X	X					X	X			
6	ANALYSIS OF DISCRETE TIME SIGNALS:Baseband Sampling – DTFT – Properties of DTFT – Ztransform – Properties of Z Transform	X			X	X					X	X			
7	LINEAR TIME INVARIANT-DISCRETE TIME SYSTEMS:Difference Equations-Block diagram representation-Impulse response – Convolution sum- Discrete Fourier and Ztransform,Analysis of Recursive & Non-Recursive systems	X			X	X					X	X			

6. Teaching and Learning Methods of Disable Students:

6.1. Teaching and Learning Methods of Disable Students:	
1	Additional Tutorials
2	Online lectures and assignments
6.2. Teaching and learning method for low capacity and outstanding Student	
For low capacity students	-Assign a portion of the office hours for those students. -Give them specific tasks. -Repeat the explanation of some of the material and tutorials. - Assign a teaching assistance to follow up the performance of these

	group of students
For outstanding Students	-Hand out project assignments to those students. -Give them some research topics to be searched using the internet and conduct presentation. Encourage them to take parts in the running research projects.

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	ILO's
1	Periodic exam	C1(1), C3(1-3)
2	Student load (Quiz & sheets, reports)	C1(1), C3(1-3)
3	Final term examination	C1(1), C3(1-2-3)

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	8^{th}
2	Student load	2^{nd} -7^{th} - 9^{th}-14^{th}
3	Final term examination	15^{th}

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	36.8%
2	final examination	60%
3	Student load	3.2%
Total		**100%**

8. List of References:

No.	Reference List
1	Kenneth E. Kendall, julie E. Kendall, "System Analysis and Design", prentice-hall, 9th ed. 2020.
2	Jeffrey Whitten and Lonnie Bentley, Systems analysis and design methods", 2023.
3	Luis F. Chaparro, Aydin Akan, signals and systems using Matlab, Academic press, 2019, ISSN: 9780128142042.

9. Facilities required for teaching and learning:

No.	Facility
1	Lecture classroom
2	
3	White board
4	Data show system

10. Matrix of knowledge and skills of the course:

No.	Topic	Aims	C1	C3

			1	1	2	3
1	CLASSIFICATION OF SIGNALS AND SYSTEMS: Continuous time signals (CT signals) - Discrete time signals (DT signals)	6	x	x		
2	Step, Ramp, Pulse, Impulse, Sinusoidal, Exponential, Classification of CT and DT signals - Periodic & Aperiodic signals, Deterministic & Random signals, Energy & Power signals - CT systems and DT systems	6	x	x		
3	Classification of systems – Static & Dynamic, Linear & Nonlinear, Time-variant & Time-invariant, Causal & Noncausal, Stable & Unstable	6	x	**x**		
4	ANALYSIS OF CONTINUOUS TIME SIGNALS: Fourier series analysis-spectrum of Continuous Time (CT) signals- Fourier and Laplace Transforms in CT Signal Analysis – Properties	6	x		x	
5	LINEAR TIME INVARIANT- CONTINUOUS TIME SYSTEMS: Differential Equation-Block diagram representation-impulse response, convolution integrals-Fourier and Laplace transforms in Analysis of CT systems	6	x		x	x
6	ANALYSIS OF DISCRETE TIME SIGNALS: Baseband Sampling - DTFT – Properties of DTFT - Z Transform – Properties of Z Transform	6	x		x	x
7	LINEAR TIME INVARIANT-DISCRETE TIME SYSTEMS: Difference Equations-Block diagram representation-Impulse response - Convolution sum- Discrete Fourier and Z Transform Analysis of Recursive & Non-Recursive systems	6	x	x		

Course Coordinator: Dr. Rania Hamdy Elabd
Head of Department: Prof. Dr. Mohamed Fouad
Date of Approval: 2023

Electronic Circuits 2
(CEE312**)**

1- Basic Information:

Program Title	Communications and Electronics Engineering program
Department Offering the Program	Communications and Electronics Engineering Department

Department Responsible for the Course	Communications and Electronics Engineering Department
Course Title	Electronic Circuits 2
Course Code	CEE312
Year/Level	Level 3
Specialization	Major
Authorization Date of Course Specification	-

Teaching hours	**Lectures**	**Lab.**	**Exercise**	**Contact**	**Student's load**
	3	**----**	**2**	**5**	**4**

2- Course Aims:

No.	Aims
11	Computer systems in Electronics and Communication engineering can be used to design a system, component, and process to meet recent technological advances.

3-Cometencies (LO'S):

Competency	Learning Outcomes (LO'S)
B3	1. Define basics of information and communication technology (ICT). 2. Merge engineering knowledge and understanding to improve design of electronic circuits, products and/or services.
C3	1. Judge engineering decision considering balanced cost, benefits, safety, quality, reliability, and environmental impact.
C5	1: Use a wide range of analytical tools, techniques, equipment, and software packages to simulate and design low consumed power electronic circuits.

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	FEEDBACK AMPLIFIERS :General Feedback Structure – Properties of negative feedback – Basic Feedback Topologies–Feedback amplifiers – Series – Shunt, Series – Series, Shunt – Shunt and Shunt	6	4	-
2	Series Feedback –Determining the Loop Gain – Stability Problem – Nyquist Plot – Effect of feedback on amplifier poles –Frequency Compensation.	6	4	-
3	OSCILLATORS : Classification, Barkhausen Criterion - Mechanism for start of oscillation and stabilization of amplitude, General form of an Oscillator, Analysis of LC oscillators - Hartley, Colpitts, Clapp, Franklin, Armstrong, Tuned	6	4	-

	collector oscillators, RC oscillators			
4	phase shift –Wienbridge - Twin-T Oscillators, Frequency range of RC and LC Oscillators, Quartz Crystal Construction, Electrical equivalent circuit of Crystal, Miller and Pierce Crystal oscillators, frequency stability of oscillators.	6	4	-
5	TUNED AMPLIFIERS : Coil losses, unloaded and loaded Q of tank circuits, small signal tuned amplifiers - Analysis of capacitor coupled single tuned amplifier – double tuned amplifier	6	4	-
6	effect of cascading single tuned and double tuned amplifiers on bandwidth – Stagger tuned amplifiers – large signal tuned amplifiers –Class C tuned amplifier – Efficiency and applications of Class C tuned amplifier - Stability of tuned amplifiers – Neutralization - Hazeltine neutralization method	6	4	-
7	WAVE SHAPING AND MULTIVIBRATOR CIRCUITS: RC & RL Integrator and Differentiator circuits – Storage, Delay and Calculation of Transistor Switching Times – Speed-up Capaitor - Diode clippers, Diode comparator - Clampers. Collector coupled and Emitter coupled Astable multivibrator – Monostable multivibrator - Bistable multivibrators- Triggering methods for Bigtable multivibrators - Schmitt trigger circuit	3	2	-
8	BLOCKING OSCILLATORS AND TIMEBASE GENERATORS : UJT saw tooth waveform generator, Pulse transformers – equivalent circuit – response - applications, Blocking Oscillator – Free running blocking oscillator - Astable Blocking Oscillators with base timing –Push-pull Astable blocking oscillator with emitter timing, Frequency control using core saturation, Triggered blocking oscillator – Monostable blocking oscillator with base timing – Monostable blocking oscillator with emitter timing, Time base circuits - Voltage-Time base circuit, Current-Time base circuit – Linearization through adjustment of driving waveform.	3	2	-
Total		**42**	**28**	**-**

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab
1	FEEDBACK AMPLIFIERS :General Feedback Structure –Properties of negative feedback – Basic Feedback Topologies–Feedback amplifiers –Series – Shunt, Series – Series, Shunt – Shunt and Shunt	X			X		X	X							
2	Series Feedback – Determining the Loop Gain –Stability Problem – Nyquist Plot – Effect of feedback on amplifier poles –Frequency Compensation.	X			X		X	X							

3	OSCILLATORS : Classification, Barkhausen Criterion – Mechanism for start of oscillation and stabilization of amplitude, General form of an Oscillator, Analysis of LC oscillators – Hartley, Colpitts, Clapp, Franklin, Armstrong, Tuned collector oscillators, RC oscillators	X			X		X	X							
4	phase shift –Wienbridge – Twin-T Oscillators, Frequency range of RC and LC Oscillators, Quartz Crystal Construction, Electrical equivalent circuit of Crystal, Miller and Pierce Crystal oscillators, frequency stability of oscillators.	X			X		X	X							
5	TUNED AMPLIFIERS : Coil losses, unloaded and loaded Q of tank circuits, small signal tuned amplifiers – Analysis of capacitor coupled single tuned amplifier – double tuned amplifier	X			X		X	X							

6	effect of cascading single tuned and double tuned amplifiers on bandwidth – Stagger tuned amplifiers – large signal tuned amplifiers –Class C tuned amplifier – Efficiency and applications of Class C tuned amplifier – Stability of tuned amplifiers – Neutralization – Hazeltine neutralization method	X			X		X	X							
7	WAVE SHAPING AND MULTIVIBRATOR CIRCUITS: RC & RL Integrator and Differentiator circuits – Storage, Delay and Calculation of Transistor Switching Times – Speed-up Capaitor – Diode clippers, Diode comparator – Clampers. Collector coupled and Emitter coupled Astable	X			X		X	X							

6. Teaching and Learning Methods of Disable Students:

6.1. Teaching and Learning Methods of Disable Students:	
1	Additional Tutorials
2	Online lectures and assignments

6.2. Teaching and learning method for low capacity and outstanding Student	
For low capacity students	-Assign a portion of the office hours for those students. -Give them specific tasks. -Repeat the explanation of some of the material and tutorials. - Assign a teaching assistance to follow up the performance of these group of students

For outstanding Students	-Hand out project assignments to those students. -Give them some research topics to be searched using the internet and conduct presentation. Encourage them to take parts in the running research projects.

7**. Student Evaluation:**

7.1 Student Evaluation methods:

No.	Evaluation Method	LO's
1	Periodic exam	B3(2), C3(1)
2	Student load (Quiz & sheets, reports)	C3(1), C5(1)
3	Final term examination	B3(1,2), C3(1)

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	8^{th}
2	Student load	2^{nd} -7^{th} - 9^{th}-14^{th}
3	Final term examination	15^{th}

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	37.3%
2	final examination	60%
3	Student load	2.7%
	Total	**100%**

8. List of References:

No.	Reference List
1	Thomas L. Floyd, "Electronic devices ", Tenth Edition, Prentice Hall Boston Columbus Indianapolis New York San Francisco, 2023.
2	Adel, Sedra" Microelectronic devices and Circuits", Tenth Edition, Boston Columbus Indianapolis New York San Francisco, 2020.
3	Adel Sedra, Smith, " Microelectronic Circuits ", Eightth Edition Oxford, New york, 2019

9. Facilities required for teaching and learning:

No.	Facility
1	Lecture classroom
2	
3	White board
4	Data show system
5	Wireless internet
6	Sound system

10. Matrix of knowledge and skills of the course:

No.	Topic	Aims	B3		C3	C5
			1	2	1	1
1	FEEDBACK AMPLIFIERS :General Feedback Structure – Properties of negative feedback – Basic Feedback Topologies–Feedback amplifiers – Series – Shunt, Series – Series, Shunt – Shunt and Shunt	1,11	x	x	x	
2	Series Feedback –Determining the Loop Gain – Stability Problem – Nyquist Plot – Effect of feedback on amplifier poles –Frequency Compensation.	1,11	x		x	
3	OSCILLATORS : Classification, Barkhausen Criterion - Mechanism for start of oscillation and stabilization of amplitude, General form of an Oscillator, Analysis of LC oscillators - Hartley, Colpitts, Clapp, Franklin, Armstrong, Tuned collector oscillators, RC oscillators	1,11	x	x	x	x
4	phase shift –Wienbridge - Twin-T Oscillators, Frequency range of RC and LC Oscillators, Quartz Crystal Construction, Electrical equivalent circuit of Crystal, Miller and Pierce Crystal oscillators, frequency stability of oscillators.	1,11	x		x	
5	TUNED AMPLIFIERS : Coil losses, unloaded and loaded Q of tank circuits, small signal tuned amplifiers - Analysis of capacitor coupled single tuned amplifier – double tuned amplifier	1,11	x		x	
6	effect of cascading single tuned and double tuned amplifiers on bandwidth – Stagger tuned amplifiers – large signal tuned amplifiers –Class C tuned amplifier – Efficiency and applications of Class C tuned amplifier - Stability of tuned amplifiers – Neutralization - Hazeltine neutralization method	1	x		x	
7	WAVE SHAPING AND MULTIVIBRATOR CIRCUITS: RC & RL Integrator and Differentiator circuits – Storage, Delay and Calculation of Transistor Switching Times – Speed-up Capaitor - Diode clippers, Diode comparator - Clampers. Collector coupled and Emitter coupled Astable multivibrator – Monostable	1	x		x	

	multivibrator - Bistable multivibrators- Triggering methods for Bigtable multivibrators - Schmitt trigger circuit					
8	BLOCKING OSCILLATORS AND TIMEBASE GENERATORS : UJT saw tooth waveform generator, Pulse transformers – equivalent circuit – response - applications, Blocking Oscillator – Free running blocking oscillator - Astable Blocking Oscillators with base timing –Push-pull Astable blocking oscillator with emitter timing, Frequency control using core saturation, Triggered blocking oscillator – Monostable blocking oscillator with base timing – Monostable blocking oscillator with emitter timing, Time base circuits - Voltage-Time base circuit, Current-Time base circuit – Linearization through adjustment of driving waveform.	11	x	x	x	x

Course Coordinator: Assoc. prof. Osama Oraby
Head of Department: Prof. Dr. Mohamed Fouad
Date of Approval: 2023

Integrated circuits
(CEE313**)**

1- Basic Information:

Program Title	Communications and Electronics Engineering program
Department Offering the Program	Communications and Electronics Engineering Department
Department Responsible for the Course	Communications and Electronics Engineering Department
Course Title	Integrated circuits
Course Code	CEE313
Year/Level	Level 3
Specialization	Major
Authorization Date of Course Specification	

Teaching hours	**Lectures**	**Lab.**	**Exercise**	**Contact**	**Student load**
	3	-	**2**	**5**	**4**

2-Course Aims

No.	Aims
2	Apply analytic critical and systemic thinking to discover, analyze, and solve a wide range of engineering problems;

3- Cometencies (LO'S):

Competency	Learning Outcomes (LO'S)
A3	1. Describe principles of design including elements design, process and/or a system in order to design low cost, low scale dimensions and low dissipated power integrated circuits.
B2	1. Create systematic and methodic approaches in dealing with new and advancing technology. 2. Identify appropriate specifications for required devices as low size, low cost and low consumed power. 3. Create and/or re-design a process, component or system, and carry out specialized engineering designs of integrated circuits.
C1	1: Recognize engineering problems to identify the best solutions.
C3	1: Judge engineering decision considering balanced cost, benefits, safety, quality, reliability, and environmental impact.

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	BASICS OF OPERATIONAL AMPLIFIERS: Current mirror and current sources, Current sources as active loads, Voltage sources, Voltage References, BJT Differential amplifier with active loads, Basic information about op-amps	6	2	-
2	Ideal Operational Amplifier - General operational amplifier stages -and internal circuit diagrams of IC 741, DC and AC performance characteristics, slew rate, Open and closed loop configurations	3	4	-
3	APPLICATIONS OF OPERATIONAL AMPLIFIERS: Sign Changer, Scale Changer, Phase Shift Circuits, Voltage Follower, V-to-I and I-to-V converters, adder, subtractor, Instrumentation amplifier, Integrator, Differentiator, Logarithmic amplifier, Antilogarithmic amplifier, Comparators, Schmitt trigger, Precision rectifier, peak detector, clipper and clamper, Low-pass, high-pass and band-pass Butterworth filters	6	4	-
4	ANALOG MULTIPLIER AND PLL: Analog Multiplier using Emitter Coupled Transistor Pair - Gilbert Multiplier cell – Variable transconductance technique, analog multiplier ICs and their applications, Operation	9	4	-

	of the basic PLL, Closed loop analysis, Voltage controlled oscillator, Monolithic PLL IC 565, application of PLL for AM detection, FM detection, FSK modulation and demodulation and Frequency synthesizing			
5	ANALOG TO DIGITAL AND DIGITAL TO ANALOG CONVERTERS: Analog and Digital Data Conversions, D/A converter – specifications - weighted resistor type, R-2R Ladder type, Voltage Mode and Current-Mode R / 2R Ladder types - switches for D/A converters, high speed sample-and-hold circuits, A/D Converters	6	4	-
6	specifications - Flash type - Successive Approximation type - Single Slope type – Dual Slope type - A/D Converter using Voltage-to-Time Conversion - Over-sampling A/D Converters	6	4	-
7	WAVEFORM GENERATORS AND SPECIAL FUNCTION ICS: Sine-wave generators, Multivibrators and Triangular wave generator, Saw-tooth wave generator, ICL8038 function generator, Timer IC 555, IC Voltage regulators	3	4	-
8	Three terminal fixed and adjustable voltage regulators - IC 723 general purpose regulator - Monolithic switching regulator, Switched capacitor filter IC MF10, Frequency to Voltage and Voltage to Frequency converters, Audio Power amplifier, Video Amplifier, Isolation Amplifier, Opto-couplers and fibre optic IC.	3	2	-
Total		**42**	**28**	

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab
1	FEEDBACK AMPLIFIERS :General Feedback Structure – Properties of negative feedback – Basic Feedback Topologies–Feedback amplifiers – Series – Shunt, Series – Series, Shunt – Shunt and Shunt	X			X	X		X							
2	Series Feedback – Determining the Loop Gain – Stability Problem – Nyquist Plot – Effect of feedback on amplifier poles – Frequency Compensation.	X			X	X		X							

3	OSCILLATORS : Classification, Barkhausen Criterion – Mechanism for start of oscillation and stabilization of amplitude, General form of an Oscillator, Analysis of LC oscillators – Hartley, Colpitts, Clapp, Franklin, Armstrong, Tuned collector oscillators, RC oscillators	×			×	×		×							
4	phase shift –Wienbridge – Twin-T Oscillators,Frequency range of RC and LCOscillators,Quartz Crystal Construction, Electrical equivalent circuit of Crystal, Miller and Pierce Crystal oscillators, frequency stability of oscillators.	×			×	×		×							
5	TUNED AMPLIFIERS : Coil losses, unloaded and loaded Q of tank circuits, small signal tuned amplifiers – Analysis of capacitor coupled single tuned amplifier – double tuned amplifier	×			×	×		×							

6	effect of cascading single tuned and double tuned amplifiers on bandwidth – Stagger tuned amplifiers – large signal tuned amplifiers –Class C tuned amplifier – Efficiency and applications of Class C tuned amplifier - Stability of tuned amplifiers – Neutralization – Hazeltine neutralization method	x			x	x		x							
7	WAVE SHAPING AND MULTIVIBRATOR CIRCUITS: RC & RL Integrator and Differentiator circuits – Storage, Delay and Calculation of Transistor Switching Times – Speed-up Capaitor – Diode clippers, Diode comparator – Clampers. Collector coupled and Emitter coupled Astable multivibrator – Monostable multivibrator – Bistable multivibrators- Triggering methods for Bigtable multivibrators – Schmitt trigger circuit	x			x	x		x							

8	BLOCKING OSCILLATORS AND TIMEBASE GENERATORS : UJT saw tooth waveform generator, Pulse transformers – equivalent circuit – response – applications, Blocking Oscillator – Free running blocking oscillator – Astable Blocking Oscillators with base timing –Push-pull Astable blocking oscillator with emitter timing, Frequency control using core saturation, Triggered blocking oscillator – Monostable blocking oscillator with base timing – Monostable blocking oscillator with emitter timing, Time base circuits – Voltage-Time base circuit, Current-Time base circuit – Linearization through adjustment of driving waveform.	X			X	X		X							

6. Teaching and Learning Methods of Disable Students:

6.1. Teaching and Learning Methods of Disable Students:	
1	Additional Tutorials
2	Online lectures and assignments
6.2. Teaching and learning method for low capacity and outstanding Student	
For low capacity students	-Assign a portion of the office hours for those students. -Give them specific tasks. -Repeat the explanation of some of the material and tutorials.

	- Assign a teaching assistance to follow up the performance of these group of students
For outstanding Students	-Hand out project assignments to those students. -Give them some research topics to be searched using the internet and conduct presentation. Encourage them to take parts in the running research projects.

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	LO's
1	Periodic exam	A3(1), B2(1,2)
2	Student load (Quiz & sheets, reports)	B2(1,2,3),C3(1)
3	Final term examination	A3(1) ,B2,(1,2,3),,C1 (1),C3,(1)

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	8th
2	Student load	2nd -7th - 9th- 14th
3	Final term examination	15th

7.3 weighting of Evaluation:

No.	Evaluation method	Weights
1	Periodic exam	37.3%
2	final examination	60%
3	Student load	2.7%
	Total	**100%**

8. List of References:

No.	Reference List
1	Adel, Sedra"Microelectronic devices and Circuits", Tenth Edition, Boston Columbus Indianapolis New York San Francisco, 2019. Columbus Indianapolis New York San Francisco, 2019.
2	ROBERT B. L. NASHELSKY, "Electronic devices and Circuit Theory ", Tenth Edition Pearson Education, Inc., Upper Saddle River, New Jersey 07458. Pearson Prentice Hall, 2023.

9. Facilities required for teaching and learning:

No.	Facility
1	Lecture classroom
2	
3	White board
4	Data show system
5	Wireless internet
6	Sound system

10. Matrix of knowledge and skills of the course:

No.	Topic	Aims	A3	B2			C1	C3
			1	1	2	3	1	1
1	BASICS OF OPERATIONAL AMPLIFIERS: Current mirror and current sources, Current sources as active loads, Voltage sources, Voltage References, BJT Differential amplifier with active loads, Basic information about op-amps	1	x	x	x		x	
2	Ideal Operational Amplifier - General operational amplifier stages -and internal circuit diagrams of IC 741, DC and AC performance characteristics, slew rate, Open and closed loop configurations	1,2	x			x		
3	APPLICATIONS OF OPERATIONAL AMPLIFIERS: Sign Changer, Scale Changer, Phase Shift Circuits, Voltage Follower, V-to-I and I-to-V converters, adder, subtractor, Instrumentation amplifier, Integrator, Differentiator, Logarithmic amplifier, Antilogarithmic amplifier, Comparators, Schmitt trigger, Precision rectifier, peak detector, clipper and clamper, Low-pass, high-pass and band-pass Butterworth filters	1, 2	x			x	x	
4	ANALOG MULTIPLIER AND PLL: Analog Multiplier using Emitter Coupled Transistor Pair - Gilbert Multiplier cell – Variable transconductance technique, analog multiplier ICs and their applications, Operation of the basic PLL, Closed loop analysis, Voltage controlled oscillator, Monolithic PLL IC 565, application of PLL for AM detection, FM detection, FSK modulation and demodulation and Frequency synthesizing	1	x	x				
5	ANALOG TO DIGITAL AND DIGITAL TO ANALOG CONVERTERS: Analog and Digital Data Conversions, D/A converter – specifications - weighted resistor type, R-2R Ladder type, Voltage Mode and Current-Mode R / 2R Ladder types - switches for D/A converters, high speed sample-and-hold circuits, A/D Converters	1, 2	x			x	x	
6	specifications - Flash type - Successive Approximation type - Single Slope type – Dual	1,2	x	x			x	x

No.	Topic	Aims	A3	B2			C1	C3
			1	1	2	3	1	1
	Slope type - A/D Converter using Voltage-to-Time Conversion - Over-sampling A/D Converters							
7	WAVEFORM GENERATORS AND SPECIAL FUNCTION ICS: Sine-wave generators, Multivibrators and Triangular wave generator, Saw-tooth wave generator, ICL8038 function generator, Timer IC 555, IC Voltage regulators	1,2			x		x	
8	Three terminal fixed and adjustable voltage regulators - IC 723 general purpose regulator - Monolithic switching regulator, Switched capacitor filter IC MF10, Frequency to Voltage and Voltage to Frequency converters, Audio Power amplifier, Video Amplifier, Isolation Amplifier, Opto-couplers and fibre optic IC.	1,2	x		x	x	x	

Course Coordinator: Dr. Walid Rasslan
Head of Department: Asso.Prof. Mohamed Fouad
Date of Approval: 2023

Electronic Tests 3
(CEE314**)**

3- Basic Information:

Program Title	Communications and Electronics Engineering program
Department Offering the Program	Communications and Electronics Engineering Department
Department Responsible for the Course	Communications and Electronics Engineering Department
Course Title	Electronic Tests 3
Course Code	CEE314
Year/Level	Level 3
Specialization	Major
Authorization Date of Course Specification	-

Teaching hours	Lec.	Lab.	Exer.	Contact	Student load
	2	3	-	5	4

4- Course Aims:

No.	Aims
1	Proper utilization of modern engineering techniques, skills, and tools
11	. Allocate projects creatively by analyzing data from intended tests.

3- Competencies Learning Outcomes (LO'S)

Competency	Learning Outcomes (LO'S)
A9	1.Think creatively in solving problems of design. 2. Effectively manage tasks, time, and resources. 3 .Refer to relevant literatures.
B4	1. Recognize methodologies of solving engineering problems. 2. Merge engineering knowledge and understanding to improve design of electronic circuits, products and/or services. 3. Demonstrates basic organizational and project management skills.
B5	1.Adopt suitable national and international standards and codes to: design, build, operate, inspect and maintain electrical/electronic/digital equipment, systems and services.
C4	1. Use relevant laboratory equipment and analyze the results correctly 2. Troubleshoot, maintain and repair almost all types of electronic systems using the standard tools. 3. Use appropriate tools to measure system performance. 4. Use computational facilities, measuring instruments, workshops and laboratories equipment to design experiments and collect, analyze and interpret results.

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	Laboratory experiments in the field of electronic circuits include: Binary system , logc gtates ,applications of logic gaes and using CAD tools.	3	-	6
2	Combinational circuits and sequential circuits	3		8
3	Applications of Combinational and sequential circuits such as design and implementation a Digital frequency mete and DMM.	2		8
4	Operational amplifier circuits and applications	2		8
5-	Thyristor specifications and its applications	1		4
6	TRIAC and DIAC properties	1		2
7	Performance of transistors – The various transistor amplifiers with single stage and multi-stages	1	-	2
8	feedback amplifiers – frequency response for amplifiers and presenting the frequency range	1	-	4

Total	14		42

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab
1	Binary system , logc gtates ,applications of logic gaes and using CAD tools	X			X	X									X
2	Combinational circuits and sequential circuits	X			X	X									X
3	Applications of Combinational and sequential circuits such as design and implementation a Digital frequency mete and DMM.	X			X	X									X
4	Operational amplifier circuits and applications	X			X	X									X
5	Thyristor specifications and its applications.	X			X	X									X
6	TRIAC and DIAC properties	X			X	X									X

7	Performance of transistors – The various transistor amplifiers with single stage and multi-stages	X			X	X									X
8	feedback amplifiers – frequency response for amplifiers and presenting the frequency range	X			X	X						X			X

6. Teaching and Learning Methods of Disable Students:

6.1. Teaching and Learning Methods of Disable Students:	
1	Additional Tutorials
2	Online lectures and assignments

6.2. Teaching and learning method for low capacity and outstanding Student	
For low capacity students	-Assign a portion of the office hours for those students. -Give them specific tasks. -Repeat the explanation of some of the material and tutorials. - Assign a teaching assistance to follow up the performance of these group of students
For outstanding Students	-Hand out project assignments to those students. -Give them some research topics to be searched using the internet and conduct presentation. Encourage them to take parts in the running research projects.

7**. Student Evaluation:**

7.1 Student Evaluation methods:

No.	Evaluation Method	LO’s
1	Periodic exam	A9(1,2,3),B4 (1)
2	Student load (Quiz & sheets, reports)	B4 (1), C4 (1)
3	Final term examination	A9(1,2,3),B5,B4 (1), C4 (1)

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	8^{th}
2	Student load	2^{nd} -7^{th} - 9^{th} -14^{th}
3	Final term examination	15^{th}

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	36.8%
2	final examination	48%

3	Student load	3.2%
4	Practical/oral	12%
	Total	**100%**

8. List of References:

No.	Reference List
1	Alan S. Morris, “Measurement and Instrumentation Principles,” Published May 14th 2019 by Butterworth-Heinemann.
2	Robert A.Witte, “Electronic Test Instruments(Analog and Digital Measurements, Hewlett Packard, 2023

9. Facilities required for teaching and learning:

No.	Facility
1	Computer and video data show
2	Lab
3	White board
4	Wireless internet
5	Sound system
1	Computer and video data show

10. Matrix of knowledge and skills of the course:

No.	Topic	Aims	A9			B4	B5	C4
			1	2	3	1	1	1
1	Binary system , logc gtates ,applications of logic gaes and using CAD tools	7,13	x	x		x		x
2	Combinational circuits and sequential circuits	7,13	x			x	x	x
3	Applications of Combinational and sequential circuits such as design and implementation a Digital frequency mete and DMM.	7,13	x	x		x		
4	Operational amplifier circuits and applications.	7,13		x	x		x	x
5	Thyristor specifications and its applications.	13				x		
6	RIAC and DIAC properties	13	x	x				x
7	Performance of transistors – The various transistor amplifiers with single stage and multi-stages.	13				x	x	

8	feedback amplifiers – frequency response for amplifiers and presenting the frequency range	13	x	x		x		x

Course Coordinator: Dr. Hossam El_sheikh
Head of Department: Prof. Mohamed Fouad
Date of Approval: 2023

Project Management and Control
(BAS321**)**

1-Basic Information:

Program Title	Communications and Electronics Engineering program
Department Offering the Program	Communications and Electronics Engineering Department
Department Responsible for the Course	Basic science and Engineering Department
Course Title	Project Management and Control
Course Code	BAS321
Year/Level	level 3
Specialization	Major
Authorization Date of Course Specification	-

Teaching hours	Lectures	Tutorial	Practical
	2	2	-

2-Course Aims:

No.	Aims
2	Work in and manage a diverse team of professionals from various engineering disciplines, taking responsibility for own and team performance; and Behave professionally and adhere to engineering ethics and standards.
5	Communicate effectively with a variety of audiences using a variety of forms, methods, and languages; cope with academic and professional issues in a critical and creative manner; and display leadership, business administration, and entrepreneurial abilities.
10	Demonstrate leadership qualities, business management, and skill development.

3- Competencies :

Competencies	Learning Outcomes (LO'S)
A4. Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements,	1.List the engineering-related business and management principles. 2. Create methodical project management

environmental issues and risk management principles.	when dealing with new and advancing technology. 3. Use fundamental organizational and project management abilities. 4 Apply quality assurance procedures and follow codes and standards.
A6. Plan, supervise and monitor implementation of engineering projects, taking into consideration other trades requirements.	1. Recognize business and management principles relevant to engineering; project planning and schedule, network based scheduling, critical path method (CPM), program evaluation and review technique (PERT), Probability aspect of project completion time, Project cost control, Resource allocation and forecasting funds requirements. 2 Judge engineering decisions considering balanced costs, benefits, time from project cost control and forecasting funds requirements.
A8. Communicate effectively – graphically, verbally and in writing – with a range of audiences using contemporary tools.	1 Communicate effectively.

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	Development, negotiation and specification of project contract	2	2	-
2	Project planning and control using activity network models	2	2	-
3	network logic; scheduling; resource allocation	2	2	-
4	time-cost trade off methods	6	6	-
5	multi-project resource allocation and leveling using available industrial software	4	4	-
Total		**28**	**28**	**-**

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab
1	Introduction to project management.	x				X		x							
2	Project planning and scheduling.	x				X		x							
3	Network based scheduling.	x				X	x	x							
4	Critical path method.	x				X	x	x							
5	Program evaluation& review technique (PERT)	x					x	x							
6	Probability aspects of project completion time.	x				X		X							
7	Project cost control.	x				X	x	x							
8	Resource allocation	x				X		x							
9	Forecasting funds requirement	x				X	x	X							

6. Teaching and Learning Methods of Disable Students:

6.1. Teaching and Learning Methods of Disable Students:	
1	Additional Tutorials
2	Online lectures and assignments
6.2. Teaching and learning method for low capacity and outstanding Student	
For low capacity students	-Assign a portion of the office hours for those students. -Give them specific tasks. -Repeat the explanation of some of the material and tutorials. - Assign a teaching assistance to follow up the performance of these

	group of students
For outstanding Students	-Hand out project assignments to those students. -Give them some research topics to be searched using the internet and conduct presentation. Encourage them to take parts in the running research projects.

7. Student evaluation:

7.1 Student evaluation method:

No.	Evaluation Method	Competencies	LO’s
1	Periodic exam	A6,A8	1
2	Student load (quizzes, sheets, report)	A8	1
3	Final term examination	A6,A8	1,1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	$2^{nd}, 3^{rd}, 5^{th}, 10^{th}, 12^{th}$
2	Mid Term examination	8^{th}
3	Final term examination	15^{th}

7.3 weighting of Evaluation:

No.	Evaluation method	Weights
1	Periodic exam	36%
2	Student load	4%
3	Final-term examination	60%
Total		**100%**

8. List of References:

No.	Reference List
1	Cleland, David. 2020. Flied guide to project management. New York: Wiley.
2	Smith, K.A. 2019. Project management and teamwork. New York: McGraw-Hill.

9. Facilities required for teaching and learning:

No.	Facility
1	Lecture classroom
2	Seminar
3	White board
4	Data Show system

10. Matrix of Competencies and LO’s :

No.	Topic	Aims	A6	A8
			1	1
1	Development, negotiation and specification of project contract	2,5,10	X	
2	Project planning and control using activity network models	2,5,10	X	
3	network logic; scheduling; resource	2,5,10		X

	allocation			
4	time-cost trade off methods	2,5,10	X	
5	multi-project resource allocation and leveling using available industrial software	2,5,10	X	

Course Coordinator: Dr / Hamdy Abd Elaty
Head of Department: Asso.prof. Amal Behery
Date of Approval: 2023

Optical Semiconductors
(CEE321**)**

1- Basic Information:

Program Title	Communications and Electronics Engineering program
Department Offering the Program	Communications and Electronics Engineering Department
Department Responsible for the Course	Communications and Electronics Engineering Department
Course Title	Optical Semiconductors
Course Code	CEE321
Year/Level	Level 3
Specialization	Major
Authorization Date of Course Specification	-

Teaching hours	**Lectures**	**Lab.**	**Exercise**	**Contact**	**Student's load**
	3	**----**	**2**	**5**	**4**

2- Course Aims:

No.	Aims
6	**Recognize and respect the importance of the environment, both physical and natural, and work to promote sustainable principles**

3- Cometencies (LO'S):

Cometency	Learning Outcomes
C1	1: Recognize engineering problems to design a system; component and process to meet the required needs, operate and maintain optical components and systems for fundamentals of optics, description of fiber optic systems, Properties of optic fiber and fiber components, Electro optic devices.
C3	1: Investigate the failure of components, system, and processes. 2: Judge engineering decision considering balanced cost, benefits, safety, quality, reliability, and environmental impact. 3: Apply safe systems at work and observe the appropriate steps to manage risks

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	Fundamentals of light wave communication in optical fiber waveguides	6	4	-
2	physical description of fiber optic systems	6	4	-
3	Properties of optical fiber and fiber components	9	6	-
4	Electro optic devices: light sources and modulator, detectors and amplifiers	9	6	-
5	optical transmitter and receiver systems	6	4	-
6	Fiber optic link design and specification; fiber optic networks.	6	4	-
Total		**42**	**28**	**-**

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab

1	Fundamentals of light wave communication in optical fiber waveguides	×			×		×								
2	Physical description of fiber optic systems	×			×	×									
3	Properties of optical fiber and fiber components	×			×		×								
4	Electro optic devices: light sources and modulator, detectors and amplifiers	×			×	×	×								
5	Optical transmitter and receiver systems	×			×		×								
6	Fiber optic link design and specification; fiber optic networks.	×			×		×								

6. Teaching and Learning Methods of Disable Students:

6.1. Teaching and Learning Methods of Disable Students:	
1	Additional Tutorials
2	Online lectures and assignments

6.2. Teaching and learning method for low capacity and outstanding Student	
For low capacity students	-Assign a portion of the office hours for those students. -Give them specific tasks. -Repeat the explanation of some of the material and tutorials. - Assign a teaching assistance to follow up the performance of these group of students
For outstanding Students	-Hand out project assignments to those students. -Give them some research topics to be searched using the internet and conduct presentation.

	Encourage them to take parts in the running research projects.

7. **Student Evaluation :**

7.1 Student Evaluation method:

No.	Evaluation Method	ILO's
1	Periodic exam	C1(1), C3(1-3)
2	Student load (quizzes- reports- sheets)	C1(1), C3(1-3)
3	Final term examination	C1(1), C3(1-2-3)

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	8^{th}
2	Student load	2^{nd} -7^{th} - 9^{th} - 14^{th}
3	Final term examination	15^{th}

7.3 weighting of Evaluation:

No.	Evaluation method	Weights
1	Periodic exam	37.3%
2	final examination	60%
3	Student load	2.7%
	Total	**100%**

8. List of References:

No.	Reference List
1	Bahaa E. A. Saleh, Malvin Carl Teich,"Fundamentals of Photonics ", McGraw-Hill,2023.
2	J.C.palais,"Fiber Optics Communications",prentice Hall,2020
3	G.p.Agrawal,"Fiber-Optic CommunicationSystems,"Wiley,5th edition 2019
4	D.K.Mynbaev and L.L.Scheiner,"Fiber-Optic Communications Technology."Prentice-Hall,2020.

9. Facilities required for teaching and learning:

No.	Facility
1	Lecture classroom
2	
3	White board
4	Data show system
5	Wireless internet
6	Sound system

10. Matrix of knowledge and skills of the course:

No.	Topic	Aims	C1	C3		
			1	1	2	3
1	Fundamentals of light wave communication in optical fiber waveguides	6	x	x		
2	physical description of fiber optic systems	6	x	x		
3	Properties of optical fiber and fiber components	6	x			x
4	Electro optic devices: light sources and modulator, detectors and amplifiers	6	x		x	
5	optical transmitter and receiver systems	6	x		x	
6	Fiber optic link design and specification; fiber optic networks.	6	x			x

Course Coordinator: Dr. Tarik Reda
Head of Department: Assoc. Prof. Mohamed Fouad
Date of Approval: 2023

Electronic Tests 4
(CEE324**)**

1- Basic Information:

Program Title	Communications and Electronics Engineering program
Department Offering the Program	Communications and Electronics Engineering Department
Department Responsible for the Course	Communications and Electronics Engineering Department
Course Title	Electronic Tests 4
Course Code	CEE324
Year/Level	Level 3
Specialization	Major
Authorization Date of Course Specification	-

Teaching hours	Lectures	Lab.	Exercise	Contact	Student's load
	1	**3**	**--**	**4**	**4**

2- Course Aims:

No.	Aims

7	**Proper utilization of modern engineering techniques, skills, and tools**
13	**. Allocate projects creatively by analyzing data from intended tests.**

3- Competencies Learning Outcomes (LO'S):

Competency	Learning Outcomes (LO'S)
A9	1.Think creatively in solving problems of design. 2. Effectively manage tasks, time, and resources. 3 .Refer to relevant literatures.
B4	1. Use relevant laboratory equipment and analyze the results correctly for communication systems
C4.	1: Use appropriate tools to measure system performance to evaluate modulation/demodulation technique And of the performance of optical communication system.

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	Laboratory experiments in the field of electronic circuits include: optics analyzers, digital measuring devices	3	-	9
2	digital harmonic plotters – logical analyzers – The vibrators	3	-	9
3	vibrators – the governed vibrators by the volt – the suddenly closing circuits –the harmonious amplifiers	3	-	9
4	the rates of the expansion and the retrievers.	3	-	9
5	Laboratory experiments in the electronic circuits engineering, communications and fine and optical waves	2	-	6
Total		**14**		**42**

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab
1	Laboratory experiments in the field of electronic circuits include: optics analyzers, digital measuring devices	×			×		×		×						
2	digital harmonic plotters – logical analyzers – The vibrators	×			×		×		×						
3	vibrators – the governed vibrators by the volt – the suddenly closing circuits – the harmonious amplifiers	×			×		×		×						
4	the rates of the expansion and the retrievers.	×			×		×		×						
5	Laboratory experiments in the electronic circuits engineering, communications and fine and optical waves	×			×		×		×						

6. Teaching and Learning Methods of Disable Students:

6.1. Teaching and Learning Methods of Disable Students:	
1	Additional Tutorials
2	Online lectures and assignments
6.2. Teaching and learning method for low capacity and outstanding Student	
For low capacity students	-Assign a portion of the office hours for those students. -Give them specific tasks.

	-Repeat the explanation of some of the material and tutorials. - Assign a teaching assistance to follow up the performance of these group of students
For outstanding Students	-Hand out project assignments to those students. -Give them some research topics to be searched using the internet and conduct presentation. Encourage them to take parts in the running research projects.

7**. Student Evaluation:**

7.1 Student Evaluation method:

No.	Evaluation Method	ILO's
1	Periodic exam	A9(1,2,3), B4(1)
2	Student load (quizzes- reports- electronic- projects)	B4(1), C4(1)
3	Final term examination	A9(1,2,3), B4(1), C4(1)

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	8^{th}
2	Student load	2^{nd} -7^{th} - 9^{th} -14^{th}
3	Final term examination	15^{th}

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	36%
2	final examination	50%
3	Practical examination	10%
4	Student load	4%
	Total	**100%**

8. List of References:

No.	Reference List
1	Bahaa E. A. Saleh, Malvin Carl Teich,"Fundamentals of Photonics ", ISBN: 978-1-119-50687-4., 3rd 2019
2	J.C.palais,"Fiber Optics Communications",prentice Hall,2020
3	G. P. Agrawal, *Nonlinear Fiber Optics* (Academic Press, Elsevier, 1989); Japanese translation, 6th ed. 2019.
4	G. P. Agrawal, *Fiber-Optic Communication Systems* (Wiley, 1992); 4th ed. 2020.
5	D.K.Mynbaev and L.L.Scheiner,"Fiber-Optic Communications Technology."prentice-Hall,2023.

9. Facilities required for teaching and learning:

No.	Facility

1	Computer and video data show
2	Lab
3	White board
4	Wireless internet
5	Sound system

10. Matrix of knowledge and skills of the course:

No.	Topic	Aims	A9			B4	C4
			1	2	3	1	1
1	Laboratory experiments in the field of electronic circuits include: optics analyzers, digital measuring devices	7,13	x			x	
	digital harmonic plotters – logical analyzers – The vibrators	7,13				x	
3	vibrators – the governed vibrators by the volt – the suddenly closing circuits –the harmonious amplifiers	13	x		x		X
4	the rates of the expansion and the retrievers.	13					x
5	Laboratory experiments in the electronic circuits engineering, communications and fine and optical waves	7,13	x		x	x	X

Course Coordinator: Dr. Walid Raslan
Head of Department: Prof. Dr. Mohamed Fouad
Date of Approval: 2023

Microprocessor systems
(CEE322**)**

1- Basic Information:

Program Title	Communications and Electronics Engineering program
Department Offering the Program	Communications and Electronics Engineering Department
Department Responsible for the Course	Communications and Electronics Engineering

	Department
Course Title	Microprocessor systems
Course Code	CEE322
Year/Level	level 3
Specialization	Major
Authorization Date of Course Specification	-

Teaching hours	**Lectures**	**Lab.**	**Exercise**	**Contact**	**Student's load**
	3	**----**	**2**	**5**	**4**

2- Course Aims:

No.	Aims
11	Deal with **Computer systems (**computer's hard ware, software, operating systems and inter facing) to meet the required needs in all electronics engineering issues.

3- Cometencies (LO'S):

By the end of this course, the student able to:

Competency	Learning Outcomes (LO'S)
A1	1 Applying basics of microprocessor's systems that are related to the electronic systems.
B2	1. Evaluate the characteristics and performance of microprocessor's types.
C2	1: Describe principles of a specific microprocessor system. 2: Explain current engineering technologies as related to microprocessor systems
C3	1: Investigate the failure of microprocessor processes
C5	1. Synthesis electronic systems for certain specific function using the right microprocessor system, and processes .2. Demonstrates basic organizational and project management skills. d1: Effectively manage tasks, time, and resources.

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	Theory and design of microprocessor. - Semiconductors technology. Support circuits.-Types of Microprocessor	3	2	-
2	80x86 Processor Architecture: - Introduction, Processor Model,- Programmer's model, -Designer's Model: 8086 hardware details,	6	4	-
3	Clock generator 8284A : Bus buffering and latching, - Processor Read & Write bus cycles, Ready and wait state generation, Minimum versus Maximum mode operation.	6	4	-
4	Memory Interfacing: 80x86 processor-Memory interfacing,	6	4	-

	Address decoding techniques, Memory Devices – ROM, EPROM, SRAM, FLASH, DRAM devices, Memory internal organization Memory read and write timing diagrams. DRAM Controller			
5	Basic I/O Interfacing: Parallel I/O, Programmed I/O, I/O port address decoding, The 8255A Programmable Peripheral Interface (PPI), programming 8255, Operation modes, Interface examples – Timer Interfacing: The 8254 Programmable Interval Timer (PIT), Timing applications. Serial I/O Interface: Asynchronous communication, Physical communication	6	4	-
6	Interrupts: Interrupt driven I/O, Software & Hardware interrupts, Interrupt vectors and vector table, Interrupt processing, The 8259A Programmable Interrupt Controller (PIC)-cascading of 8259s, programming 8259, Interrupt examples – Printer, Real-Time Clock, PC Keyboard. Direct Memory Access: Basic DMA operation, DMA Controlled I/O, The 8237.DMA Controller, Disk Memory Systems- Floppy disk, Hard disk, optical disk memory systems, video displays.	9	6	-
7	Microprocessor programming and interfacing, software development. Assembly language, Machine language	6	4	-
Total		**42**	**28**	**-**

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab

1	Theory and design of microprocessor. - Semiconductors technology. Support circuits.-Types of Microprocessor	x			x						x				
2	80x86 Processor Architecture: - Introduction, Processor Model,- Programmer's model, - Designer's Model: 8086 hardware details,	x			x						x				
3	Clock generator 8284A : Bus buffering and latching, - Processor Read & Write bus cycles, Ready and wait state generation, Minimum versus Maximum mode operation.	x			x						x				

4	Memory Interfacing: 80x86 processor- Memory interfacing, Address decoding techniques, Memory Devices – ROM, EPROM, SRAM, FLASH, DRAM devices, Memory internal organization Memory read and write timing diagrams. DRAM Controller	x			x						X				

5	Basic I/O Interfacing: Parallel I/O, Programmed I/O, I/O port address decoding, The 8255A Programmable Peripheral Interface (PPI), programming 8255, Operation modes, Interface examples – Timer Interfacing: The 8254 Programmable Interval Timer (PIT), Timing applications. Serial I/O Interface: Asynchronous communication, Physical communication	x			x						X				

6	Interrupts: Interrupt driven I/O, Software & Hardware interrupts, Interrupt vectors and vector table, Interrupt processing, The 8259A Programmable Interrupt Controller (PIC)- cascading of 8259s, programming 8259, Interrupt examples – Printer, Real-Time Clock, PC Keyboard. Direct Memory Access: Basic DMA operation, DMA Controlled I/O, The 8237.DMA Controller, Disk Memory Systems- Floppy disk, Hard disk, optical disk memory systems, video displays.	x									X				

7	Microprocessor programming and interfacing, software development. Assembly language, Machine language	x									x				

6. Teaching and Learning Methods of Disable Students:

6.1. Teaching and Learning Methods of Disable Students:	
1	Additional Tutorials
2	Online lectures and assignments

6.2. Teaching and learning method for low capacity and outstanding Student	
For low capacity students	-Assign a portion of the office hours for those students. -Give them specific tasks. -Repeat the explanation of some of the material and tutorials. - Assign a teaching assistance to follow up the performance of these group of students
For outstanding Students	-Hand out project assignments to those students. -Give them some research topics to be searched using the internet and conduct presentation. Encourage them to take parts in the running research projects.

7**. Student Evaluation:**

7.1 Student Evaluation method:

No.	**Evaluation Method**	**LO's**
1	Periodic exam	C2.1, C2.1, B1.1
2	Student load	C5.1, C5.1, C5.1
3	Final term examination	A1.1C2.1, C2.2, B1.1, B2.1, C3.1, C5.1, C5.2.

77.2 Evaluation Schedule:

No.	**Evaluation Method**	**Weeks**
1	Periodic exam	8th
2	Student load	2nd -7th - 9th -14th
3	Final term examination	15th

7.3 Weighting of Evaluation:

No.	**Evaluation Method**	**Weights**
1	Periodic exam	36%

2	final examination	60%
3	Student load	4%
	Total	**100%**

8. List of References:

No.	Reference List
1	Dr. Deepali A. Godse, Atul P. Godse, Microprocessors and Multicore Systems", Technical Publications, 2023
2	Dr. Deepali A. Godse, Atul P. Godse, ,"Microprocessors & Introduction to Microcontroller," Technical Publications,2023.
3	Thomas L. Floyd, " Electronic devices ", Ninth Edition, Prentice Hall Boston Columbus Indianapolis New York San Francisco,2020
4	Adel Sedra, Smith, " Microelectronic Circuits ", six Edition Oxford, New York, 2020
5	A.P.Godse, D.A.Godse, Microprocessors Technical Publications, 2019.
6	Introduction to Microprocessors and Microcontrollers, John Crisp, Newnes, 2020.

9. Facilities required for teaching and learning:

No.	Facility
1	Lecture classroom
2	
3	White board
4	Data show system

10. Matrix of knowledge and skills of the course:

No.	Topic	Aims	A1	B2	C2		C3	C5		
			1	1	1	2	1	1	2	3
1	Theory and design of microprocessor. - Semiconductors technology. Support circuits.-Types of Microprocessor	11			X	X				
2	80x86 Processor Architecture: - Introduction, Processor Model,- Programmer's model, -Designer's Model: 8086 hardware details,	11	X	X			X	X		
3	Clock generator 8284A : Bus buffering and latching, - Processor Read & Write bus cycles, Ready and wait state generation, Minimum versus Maximum mode operation.	11			X	X	X			
4	Memory Interfacing: 80x86 processor-Memory interfacing, Address decoding techniques, Memory Devices – ROM, EPROM, SRAM, FLASH, DRAM devices, Memory internal organization Memory read and write timing diagrams. DRAM Controller	11	X	X				X		
5	Basic I/O Interfacing: Parallel I/O, Programmed I/O, I/O port address decoding, The 8255A	11	X	X	X	X				

	Programmable Peripheral Interface (PPI), programming 8255, Operation modes, Interface examples – Timer Interfacing: The 8254 Programmable Interval Timer (PIT), Timing applications. Serial I/O Interface: Asynchronous communication, Physical communication									
6	Interrupts: Interrupt driven I/O, Software & Hardware interrupts, Interrupt vectors and vector table, Interrupt processing, The 8259A Programmable Interrupt Controller (PIC)- cascading of 8259s, programming 8259, Interrupt examples – Printer, Real-Time Clock, PC Keyboard. Direct Memory Access: Basic DMA operation, DMA Controlled I/O, The 8237.DMA Controller, Disk Memory Systems- Floppy disk, Hard disk, optical disk memory systems, video displays.	11	X	X	X	X				X
7	Microprocessor programming and interfacing, software development. Assembly language, Machine language	11					X	X	X	X

Course Coordinator: Dr. Amira Elsonbaty
Head of Department: Prof. Mohamed Fouad
Date of Approval: 2023

Electromagnetic Waves
(CEE323)

1- Basic Information:

Program Title	Communications and Electronics Engineering program
Department Offering the Program	Communications and Electronics Engineering Department
Department Responsible for the Course	Communications and Electronics Engineering Department
Course Title	Electromagnetic Waves
Course Code	CEE323
Year/Level	level 3
Specialization	Major
Authorization Date of Course Specification	-

Teaching hours	**Lec.**	**Lab.**	**Exer.**	**Contact**	**Student load**
	3	-	2	5	4

2- Course Aims:

No.	Aims
2	**Apply analytic critical and systemic thinking to discover, analyze, and solve a wide range of engineering problems;**

4- Cometencies (LO'S):

Competency	Learning Outcomes (LO'S)
C1	1. Apply knowledge of mathematics to asses theories of electromagnetics engineering . 2. Apply knowledge of science to asses theories of electromagnetics engineering. 3. apply the theories of electromagnetic engineering to asses the applications

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	Faraday's law -transformer and motional EMF,	4	2	-

	displesment current, maxwell's equations.			
2	General wave equation,polarization of a plan wave, Electromagnetic Wave propagation in different media	8	6	-
3	Power and Poyinting's theorem	2	2	-
4	Reflection of a plane wave at normal incidence and obliqe incident at different interfaces and applications	6	2	-
5	Standing wave ratio and input impedance	4	2	-
6	Transmission line theory and applications	8	4	-
7	Smith chart - Matching mechanisms	6	6	-
8	Waveguide and cavity resonator	4	2	
Total		**42**	**28**	

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab
1	Faraday's law -transformer and motional EMF's, displesment current, maxwell's equations	×			×		×								
2	General wave equation,polarization of a plan wave, lectromagnetic Wave propagation in different media	×			×		×								
3	Power and Poyinting's theorem	×			×		×								

4	Reflection of a plane wave at normal incidence and obliqe incident at different interfaces and applications	×			×		×								
5	Standing wave ratio and input impedance and appications	×			×		×								
6	Transmission line theory, charactristic & input impedance dispersion , lossy, lossless,and distortion less transmition line ,termination the transmission line with different loads, VSWR and input impedance .	×			×		×								
7	-Smith chart - Matching mechanisms: quarter wave trsansformer, open and short stub.	×			×		×								
8	Waveguide and cavity resonator	×			×		×								

6. Teaching and Learning Methods of Disable Students:

6.1. Teaching and Learning Methods of Disable Students:	
1	Additional Tutorials
2	Online lectures and assignments

6.2. Teaching and learning method for low capacity and outstanding Student	
For low capacity students	-Assign a portion of the office hours for those students. -Give them specific tasks. -Repeat the explanation of some of the material and tutorials. - Assign a teaching assistance to follow up the performance of these group of students
For outstanding Students	-Hand out project assignments to those students. -Give them some research topics to be searched using the internet and conduct presentation. Encourage them to take parts in the running research projects.

7**. Student Evaluation:**

7.1 Student Evaluation method:

No.	Evaluation Method	LO's
1	Periodic exam	C1(1,2,3)
2	Student load (quizzes-sheets-reports)	C1(1,2,3)
3	Final term examination	C1(1,2,3)

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	8th
2	Student load	2nd -7th - 9th -14th
3	Final term examination	15th

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	37.3%
2	final examination	60%
3	Student load	2.7%
	Total	**100%**

8. List of References:

No.	Reference List
1	Matthew N.O. *Sadiku***.,** J.Sagliocca and O.Soriyan " *Elements of Electromagnetics* ," 7th-edition 2020
2	W.H. Hayt, Jr.,"Engineering of Electromagnetics," Amazon, 9thEdition (2020).
3	F. T. Ulaby, "Fundamentals of Applied Electromagnetics, "Prentice- Hall, 2023.
4	R. Plonseyand R. E. Collin, "Principles and Applications of ElectromagneticFields,"McGraw-Hill,2020.

9. Facilities required for teaching and learning:

No.	Facility
1	Lecture classroom
2	
3	White board
4	Data show system

10. Matrix of knowledge and skills of the course:

No.	Topic	aim	C1		
			1	2	3
1	Faraday's law -transformer and motional EMF's, displesment current, maxwell's equations	1		x	
2	General wave equation,polarization of a plan wave, electromagnetic Wave propagation in	2	x		x

	different media.				
3	Power and Poyinting's theorem	2	x		x
4	Reflection of a plane wave at normal incidence and obliqe incident at different interfaces	1,2	x	x	x
5	Standing wave ratio and input impedance	2	x	x	
6	Transmission line theory, charactristic impedance dispersion , lossy, lossless,and distortion less ,transmition line ,termination the transmission line with different loads, VSWR and input impedance	2	x		x
7	-Smith chart - Matching mechanisms: quarter wave trsansformer, open and short stub	1,2			X
8	Waveguide and cavity resonator	2			x

Course Coordinator: Dr.Hossam Abd-El-Fattah
Head of Department: Prof. Mohamed Fouad
Date of Approval:2023

3- Basic Information:

Program Title	Communications and Electronics Engineering program
Department Offering the Program	Communications and Electronics Engineering Department
Department Responsible for the Course	Communications and Electronics Engineering Department
Course Title	Electronic Tests 4
Course Code	CEE324
Year/Level	Level 3
Specialization	Major
Authorization Date of Course Specification	-

Teaching hours	**Lectures**	**Lab.**	**Exercise**	**Contact**	**Student load**
	1	3	-----	**4**	**4**

4- Course Aims:

No.	**Aims**
7	**Proper utilization of modern engineering techniques, skills, and tools**
13	**. Allocate projects creatively by analyzing data from intended tests.**

3- Competencies Learning Outcomes (LO'S):

Competency	**Learning Outcomes (LO'S)**
A9	1.Think creatively in solving problems of design. 2. Effectively manage tasks, time, and resources. 3 .Refer to relevant literatures.
B4	1. Use relevant laboratory equipment and analyze the results correctly for communication systems
C4.	1: Use appropriate tools to measure system performance to evaluate modulation/demodulation technique And of the performance of optical communication system.

4. Course Contents:

No.	**Topics**	**Lectures**	**Tutorial**	**Practical**
1	Laboratory experiments in the field of electronic circuits include: optics analyzers, digital measuring devices	2	-	6
2	digital harmonic plotters – logical analyzers – The vibrators	2	-	6
3	vibrators – the governed vibrators by the volt – the suddenly closing circuits –the harmonious amplifiers	2	-	6
4	the rates of the expansion and the retrievers.	2	-	6

5	Laboratory experiments in the electronic circuits engineering, communications and fine and optical waves	2	-	6
Total		**14**		**42**

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab
1	Laboratory experiments in the field of electronic circuits include: optics analyzers, digital measuring devices	x			x		x		x						
2	digital harmonic plotters – logical analyzers – The vibrators	x			x		x		x						
3	vibrators – the governed vibrators by the volt – the suddenly closing circuits – the harmonious amplifiers	x			x		x		x						
4	the rates of the expansion and the retrievers.	x			x		x		x						
5	Laboratory experiments in the electronic circuits engineering, communications and fine and optical waves	x			x		x		x						

6. Teaching and Learning Methods of Disable Students:

6.1. Teaching and Learning Methods of Disable Students:	
1	Additional Tutorials
2	Online lectures and assignments

6.2. Teaching and learning method for low capacity and outstanding Student	
For low capacity students	-Assign a portion of the office hours for those students. -Give them specific tasks. -Repeat the explanation of some of the material and tutorials. - Assign a teaching assistance to follow up the performance of these group of students
For outstanding Students	-Hand out project assignments to those students. -Give them some research topics to be searched using the internet and conduct presentation. Encourage them to take parts in the running research projects.

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	ILO's
1	Periodic exam	A9(1,2,3),B4(1)
2	Student load (quizzes- reports- electronic- projects)	B4(1), C4(1)
3	Final term examination	A9(1,2,3),B4(1), C4(1)

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	8^{th}
2	Student load	2^{nd} -7^{th} - 9^{th} -14^{th}
3	Final term examination	15^{th}

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	36%
2	final examination	50%
3	Practical examination	10%
4	Student load	4%
	Total	**100%**

8. List of References:

No.	Reference List
1	Bahaa E. A. Saleh, Malvin Carl Teich,"Fundamentals of Photonics ", ISBN: 978-1-119-50687-4., 3rd 2019
2	J.C.palais,"Fiber Optics Communications",prentice Hall,2020
3	G. P. Agrawal, *Nonlinear Fiber Optics* (Academic Press, Elsevier, 1989); Japanese

	translation, 6th ed. 2019.
4	G. P. Agrawal, *Fiber-Optic Communication Systems* (Wiley, 1992); 4th ed. 2020.
5	D.K.Mynbaev and L.L.Scheiner,"Fiber-Optic Communications Technology."prentice-Hall,2023.

9. Facilities required for teaching and learning:

No.	Facility
1	Computer and video data show
2	Lab
3	White board
4	Wireless internet
5	Sound system

10. Matrix of knowledge and skills of the course:

No.	Topic	Aims	A9			B4	C4
			1	2	3	1	1
1	Laboratory experiments in the field of electronic circuits include: optics analyzers, digital measuring devices	7,13	x			x	
	digital harmonic plotters – logical analyzers – The vibrators	7,13				x	
3	vibrators – the governed vibrators by the volt – the suddenly closing circuits –the harmonious amplifiers	13	x		x		X
4	the rates of the expansion and the retrievers.	13					x
5	Laboratory experiments in the electronic circuits engineering, communications and fine and optical waves	7,13	x		x	x	X

Course Coordinator: Dr. Walid Raslan
Head of Department: Prof. Mohamed Fouad
Date of Approval: 2023

Environmental Management
(BAS311**)**

1. 1-Basic Information:

Program Title	All Programs
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Basic Science and Engineering Department
Course Title	Environmental Management
Course Code	BAS422
Year/Level	Level 4
Specialization	Major – Compulsory Course

Teaching hours	**Lectures**	**Lab.**	**Exercise**	**Contact**	**Student load**
	2	-	**1**	**3**	**3**

2. Course Aims:

No.	**Aims**
2	Work in and manage a diverse team of professionals from various engineering disciplines, taking responsibility for own and team performance; and behave professionally and adhere to engineering ethics and standards.
3	Recognize his or her role in promoting engineering and contributing to the profession's and community's development; by appreciating the importance of the environment, both physical and natural, and working to promote sustainability concepts;

3. Competencies:

Competencies	**Learning Outcomes (LO'S)**
A3 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.	**1** Understand the professional ethics and impacts of engineering solutions on society and environment. **2** Recognizes the environmental and economic impact of various industries, waste minimization, and industrial facility remediation. **3** Judge engineering decisions considering balanced costs, benefits, safety, quality, reliability, and environmental impact. **4** Incorporate economic, societal, global, environmental, and risk management factors into design.
A4 Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues and risk	**1** Describe quality assurance systems, codes of practice, and standards, as well as health and safety regulations and environmental concerns. **2** Apply safe systems at work by taking the necessary precautions to manage hazards.

management principles.	**3** Utilize modern technologies.
A10 Acquire and apply new knowledge; and practice self, lifelong and other learning strategies.	**1** Search for information to engage in lifelong self-learning discipline.

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	The importance of studying environmental science – modern technology and its effect on the environment	12	-	-
2	quality of the environment and development elements	6	-	-
3	sources of environmental pollution and method of control (air pollution – water pollution)	12	-	-
4	Solid wastes pollution – noise) – economics of environmental pollution control – legislations for the environment protection.	12	-	-
Total		**42**	**-**	**-**

5. Teaching and learning methods:

Topics	Face Lecture to Face	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	learning and Research Self	Cooperative	Discovering	Modeling	lab
The importance of studying environmental science – modern technology and its effect on the environment	x				x	x								x
Quality of the environment and development elements	x				x	x								x

Sources of environmental pollution and method of control (air pollution – water pollution	x				x	x								x
Solid wastes pollution – noise) – economics of environmental pollution control – legislations for the environment protection.	x				x	x								x

6. Teaching and Learning Methods of Disable Students:

6.1. Teaching and Learning Methods of Disable Students:	
1	Additional Tutorials
2	Online lectures and assignments

6.2. Teaching and learning method for low capacity and outstanding Student	
For low capacity students	-Assign a portion of the office hours for those students. -Give them specific tasks. -Repeat the explanation of some of the material and tutorials. - Assign a teaching assistance to follow up the performance of these group of students
For outstanding Students	-Hand out project assignments to those students. -Give them some research topics to be searched using the internet and conduct presentation. Encourage them to take parts in the running research projects.

7. Student evaluation:

7.1 Student evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Mid Term Examination	A3, A4	1, 1
2	Semester work (report, quizzes, presentation)	A4, A10	1, 2, 1
3	Final Term Examination	A3, A4, A10	2, 3, 1, 2

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Semester work	2^{nd}, 7^{th} , 9^{th}

2	Mid Term Examination	8^{th}
3	Final Term Examination	15^{th}

7.3 Weighting of Evaluation:

No.	evaluation method	Weights
1	Mid-term examination	20%
2	Semester work	20%
3	Final-term examination	60%
Total		**100%**

8. List of References:

No.	Reference List
1	د.زكريا طاحون ، ادارة البيئة نحو الانتاج الأنظف، الهيئة المصرية العامة للكتاب،القاهرة،2020
2	محمد اسماعيل خضر،مقدمة في علوم البيئة ،الهيئة العامة للكتاب ،القاهرة 2020

9. Facilities required for teaching and learning:

No.	Facility
1	Seminar
2	Lecture Classroom
3	White Board
4	Data Show system

10. Matrix of Competencies and LO's:

No.	Topic	Aims	A3			A4		A10
			1	2	3	1	2	1
1	The importance of studying environmental science – modern technology and its effect on the environment	2,3	X					X
2	Quality of the environment and development elements	2,3	X			X		X
3	Sources of environmental pollution and method of control (air pollution – water pollution	2,3			X		X	
4	Solid wastes pollution – noise) – economics of environmental pollution control – legislations for the environment protection.	2,3			X	X		

Course Coordinator: Assoc. Prof. Dr. Ramadan Elkateb
Head of Department: Assoc. Prof. Dr. Amal Bahiry
Date of Approval: July 2023

Microwave electronics
(CEE425E**)**

1- Basic Information:

Program Title	Communications and Electronics Engineering program
Department Offering the Program	Communications and Electronics Engineering Department
Department Responsible for the Course	Communications and Electronics Engineering Department
Course Title	Microwave electronics
Course Code	CEE425E
Year/Level	Level 4
Specialization	Major
Authorization Date of Course Specification	-

Teaching hours	**Lec.**	**Lab.**	**Exer.**	**Contact**	**Student load**
	2	2	-	4	3

1- Course Aims:

No.	**Aims**
1	Master a wide range of engineering knowledge and specialized skills, as well as the ability to apply that information in real-world situations using theories and analytical thinking
8	Acknowledge and accept personal responsibility for your education, personal development, as well as your ability to achieve post-graduation and research studies;
11	Computer systems in Electronics and Communication engineering can be used to design a system, component, and process to meet recent technological advances.

3- Cometencies (LO'S):

Competency	**Learning Outcomes (LO'S)**
A3	**1.** Describe principles of design including elements design, process and/or a system related to specific disciplines. **2.**Combine, exchange, and assess different ideas, views, and knowledge from a range of sources
B2	**1.** Create and/or re-design a process, component or system, and carry out specialized engineering designs**.**
C2	**1.** Describe principles of design including elements design, process and/or a system related to specific disciplines 2. Design a process, component or system to carry out specialized engineering designs

C5	**1.** Describe principles of design including elements design, process and/or a system related to electronics and communication systems . **2.** Design a process, component or system to carry out specialized engineering designs

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	Microwave Introduction,and network analysis	4	4	
2	Passive microwave components and guidance including filter design and implmentaion	6	6	-
3	Microwaves transistors and amplifiers design	8	8	
4	low noise amplifiers design	4	4	
5	Microwaves oscillators design	4	4	-
6	The converters and the phase displacements.	2	2	-
Total		**28**	**28**	**-**

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab
1	Microwave Introduction,and network analysis	×			×						×				
2	Passive microwave components and guidence	×			×						×				
3	Microwaves transistors and amplifiers	×			×						×				
4	Low noise amplifiers	×			×						×				
5	Microwaves oscillators	×			×						×				
6	The converters and the phase displacements	×			×						×				

6. Teaching and Learning Methods of Disable Students:

6.1. Teaching and Learning Methods of Disable Students:	
1	Additional Tutorials
2	Online lectures and assignments

6.2. Teaching and learning method for low capacity and outstanding Student	
For low capacity students	-Assign a portion of the office hours for those students. -Give them specific tasks. -Repeat the explanation of some of the material and tutorials. - Assign a teaching assistance to follow up the performance of these group of students
For outstanding Students	-Hand out project assignments to those students. -Give them some research topics to be searched using the internet and conduct presentation. Encourage them to take parts in the running research projects.

7**. Student Evaluation:**

7.1 Student Evaluation method:

No.	**Evaluation Method**	**ILO's**
1	Periodic exam	A3(1),B2(1)
2	Student load (quizzes- reports –sheets-presentation)	A3(1),B2(1),C2(1)
3	Final term examination	A3(1)B2(1),C2(1)C5(1,2),
(a1)		

7.2 Evaluation Schedule:

No.	**Evaluation Method**	**Weeks**
1	Periodic exam	8^{th}
2	Student load	2^{nd} -7^{th} - 9^{th} -14^{th}
3	Final term examination	15^{th}

7.3 weighting of Evaluation:

No.	**Evaluation Method**	**Weights**
1	Periodic exam	20%
2	final examination	60%
3	Student load	20%
	Total	**100%**

8. List of References:

No.	**Reference List**
1	David M.pozar, "Microwave Engineering ", 4^{th} Edition,2012
2	W.H. Hayt, Jr.,"Engineering of Electromagnetics," Amazon, 9^{th}-Edition (2020).
3	Matthew N.O. Sadiku**.,** J.Sagliocca and O.Soriyan **"** *Elements of Electromagnetics* **,"** 7^{th}-edition –Oxford, 2020.

9. Facilities required for teaching and learning:

No.	Facility
1	Lecture classroom
2	
3	White board
4	Data show system
5	Wireless internet
6	Sound system

10. Matrix of knowledge and skills of the course:

No.	Topic	Aim	A3		B2				C2				C5
			1	**2**	**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**	**1**
1	Microwave Introduction,and network analysis	1,8	x						x				X
2	Passive microwave components and guidance include microwave filter design and implementaion	1,8,	x	x			x			x		x	
3	Microwaves transistors and amplifiers design	1,8, 11		x			x			x	x		x
4	Low noise amplifiers design	1,11	x										
5	Microwaves oscillators design	1,11		x		x	x						
6	The converters and the phase displacements.	3,8, 11	x				x				x		

Course Coordinator: Dr. Hossam Elsheikh
Head of Department: Prof. Mohamed Fouad
Date of Approval: 2023

Advanced electronics measurements
(C EE415B**)**

1- Basic Information:

Program Title	Communications and Electronics Engineering program
Department Offering the Program	Communications and Electronics Engineering Department
Department Responsible for the Course	Communications and Electronics Engineering Department
Course Title	Advanced electronic measurements
Course Code	CEE415B
Year/Level	Level 4
Specialization	Major
Authorization Date of Course Specification	-

Teaching hours	**Lectures**	**Lab.**	**Exercise**	**Contact**	**Student load**
	2	-	**2**	**4**	**4**

1. Course Aims:

No.	**Aims**
11	Computer systems in Electronics and Communication engineering can be used to design a system, component, and process to meet recent technological advances.
13	Allocate projects creatively by analyzing data from intended tests.

2. Competencies Learning Outcomes (LO'S):

Competency	**Learning Outcomes (LO'S)**
B2	1. Describe quality assurance systems, codes of practice and standards, health and safety requirements, and environmental issues. 2. Assess and evaluate the characteristics and performance of components, systems and processes. 3. Create and/or re-design a process, component or system, and carry out specialized engineering designs.
C1	1: Recognize engineering problems to identify the best solutions 2: Think creatively and innovatively in problem solving and design 3: Search for information to engage in lifelong self-learning discipline.
C3	1: Describe quality assurance systems, codes of practice and standards, health and safety requirements and environmental issues.
C4	1: Evaluate the troubles to repair all types of electronic systems using the standard tools.

4. Course Contents:

No.	**Topics**	**Lectures**	**Tutorial**	**Practical**
1	Integrated measurements amplifiers	2	2	-
2	comparisons and taking of the samples and the stopping	2	2	-
3	the converters(digital/analogs and analog/digital)	6	6	-

4	the electric variables	6	6	-
5	signals preparation and its filtration	6	6	-
6	systems and components of signals attainments	6	6	-
Total		**28**	**28**	**-**

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab
1	Integrated measurements amplifiers	×			×						×				
2	comparisons and taking of the samples and the stopping	×			×						×				
3	The converters(digital/analogs and analog/digital)	×			×						×				
4	the electric variables	×			×						×				
5	signals preparation and its filtration	×			×						×				
6	systems and components of signals attainments	×			×						×				

6. Teaching and Learning Methods of Disable Students:

6.1. Teaching and Learning Methods of Disable Students:	
1	Additional Tutorials
2	Online lectures and assignments
6.2. Teaching and learning method for low capacity and outstanding Student	
For low capacity students	-Assign a portion of the office hours for those students. -Give them specific tasks.

	-Repeat the explanation of some of the material and tutorials. - Assign a teaching assistance to follow up the performance of these group of students
For outstanding Students	-Hand out project assignments to those students. -Give them some research topics to be searched using the internet and conduct presentation. Encourage them to take parts in the running research projects.

7. **Student Evaluation:**

7.1 Student Evaluation method:

No.	Evaluation Method	LO's
1	Periodic exam	B2(1,2) ,B4(1)
2	Student load (quizzes- reports –sheets-presentation)	B4(1,2),C4(1),C5(1)
3	Final term examination	B4(1),C4(1),C5(1),C5(1)

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	8^{th}
2	Student load	2^{nd} -7^{th} - 9^{th} -14^{th}
3	Final term examination	15^{th}

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	20%
2	final examination	60%
3	Student load	20%
	Total	**100%**

8. List of References:

No.	Reference List
1	Adel Sedra, smith , "Microelectronic cicuit, 6th edition Oxford Newyork , 2019"
2	Thomas L .Floyd , "Electronic devices" 11^{th} edition , Prentice Hall Boston coulombus Indianapolis Newyork San Francisco , 2023".

9. Facilities required for teaching and learning:

No.	Facility
1	Lecture classroom
2	
3	White board
4	Data show system
5	Wireless internet
6	Sound system

10. Matrix of knowledge and skills of the course:

No.	Topic	Aims	B2		C1			C3	C4
			1	2	1	2	3	1	1
1	Integrated measurements amplifiers	11,13		X				X	
2	comparisons and taking of the samples and the stoping	11,13	X		**X**		**X**	X	
3	the converters(digital/analogs and analog/digital)	11,13		X		X	X	X	
4	the electric variables	11,13			X		X	X	
5	signals preparation and its filtration	11,13						X	X
6	systems and components of signals attainments	11,13					X	X	X

Course Coordinator: Dr.Rabab Reda
Head of Department: Prof. Mohamed Fouad
Date of Approval: 2023

Electronic design with aids of computer
(CEE315A**)**

1- Basic Information:

Program Title	Communications and Electronics Engineering program
Department Offering the Program	Communications and Electronics Engineering Department
Department Responsible for the Course	Communications and Electronics Engineering Department
Course Title	Electronic design with aids of computer
Course Code	CEE315A
Year/Level	Level 3

Specialization	Major
Authorization Date of Course Specification	-

Teaching hours	Lectures	Lab.	Exercise	Contact	Student's load
	2	----	3	5	4

2- Course Aims:

No.	Aims
11	Design a system; component, process, and circuits with aids computer's software programs to meet the required needs in all communication and electronics engineering issues.
12	Communicate and work effectively within multiple teams in the field of communication and electronics engineering and consider the effects of engineering solutions on society and the environment.

3- Competencies Learning Outcomes (LO'S):

Competency	Learning Outcomes (LO'S)
B1	1. Use a wide range of analytical tools, techniques, equipment, and software packages pertaining to the discipline and develop required computer programs. 2. Identify appropriate specifications for required devices.
C1	1 .Recognize engineering problems to identify the best solutions
C2	1: Define current engineering technologies as related to Electronics and communication Engineering systems. 2: Design a process, component or system to carry out specialized engineering designs.
C3	1: Investigate the failure of components, system, and processes. 2: Judge engineering decision considering balanced cost, benefits, safety, quality, reliability, and environmental impact. 3: Apply safe systems at work and observe the appropriate steps to manage risks

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	The electronic systems and the circulating standard components in electronic and communications	4	4	-
2	The design of the schemata and the printed circuits	4	4	-
3	The computer software packages in the electronic design	4	4	-
4	Examples for the electronic design using these computer software packages.	4	4	-
Total		**28**	**28**	**-**

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab
1	The electronic systems and the circulating standard components in electronic and communications	x			x	x									
2	The design of the schemata and the printed circuits	x			x	x									
3	The computer software packages in the electronic design	x			x	x									
4	Examples for the electronic design using these computer software packages.	x			x	x									

6. Teaching and Learning Methods of Disable Students:

6.1. Teaching and Learning Methods of Disable Students:	
1	Additional Tutorials
2	Online lectures and assignments
6.2. Teaching and learning method for low capacity and outstanding Student	
For low capacity students	-Assign a portion of the office hours for those students. -Give them specific tasks. -Repeat the explanation of some of the material and tutorials. - Assign a teaching assistance to follow up the performance of these group of students
For outstanding Students	-Hand out project assignments to those students. -Give them some research topics to be searched using the internet and conduct presentation. Encourage them to take parts in the running research projects.

7**. Student Evaluation:**

7.1 Student Evaluation method:

No.	Evaluation Method	LO's
1	Periodic exam	B1(1,2),C1(1),C3(1,2,3)
2	Student load	B1(1,2),C1(1),C2(1,2)
3	Final term examination	B1(1,2),C1(1),C2(1,2),C3(1,2,3)

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	8^{th}
2	Student load (quizzes- reports –sheets-presentation)	2^{nd} -7^{th} - 9^{th} -14^{th}
3	Final term examination	15^{th}

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	20%
2	final examination	60%
3	Student load	20%
Total		**100%**

8. List of References:

No.	Reference List
1	James M.Kirkpatrick, Electronic drafting and printed circuit board design, Delmar Publishers,ISBN 0827323158,2019.
2	Robert S. Villanucci,Electronic drafting – printed circuit design , Macmillan Publishing company,ISBN 0024230502,2023.
3	a Phillips, Tony (2000). "The Antikythera Mechanism I". American Mathematical Society. Retrieved 5 April 2020

9. Facilities required for teaching and learning:

No.	Facility
1	Lecture classroom
2	
3	White board
4	Data show system
5	Wireless internet
6	Sound system

10. Matrix of knowledge and skills of the course:

No.	Topic	Aims	B1		C1	C2		C3		
			1	2	1	1	2	1	2	2
1	The electronic systems and the circulating standard components in electronic and communications	11,12	X							
2	The design of the schemata and the printed circuits	11,12			X	X				
3	The computer software	11,12		X				X		X

	packages in the electronic design									
4	Examples for the electronic design using these computer software packages.	11,12			X		X			

Course Coordinator: Dr.Amira El-Sonbaty
Head of Department: Asso.Prof. Mohamed Fouad
Date of Approval: 2023

Fundamentals of Biomedical Engineering
(CEE425B**)**

1- Basic Information:

Program Title	Communications and Electronics Engineering program
Department Offering the Program	Communications and Electronics Engineering Department
Department Responsible for the Course	Communications and Electronics Engineering Department
Course Title	Fundamentals of Biomedical Engineering
Course Code	CEE425B
Year/Level	Level 4
Specialization	Major
Authorization Date of Course Specification	-

Teaching hours	**Lectures**	**Lab.**	**Exercise**	**Contact**	**Student load**
	2	-	**2**	**4**	**3**

2- Course Aims:

No.	**Aims**
3	Establish a strong behavior and maintain engineering ethics and standards;
8	Acknowledge and accept personal responsibility for your education, personal development, as well as your ability to achieve post-graduation and research studies;
11	Computer systems in Electronics and Communication engineering can be used to design a system, component, and process to meet recent technological advances.

3. Cometencies (LO'S):

Competency	**Learning Outcomes (LO'S)**
B2	1. Create systematic and methodic approaches in dealing with new and advancing technology. 2. Demonstrate efficient IT capabilities.
B4	1. Use relevant laboratory equipment and analyze the results correctly 2. Troubleshoot, maintain and repair almost all types of electronic systems using the standard tools.

	3. Use appropriate tools to measure system performance. 4. Use computational facilities, measuring instruments, workshops and laboratories equipment to design experiments and collect, analyze and interpret results.
C1	1: Recognize engineering problems to identify the best solutions 2: Think creatively and innovatively in problem solving and design 3: Present technical reports. 4: Search for information to engage in lifelong self-learning discipline.
C2	1.Define concepts and theories of mathematics and sciences, which is appropriate to the discipline.
C3	1: Describe quality assurance systems, codes of practice and standards, health and safety requirements and environmental issues.
C5	1: Integrate electronic systems for certain specific function using the right equipment. 2: Collaborate effectively within the multidisciplinary team.

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	The safety and the insulations in the medical equipments	4	4	-
2	the manners of the noise deletion	4	4	-
3	the hearted helpful equipments	4	4	-
4	physiological measurements and the vital sensitivity	8	8	-
5	a processing of the vital signals and different photographic methods	8	8	-
Total		**28**	**28**	**-**

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab
1	The safety and the insulations in the medical equipments	x			x		x								
2	the manners of the noise deletion	x			x		x								
3	the hearted helpful equipments	x			x		x								
4	physiological measurements and the vital sensitivity	x			x		x								
5	a processing of the vital signals and different photographic methods	x			x		x								

6. Teaching and Learning Methods of Disable Students:

6.1. Teaching and Learning Methods of Disable Students:	
1	Additional Tutorials
2	Online lectures and assignments

6.2. Teaching and learning method for low capacity and outstanding Student	
For low capacity students	-Assign a portion of the office hours for those students. -Give them specific tasks. -Repeat the explanation of some of the material and tutorials. - Assign a teaching assistance to follow up the performance of these group of students
For outstanding Students	-Hand out project assignments to those students. -Give them some research topics to be searched using the internet and conduct presentation.

	Encourage them to take parts in the running research projects.

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	LO's
1	Periodic exam	B2(1)
2	Student load (quizzes- reports –sheets- presentation)	B2(1),B4(1),C1(1)
3	Final term examination	B4(1),C1(1),C2(1,2), C3(1),C51,2)

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	8th
2	Student load	2nd -7th - 9th -14th
3	Final term examination	15th

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	20%
2	final examination	60%
3	Student load	20%
	Total	**100%**

8. List of References:

No.	Reference List
1	Book Fundamentals of Biomedical Engineering Download File PDF Epub Torrent 2019

9. Facilities required for teaching and learning:

No.	Facility
1	Lecture classroom
2	
3	White board
4	Data show system
5	Wireless internet
6	Sound system

10. Matrix of knowledge and skills of the course:

No.	Topic	Aims	B2		B4				C1				C2	C3	C5	
			1	2	1	2	3	4	1	2	3	4	1	1	1	2

1	The safety and the insulations in the medical equipments	3	X		X			X								
2	the manners of the noise deletion	8	X	X	X		X				X				X	
3	the hearted helpful equipments	11		X	X				X					X		
4	physiological measurements and the vital sensitivity	12			X		X				X		X		X	
5	a processing of the vital signals and different photographic methods	12		X				X	X				X			X

Course Coordinator: Dr. Rabab reda
Head of Department: Prof. Mohamed Fouad
Date of Approval: 2023

Telecommunications
(CEE315B**)**

1- Basic Information:

Program Title	Communications and Electronics Engineering Program
Department Offering the Program	Communications and Electronics Engineering Department
Department Responsible for the Course	Communications and Electronics Engineering Department
Course Title	Telecommunications
Course Code	CEE315B
Year/Level	level 4
Specialization	Major
Authorization Date of Course Specification	-

Teaching hours	**Lectures**	**Lab.**	**Exercise**	**Contact**	**Student load**
	2	-	**2**	**4**	**4**

1. **Course Aims:**

No.	Aims
11	Design a system; component, process, and circuits with aids computer's software programs to meet the required needs in all communication and electronics engineering issues.
12	Communicate and work effectively within multiple teams in the field of communication and electronics engineering and consider the effects of engineering solutions on society and the environment.

2. **Competencies Learning Outcomes (LO'S):**

Competency	Learning Outcomes (LO'S)
B1	1. Use a wide range of analytical tools, techniques, equipment, and software packages pertaining to the discipline and develop required computer programs. 2. Identify appropriate specifications for required devices.
C1	1 .Recognize engineering problems to identify the best solutions
C2	1: Define current engineering technologies as related to Electronics and communication Engineering systems. 2: Design a process, component or system to carry out specialized engineering designs.
C3	1: Investigate the failure of components, system, and processes. 2: Judge engineering decision considering balanced cost, benefits, safety, quality, reliability, and environmental impact. 3: Apply safe systems at work and observe the appropriate steps to manage risks

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	Wireless telephony	4	4	-
2	Client circuits	4	4	-
3	Communication cables	4	4	-
4	Used tones	2	2	-
5	Telephony circuits	4	4	-
6	Communication methods	4	4	-
7	Electronic Communication	2	2	-
8	Communication between cities	4	4	-
Total		**28**	**28**	**-**

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab
1	Wireless telephony	×			×						×				
2	Client circuits	×			×						×				
3	Communication cables	×			×						×				
4	Used tones	×			×						×				
5	Telephony circuits	×			×						×				
6	Communication methods	×			×						×				
7	Electronic Communication	×			×						×				
8	Communication between cities	×									×				

6. Teaching and Learning Methods of Disable Students:

6.1. Teaching and Learning Methods of Disable Students:	
1	Additional Tutorials
2	Online lectures and assignments

6.2. Teaching and learning method for low capacity and outstanding Student	
For low capacity students	-Assign a portion of the office hours for those students. -Give them specific tasks. -Repeat the explanation of some of the material and tutorials. - Assign a teaching assistance to follow up the performance of these group of students
For outstanding Students	-Hand out project assignments to those students. -Give them some research topics to be searched using the internet and conduct presentation. Encourage them to take parts in the running research projects.

7**. Student Evaluation:**

7.1 Student Evaluation method:

No.	Evaluation Method	ILO's
1	Periodic exam	C1(1),C3(1-2)
2	Student load (quizzes-presentation-sheets-verify with CAD tools)	C1(1),C3(1-2)
3	Final term examination	C1(1),C3(1-2-3)

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	8th
2	Student load	2nd -7th - 9th -14th
3	Final term examination	15th

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	20%
2	final examination	60%
3	Student load	20%
	Total	**100%**

8. List of References:

No.	Reference List
1	Fundamentals of telecommunications, ,Rogers Freeman ,4th edition ,2020
2	B. P. Lathi, Modern Digital and Analog Communication Systems, 2019.
3	Robert W. Jones, " Hand book on Satellite communication ", 5th Edition, Willy, New york, 2023

9. Facilities required for teaching and learning:

No.	Facility
1	Lecture classroom
2	
3	White board
4	Data show system
5	Wireless internet

10. Matrix of knowledge and skills of the course:

No.	Topic	Aims	B1		C1	C2		C3		
			1	2	1	1	2	1	2	3
1	Wireless telephony	11,12	X		X	X		x		x
2	Client circuits	11,12	X	X	X		X	x		

3	Communication cables	11,12			X	X		x		x
4	Used tones	11,12			X			x		
5	Telephony circuits	11,12	X		X		X		x	
6	Communication methods	11,12	X		X		X	x		
7	Electronic Communication	11,12	X	X	X	X			x	
8	Communication between cities	11,12			X	X			x	x

Course Coordinator: Dr. Hazem El Banna
Head of Department: Prof. Mohamed Fouad
Date of Approval: 2023

Computer Circuit Design
(CEE315C**)**

1- Basic Information:

Program Title	Communications and Electronics Engineering program
Department Offering the Program	Communications and Electronics Engineering department
Department Responsible for the Course	Communications and Electronics Engineering department
Course Title	Computer Circuit Design
Course Code	CEE315C
Year/Level	Level 4
Specialization	Major
Authorization Date of Course Specification	-

Teaching hours	**Lectures**	**Lab.**	**Exercise**	**Contact**	**Student's load**
	2	**----**	**2**	**4**	**4**

4- Course Aims:

No.	**Aims**
11	Design a system; component, process, and circuits with aids computer's software programs to meet the required needs in all communication and electronics engineering

	issues.
12	Communicate and work effectively within multiple teams in the field of communication and electronics engineering and consider the effects of engineering solutions on society and the environment.

5- Competencies Learning Outcomes (LO'S):

Competency	Learning Outcomes (LO'S)
B1	1. Use a wide range of analytical tools, techniques, equipment, and software packages pertaining to the discipline and develop required computer programs. 2. Identify appropriate specifications for required devices.
C1	1 .Recognize engineering problems to identify the best solutions
C2	1: Define current engineering technologies as related to Electronics and communication Engineering systems. 2: Design a process, component or system to carry out specialized engineering designs.
C3	1: Investigate the failure of components, system, and processes. 2: Judge engineering decision considering balanced cost, benefits, safety, quality, reliability, and environmental impact. 3: Apply safe systems at work and observe the appropriate steps to manage risks

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	Introduction to digital electronic	2	2	-
2	IC's fabrication technology- Binary circuit	2	2	-
3	Characteristics using transistors-logic gates families	4	4	-
4	Types and characteristics, metal transistor gates-oxide	4	4	-
5	semiconductor and gates characteristics NMOS, CMOS, PMOS	4	4	-
6	Regeneration digital logic circuits - flip-flops - schmit impulse	4	4	-
7	Multi vibrator circuits - Temporary ICS - Semiconductor memory	4	4	-
8	ROM types ,static and dynamic writing - power sources and regulators - Energy loss Data Bus	4	4	-
Total		**28**	**28**	**-**

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab
1	Introduction to digital electronic	×			×	×									
2	IC's fabrication technology- Binary circuit	×			×	×									
3	Characteristics using transistors-logic gates families	×			×	×									
4	Types and characteristics, metal transistor gatesoxide	×			×	×									
5	semiconductor and gates characteristics NMOS,CMOS, PMOS	×			×	×									
6	Regeneration digital logic circuits - flip-flops - schmit impulse	×			×	×									
7	Multi vibrator circuits - Temporary ICS - Semiconductor memory	×			×	×									
8	ROM types ,static and dynamic writing – power sources and regulators - Energy loss Data Bus	×			×	×									

6. Teaching and Learning Methods of Disable Students:

6.1. Teaching and Learning Methods of Disable Students:	
1	Additional Tutorials
2	Online lectures and assignments
6.2. Teaching and learning method for low capacity and outstanding Student	

For low capacity students	-Assign a portion of the office hours for those students. -Give them specific tasks. -Repeat the explanation of some of the material and tutorials. - Assign a teaching assistance to follow up the performance of these group of students
For outstanding Students	-Hand out project assignments to those students. -Give them some research topics to be searched using the internet and conduct presentation. Encourage them to take parts in the running research projects.

7**. Student Evaluation:**

7.1 Student Evaluation method:

No.	Evaluation Method	LO's
1	Periodic exam	**B1(1,2),C1(1)C2(1)**
2	Student load (quizzes-presentation-sheets-reports)	**C2(1,2)**
3	Final term examination	**B1(1,2),C1(1)C2(2)C2(1,2)**,C3(**1,2,3**)

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	8^{th}
2	Student load	2^{nd} -7^{th} - 9^{th} -14^{th}
3	Final term examination	15^{th}

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	20%
2	final examination	60%
3	Student load	20%
	Total	**100%**

8. List of References:

No.	Reference List
3	a Phillips, Tony (2000). "The Antikythera Mechanism I". American Mathematical Society. Retrieved 5 April 2020

9. Facilities required for teaching and learning:

No.	Facility
1	Lecture classroom
2	
3	White board
4	Data show system

10. Matrix of knowledge and skills of the course:

N	Topic	Aims	B1	C1	C2	C3

o.			1	2	1	1	2	1	2	3
1	Introduction to digital electronic	11	x			x				
2	IC's fabrication technology- Binary circuit	11		x		x			x	x
3	characteristics using transistors-logic gates families	11	x			x				
4	types and characteristics, metal transistor gates- oxide	11		x		x		x		x
5	semiconductor and gates characteristics NMOS, CMOS, PMOS	11	x		x	x			x	
6	regeneration digital logic circuits - flip-flops – Schmitt impulse	12	x		x		x	x		x
7	multi vibrator circuits - temporary ICS - semiconductor memory	12	x			x	x	x	x	
8	ROM types ,static and dynamic writing - power sources and regulators - Energy loss Data Bus	12		x			x		x	

Course Coordinator: Dr.Amira El-Sonbaty
Head of Department: Prof. Mohamed Fouad
Date of Approval: 2023

Artificial Intelligence
(CEE415A**)**

1- Basic Information:

Program Title	Communications and Electronics Engineering program
Department Offering the Program	Communications and Electronics Engineering department
Department Responsible for the Course	Communications and Electronics Engineering department
Course Title	Artificial Intelligence
Course Code	CEE415A
Year/Level	Level 4
Specialization	Major
Authorization Date of Course Specification	-

Teaching hours	**Lectures**	**Lab.**	**Exercise**	**Contact**	**Student's load**
	2	**----**	**2**	**4**	**4**

2- Course Aims:

No.	**Aims**
11	Computer systems in Electronics and Communication engineering can be used to design a system, component, and process to meet recent technological advances.
13	Allocate projects creatively by analyzing data from intended tests.

3- Competencies Learning Outcomes (LO'S):

Competency	**Learning Outcomes (LO'S)**
B2	1. Describe quality assurance systems, codes of practice and standards, health and safety requirements, and environmental issues. 2. Assess and evaluate the characteristics and performance of components, systems and processes. 3. Create and/or re-design a process, component or system, and carry out specialized engineering designs.
C1	1: Recognize engineering problems to identify the best solutions 2: Think creatively and innovatively in problem solving and design 3: Search for information to engage in lifelong self-learning discipline.
C3	1: Describe quality assurance systems, codes of practice and standards, health and safety requirements and environmental issues.

C4	1: Evaluate the troubles to repair all types of electronic systems using the standard tools.

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	Fundamental of artificial intelligent	2	2	-
2	random search	2	2	-
3	knowledge coding	2	2	-
4	Mathematical logic for knowledge	2	2	-
5	engineering and expert systems	2	2	-
6	Natural language processing	2	2	-
7	Knowledge representation	2	2	-
8	production system	2	2	-
9	Robots	4	4	-
10	Condensed introduction to programming using Lisip language and overall review for programming by Prolog language	2	2	-
11	programming applications in AI field focusing on: structure of customer accounting system including research operations	2	2	-
12	logical presentation, and decision-making process in the uncertainty case	2	2	-
13	computer vision and neural networks	2	2	-
Total		**28**	**28**	**-**

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab

1	Fundamental of artificial intelligent	⋈			⋈	⋈	⋈				⋈				
2	random search	⋈			⋈	⋈	⋈				⋈				
3	knowledge coding	⋈			⋈	⋈	⋈				⋈				
4	Mathematical logic for knowledge	⋈			⋈	⋈	⋈				⋈				
5	engineering and expert systems	⋈			⋈	⋈	⋈				⋈				
6	Natural language processing	⋈			⋈	⋈	⋈				⋈				
7	Knowledge representation	⋈			⋈	⋈	⋈								
8	production system	⋈			⋈	⋈	⋈				⋈				
9	Robots	⋈			⋈	⋈	⋈				⋈				
10	Condensed introduction to programming using Lisip language and overall review for programming by Prolog language	⋈			⋈	⋈	⋈				⋈				
11	programming applications in AI field focusing on: structure of customer accounting system including research operations	⋈			⋈	⋈	⋈				⋈				
12	logical presentation, and decision-making process in the uncertainty case	⋈			⋈	⋈	⋈				⋈				
13	computer vision and neural networks	⋈			⋈	⋈	⋈				⋈				

6. Teaching and Learning Methods of Disable Students:

6.1. Teaching and Learning Methods of Disable Students:	
1	Additional Tutorials
2	Online lectures and assignments

6.2. Teaching and learning method for low capacity and outstanding Student	
For low capacity students	-Assign a portion of the office hours for those students. -Give them specific tasks. -Repeat the explanation of some of the material and tutorials. - Assign a teaching assistance to follow up the performance of these group of students
For outstanding Students	-Hand out project assignments to those students. -Give them some research topics to be searched using the internet and conduct presentation. Encourage them to take parts in the running research projects.

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	LO's
1	Periodic exam	B2(1,2,3),C2(1), C1(1)
2	Student load	B2(1,2,3),C3(1)
3	Final term examination	B2(1,2,3),C1.(1,2,3), C3(1),C4(1)

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	8th
2	Student load	2nd -7th - 9th – 14th
3	Final term examination	15th

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	20%
2	final examination	60%
3	Student load	20%
	Total	**100%**

8. List of References:

No.	Reference List
1	Justin Healey, "Artificial Intelligence", Spinney Press,2020.
2	Melanie Mitchell , " Artificial Intelligence: A Guide for Thinking Humans", Farrar, Straus and Giroux,2019.
3	Russell &Norvig, "Artificial Intelligence: A Modern Approach", 4th Edition, Prentice Hall, 2020. Also referred to as AIMA

9. Facilities required for teaching and learning:

No.	Facility
1	Lecture classroom
2	
3	White board
4	Data show system
5	Wireless internet

6	Sound system

10. Matrix of knowledge and skills of the course:

No.	Topic	Aims	B3			C1			C3.	C4
			1	2	3	1	2	3	1	1
1	Fundamental of artificial intelligent	11,13							X	
2	Random search	11,13				X			X	
3	knowledge coding	11,13	X		X			X		X
4	Mathematical logic for knowledge	11,13			X	X	X			
5	Engineering and expert systems	11,13		X	X				X	X
6	Natural language processing	11,13	X		X	X	X	X		
7	Knowledge representation	11,13			X	X	X	X		
8	production system	11,13	X				X	X		X
9	Robots	11,13			X	X	X	X	X	X
10	Condensed introduction to programming using LISIP language and overall review for programming by Prolog language	11,13	X		X	X			X	
11	programming applications in AI field focusing on: structure of customer accounting system including research operations	11,13	X		X	X				
12	logical presentation, and decision-making process in the uncertainty case	11,13		X	X	X				X
13	computer vision and neural networks	11,13	X					X	X	X

Course Coordinator: Dr. Amira Elsonbaty
Head of Department: Asso.Prof. Mohamed Fouad
Date of Approval: 2023

Digital Signal processing
(CEE411)

1- Basic Information:

Program Title	Communications and Electronics Engineering program
Department Offering the Program	Communications and Electronics Engineering department
Department Responsible for the Course	Communications and Electronics Engineering department
Course Title	Digital Signal processing
Course Code	CEE411
Year/Level	Level 5
Specialization	Major
Authorization Date of Course Specification	-

Teaching hours	**Lectures**	**Lab.**	**Exercise**	**Contact**	**Student's load**
	2	**----**	**2**	**4**	**4**

2- Course Aims:

No.	Aims
5	**Recognize his or her contribution in advancing engineering and contributing to the profession's and community's development;** .

3- Cometencies (LO'S)

Competency	Learning Outcomes (LO'S)
C1	1: Recognize engineering problems to apply knowledge of mathematics concepts to the solution of digital Signal processing on society and environment.
C4	1: Analyze the results of numerical models to appreciate their limitations. 2: Use appropriate tools to measure system performance. 3: Search for information to engage in lifelong self-learning discipline.

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	DISCRETE FOURIER TRANSFORM: Discrete Signals and Systems- A Review	2	2	-
2	Introduction to DFT – Properties of DFT – Circular Convolution - Filtering methods based on DFT	2	2	-

3	FFT Algorithms –Decimation in time Algorithms, Decimation in frequency Algorithms – Use of FFT in Linear Filtering	4	4	-
4	IIR FILTER DESIGN: Structures of IIR – Analog filter design – Discrete time IIR filter from analog filter – IIR filter design by Impulse Invariance, Bilinear transformation, Approximation of derivatives – (LPF, HPF, BPF, BRF) filter design using frequency translation	4	4	-
5	FIR FILTER DESIGN: Structures of FIR – Linear phase FIR filter – Fourier Series	6	6	-
6	Filter design using windowing techniques (Rectangular Window, Hamming Window, Hanning Window), Frequency sampling techniques – Finite word length effects in digital Filters: Errors, Limit Cycle, Noise Power Spectrum.	2	2	-
7	FINITE WORDLENGTH EFFECTS: Fixed point and floating point number representations – ADC – Quantization- Truncation and Rounding errors - Quantization noise	2	2	-
8	coefficient quantization error – Product quantization error - Overflow error – Roundoff noise power - limit cycle oscillations due to product round off and overflow errors – Principle of scaling	4	4	-
9	DSP APPLICATIONS: Multirate signal processing: Decimation, Interpolation, Sampling rate conversion by a rational factor – Adaptive Filters: Introduction, Applications of adaptive filtering to equalization	2	2	-
Total		**28**	**28**	

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab

1	DISCRETE FOURIER TRANSFORM: Discrete Signals and Systems- A Review	×			×						×				
2	Introduction to DFT – Properties of DFT – Circular Convolution - Filtering methods based on DFT	×			×						×				
3	FFT Algorithms – Decimation in time Algorithms,Decimation in frequency Algorithms – Use of FFT in Linear Filtering	×			×						×				
4	IIR FILTER DESIGN: Structures of IIR – Analog filter design – Discrete time IIR filter from analog filter – IIR filter design by Impulse Invariance, Bilinear transformation, Approximation of derivatives – (LPF, HPF, BPF, BRF) filter design using frequency translation	×			×						×				
5	FIR FILTER DESIGN: Structures of FIR – Linear phase FIR filter – Fourier Series	×			×						×				

6	Filter design using windowing techniques (Rectangular Window, Hamming Window, Hanning Window),Frequency sampling techniques – Finite word length effects in digital Filters: Errors, Limit Cycle, Noise Power Spectrum.	⤫			⤫						⤫				
7	FINITE WORDLENGTH EFFECTS: Fixed point and floating point number representations – ADC – Quantization- Truncation and Rounding errors – Quantization noise	⤫			⤫						⤫				
8	Coefficient quantization error – Product quantization error - Overflow error – Roundoff noise power - limit cycle oscillations due to product round off and overflow errors – Principle of scaling	⤫			⤫						⤫				
9	DSP APPLICATIONS: Multirate signal processing:Decimation, Interpolation, Sampling rate conversion by a rational factor – Adaptive Filters: Introduction, Applications of adaptive filtering to equalization	⤫			⤫						⤫				

6. Teaching and Learning Methods of Disable Students:

6.1. Teaching and Learning Methods of Disable Students:	
1	Additional Tutorials
2	Online lectures and assignments

6.2. Teaching and learning method for low capacity and outstanding Student	
For low capacity students	-Assign a portion of the office hours for those students. -Give them specific tasks. -Repeat the explanation of some of the material and tutorials. - Assign a teaching assistance to follow up the performance of these group of students
For outstanding Students	-Hand out project assignments to those students. -Give them some research topics to be searched using the internet and conduct presentation. Encourage them to take parts in the running research projects.

7**. Student Evaluation:**

7.1 Student Evaluation method:

No.	Evaluation Method	ILO's
1	Periodic exam	C1(1), C3(1- 2)
2	Student load (quizzes-presentation-sheets-reports)	C1(1), C3(1- 2-3)
3	Final term examination	C1(1), C3(1- 2-3)

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	8^{th}
2	Student load	2^{nd} -7^{th} - 9^{th} – 14^{th}
3	Final term examination	15^{th}

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	20%
2	final examination	60%
3	Student load	20%
	Total	**100%**

8. List of References:

No.	Reference List
1	S. Salivahanan،A. Vallavaraj,"Digital Signal Processing,",Tata McGraw-Hill Education.2023.

9. Facilities required for teaching and learning:

No.	Facility
1	Lecture classroom
2	
3	White board
4	Data show system

10. Matrix of knowledge and skills of the course:

No.	Topic	Aims	C1	C3		
			1	1	2	3
1	DISCRETE FOURIER TRANSFORM: Discrete Signals and Systems- A Review	5	x	x		X
2	Introduction to DFT – Properties of DFT – Circular Convolution - Filtering methods based on DFT	5	x	x		
3	FFT Algorithms –Decimation in time Algorithms, Decimation in frequency Algorithms – Use of FFT in Linear Filtering	5	x	x		
4	IIR FILTER DESIGN: Structures of IIR – Analog filter design – Discrete time IIR filter from analog filter – IIR filter design by Impulse Invariance, Bilinear transformation, Approximation of derivatives – (LPF, HPF, BPF, BRF) filter design using frequency translation	5	x		X	
5	FIR FILTER DESIGN: Structures of FIR – Linear phase FIR filter – Fourier Series	5	x		x	
6	Filter design using windowing techniques (Rectangular Window, Hamming Window, Hanning Window), Frequency sampling techniques – Finite word length effects in digital Filters: Errors, Limit Cycle, Noise Power Spectrum.	5	x	x		
7	FINITE WORDLENGTH EFFECTS: Fixed point and floating point number representations – ADC –Quantization-Truncation and Rounding errors - Quantization noise	5	x		x	
8	coefficient quantization error – Product quantization error - Overflow error – Roundoff noise power - limit cycle oscillations due to product round off and overflow errors – Principle of scaling	5	x			X
9	DSP APPLICATIONS: Multirate signal processing: Decimation, Interpolation, Sampling rate conversion by a rational factor – Adaptive Filters: Introduction, Applications of adaptive filtering to equalization	5	x			X

Course Coordinator: Dr. Walid Raslan

Head of Department: Prof. Dr. Mohamed Fouad
Date of Approval: 2023

Communication Systems
(CEE412**)**

1- Basic Information:

Program Title	Communications and Electronics Engineering program
Department Offering the Program	Communications and Electronics Engineering department
Department Responsible for the Course	Communications and Electronics Engineering department
Course Title	Communication Systems
Course Code	CEE412
Year/Level	Level 5
Specialization	Major
Authorization Date of Course Specification	-

Teaching hours	Lectures	Lab.	Exercise	Contact	Student's load
	2	**----**	**3**	**5**	**4**

2- Course Aims:

No.	Aims
6	**Recognize and respect the importance of the environment, both physical and natural, and work to promote sustainable principles**

3- Cometencies (LO’S))

Competency	Learning Outcomes (ILO’S)
C1	1: Recognize engineering problems to define concepts and theories of mathematics and sciences, which is appropriate to the analog and digital communication systems discipline.
C3	1 Investigate the failure of components, system, and processes. 2: Judge engineering decision considering balanced cost, benefits, safety, quality, reliability, and environmental impact. 3: Apply safe systems at work and observe the appropriate steps to manage risks

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	Introduction to communication systems: Elements of communication system, Frequency spectrum,	4	6	-

	Need for modulation			
2	types of modulation, TDM, FDM, Noise, Signal to noise ratio, noise figure, noise temperature, noise calculation in single and cascaded stages	6	9	-
3	Modulation techniques: Time domain equation of AM wave, Modulation index, effects of over modulation, bandwidth, power and voltage calculations of AM signal,	6	9	-
4	Suppressed carrier and single sideband techniques, angle modulation- its types, Time domain equation of FM wave, Modulation index, bandwidth, side bands, power of side bands, frequency deviation, pre-emphasis, de-emphasis, FM stereo system, merits and demerits of FM over AM	4	6	
5	Transmitters and Receivers: Specifications of transmitters, low level modulation, high level modulation, heterodyne type transmitters, SSB transmitter,	6	9	-
6	FM transmitter, Armstrong method of FM generation, sensitivity, selectivity, fidelity of receiver, Crystal receiver, TRF receiver, super heterodyne AM receiver, selection of IF, IF amplifier circuits, AVC, IMRR, FM receiver, FM detector (Foster Seeley), Noise limiter circuit, comparison of AM & FM receivers	2	3	-
Total		**28**	**42**	**-**

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab

1	Introduction to communication systems: Elements of communication system, Frequency spectrum, Need for modulation	x			x						x				
2	types of modulation, TDM, FDM, Noise, Signal to noise ratio, noise figure, noise temperature, noise calculation in single and cascaded stages	x			x						x				
3	Modulation techniques: Time domain equation of AM wave, Modulation index, effects of over modulation, bandwidth, power and voltage calculations of AM signal	x			x						x				
4	Suppressed carrier and single sideband techniques,angle modulation- its types, Time domainequation of FM wave, Modulation index, bandwidth, side bands, power of side bands, frequency deviation,pre-emphasis, de-emphasis, FM stereo system,merits and demerits of FM over AM	x			x						x				
5	Transmitters and Receivers: Specifications of transmitters, low level modulation, high level modulation, heterodyne type transmitters, SSB transmitter	x			x						x				

6	FM transmitter, Armstrong method of FM generation, sensitivity, selectivity, fidelity of receiver, Crystal receiver, TRF receiver, super heterodyne AM receiver, selection of IF, IF amplifier circuits, AVC, IMRR, FM receiver, FM detector (Foster Seeley), Noise limiter circuit, comparison of AM & FM receivers	x			X						x				

6. Teaching and Learning Methods of Disable Students:

6.1. Teaching and Learning Methods of Disable Students:	
1	Additional Tutorials
2	Online lectures and assignments

6.2. Teaching and learning method for low capacity and outstanding Student	
For low capacity students	-Assign a portion of the office hours for those students. -Give them specific tasks. -Repeat the explanation of some of the material and tutorials. - Assign a teaching assistance to follow up the performance of these group of students
For outstanding Students	-Hand out project assignments to those students. -Give them some research topics to be searched using the internet and conduct presentation. Encourage them to take parts in the running research projects.

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	ILO's
1	Periodic exam	C1(1),C3(1-3)
2	Student load (quizzes-presentation-sheets-reports)	C1(1),C3(1-3)
3	Final term examination	C1(1),C3(1-2-3)

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	8^{th}
2	Student load	2^{nd} -7^{th} - 9^{th} – 14^{th}
3	Final term examination	15^{th}

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	20%
2	final examination	60%
3	Student load	20%
	Total	**100%**

8. List of References:

No.	Reference List
1	Sklar, Digital communications fundamental and applications, 2019.
2	Communication systems, Simon Haykin, 5th edition 2020.

9. Facilities required for teaching and learning:

No.	Facility
1	Lecture classroom
2	
3	White board
4	Data show system
5	Wireless internet
6	Sound system

10. Matrix of knowledge and skills of the course:

No.	Topic	Aims	C1	C3		
			1	1	2	3
1	Introduction to communication systems: Elements of communication system, Frequency spectrum, Need for modulation	6	x	x		
2	types of modulation, TDM, FDM, Noise, Signal to noise ratio, noise figure, noise temperature, noise calculation in single and cascaded stages	6	x	x		
3	Modulation techniques: Time domain equation of AM wave, Modulation index, effects of over modulation, bandwidth, power and voltage calculations of AM signal,	6	x	**x**		
4	Suppressed carrier and single sideband techniques, angle	6	x		x	

No.	Topic	Aims	C1	C3		
			1	1	2	3
	modulation- its types, Time domain equation of FM wave, Modulation index, bandwidth, side bands, power of side bands, frequency deviation, pre-emphasis, de-emphasis, FM stereo system, merits and demerits of FM over AM					
5	Transmitters and Receivers: Specifications of transmitters, low level modulation, high level modulation, heterodyne type transmitters, SSB transmitter,	6	x		x	x
6	FM transmitter, Armstrong method of FM generation, sensitivity, selectivity, fidelity of receiver, Crystal receiver, TRF receiver, super heterodyne AM receiver, selection of IF, IF amplifier circuits, AVC, IMRR, FM receiver, FM detector (Foster Seeley), Noise limiter circuit, comparison of AM & FM receivers	6	x		x	x

Course Coordinator: Prof. Dr. Mohamed Fouad
Head of Department: Prof. Dr. Mohamed Fouad
Date of Approval: 2023

Communication networks
(CEE413**)**

1- Basic Information:

Program Title	Communications and Electronics Engineering program
Department Offering the Program	Communications and Electronics Engineering department
Department Responsible for the Course	Communications and Electronics Engineering department
Course Title	Communications networks
Course Code	CEE413
Year/Level	Level 5
Specialization	Major
Authorization Date of Course	-

Specification					
Teaching hours	**Lectures**	**Lab.**	**Exercise**	**Contact**	**Student's load**
	2	**----**	**2**	**4**	**4**

2- Course Aims:

No.	Aims
8	Accept full responsibility for personal learning and self-development. knowledge and skills and the ability to participate in post-graduate academic achievement
9	Use a variety of modes, tools, and languages to effectively communicate with a wide range of audiences.

3- Cometencies (LO'S)

By the end of this course, the student able to:

Competency	Learning Outcomes (LO'S)
A7	**1.** Collaborate effectively within multidisciplinary team. **2.** Work in stressful environment and within constraints. **3**. Motivate individuals.
B3	1. Define basics of information and communication technology (ICT). 2. Select and appraise appropriate ICT tools to a variety of communication engineering problems.
C2	1. Define current engineering technologies as related to communication Engineering systems 2. Analyze the performance of digital and analog communication. 3. Apply engineering knowledge and understanding to improve design of communication systems, and services of networks.

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	FUNDAMENTALS & LINK LAYER: Building a network – Requirements - Layering and protocols - Internet Architecture	2	2	-
2	Network software – Performance ; Link layer Services - Framing - Error Detection - Flow control	6	6	-
3	MEDIA ACCESS & INTERNETWORKING: Media access control - Ethernet (802.3) - Wireless LANs – 802.11	3	2	
4	Bluetooth - Switching and bridging – Basic Internetworking (IP, CIDR, ARP, DHCP,ICMP).	4	4	-
5	ROUTING: Routing (RIP, OSPF, metrics) – Switch basics – Global Internet (Areas, BGP, IPv6), Multicast	2	2	
6	addresses – multicast routing (DVMRP, PIM).	2	2	-
7	TRANSPORT LAYER: Overview of Transport layer - UDP - Reliable byte stream (TCP) - Connection	2	2	

	management - Flow control			
8	Retransmission – TCP Congestion control - Congestion avoidance (DECbit, RED) – QoS – Application requirements	2	2	-
9	APPLICATION LAYER: Traditional applications - Electronic Mail (SMTP, POP3, IMAP, MIME) – HTTP – Web Services – DNS – SNMP.	4	4	-
Total		**28**	**28**	**-**

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab
1	FUNDAMENTALS & LINK LAYER: Building a network – Requirements - Layering and protocols - Internet Architecture	×		×	×			×							
2	Network software – Performance ; Link layer Services - Framing - Error Detection - Flow control	×		×	×			×							
3	MEDIA ACCESS & INTERNETWORKING: Media access control - Ethernet (802.3) - Wireless LANs – 802.11	×		×	×			×							
4	Bluetooth - Switching and bridging – Basic Internetworking (IP, CIDR, ARP, DHCP,ICMP).	×		×	×			×							

5	ROUTING: Routing (RIP, OSPF, metrics) – Switch basics – Global Internet (Areas, BGP, IPv6), Multicast	×		×	×			×							
6	addresses – multicast routing (DVMRP, PIM).	×		×	×			×							
7	TRANSPORT LAYER: Overview of Transport layer - UDP -Reliable byte stream (TCP) - Connection management - Flow Control	×		×	×			×							
8	Retransmission – TCP Congestion control - Congestion avoidance (DECbit, RED) – QoS –Application requirements	×		×	×			×							
9	APPLICATION LAYER: Traditional applications – Electronic Mail (SMTP, POP3, IMAP, MIME) – HTTP – Web Services – DNS – SNMP.	×		×	×			×							

6. Teaching and Learning Methods of Disable Students:

6.1. Teaching and Learning Methods of Disable Students:	
1	Additional Tutorials
2	Online lectures and assignments

6.2. Teaching and learning method for low capacity and outstanding Student	
For low capacity students	-Assign a portion of the office hours for those students. -Give them specific tasks. -Repeat the explanation of some of the material and tutorials. - Assign a teaching assistance to follow up the performance of these group of students
For outstanding Students	-Hand out project assignments to those students. -Give them some research topics to be searched using the internet and conduct presentation. Encourage them to take parts in the running research projects.

7. **Student Evaluation:**

7.1 Student Evaluation method:

No.	Evaluation Method	LO's
1	Periodic exam	B3.1,B3.2
2	Student load	A7.1,A7.2,A7.3
3	Final term examination	B3.1,B3.2,C2.1,C2.2,C2.3

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	8^{th}
2	Student load	2^{nd} -7^{th} - 9^{th} – 14^{th}
3	Final term examination	15^{th}

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	20%
2	final examination	60%
3	Student load	20%
	Total	**100%**

8. List of References:

No.	Reference List
1	Arshad Iqbal," Computer Networks Multiple Choice Questions and Answers (MCQs), Bushra Arshad,2019
2	Saha, Debashis **, "Advances in Data Communications and Networking for Digital Business Transformation", IGI Global, 2020**
3	James Kurose , Keith Ross ," Computer Networking: A Top-Down Approach "(8th Edition) ,2019
4	**A. S. Tanenbaum, D. J. Wetherall, "Computer Networks", tenth Edition, James F. Kurose, Keith W., 2020**
5	**Forouzan " Data communication and network" sixth edition,2023**

9. Facilities required for teaching and learning:

No.	Facility
1	Lecture classroom
2	
3	White board
4	Data show system
5	Wireless internet
6	Sound system

10. Matrix of knowledge and skills of the course:

No.	Topic	Aims	A7			B3		C2		
			1	2	3	1	2	1	2	3

1	FUNDAMENTALS & LINK LAYER: Building a network – Requirements - Layering and protocols - Internet Architecture	8				X		X		
2	Network software – Performance ; Link layer Services - Framing - Error Detection - Flow control	8,9				X	X	X	X	X
3	MEDIA ACCESS & INTERNETWORKING: Media access control - Ethernet (802.3) - Wireless LANs – 802.11	8				X	X			
4	Bluetooth - Switching and bridging – Basic Internetworking (IP, CIDR, ARP, DHCP,ICMP).	9	X					X	X	X
5	ROUTING: Routing (RIP, OSPF, metrics) – Switch basics – Global Internet (Areas, BGP, IPv6), Multicast	9				X	X			
6	addresses – multicast routing (DVMRP, PIM).	8,9		X				X	X	X
7	TRANSPORT LAYER: Overview of Transport layer - UDP - Reliable byte stream (TCP) - Connection management - Flow control	9			X	X	X			
8	Retransmission – TCP Congestion control - Congestion avoidance (DECbit, RED) – QoS – Application requirements	8								
9	APPLICATION LAYER: Traditional applications -Electronic Mail (SMTP, POP3, IMAP, MIME) – HTTP – Web Services – DNS – SNMP.	9						X	X	

Course Coordinator: Dr. Amira Elsonbaty
Head of Department: Asso.Prof. Amr Hussin
Date of Approval: 2023

Project 1
(CEE416**)**

1- Basic Information:

Program Title	Communications and Electronics Engineering program
Department Offering the Program	Communications and Electronics Engineering department
Department Responsible for the Course	Communications and Electronics Engineering department
Course Title	Project 1
Course Code	CEE416
Year/Level	Level 5
Specialization	Major
Authorization Date of Course Specification	-

Teaching hours	**Lectures**	**Lab.**	**Exercise**	**Contact**	**Student's load**
	3	**2**	**----**	**5**	**4**

2- Course Aims:

No.	Aims
11	Computer systems in Electronics and Communication engineering can be used to design a system, component, and process to meet recent technological advances.
12	Communicate and work effectively within multiple teams in the field of communication and electronics engineering and consider the effects of engineering solutions on society and the environment.
13	Allocate projects creatively by analyzing data from intended tests.

3- Cometencies (LO'S):

Competency	Learning Outcomes (LO'S)
A5	1 Define technical language and report writing. 2 Assess different ideas, views, and knowledge from a range of sources. 3 Prepare technical reports 4 Search for information to engage in lifelong self-learning discipline.
A7	1 Collaborate effectively within multidisciplinary team. 2 Work in stressful environment and within constraints. 3 Motivate individuals.
A9	1.Think creatively in solving problems of design. 2. Effectively manage tasks, time, and resources. 3 .Refer to relevant literatures.
C4	1: Analyze the results of numerical models to appreciate their limitations. 2: Use appropriate tools to measure system performance. 3: Evaluate the troubles to repair all types of electronic systems using the standard tools.

	4:Search for information to engage in lifelong self-learning discipline.
C5	1: Describe principles of design including elements design, process and/or a system related to electronics and communication systems 2: Integrate electronic systems for certain specific function using the right equipment. 3: Design a process, component or system to carry out specialized engineering designs. 4: Use a wide range of analytical tools, techniques, equipment, and software packages of the discipline and to develop required computer programs. 5: Collaborate effectively within the multidisciplinary team.

4. Course Contents:

No.	Topics
1	Students will be assigned projects in which they will be expected to apply the principles of Communications and Electronics Engineering
2	The student will be able to analyze, to design and to solve a given real world problems
3	Reports and presentations will be emphasized in addition to the technical content.

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab

1	Students will be assigned projects in which they will be expected to apply the principles of Communications and Electronics Engineering	×				×			×		×				
2	The student will be able to analyze, to design and to solve a given real world problems	×				×			×		×				
3	Reports and presentations will be emphasized in addition to the technical content.	×				×			×		×				

6. Teaching and Learning Methods of Disable Students:

6.1. Teaching and Learning Methods of Disable Students:	
1	Additional Tutorials
2	Online lectures and assignments

6.2. Teaching and learning method for low capacity and outstanding Student	
For low capacity students	-Assign a portion of the office hours for those students. -Give them specific tasks. -Repeat the explanation of some of the material and tutorials. - Assign a teaching assistance to follow up the performance of these group of students
For outstanding Students	-Hand out project assignments to those students. -Give them some research topics to be searched using the internet and conduct presentation. Encourage them to take parts in the running research projects.

7**. Student Evaluation:**

7.1 Student Evaluation method:

No.	Evaluation Method	LO's
1	Oral examination	C4(1-2-3-4), C5(1-2-3-4-5)
2	Student load (presentation-verify with CAD tools)	C4(1-2-3-4), C5(1-2-3-4-5)
3	Final term examination	C4(1-2-3-4), C5(1-2-3-4-5)

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Oral Examination	at the end of IE 510

2	Student load (presentation, Report)	2^{nd} -7^{th} - 9^{th} -14^{th}

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Oral examination	50%
2	Student load	50%
	Total	**100%**

8. List of References:

No.	Reference List
1	Different new references according to the project

9. Facilities required for teaching and learning:

No.	Facility
1	Lecture classroom
2	
3	White board
4	Data show system
5	Wireless internet
6	Sound system

10. Matrix of knowledge and skills of the course:

No.	Topic	Aims	A5			A7			A9			C4				C5	
			1	2	3	1	2	3	1	2	3	1	2	3	4	1	2
1	Students will be assigned projects in which they will be expected to apply the principles of Communications and Electronics Engineering	11,12, 13	x	x	x	x	x	x	x	X	x						
2	The student will be able to analyze, to design and to solve a given real world problems	11,12, 13	x	x	x					X	x						
3	Reports and presentations will be emphasized in addition to the technical content.	11,12, 13	x						x	x	x	x	x	x	x		

Head of Department: Prof. Mohamed Fouad
Date of Approval: 2023

Digital Communications
(CEE423)

1- Basic Information:

Program Title	Communications and Electronics Engineering program
Department Offering the Program	Communications and Electronics Engineering department
Department Responsible for the Course	Communications and Electronics Engineering department
Course Title	Digital Communications
Course Code	CEE423
Year/Level	Level 5
Specialization	Major
Authorization Date of Course Specification	-

Teaching hours	**Lectures**	**Lab.**	**Exercise**	**Contact**	**Student's load**
	2	**----**	**2**	**4**	**3**

2- Course Aims:

No.	**Aims**
6	**6. Recognize and respect the importance of the environment, both physical and natural, and work to promote sustainable principles**

3- Cometencies (LO'S):

Competency	**Learning Outcomes (LO'S)**
C1	1: Recognize engineering problems to meet the required needs, operate and maintain digital communication, and coding systems.
C3	1: Investigate the failure of components, system, and processes. 2: Judge engineering decision considering balanced cost, benefits, safety, quality, reliability, and environmental impact. 3: Apply safe systems at work and observe the appropriate steps to manage risks

4. Course Contents:

No.	**Topics**	**Lectures**	**Tutorial**	**Practical**
1	SAMPLING & QUANTIZATION: Low pass sampling – Aliasing- Signal Reconstruction-Quantization	2	2	-
2	Uniform & non-uniform quantization - quantization noise - Logarithmic Companding of speech signal- PCM – TDM	2	2	-
3	WAVEFORM CODING: Prediction filtering and	4	4	-

	DPCM			
4	Delta Modulation - ADPCM & ADM principles- Linear Predictive Coding	4	4	-
5	BASEBAND TRANSMISSION: Properties of Line codes- Power Spectral Density of Unipolar / Polar RZ & NRZ – Bipolar NRZ -Manchester	4	4	-
6	ISI – Nyquist criterion for distortionless transmission – Pulse shaping – Correlative coding - Mary schemes – Eye pattern – Equalization.	4	4	-
7	DIGITAL MODULATION SCHEME: Geometric Representation of signals - Generation, detection, PSD & BER of Coherent BPSK, BFSK & QPSK - QAM - Carrier Synchronization - structure of Non-coherent Receivers - Principle of DPSK	4	4	-
8	ERROR CONTROL CODING: Channel coding theorem - Linear Block codes - Hamming codes - Cyclic codes - Convolutional codes - Vitterbi Decoder.	4	4	-
Total		**28**	**28**	**-**

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab
1	SAMPLING & QUANTIZATION: Low pass sampling – Aliasing- Signal Reconstruction- Quantization	x			x	x					x				

2	Uniform & non-uniform quantization – quantization noise - Logarithmic Companding of speech signal- PCM - TDM	x			x	x					x				
3	WAVEFORM CODING: Prediction filtering and DPCM	x			x	x					x				
4	Delta Modulation - ADPCM & ADM principles-Linear Predictive Coding	x			x	x					x				
5	BASEBAND TRANSMISSION: Properties of Line codes- Power Spectral Density of Unipolar / Polar RZ & NRZ – Bipolar NRZ –Manchester	x			x	x					x				
6	ISI – Nyquist criterion for distortionless transmission – Pulse shaping – Correlative coding -Mary schemes – Eye pattern – Equalization.	x			x	x					x				
7	DIGITAL MODULATION SCHEME: Geometric Representation of signals - Generation, detection, PSD & BER of Coherent BPSK, BFSK & QPSK - QAM Carrier Synchronization - structure of Non-coherent Receivers - Principle of DPSK	x			x	x					x				

8	ERROR CONTROL CODING: Channel coding theorem - Linear Block codes - Hamming codes - Cyclic codes - Convolutional codes - Vitterbi Decoder.	x			x	x					x				

6. Teaching and Learning Methods of Disable Students:

6.1. Teaching and Learning Methods of Disable Students:	
1	Additional Tutorials
2	Online lectures and assignments

6.2. Teaching and learning method for low capacity and outstanding Student	
For low capacity students	-Assign a portion of the office hours for those students. -Give them specific tasks. -Repeat the explanation of some of the material and tutorials. - Assign a teaching assistance to follow up the performance of these group of students
For outstanding Students	-Hand out project assignments to those students. -Give them some research topics to be searched using the internet and conduct presentation. Encourage them to take parts in the running research projects.

7**. Student Evaluation:**

7.1 Student Evaluation method:

No.	Evaluation Method	LO's
1	Periodic exam	C1(1),C3(1-2)
2	Student load (quizzes-presentation-sheets-reports)	C1(1),C3(1-2)
3	Final term examination	C1(1),C3(1-2-3)

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	8^{th}
2	Student load	2^{nd} -7^{th} - 9^{th} -14^{th}
3	Final term examination	15^{th}

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	20%
2	final examination	60%

3	Student load	20%
	Total	**100%**

8. List of References:

No.	Reference List
1	A. Lapidoth, A Foundation in Digital Communication, Cambridge, 2019
2	R. G. Gallager, Principles of Digital Communication, Cambridge University Press, 2023.

9. Facilities required for teaching and learning:

No.	Facility
1	Lecture classroom
2	
3	White board
4	Data show system
5	Wireless internet
6	Sound system

10. Matrix of knowledge and skills of the course:

No.	Topic	Aims	C1	C3		
			1	1	2	3
1	SAMPLING & QUANTIZATION: Low pass sampling – Aliasing- Signal Reconstruction-Quantization	6	x	x		
2	Uniform & non-uniform quantization - quantization noise - Logarithmic Companding of speech signal- PCM - TDM	6	x	x		
3	WAVEFORM CODING: Prediction filtering and DPCM	6	x	x		
4	Delta Modulation - ADPCM & ADM principles-Linear Predictive Coding	6	x			
5	BASEBAND TRANSMISSION: Properties of Line codes- Power Spectral Density of Unipolar / Polar RZ & NRZ – Bipolar NRZ -Manchester	6	x			x
6	ISI – Nyquist criterion for distortionless transmission – Pulse shaping – Correlative coding - Mary schemes – Eye pattern – Equalization.	6	x		x	x
7	DIGITAL MODULATION SCHEME: Geometric Representation of signals - Generation, detection, PSD & BER of Coherent BPSK, BFSK & QPSK - QAM - Carrier Synchronization - structure of Non-	6	x		x	

	coherent Receivers - Principle of DPSK					
8	ERROR CONTROL CODING: Channel coding theorem - Linear Block codes - Hamming codes - Cyclic codes - Convolutional codes - Vitterbi Decoder.	6	x		x	x

Course Coordinator: Dr. Walid Raslan
Head of Department: Prof. Mohamed Fouad
Date of Approval: 2023

Research and Analytic skills
(BAS421)

1- Basic Information:

Program Title	Communications and Electronics Engineering Program
Department Offering the Program	Communications and Electronics Engineering department
Department Responsible for the Course	Communications and Electronics Engineering department
Course Title	Luminous Communications
Course Code	BAS421
Year/Level	Level 4
Specialization	Major
Authorization Date of Course Specification	-

Teaching hours	**Lectures**	**Lab.**	**Exercise**	**Contact**	**Student's load**
	2	**-**	**-**	**2**	**3**

2- Course Aims:

No.	**Aims**
1	**. Master a wide range of engineering knowledge and specialized skills, as well as the ability to apply that information in real-world situations using theories and analytical**

	thinking.

3- Cometencies (LO’S):

Competency	Learning Outcomes (LO’S)
A2	**1.** Analyze and interpret data. **2.** Applying statistical analyses and objective engineering judgment to draw conclusions.

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	مهارات التحليل: إطار التحليل للمسائل الهندسية مع الاخذ في الاعتبار النواحي الفنية، الاقتصادية، البيئية، والاخلاقية.	4	-	-
2	أطوار حل المسائل (فهم المسألة وصياغتها، خطة الحل، تنفيذ الخطة، التقيم، والمراجعة.) دور الابداع في التحليل.	6	-	-
3	أوجه القوة، أوجة الضعف ، الفرص، والمخاطر) (SWOTتحليل بالنسبة للبدائل المختلفة. التحليل التفصيلي للتكلفة-الفائدة، وكذلك تحليل المخاطرز دور التعاون وعمل الفريق في تحليل المسائل الكبيرة.	6	-	-
4	اهمية العثور علي البيانات والمعلومات والمعارف المناسبة.	4	-	-
5	. مهارات البحث: الطرق الاساسية للبحث باستخدام الروابط المنطيقية)(كيفية البحث باستخدام العبارات، AND,OR,NOTمثل (وكذلك الروابط.URLالعناوين،المجال، الحاسب المضيف،	4	-	-
6	تقييم نتائج البحث اختيار محرك البحث المناسب. أهمية تقييم مصداقية الاماكن المتاحة علي الشبكة المعرفية العالمية.	4	-	-
Total		28	-	-

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab
1	مهارات التحليل: إطار التحليل للمسائل الهندسية مع الاخذ في الاعتبار النواحي الفنية، الاقتصادية، البيئية، والاخلاقية.	x			x	x					x				

2	أطوار حل المسائل (فهم المسألة وصياغتها، خطة الحل، تنفيذ الخطة، التقيم، والمراجعة.) دور الابداع في التحليل.	x			x	x					x				
3	أوجه القوة، أوجة (SWOTتحليل الضعف ، الفرص، والمخاطر) بالنسبة للبدائل المختلفة. التحليل التفصيلي للتكلفة-الفائدة، وكذلك تحليل المخاطرز دور التعاون وعمل الفريق في تحليل المسائل الكبيرة	x			x	x					x				
4	اهمية العثور علي البيانات والمعلومات والمعارف المناسبة.	x			x	x					x				
5	. مهارات البحث: الطرق الاساسية للبحث باستخدام الروابط المنطيقية)كيفية AND,OR,NOTمثل (البحث باستخدام العبارات، العناوين،المجال، الحاسب المضيف، وكذلك الروابط.URL	x			x	x					x				
6	تقييم نتائج البحث اختيار محرك البحث المناسب. أهمية تقييم مصداقية الاماكن المتاحة علي الشبكة المعرفية العالمية.	x			x	x					x				

6. Teaching and Learning Methods of Disable Students:

6.1. Teaching and Learning Methods of Disable Students:	
1	Additional Tutorials
2	Online lectures and assignments

6.2. Teaching and learning method for low capacity and outstanding Student	
For low capacity students	-Assign a portion of the office hours for those students. -Give them specific tasks. -Repeat the explanation of some of the material and tutorials. - Assign a teaching assistance to follow up the performance of these group of students
For outstanding Students	-Hand out project assignments to those students. -Give them some research topics to be searched using the internet and conduct presentation. Encourage them to take parts in the running research projects.

7**. Student Evaluation:**

7.1 Student Evaluation method:

No.	Evaluation Method	LO'S
1	Periodic exam	A2(1,2)
2	Student load	A2(1,2)
3	Final term examination	A2(1,2)

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	8th
2	Student load	2nd -7th - 9th -14th
3	Final term examination	15th

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	20%
2	final examination	60%
3	Student load	20%
	Total	**100%**

9. Facilities required for teaching and learning:

No.	Facility
1	Lecture classroom
2	
3	White board
4	Data show system
5	Wireless internet
6	Sound system

10. Matrix of knowledge and skills of the course:

No.	Topic	aim	A2	
			1	2
1	مهارات التحليل: إطار التحليل للمسائل الهندسية مع الاخذ في الاعتبار النواحي الفنية، الاقتصادية، البيئية، والاخلاقية.	1	x	x
2	أطوار حل المسائل (فهم المسألة وصياغتها، خطة الحل، تنفيذ الخطة، التقيم، والمراجعة.) دور الابداع في التحليل.	1	x	x
3	أوجه القوة، أوجة الضعف ، (SWOTتحليل الفرص، والمخاطر) بالنسبة للبدائل المختلفة. التحليل التفصيلي للتكلفة-الفائدة، وكذلك تحليل المخاطرز دور التعاون وعمل الفريق في تحليل المسائل الكبيرة.	1	x	x
4	اهمية العثور علي البيانات والمعلومات والمعارف المناسبة.	1		X

5	. مهارات البحث: الطرق الاساسية للبحث باستخدام الروابط المنطيقية مثل (AND,OR,NOT)(كيفية البحث باستخدام العبارات، العناوين،المجال، الحاسب المضيف، URL.وكذلك الروابط	1	x	x
6	تقييم نتائج البحث اختيار محرك البحث المناسب. أهمية تقييم مصداقية الاماكن المتاحة علي الشبكة المعرفية العالمية.	1	x	x

Course Coordinator:
Head of Department: Prof. Mohamed Fouad
Date of Approval: 2023

Luminous Communications
(CEE421**)**

1- Basic Information:

Program Title	Communications and Electronics Engineering Program
Department Offering the Program	Communications and Electronics Engineering department
Department Responsible for the Course	Communications and Electronics Engineering department
Course Title	Luminous Communications
Course Code	CEE421
Year/Level	Level 4
Specialization	Major
Authorization Date of Course Specification	-

Teaching hours	**Lectures**	**Lab.**	**Exercise**	**Contact**	**Student's load**
	2	**----**	**2**	**4**	**3**

2- Course Aims:

No.	**Aims**
1	. Master a wide range of engineering knowledge and specialized skills, as well as the ability to apply that information in real-world situations using theories and analytical thinking.
11	Computer systems in Electronics and Communication engineering can be used to design a system, component, and process to meet recent technological advances.

3- Cometencies (LO’S):

Competency	**Learning Outcomes (LO’S)**
C5	1: Listing characteristics of engineering materials related to the discipline.

	2: Evaluate the characteristics and performance of components, systems and processes such as optical amplifier, laser sources ..etc. 3: Choose appropriate specifications for required devices
C4	1: Apply knowledge of optical fibers 2: Apply knowledge of science to asses theories of luminous communications 3: proof applications of the theories of optical fibers to luminous communication

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	INTRODUCTION TO OPTICAL FIBERS: Evolution of fiber optic system- Element of an Optical Fiber Transmission link-- Total internal reflection-Acceptance angle –Numerical aperture	2	2	-
2	Skew rays Ray Optics-Optical Fiber Modes and Configurations -Mode theory of Circular Wave guides- Overview of Modes-Key Modal concepts Linearly Polarized Modes -Single Mode Fibers-Graded Index fiber structure	2	2	-
3	SIGNAL DEGRADATION OPTICAL FIBERS: Attenuation - Absorption losses, Scattering losses, Bending Losses, Core and Cladding losses, Signal Distortion in Optical Wave guides-Information Capacity determination -Group Delay-Material Dispersion	2	2	-
4	Wave guide Dispersion, Signal distortion in SM fibers-Polarization Mode dispersion, Intermodal dispersion, Pulse Broadening in GI fibers-Mode Coupling -Design Optimization of SM fibers-RI profile and cut-off wavelength	4	4	-
5	FIBER OPTICAL SOURCES AND COUPLING: Direct and indirect Band gap materials-LED structures -Light source materials -Quantum efficiency and LED power, Modulation of a LED, lasers Diodes-Modes and Threshold condition -Rate equations	4	4	-
6	External Quantum efficiency -Resonant frequencies -Laser Diodes, Temperature effects, Introduction to Quantum laser, Fiber amplifiers- Power Launching and coupling, Lencing schemes, Fiber -to- Fiber joints, Fiber splicing-Signal to Noise ratio , Detector response time	4	4	-
7	FIBER OPTIC RECEIVER AND MEASUREMENTS: Fundamental receiver operation, Pre amplifiers, Error sources – Receiver	4	4	-

	Configuration– Probability of Error– Quantum limit			
8	Fiber Attenuation measurements- Dispersion measurements – Fiber Refractive index profile measurements – Fiber cut- off Wave length Measurements – Fiber Numerical Aperture Measurements – Fiber diameter measurements	2	2	
9	OPTICAL NETWORKS AND SYSTEM TRANSMISSION: Basic Networks – SONET / SDH – Broadcast – and –select WDM Networks –Wavelength Routed Networks	2	2	
10	Nonlinear effects on Network performance —Link Power budget -Rise time budget Noise Effects on System Performance-Operational Principles of WDM Performance of WDM + EDFA system – Solutions – Optical CDMA – Ultra High Capacity Networks	2	2	
Total		28	28	-

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab
1	INTRODUCTION TO OPTICAL FIBERS:Evolution of fiber optic system- Element of an Optical Fiber Transmission link-- Total internal reflection-Acceptance angle –Numerical aperture	x			x	x					x				

2	Skew rays Ray Optics-Optical Fiber Modes and Configurations -Mode theory of Circular Wave guides- Overview of Modes-Key Modal concepts Linearly Polarized Modes -Single Mode Fibers-Graded Index fiber structure	×			×	×					×				
3	SIGNAL DEGRADATION OPTICAL FIBERS: Attenuation - Absorption losses, Scattering losses, Bending Losses, Core and Cladding losses, Signal Distortion in Optical Wave guides-Information Capacity determination - Group Delay-Material Dispersion	×			×	×					×				
4	Wave guide Dispersion, Signal distortion in SM fibers-Polarization Mode dispersion, Intermodal dispersion, Pulse Broadening in GI fibers-Mode Coupling –Design Optimization of SM fibers-RI profile and cut-off wavelength	×			×	×					×				

5	FIBER OPTICAL SOURCES AND COUPLING: Direct and indirect Band gap materials-LED structures -Light source materials -Quantum efficiency and LED power, Modulation of a LED, lasers Diodes-Modes and Threshold condition -Rate equations	x			x	x					x				
6	External Quantum efficiency -Resonant frequencies - Laser Diodes, Temperature effects, Introduction to Quantum laser, Fiber amplifiers- Power Launching and coupling, Lencing schemes, Fiber -to- Fiber joints, Fiber splicing-Signal to Noise ratio , Detector response time	x			x	x					x				
7	FIBER OPTIC RECEIVER AND MEASUREMENTS: Fundamental receiver operation, Pre amplifiers, Error sources – Receiver Configuration– Probability of Error– Quantum limit	x			x	x					x				
8	Fiber Attenuation measurements- Dispersion measurements – Fiber Refractive index profile measurements – Fiber cut-off Wave length Measurements – Fiber Numerical Aperture Measurements – Fiber diameter measurements	x			x	x					x				

9	OPTICAL NETWORKS AND SYSTEM TRANSMISSION: Basic Networks – SONET /SDH – Broadcast – and –select WDM Networks- Wavelength Routed Networks	x			x	x					x				
10	Nonlinear effects on Network performance –- Link Power budget -Rise time budget Noise Effects on System Performance- Operational Principles of WDM Performance of WDM + EDFA system – Solutions – Optical CDMA – Ultra High Capacity Networks	x			x	x					x				

6. Teaching and Learning Methods of Disable Students:

6.1. Teaching and Learning Methods of Disable Students:	
1	Additional Tutorials
2	Online lectures and assignments

6.2. Teaching and learning method for low capacity and outstanding Student	
For low capacity students	-Assign a portion of the office hours for those students. -Give them specific tasks. -Repeat the explanation of some of the material and tutorials. - Assign a teaching assistance to follow up the performance of these group of students
For outstanding Students	-Hand out project assignments to those students. -Give them some research topics to be searched using the internet and conduct presentation. Encourage them to take parts in the running research projects.

7**. Student Evaluation:**

7.1 Student Evaluation method:

No.	**Evaluation Method**	**LO'S**
1	Periodic exam	C5(1,2),
2	Student load	C5(1),
3	Final term examination	C5(1,2),

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	8^{th}
2	Student load	2^{nd} -7^{th} - 9^{th} -14^{th}
3	Final term examination	15^{th}

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	20%
2	final examination	60%
3	Student load	20%
	Total	**100%**

8. List of References:

No.	Reference List
1	G.Keiser,"Fiber Optics Communications",McGraw-Hill,1999
2	J.C.palais,"Fiber Optics Communications",prentice Hall,2002
3	G.p.Agrawal,"Fiber-Optic CommunicationSystems,"Wiley,2002
4	D.K.Mynbaev and L.L.Scheiner,"Fiber-Optic Communications Technology."Prentice-Hall,2002.

9. Facilities required for teaching and learning:

No.	Facility
1	Lecture classroom
2	
3	White board
4	Data show system
5	Wireless internet
6	Sound system

10. Matrix of knowledge and skills of the course:

No.	Topic	aim	C5			C4		
			1	2	3	1	2	3
1	INTRODUCTION TO OPTICAL FIBERS: Evolution of fiber optic system- Element of an Optical Fiber Transmission link-- Total internal reflection-Acceptance angle –Numerical aperture	1	x			x		X
2	Skew rays Ray Optics-Optical Fiber Modes and Configurations	1		X			x	

	-Mode theory of Circular Wave guides- Overview of Modes-Key Modal concepts Linearly Polarized Modes - Single Mode Fibers-Graded Index fiber structure							
3	SIGNAL DEGRADATION OPTICAL FIBERS: Attenuation - Absorption losses, Scattering losses, Bending Losses, Core and Cladding losses, Signal Distortion in Optical Wave guides-Information Capacity determination -Group Delay-Material Dispersion	1		X			x	
4	Wave guide Dispersion, Signal distortion in SM fibers-Polarization Mode dispersion, Intermodal dispersion, Pulse Broadening in GI fibers-Mode Coupling -Design Optimization of SM fibers-RI profile and cut-off wavelength	1,11			X	x	x	
5	FIBER OPTICAL SOURCES AND COUPLING: Direct and indirect Band gap materials-LED structures -Light source materials -Quantum efficiency and LED power, Modulation of a LED, lasers Diodes-Modes and Threshold condition -Rate equations	1,11		X				X
6	External Quantum efficiency -Resonant frequencies -Laser Diodes, Temperature effects, Introduction to Quantum laser, Fiber amplifiers- Power Launching and coupling, Lencing schemes, Fiber -to-Fiber joints, Fiber splicing-Signal to Noise ratio , Detector response time	1,11		X				x
7	FIBER OPTIC RECEIVER	1,11			X		x	

	AND MEASUREMENTS: Fundamental receiver operation, Pre amplifiers, Error sources – Receiver Configuration– Probability of Error– Quantum limit							
8	Fiber Attenuation measurements- Dispersion measurements – Fiber Refractive index profile measurements – Fiber cut- off Wave length Measurements – Fiber Numerical Aperture Measurements – Fiber diameter measurements							
9	OPTICAL NETWORKS AND SYSTEM TRANSMISSION: Basic Networks – SONET / SDH – Broadcast – and – select WDM Networks – Wavelength Routed Networks							
10	Nonlinear effects on Network performance –-Link Power budget -Rise time budget Noise Effects on System Performance-Operational Principles of WDM Performance of WDM + EDFA system – Solutions – Optical CDMA – Ultra High Capacity Networks							

Course Coordinator: Assoc. Prof. Ossama Oraby
Head of Department: Prof. Mohamed Fouad
Date of Approval: 2023

Electronic Tests 5
(CEE422**)**

1- Basic Information:

Program Title	Communications and Electronics Engineering program

Department Offering the Program	Communications and Electronics Engineering department
Department Responsible for the Course	Communications and Electronics Engineering department
Course Title	Electronic Tests 5
Course Code	CEE422
Year/Level	Level 5
Specialization	Major
Authorization Date of Course Specification	-

Teaching hours	**Lectures**	**Lab.**	**Exercise**	**Contact**	**Student's load**
	2	**3**	**----**	**5**	**4**

2- Course Aims:

No.	**Aims**
7	Proper utilization of modern engineering techniques, skills, and tools
13	. Allocate projects creatively by analyzing data from intended tests.

4- Cometencies (LO'S):

Competency	**Learning Outcomes (LO'S)**
A9	1.Think creatively in solving problems of design. 2. Effectively manage tasks, time, and resources. 3 .Refer to relevant literatures.
B4.	1. Use relevant laboratory equipment and analyze the results correctly of antennas and optical fiber systems and modulation/demodulation technique.
C4.	1: Use appropriate tools to measure antenna performance, evaluate modulation/demodulation technique And of the performance of optical communication system.

4. Course Contents:

No.	**Topics**	**Lectures**	**Tutorial**	**Practical**
1	Laboratory experiments in the fields of: digital communication system	4	-	6
2	properties of closed phase ring	4	-	6
3	optical communication systems	6	-	9
4	television circuits properties	4	-	6
5	antennas, fine waves and micrometry circuits.	6	-	9
6	integrated circuits	4	-	6
Total		**14**	**-**	**42**

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab
1	Laboratory experiments in the fields of: digital communication system65	x			x					x	x				x
2	properties of closed phase ring	x			x					x	x				x
3	optical communication systems	x			x					x	x				x
4	television circuits properties	x			x					x	x				x
5	antennas, fine waves and micrometry circuits.	x			x					x	x				x
6	integrated circuits	x			x					x	x				x

6. Teaching and Learning Methods of Disable Students:

6.1. Teaching and Learning Methods of Disable Students:	
1	Additional Tutorials
2	Online lectures and assignments

6.2. Teaching and learning method for low capacity and outstanding Student	
For low capacity students	-Assign a portion of the office hours for those students. -Give them specific tasks. -Repeat the explanation of some of the material and tutorials. - Assign a teaching assistance to follow up the performance of these group of students
For outstanding Students	-Hand out project assignments to those students. -Give them some research topics to be searched using the internet and conduct presentation. Encourage them to take parts in the running research projects.

7**. Student Evaluation:**

7.1 Student Evaluation method:

No.	Evaluation Method	ILO’s
1	Periodic exam	A9(1,2,3),B4(1)
2	Student load (quizzes-presentation-sheets-reports-project)	B4(1), C4(1)
3	Final term examination	A9(1,2,3),B4(1), C4(1)

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	8th
2	Student load	2nd -7th - 9th - 14th
3	Final term examination	15th

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	10%
2	final examination	60%
3	Practical examination	10%
4	Student load (project)	20%
Total		**100%**

8. List of References:

No.	Reference List
1	C. Balanis, “Antenna theory analysis and design”, 3rd editionJohn Wiley & Sons, Inc, Toronto, Canada, 2020
2	Digital Communications: Fundamentals and Applications, By “Bernard Sklar”, Prentice Hall, 4th ed, 2023.
3	Communication Systems, By Simon Haykin, 5th ed, John Wiley & Sons, Inc, Toronto, Canada, 2020
4	G. P. Agrawal, *Nonlinear Fiber Optics* (Academic Press, Elsevier, 1989); Japanese translation, 6th ed. 2019

9. Facilities required for teaching and learning:

No.	Facility
1	Computer and video data show
2	Lab
3	White board
4	Wireless internet
5	Sound system

10. Matrix of knowledge and skills of the course:

No.	Topic	Aims	A9	B4	C4

			1	2	3	1	1
1	Laboratory experiments in the fields of: digital communication system properties of closed phase ring	7,13	x			x	x
			x		x	x	x
2	optical communication systems television circuits properties	7,13		x	x	x	x
				x	x	x	x
3	antennas, fine waves and micrometry circuits.	13	x		x	x	x
						x	x
4	Laboratory experiments in the fields of: digital communication system properties of closed phase ring	7,13		x	x	x	x
				x	x	x	x
5	optical communication systems television circuits properties	7,13	x		x	x	x
						x	x
6	antennas, fine waves and micrometry circuits.	13		x	x	x	x
				x	x	x	x

Course Coordinator: Dr. AhmedKabeel
Head of Department: Prof. Mohamed Fouad
Date of Approval: 2023

Project 2
(CEE426**)**

1- Basic Information:

Program Title	Communications and Electronics Engineering program
Department Offering the Program	Communications and Electronics Engineering department
Department Responsible for the Course	Communications and Electronics Engineering department
Course Title	Project 2
Course Code	CEE426
Year/Level	Level 5
Specialization	Major
Authorization Date of Course Specification	-

Teaching hours	Lectures	Lab.	Exercise	Contact	Student's load
	2	----	4	6	3

2- Course Aims:

No.	Aims
11	**Computer systems in Electronics and Communication engineering can be used to design a system, component, and process to meet recent technological advances.**
12	**Communicate and work effectively within multiple teams in the field of communication and electronics engineering and consider the effects of engineering solutions on society and the environment.**
13	**Allocate projects creatively by analyzing data from intended tests.**

3- Cometencies (LO'S):

Competency	Learning Outcomes (LO'S)
A5	1 Define technical language and report writing. 2 Assess different ideas, views, and knowledge from a range of sources. 3 Prepare technical reports 4 Search for information to engage in lifelong self-learning discipline.
A7	1 Collaborate effectively within multidisciplinary team. 2 Work in stressful environment and within constraints. 3 Motivate individuals.
A9	1Think creatively in solving problems of design. 2 Effectively manage tasks, time, and resources. 3 Refer to relevant literatures.
C4	1: Analyze the results of numerical models to appreciate their limitations. 2: Use appropriate tools to measure system performance. 3: Evaluate the troubles to repair all types of electronic systems using the standard tools. 4:Search for information to engage in lifelong self-learning discipline.
C5	1: Describe principles of design including elements design, process and/or a system related to electronics and communication systems 2: Integrate electronic systems for certain specific function using the right equipment. 3: Design a process, component or system to carry out specialized engineering designs. 4: Use a wide range of analytical tools, techniques, equipment, and software packages of the discipline and to develop required computer programs. 5: Collaborate effectively within the multidisciplinary team.

4. Course Contents:

No.	Topics
1	Continuation and conclusion of the investigated results on the communication or electronic problems of Project I
2	written reports and team presentations are required.

5. Teaching and learning methods:

	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab
1	Continuation and conclusion of the investigated results on the communication or electronic problems of Project I	x			x	x			x		x				x
2	written reports and team presentations are required.	x			x	x			x		x				x

6. Teaching and Learning Methods of Disable Students:

6.1. Teaching and Learning Methods of Disable Students:	
1	Additional Tutorials
2	Online lectures and assignments
6.2. Teaching and learning method for low capacity and outstanding Student	
For low capacity students	-Assign a portion of the office hours for those students. -Give them specific tasks. -Repeat the explanation of some of the material and tutorials. - Assign a teaching assistance to follow up the performance of these group of students
For outstanding Students	-Hand out project assignments to those students. -Give them some research topics to be searched using the internet and conduct presentation.

	Encourage them to take parts in the running research projects.

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	ILO's
1	Oral examination	A5(1,2,3,4), A7(1,2,3), A9(1,2,3),C4(1,2,3,4), C5(1,2,3,4)
2	Student load (presentation and tasks)	A5(1,2,3,4), A7(1,2,3), A9(1,2,3),C41,2,3,4)
3	Report Evaluation	A5(1,2,3,4), A7(1,2,3), A9(1,2,3),C4(1,2,3,4), C5(1,2,3,4,5)

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Oral Examination	at the end of IE 510
2	Student load	2^{nd} -7^{th} - 9^{th}- 14^{th}
3	Report evaluation	After final exam by 2 weeks

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Oral examination	50%
2	Student load	25%
3	Report Evaluation	25%
	Total	**100%**

8. List of References:

No.	Reference List
1	Different new references according to the type of project

9. Facilities required for teaching and learning:

No.	Facility
1	Lecture classroom
2	
3	White board
4	Data show system
5	Wireless internet
6	Sound system

10. Matrix of knowledge and skills of the course:

No.	Topic	Aims	A5			A7			A9			C4				C5	
			1	2	3	1	2	3	1	2	3	1	2	3	4	1	2
1	Continuation and	11,12,	x	x	x	x	x	x	x	x	x		x	x	x	x	x

No.	Topic	Aims	A5			A7			A9			C4				C5	
			1	2	3	1	2	3	1	2	3	1	2	3	4	1	2
	conclusion of the investigated results on the communication or electronic problems of Project I	13															
2	written reports and team presentations are required.	11,12, 13	x	x	x					X	x		x	x	x	x	x

Head of Department: Prof. Mohamed Fouad
Date of Approval: 2023

Robotics and Automation
(CEE425A)

1- Basic Information:

Program Title	Communications and Electronics Engineering program
Department Offering the Program	Communications and Electronics Engineering department
Department Responsible for the Course	Communications and Electronics Engineering department
Course Title	Robotics engineering department
Course Code	CEE 511
Year/Level	Level 5
Specialization	Major
Authorization Date of Course Specification	-

Teaching hours	**Lectures**	**Lab.**	**Exercise**	**Contact**	**Student's load**
	2	**----**	**2**	**4**	**3**

2- Course Aims:

No.	**Aims**
1	Have knowledge, strong foundation on the theory and mathematics and computational platforms in the field and service of robotics Engineering and related areas
3.	Behave professionally and Practice and inspire high ethical values and technical standards
8	Engross in life-long learning to keep themselves abreast of new developments

4. Cometencies (LO'S):

Competency	**Learning Outcomes (LO'S)**

B2	1. Create systematic and methodic approaches in dealing with new and advancing technology. 2. Demonstrate efficient IT capabilities.
B4	1. Use relevant laboratory equipment and analyze the results correctly 2. Troubleshoot, maintain and repair almost all types of electronic systems using the standard tools. 3. Use appropriate tools to measure system performance. 4.Use computational facilities, measuring instruments, workshops and laboratories equipment to design experiments and collect, analyze and interpret results.
C1	1: Recognize engineering problems to identify the best solutions 2: Think creatively and innovatively in problem solving and design 3: Present technical reports. 4: Search for information to engage in lifelong self-learning discipline.
C2	1.Define concepts and theories of mathematics and sciences, which is appropriate to the discipline.
C3	1: Describe quality assurance systems, codes of practice and standards, health and safety requirements and environmental issues.
C5	1: Integrate electronic systems for certain specific function using the right equipment. 3: Collaborate effectively within the multidisciplinary team.

3. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	BASIC CONCEPTS Brief history-Types of Robot–Technology-Robot classifications and specifications-Design and control issues- Various manipulators – Sensors - work cell - Programming languages.	6	6	-
2	DIRECT AND INVERSE KINEMATICS Mathematical representation of Robots - Position and orientation – Homogeneous transformation- Various joints- Representation using the Denavit Hattenberg parameters -Degrees of freedom-Direct- kinematics- Inverse kinematics- SCARA robots- Solvability – Solution Methods-Closed form solution.	6	6	-
3	MANIPULATOR DIFFERENTIAL MOTION AND STATICS Linear and angular velocities-Manipulator Jacobian- Prismatic and rotary joints–Inverse -Wrist and arm singularity - Static analysis - Force and moment Balance.	4	4	-

4	PATH PLANNING Definition-Joint space technique-Use of p-degree polynomial-Cubic polynomial-Cartesian space technique - Parametric descriptions - Straight line and circular paths - Position and orientation planning.	6	6	-
5	DYNAMICS AND CONTROL 2DOF Manipulator-Lagrange Euler formulation-Dynamic model – Manipulator- control problem-Linear control schemes-PID control scheme-Force control of robotic manipulator.	6	6	-
Total		**28**	**28**	**-**

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab
1	**BASIC CONCEPTS Brief history-Types of Robot– Technology-Robot classifications and specifications-Design and control issues-Various manipulators – Sensors - work cell - Programming languages.**	x			x	x					x	x			

2	**DIRECT AND INVERSE KINEMATICS Mathematical representation of Robots - Position and orientation – Homogeneous transformation- Various joints- Representation using the Denavit Hattenberg parameters - Degrees of freedom-Direct-kinematics- Inverse kinematics- SCARA robots- Solvability – Solution Methods-Closed form solution.**	x			x	x					x	x			

3	**MANIPULATOR DIFFERENTIAL MOTION AND STATICS Linear and angular velocities Manipulato Jacobian- Prismatic and rotary joints– Inverse -Wrist and arm singularity – Static analysis - Force and moment Balance.**	x			x	x					x	x			
4	**PATH PLANNING Definition-Joint space technique- Use of p-degree polynomial- Cubic polynomial- Cartesian space technique - Parametric descriptions - Straight line and circular paths - Position and orientation planning.**	x			x	x					x	x			

5	**DYNAMICS AND CONTROL 2DOF Manipulator-Lagrange Euler formulation-Dynamic model – Manipulator-control problem-Linear control schemes-PID control scheme-Force control of robotic manipulator.**	x			x	x					x	x			

6. Teaching and Learning Methods of Disable Students:

6.1. Teaching and Learning Methods of Disable Students:	
1	Additional Tutorials
2	Online lectures and assignments

6.2. Teaching and learning method for low capacity and outstanding Student	
For low capacity students	-Assign a portion of the office hours for those students. -Give them specific tasks. -Repeat the explanation of some of the material and tutorials. - Assign a teaching assistance to follow up the performance of these group of students
For outstanding Students	-Hand out project assignments to those students. -Give them some research topics to be searched using the internet and conduct presentation. Encourage them to take parts in the running research projects.

7**. Student Evaluation:**

7.1 Student Evaluation method:

No.	**Evaluation Method**	**LO's**
1	Periodic exam	B2(1,2),B4(1,2,3,4)
2	Student load	B2(1,2), C3 (1),C5(1,2)
3	Final term examination	B2(1,2), B4(1,2,3,4)C1(1,2,3,4),C2(b1),C3 (1),C5(1,2)

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	8th
2	Student load	2nd -7th - 9th – 14th
3	Final term examination	15th

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	20%
2	final examination	60%
3	Student load	20%
	Total	**100%**

8. List of References:

No.	Reference List
1	Edwin J. C. Sobey, “Learn It, Try It!”, Raintree, 2020
2	Chi N. Thai, “Exploring Robotics with ROBOTIS Systems”, Springer, 2017
3	Harry H. Poole, Fundamentals of Robotics Engineering, Springer Science & Business Media, 2019
4	J.O.Gray, DarwinG.Galdwell”Advanced Robotics & Intelligent machines” Institution of Electrical Engineers, 2020.

9. Facilities required for teaching and learning:

No.	Facility
1	Lecture classroom
2	
3	White board
4	Data show system
5	Wireless internet

10. Matrix of knowledge and skills of the course:

No.	Topic	Aims	B4				B2		C1				C2	C3	C5	
			1	2	3	4	1	2	1	2	3	4	1	1	1	2
1	BASIC CONCEPTS Brief history-Types of Robot–Technology-Robot classifications and specifications-Design and control issues- Various manipulators –Sensors - work cell -Programming languages.	3	x		x		x						x		x	x
2	DIRECT AND INVERSE	3,8						x					x			x

	KINEMATICS Mathematical representation of Robots - Position and orientation – Homogeneous transformation- Various joints- Representation using the Denavit Hattenberg parameters -Degrees of freedom- Direct- kinematics- Inverse kinematics- SCARA robots- Solvability – Solution Methods-Closed form solution.															
3	MANIPULATOR DIFFERENTIAL MOTION AND STATICS Linear and angular velocities- Manipulator Jacobian- Prismatic and rotary joints–Inverse -Wrist and arm singularity - Static analysis - Force and moment Balance.	8,11		x			x		x	x	x	x	x		x	
4	PATH PLANNING Definition-Joint space technique-Use of p-degree polynomial- Cubic polynomial- Cartesian space technique - Parametric descriptions - Straight line and circular paths - Position and orientation planning.	11						x		x			x			x
5	DYNAMICS AND CONTROL	8	x			x	x		x	x			x		x	

	2DOF Manipulator- Lagrange Euler formulation-Dynamic model – Manipulator- control problem- Linear control schemes-PID control scheme-Force control of robotic manipulator.															

Course Coordinator: Dr.Amira El-Sonbaty
Head of Department: Prof. Mohamed Fouad
Date of Approval: 2023

Computer Engineering
(CEE424C)

1- Basic Information:

Program Title	Communications and Electronics Engineering program
Department Offering the Program	Communications and Electronics Engineering department
Department Responsible for the Course	Communications and Electronics Engineering department
Course Title	Computer Engineering
Course Code	CEE424C
Year/Level	Level 4
Specialization	Major
Authorization Date of Course Specification	-

Teaching hours	Lectures	Lab.	Exercise	Contact	Student's load
	2	-	2	4	3

1- Course Aims:

No.	Aims
11	Design a system; component and process for dealing with the computer's hard ware, software, operating systems and inter facing to meet the required needs in all communication and electronics engineering issues.

3. Cometencies (LO'S):

Competency	Learning Outcomes (LO'S)
B3	1. Define basics of information and communication technology (ICT). b1. Select and appraise appropriate ICT tools to a variety of engineering problems. 2. Demonstrates basic organizational and project management skills. 3. Lead and motivate individuals. 4. Acquire entrepreneurial skills
C5	1: Listing characteristics of engineering materials related to the discipline. 2: Evaluate the characteristics and performance of components, systems and processes. 3: Choose appropriate specifications for required devices.

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	The basics of the computer organization	4	4	-
2	computer instructions	6	6	-

3	processing unit- Control unit	6	6	-
4	control by micro programs– memory organization	4	4	-
5	operating systems – time management	2	2	-
6	politics – space management – the levels of storage – address translation – the pages	2	2	
7	the files – structures of the files – user interface – the orders translator	2	2	
8	the helpful and reactive programs – the synchronization – basics of networks.	2	2	
Total		**28**	**28**	**-**

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab
1	The basics of the computer organization	x			x	x					x				
2	computer instructions	x			x	x					x				
3	processing unit- Control unit	x			x	x					x				
4	control by micro programs– memory organization	x			x	x					x				
5	operating systems – time management	x			x	x					x				

6	politics – space management – the levels of storage – address translation – the pages	x			x	x					x				
7	the files – structures of the files – user interface – the orders translator	x			x	x					x				
8	the helpful and reactive programs – the synchronization – basics of networks.	x			x	x					x				

6. Teaching and Learning Methods of Disable Students:

6.1. Teaching and Learning Methods of Disable Students:	
1	Additional Tutorials
2	Online lectures and assignments

6.2. Teaching and learning method for low capacity and outstanding Student	
For low capacity students	-Assign a portion of the office hours for those students. -Give them specific tasks. -Repeat the explanation of some of the material and tutorials. - Assign a teaching assistance to follow up the performance of these group of students
For outstanding Students	-Hand out project assignments to those students. -Give them some research topics to be searched using the internet and conduct presentation. Encourage them to take parts in the running research projects.

7**. Student Evaluation:**

7.1 Student Evaluation method:

No.	**Evaluation Method**	**LO's**
1	Periodic exam	B3(1,2,3,4,5) C5(.1,2,3)
2	Student load (quizzes-sheets- reports)	B3(1,2,3,4,5)

		C5(.1,2,3)
3	Final term examination	B3(1,2,3,4,5) C5(.1,2,3),

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	8th
2	Student load	2nd -7th - 9th -14th
3	Final term examination	15th

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	20%
2	final examination	60%
3	Student load	20%
	Total	**100%**

8. List of References:

No.	Reference List
1	**Mohammed Ridha, Abdullah ridha, Nanh Ridha** ,"Computer Engineering on Overview : Elective, 2023
2	Vojin G. Oklobdzija ,"The Computer Engineering Handbook, CRC Press,2019.

9. Facilities required for teaching and learning:

No.	Facility
1	Lecture classroom
2	
3	White board
4	Data show system
5	Wireless internet
6	Sound system

10. Matrix of knowledge and skills of the course:

No.	Topic	Aims	B3					C5		
			1	2	3	4	5	1	2	3
1	The basics of the computer organization	2								X
2	computer instructions	2			X					X
3	processing unit- Control unit	2	X						X	
4	control by micro programs– memory organization	2	X		X			X		
5	operating systems – time management	2	X							X
6	politics – space management – the levels of storage –	2		X			X			

	address translation – the pages									
7	the files – structures of the files – user interface – the orders translator	2	X		X			X	X	
8	the helpful and reactive programs – the synchronization – basics of networks.	2		X		X				X

Course Coordinator: Dr.Amira El-Sonbaty
Head of Department: Prof. Mohamed Fouad
Date of Approval: 2023

Radar systems
(CEE 424A**)**

2- Basic Information:

Program Title	Communications and Electronics Engineering program
Department Offering the Program	Communications and Electronics Engineering department
Department Responsible for the Course	Communications and Electronics Engineering department
Course Title	Radar systems
Course Code	CEE 424A
Year/Level	Level 4
Specialization	Major
Authorization Date of Course Specification	-

Teaching hours	**Lectures**	**Lab.**	**Exercise**	**Contact**	**Student's load**
	2	**-**	**2**	**4**	**4**

3- Course Aims:

No.	**Aims**
1	Master a wide range of engineering knowledge and specialized skills, as well as the ability to apply that information in real-world situations using theories and analytical thinking.
2	Apply analytic critical and systemic thinking to discover, analyze, and solve a wide range of engineering problems;

4. Cometencies (LO'S):

Competency	**Learning Outcomes (LO'S)**
B3	1. Define basics of information and communication technology (ICT).

	2. Select and appraise appropriate ICT tools to a variety of engineering problems. 3. Demonstrates basic organizational and project management skills. 4. Lead and motivate individuals. 5. Acquire entrepreneurial skills
C5	1: Listing characteristics of engineering materials related to the discipline. 2: Evaluate the characteristics and performance of components, systems and processes. 3: Choose appropriate specifications for required devices.

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	INTRODUCTION TO RADAR EQUATION: Introduction- Basic Radar –The simple form of the Radar Equation- Radar Block Diagram- Radar Frequencies –Applications of Radar – The Origins of Radar	2	2	-
2	Detection of Signals in Noise- Receiver Noise and the Signal-to-Noise Ratio-Probability Density Functions-Probabilities of Detection and False Alarm	4	4	-
3	Integration of Radar Pulses- Radar Cross Section of Targets- Radar cross Section Fluctuations-Transmitter Power-Pulse Repetition Frequency-Antenna Parameters- System losses –Other Radar Equation Considerations.	4	4	
4	MTI AND PULSE DOPPLER RADAR: Introduction to Doppler and MTI Radar- Delay –Line Cancellers- Staggered Pulse Repetition Frequencies – Doppler Filter Banks - Digital MTI Processing	4	4	-
5	Moving Target Detector - Limitations to MTI Performance - MTI from a Moving Platform (AMIT) – Pulse Doppler Radar – Other Doppler Radar Topics	6	6	-
6	Tracking with Radar –Monopulse Tracking –Conical Scan and Sequential Lobing - Limitations to Tracking Accuracy - Low-Angle Tracking - Tracking in Range - Other Tracking Radar Topics -Comparison of Trackers - Automatic Tracking with Surveillance Radars (ADT).	6	6	-
7	Applications in the military and civil fields and the DETECTION OF SIGNALS IN NOISE: Matched – Filter Receiver –Detection Criteria – Detectors –-Automatic Detector - Integrators -Constant-False-Alarm Rate Receivers	4	4	-

8	The Radar operator - Signal Management - Propagation Radar Waves - Atmospheric Refraction - Standard propagation - Nonstandard Propagation - The Radar Antenna - Reflector Antennas - Electronically Steered Phased Array Antennas – Phase Shifters - Frequency-Scan Arrays Radar Transmitters and Receivers - Introduction			
9	Linear Beam Power Tubes - Solid State RF Power Sources - Magnetron - Crossed Field Amplifiers - Other RF Power Sources – Other aspects of Radar Transmitter.- The Radar Receiver - Receiver noise Figure – Super heterodyne Receiver -Duplexers and Receiver Protectors- Radar Displays.			
10	RADIO DIRECTION AND RANGES: Introduction - Four methods of Navigation .- The Loop Antenna - Loop Input Circuits - An Aural Null Direction Finder - The Goniometer - Errors in Direction Finding			
11	Adcock Direction Finders - Direction Finding at Very High Frequencies - Automatic Direction Finders – The Commutated Aerial Direction Finder - Range and Accuracy of Direction Finders			
12	The LF/MF Four course Radio Range - VHF Omni Directional Range(VOR) - VOR Receiving Equipment - Range and Accuracy of VOR – Recent Developments. Hyperbolic Systems of Navigation (Loran and Decca) - Loran-A - Loran-A Equipment - Range and precision of Standard Loran - Loran-C - The Decca Navigation System -Decca Receivers - Range and Accuracy of Decca - The Omega System			
Total		**28**	**28**	

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab

1	INTRODUCTION TO RADAR EQUATION: Introduction- Basic Radar – The simple form of the Radar Equation- Radar Block Diagram- Radar Frequencies –Applications of Radar – The Origins of Radar	×			×						×				
2	Detection of Signals in Noise- Receiver Noise and the Signal-to-Noise Ratio- Probability Density Functions- Probabilities of Detection and False Alarm	×			×						×				
3	Integration of Radar Pulses- Radar Cross Section of Targets- Radar cross Section Fluctuations- Transmitter Power-Pulse Repetition Frequency- Antenna Parameters- System losses –Other Radar Equation Considerations.	×			×						×				
4	MTI AND PULSE DOPPLER RADAR: Introduction to Doppler and MTI Radar- Delay – Line Cancellers- Staggered Pulse Repetition Frequencies – Doppler Filter Banks – Digital MTI Processing	×			×						×				

5	Moving Target Detector - Limitations to MTI Performance - MTI from a Moving Platform (AMIT) – Pulse Doppler Radar – Other Doppler Radar Topics	×			×						×				
6	Tracking with Radar – Monopulse Tracking – Conical Scan and Sequential Lobing - Limitations to Tracking Accuracy - Low-Angle Tracking - Tracking in Range - Other Tracking Radar Topics –Comparison of Trackers - Automatic Tracking with Surveillance Radars (ADT).	×			×						×				
7	Applications in the military and civil fields and the DETECTION OF SIGNALS IN NOISE: Matched –Filter Receiver – Detection Criteria – Detectors –- Automatic Detector - Integrators -Constant-False- Alarm Rate Receivers	×			×						×				

8	The Radar operator - Signal Management - Propagation Radar Waves - Atmospheric Refraction - Standard propagation - Nonstandard Propagation - The Radar Antenna - Reflector Antennas - Electronically Steered Phased Array Antennas – Phase Shifters - Frequency-Scan Arrays Radar Transmitters and Receivers - Introduction	x			x						x				
9	Linear Beam Power Tubes - Solid State RF Power Sources - Magnetron - Crossed Field Amplifiers – Other RF Power Sources – Other aspects of Radar Transmitter.- The Radar Receiver - Receiver noise Figure – Super heterodyne Receiver -Duplexers and Receiver Protectors- Radar Displays.	x			x						x				
10	RADIO DIRECTION AND RANGES: Introduction - Four methods of Navigation .- The Loop Antenna -Loop Input Circuits - An Aural Null Direction Finder –The Goniometer - Errors in Direction Finding	x			x						x				

11	Adcock Direction Finders - Direction Finding at Very High Frequencies - Automatic Direction Finders –The Commutated Aerial Direction Finder - Range and Accuracy of Direction Finders	×			×						×				
12	The LF/MF Four course Radio Range - VHF Omni Directional Range(VOR) - VOR Receiving Equipment - Range and Accuracy of VOR – Recent Developments. Hyperbolic Systems of Navigation (Loran and Decca) - Loran-A - Loran-A Equipment - Range and precision of Standard Loran - Loran-C - The Decca Navigation System - Decca Receivers - Range and Accuracy of Decca - The Omega System	×			×						×				

6. Teaching and Learning Methods of Disable Students:

6.1. Teaching and Learning Methods of Disable Students:	
1	Additional Tutorials
2	Online lectures and assignments

6.2. Teaching and learning method for low capacity and outstanding Student	
For low capacity students	-Assign a portion of the office hours for those students. -Give them specific tasks. -Repeat the explanation of some of the material and tutorials. - Assign a teaching assistance to follow up the performance of these group of students
For outstanding Students	-Hand out project assignments to those students. -Give them some research topics to be searched using the internet and conduct presentation. Encourage them to take parts in the running research projects.

7. **Student Evaluation:**

7.1 Student Evaluation methods:

No.	Evaluation Method	LO's
1	Periodic exam	B3(1,2,3,4,5) C5(.1,2,3)
2	Student load	B3(1,2,3,4,5) C5(.1,2,3)
3	Final term examination	B3(1,2,3,4,5) C5(.1,2,3)

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	8^{th}
2	Student load	2^{nd} -7^{th} - 9^{th} -14^{th}
3	Final term examination	15^{th}

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	20%
2	final examination	60%
3	Student load	20%
	Total	**100%**

8. List of References:

No.	Reference List
1	M.Sholnik,"Introduction to RADAR system, "3^{rd} McGraw-Hill, 2023.
2	W.L.StutzmanandG. A. Thiele,"Antenna Theory andDesign," John Wiley&Sons, 2019

9. Facilities required for teaching and learning:

No.	Facility
1	Lecture classroom
2	
3	White board
4	Data show system
5	Wireless internet

10. Matrix of knowledge and skills of the course:

No.	Topic	Aims	B3					C5		
			1	2	3	4	5	1	2	3
1	INTRODUCTION TO RADAR EQUATION: Introduction- Basic Radar –The simple form of the Radar Equation- Radar Block Diagram- Radar	2								X

	Frequencies –Applications of Radar – The Origins of Radar									
2	Detection of Signals in Noise- Receiver Noise and the Signal-to-Noise Ratio-Probability Density Functions- Probabilities of Detection and False Alarm	1			X					X
3	Integration of Radar Pulses- Radar Cross Section of Targets- Radar cross Section Fluctuations- Transmitter Power-Pulse Repetition Frequency- Antenna Parameters- System losses –Other Radar Equation Considerations.	1,2	X						X	
4	MTI AND PULSE DOPPLER RADAR: Introduction to Doppler and MTI Radar- Delay – Line Cancellers- Staggered Pulse Repetition Frequencies – Doppler Filter Banks - Digital MTI Processing	1	X		X			X		
5	Moving Target Detector - Limitations to MTI Performance - MTI from a Moving Platform (AMIT) – Pulse Doppler Radar – Other Doppler Radar Topics	1,2	X							X
6	Tracking with Radar – Monopulse Tracking – Conical Scan and Sequential Lobing - Limitations to Tracking Accuracy - Low-Angle Tracking - Tracking in	1	X		X			X	X	

	Range - Other Tracking Radar Topics - Comparison of Trackers - Automatic Tracking with Surveillance Radars (ADT).									
7	Applications in the military and civil fields and the DETECTION OF SIGNALS IN NOISE: Matched –Filter Receiver –Detection Criteria – Detectors —-Automatic Detector - Integrators - Constant-False-Alarm Rate Receivers		X	X						X
8	The Radar operator - Signal Management - Propagation Radar Waves - Atmospheric Refraction -Standard propagation - Nonstandard Propagation - The Radar Antenna - Reflector Antennas - Electronically Steered Phased Array Antennas – Phase Shifters - Frequency-Scan Arrays Radar Transmitters and Receivers - Introduction						X	X		
9	Linear Beam Power Tubes - Solid State RF Power Sources - Magnetron - Crossed Field Amplifiers - Other RF Power Sources – Other aspects of Radar Transmitter.- The Radar Receiver - Receiver noise Figure – Super heterodyne Receiver - Duplexers and Receiver Protectors- Radar	X	X		X	X	X		X	X

	Displays.									
10	RADIO DIRECTION AND RANGES: Introduction - Four methods of Navigation .- The Loop Antenna - Loop Input Circuits - An Aural Null Direction Finder - The Goniometer - Errors in Direction Finding	X	X			X		X	X	
11	Adcock Direction Finders - Direction Finding at Very High Frequencies - Automatic Direction Finders – The Commutated Aerial Direction Finder - Range and Accuracy of Direction Finders	X	X		X	X				
12	The LF/MF Four course Radio Range - VHF Omni Directional Range(VOR) - VOR Receiving Equipment - Range and Accuracy of VOR – Recent Developments. Hyperbolic Systems of Navigation (Loran and Decca) - Loran-A - Loran-A Equipment - Range and precision of Standard Loran - Loran-C - The Decca Navigation System - Decca Receivers - Range and Accuracy of Decca - The Omega System	X		X		X	X		X	X

Course Coordinator: Dr. Ahmed Kabeel
Head of Department: Prof. Mohamed Fouad
Date of Approval: 2023

Neural networks
(CEE424D**)**

1- Basic Information:

Program Title	Communications and Electronics Engineering program
Department Offering the Program	Communications and Electronics Engineering department
Department Responsible for the Course	Communications and Electronics Engineering department
Course Title	Neural networks
Course Code	CEE424D
Year/Level	level 4
Specialization	Major
Authorization Date of Course Specification	

Teaching hours	**Lectures**	**Lab.**	**Exercise**	**Contact**	**Student's load**
	2	**----**	**2**	**4**	**3**

2- Course Aims:

No.	Aims
1	Master a broad range of engineering physics knowledge and specialized skills, as well as the ability to apply acquired knowledge in real-world situations by applying theories in analytic critical and systemic thinking to identify, diagnose, and solve engineering problems of varying complexity and variation.
2	Apply analytic critical and systemic thinking to identify, diagnose and solve engineering problems with a wide range of complexity and variation;
3.	Behave professionally and adhere to engineering ethics and standards;

3- Learning Outcomes (LO'S):

No.	Knowledge and understanding
C1	1: Recognize engineering problems to identify the best solutions 2: Think creatively and innovatively in problem solving and design 3: Present technical reports. 4: Search for information to engage in lifelong self-learning discipline.
C2	1.Define concepts and theories of mathematics and sciences, which is appropriate to the discipline.
C3	1: Describe quality assurance systems, codes of practice and standards, health and safety requirements and environmental issues.

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	Introduction of (Natural Neural structure- Artificial natural Neural - parallel processing)	2	2	-
2	Artificial natural Neural Networks main components.	2	2	-

3	Neural Networks classification with examples& Neural Networks design	2	2	
4-5	Neuron models and basic learning rules. Learning of a single neuron and single layer neural networks	4	4	
6-7	Learning Algorithms-artificial Neural Networks, Multilayer neural networks and back-propagation, Multilayer neural network applications	4	4	-
8-9 10	Associative memory. Supervised Neural Networks learning –self organizing learning	6	6	-
11	Preprocessing data-network structure	2	2	-
12	Hopfield model-Boltzmann model	4	4	-
13-14	Neural Networks and expert systems and Neural decision tree - Presentation of projects	4	4	-
Total		**28**	**28**	

5. Teaching and learning methods:

No.	Teaching Methods
1	Hybrid learning(Lectures +E_learning)
2	Discussion sessions
3	Information collection from different sources
4	Research assignment
5	Cooperative _learning

6. Teaching and Learning Methods of Disable Students:

6.1. Teaching and Learning Methods of Disable Students:	
1	Additional Tutorials
2	Online lectures and assignments

6.2. Teaching and learning method for low capacity and outstanding Student	
For low capacity students	-Assign a portion of the office hours for those students. -Give them specific tasks. -Repeat the explanation of some of the material and tutorials. - Assign a teaching assistance to follow up the performance of these group of students
For outstanding Students	-Hand out project assignments to those students. -Give them some research topics to be searched using the internet and conduct presentation. Encourage them to take parts in the running research projects.

7. Student Evaluation :

7.1 Student Evaluation method:

No.	Evaluation Method	LO's
1	Midterm examination	C2.1, C1.1
2	Semester work	C3.1

3	Final term examination	C2.1, C1.1,C1.2,C1.3,C1.4

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Midterm examination	8^{th}
2	Semester work	2^{nd} -7^{th} - 9^{th} – 14^{th}
3	Final term examination	15^{th}

7.3 weighting of Evaluation :

No.	Evaluation Method	Weights
1	Mid-term examination	20%
2	final examination	60%
3	Semester work	20%
	Total	**100%**

8. List of References:

No.	Reference List
1	Daniel Graupe , “Principles of Artificial Neural Networks: Basic Designs to Deep Learning (4th Edition,” World Scientific,2019.
2	L. C. Jain, “Recent Advances in Artificial Neural Networks”, CRC Press, 2020
3	Russell &Norvig, "Artificial Intelligence: A Modern Approach", 2nd Edition, Prentice Hall, 2003.
4	B. D. Ripley, Pattern Recognition and Neural Networks, Cambridge University Press., 1996.

9. Facilities required for teaching and learning:

No.	Facility
1	Lecture classroom
2	
3	White board
4	Data show system
5	Wireless internet

10. Matrix of knowledge and skills of the course:

No.	Topic	Aims	C1				C2	C3
			1	2	3	4	1	1
1	Introduction to natural Neural structure- Introduction to Artificial natural Neural Networks and parallel processing	2					X	
2	Artificial natural Neural Networks main components	1		X			X	
3	Neural Networks classification	1,2	X			X		X
4	Supervised Neural Networks learning – self organizing learning	1	X	X	X			
5	Neural Networks design	1,2	X				X	X
6	Preprocessing data-network structure	1	X	X	X	X		

7	Learning Algorithms-artificial Neural Networks multilayer models	1	X	X	X	X		
8	Hopfield model-Boltzmann model	2			X	X		X
9	Neural Networks and expert systems	1,2	X	X	X	X	X	X
10	Multilayer neural network applications	1,2	X	X			X	

Course Coordinator: Dr. ahmed kabeel
Head of Department: prof.mohamed foaud
Date of Approval: 2023

Printed Circuit Design and Fabrication
(CEE325A**)**

1- Basic Information:

Program Title	Communications and Electronics Engineering program
Department Offering the Program	Communications and Electronics Engineering department
Department Responsible for the Course	Communications and Electronics Engineering department
Course Title	Printed circuits design and fabrication
Course Code	CEE325A
Year/Level	Level 3
Specialization	Major
Authorization Date of Course Specification	-

Teaching hours	**Lectures**	**Lab.**	**Exercise**	**Contact**	**Student's load**
	2	**-**	**2**	**4**	**3**

1- Course Aims:

No.	Aims
11	Computer systems in Electronics and Communication engineering can be used to design a system, component, and process to meet recent technological advances.
12	Communicate and work effectively within multiple teams in the field of communication and electronics engineering and consider the effects of engineering solutions on society and the environment.

3- Cometencies (LO'S)

Competency	Learning Outcomes (LO'S)
B3	1. Select and appraise appropriate ICT tools to a variety of engineering problems. 2. Acquire entrepreneurial skills
C5	1: Listing characteristics of engineering materials related to the discipline. 2: Evaluate the characteristics and performance of components, systems and processes. 3: Choose appropriate specifications for required devices.

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	Printed Circuit Board (PCB) scales (size and types)-	4	4	-
2	Surface treatments	2	2	-
3	Capacitors and coils for PCB connection	2	2	-

4	Spaces connection	2	2	-
5	Actual resources and earth’s connectors- Components for positioning	2	2	-
6	Cooling requirements and Group density- Tests for surface	2	2	-
7	Design rules for different PCB and their applications: Digital, Analog, High frequency, and auto-technical	2	2	-
8	Programs for PCB design	4	4	-
9	Electronic board's fabrication	2	2	-
10	Auto-mechanical operations in PCB technology	2	2	-
11	Multi-layered boards	2	2	-
12	Technical methods for welding and assembly components	2	2	-
Total		**28**	**28**	**-**

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab
1	Printed Circuit Board (PCB) scales (size and types)	×			×	×					×				
2	Surface treatments	×			×	×					×				
3	Capacitors and coils for PCB connection	×			×	×					×				
4	Spaces connection	×			×	×					×				
5	Actual resources and earth“s connectors- Components for positioning	×			×	×					×				
6	Cooling requirements and Group density- Tests for surfac	×			×	×					×				

7	Design rules for different PCB and their applications: Digital, Analog, High frequency, and auto-technical	×			×	×					×				
8	Programs for PCB design	×			×	×					×				
9	Electronic board's fabrication	×			×	×					×				
10	Auto-mechanical operations in PCB technology	×			×	×					×				
11	Multi-layered boards	×			×	×					×				
12	Technical methods for welding and assembly Components	×			×	×					×				

6. Teaching and Learning Methods of Disable Students:

6.1. Teaching and Learning Methods of Disable Students:	
1	Additional Tutorials
2	Online lectures and assignments

6.2. Teaching and learning method for low capacity and outstanding Student	
For low capacity students	-Assign a portion of the office hours for those students. -Give them specific tasks. -Repeat the explanation of some of the material and tutorials. - Assign a teaching assistance to follow up the performance of these group of students
For outstanding Students	-Hand out project assignments to those students. -Give them some research topics to be searched using the internet and conduct presentation. Encourage them to take parts in the running research projects.

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	LO's
1	Periodic exam	C5(1-2)
2	Student load (quizzes-sheets-reports)	C5(2)
3	Final term examination	B3(1,2)C5(1-2-3)

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	8^{th}
2	Student load	2^{nd} -7^{th} - 9^{th} -14^{th}

3	Final term examination	15th

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	20%
2	**final examination**	60%
3	Student load	20%
	Total	**100%**

8. List of References:

No.	Reference List
1	S. Sedra and K. C. Smith, *Microelectronic Circuits*, eight th Edition, Oxford University Press, 2020
2	Printed Circuits Board Handbook, By "Clyde F. Coombs", Mc, Graw Hill, seventh ed, 2019.

9. Facilities required for teaching and learning:

No.	Facility
1	Lecture classroom
2	
3	White board
4	Data show system
5	Wireless internet
6	Sound system

10. Matrix of knowledge and skills of the course:

No.	Topic	Aims	B3		C3		C5		
			1	2	1	2	1	2	3
1	Printed Circuit Board (PCB) scales (size and types)-	11	x	x	x				
2	Surface treatments	11,12	x						
3	Capacitors and coils for PCB connection	11	x						
4	Spaces connection	11	x						
5	Actual resources and earth's connectors- Components for positioning	11	x		x				
6	Cooling requirements and Group density- Tests for surface	11	x						
7	Design rules for different PCB and their applications: Digital, Analog, High frequency, and auto-technical	11		x	x		x		X
8	Programs for PCB design	11		x		x	x	x	X
9	Electronic board's fabrication	11,12		x		x	x	x	X

10	Auto-mechanical operations in PCB technology	11		x		x			
11	Multi-layered boards	11,12		x		x			
12	Technical methods for welding and assembly components	11,12	x						

Course Coordinator: Dr.amira elsonbaty
Head of Department: Prof. Mohamed Fouad
Date of Approval: 2023

Industrial Electronics
(CEE425C**)**

1. Basic Information:

Program Title	Communications and Electronics Engineering program
Department Offering the Program	Communications and Electronics Engineering Department
Department Responsible for the Course	Communications and Electronics Engineering Department
Course Title	Electronic Circuits 1
Course Code	CEE425C
Year/Level	Level 4
Specialization	Major
Authorization Date of Course Specification	-

Teaching hours	**Lectures**	**Lab.**	**Exercise**	**Contact**	**Student's load**
	2	**-**	**2**	**4**	**3**

2. Course Aims:

No.	**Aims**
1	Master a broad range of engineering physics knowledge and specialized skills, as well as the ability to apply acquired knowledge in real-world situations by applying theories in analytic critical and systemic thinking to identify, diagnose, and solve engineering problems of varying complexity and variation.
3	Establish a strong behavior and maintain engineering ethics and standards;
8	Acknowledge and accept personal responsibility for your education, personal development, as well as your ability to achieve post-graduation and research studies;

2 Cometencies (LO'S):

Competency	**Learning Outcomes (LO'S)**
B2	1. Create systematic and methodic approaches in dealing with new and advancing technology. 2. Demonstrate efficient IT capabilities.
B4	1. Use relevant laboratory equipment and analyze the results correctly 2. Troubleshoot, maintain and repair almost all types of electronic systems using the standard tools.

	3. Use appropriate tools to measure system performance. 4. Use computational facilities, measuring instruments, workshops and laboratories equipment to design experiments and collect, analyze and interpret results.
C1	1: Recognize engineering problems to identify the best solutions 2: Think creatively and innovatively in problem solving and design 3: Present technical reports. 4: Search for information to engage in lifelong self-learning discipline.
C2	1.Define concepts and theories of mathematics and sciences, which is appropriate to the discipline.
C3	1: Describe quality assurance systems, codes of practice and standards, health and safety requirements and environmental issues.

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	The usage of electronics in measurement equipment: Length and temperature – self waves and its usage in intelligence systems	2	2	-
2	circuit bracers and its usage in industry and traffic control	2	2	-
3	noise measurement system	4	4	-
4	different heating system using high frequency for conductive materials	4	4	-
5	different heating system using high frequency for conductive materials – sensitivity systems	4	4	-
6	sensitivity systems	2	4	-
7	loading systems	4	4	-
8	temperature recording and magnetic amplifiers	2	2	-
9	exhaust system analysis – control system for power system	4	4	-
Total		**28**	**28**	**-**

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab
1	The usage of electronics in measurement equipment: Length and temperature – self waves and its usage in intelligence systems	×			×	×					×				
2	circuit bracers and its usage in industry and traffic control	×			×	×					×				
3	noise measurement system	×			×	×					×				
4	different heating system using high frequency for conductive materials	×			×	×					×				
5	different heating system using high frequency for conductive materials – sensitivity systems	×			×	×					×				
6	sensitivity systems	×			×	×					×				
7	loading systems	×			×	×					×				
8	temperature recording and magnetic amplifiers	×			×	×					×				
9	exhaust system analysis – control system for power system	×			×	×					×				

6. Teaching and Learning Methods of Disable Students:

6.1. Teaching and Learning Methods of Disable Students:	
1	Additional Tutorials
2	Online lectures and assignments

6.2. Teaching and learning method for low capacity and outstanding Student	
For low capacity students	-Assign a portion of the office hours for those students. -Give them specific tasks. -Repeat the explanation of some of the material and tutorials. - Assign a teaching assistance to follow up the performance of these group of students
For outstanding Students	-Hand out project assignments to those students. -Give them some research topics to be searched using the internet and conduct presentation. Encourage them to take parts in the running research projects.

7. Student Evaluation:

7.1 Student Evaluation methods:

No.	Evaluation Method	LO's
1	Periodic exam	B2(1,2),B4(1,2,3,4)
2	Student load (Quiz & sheets, reports)	B2(1,2), C3 (1),C5(1,2)
3	Final term examination	B2(1,2), B4(1,2,3,4)C1(1,2,3,4),C2(1),C3 (1),C5(1,2)

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	8^{th}
2	Student load	2^{nd} -7^{th} - 9^{th} -14^{th}
3	Final term examination	15^{th}

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	20%
2	final examination	60%
3	Student load	20%
	Total	**100%**

8. List of References:

No.	Reference List
1	Adel Sedra, smith , "Microelectronic cicuit, 8th edition Oxford Newyork , 2019"
2	Thomas L .Floyd , "Electronic devices" 10^{th} edition , Prentice Hall Boston coulombus Indianapolis Newyork San Francisco , 2023".

9. Facilities required for teaching and learning:

No.	Facility
1	Lecture classroom
2	
3	White board
4	Data show system
5	Wireless internet
6	Sound system

10. Matrix of knowledge and skills of the course:

No.	Topic	Aims	B4				B2		C1				C2	C3	C5	
			1	2	3	4	1	2	1	2	3	4	1	1	1	2
1	The usage of electronics in measurement equipment: Length and temperature – self waves and its usage in intelligence systems	3	x		x		x						x		x	x
2	circuit bracers and its usage in industry and traffic control	3,8						X					x			x
3	noise measurement system	8,11		x			x		x	x	x	x	x		x	
4	different heating system using high frequency for conductive materials	11						x		x			x			x
5	different heating system using high frequency for conductive materials – sensitivity systems	8	x			x	x		x	x			x		x	
6	sensitivity systems	3		x				x				x	x			x
7	loading systems	8		x				x	x	x	x	x	x			x
8	temperature recording and magnetic amplifiers	11	x		x		x	x		x			x			

9	exhaust system analysis – control system for power system	8,11	x					x					x	x	x	x

Course Coordinator: Dr.Amira El-Sonbaty
Head of Department: Prof. Mohamed Fouad
Date of Approval: 2

Introduction to VLSI Design
(CEE425D**)**

1. Basic Information:

Program Title	Communications and Electronics Engineering program
Department Offering the Program	Communications and Electronics Engineering department
Department Responsible for the Course	Communications and Electronics Engineering department
Course Title	Introduction to VLSI Design
Course Code	CEE425D
Year/Level	Level 4
Specialization	Major
Authorization Date of Course Specification	-

Teaching hours	**Lectures**	**Lab.**	**Exercise**	**Contact**	**Student's load**
	2	**-**	**2**	**4**	**3**

2. Course Aims:

No.	**Aims**
3	Establish a strong behavior and maintain engineering ethics and standards;
8	Acknowledge and accept personal responsibility for your education, personal development, as well as your ability to achieve post-graduation and research studies;
11	Computer systems in Electronics and Communication engineering can be used to design a system, component, and process to meet recent technological advances.

2 Cometencies (LO'S):

Competency	**Learning Outcomes (LO'S)**
B2	1. Create systematic and methodic approaches in dealing with new and advancing technology.

	2. Demonstrate efficient IT capabilities.
B4	1. Use relevant laboratory equipment and analyze the results correctly 2. Troubleshoot, maintain and repair almost all types of electronic systems using the standard tools. 3. Use appropriate tools to measure system performance. 4. Use computational facilities, measuring instruments, workshops and laboratories equipment to design experiments and collect, analyze and interpret results.
C1	1: Recognize engineering problems to identify the best solutions 2: Think creatively and innovatively in problem solving and design 3: Present technical reports. 4: Search for information to engage in lifelong self-learning discipline.
C2	1.Define concepts and theories of mathematics and sciences, which is appropriate to the discipline.
C3	1: Describe quality assurance systems, codes of practice and standards, health and safety requirements and environmental issues.

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	MOS TRANSISTOR PRINCIPLE: NMOS and PMOS transistors, Process parameters for MOS and CMOS, Electrical properties of CMOS circuits and device modeling	2	2	-
2	Scaling principles and fundamental limits, CMOS inverter scaling, propagation delays, Stick diagram, Layout diagrams	2	2	-
3	COMBINATIONAL LOGIC CIRCUITS: Examples of Combinational Logic Design, Elmore‟s constant, Pass transistor Logic	4	4	-
4	Transmission gates, static and dynamic CMOS design, Power dissipation – Low power design principles	2	2	-
5	SEQUENTIAL LOGIC CIRCUITS: Static and Dynamic Latches and Registers, Timing issues, pipelines, clock strategies	4	4	-
6	Memory architecture and memory control circuits, Low power memory circuits, Synchronous and Asynchronous design	2	2	-
7	DESIGNING ARITHMETIC BUILDING BLOCKS:Data path circuits, Architectures for ripple carry adders, carry look ahead adders	2	2	-
8	High speed adders, accumulators, Multipliers, dividers, Barrel shifters, speed and area tradeoff.	2	2	-

9	IMPLEMENTATION STRATEGIES: Full custom and Semi-custom design, Standard cell design and cell libraries, FPGA building block architectures, FPGA interconnect routing procedures	2	2	-
	Total	**28**	**28**	**-**

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab
1	MOS TRANSISTOR PRINCIPLE: NMOS and PMOS transistors, Process parameters for MOS and CMOS, Electrical properties of CMOS circuits and device Modeling	×			×						×				
2	Scaling principles and fundamental limits, CMOS inverter scaling, propagation delays, Stick diagram, Layout diagrams	×			×						×				
3	COMBINATIONAL LOGIC CIRCUITS: Examples of Combinational Logic Design, Elmore"s constant,Pass transistor Logic	×			×						×				

4	Transmission gates, static and dynamic CMOS design,Power dissipation – Low power design principles	×			×						×				
5	SEQUENTIAL LOGIC CIRCUITS: Static and Dynamic Latches andRegisters, Timingissues,pipelines, clock strategies	×			×						×				
6	Memory architecture and memory control circuits,Low power memory circuits, Synchronous and Asynchronous design	×			×						×				
7	DESIGNING ARITHMETIC BUILDING BLOCKS:Data path circuits, Architectures for ripple carry adders, carry look ahead adders	×			×						×				
8	High speed adders, accumulators, Multipliers, dividers, Barrel shifters, speed and area tradeoff.	×			×						×				
9	IMPLEMENTATION STRATEGIES: Full custom and Semi-custom design, Standard cell design and cell libraries, FPGA building block architectures, FPGA interconnect routing procedures	×			×						×				

6. Teaching and Learning Methods of Disable Students:

6.1. Teaching and Learning Methods of Disable Students:	
1	Additional Tutorials

2	Online lectures and assignments
6.2. Teaching and learning method for low capacity and outstanding Student	
For low capacity students	-Assign a portion of the office hours for those students. -Give them specific tasks. -Repeat the explanation of some of the material and tutorials. - Assign a teaching assistance to follow up the performance of these group of students
For outstanding Students	-Hand out project assignments to those students. -Give them some research topics to be searched using the internet and conduct presentation. Encourage them to take parts in the running research projects.

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	LO's
1	Periodic exam	B2(1,2),B4(1,2,3,4)
2	Student load (quizzes-sheets-reports)	B2(1,2), C3 (1),C5(1,2)
3	Final term examination	B2(1,2), B4(1,2,3,4),C1(1,2,3,4),C2(1),C3 (1),C5(1,2)

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	8th
2	Student load	2nd -7th - 9th -14th
3	Final term examination	15th

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	20%
2	final examination	60%
3	Student load	20%
	Total	**100%**

8. List of References:

No.	Reference List
1	Adel, Sedra"Microelectronic devices and Circuits", Ninth Edition, Boston Columbus Indianapolis New York San Francisco, 2023 Columbus Indianapolis New York San Francisco, 2023.
2	ROBERT B. L. NASHELSKY, "Electronic devices and Circuit Theory ", tenth Edition Pearson Education, Inc., Upper Saddle River, New Jersey 07458. Pearson Prentice Hall, 2019.

9. Facilities required for teaching and learning:

No.	Facility
1	Lecture classroom
2	
3	White board
4	Data show system
5	Wireless internet
6	Sound system

10. Matrix of knowledge and skills of the course:

No.	Topic	Aims	B4				B2		C1				C2	C3	C5	
			1	2	3	4	1	2	1	2	3	4	1	1	1	2
1	MOS TRANSISTOR PRINCIPLE: NMOS and PMOS transistors, Process parameters for MOS and CMOS, Electrical properties of CMOS circuits and device modeling	3	x		x		x						x		x	x
2	Scaling principles and fundamental limits, CMOS inverter scaling, propagation delays, Stick diagram, Layout diagrams	3,8						x					x			x
3	COMBINATIONAL LOGIC CIRCUITS: Examples of Combinational Logic Design, Elmore"s constant, Pass transistor Logic	8,11		x			x		x	x	x	x	x		x	
4	Transmission gates, static and dynamic CMOS design, Power dissipation – Low power design principles	11						x		x			x			x
5	SEQUENTIAL	8	x			x	x		x	x			x		x	

	LOGIC CIRCUITS: Static and Dynamic Latches and Registers, Timing issues, pipelines, clock strategies															
6	Memory architecture and memory control circuits, Low power memory circuits, Synchronous and Asynchronous design	3		x				x				x	x			x
7	DESIGNING ARITHMETIC BUILDING BLOCKS:Data path circuits, Architectures for ripple carry adders, carry look ahead adders	8		x				x	x	x	x	x	x			x
8	High speed adders, accumulators, Multipliers, dividers, Barrel shifters, speed and area tradeoff.	11	x		x		x	x		x			x			
9	IMPLEMENTATION STRATEGIES: Full custom and Semi-custom design, Standard cell design and cell libraries, FPGA building block architectures, FPGA interconnect routing procedures	8,11	x					x					x	x	x	x

Course Coordinator: Assoc. Prof. Sherief Sharoush
Head of Department: Prof. Mohamed Fouad
Date of Approval: 2023

Satellite systems
(CEE424B)

1- Basic Information:

Program Title	Communications and Electronics Engineering program
Department Offering the Program	Communications and Electronics Engineering department
Department Responsible for the Course	Communications and Electronics Engineering department
Course Title	Satellite systems
Course Code	CEE424B
Year/Level	Level 4
Specialization	Major
Authorization Date of Course Specification	-

Teaching hours	**Lectures**	**Lab.**	**Exercise**	**Contact**	**Student's load**
	2	**-**	**2**	**4**	**3**

4- Course Aims:

No.	**Aims**
1	Master a broad range of engineering physics knowledge and specialized skills, as well as the ability to apply acquired knowledge in real-world situations by applying theories in analytic critical and systemic thinking to identify, diagnose, and solve engineering problems of varying complexity and variation.
2	Apply analytic critical and systemic thinking to discover, analyze, and solve a wide range of engineering problems;

3. Cometencies (LO'S):

Competency	**Learning Outcomes (LO'S)**
B3	1. Define basics of information and communication technology (ICT). 2. Select and appraise appropriate ICT tools to a variety of engineering problems. 3. Demonstrates basic organizational and project management skills. 4. Lead and motivate individuals. 5. Acquire entrepreneurial skills
C5	1: Listing characteristics of engineering materials related to the discipline. 2: Evaluate the characteristics and performance of components, systems and processes. 3: Choose appropriate specifications for required devices.

4. Course Contents:

No.	**Topics**	**Lectures**	**Tutorial**	**Practical**

1	SATELLITE ORBITS: Kepler"s Laws, Newton"s law, orbital parameters, orbital perturbations, station keeping, geo stationary and non-Geo-stationary orbits	2	2	-
2	Look Angle Determination- Limits of visibility – eclipse-Sub satellite point –Sun transit outage-Launching Procedures - launch vehicles and propulsion	2	2	-
3	SPACE SEGMENT AND SATELLITE LINK DESIGN: Spacecraft Technology- Structure, Primary power, Attitude and Orbit control, Thermal control and Propulsion	2	2	-
4	communication Payload and supporting subsystems, Telemetry, Tracking and command. Satellite uplink and downlink Analysis and Design, link budget	2	2	-
5	E/N calculation- performance impairments-system noise, inter modulation and interference, Propagation Characteristics and Frequency considerations- System reliability and design lifetime	2	2	-
6	EARTH SEGMENT: Introduction – Receive – Only home TV systems – Outdoor unit – Indoor unit for analog (FM) TV –Master antenna TV system – Community antenna TV system – Transmit – Receive earth stations –Problems – Equivalent isotropic radiated power	2	2	-
7	Transmission losses – Free-space transmission – Feeder losses – Antenna misalignment losses – Fixed atmospheric and ionospheric losses – Link power budget equation – System noise – Antenna noise – Amplifier noise temperature – Amplifiers in cascade – Noise factor – Noise temperature of absorptive networks – Overall system noise temperature	2	2	-
8	Carrierto- Noise ratio – Uplink – Saturation flux density – Input back off – The earth station - HPA – Downlink – Output back off – Satellite TWTA output – Effects of rain – Uplink rain–Fade margin – Downlink rain – Fade margin – Combined uplink and downlink C/N ratio – Inter modulation noise	2	2	-
9	SATELLITE ACCESS: Modulation and	2	2	

	Multiplexing: Voice, Data, Video, Analog – digital transmission system, Digital video Brocast, multiple access: FDMA, TDMA, CDMA, Assignment Methods, Spread Spectrum communication, compression – encryption			
10	SATELLITE NAVIGATION SYSTEM: Distance Measuring Equipment - Operation of DME - TACAN - TACAN Equipment - Instrument Landing System - Ground Controlled Approach System	2	2	
11	Microwave Landing System(MLS) The Doppler Effect - Beam Configurations -Doppler Frequency Equations - Track Stabilization - Doppler Spectrum - Components of the Doppler Navigation System - Doppler range Equation - Accuracy of Doppler Navigation Systems. Inertial Navigation	2	2	
12	Principles of Operation - Navigation Over the Earth – Components of an Inertial Navigation System - Earth Coordinate Mechanization - Strapped-Down Systems - Accuracy of Inertial Navigation Systems-The Transit System - Navstar Global Positioning System (GPS)	2	2	
13	SATELLITE APPLICATIONS: INTELSAT Series, INSAT, VSAT, Mobile satellite services: GSM, GPS, INMARSAT, LEO, MEO, Satellite Navigational System. Direct Broadcast satellites (DBS)- Direct to home Broadcast (DTH), Digital audio broadcast (DAB)-	2	2	
14	World space services, Business TV(BTV), GRAMSAT, Specialized services – E –mail, Video conferencing, Internet.	2	2	
Total		**28**	**28**	**-**

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab
1	SATELLITE ORBITS: Kepler‟s Laws, Newton‟s law, orbital parameters, orbital perturbations, station keeping, geo stationary and non-Geo-stationary orbits	×			×	×					×				
2	Look Angle Determination- Limits of visibility – eclipse-Sub satellite point – Sun transit outage- LaunchingProcedures - launch vehicles and propulsion	×			×	×					×				
3	SPACE SEGMENT AND SATELLITE LINK DESIGN: Spacecraft Technology- Structure,Primary power, Attitude and Orbitcontrol,Thermal control andPropulsion	×			×	×					×				
4	communication Payload and supporting subsystems, Telemetry, Tracking and command. Satellite uplink and downlink Analysis and Design, link budget	×			×	×					×				

5	E/N calculation- performance impairments- system noise, inter modulation and interference, Propagation Characteristics and Frequency considerations- System reliability and design lifetime	×			×	×					×				
6	EARTH SEGMENT: Introduction – Receive – Only home TV systems – Outdoor unit – Indoor unit for analog (FM) TV – Master antenna TVsystem - Community antenna TV system –Transmit – Receive earth stations – Problems –Equivalent isotropic radiated power	×			×	×					×				
7	Transmission losses – Free-space transmission – Feeder losses –Antenna misalignment losses – Fixed atmospheric and ionospheric losses – Linkpower budget equation – System noise – Antenna noise – Amplifier noise temperature – Amplifiers in cascade – Noise factor – Noise temperature of absorptive networks – Overall system noise temperature	×			×	×					×				

8	Carrierto- Noise ratio – Uplink – Saturation flux density – Input back off – The earth station - HPA – Downlink – Output back off – Satellite TWTA output – Effects of rain – Uplink rain– Fade margin – Downlink rain – Fade margin – Combined uplink and downlink C/N ratio – Inter modulation noise	x			x	x					x				
9	SATELLITE ACCESS: Modulation and Multiplexing: Voice, Data, Video, Analog – digital transmission system, Digital video Brocast, multiple access: FDMA, TDMA, CDMA, Assignment Methods, Spread Spectrum communication, compression – encryption	x			x	x					x				
10	SATELLITE NAVIGATION SYSTEM: Distance Measuring Equipment – Operation of DME – TACAN – TACAN Equipment – Instrument Landing System – Ground Controlled Approach System	x			x	x					x				

11	Microwave Landing System(MLS) The Doppler Effect - Beam Configurations -Doppler Frequency Equations - Track Stabilization – Doppler Spectrum - Components of the Doppler Navigation System - Doppler range Equation - Accuracy ofDoppler Navigation Systems. Inertial Navigation	×			×	×					×				
12	Principles of Operation - Navigation Over the Earth– Components of an Inertial Navigation System - Earth Coordinate Mechanization - Strapped-Down Systems - Accuracy of Inertial Navigation Systems-The Transit System - Navstar GlobalPositioning System (GPS)	×			×	×					×				
13	SATELLITE APPLICATIONS: INTELSAT Series, INSAT, VSAT, Mobile satellite services: GSM,GPS, INMARSAT, LEO, MEO, Satellite Navigational System. Direct Broadcast satellites(DBS)- Direct to home Broadcast (DTH), Digital audio broadcast (DAB)	×			×	×					×				

14	World space services, Business TV(BTV), GRAMSAT,Specialized services – E –mail, Video conferencing ,Internet.	x			x	x					x				

6. Teaching and Learning Methods of Disable Students:

6.1. Teaching and Learning Methods of Disable Students:	
1	Additional Tutorials
2	Online lectures and assignments

6.2. Teaching and learning method for low capacity and outstanding Student	
For low capacity students	-Assign a portion of the office hours for those students. -Give them specific tasks. -Repeat the explanation of some of the material and tutorials. - Assign a teaching assistance to follow up the performance of these group of students
For outstanding Students	-Hand out project assignments to those students. -Give them some research topics to be searched using the internet and conduct presentation. Encourage them to take parts in the running research projects.

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	LO's
1	Periodic exam	C5 (1)
2	Student load	C5(1,2)
3	Final term examination	C5 (1,2,3)

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	8^{th}
2	Student load	2^{nd} -7^{th} - 9^{th} -14^{th}
3	Final term examination	15^{th}

7.3 weighting of Evaluation:

No.	Evaluation method	Weights
1	Periodic exam	20%
2	final examination	60%
3	Student load	20%
	Total	**100%**

8. List of References:

No.	Reference List
1	Robert W. Jones, " Hand book on Satellite communication ", 5th Edition, Willy, New

	york, 2020
2	Michael O. Kolawole, " Satellite Communication Engineering ", Marcel Dekker, Inc, New York ,2023
3	Dennis Roddy " Satellite Communications", 4th Edition, Graw-Hill, New York , 2019

9. Facilities required for teaching and learning:

No.	Facility
1	Lecture classroom
2	
3	White board
4	Data show system
5	Wireless internet

10. Matrix of knowledge and skills of the course:

No.	Topic	Aims	B3					C5		
			1	2	**3**	4	5	1	2	**3**
1	SATELLITE ORBITS: Kepler‟s Laws, Newton‟s law, orbital parameters, orbital perturbations, station keeping, geo stationary and non-Geo-stationary orbits	2	x	x	x	x	x	x	x	x
2	Look Angle Determination- Limits of visibility –eclipse-Sub satellite point –Sun transit outage-Launching Procedures - launch vehicles and propulsion	2	x	x	x	x	x			
3	SPACE SEGMENT AND SATELLITE LINK DESIGN: Spacecraft Technology- Structure, Primary power, Attitude and Orbit control, Thermal control and Propulsion	2	x	x	x	x	x	x	x	x
4	communication Payload and supporting subsystems, Telemetry, Tracking and command. Satellite uplink and downlink Analysis and Design, link budget	2	x	x	x	x	x	x	x	x
5	E/N calculation- performance impairments-system noise, inter modulation and interference, Propagation Characteristics and Frequency considerations- System	2	x	x	x	x	x	x	x	

	reliability and design lifetime									
6	EARTH SEGMENT: Introduction – Receive – Only home TV systems – Outdoor unit – Indoor unit for analog (FM) TV –Master antenna TV system – Community antenna TV system – Transmit – Receive earth stations –Problems – Equivalent isotropic radiated power	2	x	x	x	x	x	x	x	x
7	Transmission losses – Free-space transmission –Feeder losses – Antenna misalignment losses – Fixed atmospheric and ionospheric losses – Link power budget equation – System noise – Antenna noise – Amplifier noise temperature – Amplifiers in cascade – Noise factor – Noise temperature of absorptive networks – Overall system noise temperature	2	x	x	x	x	x	x	x	x
8	Carrierto- Noise ratio – Uplink – Saturation flux density – Input back off – The earth station - HPA – Downlink – Output back off – Satellite TWTA output – Effects of rain – Uplink rain–Fade margin – Downlink rain – Fade margin – Combined uplink and downlink C/N ratio – Inter modulation noise	2	x	x	x	x	x	x	x	
9	SATELLITE ACCESS: Modulation and Multiplexing: Voice, Data, Video, Analog – digital transmission system, Digital video Brocast, multiple access: FDMA, TDMA, CDMA, Assignment Methods, Spread Spectrum communication, compression – encryption	2	x		x		x		x	
10	SATELLITE NAVIGATION SYSTEM: Distance Measuring	2	x		x		x	x	x	x

	Equipment - Operation of DME - TACAN - TACAN Equipment - Instrument Landing System - Ground Controlled Approach System									
11	Microwave Landing System(MLS) The Doppler Effect - Beam Configurations -Doppler Frequency Equations - Track Stabilization - Doppler Spectrum - Components of the Doppler Navigation System - Doppler range Equation - Accuracy of Doppler Navigation Systems. Inertial Navigation	2	x	x		x	x	x	x	x
12	Principles of Operation - Navigation Over the Earth – Components of an Inertial Navigation System - Earth Coordinate Mechanization - Strapped-Down Systems - Accuracy of Inertial Navigation Systems-The Transit System - Navstar Global Positioning System (GPS)	2	x		x	x	x	x	x	
13	SATELLITE APPLICATIONS: INTELSAT Series, INSAT, VSAT, Mobile satellite services: GSM, GPS, INMARSAT, LEO, MEO, Satellite Navigational System. Direct Broadcast satellites (DBS)- Direct to home Broadcast (DTH), Digital audio broadcast (DAB)-	2		x		x	x	x	x	
14	World space services, Business TV(BTV), GRAMSAT, Specialized services – E –mail, Video conferencing, Internet.		x		x	x			x	

Course Coordinator: Dr. Ahmed Kabeel
Head of Department: Prof. Mohamed Fouad
Date of Approval: 2023

Mobile communications systems

(CEE325B)

2- Basic Information:

Program Title	Communications and Electronics Engineering program
Department Offering the Program	Communications and Electronics Engineering department
Department Responsible for the Course	Communications and Electronics Engineering department
Course Title	Mobile communication systems
Course Code	CEE325B
Year/Level	level 3
Specialization	Major
Authorization Date of Course Specification	-

Teaching hours	**Lectures**	**Lab.**	**Exercise**	**Contact**	**Student's load**
	2	**-**	**2**	**4**	**3**

3- Course Aims:

No.	**Aims**
11	Computer systems in Electronics and Communication engineering can be used to design a system, component, and process to meet recent technological advances.
12	Communicate and work effectively within multiple teams in the field of communication and electronics engineering and consider the effects of engineering solutions on society and the environment.

3- Cometencies (LO'S)

Competency	**Learning Outcomes (LO'S)**
B3	1. Select and appraise appropriate ICT tools to a variety of engineering problems. 2. Acquire entrepreneurial skills
C5	1: Listing characteristics of engineering materials related to the discipline. 2: Evaluate the characteristics and performance of components, systems and processes. 3: Choose appropriate specifications for required devices.
C5	1: Describe principles of design including elements design, process and/or a system related to electronics and communication systems 2: Design a process, component or system to carry out specialized engineering designs. 3: Use a wide range of analytical tools, techniques, equipment, and software packages of the discipline and to develop required computer programs.

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	WIRELESS LAN: Introduction-WLAN technologies: Infrared, UHF narrowband, spread spectrum - IEEE802.11: System	2	2	-
2	architecture, protocol architecture, physical layer, MAC layer, 802.11b, 802.11a – Hiper LAN: WATM, BRAN, HiperLAN2 – Bluetooth: Architecture, Radio Layer, Baseband layer, Link manager Protocol, security - IEEE802.16-WIMAX: Physical layer, MAC, Spectrum allocation for WIMAX	4	4	-
3	MOBILE NETWORK LAYER: Introduction - Mobile IP: IP packet delivery, Agent discovery, tunneling and encapsulation, IPV6-Network layer in the internet	4	4	-
4	Mobile IP session initiation protocol - mobile ad-hoc network: Routing, Destination Sequence distance vector, Dynamic source routing.	2	2	-
5	MOBILE TRANSPORT LAYER: TCP enhancements for wireless protocols - Traditional TCP: Congestion control, fast retransmit/fast recovery, Implications of mobility	4	4	-
6	Classical TCP improvements: Indirect TCP, Snooping TCP, Mobile TCP, Time out freezing, Selective retransmission, Transaction oriented TCP - TCP over 3G wireless networks.	2	2	-
7	WIRELESS WIDE AREA NETWORK: Overview of UTMS Terrestrial Radio access network-UMTS Core network Architecture: 3G-MSC, 3GSGSN, 3G-GGSN, SMS-GMSC/SMS-IWMSC,	2	2	
8	Firewall, DNS/DHCP-High speed Downlink packet access (HSDPA)- LTE network architecture and protocol	2	2	
9	4G NETWORKS: Introduction – 4G vision – 4G features and challenges - Applications of 4G.	2	2	
10	4G Technologies: Multicarrier Modulation, Smart antenna techniques, OFDM-MIMO systems, Adaptive Modulation and coding with time slot scheduler, Cognitive Radio.	2	2	
11	5G Technologies: Drivers for 5G: The ‘Pervasive Connected World - The 5G Internet - Small Cells for 5G Mobile Networks	2	2	
Total		**28**	**28**	**-**

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab
1	WIRELESS LAN: Introduction-WLAN technologies: Infrared, UHF narrowband, spread spectrum -IEEE802.11: System	×			×						×				
2	architecture, protocol architecture, physical layer,MAC layer, 802.11b, 802.11a – Hiper LAN: WATM, BRAN, HiperLAN2 – Bluetooth:Architecture, Radio Layer, Baseband layer, Link manager Protocol, security -IEEE802.16-WIMAX:Physical layer, MAC,Spectrum allocation forWIMAX	×			×						×				
3	MOBILENETWORK LAYER: Introduction - MobileIP: IP packet delivery, Agent discovery,tunnelingand encapsulation, IPV6-Network layer in the internet	×			×						×				

4	Mobile IP session initiation protocol - mobile adhoc network: Routing, Destination Sequence distance vector, Dynamic source routing.	×			×						×				
5	MOBILE TRANSPORT LAYER: TCP enhancements for wireless protocols - Traditional TCP: Congestioncontrol, fast retransmit/fast recovery, Implications of mobility	×			×						×				
6	Classical TCP improvements: Indirect TCP, Snooping TCP, Mobile TCP, Time out freezing, Selective retransmission, Transaction oriented TCP - TCP over 3G wireless networks.	×			×						×				
7	WIRELESS WIDE AREA NETWORK: Overview of UTMS Terrestrial Radio access network-UMTS Core network Architecture: 3G-MSC, 3GSGSN, 3G-GGSN,SMS-GMSC/SMS-IWMSC	×			×						×				
8	Firewall, DNS/DHCP-High speed Downlink packet access (HSDPA)- LTE network architecture and protocol	×			×						×				

9	4G NETWORKS: Introduction – 4G vision – 4G features and challenges -Applications of 4G.	x			x						x				
10	4G Technologies: Multicarrier Modulation, Smart antenna techniques, OFDM-MIMO systems, Adaptive Modulation and coding with time slot scheduler,Cognitive Radio.	x			x						x				
11	5G Technologies: Drivers for 5G: The Pervasive Connected World - The 5G Internet - Small Cells for 5G Mobile Networks	x			x						x				

6. Teaching and Learning Methods of Disable Students:

6.1. Teaching and Learning Methods of Disable Students:	
1	Additional Tutorials
2	Online lectures and assignments

6.2. Teaching and learning method for low capacity and outstanding Student	
For low capacity students	-Assign a portion of the office hours for those students. -Give them specific tasks. -Repeat the explanation of some of the material and tutorials. - Assign a teaching assistance to follow up the performance of these group of students
For outstanding Students	-Hand out project assignments to those students. -Give them some research topics to be searched using the internet and conduct presentation. Encourage them to take parts in the running research projects.

7**. Student Evaluation:**

7.1 Student Evaluation method:

No.	**Evaluation Method**	**ILO's**
1	Periodic exam	C5(1-2)
2	Student load	C5(1)
3	Final term examination	B3(1,2)C5(1-2-3)

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	8th
2	Student load	2nd -7th - 9th -14th
3	Final term examination	15th

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	20%
2	final examination	60%
3	Student load	20%
	Total	**100%**

8. List of References:

No.	Reference List
1	C.A. Balanis,"AntennaTheory– AnalysisandDesign,"John Wiley&Sons, 2020
2	Minoru Etoh "Next Generation Mobile Systems 3 G and Beyond"John Wiley & Sons Ltd, the Atrium, Southern Gate, chichester,west Sussex ,PO198SQ, England , 2019.

9. Facilities required for teaching and learning:

No.	Facility
1	Lecture classroom
2	
3	White board
4	Data show system
5	Wireless internet

10. Matrix of knowledge and skills of the course:

No.	Topic	aim	B3		C5		
			1	2	1	2	3
1	WIRELESS LAN: Introduction-WLAN technologies: Infrared, UHF narrowband, spread spectrum -IEEE802.11: System	11	x	x	x		
2	architecture, protocol architecture, physical layer, MAC layer, 802.11b, 802.11a – Hiper LAN: WATM, BRAN, HiperLAN2 – Bluetooth: Architecture, Radio Layer, Baseband layer,	11	x	x		x	

	Link manager Protocol, security - IEEE802.16-WIMAX: Physical layer, MAC, Spectrum allocation for WIMAX						
3	MOBILE NETWORK LAYER: Introduction - Mobile IP: IP packet delivery, Agent discovery, tunneling and encapsulation, IPV6-Network layer in the internet	11	x	x		x	
4	Mobile IP session initiation protocol - mobile ad-hoc network: Routing, Destination Sequence distance vector, Dynamic source routing.	11,12	x	x			X
5	MOBILE TRANSPORT LAYER: TCP enhancements for wireless protocols - Traditional TCP: Congestion control, fast retransmit/fast recovery, Implications of mobility	11,12	x	x		x	
6	Classical TCP improvements: Indirect TCP, Snooping TCP, Mobile TCP, Time out freezing, Selective retransmission, Transaction oriented TCP - TCP over 3G wireless networks.	11,12	x	x	x	x	
7	WIRELESS WIDE AREA NETWORK: Overview of UTMS Terrestrial Radio access network-UMTS Core network Architecture:						

	3G-MSC, 3GSGSN, 3G-GGSN, SMS-GMSC/SMS-IWMSC,						

Course Coordinator: Dr. Walid Raslan
Head of Department: Prof. Mohamed Fouad
Date of Approval: 2023

Antenna and wave propagation
(CEE414**)**

1- Basic Information:

Program Title	Communications and Electronics Engineering program
Department Offering the Program	Communications and Electronics Engineering department
Department Responsible for the Course	Communications and Electronics Engineering department
Course Title	Antenna and wave propagation
Course Code	CEE414
Year/Level	level 4
Specialization	Major
Authorization Date of Course Specification	-

Teaching hours	**Lectures**	**Lab.**	**Exercise**	**Contact**	**Student's load**
	2	**-**	**2**	**4**	**4**

2- Course Aims:

No.	**Aims**
1	Master a wide range of engineering knowledge and specialized skills, as well as the ability to apply that information in real-world situations using theories and analytical thinking.
2	Apply analytic critical and systemic thinking to discover, analyze, and solve a wide range of engineering problems;

Competencies Learning Outcomes (LO'S)

Competency	**Learning Outcomes LO'S**
B3	1. Demonstrates basic organizational and project management skills. 2. Lead and motivate individuals. 3. Acquire entrepreneurial skills
C5	1: Listing characteristics of engineering materials related to the discipline. 2: Evaluate the characteristics and performance of components, systems and processes.

	3: Choose appropriate specifications for required devices.

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	FUNDAMENTALS OF RADIATION: Definition of antenna parameters – Gain, Directivity, Effective aperture, Radiation Resistance, Band width, Beam width, Input Impedance. Matching	2	2	-
2	Baluns, Polarization mismatch, Antenna noise temperature, Radiation from oscillating dipole, half wave dipole, folded dipole, and Yagi array.	2	2	-
3	APERTURE AND SLOT ANTENNAS: Radiation from rectangular apertures, Uniform and Tapered aperture, Horn antenna, Reflector antenna	2	2	-
4	Aperture blockage, Feeding structures, Slot antennas, Microstrip antennas – Radiation mechanism – Application, Numerical tool for antenna analysis	2	2	-
5	ANTENNA ARRAYS: N element linear array, Pattern multiplication, Broadside and End fire array – Concept of Phased arrays, Adaptive array, Basic principle of antenna Synthesis-Binomial array	2	2	-
6	SPECIAL ANTENNAS: Principle of frequency independent antennas –Spiral antenna, Helical antenna, Log periodic. Modern antennas-Reconfigurable antenna, Active antenna, Dielectric antennas, Electronic band gap structure and applications, Antenna Measurements-Test Ranges, Measurement of Gain, Radiation pattern, Polarization, VSWR	2	2	-
7	PROPAGATION OF RADIO WAVES: Modes of propagation, Structure of atmosphere, Ground wave propagation, Tropospheric propagation	2	2	-
8	Duct propagation, Troposcatter propagation, Flat earth and Curved earth concept Sky wave propagation – Virtual height, critical frequency, Maximum usable frequency – Skip distance, Fading, Multi hop propagation	2	2	-
Total		**28**	**28**	**-**

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab
1	FUNDAMENTALS OF RADIATION: Definition of antenna parameters – Gain, Directivity, Effective aperture, Radiation Resistance, Band width, Beam width, Input Impedance Matching	x			x	x					x				
2	Baluns, Polarization mismatch, Antenna noise temperature, Radiation from oscillating dipole, half wave dipole, folded dipole, and Yagi array.	x			x	x					x				
3	APERTURE AND SLOT ANTENNAS: Radiation from rectangular apertures, Uniform and Tapered aperture, Horn antenna, Reflector antenna	x			x	x					x				
4	Aperture blockage, Feeding structures, Slot antennas, Microstrip antennas – Radiation mechanism – Application, Numerical tool for antenna analysis	x			x	x					x				

5	ANTENNA ARRAYS: N element linear array, Pattern multiplication, Broadside and End fire array –Concept of Phased arrays, Adaptive array, Basic principle of antenna Synthesis-Binomial array	x			x	x					x				
6	SPECIAL ANTENNAS: Principle of frequency independent antennas – Spiral antenna, Helical antenna, Log periodic. Modern antennas-Reconfigurable antenna, Active antenna, Dielectric antennas, Electronic band gap structure and applications, Antenna Measurements-Test Ranges,Measurement of Gain, Radiation pattern, Polarization, VSWR	x			x	x					x				
7	PROPAGATION OF RADIO WAVES: Modes of propagation, Structure of atmosphere, Ground wave propagation, Tropospheric propagation	x			x	x					x				

8	Duct propagation, Troposcatter propagation, Flat earth and Curved earth concept Sky wave propagation – Virtual height, critical frequency, Maximum usable frequency – Skip distance, Fading, Multi hop propagation	x			x	x					x				

6. Teaching and Learning Methods of Disable Students:

6.1. Teaching and Learning Methods of Disable Students:	
1	Additional Tutorials
2	Online lectures and assignments
6.2. Teaching and learning method for low capacity and outstanding Student	
For low capacity students	-Assign a portion of the office hours for those students. -Give them specific tasks. -Repeat the explanation of some of the material and tutorials. - Assign a teaching assistance to follow up the performance of these group of students
For outstanding Students	-Hand out project assignments to those students. -Give them some research topics to be searched using the internet and conduct presentation. Encourage them to take parts in the running research projects.

7**. Student Evaluation:**

7.1 Student Evaluation method:

No.	**Evaluation Method**	**LO's**
1	Periodic exam	C5(1)
2	Student load	C5(1,2)
3	Final term examination	C5(1,2,3)

7.2 Evaluation Schedule:

No.	**Evaluation Method**	**Weeks**
1	Periodic exam	8^{th}
2	Student load	2^{nd} -7^{th} - 9^{th} -14^{th}
3	Final term examination	15^{th}

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	10%
2	final examination	60%
3	Student load	20%
	Total	**100%**

8. List of References:

No.	Reference List
1	C.A. Balanis,"AntennaTheory– AnalysisandDesign,"JohnWiley&Sons, 2020
2	W.L.StutzmanandG. A. Thiele,"AntennaTheoryandDesign," JohnWiley&Sons, 2019.

9. Facilities required for teaching and learning:

No.	Facility
1	Lecture classroom
2	
3	White board
4	Data show system
5	Wireless internet

10. Matrix of knowledge and skills of the course:

No.	Topic	Aims	C5		
			1	2	3
1	FUNDAMENTALS OF RADIATION: Definition of antenna parameters – Gain, Directivity, Effective aperture, Radiation Resistance, Band width, Beam width, Input Impedance. Matching	1,2	x	x	
2	Baluns, Polarization mismatch, Antenna noise temperature, Radiation from oscillating dipole, half wave dipole, folded dipole, and Yagi array.	1,2	x	x	
3	APERTURE AND SLOT ANTENNAS: Radiation from rectangular apertures, Uniform and Tapered aperture, Horn antenna, Reflector antenna	1,2	x	x	
4	Aperture blockage, Feeding structures, Slot antennas, Microstrip antennas – Radiation mechanism – Application, Numerical tool for antenna analysis	1,2	x	x	
5	ANTENNA ARRAYS: N element linear array, Pattern multiplication, Broadside and End fire array – Concept of Phased arrays, Adaptive array, Basic principle of antenna Synthesis-Binomial array	1,2	x	x	
6	SPECIAL ANTENNAS: Principle of frequency independent antennas –Spiral antenna, Helical	1,2	x	x	x

No.	Topic	Aims	C5		
			1	2	3
	antenna, Log periodic. Modern antennas-Reconfigurable antenna, Active antenna, Dielectric antennas, Electronic band gap structure and applications, Antenna Measurements-Test Ranges, Measurement of Gain, Radiation pattern, Polarization, VSWR				
7	PROPAGATION OF RADIO WAVES: Modes of propagation, Structure of atmosphere, Ground wave propagation, Tropospheric propagation	1,2	x	x	
8	Duct propagation, Troposcatter propagation, Flat earth and Curved earth concept Sky wave propagation – Virtual height, critical frequency, Maximum usable frequency – Skip distance, Fading, Multi hop propagation	1,2			

Course Coordinator: Dr. Ahmed Kabeel
Head of Department: Prof. Mohamed Fouad
Date of Approval: 2023

Wireless Communications
(CEE325C**)**

1- Basic Information:

Program Title	Communications and Electronics Engineering program
Department Offering the Program	Communications and Electronics Engineering department
Department Responsible for the Course	Communications and Electronics Engineering department
Course Title	Wireless Communications
Course Code	CEE325C
Year/Level	level 3
Specialization	Major
Authorization Date of Course Specification	-

Teaching hours	Lectures	Lab.	Exercise	Contact	Student's load
	2	-	2	4	3

4- Course Aims:

No.	Aims
11	Computer systems in Electronics and Communication engineering can be used to design a system, component, and process to meet recent technological advances.
12	Communicate and work effectively within multiple teams in the field of communication and electronics engineering and consider the effects of engineering solutions on society and the environment.

3- Cometencies (LO'S)

Competency	Learning Outcomes (LO'S)
B3	1. Select and appraise appropriate ICT tools to a variety of engineering problems. 2. Acquire entrepreneurial skills
C5	1: Listing characteristics of engineering materials related to the discipline. 2: Evaluate the characteristics and performance of components, systems and processes. 3: Choose appropriate specifications for required devices.
C5	1: Describe principles of design including elements design, process and/or a system related to electronics and communication systems 2: Design a process, component or system to carry out specialized engineering designs. 3: Use a wide range of analytical tools, techniques, equipment, and software packages of the discipline and to develop required computer programs.

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	Multidisciplinary	8	8	-
2	project-oriented design course that considers aspects of wireless and mobile systems including wireless networks and link protocols	4	4	-
3	mobile networking including support for the Internet Protocol suite, mobile middleware	6	6	-
4	and mobile applications. Students complete multiple experiments and design projects	8	8	-
Total		**28**	**28**	**-**

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab
1	Multidisciplinary	×			×	×					×				
2	project-oriented design course that considers aspects of wireless and mobile systems including wireless networks and link protocols	×			×	×					×				
3	mobile networking including support for the Internet Protocol suite, mobile middleware	×			×	×					×				
4	and mobile applications. Students complete multiple experiments and design projects	×			×	×					×				

6. Teaching and Learning Methods of Disable Students:

6.1. Teaching and Learning Methods of Disable Students:	
1	Additional Tutorials
2	Online lectures and assignments

6.2. Teaching and learning method for low capacity and outstanding Student	
For low capacity students	-Assign a portion of the office hours for those students. -Give them specific tasks. -Repeat the explanation of some of the material and tutorials. - Assign a teaching assistance to follow up the performance of these group of students
For outstanding Students	-Hand out project assignments to those students.

	-Give them some research topics to be searched using the internet and conduct presentation. Encourage them to take parts in the running research projects.

7. **Student Evaluation:**

7.1 Student Evaluation method:

No.	Evaluation Method	LO's
1	Periodic exam	B3(1,2),C5(1,2),
2	Student load (quizzes-sheets-reports)	C5(2)
3	Final term examination	B3(1,2),C5(1,2,3).)

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	8^{th}
2	Student load	2^{nd} -7^{th} - 9^{th} -14^{th}
3	Final term examination	15^{th}

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	20%
2	final examination	60%
3	Student load	20%
	Total	**100%**

8. List of References:

No.	Reference List
1	Wireless Communications and networks – willim Stallings.
2	Wireless Communications and neyworking – Mark, Jon M.,Zhyang , Weihua.

9. Facilities required for teaching and learning:

No.	Facility
1	Lecture classroom
2	
3	White board
4	Data show system
5	Wireless internet

10. Matrix of knowledge and skills of the course:

No.	Topic	Aims	B3		C5		
			1	2	1	2	3

1	Multidisciplinary	11,12	x	x	x		x
2	project-oriented design course that considers aspects of wireless and mobile systems including wireless networks and link protocols	11,12	x	x		x	
3	mobile networking including support for the Internet Protocol suite, mobile middleware	11,12	x	x		x	
4	and mobile applications. Students complete multiple experiments and design projects	11,12	x	x			x

Course Coordinator: Dr. Walid Raslan
Head of Department: Prof. Mohamed Fouad
Date of Approval: 2023

Special topics in communication Engineering
(CEE415C**)**

1- Basic Information:

Program Title	Communications and Electronics Engineering program
Department Offering the Program	Communications and Electronics Engineering department
Department Responsible for the Course	Communications and Electronics Engineering department
Course Title	Special topics in communication

	Engineering
Course Code	CEE415C
Year/Level	level 4
Specialization	Major
Authorization Date of Course Specification	-

Teaching hours	**Lectures**	**Lab.**	**Exercise**	**Contact**	**Student's load**
	2	**-**	**2**	**4**	**4**

1. **Course Aims:**

No.	Aims
11	Computer systems in Electronics and Communication engineering can be used to design a system, component, and process to meet recent technological advances.
13	Allocate projects creatively by analyzing data from intended tests.

2. **Competencies Learning Outcomes (LO'S):**

Competency	Learning Outcomes (LO'S)
B2	1. Describe quality assurance systems, codes of practice and standards, health and safety requirements, and environmental issues. 2. Assess and evaluate the characteristics and performance of components, systems and processes. 3. Create and/or re-design a process, component or system, and carry out specialized engineering designs.
C1	1: Recognize engineering problems to identify the best solutions 2: Think creatively and innovatively in problem solving and design 3: Search for information to engage in lifelong self-learning discipline.
C3	1: Describe quality assurance systems, codes of practice and standards, health and safety requirements and environmental issues.
C4	1: Evaluate the troubles to repair all types of electronic systems using the standard tools.

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	A topic to be selected by the department to address new subjects in Communications Engineering	28	28	-
Total		**28**	**28**	**-**

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab
1	A topic to be selected by the department to address new subjects in Communications Engineering	x			x	x					x				

6. Teaching and Learning Methods of Disable Students:

6.1. Teaching and Learning Methods of Disable Students:	
1	Additional Tutorials
2	Online lectures and assignments

6.2. Teaching and learning method for low capacity and outstanding Student	
For low capacity students	-Assign a portion of the office hours for those students. -Give them specific tasks. -Repeat the explanation of some of the material and tutorials. - Assign a teaching assistance to follow up the performance of these group of students
For outstanding Students	-Hand out project assignments to those students. -Give them some research topics to be searched using the internet and conduct presentation. Encourage them to take parts in the running research projects.

7**. Student Evaluation:**

7.1 Student Evaluation method:

No.	**Evaluation Method**	**LO's**
1	Periodic exam	C1(1),C5(1)
2	Student load (quizzes-reports-sheets-CAD tools-presentation)	C1(2)

3	Final term examination	C1(1),C5(1),B1(1,2.3)

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	8th
2	Student load	2nd -7th - 9th -14th
3	Final term examination	15th

7.3 weighting of Evaluation:

No.	Evaluation method	Weights
1	Periodic exam	20%
2	final examination	60%
3	Student load	20%
	Total	**100%**

8. List of References:

No.	Reference List
1	C.A. Balanis,"AntennaTheory– AnalysisandDesign,"John Wiley&Sons, 2019
2	W.L.StutzmanandG. A. Thiele,"AntennaTheory and Design," John Wiley&Sons, 2020.
3	David M.pozar, "microwave engineering ", Fourth Edition Pearson Education, Inc., bibliographical references and index. ISBN 978-0-470-63155-3, 2023.
4	W.H. Hayt, Jr.,"Engineering of Electromagnetics," Amazon, 9th Edition (2020).
	Matthew N.O. *Sadiku*., J.Sagliocca and O.Soriyan " *Elements of Electromagnetics* ," 7th-edition –Oxford, 2020

9. Facilities required for teaching and learning:

No.	Facility
1	Lecture classroom
2	
3	White board
4	Data show system
5	Wireless internet

10. Matrix of knowledge and skills of the course:

No.	Topic	Aim	B2			C1			C3	C4
			1	b	3	1	2	3	1	1
1	A topic to be selected by the department to address new subjects in Communications Engineering	11,13				x			x	

Course Coordinator: Prof. Mohamed Fouad
Head of Department: Prof. Mohamed Fouad

Date of Approval: 2023

Practical Training 1
(CEE224**)**

1. **Basic Information:**

Program Title	Communications and Electronics Engineering
Department Offering the Program	Communications and Electronics Engineering
Department Responsible for the Course	Communications and Electronics Engineering
Course Title	Training 1
Course Code	CEE224
Year/Level	Level 2
Specialization	Major
Authorization Date of Course Specification	-

Training hours	**Lectures**	**Tutorial**	**Practical**
	-	**-**	**42**

2. **Course Aims:**

No.	**Aims**
1	Master a wide range of engineering knowledge and specialized skills, as well as the ability to apply that information in real-world situations using theories and analytical thinking.
2	Apply analytic critical and systemic thinking to discover, analyze, and solve a wide range of engineering problems;
4	Work as part of and manage a diverse team of professionals from various engineering specializations, taking responsibility for individual and team performance.
10	Demonstrate leadership qualities, business management, and skill development.
12	Communicate and work effectively within multiple teams in the field of communication and electronics engineering and consider the effects of engineering solutions on society and the environment.
13	Allocate projects creatively by analyzing data from intended tests.

3. **Cometencies (LOs):**

Competency	**Learning Outcomes (LO'S)**
A5	1 .Define technical language and report writing. 2. Assess different ideas, views, and knowledge from a range of sources. 3. Prepare technical reports 4 .Search for information to engage in lifelong self-learning discipline.
A7	1 .Collaborate effectively within multidisciplinary team. 2. Work in stressful environment and within constraints.

	3 .Motivate individuals.
C2	1: Describe principles of design including elements design, process and/or a system related to specific disciplines 2: Define current engineering technologies as related to Electronics and communication Engineering systems 3: Select appropriate solutions for engineering problems based on analytical thinking. 4: Merge engineering knowledge and understanding to improve design, products and/or services. 5: Design a process, component or system to carry out specialized engineering designs. 6: Effectively manage tasks, time, and resources. 7: Acquire entrepreneurial skills
C3	1: Describe quality assurance systems, codes of practice and standards, health and safety requirements and environmental issues. 2: Investigate the failure of components, system, and processes. 3: Judge engineering decision considering balanced cost, benefits, safety, quality, reliability, and environmental impact. 4: Apply safe systems at work and observe the appropriate steps to manage risks
C5	1: Listing characteristics of engineering materials related to the discipline. 2: Evaluate the characteristics and performance of components, systems and processes. 3: Choose appropriate specifications for required devices.

4. Course Contents:

No.	Topic	Tutorial	Practical
1	Students should spend 6 weeks in field training, after completing the Second level, in any Engineering Institution or Engineering Firms	-	8
2	Students should demonstrate the professional and practical skills they acquired during discussion with their assigned tutors	-	26
Total		**-**	**42**

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab
1	Students should spend 6 weeks in field training, after completing the Second level, in any Engineering Institution or Engineering Firms	x				x					x				
2	Students should demonstrate the professional and practical skills they acquired during discussion with their assigned tutors	x				x					x				

6. Teaching and Learning Methods of Disable Students:

6.1. Teaching and Learning Methods of Disable Students:	
1	Additional Tutorials
2	Online lectures and assignments
6.2. Teaching and learning method for low capacity and outstanding Student	

For low capacity students	-Assign a portion of the office hours for those students. -Give them specific tasks. -Repeat the explanation of some of the material and tutorials. - Assign a teaching assistance to follow up the performance of these group of students
For outstanding Students	-Hand out project assignments to those students. -Give them some research topics to be searched using the internet and conduct presentation. Encourage them to take parts in the running research projects.

7. Student evaluation:

7.1 Student evaluation method:

No.	Evaluation Method	LO's
1	Oral examination	A5,A7,C2,C3,C5,
2	Final report (presentation, Report)	A5,A7,C2,C3,C5,

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Oral examination	at the end of training
2	Final term examination	4^{th}

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Oral examination	50%
2	Final term examination	50%
Total		**100%**

8. List of References:

No.	Reference List
1	Subject study

9. Facilities required for teaching and learning:

No.	Facility
1	Lecture classroom
2	
3	White board
4	Data show system
5	Wireless internet
6	Sound system

10. Matrix of knowledge and skills of the course:

No.	Topic	Aims	A5				A7			C2					C3						C5		
			1	2	3	4	1	2	3	1	2	3	4	5	1	2	3	4	5	6	1	2	3

1	Students should spend 6 weeks in field training, after completing the Second level, in any Engineering Institution or Engineering Firms	1,2,4,10,12,13	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	X	x	X
2	Students should demonstrate the professional and practical skills they acquired during discussion with their assigned tutors	1,2,4,10,12,13	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	X	x	X
3	Students should spend 6 weeks in field training, after completing the Second level, in any Engineering Institution or Engineering Firms	1,2,4,10,12,13	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	X	x	X

Head of Department: Prof. Mohamed Fouad
Date of Approval: 2023

Practical Training 2
(CEE326**)**

1. Basic Information:

Program Title	Communications and Electronics Engineering
Department Offering the Program	Communications and Electronics Engineering
Department Responsible for the Course	Communications and Electronics Engineering
Course Title	Training
Course Code	CEE326
Year/Level	Level 3
Specialization	Major
Authorization Date of Course Specification	-

Training hours	**Lectures**	**Tutorial**	**Practical**
	-	**-**	**42**

4. **2. Course Aims:**

No.	Aims
1	Master a wide range of engineering knowledge and specialized skills, as well as the ability to apply that information in real-world situations using theories and analytical thinking.
2	Apply analytic critical and systemic thinking to discover, analyze, and solve a wide range of engineering problems;
4	Work as part of and manage a diverse team of professionals from various engineering specializations, taking responsibility for individual and team performance.
10	Demonstrate leadership qualities, business management, and skill development.
12	Communicate and work effectively within multiple teams in the field of communication and electronics engineering and consider the effects of engineering solutions on society and the environment.
13	Allocate projects creatively by analyzing data from intended tests.

5. **3 Cometencies (LOs):**

Competency	Learning Outcomes (LO'S)
A5	1 .Define technical language and report writing. 2. Assess different ideas, views, and knowledge from a range of sources.

	3. Prepare technical reports 4 .Search for information to engage in lifelong self-learning discipline.
A7	1 .Collaborate effectively within multidisciplinary team. 2. Work in stressful environment and within constraints. 3 .Motivate individuals.
C2	1: Describe principles of design including elements design, process and/or a system related to specific disciplines 2: Define current engineering technologies as related to Electronics and communication Engineering systems 3: Select appropriate solutions for engineering problems based on analytical thinking. 4: Merge engineering knowledge and understanding to improve design, products and/or services. 5: Design a process, component or system to carry out specialized engineering designs. 6: Effectively manage tasks, time, and resources. 7: Acquire entrepreneurial skills
C3	1: Describe quality assurance systems, codes of practice and standards, health and safety requirements and environmental issues. 2: Investigate the failure of components, system, and processes. 3: Judge engineering decision considering balanced cost, benefits, safety, quality, reliability, and environmental impact. 4: Apply safe systems at work and observe the appropriate steps to manage risks
C5	1: Listing characteristics of engineering materials related to the discipline. 2: Evaluate the characteristics and performance of components, systems and processes. 3: Choose appropriate specifications for required devices.

4. Course Contents:

No.	Topic	Tutorial	Practical
1	Students should spend 6 weeks in field training, after completing the Third level, in any Engineering Institution or Engineering Firms	-	6
2	They should prepare a technical report implying a full description of the processes they joined for training	-	30
3	Students should demonstrate the professional and practical skills they acquired during discussion of report with their assigned tutors	-	6
Total		**-**	**42**

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab
1	Students should spend 6 weeks in field training, after completing the Second level, in any Engineering Institution or Engineering Firms	x				x					x				
2	They should prepare a technical report implying a full description of the processes they joined for training	x				x					x				
3	Students should demonstrate the professional and practical skills they acquired during discussion of report with their assigned tutors	x				x					x				

6. Teaching and Learning Methods of Disable Students:

6.1. Teaching and Learning Methods of Disable Students:	
1	Additional Tutorials
2	Online lectures and assignments

6.2. Teaching and learning method for low capacity and outstanding Student	
For low capacity students	-Assign a portion of the office hours for those students. -Give them specific tasks. -Repeat the explanation of some of the material and tutorials. - Assign a teaching assistance to follow up the performance of these group of students

For outstanding Students	-Hand out project assignments to those students. -Give them some research topics to be searched using the internet and conduct presentation. Encourage them to take parts in the running research projects.

7. Student evaluation:

7.1 Student evaluation method:

No.	Evaluation Method	LO's
1	Oral examination	A5,A7,C2,C3,C5,
2	Report evaluation	A5,A7,C2,C3,C5,

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Oral examination	At the end of training
2	Report evaluation	4^{th}

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Oral examination	50%
2	Report evaluation	50%
Total		**100%**

8. List of References:

No.	Reference List
1	Subject study

9. Facilities required for teaching and learning:

No.	Facility
1	Lecture classroom
2	
3	White board
4	Data show system
5	Wireless internet
6	Sound system

10. Matrix of knowledge and skills of the course:

N	Topic	Ai	A5	A7	C2	C3	C5

o.		ms	1	2	3	4	1	2	3	1	2	3	4	5	6	7	1	2	3	4	1	2	3
1	Students should spend 6 weeks in field training, after completing the Third level, in any Engineering Institution or Engineering Firms	1,2, 4, 10, 12, 13	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	X	x	X
2	They should prepare a technical report implying a full description of the processes they joined for training	1,2, 4, 10, 12, 13	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	X	x	X
3	Students should demonstrate the professional and practical skills they acquired during discussion of report with their assigned tutors	1,2, 4, 10, 12, 13	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	X	x	X

Head of Department: Prof. Mohamed Fouad
Date of Approval: 2023