Course Specifications

Partial differential equations
2025\2026

1. Basic Information

Course Title	**Partial differential equations**					
Course Code	**BAS211**					
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**	**Practical**		
	3	**2**	**2**	**0**	**6**	**10**
Course Type	**Major Requirements (Compulsory)**					
Academic level at which the course is taught	**Level 200**					
Academic Program	– Civil Engineering – Architectural 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	**BAS113, BAS111**					
Name of Course Coordinator						
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)

Special functions: beta and gamma functions, Bessel functions, Hankel functions, Legendre equation and polynomials. Partial differential equations: D'Lembert equation, Wave equation, separation of variables, Laplace and Poisson equations, Propagation equation- solution of partial differential equations using integral transforms.

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	Solve standard partial differential equations (such as Wave, Laplace, and Poisson equations) using analytical methods like separation of variables.
		CLO2	Apply integral transform techniques to solve higher-order partial differential equations and obtain analytical solutions.
		CLO3	Formulate physical engineering phenomena (such as wave propagation and potential distribution) into proper PDE representations.
B2	Develop and conduct experiments and / or simulations, analyze and interpret data, evaluate and derive results and use statistical analyzes to arrive at conclusions.	CLO4	Analyze boundary value problems in cartesian, cylindrical and spherical coordinate systems using special functions (Bessel, Hankel, and Legendre).

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	Practical		
1	Legendre Equation & Polynomials: Generating functions, orthogonality, and Rodrigues' formula.	4	2	2	0	-	6
2	Partial Differential Equations (PDEs): Basic concepts, classification, and boundary conditions.	4	2	2	0	-	6
3	D'Alembert Equation: Derivation, general solution, and physical interpretation.	4	2	2	0	-	6
4	Legendre Equation & Polynomials: Generating functions, orthogonality, and Rodrigues' formula.	4	2	2	0	-	6
5	Partial Differential Equations (PDEs): Basic concepts, classification, and boundary conditions.	4	2	2	0	-	6
6	D'Alembert Equation: Derivation, general solution, and physical interpretation.	4	2	2	0	-	6
7	Legendre Equation & Polynomials: Generating functions, orthogonality, and Rodrigues' formula.	4	2	2	0	-	6
8	**Midterm +Revision**	4	2	2	0	-	6
9	Wave Equation: One-dimensional wave equation and initial-boundary value problems.	4	2	2	0	-	6
10	Separation of Variables: Application to the wave equation and Fourier series representation.	4	2	2	0	-	6
11	Laplace Equation: Boundary value problems in Cartesian and polar coordinates.	4	2	2	0	-	6
12	Poisson Equation: Inhomogeneous boundary problems and physical applications.	4	2	2	0	-	6
13	Propagation / Diffusion Equation: Formulation and analytical solutions.	4	2	2	0	-	6
14	Solving PDEs using Integral Transforms: Fourier transform methods for PDEs.	4	2	2	0	-	6
15	Solving PDEs using Integral Transforms: Laplace transform methods and general course review.	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%
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)	**Taylor, M. E. (2011). Partial differential equations I: Basic theory (2nd ed.). Springer.**
	Other References	
	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**

Ibrahim El-Metwally

Ibrahim Elmetwally

Course Specifications

Statistics and Probability Theory
2025\2026

1. Basic Information

Course Title	**Statistics and Probability Theory**					
Course Code	**BAS212**					
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**	**Practical**		
	2	**1**	**2**	**0**	**4**	**7**
Course Type	**Major Requirements (Faculty Compulsory)**					
Academic level at which the course is taught	**Level 200**					
Academic Program	– Civil Engineering – Architectural 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	**BAS011**					
Name of Course Coordinator						
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)

Theory of probabilities and statistics- Sets and Probabilities- Random Variables probability density function- Moments- Guess distribution- Poisson distribution frequency distributions - Tendency and Dispersion Measures - Sampling Theory and Inferences - tests of hypothesis and confidence intervals - Simple regression and correlation —Application.

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	Apply probability theory concepts, random variables, and probability distributions to solve engineering problems under uncertain conditions.
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	Analyze statistical measures and frequency distributions to interpret engineering data and support decision-making processes.
		CLO3	Conduct hypothesis testing and construct confidence intervals using sampling theory to derive statistically valid conclusions.
		CLO4	Apply regression and correlation techniques to analyze relationships among variables and interpret engineering data.

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	Practical		
1	Sets and Probabilities: Set theory operations, sample space, events, and basic probability axioms.	3	1	2	0	.	4
2	Conditional Probability and Independence: Bayes' theorem, tree diagrams, and joint events.	3	1	2	0	.	4
3	Random Variables: Discrete and continuous random variables, probability mass function (PMF).	3	1	2	0	.	4
4	Probability Density Function (PDF): Cumulative distribution function (CDF) and expectation.	3	1	2	0	.	4
5	Moments: Mean, variance, higher-order moments, and moment-generating functions (MGF).	3	1	2	0	.	4
6	Probability Distributions: Gauss (Normal) distribution properties, standard normal transformation, and z-scores.	3	1	2	0	.	4
7	Discrete Distributions: Poisson distribution derivation, properties, and applications to rare events.	3	1	2	0	.	4
8	**Midterm +Revision**	3	1	2	0	.	4
9	Frequency Distributions: Data collection, tabular representation, histograms, and cumulative frequency polygons.	3	1	2	0	.	4
10	Tendency and Dispersion Measures: Mean, median, mode, variance, standard deviation, and range.	3	1	2	0	.	4
11	Sampling Theory: Sampling techniques, central limit theorem, and sampling distributions.	3	1	2	0	.	4
12	Statistical Inferences & Confidence Intervals: Point estimation, interval estimation for means and proportions.	3	1	2	0	.	4
13	Tests of Hypothesis: Null/alternative hypotheses, Type I & II errors, z-test, and t-test applications.	3	1	2	0	.	4
14	Simple Regression Analysis: Least squares method, linear model fitting, and scatter plots.	3	1	2	0	.	4

15	Correlation & Applications: Pearson correlation coefficient, coefficient of determination, and practical data analysis.	**3**	**1**	**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	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	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)**	**Mathai, A. M., & Haubold, H. J. (2018). Probability and statistics. De Gruyter.**
	Other References	Montgomery, D. C., & Runger, G. C. (2018). Applied statistics and probability for engineers (7th ed.). Wiley.
	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 PowerPoint 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

Ibrahim El-Metwally

Ibrahim Elmetwally

Course Specifications

Computer Organization
2025\2026

1. Basic Information

Course Title	**Computer Organization**					
Course Code	**ELC211**					
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**	**Practical**		
	3	**2**	**1**	**1**	**6**	**10**
Course Type	**Major Requirements (Institute Compulsory)**					
Academic level at which the course is taught	**Level 200**					
Academic Program	– Civil Engineering – Architectural 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	**ELC111**					
Name of Course Coordinator						
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)

Register transfer and micro-operations - Basic Computer organization and design -CPU architecture – Design of ALU – fetch-decode-execute instruction cycle - memory architectures - control unit - Instruction repertoires (RISC, CISC) - Bus synchronization - Interrupt circuits - I/O devices.

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	Identify and analyze the basic concepts of computer organization, register transfer, micro-operations, CPU architecture, and instruction cycle using engineering fundamentals.
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.	CLO2	Conduct simulations and analyze the performance of ALU, control unit, memory access, bus synchronization, interrupt circuits, and I/O interfaces.
		CLO3	Design, model, and analyze computer organization components including ALU, pipelined processor, control unit, memory architecture, and I/O interface for specific applications.
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 suitable standards and design principles for processor organization, RISC/CISC instruction sets, memory systems, bus synchronization, interrupts, and I/O devices.

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	Practical		
1	Register Transfer and Micro-operations: Register transfer language (RTL), bus and memory transfers.	4	2	1	1	-	6
2	Micro-operations: Arithmetic, logic, and shift micro-operations with hardware implementation.	4	2	1	1	-	6
3	Basic Computer Organization and Design: Instruction codes, computer registers, and common bus system.	4	2	1	1	-	6
4	Instruction Cycle: Detailed breakdown of Fetch, Decode, and Execute phases.	4	2	1	1	-	6
5	CPU Architecture: General register organization, stack organization, and instruction formats.	4	2	1	1	-	6
6	Design of Arithmetic Logic Unit (ALU): Design of arithmetic circuit, logic circuit, and ALU control.	4	2	1	1	-	6
7	Control Unit Design: Hardwired control unit vs. microprogrammed control unit architecture.	4	2	1	1	-	6
8	**Midterm +Revision**	4	2	1	1	-	6
9	Instruction Repertoires: Reduced Instruction Set Architecture (RISC) vs. Complex Instruction Set Architecture (CISC).	4	2	1	1	-	6
10	Memory Architectures: Memory hierarchy, main memory (RAM/ROM), and associative memory.	4	2	1	1	-	6
11	Advanced Memory Systems: Cache memory organization, mapping techniques, and virtual memory.	4	2	1	1	-	6

12	Bus Synchronization: Synchronous vs. asynchronous bus transfer, bus arbitration, and strobing/handshaking.	**4**	**2**	**1**	**1**	**-**	**6**
13	Interrupt Circuits: Hardware interrupts, priority interrupts, daisy-chaining, and interrupt service routines (ISR).	**4**	**2**	**1**	**1**	**-**	**6**
14	Input/Output Devices & Interfaces: I/O bus, interface modules, and programmed I/O vs. interrupt-initiated I/O.	**4**	**2**	**1**	**1**	**-**	**6**
15	Direct Memory Access (DMA): DMA controller, bus transfer modes, and general course review.	**4**	**2**	**1**	**1**	**-**	**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	5	5%
2	Quizzes	Every 2 weeks	5	5%
3	Proctored exams: Midterm Exam	8	20	20%
4	Practical/Oral Exam	15	20	20%
5	Proctored exams: Final Exam	16	50	50%
6	Formative assessment	5	0	0%

6. Learning Resources and Supportive Facilities *

Learning resources (books, scientific	**The main (essential) reference for the course** **(must be written in full according to the scientific documentation method)**	**Stallings, W. (2021). *Computer organization and architecture* (11th ed.). Pearson.**

references, etc.) *	**Other References**	
	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 PowerPoint 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

Ibrahim El-Metwally

Ibrahim Elmetwally

Course Specifications

Object Oriented Programming
2025\2026

1. Basic Information

Course Title	**Object Oriented Programming**					
Course Code	**ELC221**					
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**	**Practical**		
	3	**2**	**0**	**2**	**6**	**10**
Course Type	**Major Requirements (Compulsory)**					
Academic level at which the course is taught	**Level 200**					
Academic Program	– Civil Engineering – Architectural 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	**ELC121**					
Name of Course Coordinator						
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)

Object-Oriented Programming paradigms. Classes. Objects. Methods. Interfaces. OOP characteristics: Polymorphism – Inheritance – Encapsulation - Abstraction. Constructors. Destructors. Access specifiers. Operator-overloading. Function-overloading. Abstract classes. Implementation of different applications

using OOP. Graphical User Interface programming. Event-driven programming. Concurrency and multi-threaded programming.

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
A8	Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.	CLO1	Communicate object-oriented programming concepts clearly using appropriate programming terminology, diagrams, and documentation.
		CLO2	Present and document OOP-based applications effectively using modern programming tools and graphical user interface components.
A10	Acquisition and application of new knowledge; and pursuit of self-learning, lifelong learning.	CLO3	Acquire and apply new knowledge of OOP principles including classes, objects, inheritance, polymorphism, encapsulation, abstraction, interfaces, and abstract classes.
		CLO4	Apply self-learning skills to develop OOP applications involving overloading, exception handling, GUI, event-driven programming, concurrency, and multithreading.

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	Practical		
1	Introduction to OOP: Programming paradigms, procedural vs. object-oriented programming, classes, objects, and methods.	4	2	0	2	.	6
2	Class Basics & Access Control: Access specifiers (public, private, protected), instance state, and encapsulation principles.	4	2	0	2	.	6
3	Object Lifecycle: Constructors (default, parameterized, copy), destructors, and memory management.	4	2	0	2	.	6
4	Function Overloading & Static Members: Function overloading, static attributes, and static methods.	4	2	0	2	.	6
5	Operator Overloading: Overloading unary and binary operators, member vs. non-member operator functions.	4	2	0	2	.	6
6	Inheritance: Single, multiple, and hierarchical inheritance, base vs. derived classes, and code reuse.	4	2	0	2	.	6
7	Polymorphism & Abstraction: Virtual functions, dynamic binding, method overriding, abstract classes, and pure virtual functions.	4	2	0	2	.	6
8	**Midterm +Revision**	4	2	0	2	.	6
9	Interfaces & Multiple Inheritance: Interface definition, implementation contract, and abstraction separation.	4	2	0	2	.	6
10	Practical OOP Applications: Applying design principles and OOP patterns to real-world application scenarios.	4	2	0	2	.	6
11	Graphical User Interface (GUI) Programming: Window components, layouts, controls, and UI architecture.	4	2	0	2	.	6
12	Event-Driven Programming: Event listeners, callbacks, event handling loops, and UI interaction logic.	4	2	0	2	.	6
13	Concurrency & Multi-threading: Thread creation, execution lifecycle, thread synchronization, and mutual exclusion.	4	2	0	2	.	6

14	Advanced Multi-threading: Shared resources, race conditions, thread safety, and thread communication.	**4**	**2**	**0**	**2**	**.**	**6**
15	Integrated Project Implementation: Combining OOP, GUI, event handling, and multithreading into a complete application; course review.	**4**	**2**	**0**	**2**	**.**	**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	5	5%
2	Quizzes	Every 2 weeks	5	5%
3	Proctored exams: Midterm Exam	8	20	20%
4	Practical/Oral Exam	15	20	20%
5	Proctored exams: Final Exam	16	50	50%
6	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**)	**Weisfeld, M. (2019). *The object-oriented thought process* (5th ed.). Addison-Wesley Professional.**
	Other References	
	Electronic Sources (Links must be added)	Egyptian Knowledge Bank | بنك المعرفة المصري https://www.ekb.eg/ar/home
	Learning Platforms	• www.els.engmet.edu.eg

	(Links must be added)	Google Classroom(https://classroom.google.com)
	Other (to be mentioned)	• Instructor PowerPoint 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

Ibrahim El-Metwally

Ibrahim Elmetwally

Course Specifications

Electromagnetic fields
2025\2026

1. Basic Information

Course Title	**Electromagnetic fields**					
Course Code	**ELE241**					
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**	**Practical**		
	3	**2**	**2**	**0**	**6**	**10**
Course Type	**Major Requirements (Institute Compulsory)**					
Academic level at which the course is taught	**Level 200**					
Academic Program	– Civil Engineering – Architectural 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	**BAS022, BAS111**					
Name of Course Coordinator						
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)

Part I: Static Electric Fields: Basics of vector Algebra and vector Calculus - Coulomb's Law and Electric Field Intensity – Electrical dipole - Electric flux and flux density - Gauss's Law and Electric Potential - Materials in the Electric Field: Conductors & Dielectrics – Electrical Boundary Condition - Electrical Capacitance and Electrostatic Energy - Boundary Value Problems: Analytic Methods (Laplace's and Poisson's equations).

Part II: Static Magnetic Fields: The Steady Electric Current – Stoke's theorem - The Static Magnetic Field – Biot-Savart and Ampere's laws - Magnetic Materials and Properties – Maxwell's equations in static fields.

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	Recall and define fundamental concepts of vector algebra, vector calculus, Coulomb's law, electric and magnetic fields, Gauss's law, and Maxwell's equations in static fields
		CLO2	Explain the physical meaning of electric and magnetic field quantities, electric potential, flux density, capacitance, magnetic materials, and boundary conditions.
B2	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 electrostatic and magnetostatic field distributions in conductors, dielectrics, and magnetic materials using fundamental field laws, Laplace's equation, and Poisson's equation.
B3	Design and implement: elements, modules, sub-systems or systems in electrical/electronic/digital engineering using technological and professional tools.	CLO4	Apply electromagnetic field principles to determine capacitance, electrostatic energy, and magnetic field behavior relevant to electrical and electronic 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	Practical		
1	Part I — Vector Analysis: Basics of vector algebra, coordinate systems (Cartesian, Cylindrical, Spherical), and vector calculus operators.	4	2	2	0	.	6
2	Electrostatics Fundamentals: Coulomb's Law, electric field intensity due to point, line, and surface charges.	4	2	2	0	.	6
3	Flux & Gauss's Law: Electric flux, flux density, Gauss's law statement, and applications to symmetric distributions.	4	2	2	0	.	6
4	Potential & Dipoles: Electric potential, work done, potential gradient, and electrical dipole moments.	4	2	2	0	.	6
5	Materials in Electric Fields: Conductors, dielectrics, polarization, and electrical boundary conditions.	4	2	2	0	.	6
6	Capacitance & Energy: Electrical capacitance calculations for various geometries and stored electrostatic energy.	4	2	2	0	.	6
7	Boundary Value Problems: Analytic methods for solving Laplace's and Poisson's equations.	4	2	2	0	.	6
8	**Midterm +Revision**	4	2	2	0	.	6
9	Part II — Steady Electric Currents: Current density, continuity equation, Ohm's law in point form, and relaxation time.	4	2	2	0	.	6
10	Magnetostatics Fundamentals: Static magnetic fields, Biot-Savart Law, and field calculations for current distributions.	4	2	2	0	.	6
11	Ampere's Law & Vector Calculus: Ampere's Circuital Law, magnetic flux density, vector magnetic potential, and Stokes' theorem.	4	2	2	0	.	6

12	Magnetic Forces & Torques: Forces on moving charges and current elements, magnetic dipole moment, and torque.	**4**	**2**	**2**	**0**	**.**	**6**
13	Magnetic Materials & Properties: Magnetization, permeability, magnetic boundary conditions, and magnetic circuits.	**4**	**2**	**2**	**0**	**.**	**6**
14	Inductance & Energy: Self-inductance, mutual inductance, and energy stored in static magnetic fields.	**4**	**2**	**2**	**0**	**.**	**6**
15	Maxwell's Equations: Summary and formulation of Maxwell's equations in static electric and magnetic fields; course review.	**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%
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)**	**Sadiku, M. N. O. (2018). *Elements of electromagnetics* (7th ed.). Oxford University Press.**
	Other References	

	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 PowerPoint 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

Ibrahim El-Metwally

Ibrahim Elmetwally

Course Specifications

Contracts and legislation
2025\2026

1. Basic Information

Course Title	**Contracts and legislation**					
Course Code	**ENG231**					
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**	**Practical**		
	1	**1**	**0**	**0**	**2**	**3**
Course Type	**Major Requirements (Compulsory)**					
Academic level at which the course is taught	**Level 200**					
Academic Program	– Civil Engineering – Architectural 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	**Completing 60 CH**					
Name of Course Coordinator						
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)

Legal and contractual considerations, organization of contracting and construction companies, construction phases and strategies, types of contractual relationships, international contract forms, claims and dispute arbitration, engineering project specifications and legal liabilities, expert testimony, labor laws.

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
A6	Planning, supervision and monitoring of engineering projects.	CLO1	Plan contractual and legal aspects of engineering projects in compliance with professional regulations and legislations.
		CLO2	Monitor engineering project activities according to construction management requirements and applicable legal standards.

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	Practical		
1	Introduction to Construction Law: Legal and contractual considerations in engineering projects, legal framework, and sources of law.	1	1	0	0	.	2
2	Organization of Contracting & Construction Companies: Organizational structures,	1	1	0	0	.	2

	corporate governance, licensing, and joint ventures.						
3	Construction Phases & Delivery Strategies: Project life cycle, procurement strategies, and project delivery methods (DBB, DB, Turnkey, BOT).	**1**	**1**	**0**	**0**	**.**	**2**
4	Types of Contractual Relationships: Lump-sum, unit-price, cost-plus, and target-cost contracts; risk allocation among parties.	**1**	**1**	**0**	**0**	**.**	**2**
5	International Contract Forms (FIDIC): Introduction to FIDIC conditions of contract (Red, Yellow, and Silver books) and standard clauses.	**1**	**1**	**0**	**0**	**.**	**2**
6	Engineering Project Specifications: Types of specifications (performance, prescriptive), technical standards, and order of precedence.	**1**	**1**	**0**	**0**	**.**	**2**
7	Legal Liabilities in Engineering: Professional negligence, breach of contract, tort liability, decennial liability, and site safety.	**1**	**1**	**0**	**0**	**.**	**2**
8	**Midterm +Revision**	**1**	**1**	**0**	**0**	**.**	**2**
9	Claims in Construction Contracts: Causes of claims, delay analysis, disruption claims, acceleration, and variation orders.	**1**	**1**	**0**	**0**	**.**	**2**
10	Dispute Avoidance & Resolution: Dispute Boards (DAB/DAAB), negotiation, mediation, conciliation, and escalation processes.	**1**	**1**	**0**	**0**	**.**	**2**
11	Arbitration in Construction: Principles of international and domestic arbitration, arbitration agreements, and enforcement of awards.	**1**	**1**	**0**	**0**	**.**	**2**
12	Expert Testimony & Forensic Engineering: Role of the expert witness, forensic investigation, reporting, and court/arbitral testimony.	**1**	**1**	**0**	**0**	**.**	**2**
13	Labor Laws & Human Resources: Employment contracts, worker rights, working hours, benefits, and occupational health and safety regulations.	**1**	**1**	**0**	**0**	**.**	**2**
14	Labor Regulations & Safety Standards: Labor union relations, site safety law compliance, subcontractor labor liability, and dispute settlement.	**1**	**1**	**0**	**0**	**.**	**2**
15	Case Studies & Comprehensive Review: Analysis of landmark legal and arbitration cases in construction; final course review.	**1**	**1**	**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	13	13%
2	Quizzes	Every 2 weeks	12	12%
3	Proctored exams: Midterm Exam	8	25	25%
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)	**International Federation of Consulting Engineers (FIDIC). (2022). FIDIC contracts guide (2nd ed.). FIDIC.**
	Other References	
	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 PowerPoint 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

Ibrahim El-Metwally

Ibrahim Elmetwally

Course Specifications

Operations research
2025\2026

1. Basic Information

Course Title	**Operations research**					
Course Code	**BAS213**					
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**	**Practical**		
	2	**1**	**2**	**0**	**4**	**7**
Course Type	**Major Requirements (Compulsory)**					
Academic level at which the course is taught	**Level 200**					
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	**Spring Semester**					
Prerequisite	**BAS011**					
Name of Course Coordinator						
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)

Linear programming, non-linear programming, dynamic programming, stochastic modeling and simulation, network programming, computer simulation, queuing, time series analysis, and applications in engineering, science, management and economics.

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	Formulate and solve optimization models using linear, nonlinear, and dynamic programming techniques to support engineering decision-making.
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	Analyze and interpret operational data using time series techniques to forecast system behavior and support decision-making.
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	Apply optimization and network programming techniques to develop cost-effective and resource-efficient solutions for engineering and management systems.
A6	Planning, supervision and monitoring of engineering projects.	CLO4	Conduct stochastic modeling and computer simulations to evaluate system performance and support decision-making.

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	Practical		
1	Introduction to Operations Research: Optimization paradigms, problem formulation, and decision-making applications in engineering and management.	3	1	2	0	-	4
2	Linear Programming (LP): Mathematical formulation, graphical solution method, and Simplex algorithm fundamentals.	3	1	2	0	-	4
3	Advanced Linear Programming: Duality theory, sensitivity analysis, and economic interpretation of LP models.	3	1	2	0	-	4
4	Non-Linear Programming (NLP): Unconstrained vs. constrained optimization, Lagrange multipliers, and Karush-Kuhn-Tucker (KKT) conditions.	3	1	2	0	-	4
5	Dynamic Programming (DP): Principle of optimality, recursive equations, deterministic DP, and stage-wise decision processes.	3	1	2	0	-	4
6	Network Programming: Shortest path algorithms, minimum spanning tree, maximum flow problem, and CPM/PERT project networks.	3	1	2	0	-	4
7	Queuing Theory: Structure of queuing systems, Kendall's notation, M/M/1 and M/M/s single/multi-server queue models.	3	1	2	0	-	4
8	**Midterm +Revision**	3	1	2	0	-	4
9	Stochastic Modeling: Markov chains, transition probability matrices, steady-state probabilities, and stochastic processes.	3	1	2	0	-	4
10	Computer Simulation & Stochastic Simulation: Monte Carlo simulation method,	3	1	2	0	-	4

	random number generation, and pseudo-random variate sampling.						
11	Discrete-Event Computer Simulation: System state representation, event-scheduling approaches, and simulation software implementation.	**3**	**1**	**2**	**0**	**-**	**4**
12	Time Series Analysis (Part I): Components of time series (trend, seasonality, noise), stationarity, and moving averages.	**3**	**1**	**2**	**0**	**-**	**4**
13	Time Series Analysis (Part II): Exponential smoothing techniques and ARIMA/SARIMA forecasting models.	**3**	**1**	**2**	**0**	**-**	**4**
14	Applications in Engineering & Science: Case studies in resource allocation, supply chain, production scheduling, and system design.	**3**	**1**	**2**	**0**	**-**	**4**
15	Applications in Management & Economics: Financial risk modeling, economic forecasting, decision trees, and comprehensive review.	**3**	**1**	**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	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)**	**Taha, H. A. (2017). *Operations research: An introduction* (10th ed.). Pearson.**
	Other References	Carter, M. W., Price, C. C., & Rabadi, G. (2019). *Operations research: A practical approach* (2nd ed.). CRC Press.
	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 PowerPoint 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

Ibrahim El-Metwally

Ibrahim Elmetwally

Course Specifications

Numerical Methods
2025\2026

1. Basic Information

Course Title	**Numerical Methods**					
Course Code	**BAS214**					
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**	**Practical**		
	3	**2**	**2**	**0**	**5**	**9**
Course Type	**Major Requirements (Compulsory)**					
Academic level at which the course is taught	**Level 200**					
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	**Spring Semester**					
Prerequisite	**BAS011**					
Name of Course Coordinator						
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)

Numerical solution of algebraic equations –Numerical solution of Linear Systems (direct and indirect methods) – Nonlinear equations – Functions approximations (Tylor polynomial - Lagrange polynomial - Difference tables) - numerical differentiation and integration – Numerical solution of ordinary and partial differential equations – Curve fitting and extrapolation.

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	Explain the fundamental mathematical principles of numerical methods, including numerical linear algebra, root-finding, interpolation, differentiation, integration, and differential equations.
		CLO2	Apply direct and indirect numerical techniques to solve non-linear algebraic equations, systems of linear equations, and functional approximations.
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	CLO3	Evaluate numerical differentiation, integration, and utilize them in solutions of ODEs and PDEs while estimating approximation errors.
		CLO4	Utilize curve fitting and extrapolation techniques to interpret engineering data trends and derive mathematical relationships.

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	Practical		
1	Numerical Solution of Non-Linear Equations: Bracketing methods (Bisection method, Regula-Falsi method) and convergence criteria.	4	2	2	0	.	5
2	Advanced Non-Linear Systems: Open methods (Newton-Raphson method, Secant method) and systems of non-linear equations.	4	2	2	0	.	5
3	Numerical Solution of Linear Systems (Direct Methods): Gauss elimination, Gauss-Jordan elimination, and LU decomposition (Crout, Doolittle).	4	2	2	0	.	5
4	Numerical Solution of Linear Systems (Indirect Methods): Iterative methods including Jacobi iteration and Gauss-Seidel iteration techniques.	4	2	2	0	.	5
5	Function Approximations (Part I): Taylor polynomial expansion, truncation errors, and Taylor series approximation.	4	2	2	0	.	5
6	Function Approximations & Interpolation (Part II): Lagrange polynomial interpolation, divided differences, and error estimation.	4	2	2	0	.	5
7	Difference Tables & Interpolation: Forward, backward, and central difference tables; Newton's forward/backward difference formulas.	4	2	2	0	.	5
8	**Midterm +Revision**	4	2	2	0	.	5
9	Numerical Differentiation: Forward, backward, and central difference numerical derivative approximations; higher-order derivatives.	4	2	2	0	.	5
10	Numerical Integration (Part I): Trapezoidal rule, Simpson's 1/3 rule, and Simpson's 3/8 rule with error analysis.	4	2	2	0	.	5
11	Numerical Integration (Part II): Romberg integration, Gaussian quadrature, and adaptive numerical integration methods.	4	2	2	0	.	5

12	Numerical Solution of Ordinary Differential Equations (ODEs - Part I): Single-step methods: Taylor series method, Euler's method, and Modified Euler method.	**4**	**2**	**2**	**0**	**.**	**5**
13	Numerical Solution of ODEs (Part II): Multi-step methods and 4th-order Runge-Kutta (RK4) method for initial value problems.	**4**	**2**	**2**	**0**	**.**	**5**
14	Numerical Solution of Partial Differential Equations (PDEs): Finite difference methods for elliptic (Laplace/Poisson), parabolic (Heat equation), and hyperbolic equations.	**4**	**2**	**2**	**0**	**.**	**5**
15	Curve Fitting and Extrapolation: Least squares regression (linear and polynomial), data extrapolation techniques, and general course review.	**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%
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)**	**Chapra, S. C., & Canale, R. P. (2014). *Numerical methods for engineers* (7th ed.). McGraw-Hill Education.**
	Other References	**Burden, R. L., Faires, J. D., & Burden, A. M. (2016). *Numerical analysis* (10th ed.). Cengage Learning.**
	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 PowerPoint 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

Ibrahim El-Metwally

Ibrahim Elmetwally

Course Specifications

Automatic Control
2025\2026

1. Basic Information

Course Title	**Automatic Control**					
Course Code	**ELC261**					
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**	**Practical**		
	3	**2**	**1**	**1**	**5**	**9**
Course Type	**Major Requirements (Institute Compulsory)**					
Academic level at which the course is taught	**Level 200**					
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	**Spring Semester**					
Prerequisite	**ELP111**					
Name of Course Coordinator						
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)

Automatic Control concepts - Mathematical modelling of dynamic systems using Laplace Transform - Applications of electrical, electronic, and mechanical systems- Feedback control systems -Block diagram Reduction – Analysis of systems in state space - Transient response characteristics - Error analysis - Steady state error for the test input signal using static error coefficients - Stability of linear control systems - Effects of integral and derivative control actions - PID controllers - Control systems analysis and design by Root locus method.

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	Formulate mathematical models and analytical methods for dynamic control systems using Laplace Transform techniques.
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.	CLO2	Define the functions and characteristics of feedback control systems and develop control system designs using PID controllers, block diagram reduction, state space analysis, and root locus techniques.
A6	Planning, supervision and monitoring of engineering projects.	CLO3	Identify system constraints and evaluates stability, transient response, and steady-state error characteristics in control systems
B3	Design and implement: elements, modules, sub-systems or systems in electrical/electronic/digital engineering using technological and professional tools.	CLO4	Implement control systems using appropriate controllers and system components for electrical, electronic, and mechanical 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	Practical		
1	Introduction to Automatic Control: Basic concepts, open-loop vs. closed-loop control systems, feedback control principles, and transfer functions.	4	2	1	1	-	5
2	Mathematical Modeling using Laplace Transform: Review of Laplace Transform techniques, differential equations representation, and transfer function derivation.	4	2	1	1	-	5
3	Physical Systems Modeling: Dynamic modeling of mechanical (translational and rotational) and electrical networks.	4	2	1	1	-	5
4	Electronic Systems & Analog Controllers: Modeling electronic circuits, operational amplifiers (Op-Amps) in control, and electromechanical system analogies.	4	2	1	1	-	5
5	Feedback Control Systems & Block Diagram Reduction: Block diagram representations, algebra rules, canonical forms, and block diagram reduction techniques.	4	2	1	1	-	5
6	State Space Analysis (Part I): Fundamentals of state space modeling, state equations, state vector, state transformation, and controllable/observable canonical forms.	4	2	1	1	-	5
7	State Space Analysis (Part II): Solution of state equations, state transition matrix computation, and output equation mapping.	4	2	1	1	-	5
8	**Midterm +Revision**	4	2	1	1	-	5
9	Transient Response Analysis: First-order and second-order system responses to step,	4	2	1	1	-	5

	impulse, and ramp inputs; damping ratio and natural frequency.						
10	Transient Performance Characteristics: Rise time, peak time, maximum overshoot, settling time, and system performance metrics.	**4**	**2**	**1**	**1**	**-**	**5**
11	Error Analysis & Steady-State Error: Classification of control systems by type number, steady-state error analysis for test inputs (step, ramp, parabolic).	**4**	**2**	**1**	**1**	**-**	**5**
12	Static Error Coefficients: Position, velocity, and acceleration error constants (K_p, K_v, K_a) and system type classification.	**4**	**2**	**1**	**1**	**-**	**5**
13	Stability of Linear Control Systems: Concept of absolute and relative stability, characteristic equation, and Routh-Hurwitz stability criterion.	**4**	**2**	**1**	**1**	**-**	**5**
14	Control Actions & PID Controllers: Proportional (P), Integral (I), and Derivative (D) control actions; PID tuning techniques and dynamic effects.	**4**	**2**	**1**	**1**	**-**	**5**
15	Root Locus Method: Analysis and design of control systems using Root Locus construction rules, stability bounds, and parameter variation analysis.	**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	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%
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)	**Ogata, K. (2015). *Modern control engineering* (5th ed.). Pearson.**
	Other References	**Nise, N. S. (2019). *Control systems engineering* (8th ed.). Wiley.**
	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 PowerPoint 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

Ibrahim El-Metwally

Ibrahim Elmetwally

Course Specifications

Electronic circuits
2025\2026

1. Basic Information

Course Title	**Electronic circuits**					
Course Code	**ELE221**					
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**	**Practical**		
	3	**2**	**2**	**0**	**5**	**9**
Course Type	**Major Requirements (Institute Compulsory)**					
Academic level at which the course is taught	**Level 200**					
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	**Spring Semester**					
Prerequisite	**ELE121**					
Name of Course Coordinator						
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)

Amplification in AC domain for BJT transistor - small signal models of BJT (common emitter, common base, and common collector)– transistor amplifiers configurations –basics of operational amplifier – differential amplifiers – Oscillators – Current source circuits, and Current Mirror Circuit - multistage amplifiers (Cascade, Cascode, Darlington, and Feedback pair connections) – power amplifiers (class A, B, C, and D) – Construction and Characteristics of field effect transistors (FET) – DC biasing of FET – small signal analysis of FET – Designing FET Amplifier circuits.

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	Identify the fundamental concepts of BJT and FET amplifiers and formulate small signal models and amplifier configurations in the AC domain.
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	Evaluate the characteristics and limitations of operational amplifiers, differential amplifiers, oscillators, and current mirror circuits.
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	Analyze the performance of multistage amplifiers and power amplifiers including Cascade, Cascode, Darlington, feedback pair, and Class A, B, C, and D amplifiers.
B3	Design and implement: elements, modules, sub-systems or systems in electrical/electronic/digital engineering using technological and professional tools.	CLO4	Design BJT and FET amplifier circuits using appropriate biasing techniques and small signal analysis methods.

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	Practical		
1	BJT AC Domain Amplification & Small-Signal Models: Concept of AC amplification, BJT AC equivalent circuits, r_e model, and hybrid parameter model.	4	2	2	0	.	5
2	BJT Single-Stage Amplifier Configurations: Common Emitter (CE), Common Base (CB), and Common Collector (CC) amplifiers analysis (A_v, A_i, Z_in, Z_out).	4	2	2	0	.	5
3	Multistage BJT Amplifiers: Cascade connections, Cascode amplifiers, Darlington pair, and Feedback pair configurations with loading effects analysis.	4	2	2	0	.	5
4	Current Sources & Current Mirror Circuits: BJT current sources, basic current mirror circuit, Wilson current mirror, and active load configurations.	4	2	2	0	.	5
5	Differential Amplifiers: BJT differential pair, DC and AC operational modes, differential gain, common-mode gain, and Common Mode Rejection Ratio (CMRR).	4	2	2	0	.	5
6	Basics of Operational Amplifiers (Op-Amps): Ideal vs. practical Op-Amp characteristics, inverting/non-inverting amplifiers, and open/closed-loop configurations.	4	2	2	0	.	5
7	Oscillators: Positive feedback principles, Barkhausen stability criterion, RC phase-shift, Wien bridge, Colpitts, and Hartley oscillators.	4	2	2	0	.	5
8	**Midterm +Revision**	4	2	2	0	.	5
9	Power Amplifiers (Part I): Classification of power amplifiers, Class A large-signal amplifiers, efficiency, and thermal dynamics.	4	2	2	0	.	5

10	Power Amplifiers (Part II): Class B push-pull amplifiers, crossover distortion, Class C, and Class D high-efficiency power amplifiers.	**4**	**2**	**2**	**0**	**.**	**5**
11	Field Effect Transistors (FET) Construction & Characteristics: JFET and MOSFET (Depletion & Enhancement) construction, operational principles, and I-V characteristics.	**4**	**2**	**2**	**0**	**.**	**5**
12	DC Biasing of FETs: Fixed bias, self-bias, voltage divider bias, and graphical/analytical DC operating point determination.	**4**	**2**	**2**	**0**	**.**	**5**
13	Small-Signal Analysis of FETs: Small-signal equivalent circuits, transconductance (g_m), output resistance (r_d), Common Source (CS), Common Drain (CD), and Common Gate (CG) configurations.	**4**	**2**	**2**	**0**	**.**	**5**
14	FET Multistage & Advanced Amplifier Configurations: FET cascode, active loads, and differential stages using MOSFETs.	**4**	**2**	**2**	**0**	**.**	**5**
15	Designing FET Amplifier Circuits: Parameter selection, stability considerations, gain-bandwidth constraints, and comprehensive course review.	**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%
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)	
	Other References	
	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 PowerPoint 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

Ibrahim El-Metwally

Ibrahim Elmetwally

Course Specifications

Signal Analysis
2025\2026

1. Basic Information

Course Title	**Signal Analysis**					
Course Code	**ELE261**					
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**	**Practical**		
	3	**2**	**2**	**0**	**4**	**8**
Course Type	**Major Requirements (Institute Compulsory)**					
Academic level at which the course is taught	**Level 200**					
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	**Spring Semester**					
Prerequisite	**BAS211**					
Name of Course Coordinator						
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)

Classification of signals and systems - linear time-invariant analog systems - linear time invariant digital systems - Laplace transform and its applications on analog signals - analog system properties – Z transform and its applications on discrete-time signals - digital system properties - analog Fourier transform and its applications - digital Fourier transform and its applications.

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 terminology, classifications, and fundamental concepts related to continuous-time and discrete-time signals and systems.
		CLO2	Explain the concepts, properties, and behavior of linear time-invariant analog and digital systems.
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	Define and apply continuous-time and discrete-time transforms, including Laplace, Z, and Fourier transforms, for signal and system analysis.
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	Analyze analog and digital signals and systems using mathematical transforms and evaluate their system properties and performance.

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	Practical		
1	Introduction to Signals & Systems: Continuous-time vs. discrete-time signals, basic transformations, and elementary signals (step, impulse, ramp, sinusoid).	4	2	2	0	.	4
2	Classification of Signals & Systems: Energy vs. power signals, periodicity, linearity, time-invariance, causality, and stability properties.	4	2	2	0	.	4
3	Linear Time-Invariant (LTI) Analog Systems: Continuous-time LTI systems, convolution integral, impulse response, and Differential Equation representations.	4	2	2	0	.	4
4	Analog System Properties & Stability: Causality, BIBO stability, memory, and frequency-domain characteristics of LTI continuous-time systems.	4	2	2	0	.	4
5	Laplace Transform Fundamentals: Definition, Region of Convergence (ROC), unilateral and bilateral Laplace transforms, and transform properties.	4	2	2	0	.	4
6	Laplace Transform Applications on Analog Signals: Inverse Laplace transform, transfer functions H(s), pole-zero analysis, and differential equation solutions.	4	2	2	0	.	4
7	Analog Fourier Transform (CTFT): Continuous-Time Fourier Transform definition, convergence conditions, properties, and signal spectrum analysis.	4	2	2	0	.	4
8	**Midterm +Revision**	4	2	2	0	.	4
9	Applications of Analog Fourier Transform: Frequency response of LTI systems, filtering concepts, ideal filters, and modulation techniques.	4	2	2	0	.	4

10	Linear Time-Invariant (LTI) Digital Systems: Discrete-time LTI systems, convolution sum, Difference Equation representations, and impulse response.	**4**	**2**	**2**	**0**	**.**	**4**
11	Z-Transform Fundamentals: Definition, Region of Convergence (ROC) characteristics, properties, and transform pairs for discrete-time signals.	**4**	**2**	**2**	**0**	**.**	**4**
12	Z-Transform Applications on Discrete-Time Signals: Inverse Z-transform methods (partial fraction, power series), system function H(z), and difference equation solutions.	**4**	**2**	**2**	**0**	**.**	**4**
13	Digital System Properties & Stability Analysis: Causality and BIBO stability criteria in the z-domain using pole-zero locations relative to the unit circle.	**4**	**2**	**2**	**0**	**.**	**4**
14	Discrete-Time Fourier Transform (DTFT) & Digital Fourier Transform (DFT): Discrete-time frequency analysis, DTFT properties, sampling of DTFT, and DFT formulation.	**4**	**2**	**2**	**0**	**.**	**4**
15	Applications of Digital Fourier Transform & FFT: Spectral analysis of digital signals, Fast Fourier Transform (FFT) algorithms, digital filtering basics, and comprehensive course review.	**4**	**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	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	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)	**Palani, S. (2022). Signals and systems. Springer.**
	Other References	
	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 PowerPoint 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

Ibrahim El-Metwally

Ibrahim Elmetwally

Course Specifications

Elective Course 3 – Mechanical Installation
2025\2026

1. Basic Information

Course Title	**Elective Course 3 – Mechanical Installation**					
Course Code	**ENG211**					
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**	**Practical**		
	1	**1**	**1**	**0**	**2**	**4**
Course Type	**Elective Requirements (Institute Compulsory)**					
Academic level at which the course is taught	**Level 200**					
Academic Program	– Civil Engineering – Architectural Engineering – Communications & Computer Engineering					
Institute	**Misr Higher Institute of Engineering and Technology**					
University/Academy	**Ministry of Higher Education and Scientific Research**					
Semester	**Spring Semester**					
Prerequisite	**BAS022**					
Name of Course Coordinator						
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 introduces students to the new techniques used in advanced technological systems in buildings such as communication systems, fire alarm systems, firefighting systems, air conditioning systems and electronic control systems. The focus is always upon fundamental concepts of systems. This course will allow students to understand these systems and also to schedule, estimate and coordinate them within the general construction process.

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	Explain the principles and functions of advanced mechanical and electrical installation systems in modern buildings, including HVAC, fire alarm, firefighting, and communication systems.
A7	Work efficiently as an individual and as a member of a multidisciplinary and multicultural working group.	CLO2	Participate effectively within multidisciplinary teams during the coordination, scheduling, and installation of building mechanical and electrical systems.
B3	Design and implement: elements, modules, sub-systems or systems in electrical/electronic/digital engineering using technological and professional tools.	CLO3	Estimate quantities, prepare BOQs, and coordinate installation of integrated building MEP systems using appropriate engineering tools and standard practices.

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	Practical		
1	Introduction to Building MEP Systems: Overview of Mechanical, Electrical, and Plumbing systems; smart building technologies; system integration and coordination.	2	1	1	0	-	2
2	HVAC Systems (Part I): Fundamentals of heating, ventilation, and air conditioning; psychrometrics; thermal comfort; split and packaged units.	2	1	1	0	-	2
3	HVAC Systems (Part II): Central chilled water systems, chillers, cooling towers, AHUs, FCUs; ductwork design and air distribution.	2	1	1	0	-	2
4	Plumbing & Drainage Systems: Cold and hot water supply networks, sanitary drainage, storm drainage, pipe sizing, and fixture requirements.	2	1	1	0	-	2
5	Fire Alarm Systems (Part I): Detection fundamentals, conventional vs. addressable panels, smoke/heat/flame detectors, notification appliances.	2	1	1	0	-	2
6	Fire Alarm Systems (Part II): Control panel architecture, NFPA codes, cause-and-effect matrix, emergency interfaces with HVAC and elevators.	2	1	1	0	-	2
7	Firefighting & Suppression Systems: Water-based fire protection, sprinkler systems, standpipes, fire pumps, and gaseous suppression (FM-200, CO_2).	2	1	1	0	-	2
8	Midterm +Revision	2	1	1	0	-	2
9	Building Communication & Low-Current Systems: Structured cabling, data networks, telecom infrastructure, intercom, PA/VA systems, and AV integration.	2	1	1	0	-	2
10	Access Control & Security Systems: IP CCTV surveillance, access control systems (ACS), intrusion detection, and smart building automation protocols.	2	1	1	0	-	2
11	Electrical Installations: Indoor wiring, power distribution panels, protective devices, earthing systems, and electrical safety codes.	2	1	1	0	-	2
12	Elevators & Vertical Transportation: Types of elevators, operating principles, machine rooms, safety devices, and coordination with building structure.	2	1	1	0	-	2

13	MEP Estimation & Quantity Takeoff (Part I): Principles of cost estimation, material quantification, bill of quantities (BOQ) for HVAC and plumbing.	**2**	**1**	**1**	**0**	**-**	**2**
14	MEP Estimation & Quantity Takeoff (Part II): BOQ preparation for fire protection, electrical, and communication systems; procurement basics.	**2**	**1**	**1**	**0**	**-**	**2**
15	MEP Scheduling & Coordination: BIM/Clash detection, spatial coordination, installation sequencing, shop drawing workflows, commissioning, and handover.	**2**	**1**	**1**	**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	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%
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)**	V. K. Mehta, Rohit Mehta, 'Basic Electrical Engineering', S Chand, 2017.
	Other References	Allan R. Hambley, 'Electrical Engineering: Principles and Applications (Global Edition)', Pearson Education Limited, 2019.
	Electronic Sources	Egyptian Knowledge Bank | بنك المعرفة المصري

	(Links must be added)	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

Ibrahim El-Metwally

Ibrahim Elmetwally

Course Specifications

Elective Course 3 – Electrical Engineering
2025\2026

1. Basic Information

Course Title	**Elective Course 3 – Electrical Engineering**					
Course Code	**ENG212**					
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**	**Practical**		
	1	**1**	**1**	**0**	**2**	**4**
Course Type	**Elective Requirements (Institute Compulsory)**					
Academic level at which the course is taught	**Level 200**					
Academic Program	– Civil Engineering – Architectural Engineering – Communications & Computer Engineering					
Institute	**Misr Higher Institute of Engineering and Technology**					
University/Academy	**Ministry of Higher Education and Scientific Research**					
Semester	**Spring Semester**					
Prerequisite	**BAS022**					
Name of Course Coordinator						
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)

Electrical circuit first principles, AC Circles, Electrical Engines, Direct Current Engines, Low Capacity Engines, Concrete Pumps and Water Lift Pumps, Cables, and Current Transportation Methods.

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	Apply basic electrical engineering principles, circuit laws (Ohm's, KVL, KCL), and measuring techniques to identify and solve DC and AC circuit problems.
A1	Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.	CLO2	Analyze AC and DC electrical machines (motors and generators), transformers, cables, pumps, and power transmission methods using engineering fundamentals.
A7	Work efficiently as an individual and as a member of a multidisciplinary and multicultural working group.	CLO3	Work effectively as an individual and within a team during practical electrical engineering tasks, including testing, maintenance, and safety procedures on site.
B3	Design and implement: elements, modules, sub-systems or systems in electrical/electronic/digital engineering using technological and professional tools.	CLO4	Implement basic electrical systems and components such as motors, pumps, cables, wiring systems, and power supplies using appropriate professional tools and site practices.

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	Practical		
1	Electrical Circuit First Principles: Fundamental concepts, voltage, current, resistance, Ohm's law, and Kirchhoff's laws (KVL & KCL).	2	1	1	0	-	2
2	DC Circuit Analysis: Series and parallel resistor combinations, mesh current analysis, and nodal voltage analysis methods.	2	1	1	0	-	2
3	AC Circuits Fundamentals: Single-phase AC quantities, sinusoidal waveforms, phasors, impedance, power factor, and AC power analysis (P, Q, S).	2	1	1	0	-	2
4	Three-Phase AC Circuits: Balanced star and delta connections, line vs. phase quantities, and power measurement techniques.	2	1	1	0	-	2
5	DC Machines/Engines: Construction principles, operational fundamentals, DC generators, and DC motors (shunt, series, compound types).	2	1	1	0	-	2
6	AC Electrical Machines/Engines: Single-phase and three-phase induction motors, synchronous motors, characteristics, and starting methods.	2	1	1	0	-	2
7	Low Capacity Engines/Motors: Fractional horsepower motors, stepper motors, servo motors, and low-power drive applications in construction equipment.	2	1	1	0	-	2
8	**Midterm + Revision**	2	1	1	0	-	2
9	Water Lift Pumps (Part I): Hydraulic principles, pump classification (centrifugal, positive displacement), and motor selection criteria.	2	1	1	0	-	2
10	Water Lift Pumps (Part II): Electrical wiring, motor control circuits, automatic pumping control systems, and performance/head curves.	2	1	1	0	-	2
11	Concrete Pumps & Heavy Machinery Drives: Operation of concrete pumps, electrical and hydraulic motor drives, power requirements, and control.	2	1	1	0	-	2

12	Electrical Cables & Sizing: Cable construction, insulation types, voltage drop calculations, ampacity ratings, and cable selection for industrial sites.	**2**	**1**	**1**	**0**	**-**	**2**
13	Current Transportation Methods (Part I): Power transmission and distribution networks, overhead lines, underground cables, and busbar trunking systems.	**2**	**1**	**1**	**0**	**-**	**2**
14	Current Transportation Methods (Part II): Electrical distribution panels, protective devices (breakers, fuses, relays), and site safety earthing.	**2**	**1**	**1**	**0**	**-**	**2**
15	Integrated Systems & Applications: Power requirement estimation for construction sites, pump station design integration, and comprehensive review.	**2**	**1**	**1**	**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	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%
5	Formative assessment	5	0	0%

6. Learning Resources and Supportive Facilities *

Learning resources (books, scientific	**The main (essential) reference for the course** **(must be written in full according to the scientific documentation method)**	**V. K. Mehta, Rohit Mehta, 'Basic Electrical Engineering', S Chand, 2017.**

references, etc.) *	**Other References**	Allan R. Hambley, 'Electrical Engineering: Principles and Applications (Global Edition)', Pearson Education Limited, 2019.
	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

Ibrahim El-Metwally

Ibrahim Elmetwally

Course Specifications

Elective Course 4 – Mechanical Engineering
2025\2026

1. Basic Information

Course Title	**Elective Course 4 – Mechanical Engineering**					
Course Code	**ENG213**					
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**	**Practical**		
	1	**1**	**1**	**0**	**2**	**4**
Course Type	**Elective Requirements (Institute Compulsory)**					
Academic level at which the course is taught	**Level 200**					
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	**Spring Semester**					
Prerequisite	**BAS022**					
Name of Course Coordinator						
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 Law of Thermodynamics – Energy conversion – Power cycles – Principles of fluid mechanics – Prime movers (Gasoline & Diesel Engines) – Pumps & Turbines – Principles of heat transfer – Simple steam plants – Refrigerators.

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	Explain the fundamental principles of thermodynamics, energy conversion, and power cycles and apply them to engineering systems such as engines, steam plants, and refrigeration units.
		CLO2	Analyze the operating principles of fluid mechanics, prime movers (gasoline and diesel engines), pumps, and turbines to evaluate system performance.
A7	Work efficiently as an individual and as a member of a multidisciplinary and multicultural working group.	CLO3	Work effectively within multidisciplinary teams to assess and coordinate mechanical systems in building and industrial engineering contexts.
B3	Design and implement: elements, modules, sub-systems or systems in electrical/electronic/digital engineering using technological and professional tools.	CLO4	Apply principles of heat transfer and refrigeration to select and implement appropriate mechanical components and systems for practical 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)	Expected number of the Learning Hours					
		Total Weekly Hours	Theoretical teaching (lectures/discussion groups/ .....)			Training (Practical)	Self-learning (Tasks/ Assignments/ Projects)
			Lectures	Tutorial	Practical		
1	Introduction & First Law of Thermodynamics: System concepts, energy forms, internal energy, enthalpy, heat and work interactions, steady-state energy equations.	2	1	1	0	-	2
2	Second Law of Thermodynamics & Energy Conversion: Entropy, Carnot cycle, thermal efficiency, reversible and irreversible processes, and energy conversion principles.	2	1	1	0	-	2
3	Power Cycles (Part I): Otto cycle, Diesel cycle, performance parameters; comparison between gasoline and diesel engine cycles.	2	1	1	0	-	2
4	Power Cycles (Part II): Rankine cycle, steam power plant components, turbines, condensers, and cycle efficiency improvements.	2	1	1	0	-	2
5	Principles of Fluid Mechanics (Part I): Fluid properties, pressure, buoyancy, flow classification, continuity equation, Bernoulli's theorem.	2	1	1	0	-	2
6	Principles of Fluid Mechanics (Part II): Pipe flow analysis, friction losses, Reynolds number, flow measurement instruments, and applications.	2	1	1	0	-	2
7	Prime Movers – Gasoline & Diesel Engines: Engine construction, operating cycles, combustion, fuel injection systems, ignition systems, and performance.	2	1	1	0	-	2
8	**Midterm + Revision**	2	1	1	0	-	2
9	Pumps (Part I): Centrifugal and positive-displacement pump types, operating principles, pump curves, cavitation, and priming.	2	1	1	0	-	2
10	Pumps (Part II): Pump selection, series and parallel operation, motor matching, pump stations, and practical applications.	2	1	1	0	-	2
11	Turbines: Impulse and reaction turbines, steam turbines, gas turbines, hydraulic turbines (Pelton, Francis, Kaplan), and performance parameters.	2	1	1	0	-	2
12	Principles of Heat Transfer: Conduction (Fourier's law), convection (Newton's law), radiation (Stefan-Boltzmann), combined mechanisms, and heat exchangers.	2	1	1	0	-	2

13	Simple Steam Plants: Boiler types, steam generation, superheaters, economizers, steam distribution, and plant layout.	**2**	**1**	**1**	**0**	**-**	**2**
14	Refrigeration Systems: Vapour-compression refrigeration cycle, components (compressor, condenser, expansion valve, evaporator), COP, and refrigerants.	**2**	**1**	**1**	**0**	**-**	**2**
15	Integrated Applications & Review: Energy auditing basics, mechanical system selection for buildings, comprehensive problem solving and exam preparation.	**2**	**1**	**1**	**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	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%
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)**	**Michael Clifford, Kathy Simmons, Philip Shipway, 'An Introduction to Mechanical Engineering / Part 1', Hodder Education, 2009.**
	Other References	Michael Clifford, 'An Introduction to Mechanical Engineering: Part 2', CRC Press, 2010.
	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

Ibrahim El-Metwally

Ibrahim Elmetwally

Course Specifications

Elective Course 4 – Civil Engineering
2025\2026

1. Basic Information

Course Title	**Elective Course 4 – Civil Engineering**					
Course Code	**ENG214**					
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**	**Practical**		
	1	**1**	**1**	**0**	**2**	**4**
Course Type	**Elective Requirements (Institute Compulsory)**					
Academic level at which the course is taught	**Level 200**					
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	**Spring Semester**					
Prerequisite	**BAS022**					
Name of Course Coordinator						
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)

Civil Engineering: An Overview of the Building Delivery Process – Loads on Buildings – Load Resistance – The Structural Properties of Materials – Structural systems – Thermal Properties of Materials – Fire – Related Properties – Principles of Sustainable Construction. Materials and systems of construction: The Material Steel and Structural Steel Construction – Portland cement and Concrete – Soils; Foundation and basement Construction – Masonry Materials – Roofing – Stairs.

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	Identify and explain the fundamental principles of the building delivery process, structural systems, loading conditions, and load resistance mechanisms for common structural elements.
		CLO2	Describe the structural and thermal properties of construction materials including steel, concrete, timber, masonry, and their applications in sustainable construction.
A7	Work efficiently as an individual and as a member of a multidisciplinary and multicultural working group.	CLO3	Collaborate effectively within multidisciplinary teams to evaluate and coordinate civil engineering works including foundations, masonry, roofing, and finishing systems.
B3	Design and implement: elements, modules, sub-systems or systems in electrical/electronic/digital engineering using technological and professional tools.	CLO4	Apply knowledge of construction materials and systems to assess and implement appropriate structural and architectural solutions using standard engineering tools and practices.

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	Practical		
1	Overview of the Building Delivery Process: Project lifecycle, roles and responsibilities, design stages, procurement routes, and construction management basics.	2	1	1	0	-	2
2	Loads on Buildings & Structural Systems: Dead loads, live loads, wind loads, seismic loads; structural systems (frames, walls, trusses, shells).	2	1	1	0	-	2
3	Structural Properties of Materials: Stress, strain, elasticity, plasticity, ductility, toughness; load resistance mechanisms for beams, columns, and slabs.	2	1	1	0	-	2
4	Thermal Properties & Fire-Related Properties of Materials: Thermal conductivity, insulation, heat capacity; fire resistance ratings, intumescent coatings.	2	1	1	0	-	2
5	Principles of Sustainable Construction: Green building standards (LEED, BREEAM), energy efficiency, life cycle assessment, and recycled/sustainable materials.	2	1	1	0	-	2
6	Steel & Structural Steel Construction: Structural steel grades, hot-rolled sections, connections (bolted, welded), steel frame systems, and protective coatings.	2	1	1	0	-	2
7	Portland Cement & Concrete Construction: Cement types, concrete mix design, admixtures, reinforced concrete (RC) basics, durability, and quality control.	2	1	1	0	-	2
8	**Midterm + Revision**	2	1	1	0	-	2
9	Soils & Foundation Engineering: Soil classification, bearing capacity, site investigation, shallow foundations (strip, pad, raft), and deep foundations (piles).	2	1	1	0	-	2
10	Basement & Below-Ground Construction: Excavation support systems, waterproofing methods, retaining walls, and basement structural elements.	2	1	1	0	-	2
11	Masonry Materials & Construction: Brick, block, and stone masonry; mortar types; cavity walls; reinforced and prestressed masonry systems.	2	1	1	0	-	2

12	Roofing Systems: Flat roofs (inverted, warm, cold), pitched roofs, roof coverings (tiles, metal, green roofs), insulation, and drainage.	**2**	**1**	**1**	**0**	**-**	**2**
13	Stairs & Vertical Circulation: Stair types (RC, steel, timber, precast), geometrical design, landings, handrails, and accessibility requirements.	**2**	**1**	**1**	**0**	**-**	**2**
14	Building Finishes & Interior Systems: Floor finishes, wall cladding, ceiling systems, partitions, and their structural and aesthetic considerations.	**2**	**1**	**1**	**0**	**-**	**2**
15	Integrated Building Systems & Review: Coordination between structural, architectural, MEP, and civil works; comprehensive problem solving and exam preparation.	**2**	**1**	**1**	**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	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%
5	Formative assessment	5	0	0%

6. Learning Resources and Supportive Facilities *

Learning resources (books, scientific	**The main (essential) reference for the course** **(must be written in full according to the scientific documentation method)**	**Satheesh Gopi, 'Basic Civil Engineering', PEARSON INDIA, 2009.**

references, etc.) *	**Other References**	Edward Allen, Joseph Iano, 'Fundamentals of Building Construction: Materials and Methods', 7th Ed., John Wiley & Sons, 2019.
	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

Ibrahim El-Metwally

Ibrahim Elmetwally

Course Specifications

Field training
2025\2026

1. Basic Information

Course Title	**Field training**					
Course Code	**ENG241**					
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**	**Practical**		
	0	**0**	**0**	**0**	**0**	**0**
Course Type	**Major Requirements (Institute Compulsory)**					
Academic level at which the course is taught	**Level 200**					
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	**Spring Semester**					
Prerequisite	**Completing 90 CH**					
Name of Course Coordinator						
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)

Training on industrial establishments relevant to the program. Training lasts for total of 90 hours, during a period about three weeks. The program training advisor schedules at least one follows up visit to the training venue and formally report on performance of trainee(s). A Mentor in the industrial establishment provides a formal report on the student's performance during training. The student submits a formal report and presentation to be evaluated by a panel of three members with one member being an external

examiner appointed from industry or other colleges of engineering. The course is graded as Pass/Fail grade-system.

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
A6	. Planning, supervision and monitoring of engineering projects.	CLO1	Plan engineering tasks and activities within industrial establishments while considering project requirements and professional responsibilities.
		CLO2	Manage assigned engineering tasks, training activities, and technical resources during practical industrial training.
A7	Work efficiently as an individual and as a member of a multidisciplinary and multicultural working group.	CLO3	Work effectively as an individual and within multidisciplinary teams and prepare technical reports and presentations for industrial training evaluation

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	Practical		
1	Industrial Orientation: Company structure, training objectives, regulations, and workflow.	0	0	0	0	.	0
2	Health & Safety: HSE procedures, PPE, emergency procedures, and risk identification.	0	0	0	0	.	0
3	Industrial Operations: Industrial processes, engineering procedures, and professional responsibilities.	0	0	0	0	.	0
4	Equipment & Systems: Identification, operation, and safety requirements of industrial equipment.	0	0	0	0	.	0
5	Maintenance Practices: Preventive/corrective maintenance, inspection, and troubleshooting.	0	0	0	0	.	0
6	Quality Control: Inspection procedures, measurements, standards, and quality records.	0	0	0	0	.	0
7	Practical Training: Hands-on engineering tasks under industrial supervision.	0	0	0	0	.	0
8	Field Operations: Practical operation of industrial systems and processes.	0	0	0	0	.	0
9	Data Collection: Measurements, technical data, engineering logs, and field observations.	0	0	0	0	.	0
10	Troubleshooting: Problem identification, analysis, and solution implementation.	0	0	0	0	.	0
11	Industrial Mentorship: Advanced training, site supervision, and performance evaluation.	0	0	0	0	.	0
12	Technical Report: Data analysis, documentation, and report preparation.	0	0	0	0	.	0
13	Report & Presentation: Report review, corrections, and presentation preparation.	0	0	0	0	.	0
14	Final Evaluation: Report submission, oral presentation, and final assessment.	0	0	0	0	.	0

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)	**Misr Higher Institute for Engineering and Technology (MET). (2025). Field training guide. Internal institutional document.**
	Other References	
	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 PowerPoint 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

Ibrahim El-Metwally

Ibrahim Elmetwally