Course Specifications

Engineering Mathematiacs (3)
2025\2026

1. Basic Information

Course Title	**Engineering Mathematics (3)**				
Course Code	**BAS 111**				
Department participating in delivery of the course	**Communications and Electronics Engineering Department**				
Number of credit hours of the course	**Credit Hours**	**Theoretical**		**Self-Learning**	**SWL**
		Lectures	**Tutorial**		
	3	**2**	**2**	**5**	**9**
Course Type	**Major Requirements (Faculty Compulsory)**				
Academic level at which the course is taught	**Level 100**				
Academic Program	– Civil Engineering – Architecture Engineering – Communications & Computer Engineering				
Institute	**Misr Higher Institute of Engineering and Technology**				
University/Academy	**Ministry of Higher Education and Scientific Research**				
Semester	**Fall Semester**				
Prerequisite	**BAS 012**				
Name of Course Coordinator	**Dr. Entsar El-Shazly**				
Course Specification Approval Date	**18/ 8 /2025** **8/9/2025**				
Course Specification Approval	**Communications and Electronics Engineering Department Council, Institute Council**				

2. Course Overview (Brief summary of scientific content)

Functions of several variables (definitions- limits-continuity)-partial derivatives and its applications (extreme values- linear approximation) - vector analysis – Differential operators – multiple integrals and applications (Cartesian, cylindrical, and spherical coordinates- Green's, Gauss, and Stokes's theorems).

3. Course Learning Outcomes CLOs

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		Course Learning Outcomes Upon completion of the course, the student will be able to:	
Code	Text	Code	Text
A1	Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.	CLO1	Define functions of several variables, limits, continuity, and partial derivatives.
		CLO2	Apply partial differentiation and vector analysis to solve problems involving extrema and linear approximation.
A2	Develop and conduct experiments and / or simulations, analyze and interpret data, evaluate and derive results and use statistical analyzes to arrive at conclusions.	CLO3	Analyze multiple integrals in Cartesian, cylindrical, and spherical coordinates to evaluate engineering quantities.
		CLO4	Evaluate vector differential operators and interpret Green's, Gauss, and Stokes' theorems in engineering applications.

4. Teaching and Learning Methods

1. Face to face lectures\tutorials.
2. Blended Learning (Synchronous\Asynchronous sessions)
3. Active Learning (Interactive Discussions - Case studies -Brainstorming – Presentations)
4. Self-learning.

Course Schedule

Number of the Week	Scientific content of the course (Course Topics)	Total Weekly Hours	Expected number of the Learning Hours			
			Theoretical teaching (lectures/discussion groups/ .....)		Training (Practical)	Self-learning (Tasks/ Assignments/ Projects)
			Lectures	Tutorial		
1	Definition of functions of several variables, limits, continuity	9	2	2	-	5

2	Partial derivatives	**9**	2	2	-	**5**
3	Applications of Partial derivatives (extreme values- linear approximation)	**9**	2	2	-	**5**
4	Vector analysis: vector and scalar fields	**9**	2	2	-	**5**
5	Vector analysis: differential operators	**9**	2	2	-	**5**
6-7	Multiple integrals	**18**	4	4	-	**10**
8	**Midterm +Revision**	**9**	2	2	-	**5**
9	Triple integration.	**9**	2	2	-	**5**
10	Applications of Triple integration (Cartesian, cylindrical Coordinates).	**9**	2	2	-	**5**
11	Applications (Spherical Coordinates).	**9**	2	2	-	**5**
12	Line integral	**9**	2	2	-	**5**
13	Work done	**9**	2	2	-	**5**
14	Surface integral and flux	**9**	2	2	-	**5**
15	Revision	**9**	2	2	-	**5**
16	**Final Exam**					

5. Methods of students' assessment

No.	Assessment Methods	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Assignments	Every 3 weeks	15	15%
2	Quizzes	Every 2 weeks	15	15%
3	Proctored exams: Midterm Exam	8	20	20%
4	Proctored exams: Final Exam	15	50	50%
5	Formative assessment	5	0	0%

6. Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference for the course** (must be written in full according to the scientific documentation method)	• **Dennis G. Zill," Advanced Engineering Mathematics", 6th Ed., (2016), Jones &Bartlett.** • **Erwin Kreyszig, In collaboration with Herbert Kreyszig and Edward J. Norminton, "Advanced Engineering Mathematics", 10th Ed., (2015), Wiley.** • **Peter V. O'Neil, "Advanced Engineering Mathematics, 7th Edition", 7th Ed. (2011), Cegage.** • **111 James, Glyn, "Advanced modern engineering mathematics", 5th Ed., (2018), Pearson.**
	Other References	• Advanced Engineering Mathematics, prepared by Dr. Mohamed Al-Sayed Fahmy
	Electronic Sources (Links must be added)	Egyptian Knowledge Bank | بنك المعرفة المصري https://www.ekb.eg/ar/home
	Learning Platforms (Links must be added)	• **www.els.engmet.edu.eg** Google Classroom(https://classroom.google.com)
	Other (to be mentioned)	• Instructor power point presentations
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	-
	Supplies	• Whiteboard • Presenter • Data show system • Sound System
	Electronic Programs	-
	Skill Labs/ Simulators	-
	Virtual Labs	-
	Other (to be mentioned)	-

Course Coordinator

Dr. Entsar El-Shazly

Entsar EL-Shazly

Program Coordinator

Dr. Ebrahim Elmetwally

Ibrahim Elmetwally

Course Specifications
Discrete Mathematics
2025\2026

1. Basic Information

Course Title	Discrete Mathematics				
Course Code	BAS112				
Department participating in delivery of the course	Basic Sciences				
Number of credit hours of the course	Credit Hours	Theoretical		Self-Learning	SWL
	3	Lectures: 2	Tutorial: 2	4	8
Course Type	Major Requirements (Compulsory)				
Academic level at which the course is taught	Level **100**				
Academic Program	Communications & Computer Engineering				
Institute	Misr Higher Institute of Engineering and Technology				
University/Academy	Ministry of Higher Education and Scientific Research				
Semester	Fall Semester				
Prerequisite	Engineering Mathematics 1 (BAS011)				
Name of Course Coordinator	Prof. Bishri Abdel-Momen				
Course Specification Approval Date	18/ 8 /2025 8/9/2025				
Course Specification Approval	Communications and Electronics Engineering Department Council, Institute Council				

2. Course Overview (Brief summary of scientific content)

Discrete mathematics is the study of mathematical structures that are discrete, separated or distinct; in contrast with calculus which deals with continuous change. It provides foundational mathematical tools for computer science, covering logic, set theory, proof techniques (induction), combinatorics, graph theory, and Boolean algebra. It emphasizes logical reasoning, algorithmic thinking, and modeling non-continuous structures to solve problems.

3. Course Learning Outcomes CLOs

Matrix of course learning outcomes CLOs with program outcomes POs (NARS/ARS)

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		Course Learning Outcomes Upon completion of the course, the student will be able to:	
Code	Text	Code	Text
A1	Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.	CLO1	Define concepts and issues of discrete mathematics.
A2	Develop and conduct experiments and / or simulations, analyze and interpret data, evaluate and derive results and use statistical analyzes to arrive at conclusions.	CLO2	Utilize principles of discrete mathematics in solving real life problems, choice of algorithm, and mathematical proofs.
A3	Application of engineering design to achieve cost-effective solutions that meet specific needs. Taking into account global, cultural, social, economic, environmental and ethical aspects. These applications are within the principles of sustainable design and development.	CLO3	Represent problem situations using discrete structures such as finite graphs, matrices, sequences, and recurrence relations.
		CLO4	Demonstrate knowledge of Graph theories, Infinite series, Binomial Theorem, and Boolean algebra.

4. Teaching and Learning Methods

1. Face to face lectures\tutorials.
2. Blended Learning (Synchronous\Asynchronous sessions)
3. Active Learning (Interactive Discussions - Case studies -Brainstorming – Presentations)
4. Self-learning.

Course Schedule

Number of the Week	Scientific content of the course (Course Topics)	Total Weekly Hours	Expected number of the Learning Hours			
			Theoretical teaching (lectures/discussion groups/ .....)		Training (Practical)	Self-learning (Tasks/ Assignments/ Projects)
			Lectures	Tutorial		
1	**Methods of Proof:** Direct proofs, indirect proofs, counterexamples, and proof by contradiction.	**8**	2	2	-	**4**
2	**Set Theory:** Foundations, subsets, power sets, set operations, and Venn diagrams.	**8**	2	2	-	**4**
3	**Relations and Their Properties:** Equivalence relations, partial orderings, and n-ary relations.	**8**	2	2	-	**4**
4	**Propositional Logic:** Truth tables, logical connectives.	**8**	2	2	-	**4**
5	**Propositional Logic:** Operators, and compound statements.	**8**	2	2	-	**4**
6	**Functions:** Injective, surjective, bijective types.	**8**	2	2	-	**4**
7	**Functions:** Function composition, and inverse functions.	**8**	2	2	-	**4**
8	**Midterm +Revision**	**8**	2	2	-	**4**
9	**Graph Theory Foundations:** Graph models, paths, connectivity.	**8**	2	2	-	**4**
10	**Graph Theory Foundations:** Euler paths, and Hamilton paths.	**8**	2	2	-	**4**
11	**Trees and Traversals:** Spanning trees, binary trees.	**8**	2	2	-	**4**
12	**Trees and Traversals:** Traversals, and tracking algorithms.	**8**	2	2	-	**4**
13	**Boolean Algebra:** Boolean functions, logic doors.	**8**	2	2	-	**4**
14	**Boolean Algebra:** Optimization of combinatorial circuits.	**8**	2	2	-	**4**
15	**Revision**	**8**	2	2	-	**4**
16	**Final Exam**					

5. Methods of students' assessment

No.	Assessment Methods	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Assignments	Every 3 weeks	15	15%
2	Quizzes and Reports	Every 2 weeks	15	15%
3	Proctored exams: Midterm Exam	8	20	20%
4	Proctored exams: Final Exam	15	50	50%
5	Formative assessment	5,12	0	0%

6. Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference for the course** (must be written in full according to the scientific documentation method)	• Kenneth H. Rosen, "Discrete Mathematics and Its Applications", McGraw-Hill; 7th edition 2012
	Other References	Schaum's Outline of Discrete Mathematics, Fourth Edition (Schaum's Outlines), 4th ed., 2021 •
	Electronic Sources (Links must be added)	Egyptian Knowledge Bank | بنك المعرفة المصري https://www.ekb.eg/ar/home
	Learning Platforms (Links must be added)	• www.els.engmet.edu.eg • Google Classroom(https://classroom.google.com)
	Other	• Instructor power point presentations
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	-
	Supplies	• Whiteboard • Presenter • Data show system • Sound System
	Electronic Programs	-
	Skill Labs/ Simulators	-
	Virtual Labs	-

	Other (to be mentioned)	-

Course Coordinator

Prof. Bishri Abdel-Momen

Program Coordinator

Dr. Ebrahim Elmetwally

Ibrahim Elmetwally

Course Specifications

Programming and System Representation
2025\2026

1. Basic Information

Course Title	**Programming and System Representation**					
Course Code	**ELC 121**					
Department participating in delivery of the course	**Communications and Computer Engineering**					
Number of credit hours of the course	**Credit Hours**	**Theoretical**		**Practical**	**Self-Learning**	**SWL**
		Lectures	**Tutorial**			
	2	**1**	**1**	**1**	**4**	**7**
Course Type	**Faculty Requirements (Compulsory)**					
Academic level at which the course is taught	**Level 100**					
Academic Program	– Civil Engineering – Architecture Engineering – Communications & Electronic Engineering – Computer Engineering					
Institute	**Misr Higher Institute of Engineering and Technology**					
University/Academy	**Ministry of Higher Education and Scientific Research**					
Semester	**Fall Semester**					
Prerequisite	**------**					
Name of Course Coordinator	**Prof. Sally Elghamrawy**					
Course Specification Approval Date	**18/ 8 /2025** **8/9/2025**					
Course Specification Approval	**Communications and Electronics Engineering Department Council, Institute Council**					

2. Course Overview (Brief summary of scientific content)

Introduction to software design - evolution and comparison of programming languages - types and characteristics of translators – Data types, expressions, mathematical and logical operators, mathematical functions, conditions, decisions, loops, arrays, multidimensional arrays, strings, functions, structured programming - function versus Object Oriented Programming- Introduction

to parallel programming- program maintenance & testing - documentation - numerical and non-numerical examples-programming project.

3. Course Learning Outcomes CLOs

Matrix of course learning outcomes CLOs with program outcomes POs (NARS/ARS)

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		Course Learning Outcomes Upon completion of the course, the student will be able to:	
Code	Text	Code	Text
A8	Communicate effectively - graphically, verbally and in writing - with others using modern tools	CLO1	Describe the evolution of programming languages and compare their features.
		CLO2	Apply fundamental programming concepts such as data types, expressions, operators, mathematical functions, conditions, and loops to solve simple engineering problems.
		CLO3	Use arrays, functions, and structured programming techniques to implement programs.
A10	Acquisition and application of new knowledge; and pursuit of self-learning, lifelong learning.	CLO4	Apply program maintenance, testing, and debugging techniques and document programs effectively.
		CLO5	Complete a programming project integrating OOP concepts and communicate results clearly through documentation.

4. Teaching and Learning Methods

1. Face to face lectures\tutorials.
2. Blended Learning (Synchronous\Asynchronous sessions)
3. Active Learning (Interactive Discussions - Case studies -Brainstorming – Presentations)
4. Self-learning.
5. Flipped classroom.

6. Problem-based learning
7. Project-based learning
8. Experimental Learning (Practical lab. \Simulation)

Course Schedule

Number of the Week	Scientific content of the course (Course Topics)	Total Weekly Hours	Expected number of the Learning Hours			
			Theoretical teaching (lectures/discussion groups/ .....)		Training (Practical)	Self-learning (Tasks/ Assignments/ Projects)
			Lectures	Tutorial		
1	The Program Devolvement Process: Software design, (Brainstorm: Analysis – Design -Coding -Testing -Implementation and Maintenance-Documentation) The characteristics of translators & Compilers.	3	1	1	1	4
2	Overview of the .NET Framework. Comparison of different programming languages.	3	1	1	1	4
3	Sequential Execution: numerical and non-numerical examples using C# & Python	3	1	1	1	4
4	Selection Execution: numerical and non-numerical examples using C# & Python	3	1	1	1	4
5	Repetition Execution: Arrays and its examples using C#	3	1	1	1	4
6	Functions using C#: numerical examples	3	1	1	1	4
7	Functions using C#: non-numerical examples	3	1	1	1	4
8	**Midterm +Revision**	3	1	1	1	4
9	Object Oriented programming - Classes and Objects using C# (Inheritance - Polymorphism)	3	1	1	1	4
10	Object Oriented programming - Classes and Objects using C# (Encapsulation - Abstraction)	3	1	1	1	4
11	Multi-Core programming and Parallel Programming	3	1	1	1	4
12	Comparison between: Multi-Core programming, Parallel Programming, Structured Programming and Object-Oriented Programming	3	1	1	1	4
13	Graphic User Interface (GUI): Windows Application Using C#	3	1	1	1	4

14	Examples on Windows Application Using C#	**3**	1	1	1	**4**
15	**Revision**	**3**	1	1	1	**4**
16	**Final Exam**					

5. Methods of students' assessment

No.	Assessment Methods	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Assignments	Every 3 weeks	5	5%
2	Quizzes and Reports	Every 2 weeks	5	5%
3	Proctored exams: Midterm Exam	8	20	20%
4	Lab. Exam	15	10	10%
5	Project	15	10	10%
6	Proctored exams: Final Exam	16	50	50%
5	Formative assessment	5	0	0%

6. Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference for the course** (**must be written in full according to the scientific documentation method**)	• **H. Rogler, "introduction to computer systems", Kendall Hunt Publishing; 3rd edition 2018**
	Other References	• John Sharp, Microsoft Visual C# Step by Step (10th Edition) (**2022**) • Mueller, J.P., **2023**. *Beginning programming with **Python** for dummies*. John Wiley & Sons.
	Electronic Sources (Links must be added)	https://www.mhprofessional.com/9780071588300-usa-c-30-a-beginners-guide-group http://www.homeandlearn.co.uk/csharp/csharp.html Egyptian Knowledge Bank | بنك المعرفة المصري

		https://www.ekb.eg/ar/home
	Learning Platforms (Links must be added)	**www.els.engmet.edu.eg**
	Other (to be mentioned)	-
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	Computer Labs
	Supplies	• Whiteboard • Presenter • Data show system • Sound System
	Electronic Programs	-
	Skill Labs/ Simulators	-
	Virtual Labs	-
	Other (to be mentioned)	-

Course Coordinator

Prof. Sally Elghamrawy

Sally Elghamrawy

Program Coordinator

Dr. Ebrahim Elmetwally

Ibrahim Elmetwally

Course Specifications

Solid States Electronics

2025\2026

1. Basic Information

Course Title	Solid States Electronics				
Course Code	ELE121				
Department participating in delivery of the course	Department of Communications & Electronics Engineering				
Number of credit hours of the course	Credit Hours	Theoretical		Self-Learning	**SWL**
	3	Lectures 2	Tutorial 2	4	**8**
Course Type	Major Requirements (Compulsory)				
Academic level at which the course is taught	Level 100				
Academic Program	– Communications & Electronic Engineering				
Institute	Misr Higher Institute of Engineering and Technology				
University/Academy	Ministry of Higher Education and Scientific Research				
Semester	Fall Semester				
Prerequisite	BAS011-BAS021				
Name of Course Coordinator	Dr / Eman salah salem				
Course Specification Approval Date	18/ 8 /2025 8/9/2025				
Course Specification Approval	Communications and Electronics Engineering Department Council, Institute Council				

2. Course Overview (Brief summary of scientific content)

Atomic structure – Nature of energy – Quantum model for electrons orbital system – Crystal- line structure of solids – Volume, surface, and Packing density of atoms – Introduction to the Quantum Theory of Solids – Intrinsic semiconductors – Doping for extrinsic semiconductors – Formation of P-N junction – The potential barrier at the

P-N junction – Width and capacitance of the depletion layer of the p-N junction – Forward and reverse biasing of P-N junction – Volt- Ampere characteristics of the P-N junction – Diode under different bias conditions – Diode models – Series and parallel diode configurations with DC input – Diode AND/OR Gates - Diode applications with AC input (Half and Full-wave rectification- Clipper circuits-Clamper circuits- voltage multipliers)- Zener diodes-Other types of special purpose diodes (Schottky Barrier Diodes- Varactor Diodes-Optical diodes- PIN diodes-Tunnel diodes)-Bipolar junction Transistor(BJT) - BJT construction and operation- Basic configurations of transistor (common emitter-common base-common collector)-Transistor Amplifying action-Common Emitter output characteristic curve-BJT transistor parameters-DC Load Line and Operating Point/BJT-DC Biasing (Base Bias -self bias-voltage divider bias-emitter bias - emitter feedback bias-collector feedback bias)-Introduction to BJT/AC small signal analysis

3. Course Learning Outcomes CLOs

Matrix of course learning outcomes CLOs with program outcomes POs (NARS/ARS)

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		Course Learning Outcomes Upon completion of the course, the student will be able to:	
Code	Text	Code	Text
A1	Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.	CLO 1.	Identify specialized engineering knowledge of solid-state physics and apply abstract thinking to electron transport theories.
B2	Design, model and analyze an electrical/electronic/digital system or component for a specific application; and identify the tools required to optimize this design.	CLO 2.	Analyze electronic components and systems (like rectifiers and amplifiers) to meet specific technical requirements.
		CLO 3.	Design modeled engineering solutions for power regulation systems utilizing Zener and special-purpose diodes by applying acquired semiconductor theories and

			identifying appropriate optimization tools.
B3	Design and implement: elements, modules, sub-systems or systems in electrical/electronic/digital engineering using technological and professional tools.	CLO 4.	Implement structural models and simulations to calculate DC bias points and signal parameters in transistor circuits by applying mathematical, computing, and professional electronic design tools.
		CLO 5.	Solve engineering problems related to transistor amplification using systemic and analytical thinking.

4. Teaching and Learning Methods

1. Face to face lectures\tutorials.
2. Blended Learning (Synchronous\Asynchronous sessions)
3. Active Learning (Interactive Discussions - Case studies -Brainstorming – Presentations)
4. Self-learning.
5. Flipped classroom.

Course Schedule

Number of the Week	Scientific content of the course (Course Topics)	Total Weekly Hours	Expected number of the Learning Hours			
			Theoretical teaching (lectures/discussion groups/ .....)		Training (Practical)	Self-learning (Tasks/ Assignments/ Projects)
			Lectures	Tutorial		
1	Atomic structure, Nature of energy and Quantum model forelectrons orbital system	8	2	2	-	4
2	Introduction to the Quantum Theory of Solids	8	2	2	-	4
3	Theory of Solids – Intrinsic semiconductors – Doping for extrinsic semiconductors	8	2	2	-	4

4	The potential barrier at the P-N junction – Width and capacitance of the depletion layer of the p-N junction – Forward and reverse biasing of P-N junction	8	2	2	-	4
5	Diode models – Series and parallel diode configurations with DC input – Diode AND/OR Gates	8	2	2	2	2
6	Diode applications with AC input (Half and Full-wave rectification)	8	2	2	2	2
7	Diode applications with AC input (Clipper circuits-Clamper circuits-voltage multipliers)	8	2	2	2	2
8	**Midterm +Revision**	8	2	2	2	2
9	Zener diodes	8	2	2	2	2
10	Other types of special purpose diodes (Schottky Barrier Diodes- Varactor Diodes-Optical di-odes-PIN diodes-Tunnel diodes)	8	2	2	2	2
11	BJT construction and operation	8	2	2	2	2
12-13	Dc Analysis of BJT	8	2	2	-	4
14	Introduction to BJT/AC small signal analysis.	8	2	2	-	4
15	**Revision**	8	2	2	-	4
16	**Final Exam**					

5. Methods of students' assessment

No.	Assessment Methods	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quiz 1 written – MCQ (Semester work)	4	4	4%
2	Quiz 2 written – MCQ (Semester work)	7	4	4%
3	Quiz 3 written – MCQ (Semester work)	10	4	4%
4	Quiz 4 written – MCQ (Semester work)	12	4	4%
5	Assignments (Semester work)	12	6	6%
6	Reports (Project Work)	13	8	8%

7	Midterm Examination	8	20	20%
8	Final Term Examination	16	50	50%

6. Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference for the course** **(must be written in full according to the scientific documentation method)**	• **Streetman, Ben G., and Sanjay Banerjee. Solid state electronic devices. 7th edition. Englewood Cliffs, NJ: Prentice Hall, 2020.** • **Sedra, A. S., Smith, K. C., Carusone, T. C., & Gaudet, V. Microelectronic circuits. New York: Oxford University Press, 2020.**
	Other References	• Baliga, B. Jayant, ed. Wide Bandgap Semiconductor Power Devic-es: Materials, Physics, Design, and Applications. Woodhead Publishing, 2018. • Streetman, Ben G., and Sanjay Banerjee. Solid state electronic devices. Vol. 10. Englewood Cliffs, NJ: Prentice hall, 2006.
	Electronic Sources (Links must be added)	Egyptian Knowledge Bank | بنك المعرفة المصري https://www.ekb.eg/ar/home
	Learning Platforms (Links must be added)	• **www.els.engmet.edu.eg** Google Classroom(https://classroom.google.com)
	Other (to be mentioned)	• Instructor power point presentations
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	-
	Supplies	• Whiteboard • Presenter • Data show system • Sound System
	Electronic Programs	• -
	Skill Labs/ Simulators	-
	Virtual Labs	-
	Other (to be mentioned)	-

Course Coordinator **Program Coordinator**

Dr. Shymaa Atya **Dr. Ebrahim Elmetwally**

Shimaa Atya

Ibrahim Elmetwally

Course Specifications
Electrical Circuits
2025\2026

1. Basic Information

Course Title	Electrical Circuits				
Course Code	ELP 111				
Department participating in delivery of the course	Communications and Electronics Engineering				
Number of credit hours of the course	Credit hours	Theoretical		Self learning	**SWL**
		Lectures	tutorial		
	3	2	2	4	8
Course Type	Major Requirements (Institude Compulsory)				
Academic level at which the course is taught	level 100				
Academic Program	Communications and Electronics Engineering				
Institute	Misr Higher Institute for Engineering and Technology at Mansoura				
University/Academy	Ministry of Higher Education and Scientific Research				
Semester	Fall Term				
Prerequisite	BAS021-BAS012				
Name of Course Coordinator	Prof. Eid Abdelbaki Ahmed Gouda				
Course Specification Approval Date	18/ 8 /2025 8/9/2025				
Course Specification Approval	Communications and Electronics Engineering Department Council, Institute Council				

2. Course Overview (Brief summary of scientific content)

Electric circuit variables - Electric circuit Elements - Power and energy – Constant and controlled current/voltage sources – Series and Parallel Circuit Analysis – DC circuits (Loop/mesh and Nodal methods) – Circuit Theorems – Capacitance and inductance - Alternating current - Analysis of AC circuits using Vectors – Computation of power – Resonance Circuits – Magnetic circuits - Response of First Order Circuits – Response of Second Order Circuits.

3. Course Learning Outcomes CLOs

Matrix of course learning outcomes CLOs with program outcomes POs (NARS/ARS)

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		Course Learning Outcomes Upon completion of the course, the student will be able to:	
Code	Text	Code	Text
A1	Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.	CLO 1.	Define the concepts and electric circuit analysis theories (Kirchhoff's, Nodal, Mesh, Superposition and Thevenin's theories for AC and DC) and Solve appropriate mathematical for analyzing electric circuits
A2	Develop and conduct experiments and / or simulations, analyze and interpret data, evaluate and derive results and use statistical analyzes to arrive at conclusions.	CLO 2.	Evaluate the characteristics and performance of inductors and capacitor and Use valid methods.
B1	Select, model and analyze electrical power systems applicable to the specific discipline by applying the concepts of: generation, transmission and distribution of electrical power systems.	CLO 3.	Determine the functions of the electrical circuits using the appropriate tools in measurements and experiments and Implement safe systems to solve engineering problems.
B2	Design, model and analyze an electrical/electronic/digital system or component for a specific application; and identify the tools required to optimize this design.	CLO 4.	Evaluate the characteristics and performance of electrical circuits used for industrial applications.

4. Teaching and Learning Methods

1. Face to face lectures\tutorials.
2. Blended Learning (Synchronous\Asynchronous sessions)
3. Active Learning (Interactive Discussions - Case studies -Brainstorming – Presentations)
4. Self-learning.

Course Schedule

Number of the Week	Scientific content of the course (Course Topics)	Total Weekly Hours	Expected number of the Learning Hours			
			Theoretical teaching (lectures/discussion groups/ .....)		Training (Practical)	Self-learning (Tasks/ Assignments / Projects)
			Lectures	Tutorial		
1	Electric circuit variables	8	2	2	**0**	**4**
2	Power and energy – Constant and controlled current/voltage sources	8	2	2	**0**	**4**
3	Series and Parallel Circuit Analysis – DC circuits (Loop/mesh)	8	2	2	**0**	**4**
4	Series and Parallel Circuit Analysis – DC circuits (Nodal methods)	8	2	2	**0**	**4**
5	Circuit Theorems – Capacitance and inductance -	8	2	2	**0**	**4**
6	Electric circuit Elements–)Alternating current	8	2	2	**0**	**4**
7	Analysis of AC circuits using Vectors	8	2	2	**0**	**4**
8	**Midterm +Revision**	8	2	2	**0**	**4**
9	Computation of power	8	2	2	**0**	**4**
10	Resonance Circuits	8	2	2	**0**	**4**
11	Magnetic circuits	8	2	2	**0**	**4**
11-12	Response of First Order Circuits	16	4	4	0	**8**
13-14	Response of Second Order Circuits.	16	4	4	0	**8**
15	**Revision**	8	2	2	**0**	**4**
16	Final Exam					

5. Methods of students' assessment

No.	Assessment Methods	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Assignments	Every 3 weeks	15	15%
2	Quizzes and Reports	Every 2 weeks	15	15%
3	Proctored exams: Midterm Exam	8	20	20%
4	Proctored exams: Final Exam	16	50	50%
5	Formative assessment	5,12	0	0%

6. Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference for the course** (must be written in full according to the scientific documentation method)	• Charles K Alexander and Matthew Sadiku; "Fundamentals of Electric Circuits "6th edition (January 1, 2019) • Hsu, Hwei P. Schaum's outline of signals and systems. McGraw-Hill Education, 2020.
	Other References	Richard G. Dorf, and James A. Svoboda "introduction to electric circuits", 8th Edition, 2017.
	Electronic Sources (Links must be added)	Egyptian Knowledge Bank | بنك المعرفة المصري https://www.ekb.eg/ar/home
	Learning Platforms (Links must be added)	• www.els.engmet.edu.eg • Google Classroom(https://classroom.google.com)
	Other (to be mentioned)	Instructor power point presentations
Supportive facilities & equipment for teaching	**Devices/Instruments**	-
	Supplies	• Whiteboard • Presenter • Data show system • Sound System

and learning *	Electronic Programs	-
	Skill Labs/ Simulators	-
	Virtual Labs	-
	Other (to be mentioned)	-

Course Coordinator

Prof. Eid Abdelbaki

Eid Abdelbaki

Program Coordinator

Dr. Ebrahim Elmetwally

Ibrahim Elmetwally

Course Specifications

Technical Report Writing

2025\2026

1. Basic Information

Course Title (according to the bylaw)	Technical Report Writing				
Course Code (according to the bylaw)	ENG141				
Department/s participating in delivery of the course	Communications and Electronics Engineering				
Number of credit hours/points of the course (according to the bylaw) عدد الساعات / النقاط المعتمدة للمقرر (تبعا لما ورد باللائحة)	Credit hours	Theoretical		Self-Learning	SWL
		Lecture	Tutorial		
	2	1	2	3	6
Course Type	Major Requirements (Compulsory)				
Academic level at which the course is taught	Level 100				
Academic Program	- Communications and Electronics Engineering - Civil Engineering - Arch Engineering				
Faculty/Institute	Misr Higher Institute of Engineering and Technology				
Academic year	2025/2026				
Semester	Fall Semester				
Prerequisite	GEN051				
Name of Course Coordinator	Dr. Hithem Yahya				
Course Specification Approval Date	18/ 8 /2025 8/9/2025				
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	Communications and Electronics Engineering Department Council, Institute Council				

2. Course Overview (Brief summary of scientific content)

Essential elements of a technical report: Abstract – Summary – Contents – Objectives Details of the report including figures – images – video …etc – Conclusions – Recommendations – References using a standard format and the different electronic sources. Report Classification: Technical (Requirement specification – Analysis – Design – and Implementation). Ad- ministrative (Directed to different

operational and management levels). Levels of confidentiality for the different re-ports. Report Composition: Logical presentation of the report and co- ordination be-tween its components. Importance of using correct grammar and punctuation. Enhancing communication effectiveness by the use of different media. Report Implementation: Use of the appropriate software packages including any graphics or multimedia packages.

3. Course Learning Outcomes CLOs

Matrix of course learning outcomes CLOs with program outcomes POs (NARS/ARS)

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		Course Learning Outcomes Upon completion of the course, the student will be able to:	
Code	Text	Code	Text
A2	Develop and conduct experiments and / or simulations, analyze and interpret data, evaluate and derive results and use statistical analyzes to arrive at conclusions.	CLO1	Formulate technical report structures (Abstract, Objectives, Details, Conclusions) that logically synthesize experimental findings, analytical data, and design specifications.
		CLO2	Integrate data visualizations, figures, and multimedia into technical documentation to illustrate experimental and implementation outcomes.
		CLO3	Derive actionable recommendations based on analyzed data tailored to report classifications and confidentiality levels.
		CLO4	Apply standard referencing and citation formats to validate electronic sources and external data used in analysis and implementation reports.
		CLO5	Demonstrate professional written communication standards using correct grammar, logical coordination between

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		Course Learning Outcomes Upon completion of the course, the student will be able to:	
Code	Text	Code	Text
			components, and effective media tools to present technical outcomes.

4. Teaching and Learning Methods

1. Face to face lectures\tutorials.
2. Blended Learning (Synchronous\Asynchronous sessions)
3. Active Learning (Interactive Discussions - Case studies -Brainstorming – Presentations)
4. Self-learning.
5. Flipped classroom.

Course Schedule

Number of the Week	Scientific content of the course (Course Topics)	Total Weekly Hours	Expected number of the Learning Hours			
			Theoretical teaching (lectures/discussion groups/ .....)		Training (Practical)	Self-learning (Tasks/ Assignments/ Projects)
			Lectures	Tutorial		
1	Introduction to Technical Report Writing	6	1	2	0	3
2	Types of Technical Documents and their Function	6	1	2	0	3
3	Basic Structure of Reports	6	1	2	0	3
4	Completion of the Technical Report	6	1	2	0	3
5	Useful behavior for working on project and Technical Report	6	1	2	0	3
6	Sentence Combination	6	1	2	0	3
7	Coordination and Subordination	6	1	2	0	3
8	**Midterm +Revision**	6	1	2	0	3

9	Parallel Structure, Matching Idea to Form	**6**	**1**	**2**	**0**	**3**
10	The writing Process	**6**	**1**	**2**	**0**	**3**
11	Formal Reports	**6**	**1**	**2**	**0**	**3**
12	Writing Expository	**6**	**1**	**2**	**0**	**3**
13	Capitalization	**6**	**1**	**2**	**0**	**3**
14	Dashes, Exclamation marks	**6**	**1**	**2**	**0**	**3**
15	**Revision**	**6**	**1**	**2**	**0**	**3**
16	**Final Exam**					

5. Methods of students' assessment

No.	Assessment Methods	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quizzes	3	10	10%
2	Presentation (1)	7	5	5%
3	Mid Term Examination (written exam)	8	25	25%
4	Assignment	12	10	10%
5	Final Term Examination (written exam)	16	50	50%

6. Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference for the course** **(must be written in full according to the scientific documentation method)**	***Heike Hering*** **, " How to Write Technical Reports": Understandable Structure, Good Design , Convincing Presentation", (2019), Springer**
	Other References	***Raymond Greenlaw*****, Raymond Greenlaw, " Technical Writing , Presentational Skills and Online Communication: Professional Tools and Insights". , (2012), IGI Global.**
	Electronic Sources (Links must be added)	Egyptian Knowledge Bank | بنك المعرفة المصري https://www.ekb.eg/ar/home
	Learning Platforms (Links must be added)	• **www.els.engmet.edu.eg** Google Classroom(https://classroom.google.com)
	Other (to be mentioned)	Instructor power point presentations
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	-
	Supplies	• Whiteboard • Presenter • Data show system • Sound System
	Electronic Programs	-
	Skill Labs/ Simulators	-
	Virtual Labs	-
	Other (to be mentioned)	-

Course Coordinator

Dr. Hithem Yahia

Hithem Yahia

Program Coordinator

Dr. Ebrahim Elmetwally

Ibrahim Elmetwally

Course Specifications

Elective 1&2 - Negotiation Skills
2025\2026

1. Basic Information

Course Title (according to the bylaw)	**Elective 1&2 - Negotiation Skills**			
Course Code (according to the bylaw)	**GEN153**			
Department/s participating in delivery of the course	**Communications and Computer Engineering**			
Number of credit hours/points of the course (according to the bylaw) عدد الساعات / النقاط المعتمدة للمقرر (تبعا لما ورد باللائحة)	**Credit Hours**	**Theoretical**	**Self-Learning**	**SWL**
	2	**Lectures** **2**	**2**	**4**
Course Type	**Faculty Requirements (Elective)**			
Academic level at which the course is taught	**Level 100**			
Academic Program	– Civil Engineering – Architecture Engineering – Communications & Computer Engineering			
Faculty/Institute	**Misr Higher Institute of Engineering and Technology**			
Academic year	**2025/2026**			
Semester	**Fall Semester**			
Academic Standards	**NARS 2018**			
Prerequisite	**------**			
Name of Course Coordinator	**Assistant Prof. Marwa Elbatreek**			
Course Specification Approval Date	**18/ 8 /2025** **8/9/2025**			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	**Communications and Electronics Engineering Department Council, Institute Council**			

2. Course Overview (Brief summary of scientific content)

Negotiation: concept, attributes, and principles; dynamic nature of negotiation; interdependence; ethics of negotiation; psychological and social aspects of negotiation; cooperative and competitive negotiations; preparation for negotiation; strategies and tactics of

negotiation; organizing negotiation; using power in negotiation; using questions and dealing with objections; handling failures in negotiations; and best practices in negotiations through case studies.

3. Course Learning Outcomes CLOs

Matrix of course learning outcomes CLOs with program outcomes POs (NARS/ARS)

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		Course Learning Outcomes Upon completion of the course, the student will be able to:	
Code	Text	Code	Text
A7	Work efficiently as an individual and as a member of a multidisciplinary and multicultural working group	CLO1	Navigate complex cooperative and competitive negotiations with strict adherence to professional engineering ethics, international standards, and high moral integrity.
A9	Use creative, innovative, flexible ideas, and gain entrepreneurial and leadership skills to anticipate and react to new circumstances	CLO2	Demonstrate advanced communication skills to present arguments effectively and handle objections during high-stakes discussions.
A10	Acquisition and application of new knowledge; and pursuit of self-learning, lifelong learning	CLO3	Synthesize insights from negotiation case studies to systematically adapt best practices and drive life-long self-learning in professional conflict resolution.

4. Teaching and Learning Methods

1. Face to face lectures\tutorials.
2. Blended Learning (Synchronous\Asynchronous sessions)
3. Active Learning (Interactive Discussions - Case studies -Brainstorming – Presentations)
4. Self-learning.
5. Flipped classroom.

Course Schedule

Number of the Week	Scientific content of the course (Course Topics)	Total Weekly Hours	Expected number of the Learning Hours			
			Theoretical teaching (lectures/discussion groups/ .....)		Training (Practical)	Self-learning (Tasks/ Assignments/ Projects)
			Lectures	Tutorial		
1	Concept, attributes, and principles of negotiation	4	2	0	0	2
2	Dynamic nature of negotiation	4	2	0	0	2
3	Interdependence in negotiation	4	2	0	0	2
4	Ethics of negotiation	4	2	0	0	2
5	Psychological aspects of negotiation	4	2	0	0	2
6	Social aspects of negotiation	4	2	0	0	2
7	Cooperative and competitive negotiations	4	2	0	0	2
8	**Midterm +Revision**	4	2	0	0	2
9	Preparation for negotiation	4	2	0	0	2
10	Negotiation strategies and tactics	4	2	0	0	2
11	Organizing negotiation	4	2	0	0	2
12	Using power in negotiation & Handling failures in negotiation	4	2	0	0	2
13	Using questions	4	2	0	0	2
14	Handling objections	4	2	0	0	2
15	**Revision**	4	2	0	0	2
15	**Final Exam**					

5. Methods of students' assessment

No.	Assessment Methods	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Assignments	Every 3 weeks	5	5%
2	Quizzes and Reports	Every 2 weeks	5	5%
3	Proctored exams: Midterm Exam	8	20	20%

5	Case study analysis	14	10	10%
6	Proctored exams: Final Exam	15	50	50%

6. Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.) *	**The main (essential) reference for the course** (**must be written in full according to the scientific documentation method**)	• Lewicki, R., Saunders, D., & Barry, B., Negotiation, 8th Edition, McGraw-Hill Education, New York, USA, 2020.
	Other References	• Fisher, R., Ury, W., & Patton, B., Getting to Yes: Negotiating Agreement Without Giving In, 3rd Edition, Penguin Books, New York, USA, 2011.
	Electronic Sources (Links must be added)	https://www.coursera.org/learn/negotiation-skills https://www.pon.harvard.edu Egyptian Knowledge Bank | بنك المعرفة المصري https://www.ekb.eg/ar/home
	Learning Platforms (Links must be added)	**www.els.engmet.edu.eg**
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	
	Supplies	• Whiteboard • Presenter • Data show system • Sound System
	Electronic Programs	
	Skill Labs/ Simulators	-
	Virtual Labs	-
	Other (to be mentioned)	-

Course Coordinator

Ass. Prof. Marwa Elbatreek

Marwa Elbatreek

Program Coordinator

Dr. Ebrahim Elmetwally

Ebrahim Elmetwally

Course Specifications
Ordinary Differential Equations
2025\2026

1. Basic Information

Course Title	**Ordinary Differential Equations**				
Course Code	**BAS 113**				
Department participating in delivery of the course	**Communications and Electronics Engineering Department**				
Number of credit hours of the course	**Credit Hours**	**Theoretical**		**Self-Learning** (Tasks/ Assignments/ Projects)	**SWL**
	3	**Lectures**	**Tutorial**	**5**	**9**
		2	**2**		
Course Type	**Major Requirements (Compulsory)**				
Academic level at which the course is taught	**Level 100**				
Academic Program	– **Civil Engineering** – **Architecture Engineering** – **Communications & Computer Engineering**				
Institute	**Misr Higher Institute of Engineering and Technology at Mansoura**				
University/Academy	**Ministry of Higher Education and Scientific Research**				
Semester	**Spring semester**				
Prerequisite	**BAS 012**				
Name of Course Coordinator	**Prof. Dr. Bishri Abdel-Moemen**				
Course Specification Approval Date	**18/ 8 /2025** **8/9/2025**				
Course Specification Approval	**Communications and Electronics Engineering Department Council, Institute Council**				

2. Course Overview (Brief summary of scientific content)

First-order ordinary differential equations, second order linear differential equations with constant coefficients, Higher order differential equations with constant coefficients (special and complementary solutions)-first-order systems of differential equations with constant coefficients, Exponential matrix, Laplace transforms and its applications on solving linear and Nonlinear odes, series solutions. numerical methods (optional).

3. Course Learning Outcomes CLOs

Matrix of course learning outcomes CLOs with program outcomes POs (NARS/ARS)

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		Course Learning Outcomes Upon completion of the course, the student will be able to:	
Code	Text	Code	Text
A1	Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.	CLO1	Define concepts and terminology related to ordinary differential equations, initial value problems, and solution methods for first-order and higher-order differential equations.
		CLO2	Apply analytical techniques to solve first-order ordinary differential equations and systems of differential equations with constant coefficients.
		CLO3	Solve second-order and higher-order linear differential equations with constant coefficients, including complementary and particular solutions.
B1	Select, model and analyze electrical power systems applicable to the specific discipline by applying the concepts of: generation, transmission and distribution of electrical power systems.	CLO4	Apply Laplace transforms and exponential matrix methods to solve linear and nonlinear differential equations in engineering applications.

4. Teaching and Learning Methods

1. Face to face lectures\tutorials.
2. Blended Learning (Synchronous\Asynchronous sessions)
3. Active Learning (Interactive Discussions - Case studies -Brainstorming – Presentations)
4. Self-learning.

Course Schedule

Number of the Week	Scientific content of the course (Course Topics)	Total Weekly Hours	Expected number of the Learning Hours			
			Theoretical teaching (lectures/discussion groups/ .....)		Training (Practical)	Self-learning (Tasks/ Assignments/ Projects)
			Lectures	Tutorial		
1	• First-Order Differential Equations: Basic concepts, formation of differential equations, classification and separable equations.	4	2	2	0	5
2	• First-Order Differential Equations: First-order linear equations, homogeneous, exact equations and integrating factors.	4	2	2	0	5
3	• First-Order Differential Equations: Bernoulli equations	4	2	2	0	5
4	• Second-Order Linear Differential Equations with Constant Coefficients: Homogeneous equations and characteristic equations	4	2	2	0	5
5	• Second-Order Linear Differential Equations: Nonhomogeneous equations, complementary solution and particular solution	4	2	2	0	5
6	• Higher-Order Differential Equations with Constant Coefficients: Complementary and particular solutions	4	2	2	0	5
7	• First-Order Systems of Differential Equations with Constant	4	2	2	0	5

	Coefficients: Matrix formulation and solution of systems					
8	• Midterm + Revision	4	2	2	0	5
9	• Exponential Matrix: Definition, properties and computation of the exponential matrix	4	2	2	0	5
10	• Laplace Transforms: Definition, properties and basic transforms	4	2	2	0	5
11	• Inverse Laplace Transforms: Methods of inversion and applications to initial-value problems	4	2	2	0	5
12	• Applications of Laplace Transforms: Solving linear ordinary differential equations	4	2	2	0	5
13	• Applications of Laplace Transforms: Solving linear systems	4	2	2	0	5
14	• Series Solutions: Power-series methods and ordinary points	4	2	2	0	5
15	• Revision	4	2	2	0	5
16	Final Exam					

5. Methods of students' assessment

No.	Assessment Methods	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Assignments	Every 3 weeks	15	15%
2	Quizzes	Every 2 weeks	15	15%
3	Proctored exams: Midterm Exam	8	20	20%
4	Proctored exams: Final Exam	16	50	50%

6. Learning Resources and Supportive Facilities *

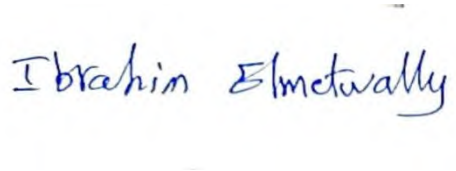
Learning resources (books, scientific references, etc.) *	**The main (essential) reference for the course** **(must be written in full according to the scientific documentation method)**	• *James C. Robinson, "An Introduction to Ordinary Differential Equations", (2004), Cambridge University Press*
	Other References	• *William A. Adkins, Mark G. Davidson," Ordinary Differential Equations", 1st Ed., (2012), Springer.* • *Ricardo, Henry J. A Modern Introduction to Differential Equations. 3rd ed. Elsevier, 2023.* • *Ali Ümit Keskin, "Ordinary Differential Equations for Engineers: Problems with MATLAB Solutions", 1st Ed., (2019), Springer International Publishing.* • *Andrei D. Polyanin, Valentin F. Zaitsev," Handbook of Ordinary Differential Equations: Exact Solutions, Methods, and Problems", 3rd Ed., (2018), Chapman and Hall/CRC*
	Electronic Sources (Links must be added)	• Egyptian Knowledge Bank: https://www.ekb.eg/ar/home
	Learning Platforms (Links must be added)	• Electronic Learning System www.els.engmet.edu.eg • Google Classroom https://classroom.google.com/h/tv
	Other (to be mentioned)	• Instructor power point presentations
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	-
	Supplies	• Whiteboard • Presenter • Data show system • Sound System
	Electronic Programs	-
	Skill Labs/ Simulators	-
	Virtual Labs	-
	Other (to be mentioned)	-

Course Coordinator

Prof. Dr. Bishri Abdel-Moemen

Program Coordinator

Dr. Ibrahim Elmetwally



Course Specifications
Complex Analysis
2025\2026

1. Basic Information

Course Title	**Complex Analysis**				
Course Code	**BAS 113**				
Department participating in delivery of the course	**Communications and Electronics Engineering Department**				
Number of credit hours of the course	**Credit Hours**	**Theoretical**		**Self-Learning** (Tasks/ Assignments/ Projects)	**SWL**
	3	**Lectures**	**Tutorial**	**6**	**10**
		2	**2**		
Course Type	**Major Requirements (Compulsory)**				
Academic level at which the course is taught	**Level 100**				
Academic Program	**Communications & Computer Engineering**				
Institute	**Misr Higher Institute of Engineering and Technology at Mansoura**				
University/Academy	**Ministry of Higher Education and Scientific Research**				
Semester	**Spring semester**				
Prerequisite	**BAS 011**				
Name of Course Coordinator	**Dr. Entsar El-Shazly**				
Course Specification Approval Date	**18/ 8 /2025** **8/9/2025**				
Course Specification Approval	**Communications and Electronics Engineering Department Council, Institute Council**				

2. Course Overview (Brief summary of scientific content)

Algebra of complex numbers, - analytic functions, complex integration, Cauchy Riemann theorem, Cauchy integral formula - complex series-Taylor and Laurent series singularity points, zeros and residue- conformal mapping- infinite series – Fourier transform, Integral transforms: Fourier, Laplace, Bessel, Hankel, Hilbert, and Z transforms.

3. Course Learning Outcomes CLOs

Matrix of course learning outcomes CLOs with program outcomes POs (NARS/ARS)

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		Course Learning Outcomes Upon completion of the course, the student will be able to:	
Code	Text	Code	Text
A1	Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.	CLO1	Define algebraic operations of complex numbers and properties of analytic functions used in engineering applications.
		CLO2	Apply complex integration techniques and Cauchy theorems to solve problems involving analytic functions.
		CLO3	Analyze complex series, singularities, zeros, residues, and conformal mappings in complex analysis problems.
A2	Develop and conduct experiments and / or simulations, analyze and interpret data, evaluate and derive results and use statistical analyzes to arrive at conclusions.	CLO4	Apply Fourier and integral transforms (Laplace, Bessel, Hankel, Hilbert, and Z) to interpret engineering problems and derive meaningful results.

4. Teaching and Learning Methods

1. Face to face lectures\tutorials.
2. Blended Learning (Synchronous\Asynchronous sessions)
3. Active Learning (Interactive Discussions - Case studies -Brainstorming – Presentations)
4. Self-learning.

Course Schedule

Number of the Week	Scientific content of the course (Course Topics)	Total Weekly Hours	Expected number of the Learning Hours			
			Theoretical teaching (lectures/discussion groups/ .....)		Training (Practical)	Self-learning (Tasks/ Assignments/ Projects)
			Lectures	Tutorial		
1	• Algebra of complex numbers and complex plane	4	2	2	0	6
2	• Functions of complex variables and limits	4	2	2	0	6
3	• Analytic functions and Cauchy-Riemann equations	4	2	2	0	6
4	• Cauchy-Riemann theorem and harmonic functions	4	2	2	0	6
5	• Complex integration and line integrals	4	2	2	0	6
6	• Cauchy's theorem and Cauchy integral formula	4	2	2	0	6
7	• Applications of Cauchy integral formula	4	2	2	0	6
8	• Midterm + Revision	4	2	2	0	6
9	• Complex series: Taylor series	4	2	2	0	6
10	• Laurent series and expansion of complex functions	4	2	2	0	6
11	• Singularity points, zeros and poles	4	2	2	0	6

12	• Residues and applications of the residue theorem	4	2	2	0	6
13	• Conformal mapping and applications	4	2	2	0	6
14	• Infinite series and Fourier transform	4	2	2	0	6
15	• Integral transforms: Laplace, Bessel, Hankel, Hilbert and Z-transforms	4	2	2	0	6
16	Final Exam					

5. Methods of students' assessment

No.	Assessment Methods	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Assignments	Every 3 weeks	15	15%
2	Quizzes	Every 2 weeks	15	15%
3	Proctored exams: Midterm Exam	8	20	20%
4	Proctored exams: Final Exam	16	50	50%

6. Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference for the course** (**must be written in full according to the scientific documentation method**)	• *John H. Mathews, Russell W. Howell,"Complex Analysis for Mathematics and Engineering", 6th Ed., (2012), Jones & Bartlett Publishers*
	Other References	• *Yu, Kit-Wing. Problems and Solutions for Undergraduate Complex Analysis I. 2022.* • *Richard Beals, Roderick Wong, "Explorations in Complex Functions", 1st Ed., (2020), Springer* • *Asmar, Nakhlé H., Grafakos, Loukas," Complex Analysis with Applications", (2018), Springer.*

		• *Erwin Kreyszig, "Advanced Engineering Mathematics", 10th Ed., (2015), Wiley.*
	Electronic Sources (Links must be added)	• Egyptian Knowledge Bank: https://www.ekb.eg/ar/home
	Learning Platforms (Links must be added)	• Electronic Learning System www.els.engmet.edu.eg • Google Classroom https://classroom.google.com/h/tv
	Other (to be mentioned)	• Instructor power point presentations
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	-
	Supplies	• Whiteboard • Presenter • Data show system • Sound System
	Electronic Programs	-
	Skill Labs/ Simulators	-
	Virtual Labs	-
	Other (to be mentioned)	-

Course Coordinator

Dr. Entsar El-Shazly

Entsar EL-Shazly

Program Coordinator

Dr. Ibrahim Elmetwally

Ibrahim Elmetwally

Course Specifications
Digital Design
2025\2026

1. Basic Information

Course Title	**Digital Design**					
Course Code	**ELC 111**					
Department participating in delivery of the course	**Communications and Electronics Engineering Department**					
Number of credit hours of the course	**Credit Hours**	**Theoretical**		**Practical**	**Self-Learning** (Tasks/ Assignments/ Projects)	**SWL**
	3	**Lectures**	**Tutorial**	**1**	**5**	**9**
		2	**1**			
Course Type	**Major Requirements (Compulsory)**					
Academic level at which the course is taught	**Level 100**					
Academic Program	**Communications and Electronics Engineering Department**					
Institute	**Misr Higher Institute of Engineering and Technology at Mansoura**					
University/Academy	**Ministry of Higher Education and Scientific Research**					
Semester	**Spring semester**					
Prerequisite	**BAS 112**					
Name of Course Coordinator	**Dr. Tamer Ramadan**					
Course Specification Approval Date	**18/ 8 /2025** **8/9/2025**					
Course Specification Approval	**Communications and Electronics Engineering Department Council, Institute Council**					

2. Course Overview (Brief summary of scientific content)

Numbering systems – Logic gates – Boolean algebra — Different Forms of Boolean expressions – Simplification of Boolean Functions using Karnaugh maps – Combinational logic circuits (Arithmetic Circuits) – Encoders – Decoders –Multiplexers – Flip Flop and latches - Sequential logic circuits – Counters – Registers.

3. Course Learning Outcomes CLOs

Matrix of course learning outcomes CLOs with program outcomes POs (NARS/ARS)

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		Course Learning Outcomes Upon completion of the course, the student will be able to:	
Code	Text	Code	Text
A1	Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.	CLO1	Explain the principles of digital systems, number systems, and logic design techniques.
		CLO2	Analyze combinational and sequential logic circuits using Boolean algebra and simplification methods.
B2	Design, model and analyze an electrical/electronic/digital system or component for a specific application; and identify the tools required to optimize this design.	CLO3	Design digital circuits including adders, counters, registers, and memory units using suitable tools and ICs.
B5	Adopt suitable national and international standards and codes to: design, build, operate, inspect and maintain electrical/electronic/digital equipment, systems and services.	CLO4	Apply hardware design techniques to develop digital systems for engineering applications.
		CLO5	Prepare laboratory reports and practical projects related to digital design and circuit implementation.

4. Teaching and Learning Methods

1. Face to face lectures\tutorials.
2. Blended Learning (Synchronous\Asynchronous sessions)
3. Active Learning (Interactive Discussions - Case studies -Brainstorming – Presentations)
4. Self-learning.
5. Problem -based learning
6. Project-based learning
7. Experimental Learning (Practical lab. \Simulation)

Course Schedule

Number of the Week	Scientific content of the course (Course Topics)	Total Weekly Hours	Expected number of the Learning Hours			
			Theoretical teaching (lectures/discussion groups/ .....)		Training (Practical)	Self-learning (Tasks/ Assignments/ Projects)
			Lectures	Tutorial		
1	• Number systems and digital codes	4	2	1	1	5
2	• Logic gates and Boolean algebra	4	2	1	1	5
3	• Simplification using Karnaugh maps	4	2	1	1	5
4	• Combinational logic circuits	4	2	1	1	5
5	• Decoders and encoders	4	2	1	1	5
6	• Multiplexers and demultiplexers	4	2	1	1	5
7	• Arithmetic logic circuits	4	2	1	1	5
8	• Midterm + Revision	4	2	1	1	5
9	• Flip-flops and latches	4	2	1	1	5
10	• Registers and shift registers	4	2	1	1	5
11	• Counters and timing circuits	4	2	1	1	5
12	• Memory units	4	2	1	1	5

13	• programmable logic devices	4	2	1	1	5
14	• Digital system design project	4	2	1	1	5
15	• Revision and Lab. Exam	4	2	1	1	5
16	**Final Exam**					

5. Methods of students' assessment

No.	Assessment Methods	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Assignments	Every 3 weeks	5	5%
2	Quizzes and Reports	Every 2 weeks	5	5%
3	Proctored exams: Midterm Exam	8	20	20%
4	Lab. Exam	15	10	10%
5	Project	15	10	10%
6	Proctored exams: Final Exam	16	50	50%
7	Formative Assessments	5	0	0%

6. Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference for the course** (**must be written in full according to the scientific documentation method**)	• *M. Morris Mano and Michael D. Ciletti, Digital Design: With an Introduction to the Verilog HDL, 5th Edition, Pearson, 2013.*
	Other References	• *Mano, M. Morris, and Ciletti, Michael D.,Digital Design, 6th Edition, Pearson Education Limited, Harlow, United Kingdom, 2024.* • *Roy, Shirshendu, Advanced Digital System Design: Techniques and Applications, Springer Nature, Cham, Switzerland, 2023.* • *Ward, Hubert Henry,Mastering Digital Electronics: A Practical Gui de to Circuit Design and Analysis, Apress, New York, USA, 2024.*

		• *Elahi, Ata, Computer Systems: Digital Design, Fundamentals and Architecture, Springer Nature, Cham, Switzerland, 2022.* • *Suganthi, S., Gangalakshmi, P., and Usha, D.,Mastering Digital Logic Design: A Complete Guide with Concepts and Circuits, SAN International Scientific Publications, Chennai, India, 2025.* • *El-Sheikh, Gamal M., Digital Logic Design: Devices, Circuits, and Applications, 9th Edition, McGraw-Hill Education, New York, USA, 2023.*
	Electronic Sources (Links must be added)	• Egyptian Knowledge Bank: https://www.ekb.eg/ar/home
	Learning Platforms (Links must be added)	• Electronic Learning System www.els.engmet.edu.eg • Google Classroom https://classroom.google.com/h/tv
	Other (to be mentioned)	• El-Sheikh, Gamal M., Digital Logic Design: Devices, Circuits, and Applications, 9th Edition, McGraw-Hill Education, New York, USA, 2023.
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	• Digital Logic Trainer Kit. • Digital ICs • Digital Multimeter • Oscilloscope • DC Power • Supply
	Supplies	• Whiteboard • Presenter • Data show system • Sound System
	Electronic Programs	• Logisim
	Skill Labs/ Simulators	• Logic Lab
	Virtual Labs	-
	Other (to be mentioned)	-

Course Coordinator

Dr. Tamer Ramadan

Tamer Ramadan

Program Coordinator

Dr. Ibrahim Elmetwally

Ibrahim Elmetwally

Course Specifications
Electronic Testing (1)
2025\2026

1. Basic Information

Course Title	**Electronic Testing (1)**				
Course Code	**ELE 111**				
Department participating in delivery of the course	**Communications and Electronics Engineering Department**				
Number of credit hours of the course	**Credit Hours**	**Theoretical**	**Practical**	**Self-Learning** (Tasks/ Assignments/ Projects)	**SWL**
	3	**Lectures** **1**	**4**	**4**	**9**
Course Type	**Major Requirements (Compulsory)**				
Academic level at which the course is taught	**Level 100**				
Academic Program	**Communications and Electronics Engineering Department**				
Institute	**Misr Higher Institute of Engineering and Technology at Mansoura**				
University/Academy	**Ministry of Higher Education and Scientific Research**				
Semester	**Spring semester**				
Prerequisite	**ELE 121**				
Name of Course Coordinator	**Dr. Ibrahim Elmetwally**				
Course Specification Approval Date	**18/ 8 /2025** **8/9/2025**				
Course Specification Approval	**Communications and Electronics Engineering Department Council, Institute Council**				

2. Course Overview (Brief summary of scientific content)

Set of lab experiments to cover: Passive circuits analysis- RC circuits (charge and discharge analysis) and filter design representation-PN junction diodes and Zener characteristic curves – diode circuits applications (different rectifiers circuits – clippers clampers-logic gates)-Zener as voltage regulator- DC analysis of different Bipolar junction transistors (BJT) configurations – BJT for logic circuits- Field Effect Transistor (FET) configuration and analysis.

3. Course Learning Outcomes CLOs

Matrix of course learning outcomes CLOs with program outcomes POs (NARS/ARS)

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		Course Learning Outcomes Upon completion of the course, the student will be able to:	
Code	Text	Code	Text
A2	Develop and conduct experiments and/or simulations, analyze and interpret data, evaluate and derive results, and use statistical analyses to arrive at conclusions.	CLO 1.	Analyze experimental and simulated frequency responses of passive RC low- and high-pass filters to determine their performance characteristics.
A4	Use of contemporary technologies, standards, specifications and codes of practice, principles of quality, health and safety requirements, environmental issues, principles of risk management.	CLO 2.	Apply contemporary laboratory instruments and standard test procedures to evaluate electronic circuits while adhering to health, safety, and risk management guidelines.
B4	Estimate and measure the performance of an electrical/electronic/digital system and circuit under specific input excitation, and evaluate its suitability for a specific application.	CLO 3.	Evaluate the operational performance of diode applications (rectifiers, regulators, clippers, clampers, logic gates) under various input excitations.
B5	Adopt suitable national and international standards and codes to design, build, operate, inspect, and maintain electrical/electronic/digital equipment, systems and services.	CLO 4.	Analyze BJT and FET circuits in different configurations, including DC analysis and transistor-based logic circuit applications, following suitable laboratory standards and procedures.

4. Teaching and Learning Methods

1. Face to face lectures\tutorials.
2. Blended Learning (Synchronous\Asynchronous sessions)
3. Active Learning (Interactive Discussions - Case studies -Brainstorming – Presentations)
4. Self-learning.
5. Flipped classroom.
6. Project-based learning
7. Experimental Learning (Practical lab. \Simulation)

Course Schedule

Number of the Week	Scientific content of the course (Course Topics)	Total Weekly Hours	Expected number of the Learning Hours			
			Theoretical teaching (lectures/discussion groups/ .....)		Training (Practical)	Self-learning (Tasks/ Assignments/ Projects)
			Lectures	Tutorial		
1	• Lab precautions and instrumentation: Multimeter, Oscilloscope, Function Generator, DC Power Supply and basic measurement techniques	5	1	0	4	4
2	• Passive circuits analysis: Series/parallel RC circuits and measurement of voltage and current	5	1	0	4	4
3	• RC circuits: Charging and discharging characteristics and time constant	5	1	0	4	4
4	• RC filters: Low-Pass Filter (LPF) and High-Pass Filter (HPF); frequency response	5	1	0	4	4
5	• PN junction diode: Forward and reverse characteristics and determination of diode parameters	5	1	0	4	4
6	• Rectifier circuits: Half-wave, full-wave and bridge rectifiers	5	1	0	4	4

7	• Diode applications: Clippers, clampers and diode logic circuits	5	1	0	4	4
8	• Midterm + Revision	5	1	0	4	4
9	• Zener diode: Zener characteristics and Zener diode as a voltage regulator	5	1	0	4	4
10	• BJT characteristics: Input/output characteristics and determination of transistor operating regions	5	1	0	4	4
11	• BJT for logic circuits: Transistor switching and implementation of basic logic gates	5	1	0	4	4
12	• BJT amplifier – Common Emitter: DC biasing and AC analysis	5	1	0	4	4
13	• BJT configurations: DC and AC analysis of Common Base and Common Collector configurations	5	1	0	4	4
14	• FET: Characteristics, operating regions and DC analysis • FET AC analysis and comprehensive revision: FET configurations and comparison with BJT	5	1	0	4	4
15	• Revision and Oral and Practical Exam	5	1	0	4	4
16	Final Exam					

5. Methods of students' assessment

No.	Assessment Methods	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quizzes and Reports	Every 3 weeks	6	6%
2	Assignments (Semester work)	13	2	2%
3	Performing experiments in the electronics lab	Per week	2	2%
4	Midterm Examination	8	20	20%
5	Oral Exam + Lab Exam (Project Work)	15	20	20%

6	Final Term Examination	16	50	50%
7	Formative Assessments	5	0	0%

6. Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference for the course** **(must be written in full according to the scientific documentation method)**	• *Boylestad, R.L. and Nashelsky, L.," Electronic Devices and Circuit Theory", Pearson Education, 2013, ISBN: 9780133109047, Edition: 11.*
	Other References	• *Floyd, Thomas L., "Electronic Devices", Global Edition. Pearson Education Canada, 2018.* • *Sedra, A. S., Smith, K. C., Carusone, T. C., & Gaudet, V., "Microelectronic circuits". New York: Oxford University Press, 2020* • *Whitaker, Jerry C. The electronics handbook. Crc Press, 2018.* • *Floyd, T.L.," Electronic Devices (Conventional Current Version)", Pearson Education, 2011.*
	Electronic Sources (Links must be added)	• Egyptian Knowledge Bank: https://www.ekb.eg/ar/home
	Learning Platforms (Links must be added)	• Electronic Learning System www.els.engmet.edu.eg • Google Classroom https://classroom.google.com/h/tv
	Other (to be mentioned)	• Instructor power point presentations.
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	• Basic electronic components (resistors, capacitors, inductors, diodes, transistors, ICs • Consumables such as wires, jumpers, soldering tools, and PCB boards • Function generator /test board / multimeter /Osc
	Supplies	• Whiteboard • Presenter • Data show system • Sound System
	Electronic Programs	• Multisim • MATLAB/Simulink

	Skill Labs/ Simulators	Electronic lab
	Virtual Labs	-
	Other (to be mentioned)	-

Course Coordinator

Dr. Ibrahim Elmetwally

Ibrahim Elmetwally

Program Coordinator

Dr. Ibrahim Elmetwally

Ibrahim Elmetwally

Course Specifications
Electrical Measurements and Sensors
2025\2026

1. Basic Information

Course Title	**Electrical Measurements and Sensors**					
Course Code	**ELE 112**					
Department participating in delivery of the course	**Communications and Electronics Engineering Department**					
Number of credit hours of the course	**Credit Hours**	**Theoretical**		**Practical**	**Self-Learning** (Tasks/ Assignments/ Projects)	**SWL**
	3	**Lectures**	**Tutorial**	**1**	**5**	**9**
		2	**1**			
Course Type	**Major Requirements (Compulsory)**					
Academic level at which the course is taught	**Level 100**					
Academic Program	**Communications & Computer Engineering**					
Institute	**Misr Higher Institute of Engineering and Technology at Mansoura**					
University/Academy	**Ministry of Higher Education and Scientific Research**					
Semester	**Spring semester**					
Prerequisite	**ELP 111**					
Name of Course Coordinator	**Dr. Ahmed Nageeb Mahmoud**					
Course Specification Approval Date	**18/ 8 /2025** **8/9/2025**					
Course Specification Approval	**Communications and Electronics Engineering Department Council, Institute Council**					

2. Course Overview (Brief summary of scientific content)

Introduction about measurements – Errors in measurements – Statistical analysis of errors in measurements – Measurements of all electrical quantities (current – voltage –and power) for dc and ac current – Measurement of resistances and capacitors – The (multi- meter) – DC and AC bridges -Analog and Digital oscilloscopes –

Measurements of time period and frequency -Theory of sensor-Advantages of sensor-Specification of sensor-Types of sensors (Light sensor, Displacement sensor-Capacitive sensor, Resistive sensor, Magnetic sensor, and Temperature sensor).

3. Course Learning Outcomes CLOs

Matrix of course learning outcomes CLOs with program outcomes POs (NARS/ARS)

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		Course Learning Outcomes Upon completion of the course, the student will be able to:	
Code	Text	Code	Text
A1	Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics	CLO1	Configure a wide spectrum of measurement knowledge and specialized skills to apply theories in real-life diagnostic situations.
		CLO2	Use abstract thinking to select appropriate sensor types based on engineering specifications and environmental constraints
A2	Develop and conduct experiments and / or simulations, analyze and interpret data, evaluate and derive results and use statistical analyzes to arrive at conclusions	CLO3	Apply analytic and systemic thinking to identify, diagnose, and perform statistical analysis of measurement errors
B2	Design, model and analyze an electrical/electronic/digital system or component for a specific application; and identify the tools required to optimize this design.	CLO4	Design sensing components for specific applications by identifying the tools required for optimization.
B4	Estimate and measure the performance of an electrical/electronic/digital system and circuit under specific input excitation, and evaluate its suitability for a specific application.	CLO5	Demonstrate the ability to use specialized laboratory equipment (Oscilloscopes/Bridges) while identifying and preventing hazards.

4. Teaching and Learning Methods

1. Face to face lectures\tutorials.
2. Blended Learning (Synchronous\Asynchronous sessions)
3. Active Learning (Interactive Discussions - Case studies -Brainstorming – Presentations)

4. Self-learning.
5. Project-based learning
6. Experimental Learning (Practical lab. \Simulation)

Course Schedule

Number of the Week	Scientific content of the course (Course Topics)	Total Weekly Hours	Expected number of the Learning Hours			
			Theoretical teaching (lectures/discussion groups/ .....)		Training (Practical)	Self-learning (Tasks/ Assignments/ Projects)
			Lectures	Tutorial		
1	• Measurement Foundations & Errors: Introduction to instrumentation and the types of systematic/random measurement errors.	4	2	1	1	5
2	• Statistical Analysis of Errors: Applying mathematical tools to evaluate accuracy, precision, and deviation trends.	4	2	1	1	5
3	• Basic Electrical Quantities: Direct and alternating current (DC/AC) metrics for voltage, current, and power calculation.	4	2	1	1	5
4	• Passive Component Instrumentation: Methods for identifying, measuring, and testing electrical resistances and capacitors.	4	2	1	1	5
5	• The Multimeter: Practical operational theory of digital and analog multi-functional multimeters.	4	2	1	1	5
6	• DC and AC Bridges: Using Wheatstone, Maxwell, or Wien bridges to solve for unknown impedance components.	4	2	1	1	5
7	• Oscilloscopes: Comparing principles, signals, and interface structures between analog and digital oscilloscopes.	4	2	1	1	5
8	• Midterm + Revision	4	2	1	1	5
9	• Time and Frequency Metrics: Techniques for capturing time	4	2	1	1	5

	periods, wave parameters, and signal frequencies accurately.					
10	• Sensor Theory & Specifications: Understanding transduction principles, calibration curves, advantages, and key data specifications.	4	2	1	1	5
11	• Resistive & Capacitive Sensors: Operation of strain gauges, potentiometers, and structural displacement proximity sensors.	4	2	1	1	5
12	• Temperature & Light Sensors: Characteristics of thermocouples, RTDs, thermistors, and photo-detecting semiconductors.	4	2	1	1	5
13	• Magnetic & Displacement Sensors: Application of Hall-effect, inductive, and mechanical movement tracking components.	4	2	1	1	5
14	• Industrial Sensor Applications: Implementing standard telemetry methods to collect real-world engineering environmental values.	4	2	1	1	5
15	• Revision and Lab. Exam	4	2	1	1	5
16	Final Exam					

5. Methods of students' assessment

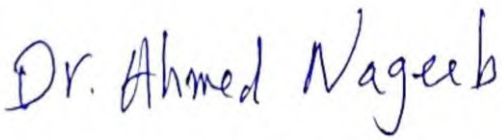
No.	Assessment Methods	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Assignments	Every 3 weeks	5	5%
2	Quizzes and Reports	Every 2 weeks	5	5%
3	Proctored exams: Midterm Exam	8	20	20%
4	Lab. Exam	15	10	10%
5	Project	15	10	10%
6	Proctored exams: Final Exam	16	50	50%
7	Formative Assessments	5	0	0%

6. Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference for the course** **(must be written in full according to the scientific documentation method)**	• *David A. Bell "Electronic Instrumentation and Measurements" Fifth Edition 2016 oxford Publication.*
	Other References	• *Andrea Cataldo,Nich Giaqanits and Leaopolodo Angrsemi, "Basic Theory and Laboratory Experiments in Measurements and Instrumentation", 5th Edition, January 1, 2020.*
	Electronic Sources (Links must be added)	• Egyptian Knowledge Bank: https://www.ekb.eg/ar/home • http://www.innovateus.net/science/what-digital-voltmeter • https://www.tek.com/document/online/primer/xyzscopes ch2/ oscilloscope-types#Oscilloscope Types
	Learning Platforms (Links must be added)	• Electronic Learning System www.els.engmet.edu.eg • Google Classroom https://classroom.google.com/h/tv
	Other (to be mentioned)	• Instructor power point presentations.
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	• Function generator /test board / multimeter/Osc
	Supplies	• White board • Presenter • Data show system • Sound System
	Electronic Programs	• PyCharm (Student) • Logisim
	Skill Labs/ Simulators	Electronic lab
	Virtual Labs	-
	Other (to be mentioned)	-

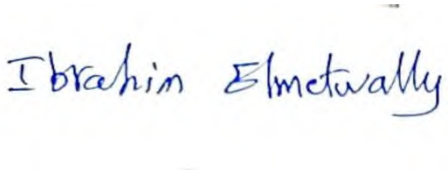
Course Coordinator

Dr. Ahmed Naguib Mahmoud



Program Coordinator

Dr. Ibrahim Elmetwally



Course Specifications
Specialized training
2025-2026

1. Basic Information

Course Title	Specialized training					
Course Code	ENG142					
Department participating in delivery of the course	Communications and Electronics Engineering Department					
Number of credit hours of the course	**Credit Hours**	**Theoretical**		Practical	**Self-Learning** (Tasks/ Assignments/ Projects)	**SWL**
		Lectures	**Tutorial**			
	1	**0**	**0**	0	**0**	**0**
Course Type	Institute Requirements (Compulsory)					
Academic level at which the course is taught	Level 100					
Academic Program	Computer Engineering Department					
Institute	Misr Higher Institute of Engineering and Technology at Mansoura					
University/Academy	Ministry of Higher Education and Scientific Research					
Semester	Summer semester					
Prerequisite	Completing 60 CH					
Name of Course Coordinator	Dr.					
Course Specification Approval Date	18/ 8 /2025 8/9/2025					
Course Specification Approval	Communications and Electronics Engineering Department Council, Institute Council					

2. Course Overview (Brief summary of scientific content)

The course covers microcontroller fundamentals, Arduino programming, control systems, sensors, actuators, and practical embedded-system applications, including Arduino C programming, sequential and conditional control, PWM, servo motors, IR and ultrasonic sensors, ADC, LCD interfacing, soil-moisture, gas, LDR, rain, and

temperature sensors, as well as PCB schematic and layout design, printed-circuit-board prototyping, circuit testing and soldering, followed by final project implementation and evaluation.

3. Course Learning Outcomes CLOs

Matrix of course learning outcomes CLOs with program outcomes POs (NARS/ARS)

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		Course Learning Outcomes Upon completion of the course, the student will be able to:	
Code	**Text**	**Code**	**Text**
A2	Develop and conduct experiments and / or simulations, analyze and interpret data, evaluate and derive results and use statistical analyzes to arrive at conclusions.	CLO1	Identify, analyze, and formulate technical solutions for engineering problems during on-campus laboratory exercises.
		CLO2	Apply basic mathematics and science concepts to resolve complex hardware or software errors encountered on lab kits.
A8	Communicate effectively - graphically, verbally and in writing - with others using modern tools.	CLO3	Produce clear, structured lab logbooks, technical charts, and documentation to share effectively with engineering peers.
B3	Design and implement: elements, modules, sub-systems or systems in electrical/electronic/digital engineering using technological and professional tools.	CLO4	Assemble and run communication hardware setups or electronic sub-systems using contemporary laboratory equipment.

4. Teaching and Learning Methods

1. Face to face lectures
2. Blended Learning (Synchronous\Asynchronous sessions)
3. Active Learning (Interactive Discussions - Case studies -Brainstorming – Presentations)
4. Self-learning.
5. Problem-based learning
6. Project-based learning

7. Experimental Learning (Practical lab. \Simulation)

Course Schedule

Number of the Day	Scientific content of the course (Course Topics)	Total Daily Hours	Expected number of the Learning Hours			
			Theoretical teaching (lectures/discussion groups/ .....)		Training (Practical)	Self-learning (Tasks/ Assignments/ Projects)
			Lectures	Tutorial		
1	Introduction to microcontrollers, Arduino kits comparison, basic concepts of control systems, Arduino project development.	4	0	0	4	5
2	Arduino C programming, sequential control, stepped sequences, conditional statements.	4	0	0	4	
3	Arduino Actuators and Motion Control (PWM, LED brightness control, servo motor control, Serial Monitor, anti-theft alarm system.)	4	0	0	4	
4	Sensors and Arduino-Based Measurement Systems (IR sensor, ultrasonic module, ultrasonic glasses for the blind, ADC basics).	4	0	0	4	
5	Arduino Display and Environmental Sensor Interfacing (LCD interfacing, soil-moisture sensor, LDR, gas sensor, rain sensor, LM35 temperature sensor).	4	0	0	4	5
6	Arduino Control Systems and High-Voltage Load Interfacing (Light-control system with LCD, smoke-detection system, water-detection system, temperature alarm, relays and high-voltage loads).	4	0	0	4	
7	PCB Design, Fabrication, and Prototyping (Printed schematic design, PCB layout design, PCB fabrication, circuit testing bench, soldering and board prototyping).	4	0	0	4	
8	Integrated Final Project Implementation and Evaluation (Integration of Arduino, sensors, actuators, interfacing and PCB techniques; final project implementation, testing, and final evaluation).	4	0	0	4	

5. Methods of students' assessment

No.	Assessment Methods	Assessment Timing (Day Number)	Marks/ Scores	Percentage of total course Marks
1	Class participation	Daily	20	50%
2	Tasks and Reports	Every 2 days	30	
3	Oral / practical and Projects	8	50	50%

6. Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference for the course** (must be written in full according to the scientific documentation method)	• Michael McRoberts. "Beginning Arduino." 2nd Edition. © Apress, 2013.
	Other References	• Note Book – including required software and brief discussion on all topics. • Mike Cheich. "Arduino Book for Beginners." © Programming Electronics Academy, 2021 • Yogesh Misra. "Programming and Interfacing with Arduino." © CRC Press, 2021.
	Electronic Sources (Links must be added)	• Egyptian Knowledge Bank: https://www.ekb.eg/ar/home
	Learning Platforms (Links must be added)	• Google Classroom https://classroom.google.com/h/tv
	Other (to be mentioned)	• Instructor power point presentations.
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	• Arduino – UNO • Test-board • Sensors • Actuators • LCD
	Supplies	• Whiteboard • Presenter

		• Data show system • Sound System
	Electronic Programs	• Arduino IDE • Proteus
	Skill Labs/ Simulators	• Computer LAB
	Virtual Labs	-
	Other (to be mentioned)	-

Course Coordinator **Program Coordinator**

Dr. Ibrahim Elmetwally

Ibrahim Elmetwally

Course Specifications
Communication & Presentation Skills
2025\2026

1. Basic Information

Course Title	**Communication & Presentation Skills**			
Course Code	**GEN 152**			
Department participating in delivery of the course	**Communications and Electronics Engineering Department**			
Number of credit hours of the course	**Credit Hours**	**Theoretical**	**Self-Learning** (Tasks/ Assignments/ Projects)	**SWL**
	2	**Lectures** **2**	**2**	**4**
Course Type	**University Requirements (Elective)**			
Academic level at which the course is taught	**Level 100**			
Academic Program	**Communications & Computer Engineering**			
Institute	**Misr Higher Institute of Engineering and Technology at Mansoura**			
University/Academy	**Ministry of Higher Education and Scientific Research**			
Semester	**Spring semester**			
Prerequisite	**-**			
Name of Course Coordinator	**Assistant Prof. Marwa Elbatreek**			
Course Specification Approval Date	**18/ 8 /2025** **8/9/2025**			
Course Specification Approval	**Communications and Electronics Engineering Department Council, Institute Council**			

2. Course Overview (Brief summary of scientific content)

Concept and nature of communication – Communication model – Formal and informal communications – Interpersonal and managerial communications – Body language – Written communications (Reports and memos) – Ten Commandments of effective communication – Good listing – Elements of effective presentation model – Preparation of good presentation – Researching and generating information for informative presentations -Designing effective visual aids. Carrying out presentations – Discussion and dealing with objections – Evaluating presentation performance. Overcoming nervousness and developing confidence while addressing an audience.

3. Course Learning Outcomes CLOs

Matrix of course learning outcomes CLOs with program outcomes POs (NARS/ARS)

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		Course Learning Outcomes Upon completion of the course, the student will be able to:	
Code	Text	Code	Text
A7	Work efficiently as an individual and as a member of a multidisciplinary and multicultural working group.	CLO 1.	Execute effective interpersonal communication—including verbal delivery, body language, active listening, and constructive feedback within professional team dynamics and public presentations.
A9	Use creative, innovative, flexible ideas, and gain entrepreneurial and leadership skills to anticipate and react to new circumstances.	CLO 2.	Employ structured communication models and professional writing formats to prepare reports, memos, and oral presentations in organizational contexts.
A10	Acquisition and application of new knowledge; and pursuit of self-learning, lifelong learning.	CLO 3.	Prepare informative presentations by researching and organizing information and designing effective visual aids.
		CLO 4.	Optimize personal communication and presentation performance through data-driven self-evaluation and peer feedback to systematically build professional confidence.

4. Teaching and Learning Methods

1. Face to face lectures\tutorials.
2. Blended Learning (Synchronous\Asynchronous sessions)
3. Active Learning (Interactive Discussions - Case studies -Brainstorming – Presentations)
4. Self-learning.
5. Flipped classroom.

Course Schedule

Number of the Week	Scientific content of the course (Course Topics)	Total Weekly Hours	Expected number of the Learning Hours			
			Theoretical teaching (lectures/discussion groups/ .....)		Training (Practical)	Self-learning (Tasks/ Assignments/ Projects)
			Lectures	Tutorial		
1	• Concept and nature of communication	2	2	0	0	2
2	• Communication models and communication process	2	2	0	0	2
3	• Formal and informal communication in organizations	2	2	0	0	2
4	• Interpersonal and managerial communication	2	2	0	0	2
5	• Body language and non-verbal communication	2	2	0	0	2
6	• Written communication: reports and memos	2	2	0	0	2
7	• Ten Commandments of effective communication & good listening	2	2	0	0	2
8	• Midterm + Revision	2	2	0	0	2
9	• Elements of an effective presentation model	2	2	0	0	2
10	• Preparation of effective presentations	2	2	0	0	2

11	• Researching and generating information for informative presentations	2	2	0	0	2
12	• Designing effective visual aids	2	2	0	0	2
13	• Delivering presentations, discussion, and dealing with objections	2	2	0	0	2
14	• Evaluating presentation performance, overcoming nervousness, and developing confidence	2	2	0	0	2
15	• Revision	2	2	0	0	2
16	Final Exam					

5. Methods of students' assessment

No.	Assessment Methods	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Assignments	Every 3 weeks	10	10%
2	Quizzes and Reports	Every 2 weeks	15	15%
3	Proctored exams: Midterm Exam	8	25	25%
4	Proctored exams: Final Exam	15	50	50%

6. Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	The main (essential) reference for the course (must be written in full according to the scientific documentation method)	• *Adler, R. B., Rodman, G., & du Pré, A. (2017). Understanding Human Communication (13th ed.). Oxford University Press.*
	Other References	• *Alwalss, Bakil Ali. "An Explicatory Overview of Human Communication and Sign Species." (2024).* • *Guffey, M. E., & Loewy, D. (2018). Essentials of Business Communication (11th ed.). Cengage Learning*

	Electronic Sources (Links must be added)	• Egyptian Knowledge Bank: https://www.ekb.eg/ar/home • https://www.skillsyouneed.com • https://www.mindtools.com • https://www.presentationzen.com
	Learning Platforms (Links must be added)	• Electronic Learning System www.els.engmet.edu.eg • Google Classroom https://classroom.google.com/h/tv
	Other (to be mentioned)	• Instructor power point presentations Recorded lecture videos
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	• Computer / Laptop
	Supplies	• White board • Presenter • Data show system • Sound System
	Electronic Programs	• Microsoft PowerPoint • Microsoft Word / PDF Reader • Internet browsers
	Skill Labs/ Simulators	Computer Lab
	Virtual Labs	-
	Other (to be mentioned)	-

Course Coordinator

Dr. Marwa Elbatrik

Marwa Elbatreek

Program Coordinator

Dr. Ibrahim Elmetwally

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