Mathematics (1)
(MTH101)

1. Basic Information:

Program Title	All Programs
Department Offering the Program	Basic Science and Engineering Department
Department Responsible for the Course	Basic Science and Engineering Department
Course Title	Mathematics (1)
Course Code	MTH101
Year/Level	Level 1
Specialization	Major – Compulsory Course
Authorization Date of Course Specification	-
Pre- request	-

Teaching hours	Lectures	Tutorial	Practical
	2	2	-

2. Course Aims

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

3. Competencies:

Competencies	Learning Outcomes (LO'S)
C1 Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science, and mathematics.	**a1** Explain the relevant mathematical engineering principles and theories in Algebra and Calculus. **a3** Explain the basic concepts of derivative and algebra. **b1** Use the mathematical engineering principles and theories that apply in the most fundamental problems.

4. Course Contents:

No.	Topics	Lecture	Tutorial	Practical
1	Vectors - Vectors Algebra- partial fractions	4	4	-
2	The Concept of functions	2	2	-
3	Equations theory –Mathematical Deduction	4	4	-
4	Basic Trigonometric functions and its inverse	4	4	-

	Exponential and Logarithmic functions Hyperbolic functions and its inverse Connection (definition – theories) Maclaurin expansion The Taylor series			
5	Numerical solutions methods	4	4	-
6	Limits, derivatives, and curves drawing	4	4	-
7	Introduction of Partial Derivatives	4	4	-
8	Linear equations systems – Gauss Jordan method for deletion.	2	2	-
Total		**28**	**28**	-

5. Teaching and learning methods:

Topics	**Face-to-Face Lecture**	**Online Lecture**	**Flipped Classroom**	**Presentation and movies**	**Discussion**	**Problem solving**	**Brainstorming**	**Projects**	**Site visits**	**Self-learning and Research**	**Cooperative**	**Discovering**	**Modeling**	**lab**
Vectors - Vectors Algebra- partial fractions	x	x			x	x	x							
The Concept of functions	x	x			x	x	x							

Equations theory –Mathematical Deduction	x	x			x	x	x							
Basic Trigonometric functions and its inverse Exponential and Logarithmic functions Hyperbolic functions and its inverse Connection (definition – theories) Maclaurin expansion The Taylor series	x	x			x	x	x							
Numerical solutions methods	x	x			x	x	x							
Limits, derivatives, and curves drawing	x	x			x	x	x							
Introduction of Partial Derivatives	x	x			x	x	x							
Linear equations systems – Gauss Jordan method for deletion.	x	x			x	x	x							

6. Teaching and learning methods for disabled students:

No.	Teaching Methods	Reason
1	Presentation of the course in digital material	Better access any time
2	Wed communication with students	Better communication with certain cases
3	Asking small groups to do assignments; each composed of low, medium, and high-performance students	Knowledge and skills transfer among different levels of students

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO’s
1	Midterm examination	C1	a1, b1
2	Semester work (quizzes, sheets, report)	C1	b1
3	Final term examination	C1	a1, a3, b1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Midterm examination	8^{th}

2	Semester work	7^{th} - 9^{th}
3	Final term examination	15^{th}

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Midterm examination	20%
2	Semester work	20%
3	Final term examination	60%
	Total	**100%**

8. List of References:

No.	Reference List
1	Richard W. Fisher "No-Nonsense Algebra, 2nd Edition" Math Essentials; 2nd edition (2018).
2	Sherman K. Stein " Calculus in the First Three Dimensions" Dover Publications; Second Edition, (2018).

9. Facilities required for teaching and learning:

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

10. Matrix of Competencies and LO's:

No	Topic	Aims	Competencies	LO's
1	Vectors - Vectors Algebra- partial fractions	1	C1	a1, b1
2	The Concept of functions	1	C1	a1, b1
3	Equations theory –Mathematical Deduction	1	C1	a1, b1
4	Basic Trigonometric functions and its inverse Exponential and Logarithmic functions Hyperbolic functions and its inverse Connection (definition – theories) Maclaurin expansion The Taylor series	1	C1	a1, b1
5	Numerical solutions methods	1	C1	a1, b1
6	Limits, derivatives and curves drawing	1	C1	a3, b1
7	Introduction of Partial Derivatives	1	C1	a3, b1
8	Linear equations systems – Gauss Jordan method for deletion.	1	C1	a1, b1

Course Coordinator: Dr. Reda Abdo
Head of Department: Assoc. Prof. Dr. Amal Bahiry

Date of Approval: 2022

Mechanics (1)
(ENG101)

1. Basic Information:

Program Title	All Programs
Department Offering the Program	Basic Science and Engineering Department
Department Responsible for the Course	Basic Science and Engineering Department
Course Title	Mechanics (1)
Course Code	ENG101
Year/Level	Level 1
Specialization	Major – Compulsory Course
Authorization Date of Course Specification	-
Pre- request	-

Teaching hours	**Lectures**	**Tutorial**	**Practical**
	2	2	-

2. Course Aims:

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

3. Competencies:

Competencies	Learning Outcomes (LO'S)
C1 Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science, and mathematics.	**a1** Define concepts and theories of space vectors, momentums, equivalent couples, and equation of equilibrium for rigid body. **a2** Recognize methodologies of solving equilibrium under the effect of forces. **b1** Solve engineering problems, such as finding the center of mass (group of particles – flat surfaces).

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	Introduction to statics. Fundamental concept	2	2	-

	Basic quantities of unit dimension- System of units Space, Trigonometry and U.S. Customary units, Force. Statics of particles, Statics of Rigid Body, Free body diagrams. Types of forces, Types of system of forces			
2	Statics of particles Forces on a particle, Addition of vectors, Resultant of several concurrent forces.	2	2	-
3	Resolution of a forces into components Rectangular components of a forces, (unit vectors). Addition of forces by summing X and Y components. Equilibrium of a particle, and Newton's first law of motion.	2	2	-
4	Problem involving the equilibrium of a practice- free body diagram. Rectangular components of a force in space, force defined by its magnitude and two points on its line of action. Addition of concurrent forces in space, equilibrium of a particle in space.	2	2	-
5	Rigid bodies: equivalent systems of forces. External and internal forces, principle of transmissibility and equivalent forces, vector product of two vectors, vector product expressed in terms of rectangular components	2	2	-
6	Moment of a force about a point. Varignon's theorem, rectangular components of the moment of a force, equivalent systems of forces.	4	4	-
7	Equilibrium of rigid bodies Free- body diagram. Equilibrium of a rigid body in two dimensions.	2	2	-
8	Equilibrium of three- dimension force body. Reduction of a system of forces to one force and one couple. Equilibrium of a rigid body in three dimensions. Reactions at supports and connections for a two-dimensional and for a three- dimensional structure.	4	4	-
9	Centroids and centers of gravity. Centre of gravity of a two- dimensional body, centroids of area and lines, first moments of areas and lines, composite plates and wires.	4	4	-

10	Analysis of structures Definition of truss Simple trusses Analysis of trusses by the method of joints	4	4	-
Total		**28**	**28**	**-**

5. Teaching and learning methods:

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

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

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

6. Teaching and learning methods for disabled students:

No.	Teaching Methods	Reason
1	Presentation of the course in digital material	Better access any time
2	Web communication with students	Better communication with certain cases
3	Asking small groups to do assignments; each composed of low, medium, and high-performance students	Knowledge and skills transfer among different levels of students

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Midterm examination	C1	a1, b1
2	Semester work (quizzes, sheets, report)	C1	a1, b1
3	Final term examination	C1	a1, a2, b1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Midterm examination	8th
2	Semester work	2nd -7th - 9th -14th
3	Final term examination	15th

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Midterm examination	20%
2	Semester work	20%
3	Final term examination	60%
Total		**100%**

8. List of References:

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

9. Facilities required for teaching and learning:

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

10. Matrix of Competencies and LO's:

No.	Topic	Aims	Competencies	LO's
1	Introduction to statics. Fundamental concept Basic quantities of unit dimension- System of units Space, Trigonometry and U.S. Customary units, Force. Statics of particles, Statics of Rigid Body, Free body diagrams. Types of forces, Types of system of forces	1	C1	a1
2	Statics of particles Forces on a particle, Addition of vectors, Resultant of several concurrent forces.	1	C1	a1
3	Resolution of a forces into components Rectangular components of a forces, (unit vectors). Addition of forces by summing X and Y components. Equilibrium of a particle, and Newton's first law of motion.	3	C1	a2
4	Problem involving the equilibrium of a practice- free body diagram. Rectangular components of a force in space, force defined by its magnitude and two points on its line of action. Addition of concurrent forces in space, equilibrium of a particle in space.	3	C1	a2
5	Rigid bodies: equivalent systems of forces. External and internal forces, principle of transmissibility and equivalent forces, vector product of two vectors, vector product expressed in terms of rectangular components	1	C1	a1
6	Moment of a force about a point. Varignon's theorem, rectangular components of the moment of a force, equivalent systems of forces.	1	C1	a1
7	Equilibrium of rigid bodies Free- body diagram. Equilibrium of a rigid body in two dimensions.	3	C1	a2

8	Equilibrium of three- dimension force body. Reduction of a system of forces to one force and one couple. Equilibrium of a rigid body in three dimensions. Reactions at supports and connections for a two-dimensional and for a three- dimensional structure.	3	C1	a1, a2
9	Centroids and centers of gravity. Centre of gravity of a two- dimensional body, centroids of area and lines, first moments of areas and lines, composite plates and wires.	1	C1	b1
10	Analysis of structures Definition of truss Simple trusses Analysis of trusses by the method of joints	3	C1	b1

Course Coordinator: Dr. Moataz Mostafa
Head of Department: Assoc. Prof. Dr. Amal Bahiry
Date of Approval: 2022

Physics (1)
(PHY101)

1. Basic Information:

Program Title	All Programs
Department Offering the Program	Basic Science and Engineering Department
Department Responsible for the Course	Basic Science and Engineering Department
Course Title	Physics (1)
Course Code	PHY101
Year/Level	Level 1
Specialization	Major – Compulsory Course
Authorization Date of Course Specification	-
Pre- request	-

Teaching hours	**Lectures**	**Tutorial**	**Practical**
	2	2	2

2. Course Aims:

No.	Aims
1	Mastery of a broad range of engineering physics knowledge and specialized skills, as well as the ability to apply acquired knowledge in real-world situations by applying theories in critical and systemic analytical thinking to identify, diagnose, and solve engineering problems of varying complexity and variance.
4	Use the experimental techniques, skills, and current engineering tools required for engineering practice by taking full responsibility for one's own learning and development, participating in lifelong learning, and demonstrating the ability to pursue postgraduate and research studies.

3. Competencies:

Competencies	Learning Outcomes (LO'S)
C1 Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science, and mathematics.	**a1** Explain concepts and theories of mathematics for physical quantities, unit's dimensional analysis and basics of thermodynamics. **a2** Recognize methodologies of solving problems for stress-strain diagram, and fluids study. **b1** Select the appropriate solutions for properties of materials through Brittle and Ductile material.

C2 Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess, and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.	**a2** Describe quality assurance systems, codes of practice and standards, health and safety requirements, and environmental issues.
C6 Plan, supervise and monitor implementation of engineering projects, taking into consideration other trades requirements.	**c1** Conduct troubleshooting in chemical engineering plants.

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	Physics and Measurement Practical: measurement methods	4	4	2
2	Mechanical properties for materials Practical: Hooks' Law	4	4	2
3	Oscillations Practical: simple pendulum.	4	4	2
4	Sounds. Practical: Resonance in the Air columns.	2	2	4
5	Fluids. Practical: Viscosity.	4	4	4
6	Heat transfer Practical: Heat& Specific Heat& thermo-electrical equivalent& the latent heat of melting ice.	2	2	6
7	The kinetic theory of gases and the work in thermodynamics Practical: melting point of solid materials.	2	2	4
8	The laws of thermodynamic Practical: heating and cooling curves.	4	4	2
9	Temperature and thermal expansion Practical: coefficient of linear thermal expansion.	2	2	2
Total		**28**	**28**	**28**

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brainstorming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab
1	Physics and Measurement Practical: measurement methods	x	x				x								x
2	Mechanical properties for materials Practical: Hooks' Law	x	x			x									x
3	Oscillations Practical: simple pendulum.	x	x					x							x
4	Sounds. Practical: Resonance in the Air columns.	x	x				x								x
5	Fluids. Practical: Viscosity.	x	x					x							x

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

6. Teaching and learning methods for disabled students:

No.	Teaching Methods	Reason
1	Presentation of the course in digital material	Better access any time
2	Web communication with students	Better communication with certain cases
3	Asking small groups to do assignments; each composed of low, medium, and high-performance students.	Knowledge and skills transfer among different levels of students

7. Student evaluation:

7.1 Student evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Midterm examination	C1, C2, C6	a1, a2, c1
2	Semester work (quizzes, sheets, report)	C1, C2, C6	a1
3	Practical exam	C1	a1, a2
4	Final term examination	C1, C6	a2, c1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks

1	Midterm examination	8^{th}
2	Semester work	7^{th},9^{th}
3	Practical examination	14^{th}
4	Final term examination	15^{th}

7.3 weighting of Evaluation:

No.	Evaluation method	Weights
1	Mid-term examination	10%
2	final examination	60%
3	Practical examination	10%
4	Semester work	20%
	Total	**100%**

8. List of References:

No.	Reference List
1	Peter J. Williams; Firas Mansour; Robert L. Hawkes; (Nuclear physicist) Javed Iqbal; Marina Milner-Bolotin. Physics for scientists and engineers: an interactive approach, Nelson Education Ltd., Year: 2019
2	David Halliday, Robert Resnick, Jearl Walker. Fundamentals of Physics, 9th Edition, Binder Ready Version,2019
3	Serway, Raymond A., and John W. Jewett. Physics for scientists and engineers. Cengage learning, 2018.
4	Hibbeler, Russell C. "Mechanics of materials." (2018).

9. Facilities required for teaching and learning:

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

10. Matrix of Competencies and LO's:

No.	Topic	Aims	Competencies	LO's
1	Physics and Measurement Practical: measurement methods	1, 4	C1, C2, C6	a1, a2, c1
2	Mechanical properties for materials Practical: Hooks' Law	1, 4	C1, C2, C6	a1, a2, c1
3	Oscillations Practical: simple pendulum.	1, 4	C1, C2, C6	a1, a2, c1
4	Sounds. Practical: Resonance in the Air columns.	1, 4	C1, C2, C6	a1, a2, c1
5	Fluids. Practical: Viscosity.	1, 4	C1, C2, C6	a1, a2, c1
6	Heat transfer Practical: Heat& Specific Heat& thermo-electrical equivalent& the latent heat of melting ice.	1, 4	C1, C2, C6	a1, a2, c1
7	The kinetic theory of gases and the work in thermodynamics Practical: melting point of solid materials.	1, 4	C1, C2, C6	a1, a2, c1
8	The laws of thermodynamic Practical: heating and cooling curves.	1, 4	C1, C2, C6	a1, a2, c1
9	Temperature and thermal expansion Practical: coefficient of linear thermal expansion.	1, 4	C1, C2, C6	a1, a2, c1

Course Coordinator: Assoc. Prof. Dr. Amal Bahiry & Dr. Ahmed Lotfy
Head of Department: Assoc. Prof. Dr. Amal Bahiry
Date of Approval: 2022

General Chemistry
(CHE101)

1. Basic Information:

Program Title	All Programs
Department Offering the Program	Basic Science and Engineering Department
Department Responsible for the Course	Basic Science and Engineering Department
Course Title	General Chemistry
Course Code	CHE101
Year/Level	Level 1
Specialization	Major – Compulsory Course
Authorization Date of Course Specification	-
Pre- request	-

Teaching hours	**Lectures**	**Tutorial**	**Practical**
	2	-	2

2. Course Aims:

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

3. Competencies:

Competencies	Learning Outcomes (LO'S)
C1 Identify, formulate, and solve complex engineering problems by applying engineering fundamentals and basic science.	**a1** Describe the relevant Chemical principles and theories in the discipline. **c2** Identify the chemical engineering principles and theories that apply to the topic. **c3** Solve chemical engineering problems by applying chemical engineering fundamentals.
C2 Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess, and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.	**a2** Describe quality assurance systems, codes of practice and standards, health and safety requirements, and environmental issues.
C3 Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global,	**d1** Collaborate effectively within multidisciplinary team.

cultural, social, economic, environmental, ethical, and other aspects as appropriate to the discipline and within the principles and contexts of sustainable design and development.	**d2** Work in stressful environment and within constraints.
C6 Plan, supervise and monitor implementation of engineering projects, taking into consideration other trades requirements.	**c1** Conduct troubleshooting in chemical engineering plants.
C10 Acquire and apply new knowledge; and practice self, lifelong and other learning strategies.	**d2** Acquire chemical engineering principles for professionally merge, understanding, and feedback to improve design, products for many chemical engineering industries.

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	Gaseous status. Practical: Chemistry Laboratory Equipment, Titrimetric Analysis.	4	-	4
2	Chemical thermodynamics. Practical: Preparation of standard solution of Na_2CO_3 (0.1N), Determination of normality of HCL by using standard solution of oxalic acid.	4	-	4
3	Properties of solutions. Practical: Determination of normality of acetic acid by using standard solution of sodium hydroxide, Determination of normality of sodium carbonate by using standard solution of HCL.	4	-	4
4	Material balance in combustion processes. Practical: Standardization of potassium permanganate with oxalic acid.	2	-	2
5	Dynamic balance in physical and chemical operations. Practical: Determination of nitrites, precipitation titrations.	4	-	4
6	Kinetic chemical interactions. Practical: Preparation of 0.05N of sodium chloride.	2	-	2
7	Electrochemistry, corrosion, and corrosion control. Practical: Determination of chloride ion by using Mohr method.	2	-	2
8	Fertilizers.	2	-	2

	Practical: Determining Molecule Weight by Freezing Point Depression Method.			
9	Manufacturing and chemistry of Cement. Practical: Determining Molecule Weight by Freezing Point Depression Method.	2	-	2
10	Water processes. Practical: determination of water hardness by complex metric titration.	2	-	2
Total		**28**	**-**	**28**

5. Teaching and learning methods:

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

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

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

6. Teaching and learning methods for disabled students:

No.	Teaching Methods	Reason
1	Presentation of the course in digital material	Better access any time
2	Web communication with students	Better communication with certain cases
3	Asking small groups to do assignments; each composed of low, medium, and high-performance students	Knowledge and skills transfer among different levels of students

7. Student Evaluation:

7.1 Student Evaluation Method:

No.	Evaluation Method	Competencies	LO's
1	Midterm examination	C1, C3, C2, C6	a1, c3, a2, c1
2	Semester work (quizzes, sheets, report)	C1, C3, C2, C6	c2, c3, d2, a2, c1
3	Practical Examination	C1, C10, C3, C2, C6	c2, c3, d2, a2, c1
4	Final term examination	C1, C10	a1, c2, c3, a2, c1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Midterm examination	8^{th}

2	Semester work	2^{nd} - 7^{th} - 9^{th}
3	Practical Examination	14^{th}
4	Final term examination	15^{th}

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Midterm examination	10%
2	Semester work	20%
3	Practical Examination	10%
4	Final term examination	60%
Total		**100%**

8. List of References:

No.	Reference List
1	Theodore L. Brown, et al, Chemistry the Central Science, Prentice Hall Int. (Pearson International 14 edition), 2017.
2	Peter Atkins, Julio de Paula, James Keeler " Atkins' Physical Chemistry 11ed" Oxford University Press; 11th edition (2018)

9. Facilities required for teaching and learning:

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

10. Matrix of Competencies and LO's:

No.	Topic	Aims	Competencies	LO's
1	Gaseous status. Practical: Chemistry Laboratory Equipment, Titrimetric Analysis.	1	C1, C3, C2, C6	a1, a2, c1
2	Chemical thermodynamics. Practical: Preparation of standard solution of Na_2CO_3 (0.1N), Determination of normality of HCL by using standard solution of oxalic acid.	1	C1, C3, C2, C6, C3, C2, C6	a1, a2, c1
3	Properties of solutions. Practical: Determination of normality of acetic acid by using standard solution of sodium hydroxide, Determination of normality of sodium carbonate by using standard solution of HCL.	1	C1, C3, C2, C6	a1, a2, c1
4	Material balance in combustion processes. Practical: Standardization of potassium permanganate with oxalic acid.	1	C1, C3, C2, C6	a1, c3, a2, c1
5	Dynamic balance in physical and chemical operations. Practical: Determination of nitrites, precipitation titrations.	1	C1, C3, C2, C6	a1, c3, a2, c1
6	Kinetic chemical interactions. Practical: Preparation of 0.05N of sodium chloride.	1	C1, C3, C2, C6	a2, c1, a1
7	Electrochemistry, corrosion, and corrosion control. Practical: Determination of chloride ion by using Mohr method.	1, 8	C3, C2, C6, C10	a2, c1, a1, c2, c3, d2
8	Fertilizers. Practical: Determining Molecule Weight by Freezing Point Depression Method.	8	C3, C2, C6, C10	a2, c1, c2, d2
9	Manufacturing and chemistry of Cement. Practical: Determining Molecule Weight by Freezing Point Depression Method.	8	C3, C2, C6, C10	a2, c1, c2, d2
10	Water processes. Practical: determination of water hardness by complex metric titration.	8	C10	c2, d2

Course Coordinator: Prof. Dr. Khaled Samir & Dr. Sohir Abo Baker
Head of Department: Assoc. Prof. Dr. Amal Bahiry
Date of Approval: 2022

Engineering Drawing and Projection
(ENG103)

1. Basic Information:

Program Title	All Programs
Department Offering the Program	Basic Science and Engineering Department
Department Responsible for the Course	Basic Science and Engineering Department
Course Title	Engineering Drawing and Projection
Course Code	ENG103
Year/Level	Level 1
Specialization	Major – Compulsory Course
Authorization Date of Course Specification	-
Pre- request	-

Teaching hours	**Lectures**	**Tutorial**	**Practical**
	1	-	4

2. Course Aims:

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

3. Competencies:

Competencies	**Learning Outcomes (LO'S)**
C1 Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science, and mathematics.	**a1** Explain the basic principles of engineering drawing. **a2** Explain the scientific principles and theories that apply to the topic. **b1** Using scientific concepts and tools that are relevant to the profession. **b2** Applying engineering drawing basics that are relevant to the subject.

4. Course Contents:

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

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brainstorming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	lab
1	Techniques and skills of engineering drawing	x	x												
2	Engineering operations					x									
3	Orthogonal projection – Secondary orthogonal	x				x									
4	Intersections	x	x			x									

5	Projections of simple bodies	X				X									
6	Rules of writing dimensions	x	x			x									
7	Deduction of missing projections	x	x			x									
8	Drawing of engineering sections.	x				X									
9	Steel frames	x	X			X									
10	Introduction to AutoCAD Fundamentals of engineering drafting by way of computer aided drawing (CAD) software. Basic features and capabilities of CAD software and drafting fundamentals including orthographic projection, and isometric pictorials, part dimensioning in 2 dimensional drawings.	X													x

6. Teaching and learning methods for disabled students:

No.	Teaching Methods	Reason
1	Presentation of the course in digital material	Better access any time
2	Asking small groups to do assignments each composed of low, medium, and high-performance students.	Knowledge and skills transfer among different level of students.

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Midterm exam	C1	a1, a2, b1

2	Semester work (quizzes, sheets, report)	C1	a1, a2
3	Final exam	C1	b1, b2

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Semester work	2^{nd} -7^{th} - 9^{th}
2	Mid Term exam	8^{th}
3	Practical examination	14^{th}
4	Final term exam	15^{th}

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Mid-term examination	10%
2	Practical examination	10%
3	Semester work	20%
4	Final-term examination	60%
Total		**100%**

8. List of References:

No.	Reference List
1	K. V. NATARAJAN "ENGINEERING GRAPHICS Paperback" DHANALAKSHMI PUBLISHERS (2018)
2	Lakhwinder Pal Singh, Harwinder Singh "Engineering Drawing: Principles and Applications" Cambridge University Press; First edition (2019)

9. Facilities required for teaching and learning:

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

10. Matrix of Competencies and LO's:

No.	Topic	Aims	Competencies	LO's
1	Techniques and skills of engineering drawing	1	C1	a1
2	Engineering operations	1, 4	C1	a2
3	Orthogonal projection – Secondary orthogonal	1, 4	C1	a1
4	Intersections	1	C1	a1
5	Projections of simple bodies	1	C1	a2
6	Rules of writing dimensions	1, 2	C1	b1
7	Deduction of missing projections	1	C1	b1
8	Drawing of engineering sections.	1	C1	b2
9	Steel frames	1	C1	b2
10	Introduction to AutoCAD Fundamentals of engineering drafting by way of computer aided drawing (CAD) software. Basic features and capabilities of CAD software and drafting fundamentals including orthographic projection, and isometric pictorials, part dimensioning in 2 dimensional drawings.	1, 4	C1	b1, b2

Course Coordinator: Dr. Moataz Mostafa
Head of Department: Assoc. Prof. Dr. Amal Bahiry
Date of Approval: 2022

Introductions to Computer Systems
(ENG104)

1. Basic Information:

Program Title	All Programs
Department Offering the Program	Basic Science and EngineeringDepartment
Department Responsible for the Course	Basic Science and Engineering Department
Course Title	Introductions to Computer Systems
Course Code	ENG104
Year/Level	Level 1
Specialization	Major – Compulsory Course
Authorization Date of Course Specification	-
Pre- request	-

Teaching hours	Lectures	Tutorial	Practical
	1	-	2

2. Course Aims:

No.	Aims
1	Master a wide range of engineering knowledge and specialized skills, as well as the ability to apply that information in real-world situations using theories and analytical thinking.
7	Use techniques, skills and modern engineering tools necessary for engineering practice;

3. Competencies:

Competencies	Learning Outcomes (LO'S)
C1 Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science, and mathematics.	**c2** Identify the concepts and theories of science necessary for engineering systems. **c3** Applying engineering basics that are relevant to the subject.
C5 Practice research techniques and methods of investigation as an inherent part of learning.	**b1** Assess different ideas, views, and knowledge from a range of sources.

4. Course Contents:

No.	Topics	Lecture	Practical	Tutorial
1	Computer architecture. practical: Visual Studio C# Interface Writing simple statements	1	2	-
2	Computer systems Practical: Variables, Data type	2	4	-

3	Files systems Practical: Input & Output	1	2	-
4	Computer networks Practical: Conditional Statements	2	4	-
5	Internet networks Practical: Arrays	2	4	-
6	Data systems and information technology Practical: Loop Statement (For, while & do -while)	2	4	-
7	Computer graphics – Multimedia systems Practical: Loop Statement (For, while & do -while)	1	2	-
8	Methods of solving problems and logical design for the programs and matrices. Practical: Nested loop	2	4	-
9	Engineering applications in programming using one structured programming language. Practical: Engineering Case Study.	1	2	-
Total		**14**	**28**	**-**

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brainstorming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	lab
1	Computer architecture. practical: Visual Studio C# Interface Writing simple statements	x	x	x											X
2	Computer systems Practical: Variables, Data type	x	x			x									X
3	Files systems Practical: Input & Output	x	x			x									X

4	Computer networks Practical: Conditional Statements	x		X											X
5	Internet networks Practical: Arrays	x	x												X
6	Data systems and information technology Practical: Loop Statement (For, while & do -while)	x	x												X
7	Computer graphics Multimedia systems Practical: Loop Statement (For, while do -while)	x	x			x									X
8	Methods of solving problems and logical design for the programs and matrices. Practical: Nested loop	x	x				x								X
9	Engineering applications in programming using one structured programming language. Practical: Engineering Case Study.	x	x												X

6. Teaching and learning methods for disabled students:

No.	Teaching Methods	Reason
1	Presentation of the course in digital material	Better access any time
2	Web communication with students	Better communication with certain cases
3	Asking small groups to do assignments; each composed of low, medium, and high-performance students.	Knowledge and skills transfer among different levels of students

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Midterm examination	C1	c2, c3
2	Semester work (quizzes, sheets, report)	C5	b1, c3
3	Practical Examination	C1, C5	c2, c3
4	Final term examination	C1, C5	c3, b1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Midterm examination	8^{th}
2	Semester work	2^{nd} ,7^{th},9^{th},13^{th}
3	Practical Examination	14^{th}
4	Final term examination	15^{th}

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Mid-term examination	10%
2	final examination	60%
3	Practical examination	10%
4	Semester work	20%
	Total	**100%**

8. List of References:

No.	Reference List
1	Darrell Hajek, Cesar Herrera “Introduction to Computers" CreateSpace Independent Publishing Platform (May 8, 2018).
2	Ludwik Czaja "Introduction to Distributed Computer systems: Principles and features" Springer; 1st ed. 2018.

9. Facilities required for teaching and learning:

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

10. Matrix of Competencies and LO's:

No.	Topic	Aims	Competencies	LO's
1	Computer architecture. practical: Visual Studio C# Interface Writing simple statements	1	C1	c2
2	Computer systems Practical: Variables, Data type	1	C1	c2

3	Files systems Practical: Input & Output	1	C1	c3
4	Computer networks Practical: Conditional Statements	1	C1	c3
5	Internet networks Practical: Arrays	1	C1	c3
6	Data systems and information technology Practical: Loop Statement (For, while & do -while)	1, 7	C1	c3
7	Computer graphics – Multimedia systems Practical: Loop Statement (For, while & do -while)	1, 7	C1	c3
8	Methods of solving problems and logical design for the programs and matrices. Practical: Nested loop	7	C5	b1
9	Engineering applications in programming using one structured programming language. Practical: Engineering Case Study.	7	C5	b1

Course Coordinator: Dr. Amira El Sonbaty
Head of Department: Assoc. Prof. Dr. Amal Bahiry
Date of Approval: 2022

Mathematics (2)
(MTH102)

1. Basic Information:

Program Title	All Programs
Department Offering the Program	Basic Science and Engineering Department
Department Responsible for the Course	Basic Science and Engineering Department
Course Title	Mathematics (2)
Course Code	MTH102
Year/Level	Level 1
Specialization	Major – Compulsory Course
Authorization Date of Course Specification	-
Pre- request	-

Teaching hours	Lectures	Tutorial	Practical
	2	2	-

2. Course Aims:

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

3. Competencies:

Competencies	Learning Outcomes (LO'S)
C1 Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science, and mathematics.	**a1** Explain the relevant mathematical engineering principles and theories in the Analytical geometry and Integration. **a3** Explain the basic concepts of Analytical geometry and Integration. **b1** Use the mathematical engineering principles and theories that apply in the most fundamental problems. **b3** Use the basics of integration and Geometry that are applicable to the field.

4. Course Contents:

No.	Topic	Lecture	Tutorial	Practical

1	Basic concepts- equations of second degree and double equation for two straight lines Movement and rotation of axes	4	4	-
2	Circle– conical sectors	6	6	-
3	Analytical geometry in space Cartesian coordinates Cylindrical-spherical -plane in space	2	2	-
4	Equations of surfaces in second order – rotation and movement of axes in space.	2	2	-
5	Indefinite integration (basic functions – theories) – method of integration	6	6	-
6	Definite integration (definition – properties -theories) Applications of definite integration (plain areas – circular volumes – plain technical length)	4	4	-
7	Areas – Circular surfaces	2	2	-
8	Numerical integration.	2	2	-
Total		**28**	**28**	-

5. Teaching and learning methods:

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

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

6. Teaching and learning methods for disabled students:

No.	Teaching Methods	Reason
1	Presentation of the course in digital material	Better access any time
2	Web communication with students	Better communication with certain cases
3	Asking small groups to do assignments; each composed of low, medium, and high-performance students	Knowledge and skills transfer among different levels of students

7. Student Evaluation:

7.1 Student Evaluation method

No.	Evaluation Method	Competencies	LO’s
1	Midterm examination	C1	a1, a3
2	Semester work (quizzes, sheets, report)	C1	b1, b3
3	Final term examination	C1	a1, a3, b1, b3

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Midterm examination	8^{th}
2	Semester work	7^{th} - 9^{th}
3	Final term examination	15^{th}

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Midterm examination	20%
2	Semester work	20%
3	Final term examination	60%
Total		**100%**

8. List of References:

No.	Reference List
1	P.N.Chatterjee "Analytical Geometry Paperback"Anu Books (2019)
2	Gerardus Blokdyk "System Integration A Complete Guide" 5STARCooks (2019).
3	Chris McMullen “Essential Calculus Skills Practice Workbook with Full Solutions" Zishka Publishing (2018).

9. Facilities required for teaching and learning:

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

10. Matrix of Competencies and LO’s:

No	Topic	Aims	Competencies	LO’s
1	Position, Displacement, Velocity, and Acceleration of Particle	1	C1	a1, a3
2	Plane Motion path of Particle	1	C1	a1, a3
3	Description of plane Motion using Cartesian axes	1	C1	a1, a3
4	Projectiles	1	C1	a1, a3
5	Relative motion between particles	1	C1	a1, a3
6	Motion for particle in circular path	1	C1	a1, a3
7	Newton’s second law of motion	1	C1	b1, b3
8	Principle of work and energy of motion	1	C1	b1, b3
9	Principle of conservation of mechanical energy	1	C1	b1, b3
10	Principle of impulse and momentum of rigid body	1	C1	b1, b3

Course Coordinator: Dr. Reda Abdo
Head of Department: Assoc. Prof. Dr. Amal Bahiry
Date of Approval: 2022

Mechanics (2)
(ENG102)

1. Basic Information:

Program Title	All Programs
Department Offering the Program	Basic Science and Engineering Department
Department Responsible for the Course	Basic Science and Engineering Department
Course Title	Mechanics (2)
Course Code	ENG102
Year/Level	Level 1
Specialization	Major – Compulsory Course
Authorization Date of Course Specification	-
Pre- request	-

Teaching hours	**Lectures**	**Tutorial**	**Practical**
	2	2	-

2. Course Aims:

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

3. Competencies:

Competencies	Learning Outcomes (LO'S)
C1 Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science, and mathematics.	**a1** Define position, velocity and acceleration of particles and principles of conversation of mechanical energy. **a2** Recognize methodologies of solving engineering problems including principles of work and energy. **b1** Solve engineering problems to determine the velocity and position of projectile. **c1** Apply knowledge of principle of work and principle of work and energy of motion and principle of conservation of mechanical energy and momentum of rigid body.

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	Position, Displacement, Velocity, and Acceleration of particle	4	4	-

2	Plane Motion Path of Particle	2	2	-
3	Description of plane motion using Cartesian axes	2	2	-
4	Projectiles	2	2	-
5	Relative motion between particles	2	2	-
6	Motion for particle in circular path	2	2	-
7	Newton's second law of motion	4	4	-
8	Principle of work and energy of motion	4	4	-
9	Principle of conservation of mechanical energy	2	2	-
10	Principle of Impulse and Momentum of rigid body	4	4	-
Total		**28**	**28**	**-**

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brainstorming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	lab
1	Position, Displacement, Velocity, and Acceleration of Particle	x	X			X									
2	Plane Motion path of Particle	x	X			X									

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

6. Teaching and learning methods for disabled students:

No.	Teaching Methods	Reason
1	Presentation of the course in digital material	Better access any time
2	Wed communication with students	Better communication with certain cases
3	Asking small groups to do assignments; each composed of low, medium, and high-performance students	Knowledge and skills transfer among different levels of students

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Midterm examination	C1	a1, a2, b1
2	Semester work (quizzes, sheets, report)	C1	b1, c1
3	Final term examination	C1	a1, a2, b1, c1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Midterm examination	8^{th}
2	Semester work	2^{nd} -7^{th} - 9^{th} -14^{th}
3	Final term examination	15^{th}

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Midterm examination	20%
2	Semester work	20%
3	Final term examination	60%
	Total	**100%**

8. List of References:

No.	Reference List
1	Marcelo R. M. Crespo da Silva "Fundamentals of Dynamics and Analysis of Motion" 2nd edition, Dover Publications; (2019).
2	C. Hibbeler, Russell "Engineering Mechanics: Dynamics in SI Units, Global Edition" 14th edition, P&C ECS; 15th edition 2018).

9. Facilities required for teaching and learning:

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

10. Matrix of Competencies and LO's:

No	Topic	Aims	Competencies	LO's
1	Position, Displacement, Velocity, and Acceleration of Particle	1	C1	a1
2	Plane Motion path of Particle	1	C1	a1
3	Description of plane Motion using Cartesian axes	1	C1	a2
4	Projectiles	1	C1	b1
5	Relative motion between particles	1	C1	b1
6	Motion for particle in circular path	1	C1	a2
7	Newton's second law of motion	1	C1	b1
8	Principle of work and energy of motion	1	C1	a2
9	Principle of conservation of mechanical energy	1	C1	a1
10	Principle of impulse and momentum of rigid body	1	C1	c1

Course Coordinator: Dr. Moataz Mostafa
Head of Department: Assoc. Prof. Dr. Amal Bahiry
Date of Approval: 2022

Physics (2)
(PHY102)

1. Basic Information:

Program Title	All Programs
Department Offering the Program	Basic Science and Engineering Department
Department Responsible for the Course	Basic Science and Engineering Department
Course Title	Physics (2)
Course Code	PHY102
Year/Level	Level 1
Specialization	Major – Compulsory Course
Authorization Date of Course Specification	-
Pre- request	-

Teaching hours	**Lectures**	**Tutorial**	**Practical**
	2	2	2

2. Course Aims:

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

3. Competencies:

Competencies	Learning Outcomes (LO'S)
C1 Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science, and mathematics.	**a1** Define concepts and theories of physics necessary for engineering system analysis. **a2** Study solving engineering problems including Einstein's quantum hypothesis, laws of reflection and refraction, interference, and diffraction. **a3** Define measurement devices in electrical conductivity, basic characteristics, and properties. **b2** Select the appropriate solutions for engineering problems including Newton's Rings and design of optical fibers.
C2 Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess and evaluate findings, and use statistical analyses and	**a2** Describe quality assurance systems, codes of practice and standards, health and safety requirements, and environmental issues.

objective engineering judgment to draw conclusions.	
C6 Plan, supervise and monitor implementation of engineering projects, taking into consideration other trades requirements.	**c1** Conduct troubleshooting in chemical engineering plants.

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	Basic of electricity. Practical: measurement devices in electrical conductivity.	2	2	4
2	Column's law and Gauss's law. Practical: sensitivity of galvanometer.	4	4	2
3	capacitors and capacitance. Practical: capacitors and capacitance	2	2	2
4	Currents and Resistance. Practical: ohm's law - series connection &parallel connection& resistance color code& meter bridge - voltmeter resistance.	4	4	10
5	Magnetic field and magnetic force. Practical: the inverse square law in magnetism.	4	4	2
6	The nature and propagation of light. Practical: the glass prism.	4	4	2
7	Optical fiber. Practical: the glass prism.	2	2	2
8	Introduction to Quantum theory.	2	2	0
9	Laser. Practical:	2	2	0
10	Lenses and mirrors. Practical: spherometer- mirrors and lenses.	2	2	4
Total		**28**	**28**	**28**

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brainstorming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	lab
1	Basic of electricity. Practical: measurement devices in electrical conductivity.	x	x			X									X
2	Column's law and Gauss's law. Practical: sensitivity of galvanometer.	x	x				X								X
3	capacitors and capacitance. Practical: capacitors and capacitance	x	x					X							X
4	Currents and Resistance. Practical: ohm's law - series connection &parallel connection& resistance color code& meter	x	x			X	X								X

	bridge - voltmeter resistance.														
5	Magnetic field and magnetic force. Practical: the inverse square law in magnetism.	x	x			x									x
6	The nature and propagation of light. Practical: the glass prism.	x	x				X								x
7	Optical fiber. Practical: the glass prism.	x	x					X							x
8	Introduction to Quantum theory.	x	x				X								x
9	Laser. Practical:	x	x					x							x
10	Lenses and mirrors. Practical: spherometer-mirrors and lenses.	x	x				X								x

6. Teaching and learning methods for disabled students:

No.	Teaching Methods	Reason
1	Presentation of the course in digital material	Better access any time
2	Web communication with students	Better communication with certain cases
3	Asking small groups to do assignments, each composed of low, medium, and high-performance students.	Knowledge and skills transfer among different levels of students

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Midterm examination	C1, C2, C6	a1, a3, a2, c1
2	Semester work (quizzes, sheets, report)	C1, C2, C6	a1, a3
3	Final term examination	C1	a1, a2, b2
4	Practical exam	C1, C6	a2, b2, c1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks

1	Midterm examination	8th
2	Semester work	5th ،7th ،14th
3	Final term examination	15th

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Mid-term examination	10%
2	final examination	60%
3	Practical examination	10%
4	Semester work	20%
Total		**100%**

8. List of References:

No.	Reference List
1	Shankar, Ramamurti. Fundamentals of Physics II. Yale University Press, 2021.
2	Peter J. Williams; Firas Mansour; Robert L. Hawkes; (Nuclear physicist) Javed Iqbal; Marina Milner-Bolotin. Physics for scientists and engineers: an interactive approach, Nelson Education Ltd., Year: 2019
3	David Halliday, Robert Resnick, Jearl Walker. Fundamentals of Physics, 9th Edition, Binder Ready Version,2019
4	Serway, Raymond A., and John W. Jewett. Physics for scientists and engineers. Cengage learning, 2018.

9. Facilities required for teaching and learning:

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

10. Matrix of Competencies and LO's:

No.	Topic	Aims	Competencies	LO's
1	Basic of electricity. Practical: measurement devices in electrical conductivity.	1	C1, C2	a1, a3
2	Column's law and Gauss's law. Practical: sensitivity of galvanometer.	1	C1, C2, C6	a1, a2, c1
3	capacitors and capacitance. Practical: capacitors and capacitance	1	C1, C2, C6	a1, a2, c1
4	Currents and Resistance.	1	C1, C2, C6	a1, a3 a2, c1

	Practical: ohm's law - series connection &parallel connection& resistance color code& meter bridge - voltmeter resistance.			
5	Magnetic field and magnetic force. Practical: the inverse square law in magnetism.	1	C1, C2, C6	a1, a2, c1
6	The nature and propagation of light. Practical: the glass prism.	1	C1, C2, C6	a2, c1
7	Optical fiber. Practical: the glass prism.	1	C1, C2, C6	b2, a2, c1
8	Introduction to Quantum theory.	1	C1, C2, C6	a2, c1
9	Laser. Practical:	1	C1, C2, C6	b2, a2, c1
10	Lenses and mirrors. Practical: spherometer- mirrors and lenses.	1	C1, C2, C6	a2, b2 a2, c1

Course Coordinator: Assoc. Prof. Dr. Amal Bahiry & Dr. Ahmed Lotfy
Head of Department: Assoc. Prof. Dr. Amal Bahiry
Date of Approval: 2022

Production Engineering
(ENG105)

1. Basic Information:

Program Title	All Programs
Department Offering the Program	Basic Science and Engineering Department
Department Responsible for the Course	Basic Science and Engineering Department
Course Title	Production Engineering
Course Code	ENG105
Year/Level	Level 1
Specialization	Major – Compulsory Course
Authorization Date of Course Specification	-
Pre- request	-

Teaching hours	**Lectures**	**Tutorial**	**Practical**
	3	-	2

2. Course Aims:

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

3. Competencies:

Competencies	Learning Outcomes (LO'S)
C1 Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.	**a1** Explain the basic principles of production engineering. **a3** List the characteristics of engineering materials related to production engineering. **b3** Evaluate the characteristics and performance of engineering materials related to production engineering
C3 Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global,	**c1** Apply engineering knowledge to improve products of modern tools, systems, and procedure, to make the engineering process more balanced costs, benefits, safety, quality and reliability and environmental impact.

cultural, social, economic, and environmental.	**c2** Apply safe systems including the use laboratory and field equipment competently
C6 Plan, supervise and monitor of production process, taking into consideration other trades requirements.	**a1** Show the conventional procedures and characterization of common engineering materials and components. **c2** Acquire production skills.

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	The engineering substances and its properties Practical: engineering materials	3	-	2
2	Heating and cooling diagrams Practical: iron and steel production	3		2
3	Heating equilibrium diagrams Practical: heat treatment	3	-	2
4	Alloys - Casting operation (sand casting and the preparation of the mold) Practical: metal casting & mold for a sand casting& carpenter workshop	6	-	4
5	Forming processes (cold and hot forming: forging rolling – Wire drawing – Blanking and piercing - Deep drawing - The extrusion) Practical: metal forming	6	--	4
6	Processes of metal connections (the riveting – welding with its types sticking) Practical: metal joining process	6	--	2
7	Cutting machining: Lathing - Shaping – Drilling –Milling - Grinding – Work Piece fixation - Cutting tools fixation - Specifications of the operating machine) Practical: carpenter workshop	6	-	2
8	Methods of solving problems Practical: metal machining	3	-	2
9	Measuring tools (venire caliper – micrometers and its types) Practical: measurement tools	3	-	4
10	Production cycle production efficiency - Industrial safety Practical training in the different workshops	3	-	4
Total		**42**	**-**	**28**

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brainstorming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	lab
1	The engineering substances and its properties Practical: engineering materials	x	X			x									x
2	Heating and cooling diagrams Practical: iron and steel production	x	X												x
3	Heating equilibrium diagrams Practical: heat treatment	x	X	x											x
4	Alloys - Casting operation (sand casting and the preparation of the mold)	x													x

	Practical: metal casting & mold for a sand casting& carpenter workshop														
5	Forming processes (cold and hot forming: forging rolling – Wire drawing – Blanking and piercing - Deep drawing - The extrusion) Practical: metal forming	X	X												x
6	Processes of metal connections (the riveting – welding with its types sticking) Practical: metal joining process	x	X												x
7	Cutting machining: Lathing - Shaping – Drilling –Milling - Grinding – Work Piece fixation - Cutting tools fixation - Specifications of the operating machine) Practical: carpenter workshop	x	X												x
8	Methods of solving problems Practical: metal machining	x	X			x	x								x
9	Measuring tools (venire caliper – micrometers and its types)	x	x												x

	Practical: measurement tools														
10	Production cycle production efficiency - Industrial safety Practical training in the different workshops	x	x			x									X

6. Teaching and learning methods for disabled students:

No.	Teaching Methods	Reason
1	Presentation of the course in digital material	Better access any time
2	Web communication with students	Better communication with certain cases
3	Asking small groups to do assignments, each composed of low, medium, and high-performance students.	Knowledge and skills transfer among different levels of students

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Midterm examination	C1	a1, a3, b3
2	Semester work (quizzes, sheets report),	C3	c1, c2
3	Practical Exam	C3	c1, c2
4	Final term examination	C1	a1, b3, a3

7.2 Evaluation Schedule:

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

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	final examination	60%
2	Practical examination	8%
3	Periodic exam	32%
	Total	**100%**

8. List of References:

No.	Reference List
1	Shanker, Kripa, Shankar, Ravi, Sindhwani, Rahu "Advances in Industrial and Production Engineering" 1st edition, Springer Nature Singapore Pte Ltd. (2018).
2	Jeff Hansen "Manufacturing and Production Engineering: Planning and Control" Willford Press (2018).

9. Facilities required for teaching and learning:

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

10. Matrix of Competencies and LO's:

No.	Topic	Aims	Competencies	LO's
1	The engineering substances and its properties Practical: engineering materials	1	C1	a1, a3
2	Heating and cooling diagrams Practical: iron and steel production	1	C1	a3
3	Heating equilibrium diagrams Practical: heat treatment	1	C1	b3
4	Alloys - Casting operation (sand casting and the preparation of the mold) Practical: metal casting & mold for a sand casting& carpenter workshop	1, 3	C3	c1, c2
5	Forming processes (cold and hot forming: forging rolling – Wire drawing – Blanking and piercing - Deep drawing - The extrusion) Practical: metal forming	1, 2	C3	c1, c2
6	Processes of metal connections (the riveting – welding with its types sticking) Practical: metal joining process	1, 3	C3	c1, c2
7	Cutting machining: Lathing - Shaping – Drilling –Milling - Grinding – Work Piece fixation - Cutting tools fixation - Specifications of the operating machine) Practical: carpenter workshop	1, 2, 3	C6	a1, c2
8	Methods of solving problems Practical: metal machining	1, 3	C1	b3

No.	Topic	Aims	Competencies	LO's
9	Measuring tools (venire caliper – micrometers and its types) Practical: measurement tools	1, 3	C3	c1
10	Production cycle production efficiency - Industrial safety Practical training in the different workshops	1, 3	C6	c2

Course Coordinator: Dr. Moataz Mostafa
Head of Department: Assoc. Prof. Dr. Amal Bahiry
Date of Approval: 2022

Introduction to Engineering and Environment (ENG106)

1. Basic Information:

Program Title	All Programs
Department Offering the Program	Basic Science and Engineering Department
Department Responsible for the Course	Basic Science and Engineering Department
Course Title	Introduction to Engineering and Environment
Course Code	ENG106
Year/Level	Level 1
Specialization	Major – Compulsory Course
Authorization Date of Course Specification	-
Pre- request	-

	Lectures	Tutorial	Practical
Teaching hours	2	-	-

2. Course Aims:

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

3. Competencies:

Competencies	Learning Outcomes (LO'S)
C1 Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science, and mathematics.	**a2** Explain the scientific principles and theories that apply to the topic. **a3** Explain the basic principles of engineering. **b2** Use scientific concepts and theories that are relevant to the profession. **c3** Solve complex engineering problems by applying engineering fundamentals.
C3 Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global, cultural, social, economic, environmental, ethical, and other aspects as appropriate to the discipline and within the principles	**a2** Understand the professional ethics and impacts of engineering solutions on society and environment. **a3** Recognizes the environmental and economic impact of various industries, waste minimization, and industrial facility remediation. **b1** Judge engineering decisions considering balanced costs, benefits, safety, quality, reliability, and environmental impact.

and contexts of sustainable design and development.	**c1** Incorporate economic, societal, global, environmental, and risk management factors into design.

4. Course Contents:

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

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brainstorming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	lab
1	Engineering concepts: What is engineering – international classification for the engineering jobs – relation between engineering development and environment economic and social development – engineering branches – ethics of the engineering jobs.	x	X								X				
2	Introduction to environmental science: the importance of	x	X								X				

	studying environmental science														
3	Modern technology and its effect on the environment – quality of the environment and development elements	x	X	X							X				
4	Sources of environmental pollution and method of control (air pollution – water pollution – solid wastes pollution –noise) – economics of environmental pollution control – legislations for the environment protection.	x	X	x							X				

6. Teaching and learning methods for disabled students:

No.	Teaching Methods	Reason
1	Presentation of the course in digital material.	Better access any time.
2	Asking small groups to do assignments; each composed of low, medium, and high-performance students.	Knowledge and skills transfer among different levels of students.

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Mid Term Examination	C1, C3	a2, a3, b1, b2
2	Semester work (quizzes, sheets, report)	C3	c1, c3
3	Final Term Examination	C1, C3	b1, b2, c3

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Semester work (Sheets, Quiz and Reports)	$2^{nd}, 7^{th}, 9^{th}$

2	Mid Term Examination	8^{th}
3	Final Term Examination	15^{th}

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Mid-term examination	20%
2	Semester work	20%
3	Final-term examination	60%
Total		**100%**

8. List of References:

No.	Reference List
1	د. جمال صالح السلامة من الكوارث الطبيعية والمخاطر البشرية، دار الشروق، 2019
2	Raju, Fundamental of air pollution, Oxford & IBH, 2019.

9. Facilities required for teaching and learning:

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

10. Matrix of Competencies and LO's:

No.	Topic	Aims	Competencies	LO's
1	Engineering concepts: What is engineering – international classification for the engineering jobs – relation between engineering development and environment economic and social development – engineering branches – ethics of the engineering jobs.	3	C3	a2, a3
2	Introduction to environmental science: the importance of studying environmental science	3	C1	a2, b2
3	Modern technology and its effect on the environment – quality of the environment and development elements	3	C3	b1, c1
4	Sources of environmental pollution and method of control (air pollution – water pollution – solid wastes pollution –noise) – economics of environmental pollution control – legislations for the environment protection.	3	C1	b2, c3

Course Coordinator: Prof. Dr. Osami Rageh & Assoc. Prof. Dr. Ramadan Elkateb
Head of Department: Assoc. Prof. Dr. Amal Bahiry
Date of Approval: 2022

Technical English Language (1)
(LNG101)

1. Basic Information:

Program Title	All Programs
Department Offering the Program	Basic Science and Engineering Department
Department Responsible for the Course	Basic Science and Engineering Department
Course Title	Technical English Language (1)
Course Code	LNG101
Year/Level	Level 1
Specialization	Major – Compulsory Course
Authorization Date of Course Specification	-
Pre- request	-

Teaching hours	**Lectures**	**Tutorial**	**Practical**
	1	-	**2**

2. Course Aims:

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

3. Competencies:

Competencies	**Learning Outcomes (LO'S)**
C8 Communicate effectively graphically, verbally and in writing with a range of audiences using contemporary tools.	**d1** Communicate effectively with a range of audiences using contemporary tools.

4. Course Contents:

No.	**Topics**	**Lectures**	**Tutorial**	**Practical**
1	Engineering Lab.: skills in English Lesson 1 Bob's Day at work & Lesson 2 Bob returns home with bad news	3	-	6
2	A private flat Lab.: skills in English Lesson 3 Ted's Day at school	1	-	2
3	Bookshelves Lab.: skills in English	1	-	2

	Lesson 4 Nicole's day at school			
4	Bridges Lab.: skills in English Lesson 5 Ted goes out for the evening. Grammar Topics	2	-	4
5	Reinforced concrete Lab.: skills in English Lesson 6 Susan stays home and bake cookies & Lesson 7 Susan hires Bob to run her own business	2	-	4
6	Surveying Lab.: skills in English Lesson 8 Ted forms a rock band & Lesson 9 Nicole for president	2	-	4
7	Hydraulic works Lab.: skills in English Lesson 10 Bob visits the village market	2	-	4
8	Soil mechanics and foundations Lab.: skills in English Grammar topics	1	-	2
Total		**14**	**-**	**28**

5. Teaching and learning methods:

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

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

6. Teaching and learning methods for disabled students:

No.	Teaching Methods	Reason
1	Presentation of the course in digital material	Better access any time
2	Asking small groups to do assignments; each composed of low, medium, and high-performance students.	Knowledge and skills transfer among different level of students.

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Midterm examination	C8	d1
2	Semester work (quizzes, sheets, report)	C8	d1
3	Practical exam	C8	d1
4	Final term examination	C8	d1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Midterm examination	8^{th}
2	Semester work	7^{th},9^{th}
3	Practical examination	14^{th}
4	Final term examination	15^{th}

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Mid-term examination	10%
2	Practical examination	10%
3	Semester work	20%
4	Final-term examination	60%
	Total	**100%**

8. List of References:

No.	Reference List
1	David Bonamy "Technical English" Longman Publishing Group 2018
2	Paul J. Hamel "English for Better Jobs 1: Language for Working and Living" Create Space Independent Publishing Platform; 1st edition (2019)
3	Mahmood Reza Atai, Alireza Zaré Alanagh, Morteza Nasiri and Reza Taherkhani "English for The Students of Engineering" 1st edition, SAMT Publication (2021).

9. Facilities required for teaching and learning:

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

10. Matrix of Competencies and LO's:

No.	Topic	Aims	Competencies	LO's
1	Engineering	5	C8	d1

No.	Topic	Aims	Competencies	LO's
	Lab.: skills in English Lesson 1 Bob's Day at work & Lesson 2 Bob returns home with bad news			
2	A private flat Lab.: skills in English Lesson 3 Ted's Day at school	5	C8	d1
3	Bookshelves Lab.: skills in English Lesson 4 Nicole's day at school	5	C8	d1
4	Bridges Lab.: skills in English Lesson 5 Ted goes out for the evening. Grammar Topics	5	C8	d1
5	Reinforced concrete Lab.: skills in English Lesson 6 Susan stays home and bake cookies & Lesson 7 Susan hires Bob to run her own business	5	C8	d1
6	Surveying Lab.: skills in English Lesson 8 Ted forms a rock band & Lesson 9 Nicole for president	5	C8	d1
7	Hydraulic works Lab.: skills in English Lesson 10 Bob visits the village market	5	C8	d1
8	Soil mechanics and foundations Lab.: skills in English Grammar topics	5	C8	d1

Course Coordinator: Dr. Doaa Elshrbiny
Head of Department: Assoc. Prof. Dr. Amal Bahiry
Date of Approval: 2022

Mathematics (3)
(MTH201)

1. Basic Information:

Program Title	All Programs
Department Offering the Program	Basic Science and Engineering Department
Department Responsible for the Course	Basic Science and Engineering Department
Course Title	Mathematics (3)
Course Code	MTH 201
Year/Level	Level 2
Specialization	Major – Compulsory Course
Authorization Date of Course Specification	-
Pre- request	MTH101

Teaching hours	**Lectures**	**Tutorial**	**Practical**
	2	2	-

2. Course Aims:

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

3. Competencies:

Competencies	**Learning Outcomes (LO'S)**
C1 Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science, and mathematics.	**a1** Understand the relevant engineering mathematical of ordinary differential equations and applications of Partial differentiation equations. **a2** Describe the effect of mathematical engineering principles and theories that apply in the most fundamental problems. **a3** Define the basic concepts of ordinary differential equations and Partial differentiation equations. **b1** Applying the basics of ordinary differential equations and applications of Partial differentiation equations in engineering problems.

4. Course Contents:

No.	**Topic**	**Lectures**	**Tutorial**	**Practical**

1	Functions of several variables Limits of functions of several variables. Continuity in multivariable functions	2	4	-
2	Partial derivatives of higher order extreme for functions of two variables	4	4	-
3	Double integral Triple integral Line integral in space, green’s theorem Surface integral Gauss and stokes's theory	10	4	-
4	Basic concepts Formation of the differential equations Separable differential equations Homogenous differential equations Exact differential equation linear differential equation Bernoulli’s equation the linear differential operator	4	2 4 2 4	- - - -
5	Second order homogeneous differential equations with constant coefficients Non-homogeneous linear differential equations	4	2	-
6	Convergence of la-place transform Important properties of la-place transform Laplace transforms of derivatives. Inverse la-place transform	4	2	-
Total		**28**	**28**	**-**

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brainstorming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	lab
1	Functions of several variables Limits of functions of several variables. Continuity in multivariable functions	x	x			X	X								
2	Partial derivatives of higher order extreme for functions of two variables	x	x			X		X							
3	Double integral Triple integral Line integral in space, green's theorem Surface integral Gauss and stokes's theory	x	x			X	X								

4	Basic concepts Formation of the differential equations Separable differential equations Homogenous differential equations Exact differential equation linear differential equation Bernoulli's equation the linear differential operator	x	x			X		X							
5	Second order homogeneous differential equations with constant coefficients Non-homogeneous linear differential equations	x	x			X	X								
6	Convergence of la-place transform Important properties of la-place transform Laplace transforms of derivatives. Inverse la-place transform	x	x			X		x							

6. Teaching and learning methods for disabled students:

No.	Teaching Methods	Reason
1	Presentation of the course in digital material	Better access any time
2	Web communication with students	Better communication with certain cases

3	Asking small groups to do assignments; each composed of low, medium and high-performance students	Knowledge and skills transfer among different levels of students

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Midterm examination	C1	a1, a2
2	Semester work (quizzes, sheets, report)	C1	a2, a3
3	Final term examination	C1	a1, a2, a3, b1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Midterm examination	8^{th}
2	Semester work	2^{nd} -7^{th} - 14^{th}
3	Final term examination	15^{th}

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Midterm examination	20%
2	Semester work	20%
3	Final term examination	60%
Total		**100%**

8. List of References:

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

9. Facilities required for teaching and learning:

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

10. Matrix of Competencies and LO's methods:

No.	Topic	Aims	Competencies	LO's
1	Functions of several variables	1	C1	a1, a2

	Limits of functions of several variables. Continuity in multivariable functions			
2	Partial derivatives of higher order extreme for functions of two variables	1	C1	a1, a2
3	Double integral Triple integral Line integral in space, green's theorem Surface integral Gauss and stokes's theory	1	C1	a2
4	Basic concepts Formation of the differential equations Separable differential equations Homogenous differential equations Exact differential equation linear differential equation Bernoulli's equation the linear differential operator	1	C1	a1, a3
5	Second order homogeneous differential equations with constant coefficients Non-homogeneous linear differential equations	1	C1	a3
6	Convergence of la-place transform Important properties of la-place transform Laplace transforms of derivatives. Inverse la-place transform	1	C1	b1

Course Coordinator: Dr. Reda Abdo
Head of Department: Assoc. Prof. Dr. Amal Bahiry
Date of Approval: 2022

Civil Engineering Drawing
(CIE201)

1. Basic Information:

Program Title	Civil Engineering Program
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Civil Engineering Department
Course Title	Civil Engineering Drawing
Course Code	CIE201
Year/Level	Level 2
Specialization	Major – Compulsory Course
Authorization Date of Course Specification	-
Pre- request	ENG105

Teaching hours	Lectures	Tutorial	Practical
	1	4	-

2. Course Aims

No.	Aims
4	Use the techniques, skills, and current engineering tools required for engineering drawing practice for irrigation works structures, reinforced concrete structure, and steel structures.
10	Select appropriate and sustainable technologies for drawing the irrigation works structures, reinforced concrete structure, and steel structures such as AUTOCAD program.

3. Competencies:

Competencies	Learning Outcomes (LO'S)
C1 Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science, and mathematics.	**a2** Define the principles, (general concepts- legends and symbols – scales and drawing size – general layout and views. **a3** Define the principal types of irrigation works (bridges, culverts, syphons) – reinforcement details – steel sections.
C11 Select appropriate and sustainable technologies for drawing structures; using computer programs (AUTO CAD program).	**c1** Using either numerical technique (AUTO CAD program)
C12 Achieve an optimum details of drawing irrigation works,	**b1** Achieve the optimum planning and drawing main views, and the detail of irrigation works structures

reinforcement details and steel sections	(bridges, culverts, syphons) – reinforcement details – reinforces concrete structure and steel structures sections.

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	Introduction to civil engineering projects drawings (general concepts- legends and symbols – scales and drawing size – general layout and views – longitudinal and cross sections – detailing – drawings include steel structural cross-sections and details, irrigation works structures (culverts, bridges, and syphons), reinforcement details, reinforced concrete structures views and reinforcement details.	8	32	-
2	AutoCAD fundamentals of civil engineering drafting by way of computer aided drawing (CAD) software.	4	16	-
3	Basic features and capabilities of CAD software.	2	8	-
Total		**14**	**56**	**-**

5. Teaching and learning methods:

Topics	Face to face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brainstorming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	lab

Introduction to civil engineering projects (general concepts- legends and symbols – scales and drawing size – general layout and views – longitudinal and cross sections – detailing – drawings include structural steel sections and details, culverts roof and floor views, reinforcement details, housing details.	x	x			x	x								
AutoCAD fundamentals of civil engineering drafting by way of computer aided drawing (CAD) software.	x	x			x	x								
Basic features and capabilities of CAD software.	x	x			x	x								

6. Teaching and learning methods for disabled students:

No.	Teaching Methods	Reason
1	Presentation of the course in digital material	Better access any time
2	Wed communication with students	Better communication with certain cases
3	Asking small groups to do assignments; each composed of low, medium, and high-performance students	Knowledge and skills transfer among different levels of students
4	Electronic model system for the Institution.	Better access any time

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO’s
1	Mid-term examination	C1 C12	a2, a3 b1
2	Semester work	C1 C12 C11	a2, a3 b1 c1
4	Final term examination	C1 C12	a2, a3 b1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	semester work	$2^{nd}, 7^{th}, 9^{th}$
2	Mid Term examination	8^{th}
3	Final term examination	15^{th}

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Mid-term examination	20%
2	Semester work	20%
3	Final-term examination	60%
	Total	**100%**

8. List of References:

No.	Reference List
1	Waller, Peter, Yitayew, Muluneh. (2016) Irrigation and Drainage Engineering. Available from your library or springer.com/shop.
2	Bedient, P.B., and Huber, W.C., (1988). "Hydrology and floodplain Analysis". Addison-Wesley Publishing Company.p.650.
3	Deming, D., (2002)."Introduction to Hydrogeology". McGraw-Hill, New York.
4	Han, D., (2010). "Concise Hydrology". Download free Textbook at bookboon.com. P.145.

9. Facilities required for teaching and learning:

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

10. Matrix of knowledge and LO’S skills of the course:

No	Topic	Aims	Competencies	LO’s

1	Introduction to civil engineering projects (general concepts- legends and symbols – scales and drawing size – general layout and views – longitudinal and cross sections – detailing – drawings include structural steel sections and details, culverts roof and floor views, reinforcement details, housing details.	4	C1 C12	a2, a3 b1
2	Estimating of water requirements AutoCAD fundamentals of civil engineering drafting by way of computer aided drawing (CAD) software.	10	C11	C1
3	Basic features and capabilities of CAD software.	10	C11	C1

Course Coordinator Assoc. Prof. Dr. Mohamed Gabr
Head of Department: Prof. Dr. Mohamed Elkiki
Date of Approval: 2022

Structures Analysis (1)
(CIE202)

1. Basic Information:

Program Title	Civil Engineering Program
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Civil Engineering Department
Course Title	Structures Analysis (1)
Course Code	CIE202
Year/Level	Level 2
Specialization	Major – Compulsory Course
Authorization Date of Course Specification	-
Pre- request	ENG101

Teaching hours	**Lectures**	**Tutorial**	**Practical**
	2	2	-

2. Course Aims

No.	Aims
1	Applying theories and abstract thinking in analytic critical and systemic thinking to solve engineering problems of varying complexity and variation.
10	Select appropriate and sustainable technologies for construction of buildings

3. Competencies:

Competencies	Learning Outcomes (LO'S)
C1 Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science, and mathematics.	**a3** Explain the basic principles of engineering for structural analysis. **b3** Applying engineering basics that are relevant to the structural analysis. **c3** Identify, formulate, and solve complex engineering problems by applying engineering fundamentals.

C2 Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess, and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.	**a1** Define, basic characteristics, properties, concepts, and techniques of structural analysis and mechanics. **c3** Applying statistical analyses and objective engineering judgment to draw conclusions.
C11 Select appropriate and sustainable technologies for construction of buildings, infrastructures, and water structures; using either numerical techniques or physical measurements and/or testing by applying a full range of civil engineering concepts and techniques of structural analysis and mechanics, properties and strength of materials, surveying, soil mechanics, hydrology and fluid mechanics.	**a1** Recognize the fundamentals of structural analysis and mechanics. **c1** Using either numerical techniques or physical measurements and/or testing by applying a full range of civil engineering concepts and techniques of structural analysis and mechanics.

4. Course Contents:

No.	Topics	Lecture	Tutorial	Practical
1	Basic concept in structural analyses	2	2	-
2	Loads and reactions	4	4	-
3	Statically determinate beams	4	4	-
4	Statically determinate rigid frames	4	4	-
5	Statically determinate arches	4	4	-
6	Statically determinate trusses.	6	6	-
7	Influence lines for Statically determinate structures	4	4	-
Total		**28**	**28**	**-**

5. Teaching and learning methods:

Topics	Face to face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brainstorming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	lab
Basic concept in structural analyses	x	x			x	x								
Loads and reactions	x	x			x	x								

Statically determinate beams	x	x			x	x								
Statically determinate rigid frames	x	x			x	x								
Statically determinate arches	x	x			x	x								
Statically determinate trusses.	x	x			x	x								
Influence lines for Statically determinate structures	x	x			x	x								

6. Teaching and learning methods for disabled students:

No.	Teaching Methods	Reason
1	Presentation of the course in digital material	Better access any time
2	Asking small groups to do assignments each composed of low, medium, and high-performance students.	Knowledge and skills transfer among different level of students.

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Midterm examination	C1 C11	a3, c3 c1
2	Semester work (quizzes, sheets, report)	C2 C11	a1, a3 a1, c1
3	Final term examination	C1 C2 C11	a3, b3, c3 a1, a3 a1, c1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Midterm examination	8^{th}
2	Semester work	$2^{nd}, 7^{th}, 9^{th}$

3	Final term examination	15^{th}

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Midterm examination	20%
2	Semester work	20%
3	Final term examination	60%
Total		**100%**

8. List of References:

No.	Reference List
1	Essential books (textbooks) ● W. M. El-dakhakhni, "Theory of Structures", Part One, Assiut University, 2016. ● W. M. El-dakhakhni, "Theory of Structures", Part Two, Assiut University, 2016. ● El-Sayed El-Kasaby and Fayez Kaiser, "Theory of Structures-Solved examples", Part 1, 2018.
2	Recommended books ● Structural Analysis, R. C. Hibbeler, 2020. ● Structural Analysis 1: Statically Determinate Structures, S. Khalfalla, September -2018 ● Structural Analysis, R. C. Hibbeler, 2018
3	Structural Engineering Web Sites -ASCE Periodicals.

9. Facilities required for teaching and learning:

Facility			
1	Seminar	3	teaching aids as interactive (smart) board
2	discussions rooms with internet connections	4	Data show

10. Matrix of knowledge and LO's skills of the course:

No	Topic	Aims	Competencies	LO's
1	Basic concept in structural analyses	1, 10	C1	a3
2	Loads and reactions	1, 10	C1	c3
3	Statically determinate beams	1, 10	C1, C2, C11	a1, c3
4	Statically determinate rigid frames	1, 10	C1, C2, C11	a1, c3
5	Statically determinate arches	1, 10	C1, C2, C11	a1, c3
6	Statically determinate trusses.	1, 10	C1, C2	c3
7	Influence lines for Statically determinate structures	1, 10	C1, C2	c3

Course Coordinator: Dr. Rafeek Wadieh

Head of Department: Prof. Dr. Mohamed Elkiki
Date of Approval: 2022

Computer Programming
(ENG201)

1. Basic Information:

Program Title	All Programs
Department Offering the Program	Communications and Electronics Engineering Program
Department Responsible for the Course	Basic Science and Engineering Department
Course Title	Computer Programming
Course Code	ENG201
Year/Level	Level 2
Specialization	Major – Compulsory Course
Authorization Date of Course Specification	-
Pre- request	-

Teaching hours	**Lectures**	**Tutorial**	**Practical**
	2	-	2

2. Course Aims:

No.	Aims
1	Apply acquired knowledge in real-world situations by applying theories and abstract thinking in analytic critical and systemic thinking to identify, diagnose, and solve engineering problems of varying complexity and variation.
5	Communicate effectively with a variety of audiences using a variety of forms, methods, and languages; cope with academic and professional issues in a critical and creative manner; and display leadership, business administration, and entrepreneurial abilities.

3. Competencies:

Competencies	Learning Outcomes (LO'S)
C1 Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science, and mathematics.	**b3** Applying engineering basics that are relevant to the computer programing (java) **c1** Solve engineering problems by applying engineering different algorithms. **c2** Identify complex engineering problems by applying engineering fundamentals for solving.
C2 Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess, and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.	**a1** Describe an appropriate system by applying "java "language programming. **b3** Interpret data problems to identify java programs. **c1** Choose relevant computer-based software for modelling to analysis java programs

4. Course Contents:

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

5. Teaching and learning methods:

Topics	Face to face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brainstorming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	lab
Basic concepts of programming. Practical: problem analysis& developing the programs charts& Structured programming	x	x			x	x								
Introduction Java Applications Practical: Form of the Program& fundamentals of Java programming language and its syntax& Primitive data types, operators, variables & Joptionpane & scanner Classes.	x	x			x	x								
Branching [Control Statements]. Practical: programs about (If statement, If -Else, Nested IF, Switch)	x	x			x	x								
[Iterations] Control Statements. Practical: solved problems about (Repetition statements: for, while, do-while& Nested loop &Continue, Break.)	x	x			x	x								

Concepts of object-Oriented programming Practical: Examples of Classes, Inheritance Concept.	x	x			x	x								
Methods in java. Practical: problems of (Declare method& Message passing& Method overloading)	x	x			x	x								
Arrays and Array list Practical: Create Array& Matrix& Array List.	x	x			x	x								
Introduction to java Applets. Practical: java Applets programs.	x	x			x	x								
Graphical user interface (GUI). Practical: GUI exercises.	x	x			x	x								

6. Teaching and learning methods for disabled students:

No.	Teaching Methods	Reason
1	Presentation of the course in digital material	Better access any time
2	Web communication with students	Better communication with certain cases
3	Asking small groups to do assignments; each composed of low, medium, and high-performance students.	Knowledge and skills transfer among different levels of students

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO’s
1	Midterm examination	C1, C2	b3, c1
2	Semester work (report, quizzes)	C1, C2	c1, c2
3	Final term examination	C1, C2	a1, b3
4	Practical	C1, C2	c1, c2

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Midterm examination	8^{th}
2	Semester work	14^{th}
3	Final term examination	15^{th}

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Mid-term examination	10%
2	final examination	60%
3	Practical examination	10%
4	Semester work	20%
Total		**100%**

8. List of References:

No.	Reference List
1	Jeffrey L. Nyhoff, Larry R. Nyhoff "Processing: An Introduction to Programming" ebook (2017).
2	Usman Opeyemi Lateef, Akeem Owoade, Abimbola B.L. and Gbenga Ogunsanwo "introduction to computer programming" 2nd edition, College of Science, and Information Technology, (2016).

9. Facilities required for teaching and learning:

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

10. Matrix of teaching and learning methods:

No.	Topic	Aims	Competencies	LO's
1	Basic concepts of programming. Practical: problem analysis & developing the programs charts& Structured programming	1	C1	b3, c1
2	Introduction Java Applications Practical: Form of the Program& fundamentals of Java programming language and its syntax& Primitive data types, operators, variables & Joptionpane & scanner Classes.	1	C1	b3
3	Branching [Control Statements]. Practical: programs about (If statement, If -Else, Nested IF, Switch)	1	C1	b3
4	[Iterations] Control Statements. Practical: solved problems about (Repetition statements: for, while, do-while& Nested loop &Continue, Break.)	1	C1	c2
5	Concepts of object-Oriented programming Practical: Examples of Classes, Inheritance Concept.	1	C2	b3

6	Methods in java. Practical: problems of (Declare method& Message passing& Method overloading)	1	C2	a1
7	Arrays and Array list Practical: Create Array& Matrix& Array List.	1	C2	c1
8	Introduction to java Applets. Practical: java Applets programs.	1	C1	b3
9	Graphical user interface (GUI). Practical: GUI exercises.	1	C2	a1, c1

Course Coordinator: Dr. Amira El Sonbaty
Head of Department: Assoc. Prof. Dr. Amal Bahiry
Date of Approval: 2022

Engineering Thermodynamics (ENG202)

1. Basic Information:

Program Title	All Programs
Department Offering the Program	Chemical Engineering Program
Department Responsible for the Course	Basic Science and Engineering Department
Course Title	Engineering Thermodynamics
Course Code	ENG202
Year/Level	level 2
Specialization	Major – Compulsory Course
Authorization Date of Course Specification	-
Pre- request	ENG102

Teaching hours	Lectures	Tutorial	Practical
	2	2	-

2. Course Aims:

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

3. Competencies:

Competencies	Learning Outcomes (LO'S)
C1 Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science, and mathematics.	**a1** Demonstrate the thermodynamics laws that apply to the engineering problems. **a2** Explain the basic principles of engineering thermodynamics. **a3** Study the concepts and theories of mathematical, science necessary for engineering thermodynamic properties for different types of systems. **b1** Select the appropriate solutions for engineering problems and system design, gas power cycles, vapor cycles. **b2** Using scientific concepts and thermodynamics laws that are relevant to the real life. **c1** Modify engineering knowledge and understanding to improve design, products and services, gas power cycles, vapor cycles. **c2** Solve complex engineering problems by applying the concepts and the thermodynamics laws.

4. Course Contents:

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

5. Teaching and learning methods:

Topics	Face to face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brainstorming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	lab
Fundamental concepts - Properties of a pure substance	x	x			x									

Equation of state - thermodynamic systems - Work and heat	x	x			x	x								
First law of thermodynamics ; Applications to Systems and Control Volumes	x	x			x	x								
Second Law of Thermodynamics ; Principle of Carnot cycles	x	x			x	x								
Heat engines, Refrigerators, and heat pumps - Principle of the increase of entropy	x	x			x									
Applications to systems and control volumes - Irreversibility and availability	x	x			x									
Power and refrigeration cycles	x	x			x									

6. Teaching and learning methods for disabled students:

No.	Teaching Methods	Reason
1	Presentation of the course in digital material.	Better access any time
2	Web communication with students.	Better communication with certain cases
3	Asking small groups to do assignments; each composed of low, medium, and high-performance students.	Knowledge and skills transfer among different levels of students

7. Student evaluation:

7.1 Student evaluation method:

No.	Evaluation Method	Competencies	LO's

1	Midterm examination	C1	a1, a2, b1
2	Semester work (quizzes, sheets, report)	C1	c1, c2
3	Final term examination	C1	a3, b1, b2

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Midterm examination	8th
2	Semester work	2nd ,7th,9th,14th
3	Final term examination	15th

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Mid-term examination	20%
2	final examination	60%
3	Semester work	20%
	Total	**100%**

8. List of References:

No.	Reference List
1	P. K. Nag "Engineering Thermodynamics | 6th Edition" McGraw Hill Education; Sixth edition (2017).
2	Michael J. Moran, Howard N. Shapiro, Daisie D. Boettner, Margaret B. Bailey "Fundamentals of Engineering Thermodynamics" 9th edition Wiley (2018)

9. Facilities required for teaching and learning:

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

10. Matrix of Competencies and LO's:

No.	Topic	Aims	Competencies	LO's
1	Fundamental concepts - Properties of a pure substance	1	C1	a1, a2
2	Equation of state - thermodynamic systems - Work and heat	1	C1	a1, a2
3	First law of thermodynamics; Applications to Systems and Control Volumes	1	C1	a1, a2, b2
4	Second Law of Thermodynamics; Principle of Carnot cycles	1	C1	b1, b2, c1

5	Heat engines, Refrigerators, and heat pumps - Principle of the increase of entropy	1	C1	b1, c1
6	Applications to systems and control volumes - Irreversibility and availability	1	C1	a3, c2
7	Power and refrigeration cycles	1	C1	b1, c1

Course Coordinator: Prof. Dr Abd Elnaby Kabeel
Head of Department: Assoc. Prof. Dr. Amal Bahiry
Date of Approval: 2022

Technical English Language (2)
(LNG201)

1. Basic Information:

Program Title	All Programs
Department Offering the Program	Basic Science and Engineering Department
Department Responsible for the Course	Basic Science and Engineering Department
Course Title	Technical English Language (2)
Course Code	LNG201
Year/Level	Level 2
Specialization	Major – Compulsory Course
Authorization Date of Course Specification	-
Pre- request	LNG101

Teaching hours	**Lectures**	**Tutorial**	**Practical**
	1	-	2

2. Course Aims:

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

3. Competencies:

Competencies	Learning Outcomes (LO'S)
C5 Practice research techniques and methods of investigation as an inherent part of learning.	**a1** Define technical language and report writing
C8 Communicate effectively – graphically, verbally and in writing – with a range of audiences using contemporary tools.	**d1** Communicate effectively. **d2** Demonstrate efficient IT capabilities.
C10 Acquire and apply new knowledge; and practice self, lifelong and other learning strategies.	**d1** Search for information to engage in lifelong self-learning discipline. **d2** Professionally merge the language skills in self-learning

4. Course Contents:

No	Content	Lecture	Tutorial	Practical
1	Water Lab skills in English: Lesson 1 Bob drives a hard bargain& Lesson 2 Bob's big coolie order& grammar topics	2	-	4

2	Chemical and physical properties. Lab skills in English Lesson 3 Amber comes over to bake cookies & Lesson 4Amber and Ted heat up the kitchen& grammar topics	2	-	4
3	Water cycle Lab skills in English lesson 5 Nicole practices her election speech& grammar topics	1	-	2
4	Human uses Lab skills in English: Grammar topics	2	-	4
5	Heat transfer Lab skills in English lesson 6 Bob brings the cookies to the village market& lesson 7 Carol tells Bob the good news& grammar topics	2	-	4
6	Graphic language Lab skills in English: lesson 8 Everyone bakes cookies & lesson 9 Nicole's close election & grammar topics	2	-	4
7	Energy Lab Skills in English lesson 10 Bob gets any angry call from Carol & Grammar topics	2	-	4
8	Automatic Control Lab Skills in English Grammar topics	1		2
Total		**14**	**-**	**28**

5. Teaching and learning methods:

Topics	Face to face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brainstorming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	lab
Water Lab skills in English: Lesson 1 Bob drives a hard bargain& Lesson 2 Bob's big coolie order& grammar topics	x	x			x	x								
Chemical and physical properties. Lab skills in English Lesson 3 Amber comes over to bake cookies & Lesson 4Amber and Ted heat up the kitchen& grammar topics	x	x			x	x								
Water cycle Lab skills in English lesson 5 Nicole practices her election speech& grammar topics	x	x			x	x								
Human uses Lab skills in English: Grammar topics	x	x			x	x								

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

6. Teaching and learning methods for disabled students:

No.	Teaching Methods	Reason
1	Presentation of the course in digital material	Better access any time
2	Asking small groups to do assignments; each composed of low, medium, and high-performance students.	Knowledge and skills transfer among different level of students.

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Midterm examination	C8, C10	d1, d2
2	Semester work (quizzes, sheets, report)	C8	d1, d2
3	Practical exam	C8, C10	d1, d2
4	Final term examination	C10	d1, d2

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Midterm examination	8^{th}
2	Semester work	7^{th},9^{th}
3	Practical examination	14^{th}
4	Final term examination	15^{th}

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Midterm examination	10%

2	Semester work	20%
3	Practical examination	10%
4	Final term examination	60%
Total		**100%**

8. List of References:

No.	Reference List
1	David Bonamy "Technical English" Longman Publishing Group 2016
2	Paul J. Hamel "English for Better Jobs 1: Language for Working and Living" Create Space Independent Publishing Platform; 1st edition (2016)/
3	Mahmood Reza Atai, Alireza Zaré Alanagh, Morteza Nasiri and Reza Taherkhani "English for The Students of Engineering" 1st edition, SAMT Publication (2016).

9. Facilities required for teaching and learning:

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

10. Matrix of Competencies and LO's:

No.	Topic	Aims	Competencies	LO's
1	Water Lab skills in English: Lesson 1 Bob drives a hard bargain & Lesson 2 Bob's big coolie order & grammar topics	5	C8	d1, d2
2	Chemical and physical properties. Lab skills in English Lesson 3 Amber comes over to bake cookies & Lesson 4Amber and Ted heat up the kitchen & grammar topics	5	C8	d1, d2
3	Water cycle Lab skills in English lesson 5 Nicole practices her election speech & grammar topics	5	C8	d1, d2
4	Human uses Lab skills in English: Grammar topics	5	C10	d2
5	Heat transfer Lab skills in English lesson 6 Bob brings the cookies to the village market& lesson 7 Carol tells Bob the good news & grammar topics	5	C10	d2
6	Graphic language Lab skills in English: lesson 8 Everyone bakes cookies & lesson 9 Nicole's close election & grammar topics	5	C10	d2
7	Energy	5	C10	d1, d2

	Lab Skills in English lesson 10 Bob gets any angry call from Carol & Grammar topics			
8	Automatic Control Lab Skills in English Grammar topics	5	C10	d1, d2

Course Coordinator: Dr. Doaa Elshrbiny
Head of Department: Assoc. Prof. Dr. Amal Bahiry
Date of Approval: 2022

Mathematics (4)
(MTH202)

1. Basic Information:

Program Title	All Programs
Department Offering the Program	Basic Science and Engineering Department
Department Responsible for the Course	Basic Science and Engineering Department
Course Title	Mathematics (4)
Course Code	MTH202
Year/Level	Level 1
Specialization	Major – Compulsory Course
Authorization Date of Course Specification	-
Pre- request	MTH101

Teaching hours	**Lectures**	**Exercise**	**laboratory**	**Student's load**
	2	2	-	5

2. Course Aims:

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

3. Competencies:

Competencies	**Learning Outcomes (LO'S)**
C1 Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.	**a1** Learn the general principles of differential equations and series and its applications in mathematical engineering. **a2** Describe the effect of mathematical engineering principles and theories that apply in the most fundamental problems. **a3** Define the basic concepts of series and analytic functions. **b1** Use the basics of Complex Analysis and Special functions to solve engineering problems. **c1** Apply the methods of solving partial differential equations to generate solutions for heating and wave equations.

4. Course Contents:

No.	**Topics**	**Lecture**	**Exercise**	**laboratory**	**Student load**

1	Special functions	4	4	-	8
2	Fourier series	2	2	-	4
3	periodic functions and Euler's laws	4	4	-	8
4	Fourier's integrations – solutions of the differential	2	2	-	8
5	equations by series - solving the partial differential equations using variables separation	2	2	-	4
6	Functions with complex variables – complex quantities algebra	2	2	-	4
7	multiple values functions - the analytical functions and Koshi's theorem	2	2	-	8
8	the complex series	2	2	-	4
9	Taylor and Lorant series - the zeros, unique points, and the rest - the infinite series.	8	8	-	8
Total		**28**	**28**	-	**56**

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brainstorming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	lab
1	Special functions	x	x			x	x	x							
2	Fourier series	x	x			x	x	x							
3	periodic functions and Euler's laws	x	x			x	x	x							
4	Fourier's integrations – solutions of the differential	x	x			x	x	x							

5	equations by series - solving the partial differential equations using variables separation	x	x			x	x	x							
6	Functions with complex variables – complex quantities algebra	x	x			x	x	x							
7	multiple values functions - the analytical functions and Koshi's theorem	x	x			x	x	x							
8	the complex series	x	x			x	x	x							
9	Taylor and Lorant series - the zeros, unique points and the rest - the infinite series.	x	x			x	x	x							

6. Teaching and learning methods for disabled students:

No.	Teaching Methods	Reason
1	Presentation of the course in digital material	Better access any time
2	Wed communication with students	Better communication with certain cases
3	Asking small groups to do assignments; each composed of low, medium, and high-performance students	Knowledge and skills transfer among different levels of students

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO’s

1	Periodic exams	C1	a1, a2, a3, b1
2	Semester work (quizzes, sheets, report)	C1	a1, c1
3	Final term examination	C1	b1, a3, c1

7.2 Evaluation Schedule:

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

7.3 weighting of Evaluation:

No.	Evaluation Method	Marks
1	Periodic exams	30
2	Student load	30
3	Final term examination	90
	Total	**150**

8. List of References:

No.	Reference List
1	Brett Borden and James Luscombe "Fourier series and integrals" Morgan & Claypool Publishers (2017).
2	Chris McMullen "Essential Calculus Skills Practice Workbook with Full Solutions" Zishka Publishing (2018).

9. Facilities required for teaching and learning:

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

10. Matrix of Competencies and LO's of the course:

No.	Topic	Aims	Competencies	LO's
1	Special functions	1	C1	a1, b1
2	Fourier series	1	C1	a1, a2
3	periodic functions and Euler's laws	1	C1	a3
4	Fourier's integrations – solutions of the differential	1	C1	c1

5	equations by series - solving the partial differential equations using variables separation	1	C1	c1
6	Functions with complex variables – complex quantities algebra	1	C1	b1
7	multiple values functions - the analytical functions and Koshi's theorem	1	C1	b1
8	- the complex series	1	C1	b1
9	Taylor and Lorant series - the zeros, unique points and the rest - the infinite series.	1	C1	a3

Course Coordinator: Dr. Samar Madian
Head of Department: Assoc. Prof. Dr. Amal Bahiry
Date of Approval: 2022

Surveying (1)
(CIE203)

1. Basic Information:

Program Title	Civil Engineering Program
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Civil Engineering Department
Course Title	Surveying (1)
Course Code	CIE203
Year/Level	Level 2
Specialization	Major – Compulsory Course
Authorization Date of Course Specification	-
Pre-request	-

Teaching hours	**Lectures**	**Tutorial**	**Practical**
	2	1	1

2. Course Aims:

No.	**Aims**
1	Applying theories and abstract thinking in analytic critical and systemic thinking to identify and solve engineering problems of varying complexity and variation.
10	Select appropriate and sustainable technologies for civil engineering fields such as surveying.

3. Competencies:

Competencies	**Learning Outcomes (LO'S)**
C1 Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science, and mathematics.	**a2** Explain the scientific principles and theories that apply to the topic. **b1** Using math ideas and theories that are applicable to the field.

C2 Develop and conduct appropriate simulation, analyze, and interpret data, assess, and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.	**b1** Conduct basic experiments to learn about the basic characteristics and features of surveying
C11 Select appropriate and sustainable technologies for construction of buildings, infrastructures, and water structures; using either numerical techniques or physical measurements and/or testing by applying a full range of civil engineering concepts and techniques of structural analysis and mechanics, properties and strength of materials, surveying, soil mechanics, hydrology and fluid mechanics.	**a1** Recognize the fundamentals of surveying, **c1** Using either physical measurements and/or testing by applying a full range of civil engineering concepts and techniques of surveying.

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	Introduction to Surveying: basic definitions, classification of maps and scales. Introduction to leveling. Types of levels Practical: Learn about levels devices	4	2	2
2	Mapping using linear measurements. Practical: measuring some buildings and details inside the institute using the tape	6	3	3
3	Levelling instruments, method of calculation, cross and longitudinal sections, contouring earth work Practical: Use level and take differential readings between points. Create longitudinal level	10	5	5
4	Compass surveying and traverse computation area determination Practical: Make a landline and calculate an area adjacent to it	4	2	2
5	Theodolite: temporary setting up, measuring of horizontal and vertical angles Practical: Identifying theodolite, methods of controlling it, and reading the vertical and horizontal angles	2	1	1

6	Permanent adjustment of theodolite, errors in measuring horizontal and vertical angles Practical: Using theodolite as a model to identify permanent errors in theory	2	1	1
Total		**28**	**14**	**14**

5. Teaching and learning methods:

Topics	Face -to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self -learning and Research	Cooperative	Discovering	Modeling	lab
Introduction to Surveying: basic definitions, classification of maps and scales. Introduction to leveling. Types of levels Practical: Learn about levels devices	x				x	x								x
Mapping using linear measurements. Practical: measuring some buildings and details inside the institute using the tape	x				x	x								x
Levelling instruments, method of calculation, cross and longitudinal sections, contouring earth work Practical: Use level and take differential readings between points. Create longitudinal level	x			x	x	x								x
Compass surveying and traverse computation area determination Practical: Make a landline and calculate an area adjacent to it	x				x	x								x

Theodolite: temporary setting up, measuring of horizontal and vertical angles Practical: Identifying theodolite, methods of controlling it, and reading the vertical and horizontal angles	x				x	x								x
Permanent adjustment of theodolite, errors in measuring horizontal and vertical angles Practical: Using theodolite as a model to identify permanent errors in theory	x				x	x								x

6. Teaching and learning methods for disabled students:

No.	Teaching Methods	Reason
1	Presentation of the course in digital material	Better access any time
2	Wed communication with students	Better communication with certain cases
3	Asking small groups to do assignments; each composed of low medium and high-performance students	Knowledge and skills transfer among different levels of students
4	Electronic model system for the Institution.	E. learning

7. Student evaluation:

7.1 Student evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Midterm examination	C1, C11	a2, a1
2	Semester work (quizzes, sheets, report)	C10	d1, d2
3	Practical examination	C1, C11	b1, c1
4	Final term examination	C1 C11	a2, b1 a1, c1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Semester work	$2^{nd}, 7^{th}, 9^{th}$
2	Mid Term examination	8^{th}
3	Practical examination	14^{th}
4	Final term examination	15^{th}

7.3 Weighting of Evaluation:

No.	Evaluation method	Weights

1	Mid-term examination	10%
2	Practical examination	10%
3	Semester work	20%
4	Final-term examination	60%
Total		**100%**

8. List of References:

No.	Reference List
1	Walker, J., and Awange, J. L. (2020) Surveying for Civil and Mine Engineers.
2	Recommended books Wolf, P.R. and Brinker, R.C., Elementary Surveying, 10th ed., Harper Collins College Publisher, NY, USA (2002)

9. Facilities required for teaching and learning:

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

10. Matrix of knowledge and skills of the course:

No	Topic	Aims	Competencies	LO's
1	Introduction to Surveying: basic definitions, classification of maps and scales. Introduction to leveling. Types of levels Practical: Learn about levels devices	1, 10	C1 C11	a2, b1
2	Mapping using linear measurements. Practical: measuring some buildings and details inside the institute using the tape	1, 10	C1	a2
3	Levelling instruments, method of calculation, cross and longitudinal sections, contouring earth work Practical: Use level and take differential readings between points. Create longitudinal level	1,10	C11	a1
4	Compass surveying and traverse computation area determination Practical: Make a landline and calculate an area adjacent to it	1, 10	C1 C11	a2 a1
5	Theodolite: temporary setting up, measuring of horizontal and vertical angles	1, 10	C1 C11	b1 C1

	Practical: Identifying theodolite, methods of controlling it, and reading the vertical and horizontal angles			
	Permanent adjustment of theodolite, errors in measuring horizontal and vertical angles Practical: Using theodolite as a model to identify permanent errors in theory	1, 10	C1 C11	a2, b1 a1, C1

Course Coordinator: Dr. Ayman Helal
Head of Department: Prof. Dr. Mohamed Elkiki
Date of Approval: 2022

Structures Analysis (2)
(CIE301)

1. Basic Information:

Program Title	Civil Engineering Program
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Civil Engineering Department
Course Title	Structures Analysis (2)
Course Code	CIE301
Year/Level	Level 3
Specialization	Major – Compulsory Course
Authorization Date of Course Specification	-
Pre-request	CIE202

Teaching hours	**Lectures**	**Tutorial**	**Practical**
	3	2	-

2. Course Aims:

No.	Aims
1	Use engineering knowledge, mathematics, structural engineering concepts, and constructed structures to solve structural problems.

3. Intended Learning Outcomes (LO'S):

Competencies	Learning Outcomes (LO'S)
C1 Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science, and mathematics.	**a1** Describe how to solve structure problems using relevant mathematical principles and theories. **b3** Applying engineering fundamentals to structure-related issues.

C2 Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess, and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.	**a1** Define structural analysis and mechanics' basic characteristics, properties, concepts, and techniques.
C11 Select appropriate and sustainable technologies for construction of buildings, infrastructures, and water structures; using either numerical technique and techniques of structural analysis and mechanics, properties and strength of materials, surveying, soil mechanics, hydrology and fluid mechanics.	**a1** Recognize the fundamentals of structural analysis and mechanics, as well as material properties and strength.

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	Properties of plane sections	9	6	-
2	Normal, shear and combined stresses	12	8	-
3	Elastic deformation of statically determinate structures	15	10	-
4	Analysis of statically indeterminate structures using the equation of three moments	6	4	-
Total		**42**	**28**	**-**

5. Teaching and learning methods:

Topics	**Face to face Lecture**	**Online Lecture**	**Flipped Classroom**	**Presentation and movies**	**Discussion**	**Problem solving**	**Brainstorming**	**Projects**	**Site visits**	**Self-learning and Research**	**Cooperative**	**Discovering**	**Modeling**	**lab**
Properties of plane sections	x	x			x	x	x							
Normal, shear and combined stresses	x	x			x	x	x							

Elastic deformation of statically determinate structures	x	x			x	x	x							
Analysis of statically indeterminate structures using the equation of three moments	x	x			x	x	x							
Properties of plane sections	x	x			x	x	x							

6. Teaching and learning methods for disabled students:

No.	Teaching Methods	Reason
1	Presentation of the course in digital material	Better access any time
2	Asking small groups to do assignments each composed of low, medium, and high-performance students.	Knowledge and skills transfer among different level of students.

7. Student evaluation:

7.1 Student evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Mid Term Examination	C1 C2	a1, a3 a1
2	Semester work	C11	a1
3	Final Term Examination	C1 C2 C11	a1, a3 a1 a1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Mid Term Examination	8^{th}
2	Semester work	$2^{nd}, 7^{th}, 9^{th}$
3	Final Term Examination	15^{th}

7.3 Weighting of Evaluation:

No.	Evaluation method	Weights
1	Mid-term examination	20%
2	Semester work	20%
3	Final-term examination	60%
	Total	**100%**

8. List of References:

No.	Reference List
1	Essential books (textbooks) W. M. El-dakhakhni, “Theory of Structures”, Part One, Assiut University, 1973, 1974. W. M. El-dakhakhni, “Theory of Structures”, Part Two, Assiut University, 1973, 1974. R. C. Coats, M. G. Coutie and F. K. Kong, “Structural Analysis”, Second Edition, NCN 420-5870-1, ELBS-2007.
2	Recommended books Structural Analysis 2: Statically Indeterminate Structures, S. Khalfalla, September -2020. Structural Analysis, R. C. Hibbeler, 2018. Structural Analysis 2: Statically Indeterminate Structures, Salah Khalfallah · 2018

9. Facilities required for teaching and learning:

No.	Facility
1	Seminar
2	Discussions rooms with internet connections
3	Teaching aids such as interactive (smart) board
4	Data show

10. Matrix of knowledge and skills of the course:

No.	Topic	Aims	Competencies	LO’s
1	Properties of plane sections	1	C1	a1, a3
2	Normal, shear and combined stresses	1	C1 C2	a1, a3 a1
3	Elastic deformation of statically determinate structures	1	C11	a1
4	Analysis of statically indeterminate structures using the equation of three moments	1	C2 C11	a1 a1

Course Coordinator: Dr. Rafeek Wadieh
Head of Department: Prof. Dr. Mohamed Elkiki
Date of Approval: 2022

Strength of Materials
(ENG205)

1. Basic Information:

Program Title	All Programs
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Basic Science and Engineering Department
Course Title	Strength of Materials
Course Code	ENG205
Year/Level	Level 2
Specialization	Major – Compulsory Course
Authorization Date of Course Specification	-
Pre- request	ENG101

Teaching hours	**Lectures**	**Tutorial**	**Practical**
	2	2	-

2. Course Aims:

No.	Aims
2	Work in and manage a diverse team of professionals from various engineering disciplines, taking responsibility for own and team performance; and behave professionally and adhere to engineering ethics and standards.
3	Use the techniques, skills, and current engineering tools required for engineering practice of Statics applications by taking full responsibility for one's own learning and development, participating in lifelong learning and consider the impact of statics study in real world, and its strong relation with environment and almost of all the technology fields upgrades.

3. Competencies:

Competencies	Learning Outcomes (LO'S)
C1 Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science, and mathematics.	**a1** Define the concepts and theories of mathematics, necessary for engineering system analysis, general concepts of strength of material, normal stress, direct shear stress, Mohr's cycle. **b1** Use math ideas and theories that are applicable to solutions for engineering problems and system design, normal stress, direct shear, stresses in beams, torsional stresses. **c2** Practice the neatness and aesthetics in design to approach stresses in beams, torsional stresses, and pressure vessels. **c3** Apply engineering knowledge and understanding to improve design, products and/or services, normal stress, direct shear stress, stresses in beams, torsional stresses, pressure vessels, Mohr's cycle.

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	Simple states of stress and strain	2	2	-
2	Tension and compression stress	4	4	-
3	Shear stress in bolts	4	4	-
4	Bending and shearing stresses in beams	4	4	-
5	Torsion stresses	2	2	-
6	Deflection of Beams	4	4	
7	Analysis of thin-walled pressure vessels	4	4	-
8	Analysis of plane stress	4	4	-
Total		**28**	**28**	**-**

5. Teaching and learning methods:

Topics	Face -to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self -learning and Research	Cooperative	Discovering	Modeling	lab
Simple states of stress and strain		x			x	x								x
Tension and compression stress		x			x	x								x
Shear stress in bolts		x			x	x								x
Bending and shearing stresses in beams		x			x	x								x
Torsion stresses		x			x	x								x
Deflection of Beams		x			x	x								x

6. Teaching and learning methods for disabled students:

No	Teaching Methods	Reason
1	Presentation of the course in digital material	Better access any time
2	Asking small groups to do assignments; each composed of low, medium, and high-performance students.	Knowledge and skills transfer among different level of students.

7. Student evaluation:

7.1 Student evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Mid Term examination	C1	a1, b1
2	Semester work (quizzes, sheets, report)	C1	c2, c3
3	Final term examination	C1	a1, b1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	semester work	2^{nd}, 7^{th}, 9^{th}
2	Mid Term examination	8^{th}
3	Final term examination	15^{th}

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Mid-term examination	20%
2	Semester work	20%
3	Final-term examination	60%
	Total	**100%**

8. List of References:

No.	Reference list
1	T. D. Gunneswara Rao and Mudimby Andal " Strength of Materials: Fundamentals and Applications" Cambridge University Press; 1st edition (2020).
2	Akira Todoroki “Fundamentals of Mechanics of Materials: Part 1 Stress, Strain, Torsion" 2017.

9. Facilities required for teaching and learning:

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

10. Matrix of Competencies and LO's:

No.	Topic	Aims	Competencies	LO's
1	Simple states of stress and strain	2	C1	a1, b1
2	Tension and compression stress	2	C1	a1, b1
3	Shear stress in bolts	2	C1	a1, b1
4	Bending and shearing stresses in beams	2	C1	a1, b1

5	Torsion stresses	2	C1	a1, b1
6	Deflection of Beams	2	C1	c3
7	Analysis of thin-walled pressure vessels	2	C1	c2, c3
8	Analysis of plane stress	2	C1	c2, c3

Course Coordinator: Prof. Dr. Abd Elnaby Kabeel
Head of Department: Assoc. Prof. Dr. Amal Bahiry
Date of Approval: 2022

Introductions to Information Technology
(ENG206)

1. Basic Information:

Program Title	All Programs
Department Offering the Program	Communication and electronics Engineering Department
Department Responsible for the Course	Basic Science and Engineering Department
Course Title	Introductions to Information Technology
Course Code	ENG206
Year/Level	Level 2
Specialization	Major – Compulsory Course
Authorization Date of Course Specification	-
Pre- request	-

Teaching hours	**Lectures**	**Tutorial**	**Practical**
	2	-	2

2. Course Aims:

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

3. Competencies:

Competencies	Learning Outcomes (LO'S)
C4 Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues, and risk management principles.	**a2** List the engineering-related business and management principles, websites. **a3** Define contemporary websites technologies and their applications in relation to engineering field. **c3** Utilize modern technologies, programs, applications related by websites.
C8 Communicate effectively graphically, verbally, and in writing with a range of audiences using contemporary tools.	**d1** Communicate effectively. **d2** Demonstrate efficient IT capabilities.

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	Lecture: Introduction to information systems & information technology Practical: Introduction of html	2	-	2

2	Lecture: information systems & information technology (Fields- Applications -Examples) Practical: html structure code	2	-	2
3	Lecture: Computer systems Practical: Font Tags	2	-	2
4	Lecture: Hardware used in information systems Practical: Font Tags	2	-	2
5	Lecture: Software used in information systems Practical: paragraph tags	2	-	2
6	Lecture: Introduction of data communication system Practical: order lists	2	-	2
7	Lecture: Introduction of Computer Networking Practical: unorder lists	2	-	2
8	Lecture: The internet; the foundations, Resources, and uses of the internet, Practical: Image tag	4	-	4
9	Lecture: Privacy Security and Ethics Practical: horizontal &vertical Rules	2	-	2
10	Lecture: Emphasizing practical skills for finding, Reading, and authorizing materials Practical: Frames	2	-	2
11	Lecture: Introduction of Artificial Intelligence Practical: Tables	2	-	2
12	Lecture: introduction of cloud computing Practical: Hyper Links	2	-	2
13	Lecture: Html Projects	2	-	2
Total		**28**	**-**	**28**

5. Teaching and learning methods:

Topics	Face -to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self -learning and Research	Cooperative	Discovering	Modeling	lab

Lecture: Introduction to information systems & information technology Practical: Introduction of html		x			x	x								x
Lecture: information systems & information technology (Fields-Applications -Examples) Practical: html structure code		x			x	x								x
Lecture: Computer systems Practical: Font Tags		x			x	x								x
Lecture: Hardware used in information systems Practical: Font Tags		x			x	x								x
Lecture: Software used in information systems Practical: paragraph tags		x			x	x								x
Lecture: Introduction of data communication system Practical: order lists		x			x	x								x
Lecture: Introduction of Computer Networking Practical: unorder lists		x			x	x								x
Lecture: The internet; the foundations, Resources, and uses of the internet, Practical: Image tag		x			x	x								x
Lecture: Privacy Security and Ethics Practical: horizontal &vertical Rules	x			x	x								x	x

Lecture: Emphasizing practical skills for finding, Reading, and authorizing materials Practical: Frames	x			x	x								x	x
Lecture: Introduction of Artificial Intelligence Practical: Tables	x			x	x								x	x
Lecture: introduction of cloud computing Practical: Hyper Links	x			x	x								x	x
Lecture: Html Projects	x			x	x								x	x

6. Teaching and learning methods for disabled students:

No.	Teaching Methods	Reason
1	Provide regular quality feedback.	Better access any time
2	Use Direct Instruction.	Better access any time
3	Break learning tasks into small steps.	
4	Moodle	Better communication with certain cases
5	Forming small groups of two or three students within the class grouped according to their level can help with personalizing the teaching while not sacrificing class instruction time	Knowledge and skills transfer among different levels of students

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Midterm examination	C4	a2, a3
2	Semester work (quizzes, sheets, report)	C8	d1, d2
3	Practical Examination	C4	c3
4	Final term examination	C4	a2, a3, c3

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Midterm examination	8^{th}
2	Semester work	2^{nd} ,7^{th},9^{th},13^{th}
3	Practical Examination	14^{th}
4	Final term examination	15^{th}

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights

1	Mid-term examination	20%
2	final examination	50%
3	Practical examination	10%
4	Semester work	20%
Total		**100%**

8. List of References:

No.	Reference List
1	INFORMATION TECHNOLOGY : THEORY AND PRACTICE SINHA, PRADEEP K. SINHA, PRITII,2018
2	INFORMATION TECHNOLOGY LAW, IAN J. LLOYD ·,2020

9. Facilities required for teaching and learning:

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

10. Matrix of Competencies and LO's:

No.	Topic	Aims	Competencies	LO's
1	Lecture: Introduction to information systems & information technology Practical: Introduction of html	7	C4	a2, a3
2	Lecture: information systems & information technology (Fields- Applications -Examples) Practical: html structure code	7	C4	a2, a3, c3
3	Lecture: Computer systems Practical: Font Tags	7	C4 C8	a2 d2
4	Lecture: Hardware used in information systems Practical: Font Tags	7	C4 C8	a3 d2

5	Lecture: Software used in information systems Practical: paragraph tags	7	C4 C8	c3 d2
6	Lecture: Introduction of data communication system Practical: order lists	7	C4	c3
7	Lecture: Introduction of Computer Networking Practical: unorder lists	7	C4	a2
8	Lecture: The internet; the foundations, Resources, and uses of the internet, Practical: Image tag	7	C4	a2
9	Lecture: Privacy Security and Ethics Practical: horizontal &vertical Rules	7	C4 C8	c3 d2
10	Lecture: Emphasizing practical skills for finding, Reading, and authorizing materials Practical: Frames	7	C4 C8	c3 d2
11	Lecture: Introduction of Artificial Intelligence Practical: Tables	7	C4	c3
12	Lecture: introduction of cloud computing Practical: Hyper Links	7	C4 C8	c3 d1
13	Lecture: Html Projects	7	C8	d1, d2

Course Coordinator: Dr. Amira Elsonbaty
Head of Department: Assoc. Prof. Dr. Amal Bahiry
Date of Approval: 2022

Electrical Engineering Fundamentals (ENG208)

1. Basic Information:

Program Title	All Programs
Department Offering the Program	Communication and Electronics Engineering Department
Department Responsible for the Course	Basic Science and Engineering Department
Course Title	Electrical Engineering Fundamentals
Course Code	ENG208
Year/Level	Level 2
Specialization	Major – Compulsory Course
Authorization Date of Course Specification	-
Pre- request	-

Teaching hours	**Lectures**	**Tutorial**	**Practical**
	2	2	-

2. Course Aims:

No.	Aims
2	Apply analytic critical and systemic thinking to discover, analyze, and solve a wide range of electrical engineering problems;
7	Proper utilization of modern electrical engineering techniques, skills, and tools

3. Competencies:

Competencies	Learning Outcomes (LO'S)
C1 Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science, and mathematics.	**a1** Identify the mathematical principles and theories that are relevant to the electrical circuit. **c1** Solve engineering problems by applying mathematics and science concepts and theories appropriate to the discipline to identify, formulate and solve complex electrical engineering problems. **c2** Identify, formulate, and solve complex engineering problems by applying engineering fundamentals electrical
C2 Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess, and evaluate findings, and use statistical	**b3** Analyze and interpret data.

analyses and objective engineering judgment to conclude.	

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	Direct Current	2	2	-
2	Theory of electric circuits	6	6	-
3	Delta and Star connections	1	1	-
4	Sine A.C and D.C circuits	5	5	-
5	Time vectors diagram	2	2	-
6	Electric power and power factor in A.C circuits	2	2	-
7	3-Phase current - Electric machines - D.C machines	4	4	-
8	Transformers	2	2	-
9	Induction and synchronous machines	2	2	-
10	Fractional power machine	2	2	-
Total		**42**	**28**	**-**

5. Teaching and learning methods:

Topics	Face -to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self -learning and Research	Cooperative	Discovering	Modeling	lab
Direct Current		x			x	x								x
Theory of electric circuits		x			x	x								x
Delta and Star connections		x			x	x								x
Sine A.C and D.C circuits		x			x	x								x
Time vectors diagram		x			x	x								x
Electric power and power factor in A.C circuits		x			x	x								x
3-Phase current - Electric machines - D.C machines		x			x	x								x
Transformers		x			x	x								x
Induction and synchronous machines		x			x	x								x

Fractional power machine		x			x	x								x

6. Teaching and learning methods for disabled students:

No.	Teaching Methods	Reason
1	Presentation of the course in digital material	Better access any time
2	Web communication with students	Better communication with certain cases
3	Asking small groups to do assignments; each composed of low, medium, and high-performance students.	Knowledge and skills transfer among different levels of students

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Midterm examination	C1 C2	a1, c1, c2 b3
2	Semester work (quizzes, sheets, report)	C2	b3
3	Final term examination	C2	b3

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Midterm examination	8^{th}
2	Semester work	2^{nd} ,7^{th},9^{th},14^{th}
3	Final term examination	15^{th}

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Mid-term examination	20%
2	Semester work	20%
3	final examination	60%
	Total	**100%**

8. List of References:

No.	Reference List
1	Fundamentals of electric circuits alexander sadiku 4th edition.2019.
2	Fundamentals of Electrical Circuit Analysis, March 2018

9. Facilities required for teaching and learning:

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

10. Matrix of Competencies and LO's:

No.	Topic	Aims	Competencies	LO's
1	Direct Current	2	C1 C2	a1 b3
2	Theory of electric circuits	2	C1 C2	a1, c1 b3
3	Delta and Star connections	7	C1	c1
4	Sine A.C and D.C circuits	7	C1 C2	c2 b3
5	Time vectors diagram	7	C1	c1
6	Electric power and power factor in A.C circuits	7	C1 C2	c1 b3
7	3-Phase current - Electric machines - D.C machines	7	C1 C2	a1, c2 b3
8	Transformers	7	C1	c1
9	Induction and synchronous machines	7	C1 C2	a1, c1 b3
10	Fractional power machine	7	C1	a1, c1

Course Coordinator: Dr. Rabab Reda
Head of Department: Assoc. Prof. Dr. Amal Bahiry
Date of Approval: 2022

Engineering Probability and Statistics (MTH301)

1. Basic Information:

Program Title	All Programs
Department Offering the Program	Basic Science and Engineering Department
Department Responsible for the Course	Basic Science and Engineering Department
Course Title	Engineering Probability and Statistics
Course Code	MTH301
Year/Level	Level 3
Specialization	Major – Compulsory Course
Authorization Date of Course Specification	-
Pre- request	-

	Lectures	Tutorial	Practical
Teaching hours	2	2	-

2. Course Aims:

No.	Aims
1	The ability to apply probability theories and hypothesis testing in analytic critical and systemic thinking to solve engineering problems of varying complexity and variation.
6	Analyze data from the intended tests to manage resources creatively

3. Competencies:

Competencies	Learning Outcomes (LO'S)
C1 Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science, and mathematics.	**a1** Describe the relevant mathematical principles and theories in the discipline. **a2** Explain the scientific principles and theories that apply to the topic. **b1** Use math ideas and theories that are applicable to the field. **b3** Applying engineering basics that are relevant to the subject. **c2** Identify, formulate, and solve complex engineering problems by applying the concepts and the theories of sciences, appropriate to the discipline.

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	Probability theory	4	4	-
2	Discrete and continuous probability distributions	6	6	-
3	Statistics in engineering	4	4	-

4	Descriptive Statistics Sampling distributions	2	2	-
5	Estimation and confidence intervals	4	4	-
6	Hypothesis testing	4	4	-
7	Simple regression	4	4	-
Total		**28**	**28**	

5. Teaching and learning methods:

Topics	Face -to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self -learning and Research	Cooperative	Discovering	Modeling	lab
Probability theory		x			x	x								x
Discrete and continuous probability distributions		x			x	x								x
Statistics in engineering		x			x	x								x
Descriptive Statistics Sampling distributions		x			x	x								x
Estimation and confidence intervals		x			x	x								x
Hypothesis testing		x			x	x								x
Simple regression		x			x	x								x

6. Teaching and learning methods for disabled students:

No.	Teaching Methods	Reason
1	Presentation of the course in digital material	Better access any time
2	Wed communication with students	Better communication with certain cases
3	Asking small groups to do assignments; each composed of low, medium, and high-performance students	Knowledge and skills transfer among different levels of students

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Midterm examination	C1	a1, a2, b3
2	Semester work (quizzes, sheets, report)	C1	a1, c2
3	Final term examination	C1	a2, b1, b3

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Midterm examination	8^{th}
2	Semester work	2^{nd} -7^{th} - 9^{th} -14^{th}
3	Final term examination	15^{th}

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Midterm examination	20%
2	Semester work	20%
3	Final term examination	60%
	Total	**100%**

8. List of References:

No.	Reference List
1	E. Kreyszig "Advanced Engineering Mathematics" 11th edition, John Wiley and Sons, Inc. 2009
2	Andrew Metcalfe, David Green, Tony Greenfield, Mayhayaudin Mansor, Andrew Smith, Jonathan Tuke " Statistics in Engineering With Examples in MATLAB" 2^{nd} Edition, Chapman and Hall/CRC (2019).

9. Facilities required for teaching and learning:

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

10. Matrix of Competencies and LO's:

No.	Topic	Aims	Competencies	LO's
1	Probability theory	1	C1	a1
2	Discrete and continuous probability distributions	6	C1	a2
3	Statistics in engineering	1	C1	b3

4	Descriptive Statistics Sampling distributions	1	C1	b1
5	Estimation and confidence intervals	1	C1	c2
6	Hypothesis testing	6	C1	c2
7	Simple regression	6	C1	c2

Course Coordinator: Dr. Samar Madian
Head of Department: Assoc. Prof. Dr. Amal Bahiry
Date of Approval: 2022

Properties and Strength of Materials
(CIE302)

1. Basic Information:

Program Title	Civil Engineering Program
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Civil Engineering Department
Course Title	Properties and Strength of Materials
Course Code	CIE302
Year/Level	Level 3
Specialization	Major – Compulsory Course
Authorization Date of Course Specification	-
Pre-request	-

Teaching hours	Lectures	Tutorial	Practical
	2	1	1

2. Course Aims

No.	Aims
8	Select appropriate and sustainable technologies for construction of buildings, infrastructures, and water structures, using numerical techniques, experiment measurements, and testing by applying a full range of civil engineering fields such as properties and strength of materials
10	Use the techniques, skills, and current engineering tools required for engineering practice.

3. Competencies:

Competencies	Learning Outcomes (LO'S)
C1 Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.	**b2** Using scientific concepts
C2 Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions	**a2** Define the principles, basic properties, and features of construction material, as well as their use in sustainable technologies for construction of buildings. **b1** Conduct basic experiments to learn about the basic characteristics and features of materials. **b3** Interpret data problems to identify java programs

C4 Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues, and risk management principles	**a1** Describe codes of practice, and standards, as well as health and safety regulations. **a3** Define contemporary engineering technologies and their applications in relation to disciplines.
C11 Select appropriate and sustainable technologies for construction of buildings, infrastructures, and water structures; using either numerical techniques or physical measurements and/or testing by applying a full range of civil engineering concepts and techniques of: Properties and strength of materials.	**a1** Recognize the fundamentals of properties and strength of materials, **a2** Summarize, appropriate and sustainable technologies for construction of buildings.

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	Introduction to properties and strength of materials, properties and grading of aggregates (fine – coarse) Practical: Sieve analysis – adsorption – specific gravity – specific volume – fineness modulus	4	4	6
2	Manufacture and types of cement Practical: fineness modulus of cement –compression strength – initial and final setting time	4	-	2
3	Concrete manufacture Practical: slump test – compacting factor test – air content in fresh concrete – compression strength – steel tensile strength	4	-	2
4	Concrete workability	2	6	-
5	Concrete strength in tension, compression, and flexure – concrete durability	4	-	-
6	Concrete mix design	6	8	-
7	Building materials (steel, wood, brick, lime, gypsum, stones, bitumen)	2	-	-
Total		**28**	**10**	**18**

5. Teaching and learning methods:

Topics	Face -to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self -learning and Research	Cooperative	Discovering	Modeling	lab
Introduction to properties and strength of materials, properties and grading of aggregates (fine – coarse) Practical: Sieve analysis – adsorption – specific gravity – specific volume – fineness modulus	√			√	√	√							√	√
Manufacture and types of cement Practical: fineness modulus of cement –compression strength – initial and final setting time	√			√	√	√							√	√
Concrete manufacture Practical: slump test – compacting factor test – air content in fresh concrete – compression strength – steel tensile strength	√			√	√	√		√					√	√
Concrete workability	√			√	√	√							√	√
Concrete strength in tension, compression, and flexure – concrete durability	√				√	√								√
Concrete mix design	√				√	√								√
Building materials (steel, wood, brick, lime, gypsum, stones, bitumen)	√				√	√		√						√

6. Teaching and learning methods for disabled students:

No.	Teaching Methods	Reason

1	Presentation of the course in digital material	Better access any time
2	Wed communication with students	Better communication with certain cases
3	Asking small groups to do assignments; each composed of low, medium, and high-performance students	Knowledge and skills transfer among different levels of students
4	Electronic model system for the Institution.	E. learning

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Midterm examination	C2 C4 C11	b3, a2 a1, a3 a1, a2
2	Semester work (quizzes, sheets, report)	C4 C11	a1, a3 a1, a2
3	Final term examination	C1 C2 C4	b2 a2, b1, b3 a1, a3

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	semester work	all
2	Mid Term examination	8^{th}
3	Practical Examination	14^{th}
4	Final term examination	15^{th}

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Mid-term examination	10%
2	Semester work	20%
3	Practical Examination	10%
4	Final-term examination	60%
	Total	**100%**

8. List of References:

No.	Reference List
1	**Course notes** Egyptian Code for design and construction of reinforced concrete structures – Appendix No.3: Guide for laboratory testing of concrete materials. الكود المصري لتصميم وتنفيذ المنشآت الخرسانية ، دليل الإختبارات المعملية للخرسانة ، وزارة الإسكان والمرفق والمجتمعات العمرانية ، كود رقم (203) اصدار 2018 Lecture Notes, Staff of Properties and Testing of Materials

	Egyptian standard specifications, Ministry of Industrial, Latest Version.
2	**Recommended books** Prasad, I., "A Textbook of Strength of Materials" Delhi Khanna ,2002 Komar, A.**, "**Building Materials and Components", Moscow Mir ,2005 Printice Hall, New Jersey, 2008. Abdul-Rahman, Ali, "Fundamentals of Reinforced Concrete," Faculty of Engineering, Cairo University. Hilal, M., Theory and Design of Reinforced Concrete Tanks.

9. Facilities required for teaching and learning:

Facility			
1	Lecture classroom	3	White board
2	Seminar	4	Data show system
5	Lab.		

10. Matrix of knowledge and skills of the course:

No	Topic	Aims	Competencies	LO's
1	Introduction to properties and strength of materials, properties and grading of aggregates (fine – coarse) Practical: Sieve analysis – adsorption – specific gravity – specific volume – fineness modulus	10	C1 C4 C11	b2 a3, a1 a1, a2
2	Manufacture and types of cement Practical: fineness modulus of cement –compression strength – initial and final setting time	10	C4 C11	a1, a3 a1, a2
3	Concrete manufacture Practical: slump test – compacting factor test – air content in fresh concrete – compression strength – steel tensile strength	8, 10	C1 C4 C11	b2 a3, a1 a1, a2
4	Concrete workability	8, 10	C1 C4 C11	b2 a3, a1 a1, a2
5	Concrete strength in tension, compression and flexure – concrete durability	8, 10	C1 C4 C11	b2 a3, a1 a1, a2

6	Concrete mix design	8, 10	C1 C4 C11	b2 a3, a1 a1, a2
7	Building materials (steel, wood, brick, lime, gypsum, stones, bitumen)	8, 10	C1 C4 C11	b2 a3, a1 a1, a2

Course Coordinator: Dr. Nesreen Elawadly
Head of Department: Prof. Dr. Mohamed Elkiki
Date of Approval: 2022

Principles of Building Construction (CIE303)

1. Basic Information:

Program Title	Civil Engineering Program
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Civil Engineering Department
Course Title	Principles of Building Construction
Course Code	CIE303
Year/Level	Level 3
Specialization	Major – Compulsory Course
Authorization Date of Course Specification	-
Pre-request	-

Teaching hours	Lectures	Tutorial	Practical
	2	2	-

2. Course Aims

No.	Aims
6	Analyze data from the intended tests to manage resources creatively
10	Select appropriate and sustainable technologies for construction of buildings and infrastructures

3. Competencies:

Competencies	Learning Outcomes (LO'S)
C2 Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess, and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions	**a2** Define the principles, basic properties, and features of construction material, as well as their use in sustainable technologies for construction of buildings, infrastructures, and water structures.

C4 Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues, and risk management principles	**a1** Describe codes of practice, and standards, as well as health and safety regulations. **a2** List the engineering-related economy. **a3** Define contemporary engineering technologies and their applications in relation to disciplines.
C11 Select appropriate and sustainable technologies for construction of buildings, infrastructures, and water structures, using either numerical techniques or physical measurements and/or testing by applying a full range of civil engineering concepts and techniques of properties and strength of materials	**a2** Summarize, appropriate and sustainable technologies for construction of buildings,

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	Construction technology of different types of projects	2	2	-
2	Conventional construction methods	2	2	-
3	Construction Equipment	2	2	-
4	Prefabricated construction methods	2	2	-
5	Effect of environment on methods of construction	2	2	-
6	Architectural principals (utilities – services – properties)	2	2	-
7	Safety issues during different stages of construction	2	2	-
8	Examples of construction of different types of projects (buildings, roads, RCC dams, marine works, underground structures, etc.)	4	4	-
9	Building materials technology (steel, concrete, wood and natural stones)	2	2	-
10	Developing new materials (Fiber reinforced polymers, high strength concrete and ultra-high strength concrete)	4	4	-
11	Architectural drawings and details	4	4	-
Total		**28**	**28**	**-**

5. Teaching and learning methods:

Topics	Face -to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self -learning and Research	Cooperative	Discovering	Modeling	lab
Construction technology of different types of projects	x				x	x								
Conventional construction methods	x				x	x								
Construction Equipment	x				x	x								
Prefabricated construction methods	x				x	x								
Effect of environment on methods of construction	x				x	x								
Architectural principals (utilities – services – properties)	x				x	x								
Safety issues during different stages of construction	x				x	x								
Examples of construction of different types of projects (buildings, roads, RCC dams, marine works, underground structures, etc.)	x				x	x								
Building materials technology (steel, concrete, wood, and natural stones)	x				x	x	**x**						**x**	
Developing new materials (Fiber reinforced polymers, high strength concrete and ultra-high strength concrete)	x				x	x								
Architectural drawings and details	x				x	x								

6. Teaching and learning methods for disabled students:

No.	Teaching Methods	Reason
1	Presentation of the course in digital material	Better access any time
2	Wed communication with students	Better communication with certain cases

3	Asking small groups to do assignments; each composed of low, medium, and high-performance students	Knowledge and skills transfer among different levels of students
4	Electronic model system for the Institution.	E. learning

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Midterm examination	C2 C4	a2 a3
2	Semester work (quizzes, sheets, report)	C4 C11	a1 a2
3	Final term examination	C4 C11	a1, a3 a2

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Midterm examination	8th
2	Semester work	7th - 9th
3	Final term examination	15th

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Midterm examination	20%
2	Semester work	20%
3	Final term examination	60%
	Total	**100%**

8. List of References:

No.	Reference List
1	**Course notes:** Are delivered during the lecture, including handout materials such as solved problems, design charts, tables, etc.
2	**Essential books (textbooks / design codes):** Egyptian Code for Design and Construction of Reinforced Concrete Structures 203-2018. Design Aids and Examples in Accordance with the Egyptian Code for Design and Construction of Reinforced Concrete Structures 203-2018.
3	**Recommended books:** Chu-Kia Wang and Charles G. Salmon, "Reinforced Concrete Design," 4th Edition, Harper and Row Publishers, New York, 1985. MacGregor J., "Reinforced Concrete: Mechanics and Design," Printice Hall, New Jersey, 1988.

	Abdul-Rahman, Ali, "Fundamentals of Reinforced Concrete," Faculty of Engineering, Cairo University. Hilal, M., Theory and Design of Reinforced Concrete Tanks.

9. Facilities required for teaching and learning:

Facility			
1	Lecture classroom	3	White board
2	Seminar	4	Data show system
		5	Gallery

10. Matrix of knowledge and skills of the course:

No	Topic	Aims	Competencies	LO's
1	Construction technology of different types of projects	4,10	C4	a3, a1
2	Conventional construction methods	4,10	C4 C11	a3 a1, a2
3	Construction Equipment	4,10	C4 C11	a3 a1, a2
4	Prefabricated construction methods	4,10	C4 C11	a3 a1, a2
5	Effect of environment on methods of construction	4,10	C4 C11	a3 a1, a2
6	Architectural principals (utilities – services – properties)	4,10	C4 C11	a3 a1, a2
7	Safety issues during different stages of construction	4,10	C4 C11	a3 a1, a2
8	Examples of construction of different types of projects (buildings, roads, RCC dams, marine works, underground structures, etc.)	4,10	C4 C11	a3 a1, a2
9	Building materials technology (steel, concrete, wood, and natural stones)	4,10	C4 C11	a3 a1, a2
10	Developing new materials (Fiber reinforced polymers, high strength concrete and ultra-high strength concrete)	4,10	C4 C11	a3 a1, a2

Course Coordinator: Dr. Ayman Helal
Head of Department: Prof. Dr. Mohamed Elkiki
Date of Approval: 2022

Structures Analysis (3)
(CIE304)

1. Basic Information:

Program Title	Civil Engineering Program
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Civil Engineering Department
Course Title	Structures Analysis (3)
Course Code	CIE 301
Year/Level	Level 3
Specialization	Major – Compulsory Course
Authorization Date of Course Specification	-
Pre- request	CIE202

Teaching hours	Lectures	Tutorial	Practical
	2	2	-

2. Course Aims

No.	Aims
10	Select the appropriate and sustainable technologies for construction of buildings using numerical techniques by applying a full range of civil engineering fields such as structural analysis.

3. Competencies:

Competencies	Learning Outcomes (LO'S)
C1 Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science, and mathematics.	**a3** Explain the basic principles of engineering for structural analysis. **b3** Applying engineering basics that are relevant to the structural analysis. **c2** Practice the neatness and aesthetics in design to approach stresses in beams, torsional stresses,

	c3 Identify, formulate, and solve complex engineering problems by applying engineering fundamentals.
C2 Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess, and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.	**a1** Define, basic characteristics, properties, concepts, and techniques of structural analysis and mechanics. **c3** Applying statistical analyses and objective engineering judgment to draw conclusions.
C11 Select appropriate and sustainable technologies for construction of buildings, infrastructures, and water structures; using either numerical techniques or physical measurements and/or testing by applying a full range of civil engineering concepts and techniques of structural analysis and mechanics, properties and strength of materials, surveying, soil mechanics, hydrology and fluid mechanics.	**a1** Recognize the fundamentals of structural analysis and mechanics. **c1** Using either numerical techniques or physical measurements and/or testing by applying a full range of civil engineering concepts and techniques of structural analysis and mechanics.

4. Course Contents:

No.	Topics	Lecture	Tutorial	Practical
1	Statically indeterminate structures using force method	6	6	-
2	slope deflection method	8	8	-
3	Moment distribution method	10	10	-
4	Introduction to stiffness method	4	4	-
Total		**28**	**28**	-

5. Teaching and learning methods:

Topics	Face to face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brainstorming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	lab
Statically indeterminate	x	x			x	x	x							

structures using force method														
slope deflection method	x	x			x	x	x							
Moment distribution method	x	x			x	x	x							
Introduction to stiffness method	x	x			x	x	x							

6. Teaching and learning methods for disabled students:

No.	Teaching Methods	Reason
1	Presentation of the course in digital material	Better access any time
2	Asking small groups to do assignments each composed of low, medium, and high-performance students.	Knowledge and skills transfer among different level of students.

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Midterm examination	C1 C11	a3, c3 c1
2	Semester work (quizzes, sheets, report)	C1 C11	a3, c3 c1
3	Final term examination	C1 C2 C11	a3, b3, c3 a1, c3 a1, c1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Mid Term Examination	8^{th}
2	Semester work	$2^{nd}, 7^{th}, 9^{th}$
3	Final Term Examination	15^{th}

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Midterm examination	20%
2	Semester work	20%
3	Final term examination	60%
	Total	**100%**

8. List of References:

No.	Reference List

1	**Essential books (textbooks)** W. M. El-dakhakhni, “Theory of Structures”, Part One, AssiutUniversity, 2016. W. M. El-dakhakhni, “Theory of Structures”, Part Two, AssiutUniversity, 2016. El-Sayed El-Kasaby & Fayez Kaiser, “Theory of Structures-Solved examples”, Part 1, 2018.
2	**Recommended books** Structural Analysis, R. C. Hibbeler, 2022. Structural Analysis 1: Statically Determinate Structures, S. Khalfalla, September -2018 Structural Analysis, R. C. Hibbeler, 2018

9. Facilities required for teaching and learning:

Facility			
1	Seminar	3	Teaching aids as interactive (smart) board
2	Discussions rooms with internet connections	4	Data show

10. Matrix of knowledge and skills of the course:

No	Topic	Aims	Competencies	LO’s
1	Statically indeterminate structures using force method	1, 10	C1	a3
2	slope deflection method	1, 10	C1	c3
3	Moment distribution method	1, 10	C1, C2, C11	a1, c3
4	Introduction to stiffness method	1, 10	C1, C2, C11	a1, c3

Course Coordinator: Dr. Rafeek Wadieh
Head of Department: Prof. Dr. Mohamed Elkiki
Date of Approval: 2022

Fluid Mechanics
(ENG301)

1. Basic Information:

Program Title	All Programs
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Basic Science and Engineering Department
Course Title	Fluid Mechanics
Course Code	ENG301
Year/Level	Level 2
Specialization	Major – Compulsory Course
Authorization Date of Course Specification	-
Pre- request	ENG 102

Teaching hours	**Lectures**	**Tutorial**	**Practical**
	2	1	1

2. Course Aims:

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

3. Competencies

Competencies	Learning Outcomes (LO'S)
C1 Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.	**a1** Define concepts of energy, momentum equations and dimensional analysis (laminar and turbulent flow). **a2** Explain the basic principles of fluid mechanics engineering. **b1** Analyze various ideas and views for different forces on immersed bodies.

	b2 Using scientific concepts and theories that are relevant to the fluid mechanics. **b3** Applying engineering basics that are relevant to the subject.
C2 Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.	**a1** Apply knowledge of Bernoulli and continuity equations for experiments of Venturi meter and losses in pipes. **a2** Analyze data in laboratory and in pipes and pumps field. **b1** Conduct basic experiments to learn about the basic characteristics and features of fluids for statics and dynamics branches.

4. Course Contents:

No.	Topics	Lecture	Exercise	laboratory	Student load
1	Fluid properties, fluid statics, kinematics	2	1	1	4
2	Fluid dynamics including energy and Momentum equations	4	2	2	8
3	Dimensional analysis, Laminar flow, turbulent flow and its applications	2	1	1	4
4	Forces on immersed bodies, Introduction to compressible flow	4	2	2	8
5	Applications to filtration and fluidization	2	1	1	4
6	Friction losses in pipes.	4	2	2	8
7	Laboratory course in Fluid Mechanics includes experiments on venture-meter, friction losses in pipes	4	2	2	4
8	Center of pressure, Flow measuring apparatus, multi-pump test (Pump characteristics) and losses in piping systems	6	3	3	4
Total		**28**	**28**	**14**	

5. Teaching and learning methods:

Topics	Face -to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self -learning and Research	Cooperative	Discovering	Modeling	lab
Fluid properties, fluid statics, kinematics		x			x	x								x
Fluid dynamics including energy and Momentum equations		x			x	x								x
Dimensional analysis, Laminar flow, turbulent flow, and its applications		x			x	x								x
Forces on immersed bodies, Introduction to compressible flow		x			x	x								x
Applications to filtration and fluidization		x			x	x								x
Laboratory course in Fluid Mechanics includes experiments on venture-meter, friction losses in pipes		x			x	x								x
Center of pressure, Flow measuring apparatus, multi-pump test (Pump characteristics) and losses in piping systems		x			x	x								x

6. Teaching and learning methods for disabled students:

No.	Teaching Methods	Reason
1	Presentation of the course in digital material	Better access any time
2	Web communication with students	Better communication with certain cases
3	Asking small groups to do assignments; each composed of low, medium, and high-performance students.	Knowledge and skills transfer among different levels of students

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Midterm examination	C1	a1, a2, b1, b2, b3
2	Semester work (quizzes, sheets, report)	C1, C2	a1, b2
3	Final term examination	C1, C2	a1, a2, b1, b2, b3

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Midterm examination	8^{th}
2	Semester work	2^{nd} ,7^{th},9^{th},14^{th}
3	Final term examination	15^{th}

7.3 Weighting of Evaluation:

No.	Evaluation method	Weights
1	Mid-term examination	10%
2	final examination	60%
3	Practical examination	10%
4	Semester work	20%
Total		**100%**

8. List of References:

No.	Reference List
1	Gerhart, Philip M., Andrew L. Gerhart, and John I. Hochstein. Munson, Young and Okiishi's Fundamentals of Fluid Mechanics. John Wiley & Sons, 2016.
2	Schetz, J. A., & Fuhs, A. E. (Eds.). (2011). Fundamentals of fluid mechanics. John Wiley & Sons.
3	Young, D. F., Munson, B. R., Okiishi, T. H., & Huebsch, W. W. (2010). A brief introduction to fluid mechanics. John Wiley & Sons.

9. Facilities required for teaching and learning:

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

10. Matrix of Competencies and LO's:

No.	Topic	Aims	Competencies	LO's
1	Fluid properties, fluid statics, kinematics	1	C1	a1, a2

2	Fluid Dynamics including Energy and Momentum equations	1	C1	a1
3	Dimensional analysis, laminar flow, turbulent flow, and its applications	1	C1	a1
4	forces on immersed bodies, introduction to compressible flow	4	C1	b1
5	Applications to filtration and fluidization	8	C1	b2, b3
6	Laboratory course in Fluid Mechanics includes experiments on venture-meter, friction losses in pipes	4, 8	C2	a2
7	Center of pressure, flow measuring apparatus, multi-pump test (Pump characteristics) and losses in piping systems	4, 8	C2	a1, b1

Course Coordinator: Assoc. Prof. Dr. Mohamed Gabr
Head of Department: Assoc. Prof. Dr. Amal Bahiry
Date of Approval: 2022

Engineering Economy
(ENG303)

1. Basic Information:

Program Title	All Programs
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Basic Science and Engineering Department
Course Title	Engineering Economy
Course Code	ENG303
Year/Level	Level 3
Specialization	Major – Compulsory Course
Authorization Date of Course Specification	-
Pre-request	-

Teaching hours	**Lectures**	**Tutorial**	**Practical**
	2	1	-

2. Course Aims:

No.	Aims
2	Work in and manage a diverse team of professionals from various engineering disciplines, taking responsibility for own and team performance; and behave professionally and adhere to engineering ethics and standards.
10	Demonstrate leadership qualities, business management, and skill development.

3. Competencies:

Competencies	Learning Outcomes (LO'S)
C3 Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global, cultural, social, economic, environmental, ethical and other aspects as	**a1** List the economic concepts related to characteristics in engineering analysis to improve the engineering process. **a2** Recognize business and management principles relevant to engineering for replacement and

appropriate to the discipline and within the principles and contexts of sustainable design and development.	depreciation of equipment to reduce the cost of operations. **b1** Combine different ideas, views, and knowledge from a range of sources to evaluate the characteristics of project economic. **c1** Assess economic, societal, and environmental dimensions and risk management in engineering design.
C4 Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues and risk management principles.	**a2** List the engineering-related economy. **b1** Innovate economy methodical approaches when dealing with new and advancing technology. **c2** Use fundamental economy organizational abilities.

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	Basic concepts of engineering economy as applied to the evaluation of capital investment alternatives in both the private and public sectors of our economy	4	4	-
2	Attention is given to the time value of money by showing the concepts and techniques for evaluating the worth of products, systems, structures, and services in relation to their cost	6	4	-
3	Economic and cost concepts: calculating economic equivalence, comparison of alternatives and replacement economy	6	6	-
4	Deprecation and method used for calculating	6		-
5	Economic optimization in design and operations. Cost estimation of products and systems	6	4	-
Total		**28**	**28**	**-**

5. Teaching and learning methods:

Topics	Face -to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self -learning and Research	Cooperative	Discovering	Modeling	lab
Basic concepts of engineering economy as applied to the evaluation of capital investment alternatives in both the private and public sectors of our economy	x	x			x									
Attention is given to the time value of money by showing the concepts and techniques for evaluating the worth of products, systems, structures, and services in relation to their cost	x	x			x	x								
Economic and cost concepts: calculating economic equivalence, comparison of alternatives and replacement economy	x	x			x		X							
Deprecation and method used for calculating	x	x			x	x								
Economic optimization in design and operations. Cost estimation of products and systems	x	x			x		x							

6. Teaching and learning methods for disabled students:

No.	Teaching Methods	Reason
1	Presentation of the course in digital material	Better access any time
2	Asking small groups to do assignments; each composed of low, medium, and high-performance students.	Knowledge and skills transfer among different level of students.

7. Student evaluation:

7.1 Student evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Mid Term exam	C3	a1, a2
2	Semester work (quizzes, sheets, report)	C3	c1, a1
3	Final term examination	C3	a2, b1, c1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Semester work (quiz, report)	$6^{th}, 11^{th}$
2	Mid Term examination	8^{th}
3	Final term examination	15^{th}

7.3 Weighting of Evaluation:

No.	Evaluation method	Weights
1	Mid-term examination	20%
2	Semester work	20%
3	Final-term examination	60%
Total		**100%**

8. List of References:

No.	Reference List
1	Engineering economic and financial accounting, A.R.Argasri and VVR McGraw-Hill,New Delhi,2006
2	Industrial Engineering M.I. KHAN, New-Age publishers, New Delhi,2008
3	Engineering Economics Rajan Misra, University science press, New Delhi,2009

9. Facilities required for teaching and learning:

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

10. Matrix of Competencies and LO's:

No.	Topic	Aims	Competencies	LO's
1	Basic concepts of engineering economy as applied to the evaluation of capital investment alternatives in both the private and public sectors of our economy	2	C3	a1

2	Attention is given to the time value of money by showing the concepts and techniques for evaluating the worth of products, systems, structures, and services in relation to their cost	2	C3	a1
3	Economic and cost concepts: calculating economic equivalence, comparison of alternatives and replacement economy	2	C3	a2
4	Deprecation and method used for calculating	2	C3	a2
5	Economic optimization in design and operations. Cost estimation of products and systems	2	C3	a2

Course Coordinator: Dr. Rania Hamdy & Dr. Hany Hashish
Head of Department: Assoc. Prof. Dr. Amal Bahiry
Date of Approval: 2022

Numerical Methods in Engineering
(MTH302)

1. Basic Information:

Program Title	All Programs
Department Offering the Program	Basic Science and Engineering Department
Department Responsible for the Course	Basic Science and Engineering Department
Course Title	Numerical Methods in Engineering
Course Code	MTH302
Year/Level	Level 2
Specialization	Major – Compulsory Course
Authorization Date of Course Specification	-
Pre- request	-

Teaching hours	**Lectures**	**Tutorial**	**Practical**
	2	2	-

2. Course Aims:

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

3. Competencies:

Competencies	Learning Outcomes (LO'S)
C1 Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science, and mathematics.	**a1** Describe the relevant mathematical principles and theories in the discipline. **a2** Explain the scientific principles and theories that apply to the topic. **b1** Using math ideas and theories that are applicable to the field. **b2** Using scientific concepts and theories that are relevant to the profession. **c1** solve complex engineering problems by -applying the concepts and the theories of mathematics. **c2** Identify complex engineering problems by applying the concepts and the theories of sciences, appropriate to the discipline.

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	Numerical solution of linear and nonlinear systems	4	4	-

2	Numerical differentiation and integration	6	6	-
3	Curve fitting and interpolation	10	10	-
4	Numerical solution of initial value problems	4	4	-
5	Boundary and Eigen value problems	4	4	-
Total		**28**	**28**	**-**

5. Teaching and learning methods:

Topics	Face -to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self -learning and Research	Cooperative	Discovering	Modeling	lab
Numerical solution of linear and nonlinear systems		x			x	x								x
Numerical differentiation and integration		x			x	x								x
Curve fitting and interpolation		x			x	x								x
Numerical solution of initial value problems		x			x	x								x
Boundary and Eigen value problems		x			x	x								x

6. Teaching and learning methods for disabled students:

No.	Teaching Methods	Reason
1	Presentation of the course in digital material	Better access any time
2	Wed communication with students	Better communication with certain cases
3	Asking small groups to do assignments; each composed of low, medium, and high-performance students	Knowledge and skills transfer among different levels of students

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Midterm examination	C1	a1, a2, b1

2	Semester work (quizzes, sheets, report)	C1	a2, c1, c2
3	Final term examination	C1	b1, b2

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Midterm examination	8^{th}
2	Semester work	2^{nd} -7^{th} - 9^{th} -14^{th}
3	Final term examination	15^{th}

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Midterm examination	20%
2	Semester work	20%
3	Final term examination	60%
	Total	**100%**

8. List of References:

No.	Reference List
1	Kiusalaas, Jaan. Numerical methods in engineering with Python 3. Cambridge university press, 2013.
2	B. S. Grewal "Numerical Methods in Engineering and Science" Mercury Learning and Information (2018).

9. Facilities required for teaching and learning:

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

10. Matrix of Competencies and LO's:

No.	Topic	Aims	Competencies	LO's
1	Numerical solution of linear and nonlinear systems	1	C1	a1
2	Numerical differentiation and integration	1	C1	a2
3	Curve fitting and interpolation	1	C1	b1
4	Numerical solution of initial value problems	1	C1	b2
5	Boundary and eigen value problems	1	C1	c1, c2

Course Coordinator: Dr. Samar Madian
Head of Department: Assoc. Prof. Dr. Amal Bahiry
Date of Approval: 2022

Hydrology and Irrigation Engineering
(CIE305)

1. Basic Information:

Program Title	Civil Engineering Program
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Civil Engineering Department
Course Title	Hydrology and Irrigation Engineering
Course Code	CIE 305
Year/Level	Level 3
Specialization	Major – Compulsory Course
Authorization Date of Course Specification	-
Pre- request	ENG301

Teaching hours	**Lectures**	**Tutorial**	**Practical**
	2	2	-

2. Course Aims

No.	Aims
4	Use the techniques, skills, and current engineering tools required for irrigation engineering practices
7	Achieve an optimum design of irrigation and drainage systems and the applications of hydrology.

3. Competencies:

Competencies	Learning Outcomes (LO'S)
C1 Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.	**a2** Explain the scientific principles, and theories that apply to water resources and Irrigation. **a3** Explain the basic principles of irrigation and drainage systems. **b1** Estimating of water requirements for crops and managing and distribution of irrigation systems. **b2** Using scientific concepts and theories that are relevant Crops, Soil and Water relation.
C2 Develop and conduct appropriate simulation, analyze and interpret data, assess and evaluate findings, and use statistical analyses and	**a1** Define basic characteristics, properties, concepts, and techniques of Irrigation and Drainage Engineering.

objective engineering judgment to draw conclusions.	**b1** Conduct basic experiments to learn about the basic characteristics and features of flow types in open channels. **b2** Conduct basic experiments to learn about the applications of Hydraulic, Hydrology and fluid mechanics in the fields of Irrigation Engineering and Canal Design.
C11 Select appropriate and sustainable technologies for construction of buildings, infrastructures and water structures; using either numerical techniques or physical measurements and/or testing by applying a full range of civil engineering concepts and techniques of structural analysis and mechanics, properties and strength of materials, surveying, soil mechanics, hydrology and fluid mechanics.	**a1** Recognize the fundamentals of Irrigation Canal Design, Canal lining and Modern Irrigation Systems. **c1** Using either numerical techniques or physical measurements and/or testing by applying a full range of civil engineering concepts and techniques of Irrigation Canal Design and Sprinkler and Trickle Irrigation parts.
C12 Achieve an optimum design of Reinforced Concrete and Steel Structures, Foundations and Earth Retaining Structures; and at least three of the following civil engineering topics: Transportation and Traffic, Roadways and Airports, Railways, Sanitary Works, Irrigation, Water Resources and Harbors; or any other emerging field relevant to the discipline.	**b2** Achieve an optimum Planning and design of open channel for irrigation and drainage networks, and design modern irrigation systems (sprinkler and Trickle).

4. Course Contents:

No.	Topics	Lecture	Tutorial	Practical
1	Introduction – The concept of Irrigation and its importance – Stages of Development of Irrigation in Egypt – Irrigation Water Resources.	2	2	-
2	Plant Relationship with Soil and Water.	2	2	-
3	Water Consumptive Use & Water Requirements for Crops.	3	3	-
4	Planning and Design of Irrigation and Drainage Networks.	4	4	-
5	Different Irrigation Methods	3	3	-
6	Surface Water Irrigation	2	2	-
7	Sprinkler Irrigation	4	4	-
8	Trickle Irrigation	4	4	-
9	Drainage Systems	4	4	-
Total		**28**	**28**	**-**

5. Teaching and learning methods:

Topics	Face -to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self -learning and Research	Cooperative	Discovering	Modeling	lab
Introduction – The concept of Irrigation and its importance – Stages of Development of Irrigation in Egypt – Irrigation Water Resources.	x			x	x	x	x			x				
Plant Relationship with Soil and Water.	x			x	x	x	x			x				x
Water Consumptive Use & Water Requirements for Crops.	x			x	x	x				x		x	x	
Planning and Design of Irrigation and Drainage Networks.	x			x	x	x	x		x	x	x			
Different Irrigation Methods	x			x	x	x	x		x	x	x			
Surface Water Irrigation	x			x	x	x	x			x		x		
Sprinkler Irrigation	x			x	x	x	x	x		x	x			
Trickle Irrigation	x			x	x	x	x	x		x	x			
Drainage Systems	x			x	x	x	x			x			x	

6. Teaching and learning methods for disabled students:

No.	Teaching Methods	Reason
1	Presentation of the course in digital material.	Better access any time.
2	Weekly communication with students.	Better communication with certain cases.
3	Asking small groups to do assignments; each composed of low, medium, and high-performance students.	Knowledge and skills transfer among different levels of students.
4	Electronic model system for the Institution.	Better access any time.

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Mid-term examination	C1 C2 C12	a2, b1, b2 a1, b1, b2 b2
2	Semester work	C1 C2 C11 C12	a2, a3, b1, b2 a1, b1, b2 a1, c1 b2
4	Final term examination	C1 C2 C11 C12	a2, b1, b2 a1, b2 c1 b2

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	semester work	2^{nd}, 5^{th}, 7^{th}, 10^{nd}, 12^{th}, 14^{th}
2	Mid Term examination	8^{th}
3	Final term examination	15^{th}

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Mid-term examination	20%
2	Semester work	20%
3	Final-term examination	60%
	Total	**100%**

8. List of References:

No.	Reference List
1	Peter Waller and Muluneh Yitayew. (2015). "Irrigation and Drainage Engineering". springer.
2	Dean E. Eisenhauer, Derrel L. Martin, et al. (2021). "Irrigation Systems Management". ASABE Puplications.
3	Vijay P. Singh and Qiong So. (2022). "Irrigation Engineering: Principles, Processes, Procedures, Design, and Management". Cambridge University Press.
4	محمد السلاوى و امير مباشر (2014). "هندسة الرى والصرف". جامعة الأزهر.

9. Facilities required for teaching and learning:

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

10. Matrix of knowledge and skills of the course:

No	Topic	Aims	Competencies	LO's
1	Introduction – The concept of Irrigation and its importance – Stages of Development of Irrigation in Egypt – Irrigation Water Resources.	4	C1	a2, a3
2	Plant Relationship with Soil and Water.	4	C1	b1, b2
3	Water Consumptive Use & Water Requirements for Crops.	4	C1	b1, b2
4	Planning and Design of Irrigation and Drainage Networks.	4	C2	a1, b1, b2
5	Different Irrigation Methods	7	C11	a1
6	Surface Water Irrigation	7	C11	a1
7	Sprinkler Irrigation	7	C11 C12	c1, b2 b2
8	Trickle Irrigation	7	C11 C12	c1, b2 b2
9	Drainage Systems	7	C1 C2	a3 a1

Course Coordinator: Prof. Dr. Mohamed Elkiki
Head of Department: Prof. Dr. Mohamed Elkiki
Date of Approval: 2022

Reinforced Concrete (1)
(CIE306)

1. Basic Information:

Program Title	Civil Engineering Program
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Civil Engineering Department
Course Title	Reinforced Concrete (1)
Course Code	CIE306
Year/Level	Level 3
Specialization	Major – Compulsory Course
Authorization Date of Course Specification	-
Pre- request	ENG205

Teaching hours	**Lectures**	**Tutorial**	**Practical**
	3	2	-

2. Course Aims

No.	Aims
1	Master a broad range of engineering knowledge and specialized skills, as well as the ability to apply acquired knowledge by applying theories and abstract thinking to identify, diagnose, and solve engineering problems of varying complexity and variation.
7	Achieve an optimum design of Reinforced Concrete.

3. Competencies:

Competencies	Learning Outcomes (LO'S)
C1 Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science, and mathematics.	**a3** Explain the basic principles of engineering. **c2** Practice the neatness and aesthetics in design to approach stresses in beams, torsional stresses
C2 Develop and conduct appropriate simulation, analyze, and interpret data, assess, and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.	**a2** Define the principles, basic properties, and features of construction material, as well as their use in sustainable technologies for construction of buildings, infrastructures. **c3** Applying statistical analyses and objective engineering judgment to draw conclusions.
C4 Utilize contemporary technologies, codes of practice and standards, quality guidelines, health, and safety requirements,	**a1** Describe quality assurance systems, codes of practice, and standards

C11 Select appropriate and sustainable technologies for construction of buildings, infrastructures and water structures; using either numerical techniques or physical measurements and/or testing by applying a full range of civil engineering concepts and techniques of: structural analysis and mechanics, properties and strength of materials, surveying, soil mechanics, hydrology and fluid mechanics.	**c1** Using either numerical techniques or physical measurements and/or testing by applying a full range of civil engineering concepts and techniques of structural analysis and mechanics, properties and strength of materials, surveying, soil mechanics, hydrology and fluid mechanics.
C12 Achieve an optimum design of Reinforced Concrete.	**b1** Achieve an optimum design of Reinforced Concrete

4. Course Contents:

No.	Topics	Lecture	Tutorial	Practical
1	Introduction, materials, properties	2	2	-
2	Design methods and requirements.	2	2	-
3	Load distribution	4	4	-
4	Bond length between concrete and steel bars	4	4	-
5	Loading analysis and design	4	4	-
6	Limit state design method (Flexural analysis and design, shear, and design, etc. Loading analysis and design)	4	4	-
7	Design of Beams and design of solid slabs One- and two-way slabs	4	4	-
8	Short columns	4	4	-
Total		**28**	**28**	**-**

5. Teaching and learning methods:

Topics	Face -to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self -learning and Research	Cooperative	Discovering	Modeling	lab
Introduction, materials, properties		x			x			x						x

Design methods and requirements.		x			x			x						x
Load distribution		x			x			x						x
Bond length between concrete and steel bars		x			x			x						x
Loading analysis and design		x			x			x						x
Limit state design method (Flexural analysis and design, shear, and design, etc. Loading analysis and design)		x			x			x						x
Design of Beams and design of solid slabs One- and two-way slabs		x			x			x						x
Short columns		x			x			x						x

6. Teaching and learning methods for disabled students:

No.	Teaching Methods	Reason
1	Presentation of the course in digital material	Better access any time
2	Wed communication with students	Better communication with certain cases
3	Asking small groups to do assignments; each composed of low, medium, and high-performance students	Knowledge and skills transfer among different levels of students
4	Electronic model system for the Institution.	E. learning

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Mid-term examination	C2 C4 C12	a2 a1, b1 b1
2	Semester work	C2 C4 C12	a2 a1 b1
3	Final term examination	C2 C4 C12	a2, c3 a1 b1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	semester work	$2^{nd}, 7^{th}, 9^{th}$
2	Mid Term examination	8^{th}
3	Practical Examination	14^{th}
4	Final term examination	15^{th}

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Mid-term examination	20%
2	Semester work	20%
3	Final-term examination	60%
Total		**100%**

8. List of References:

No.	Reference List
1	**Course notes:** Are delivered during the lecture, including handout materials such as solved problems, design charts, tables, etc.
2	**Essential books (textbooks / design codes):** Egyptian Code for Design and Construction of Reinforced Concrete Structures 2018. Design Aids and Examples in Accordance with the Egyptian Code for Design and Construction of Reinforced Concrete Structures 2018.

9. Facilities required for teaching and learning:

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

10. Matrix of knowledge and skills of the course:

No	Topic	Aims	Competencies	LO's
1	Introduction, materials, properties	1, 2, 7	C1	a3
2	Design methods and requirements.	1, 2, 7	C2 C4 C12	a2, c3 a1 b1
3	Load distribution	1, 2, 7	C2	a2
4	Bond length between concrete and steel bars	1, 2, 7	C2 C4	a2, c3 a1
5	Loading analysis and design	1, 2, 7	C2 C4 C12	a2, c3 a1 b1

6	Limit state design method (Flexural analysis and design, shear and design, etc. Loading analysis and design)	1, 2, 7	C2 C4 C12	a1, c3 a1 b1
7	Design of Beams and design of solid slabs One- and two-way slabs.	1, 2, 7	C2 C4 C12	a1, c3 a1 b1
8	Short columns	1, 2, 7	C2 C4 C12	a1, c3 a1 b1

Course Coordinator: Dr. Shady Ragheb
Head of Department: Prof. Dr. Mohamed Elkiki
Date of Approval: 2022

Surveying (2)
(CIE307)

1. Basic Information:

Program Title	Civil Engineering Program
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Civil Engineering Department
Course Title	Surveying (2)
Course Code	CIE307
Year/Level	Level 3
Specialization	Major – Compulsory Course
Authorization Date of Course Specification	-
Pre-request	CIE202

Teaching hours	**Lectures**	**Tutorial**	**Practical**
	2	1	1

2. Course Aims:

No.	**Aims**
6	Analyze data from the intended tests to manage resources creatively
10	Select appropriate and sustainable technologies for civil engineering fields such as surveying.

3. Competencies:

Competencies	**Learning Outcomes (LO'S)**
C1 Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science, and mathematics.	**a2** Explain the scientific principles and theories that apply to the topic. **b1** Using math ideas and theories that are applicable to the field.

C11 Select appropriate and sustainable technologies for construction of buildings, infrastructures, and water structures; using either numerical techniques or physical measurements and/or testing by applying a full range of civil engineering concepts and techniques of structural analysis and mechanics, properties and strength of materials, surveying, soil mechanics, hydrology and fluid mechanics.	**a1** Recognize the fundamentals of surveying. **c1** Using either numerical techniques or physical measurements and/or testing by applying a full range of civil engineering concepts and techniques of surveying.

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	Indirect methods for distance measurement: Stadia method-tangent methods-substance bar.	2	1	1
2	Setting out of horizontal and vertical curves	4	2	2
3	Introduction to theory of errors and error analysis of surveying measurements. Computations of areas and volumes of earth work in construction sites.	6	3	3
4	Coordinate systems and transformations coordinate computations: Polar method-intersection-resection	6	3	3
5	Modern methods for distance measurements: Distance measurement (EDM) and total stations.	4	2	2
6	Setting out of engineering projects.	2	1	1
7	Course Project	4	2	2
Total		**28**	**14**	**14**

5. Teaching and learning methods:

Topics	Face -to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self -learning and Research	Cooperative	Discovering	Modeling	lab
Indirect methods for distance measurement:	x				x	x								x

Stadia method-tangent methods-substance bar.	x				x	x								x
Setting out of horizontal and vertical curves	x				x	x								x
Introduction to theory of errors and error analysis of surveying measurements. Computations of areas and volumes of earth work in construction sites.	x				x	x								x
C Coordinate systems and transformations coordinate computations: Polar method-intersection-resection	x				x	x								x
Modern methods for distance measurements: Distance measurement (EDM) and total stations.	x				x	x								x
Setting out of engineering projects.	x				x	x								x
Course Project	x				x	x								x

6. Teaching and learning methods for disabled students:

No.	Teaching Methods	Reason
1	Presentation of the course in digital material	Better access any time
2	Wed communication with students	Better communication with certain cases
3	Asking small groups to do assignments; each composed of low, medium, and high-performance students	Knowledge and skills transfer among different levels of students
4	Electronic model system for the Institution.	E. learning

7. Student evaluation:

7.1 Student evaluation method:

No.	Evaluation Method	Competencies	LO’s
1	Midterm examination	C1 C11	a2 a1
2	Semester work (quizzes, sheets, report)	C10	d1, d2
3	Final term examination	C1 C11	a2, b1 a1, c1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Semester work	2^{nd} -7^{th} - 9^{th}
2	Mid Term examination	8^{th}
3	Practical examination	14^{th}
4	Final term examination	15^{th}

7.3 Weighting of Evaluation:

No.	Evaluation method	Weights
1	Mid-term examination	10%
2	Semester work	20%
3	Practical examination	10%
4	Final-term examination	60%
	Total	**100%**

8. List of References:

No.	Reference List
1	Walker, J., and Awange, J. L. (2017) Surveying for Civil and Mine Engineers.
2	Wolf, P.R. and Brinker, R.C., Elementary Surveying, 10^{th} ed., Harper Collins College Publisher, NY, USA (2002)

9. Facilities required for teaching and learning:

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

10. Matrix of knowledge and skills of the course:

No	Topic	Aims	Competencies	LO's
1	Indirect methods for distance measurement: Stadia method-tangent methods-substance bar.	1, 10	C1	a2, b1
2	Setting out of horizontal and vertical curves	1, 10	C1 C11	a2 a1, c1
3	Introduction to theory of errors and error analysis of surveying measurements. Computations of areas and volumes of earth work in construction sites.	1,10	C11	a1

4	oordinate systems and transformations coordinate computations: Polar method-intersection-resection	1, 10	C1 C11	a2 a1
5	Modern methods for distance measurements: Distance measurement (EDM) and total stations.	1, 10	C1 C11	b1 C1
6	Setting out of engineering projects.	1, 10	C1 C11	a2, b1 a1, C1
7	Course Project	1, 10	C1 C11	a2, b1 a1, C1

Course Coordinator: Dr. Ayman Helal
Head of Department: Prof. Dr. Mohamed Elkiki
Date of Approval: 2022

Traffic and Transportation Engineering (CIE308)

1. Basic Information:

Program Title	Civil Engineering Program
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Civil Engineering Department
Course Title	Traffic and Transportation Engineering
Course Code	CIE308
Year/Level	Level 3
Specialization	Major – Compulsory Course
Authorization Date of Course Specification	-
Pre- request	-

Teaching hours	**Lectures**	**Tutorial**	**Practical**
	2	1	-

2. Course Aims

No.	**Aims**
1	Master a broad range of engineering knowledge and specialized skills, as well as the ability to apply acquired knowledge in real-world situations by applying theories and abstract thinking in analytic critical and systemic thinking to identify, diagnose, and solve engineering problems of varying complexity and variation.
6	Analyze data from the intended tests to manage resources creatively
7	Achieve an optimum design of Transportation and Traffic, Roadways and Airports, Railways, or any other emerging field relevant to the discipline.

3. Competencies:

Competencies	**Learning Outcomes (LO'S)**
C1 Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.	**c2** Practice the neatness and aesthetics in design
C2 Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess, and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.	**a2** Define the principles and basic of traffic and transportation works and use the sustainable technologies. **b2** Conduct basic experiments to learn about transportation and traffic or other emerging field relevant to the discipline. **b3** Analyze and interpret data.

	c3 Applying statistical analyses and objective engineering judgment to draw conclusions.
C11 Select appropriate and sustainable technologies for road construction	**a2** Summarize, appropriate and sustainable technologies for road construction
C12 Achieve an optimum design for Transportation and Traffic, Roadways, or any other emerging field relevant to the discipline.	**b2** Achieve an optimum design of works for transportation and traffic or any other emerging field relevant to the discipline.

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	Measures of flow, speed, and Density	2	2	-
2	Statically of traffic characteristics (travel time, delay, speed, pedestrians, parking, and accident studies	2	2	-
3	Traffic signals	2	2	-
4	Parking garages and terminals design	2	2	-
5	Freeway surveillance and control	2	2	-
6	General characteristics of transportation: streets, highways, rail, transit, water, and pipelines. Egypt transport system: on overview	2	2	-
7	Fundamentals of traffic flow: time space diagrams, capacity analysis	2	2	-
8	control, IVHS, public issues and administration	4	4	-
9	Transport system design: characteristics of driver, vehicle, and road. Route location, horizontal, an. Vertical alignment, earthwork, drainage, and pavements	2	2	-
10	Economic evaluation, system operation, maintenance, and rehabilitation	4	4	-
11	Environmental impacts, various laboratory experiments and design projects supplement the subject matter	4	4	-
Total		**28**	**28**	**-**

5. Teaching and learning methods:

Topics	Face -to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self -learning and Research	Cooperative	Discovering	Modeling	lab
Measures of flow, speed, and Density		x			x	x								x
Statically of traffic characteristics (travel time, delay, speed, pedestrians, parking, and accident studies		x			x	x								x
Traffic signals		x			x	x								x
Parking garages and terminals design		x			x	x								x
Freeway surveillance and control		x			x	x								x
General characteristics of transportation: streets, highways, rail, transit, water, and pipelines. Egypt transport system: on overview		x			x	x								x
Fundamentals of traffic flow: time space diagrams, capacity analysis		x			x	x								x
control, IVHS, public issues and administration		x			x	x								x
Transport system design: characteristics of driver, vehicle, and road. Route location, horizontal, an. Vertical alignment, earthwork, drainage, and pavements		x			x	x								x
Economic evaluation, system operation, maintenance, and rehabilitation		x			x	x								x

Environmental impacts, various laboratory experiments and design projects supplement the subject matter		x			x	x								x

6. Teaching and learning methods for disabled students:

No.	Teaching Methods	Reason
1	Presentation of the course in digital material	Better access any time
2	Wed communication with students	Better communication with certain cases
3	Asking small groups to do assignments; each composed of low, medium, and high-performance students	Knowledge and skills transfer among different levels of students
4	Electronic model system for the Institution.	E. learning

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Midterm examination	C2 C12	a2, b2 b2
2	Semester work (quizzes, sheets, report)	C2	a2, c3
3	Final term examination	C2 C11 C12	a2, b2, c3 a2 b2

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Midterm examination	8^{th}
2	Semester work	7^{th} - 9^{th}
3	Final term examination	15^{th}

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Midterm examination	20%
2	Semester work	20%
3	Final term examination	60%
	Total	**100%**

8. List of References:

No.	Reference List
1	Khisty C. J. and Lall B. K., Transportation Engineering – An Introduction,3rd Edition, Prentice-Hall, Inc., New Jersey, USA, 2018.

2	Wright, P. H. and Dixon K. K., Highway Engineering, 7th Edition, John Wiley & Sons, Inc., 2016.
3	Tom V. M., (2017) lecture notes in traffic engineering and management. Department of civil engineering, Bombay.

9. Facilities required for teaching and learning:

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

10. Matrix of knowledge and skills of the course:

No	Topic	Aims	Competencies	LO's
1	Measures of flow, speed and Density	1, 7	C2	a2
2	Statically of traffic characteristics (travel time, delay, speed, pedestrians, parking and accident studies	1, 7	C2	a2 c3
3	Traffic signals	1,7	C2 C12	a2, b2 b2
4	Parking garages and terminals design	1, 7	C2 C12	a2 b2
5	Freeway surveillance and control	1, 7	C2 C12	a2, c3 b2
6	General characteristics of transportation: streets. And highways, rail, transit, water, and pipelines. Egypt transport system: on overview.	1, 7	C2 C11	a2, c3 a2
7	Fundamentals of traffic flow: time space diagrams, capacity analysis	1, 7	C2	a2 b3 c3
8	control, IVHS, public issues and administration	1, 7	C2	a2 b2
9	Transport system design: characteristics of driver, vehicle, and road. Route location, horizontal, and vertical alignment, earthwork, drainage, and pavements	1, 7	C2 C11 C12	a2, b2, c3 a2 b2
10	Economic evaluation, system operation, maintenance, and rehabilitation	1, 7	C2	a2 b2
11	Environmental impacts, various laboratory experiments and design projects supplement the subject matter	1, 7	C2	a2 b2

Course Coordinator: Assoc. Prof. Dr. Alaa Gabr
Head of Department: Prof. Dr. Mohamed Elkiki
Date of Approval: 2022

Technical Report Writing
(ENG207)

1. Basic Information:

Program Title	All Programs
Department Offering the Program	Basic Science and Engineering Department
Department Responsible for the Course	Basic Science and Engineering Department
Course Title	Technical Report Writing
Course Code	ENG207
Year/Level	Level 2
Specialization	Major – Compulsory Course
Authorization Date of Course Specification	-
Pre- request	-

Teaching hours	**Lectures**	**Tutorial**	**Practical**
	1	-	2

2. Course Aims:

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

3. Competencies:

Competencies	Learning Outcomes (LO'S)
C5 Practice research techniques and methods of investigation as an inherent part of learning.	**a1** Define technical language and report writing. **b1** Assess different ideas, views, and knowledge from a range of sources. **c1** Prepare technical reports. **d1** Search for information to engage in lifelong self-learning discipline.
C8 Communicate effectively – graphically, verbally and in writing – with a range of audiences using contemporary tools.	**d1** Communicate effectively. **d2** Demonstrate efficient IT capabilities.

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical

1	Introduction to technical writing. Define a report, Types of reports, Aim. Common concepts: clarity of Writing, Consistency Supporting Material Language rules (voice, tense) and Style	2	-	-
2	Common components of a technical report Organization of report sections Section's function and content	2	-	-
3	How to write a technical report Identify layout, Determine Audience Assign reference, add non text component. Mechanics of report writing. Quantitative Writing	2	-	-
4	Equations, Tables and Figures	1	-	-
5	Literature citations	1	-	-
6	Using word processing for Writing Report	1	-	8
7	Creating slides with presentation graphics programs	1	-	4
8	MS Excel Application and power view report command	2	-	8
9	Database Report using MS SQL	2	-	8
Total		**14**	**-**	**28**

5. Teaching and learning methods:

Topics	Face -to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self -learning and Research	Cooperative	Discovering	Modeling	lab
Introduction to technical writing. Define a report, Types of reports, Aim. Common concepts: clarity of Writing, Consistency Supporting Material Language rules (voice, tense) and Style	x	x		x	x	x	x							x

Common components of a technical report Organization of report sections Section’s function and content	x	x		x	x	x	x							x
How to write a technical report Identify layout, Determine Audience Assign reference, add non text component. Mechanics of report writing. Quantitative Writing	x	x		x	x	x	x							x
Equations, Tables and Figures	x	x		x	x	x	x							x
Literature citations	x	x		x	x	x	x							x
Using word processing for Writing Report	x	x		x	x	x	x							x
Creating slides with presentation graphics programs	x	x		x	x	x	x							x
MS Excel Application and power view report command	x	x		x	x	x	x							x
Database Report using MS SQL	x	x		x	x	x	x							x

6. Teaching and learning methods for disabled students:

No.	Teaching Methods	Reason
1	Presentation of the course in digital material	Better access any time
2	Web communication with students	Better communication with certain cases
3	Asking small groups to do assignments; each composed of low, medium, and high-performance students.	Knowledge and skills transfer among different levels of students

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO’s
1	Midterm examination	C5	a1
2	Semester work (quizzes, sheets, report, presentation)	C5, C8	c1, d1, d2
3	Practical Examination	C5, C8	c1, d1, d2
4	Final term examination	C5, C8	b1, a1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Midterm examination	8^{th}

2	Semester work	2^{nd} ,7^{th},9^{th},13^{th}
3	Practical Examination	14^{th}
4	Final term examination	15^{th}

7.3 Weighting of Evaluation:

No.	Evaluation method	Weights
1	Mid-term examination	10%
2	final examination	60%
3	Practical examination	10%
4	Semester work	20%
Total		**100%**

8. List of References:

No.	Reference List
1	How to write technical report, 2010 by lutezhering.

9. Facilities required for teaching and learning:

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

10. Matrix of Competencies and LO's:

No	Topic	Aims	Competencies	LO's
1	Introduction to technical writing	5	C5	a1
2	Common components of a technical report	5	C5	a1
3	How to write a technical report	5	C5	c1
4	Equations, Tables and Figures	5	C5	a1
5	Literature citations	5	C5	b1, d1
6	Using word processing for Writing Report	5	C5	b1
7	Creating slides with presentation graphics programs	5	C8	d1, d2
8	MS Excel Application and power view report command	5	C8	d1, d2
9	Database Report using MS SQL	5	C5	b2

Course Coordinator: Dr. Mohamed Elbindary & Dr. Hany Hashish

Head of Department: Assoc. Prof. Dr. Amal Bahiry
Date of Approval: 2022

Open Channel Hydraulics
(CIE401)

1. Basic Information:

Program Title	Civil Engineering Program
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Civil Engineering Department
Course Title	Open Channel Hydraulics
Course Code	CIE401
Year/Level	Level 4
Specialization	Major – Compulsory Course
Authorization Date of Course Specification	-
Pre- request	ENG301

Teaching hours	**Lectures**	**Tutorial**	**Practical**
	2	**1**	**1**

2. Course Aims

No.	Aims
1	Master a broad range of engineering knowledge and specialized skills by applying theories and thinking to identify and solve engineering problems regarding to the applications of open channel hydraulics.
7	Achieve an optimum design for nonuniform flow, gradually varied flow, and rapidly varied flow.
10	Select appropriate and sustainable technologies for open channel hydraulics best hydraulic section, gradually varied flow, rapidly varied flow and hydraulic machines (pump).

3. Competencies:

Competencies	Learning Outcomes (LO'S)
C2 Develop and conduct appropriate simulation, analyze, and interpret data, assess and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.	**a2** Define the principles, basic properties, and features of open channel flow, specific energy, specific force, surface water profiles for water structures, Turbines and Pumps. **c2** Conduct basic experiments to learn about the basic characteristics and features of flow types in open channels, hydraulic jump.
C12 Achieve an optimum design of open channel flow hydraulics, and surface water profiles related to hydraulic structures and water resources.	**b1** Achieve an optimum design for nonuniform flow in open channel. **b2** Achieve an optimum design for rapidly varied flow, gradually varied flow in open channel, pumps, and turbines.

4. Course Contents:

No.	Topics	Lecture	Tutorial	Practical
1	Introduction – review (pipelines hydraulics)	2	-	2
2	Principles of hydraulics of open channel flow	4	-	4
3	Critical flow – velocity distribution – unsteady flow equations	4	-	4
4	Energy approach Practical: [Hump + Depression]	6	-	6
5	Momentum approach – rabidly varied flow Practical: [Hydraulic jump]	4	-	4
6	Surface roughness	2	-	2
7	Gradually varied flow Practical: [G.V.F]	2	-	2
8	Hydraulic machines (pump) – Best hydraulic section	4	-	4
Total		**28**	**-**	**28**

5. Teaching and learning methods:

Topics	Face-to-face lecture	Online lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brainstorming	Projects	Site Visits	Self learning and Research	Cooperative	Discovering	Modeling	Lab
Introduction –review (Pipelines hydraulics)		x			x		X							
Principles of hydraulics of open channel flow		x			x		X							

Critical flow – velocity distribution – unsteady flow equations		x			x		X							
Energy approach Practical: [Hump + Depression]		x			x		X							
Momentum approach – rabidly varied flow Practical: [Hydraulic jump]		x			x		X							
Surface roughness		x			x		X							
Surface roughness Gradually varied flow		x			x		X							
Hydraulic machines (pump) – Best hydraulic section		x			x		X							

6. Teaching and learning methods for disabled students:

No.	Teaching Methods	Reason
1	Presentation of the course in digital material	Better access any time
2	Wed communication with students	Better communication with certain cases
3	Asking small groups to do assignments; each composed of low, medium, and high-performance students	Knowledge and skills transfer among different levels of students

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Mid-term examination	C2 C12	a2 b1
2	Semester work	C2 C12	a2, c2 b1, b2
3	Practical Examination	C2	c2
4	Final term examination	C2 C12	a2 b1, b2

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Semester work	$2^{nd}, 7^{th}, 9^{th}$
2	Mid Term examination	8^{th}
3	Practical Examination	14^{th}
4	Final term examination	15^{th}

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Mid-term examination	10%
2	Semester work	20%
3	Practical Examination	10%
4	Final-term examination	60%
	Total	**100%**

8. List of References:

No.	Reference List
1	Khurmi, R.S. (2018). '' A textbook of hydraulics, fluid mechanics and hydraulic machines'' S. Chanel and company Ltd. P.990
2	Subramanya, K. (2018 ''Flow in open channels'' McGra- Hill Education (India). P.602
3	Glenn E. Moglen. 2019.Fundamentals of Open Channel Flow. CRC Press. Available on Taylor & Francis eBooks.

9. Facilities required for teaching and learning:

Facility			
1	Lecture classroom	3	White board
2	Seminar	4	Data show system
5	Lab.		

10. Matrix of knowledge and skills of the course:

No	Topic	Aims	Competencies	LO's
1	Introduction – review (Pipelines hydraulics)	7	C2	a2
2	Principles of hydraulics of open channel flow	1	C2 C12	a2 b1, b2
3	Critical flow – velocity distribution – unsteady flow equations	1	C12	b1, b2
4	Energy approach Practical: [Hump + Depression]	7	C12	b1, b2
5	Momentum approach – rabidly varied flow Practical: [Hydraulic jump]	7	C2 C12	a2, c1 b1
6	Surface roughness	10	C2 C12	a2, c1 b1
7	Surface roughness Gradually varied flow	7	C2 C12	a1, b1 b1
8	Hydraulic machines (pump) – Best hydraulic section	10	C2 C12	a2 b1

Course Coordinator: Assoc. Prof. Dr. Mohamed Gabr
Head of Department: Prof. Dr. Mohamed Elkiki
Date of Approval: 2022

Steel Structures Design (1)
(CIE402)

1. Basic Information:

Program Title	Civil Engineering Program
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Civil Engineering Department
Course Title	Steel Structures Design (1)
Course Code	CIE402
Year/Level	Level 4
Specialization	Major – Compulsory Course
Authorization Date of Course Specification	-
Pre- request	CIE202

Teaching hours	**Lectures**	**Tutorial**	**Practical**
	3	2	-

2. Course Aims:

No.	**Aims**
1	Master a broad range of engineering knowledge and specialized skills, as well as the ability to apply acquired knowledge in real-world situations by applying theories and abstract thinking in analytic critical and systemic thinking to identify, diagnose, and solve engineering problems of varying complexity and variation.
7	Achieve an optimum design of steel structures
10	Select appropriate and sustainable technologies for construction of steel buildings. using numerical techniques, experiment measurements, and testing by applying a full range of civil engineering fields.

3. Competencies:

Competencies	**Learning Outcomes (LO'S)**
C1 Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science, and mathematics.	**a3** Explain the basic principles of engineering in steel structures design. **b3** Applying engineering basics that are relevant to the steel structures design. **c3** Identify, formulate, and solve complex engineering problems by applying engineering fundamentals.
C2 Develop and conduct appropriate experimentation and/or simulation, analyze and	**a1** Define, basic characteristics, properties, concepts, and techniques of structural

interpret data, assess, and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.	analysis and mechanics, and properties and strength of materials of steel structures. **c3** Applying statistical analyses and objective engineering judgment to draw conclusions.
C9 Use creative, innovative, and flexible thinking and acquire entrepreneurial and leadership skills to anticipate and respond to new situations.	**d3** Refer to relevant literatures.
C11 Select appropriate and sustainable technologies for construction of steel buildings using either numerical techniques or physical measurements and/or testing by applying a full range of civil engineering concepts and techniques of structural analysis and mechanics, and properties and strength of materials.	**a1** Recognize the fundamentals of structural analysis and mechanics, and properties and strength of materials of steel structures. **c1** Using either numerical techniques or physical measurements and/or testing by applying a full range of civil engineering concepts and techniques of structural analysis and mechanics, and properties and strength of materials of steel structures.
C12 Achieve an optimum design of steel structures.	**b1** Achieve an optimum design of steel structures.

4. Course Contents:

No.	Topics	Lecture	Tutorial	Practical
1	Types of steel structures.	4	2	-
2	Types of loads on steel structural building.	4	2	-
3	Method of Design of steel structural buildings. (ASD - LRFD. Methods)	6	4	-
4	Allowable stress in different steel structural buildings.	4	2	-
5	Design of tension members, according to ASDM.	4	2	
6	Design of Compression members, according to ASDM.	4	4	
7	Design of bolted connections in trusses	4	2	
8	Design of welded connections in trusses	4	4	
9	Design of columns under axial loads.	4	4	-
10	General review of the course	4	2	-
Total		**42**	**28**	**-**

5. Teaching and learning methods:

No.	Topics	Lecture	Tutorial	Practical
1	Introduction:	6	4	-

	Types of steel structures. Planning & general layout of steel structures.			
2	Types of loads on steel buildings.	3	2	-
3	Methods of design of steel structural buildings: Allowable stress design method (ASD). Load and resistance factored design (LRFD). Allowable stresses in different steel members.	3	2	-
4	Design of truss members: Tension members. Compression members.	6	4	-
5	Design of truss connections: Bolted connections. Welded connections.	6	4	
6	Design of beams: principles & applications on: Roof purlins. Floor beams. Built-up plate girder.	12	8	-
7	Design of beam-columns.	6	4	
Total		**42**	**28**	**-**

6. Teaching and learning methods for disabled students:

Topics	Face to face lecture	Online lecture	Flipped classroom	Presentation and movies	Discussion	Problem solving	Brainstorming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab
1- Introduction: - Types of steel structures. - Planning & general layout of steel structures.	x			x	x					x				x
2- Types of loads on steel buildings.	x			x	x									x
3- Methods of design of steel structural buildings: - Allowable stress design method (ASD). - Load and resistance factored design (LRFD). - Allowable stresses in different steel members.	x			x	x									x

4- Design of truss members: - Tension members. - Compression members.	x			x	x									x
5- Design of truss connections: - Bolted connections. - Welded connections.	x			x	x									x
6- Design of beams: principles & applications on: - Roof purlins. - Floor beams. - Built-up plate girder.	x			x	x									x
7- Design of beam-columns.	x			x	x									x

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Midterm examination	C1 C2 C11 C12	a3, b3, c3 a1, c3 a1, c1 b1
2	Semester work (quizzes, sheets, report)	C1 C2 C9 C11 C12	a3, b3, c3 a1, c3 d3 a1, c1 b1
3	Final term examination	C1 C2 C11 C12	a3, b3, c3 a1, c3 a1, c1 b1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Midterm examination	8^{th}
2	Semester work	*continuous evaluation*
3	Final term examination	15^{th}

8. List of References:

No.	Reference List
1	Course notes: Lecture notes prepared by the course coordinator. Solved examples.
2	Essential books (textbooks):

	Egyptian Code of Practice for Steel Construction and Bridges (ASD), Code No. 205, HBRC, 2003.
3	Recommended books E. B. Machaly, "Behavior, analysis and design of structural steel element", vol. 1, 2019. E. B. Machaly, "Behavior, analysis and design of steel work connections", vol. 3, 2019.
4	Periodicals, Web sites, etc. www.steelconstruction.org www.modernsteel.com www.berlinsteel.com

9. Facilities required for teaching and learning:

Facility			
1	Seminar	**3**	teaching aids as interactive (smart) board
2	discussions rooms with internet connections	**4**	Data Show

10. Matrix of knowledge and skills of the course:

No	Topic	Aims	Competencies	LO's
1	Introduction: Types of steel structures. Planning & general layout of steel structures.	1,10	C1, C9	a3, b3 d3
2	Types of loads on steel buildings.	1,10	C2, C11	a1, c3 a1, c1
3	Methods of design of steel structural buildings: Allowable stress design method (ASD). Load and resistance factored design (LRFD). Allowable stresses in different steel members.	1,10	C1, C2, C11	c3 a1, c3 a1, c1
4	Design of truss members: Tension members. Compression members.	1,7	C1, C11, C12	c3 c1 b1
5	Design of truss connections: Bolted connections. Welded connections.	1,7	C1, C11, C12	c3 c1 b1
6	Design of beams: principles & applications on: Roof purlins. Floor beams. Built-up plate girder.	1,7	C1, C11, C12	c3 c1 b1
7	Design of beam-columns.	1,7	C1, C11, C12	c3 c1 b1

Course Coordinator: Assoc. Prof. Dr. Ashraf Elsabagh

Head of Department: Prof. Dr. Mohamed Elkiki
Date of Approval: 2022

Reinforced Concrete (2)
(CIE403)

1. Basic Information:

Program Title	Civil Engineering Program
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Civil Engineering Department
Course Title	Reinforced Concrete (2)
Course Code	CIE403
Year/Level	Level 4
Specialization	Major – Compulsory Course
Authorization Date of Course Specification	-
Pre- request	CIE306

Teaching hours	**Lectures**	**Tutorial**	**Practical**
	3	**2**	**-**

2. Course Aims:

No.	Aims
7	Achieve an optimum design of Reinforced Concrete.

3. Competencies:

Competencies	Learning Outcomes (LO'S)
C2 Develop and conduct appropriate simulation, analyze, and interpret data, assess, and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.	**a2** Define the principles, basic properties, and features of construction material, as well as their use in sustainable technologies for construction of buildings, infrastructures, and water structures. **c3** Applying statistical analyses and objective engineering judgment to draw conclusions.
C9 Use creative, innovative, and flexible thinking and acquire entrepreneurial and leadership skills to anticipate and respond to new situations.	**d1** Think creatively in solving problems of design. **d3** Refer to relevant literatures.
C12 Achieve an optimum design of Reinforced Concrete.	**b1** Achieve an optimum design of Reinforced Concrete

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	Introduction	3	2	-
2	Design of Hollow Block and Ribbed slabs	6	4	-

3	Design of sections subjected to Torsion	6	4	-
4	Design of flat slabs	9	6	-
5	Design of Stairs	9	6	-
6	Design of paneled beams	6	4	-
7	Deflection	3	2	-
Total		**42**	**28**	**-**

5. Teaching and learning methods:

Topics	Face -to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self -learning and Research	Cooperative	Discovering	Modeling	lab
Introduction					x			x						x
Design of Hollow Block and Ribbed slabs					x			x						x
Design of sections subjected to Torsion					x			x						x
Design of flat slabs					x			x						x
Design of Stairs					x			x						x
Design of paneled beams					x			x						x
Deflection					x			x						x

6. Teaching and learning methods for disabled students:

No.	Teaching Methods	Reason
1	Presentation of the course in digital material	Better access any time
2	Wed communication with students	Better communication with certain cases
3	Asking small groups to do assignments; each composed of low, medium, and high-performance students	Knowledge and skills transfer among different levels of students
4	Electronic model system for the Institution.	E. learning

7. Student evaluation:

7.1 Student evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Mid-term examination	C2 C9	a2, c3 d1
2	Semester work	C2 C12	a2 b1
3	Final term examination	C2 C9 C12	a2, c3 d1 b1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	semester work	$2^{nd}, 7^{th}, 9^{th}$
2	Mid Term examination	8^{th}
3	Practical Examination	14^{th}
4	Final term examination	15^{th}

7.3 Weighting of Evaluation:

No.	Evaluation method	Weights
1	Mid-term examination	20%
2	Semester work	20%
3	Final-term examination	60%
Total		**100%**

8. List of References:

No.	Reference List
1	EL-Metwally, S.E., and Hosny, H.M.H., "Design Fundamental of Structure Concrete." 1977 Ministry of Housing. Utilities and Urban Communities, "Egyptian Code for Design and Construction of Reinforced Concrete Structures (ECCS203-2020)."Cairo 2020.
2	Hilal.M.,"Reinforced Concrete Fundamentals." Marcou, 1975 Books Hilal M., "Design of Reinforced Concrete Halls," Marcou 1981. Nassef, M.A.," Reinforced Concrete Design," Cairo Univ., 1988.Abdel Rahman, A., "Fundamental of Reinforced Concrete Incorporating the Egyptian Code of 1989."

9. Facilities required for teaching and learning:

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

10. Matrix of knowledge and skills of the course:

No	Topic	Aims	Competencies	LO's
1	Introduction	7	C2 C9	a2, c3 d1

2	Design of Hollow Block and Ribbed slabs	7	C2 C12	a2, c3 b1
3	Design of sections subjected to Torsion	7	C9 C12	d1 b1
4	Design of flat slabs	7	C2 C9 C12	a2, c3 d1 b1
5	Design of Stairs	7	C2 C9 C12	a2, c3 d1 b1
6	Design of paneled beams	7	C2 C9	a2, c3 d1
7	Deflection	7	C9	d1

Course Coordinator: Dr. Hamdy Abd Elaty
Head of Department: Prof. Dr. Mohamed Elkiki
Date of Approval: 2022

Geology and Soil Mechanics (1)
(CIE404)

1. Basic Information:

Program Title	Civil Engineering Program
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Civil Engineering Department
Course Title	Geology and Soil Mechanics (1)
Course Code	CIE404
Year/Level	Level 4
Specialization	Major – Compulsory Course
Authorization Date of Course Specification	-
Pre- request	-

Teaching hours	Lectures	Tutorial	Practical
	2	**1**	**1**

2. Course Aims:

No.	Aims
1	Master a broad range of engineering knowledge and specialized skills, as well as the ability to apply acquired knowledge in real-world situations by applying theories and abstract thinking in analytic critical and systemic thinking to identify, diagnose, and solve engineering problems of varying complexity and variation.
10	Select appropriate and sustainable technologies for construction of buildings, infrastructures and water structures; using numerical techniques, experiment measurements, and testing by applying a full range of civil engineering fields such soil mechanics.

3. Competencies:

Competencies	Learning Outcomes (LO'S)
C1. Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science, and mathematics.	**a3** Explain the basic principles of engineering in geology and soil mechanics. **b3** Applying engineering basics that are relevant to geology and soil mechanics. **c3** identify, formulate, and solve complex engineering problems by applying geology and soil mechanics fundamentals.
C2 Develop and conduct appropriate experimentation, analyze, and interpret data,	**a1** Define, basic characteristics, properties, concepts, and techniques of soil mechanics.

assess, and evaluate findings, and use statistical analyses and objective engineering	**b1** Conduct basic experiments to learn about the basic characteristics and features of structural analysis and mechanics, properties and strength of materials, surveying, soil mechanics, hydrology and fluid mechanics.
C6 Plan, supervise and monitor implementation of engineering projects, taking into consideration other trades requirements	**b**1 interpret data derived from laboratory observation from equipment flow sheets, charts and curves to interpret data derived from laboratory observation. **c1** Conduct experimental work related to the reinforced concrete and steel structures, foundations and earth retaining structures
C11 Select appropriate and sustainable technologies construction of buildings, infrastructures, and water structures, using either numerical techniques or physical measurements and/or testing by applying a full range of civil engineering concepts and techniques of structural analysis and mechanics, properties and strength of materials, surveying, soil mechanics, hydrology and fluid mechanics	**a1** Recognize the fundamentals of soil mechanics. **c1** Using either numerical techniques or physical measurements and/or testing by applying a full range of civil engineering concepts and techniques of soil mechanics.

4. Course Contents:

No.	Topics	Lecture	Tutorial	Practical
1	Introduction and basics of Geology	2	2	-
2	Basic geological properties of rocks	2	2	-
3	Basic engineering properties of soils Practical: water content – specific gravity – sieve analysis – hydrometer – Casagrande – sand cone test – standard proctor – modified proctor test	12	12	4
4	Permeability and Seepage	4	4	2
5	Effective stresses and pore water pressure	2	2	-
6	Stresses and strains in continuous body and shear stress of soil Practical: un-confined test	2	2	4
7	Consolidation: Practical: oedometer	2	2	4
8	Stability analysis	2	2	-
Total		**28**	**28**	**14**

5. Teaching and learning methods:

Topics	Face to face lecture	Online lecture	Flipped classroom	Presentation and movies	Discussion	Problem solving	Brainstorming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab
Introduction and basics of Geology	x	x		x	x	x								x
Basic geological properties of rocks	x	x		x	x	x								x
Basic engineering properties of soils Practical: water content – specific gravity – sieve analysis – hydrometer – Casagrande – sand cone test – standard proctor – modified proctor test	x	x		x	x	x								x
Permeability and Seepage	x	x		x	x	x								x
Effective stresses and pore water pressure	x	x		x	x	x								x
Stresses and strains in continuous body and shear stress of soil Practical: un-confined test	x	x		x	x	x								x
Consolidation Practical: oedometer	x	x		x	x	x								x
Stability analysis	x	x		x	x	x								x

6. Teaching and learning methods for disabled students:

No.	Teaching Methods	Reason
1	Presentation of the course in digital material	Better access any time
2	Wed communication with students	Better communication with certain cases

3	Asking small groups to do assignments; each composed of low, medium, and high-performance students	Knowledge and skills transfer among different levels of students
4	Electronic model system for the Institution.	E. learning

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Mid-term examination	C1 C2 C11	a3, b3, b3 a1, b1 a1, c1
2	Semester work	C1 C11	a3, b3, b3 a1, c1
3	Practical Examination	C11	a1, c1
4	Final term examination	C1 C2 C6 C11	a3, b3, b3 a1, b1 b1, c1 a1, c1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Semester work	*continuous evaluation*
2	Mid Term examination	8^{th}
3	Practical Examination	14^{th}
4	Final term examination	15^{th}

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Mid-term examination	10%
2	Semester work	20%
3	Practical Examination	10%
4	Final-term examination	60%
	Total	**100%**

8. List of References:

No.	Reference List
1	Course notes: Lecture notes prepared by the course coordinator + solved examples. Practical notes prepared by the course coordinator
2	Das, B., M. (2017), "Principles of geotechnical Engineering " Eighth Edition, CENGAGE Learning,

3	Knappett, J.A. and Craige R. F. (2012), " Craig's Soil Mechanics" Eighth Edition, Spon Press.
4	Essential books (textbooks): Egyptian Code of Practice for Soil Mechanics and Foundations (2002)

9. Facilities required for teaching and learning:

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

10. Matrix of knowledge and skills of the course:

No	Topic	Aims	Competencies	LO's
1	Introduction and basics of Geology	1	C1	a3, b3, b3
2	Basic geological properties of rocks	1,10	C2 C11	a1, b1 a1, c1
3	Basic engineering properties of soils Practical: water content – specific gravity – sieve analysis – hydrometer – Casagrande – sand cone test – standard proctor – modified proctor test	1,10	C2 C11	a1, b1 a1, c1
4	Permeability and Seepage	1,10	C1 C2 C6 C11	a3,b3,b3 a1,b1 b1,c1 a1, c1
5	Effective stresses and pore water pressure	1,10	C1 C2 C6 C11	a3,b3,b3 a1,b1 b1,c1 a1, c1
6	Stresses and strains in continuous body and shear stress of soil Practical: un-confined test	1,10	C1 C2 C6 C11	a3,b3,b3 a1,b1 b1,c1 a1, c1

7	Consolidation Practical: oedometer	1,10	C1 C2 C6 C11	a3,b3,b3 a1,b1 b1,c1 a1, c1
8	Stability analysis	1,10	C1 C2 C6 C11	a3,b3,b3 a1,b1 b1,c1 a1, c1

Course Coordinator: Dr. Hany Hashish.
Head of Department: Prof. Dr. Mohamed Elkiki
Date of Approval: 2022

Project Management and Control
(ENG402)

1. Basic Information:

Program Title	All Programs
Department Offering the Program	Civil engineering Department
Department Responsible for the Course	Basic science and Engineering Department
Course Title	Project Management and Control
Course Code	ENG402
Year/Level	Level 4 – Semester 1
Specialization	Major – Compulsory Course
Authorization Date of Course Specification	-
Pre- request	-

Teaching Hours	**Lectures**	**Tutorial**	**Practical**
	1	2	-

2. Course Aims:

No.	Aims
6	Analyze data from the intended tests to manage resources creatively.
8	Plan and manage construction processes; address construction defects, instability, and quality issues; maintain safety measures in construction and materials; and assess the environmental impacts of projects.
9	Deal with biddings, contracts, and financial issues including project insurance and guarantees.

3. Competencies:

Competencies	Learning Outcomes (LOs)
C3 Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global, cultural, social, economic, environmental, ethical, and other aspects as appropriate to the discipline, and within the principles and contexts of sustainable design and development.	**b1** Judge engineering decisions considering balanced costs, benefits, safety, quality, reliability, and environmental impact. **c2** Applying engineering design procedures to generate cost-effective solutions while adhering to sustainable design and development principles and contexts.
C9 Use creative, innovative, and flexible thinking and acquire entrepreneurial and leadership skills to anticipate and respond to new situations.	**d2** Effectively manage tasks, time, and resources.

C13 Plan and manage construction processes; address construction defects, instability, and quality issues; maintain safety measures in construction and materials; and assess the environmental impacts of projects.	**a1** Define the plan and manage the construction process.
C14 Deal with biddings, contracts, and financial issues including project insurance and guarantees.	**a1** Define biddings, contracts, and financial issues. **b1** Address biddings, contracts, and financial issues including project insurance and guarantees. **c1** Apply biddings, contracts, and financial issues on civil engineering projects.

4. Course Contents:

No.	Topics	Lecture	Tutorial	Practical
1	Development, Negotiation, and Specification of The Project Contract	2	4	-
2	Project Planning and Control Using Activity Network Models	2	4	-
3	Network Logic, Scheduling	4	8	-
4	Resource Allocation, Multi-Project Resource Allocation and Leveling Using Available Industrial Software	4	8	-
5	Time-Cost Trade-off Methods	2	4	-
Total		**14**	**28**	**-**

5. Teaching and Learning Methods:

No.	Topics	Face-To-Face Lecture	Online Lecture	Flipped Classroom	Presentation and Movies	Discussion	Problem-Solving	Brain Storming	Projects	Site Visits	Self-Learning and Research	Cooperative	Discovering	Modeling	Lab
1	Development, Negotiation, and		√			√									

	Specification of The Project Contract														
2	Project Planning and Control Using Activity Network Models	√					√								
3	Network Logic, Scheduling	√			√										
4	Resource Allocation, Multi-Project Resource Allocation and Leveling Using Available Industrial Software		√						√						
5	Time-Cost Trade-off Methods	√					√								

6. Teaching and Learning Methods for Disabled Students:

No.	Teaching Method	Reason
1	Presentation of The Course in Digital Material	Better Access at Any Time
2	Wed Communication with Students	Better Communication with Certain Cases
3	Asking Small Groups to Do Assignments; Each Composed of Low, Medium, and High-Performance Students	Knowledge and Skills Transfer Among Different Levels of Students
4	An Electronic Model System for The Institution	E. Learning

7. Student Evaluation:

7.1 Student Evaluation Method:

No.	Evaluation Method	Competencies	LOs
1	Semester Works (Quizzes, Sheets, Reports)	C3 C9 C13 C14	b1, c2 d2 a1 a1, b1, c1
2	Mid-Term Exam	C9 C13 C14	d2 a1 a1, b1, c1
3	Final-Term Exam	C3 C9 C13 C14	b1, c2 d2 a1 a1, b1, c1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Semester Works (Quizzes, Sheets, Reports)	4^{th}, 11^{th}

2	Mid-Term Exam	8th
3	Final-Term Exam	15th

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Semester Works (Quizzes, Sheets, Reports)	20%
2	Mid-Term Exam	20%
3	Final-Term Exam	60%
Total		**100%**

8. List of References:

No.	Reference List
1	Wiley-Blackwell. Code of Practice for Project Management for Construction and Development. Chartered Institute of Building (Great Britain).
2	Kerzner, Harold. Project Management Workbook. A System Approach to Planning, Scheduling, and Control.
3	de Marco, A. Project Management for Facility Constructions A Guide for Engineers, and Architects.
4	Project Management Institute and Project Management Institute. A Guide to the Project Management Body of Knowledge (PMBOK Guide).
5	Lester, Albert. Project Management, Planning, and Control. Managing Engineering, Construction, and Manufacturing Projects to PMI, APM, and BSI Standards.
6	Vanhoucke, M. Management for Professionals Integrated Project Management and Control.

9. Facilities Required for Teaching and Learning:

Facility			
1	Lecture Classroom	3	White Board
2	Seminar	4	Data Show System

10. Matrix of Knowledge and Skills:

No.	Topic	Aims	Competencies	LOs
1	Development, Negotiation, and Specification of The Project Contract	9	C14	a1, b1, c1
2	Project Planning and Control Using Activity Network Models	6, 8	C9 C13	d2 a1
3	Network Logic, Scheduling	6, 8	C9 C13	d2 a1
4	Resource Allocation, Multi-Project Resource Allocation and Leveling Using Available Industrial Software	6, 8	C3	b1, c2
5	Time-Cost Trade-off Methods	6, 8	C3 C9	b1, c2 d2

Course Coordinator: Dr. Hamdy Abd Elaty
Head of Department: Assoc. Prof. Dr. Amal Bahiry
Date of Approval: 2022

Computer Applications in Civil Engineering
(CIE405)

1. Basic Information:

Program Title	Civil Engineering Program
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Civil Engineering Department
Course Title	Computer Applications in Civil Engineering
Course Code	CIE405
Year/Level	Level 4
Specialization	Major – Compulsory Course
Authorization Date of Course Specification	-
Pre- request	ENG201

Teaching hours	**Lectures**	**Tutorial**	**Practical**
	2	**-**	**2**

2. Course Aims

No.	**Aims**
7	Achieve the optimum design of reinforced concrete and steel structures, hydraulic applications (such as gradually and rapidly varied flow – channel cross-section) and sanitary works (such as water distribution system) using computer applications.
10	Select appropriate and sustainable technologies to design buildings, infrastructures and water structures; using numerical techniques, and computer applications.

3. Competencies:

Competencies	**Learning Outcomes (LO'S)**
C2 Develop and conduct appropriate simulation, analyze and interpret data, assess and evaluate findings, and use statistical for computer applications in civil engineering.	**a1** Define, basic characteristics, properties, concepts, and techniques to design reinforced concrete and steel structures, hydraulic applications (such as gradually and rapidly varied flow – channel cross-section) and sanitary works (such as water distribution system). **c1** Choose relevant mathematical and computer-based methodologies for problem modelling and analysis in civil engineering.
C11 Select appropriate and sustainable technologies to design reinforced concrete and steel structures, hydraulic applications and sanitary works using	**c1** Using software programs (MATLAB or SAP 2000, Excel, EPANET) to design reinforced concrete and steel structures, hydraulic applications (such as gradually and rapidly varied flow – channel cross-section) and

either numerical technique and design software programs.	sanitary works (such as stormwater network and water distribution system).

4. Course Contents:

No.	Topics	Lecture	Tutorial	Practical
1	Study of theoretical models for the analysis of structures. Practical: analyze beams, frames, trusses and slabs	4	-	4
2	Study of how to choose suitable methods for analysis of various structures. Practical: choose suitable methods for designing beams, frames, trusses and slabs	4	-	4
3	Preparation of simple programs based on these models. Practical: design programs for structure analysis using excel or MATLAB	4	-	4
4	Study of available programs and modifying them for analysis of certain problems. Practical: solving some hydraulic problems	6	-	6
5	Training on the use of available commercial software programs. Practical: using SAP 2000, Excel, and EPANET	6	-	6
6	Computer applications. Practical: choosing a civil engineering case	4	-	4
Total		**28**	**-**	**28**

5. Teaching and learning methods:

Topics	Face -to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self -learning and Research	Cooperative	Discovering	Modeling	lab
Study of theoretical models for the analysis of		x			x	x								

structures. Practical: analyze beams, frames, trusses and slabs														
Study of how to choose suitable methods for analysis of various structures. Practical: choose suitable methods for designing beams, frames, trusses and slabs		x			x	x								
Preparation of simple programs based on these models. Practical: design programs for structure analysis using Excel or MATLAB		x			x	x								
Study of available programs and modifying them for analysis of certain problems.		x			x	x								
Training on the use of available commercial software programs. Practical: using sap, excel, EPANET		x			x	x								
Computer applications. Practical: choosing a civil engineering case study for structural analysis, pipe network design, hydraulics, and sanitary engineering.		x			x	x								

6. Teaching and learning methods for disabled students:

No.	Teaching Methods	Reason

1	Presentation of the course in digital material	Better access any time
2	Wed communication with students	Better communication with certain cases
3	Asking small groups to do assignments; each composed of low, medium, and high-performance students	Knowledge and skills transfer among different levels of students
4	Electronic model system for the Institution.	E. learning

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Mid-term examination	C2 C11	a1, c1 c1
2	Semester work	C2 C11	a1, c1 c1
3	Practical Examination	C11	c1
4	Final term examination	C2 C11	a1, c1 c1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	semester work	$2^{nd}, 7^{th}, 9^{th}$
2	Mid Term examination	8^{th}
3	Practical Examination	14^{th}
4	Final term examination	15^{th}

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Mid-term examination	10%
2	Semester work	20%
3	Practical Examination	10%
4	Final-term examination	60%
	Total	**100%**

8. List of References:

No.	Reference List
1	Brain R. Hunt et al. A Guide to MATLAB for Beginners and Experienced Users, 2018

2	Wendly L. Martinez et al. Computational statistics Handbook with MATLAB, 2019
3	Brain D. Hahn et al. Essential MTLAP for Engineering and scientists, 2018

9. Facilities required for teaching and learning:

Facility			
1	Lecture classroom	3	White board
2	Seminar	4	Data show system
5	Lab.		

10. Matrix of knowledge and skills of the course:

No	Topic	Aims	Competencies	LO's
1	Study of theoretical models for the analysis of structures. Practical: analyze beams, frames, trusses and slabs	7, 10	C2	a1, c1
2	Study of how to choose suitable methods for analysis of various structures. Practical: choose suitable methods for designing beams, frames, trusses and slabs	7, 10	C2	a1, c1
3	Preparation of simple programs based on these models. Practical: design programs for structure analysis using Excel or MATLAB	7, 10	C2 C11	a1, c1 c1
4	Study of available programs and modifying them for analysis of certain problems.	7, 10	C2 C11	a1, c1 c1
5	Training on the use of available commercial software programs. Practical: using sap, excel, EPANET	7,10	C2 C11	a1, c1 c1
6	Computer applications. Practical: choosing a civil engineering case study for structural analysis, pipe network design, hydraulics, and sanitary engineering.	10	C11	C1

Course Coordinator: Assoc. Prof. Dr. Mohamed Gabr
Head of Department: Prof. Dr. Mohammed Elkiki
Date of Approval: 2022

Water Supply and Sanitary Engineering (CIE406)

1. Basic Information:

Program Title	Civil Engineering Program
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Civil Engineering Department
Course Title	Water Supply and Sanitary Engineering
Course Code	CIE406
Year/Level	Level 5
Specialization	Major – Compulsory Course
Authorization Date of Course Specification	-
Pre- request	ENG 301

Teaching hours	Lectures	Tutorial	Practical
	2	2	-

2. Course Aims:

No.	Aims
3	Recognize his or her role in promoting water supply and sanitary engineering by appreciating the importance of the physical and natural environment.
7	Achieve an optimum design of water supply and sanitary works

3. Competencies:

Competencies	Learning Outcomes (LO'S)
C1 Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science, and mathematics.	**a3** Explain the basic principles of water supply and sanitary engineering works. **b2** Using scientific concepts and theories that are relevant to water supply and sanitary works.
C10 Acquire and apply new knowledge, and practice self, lifelong, and other learning strategies.	**d1** Search for information to engage in lifelong self-learning water supply and sanitary engineering discipline.
C11 Select appropriate and sustainable technologies for water supply and sanitary project structures; use numerical techniques or physical measurements and/or testing by applying a full range of civil	**a2** Summarize, appropriate and sustainable technologies for water supply and sanitary works and stages.

engineering concepts and techniques of hydraulics and fluid mechanics.	
C12 Achieve an optimum design of Water Supply and Sanitary Works.	**b2** Achieve an optimum design of works for sanitary works, or any other emerging field relevant to the discipline.

4. Course Contents:

No.	Topics	Lecture	Tutorial	Practical
1	Sources of water and water pollution	2	2	-
2	Drinking water standards, and water quality requirements	2	2	-
3	Surface and groundwater collection (Intakes and wells)	2	2	
4	Water purification stages (Coagulation, flocculation, and sedimentation)	4	4	-
5	Water purification stages (filtration and disinfection)	4	4	-
6	Water storage and distribution	2	2	-
7	Sewage sources and characteristics	2	2	-
8	Planning and design of sewerage system	4	4	-
9	Design of pump stations	2	2	
10	Planning and design of primary and secondary wastewater treatment units	4	4	
	Total	**28**	**28**	**-**

5. Teaching and learning methods:

Topics	Face to face lecture	Online lecture	Flipped classroom	Presentation and movies	Discussion	Problem solving	Brainstorming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Tutorial
Sources of water and water pollution	x			x	x					X				x
Drinking water standards, and water quality requirements	x			x	x									x

Surface and groundwater collection (Intakes and wells)	x			x	x									x
Water purification stages (Coagulation, flocculation, and sedimentation)	x			x	x					x				x
Water purification stages (filtration and disinfection)	x			x	x									x
Water storage and distribution	x			x	x									x
Sewage sources and characteristics	x			x	x					x				x
Planning and design of sewerage system	x			x	x									x
Design of pump stations	x			x	x									x
Planning and design of primary and secondary wastewater treatment units	x			x	x									x

6. Teaching and learning methods for disable students:

No.	Teaching Methods	Reason
1	Presentation of the course in digital material	Better access any time
2	Wed communication with students	Better communication with certain cases
3	Asking small groups to do assignments; each composed of low, medium and high-performance students	Knowledge and skills transfer among different levels of students
4	Electronic model system for the Institution.	E. learning

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Midterm examination	C1 C10 C11 C12	a3, b2 d1 a2 b2
2	Semester work (quizzes, sheets, reports)	C1 C10 C11 C12	a3, b2 d1 a2 b2
3	Final term examination	C1 C2 C11 C12	a3, b2 d1 a2 b2

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Midterm examination	8^{th}
2	Semester work	$Continuous$
3	Final term examination	15^{th}

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Midterm examination	20%
2	Semester work	20%
3	Final term examination	60%
	Total	**100%**

8. List of References:

No.	Reference List
1	Course notes: Lecture notes prepared by the course coordinator. Solved examples.
2	Essential books (textbooks): • الكود المصري لأسس تصميم وتنفيذ محطات تنقية مياه الشرب والصرف الصحي ومحطات الرفع – قرار وزاري رقم 169 لسنة 1997-الطبعة الثالثة 2004.
3	Recommended books Wastewater Engineering: Treatment and Reuse (McGraw-Hill Series in Civil and Environmental Engineering)–16 May 2002-by N/A Metcalf & Eddy, Inc., George Tchobanoglous, Franklin Burton, H. David Stensel
4	1- د /محمد صادق العدوى "هندسة امداد المياه" دار صادق للنشر – كلية الهندسة جامعة القاهرة 2- د /محمد سعيد الخولى "الهندسة الصحية للمبانى " – كلية الهندسة جامعة عين شمس 3- د /محمد على على فرج "الهندسة الصحية" منشأة المعارف بالاسكندرية – كلية الهندسة جامعة الاسكندرية 4- د/ احمد فاضل عشرى "امداد المدن بالمياه – تنقية مياه الشرب – معالجة المخلفات السائلة" – كلية الهندسة – قسم الاشغال العامة – جامعة المنصورة
5	Periodicals, Web sites, etc. www.awwa.org www.epa.gov www.wef.org

9. Facilities required for teaching and learning:

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

10. Matrix of knowledge and skills of the course:

No	Topic	Aims	Competencies	LO's

1	Sources of water and water pollution	3, 7	C1	a3, b2
2	Drinking water standards, and water quality requirements	3, 7	C1, C10	a3, b2, d1
3	Surface and groundwater collection (Intakes and wells)	3, 7	C10, C11	d1, a2
4	Water purification stages (Coagulation, flocculation, and sedimentation)	3, 7	C10, C11, C12	d1, a2, b2
5	Water purification stages (filtration and disinfection)	3, 7	C10, C11, C12	d1, a2, b2
6	Water storage and distribution	3, 7	C11, C12	a2, b2
7	Sewage sources and characteristics	3, 7	C1	a3, b2
8	Planning and design of sewerage system	3, 7	C10, C11	d1, a2
9	Design of pump stations	3, 7	C11, C12	a2, b2
10	Planning and design of primary and secondary wastewater treatment units	3, 7	C11, C12	a2, b2

Course Coordinator: Assoc. Prof. Dr. Medhat Elzahar
Head of Department: Prof. Dr. Mohamed Elkiki
Date of Approval: 2022

Steel Structures Design (2)
(CIE407)

1. Basic Information:

Program Title	Civil Engineering Program
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Civil Engineering Department
Course Title	Steel Structures Design (2)
Course Code	CIE407
Year/Level	Level 4
Specialization	Major – Compulsory Course
Authorization Date of Course Specification	-
Pre- request	CIE402

Teaching hours	Lectures	Tutorial	Practical
	3	2	-

2. Course Aims

No.	Aims
6	Analyze data from the intended tests to manage resources creatively.
7	Achieve an optimum design of steel structures.
10	Select appropriate and sustainable technologies for construction of steel buildings.

3. Competencies:

Competencies	Learning Outcomes (LO'S)
C1 Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science, and mathematics.	**a3** Explain the basic principles of engineering in steel structures design. **b3** Applying engineering basics that are relevant to the steel structures design.
C2 Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess, and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.	**a1** Define, basic characteristics, properties, concepts, and techniques of structural analysis and mechanics, and properties and strength of materials of steel structures.
C5 Practice research techniques and methods of investigation as an inherent part of learning.	**d1** Search for information to engage in lifelong self-learning discipline.
C11 Select appropriate and sustainable technologies for construction of steel buildings using either numerical techniques or physical	**a1** Recognize the fundamentals of structural analysis and mechanics, and

measurements and/or testing by applying a full range of civil engineering concepts and techniques of structural analysis and mechanics, and properties and strength of materials.	properties and strength of materials of steel structures. **c1** Using either numerical techniques or physical measurements and/or testing by applying a full range of civil engineering concepts and techniques of structural analysis and mechanics, and properties and strength of materials of steel structures.
C12 Achieve an optimum design of steel structures.	**b1** Achieve an optimum design of steel structures.

4. Course Contents:

No.	Topics	Lecture	Tutorial	Practical
1	Steel frame design: Rafter and crane girder design. Column design, single columns, built-up columns.	12	8	-
2	Riveted and bolted connections.	6	4	-
3	High strength bolted connections.	6	4	-
4	Welded connections.	6	4	-
5	Base connections.	6	4	
6	Roof truss structures' applications.	3	2	-
7	Rigid frame structures' applications.	3	2	
Total		**42**	**28**	-

5. Teaching and learning methods:

Topics	Face to face lecture	Online lecture	Flipped classroom	Presentation and movies	Discussion	Problem solving	Brainstorming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab
Steel frame design: Rafter and crane girder design. Column design, single columns, built-up columns.	x			x	x									x
Riveted and bolted connections.	x			x	x									x
High strength bolted connections.	x			x	x									x

Welded connections.	x			x	x									x
Base connections.	x			x	x									x
Roof truss structures' applications.	x			x	x					x				x
Rigid frame structures' applications.	x			x	x					x				x

6. Teaching and learning methods for disabled students:

No.	Teaching Methods	Reason
1	Presentation of the course in digital material	Better access any time
2	Asking small groups to do assignments each composed of low, medium, and high-performance students.	Knowledge and skills transfer among different level of students.

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Midterm examination	C1 C2 C11 C12	a3, b3, c3 a1, c3 c1 b1
2	Semester work (quizzes, sheets, report)	C1 C2 C5 C11 C12	a3, b3, c3 a1, c3 d1 a1, c1 b1
3	Final term examination	C1 C2 C11 C12	a3, b3, c3 a1, c3 a1, c1 b1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Midterm examination	8^{th}
2	Semester work	$continuous\ evaluation$
3	Final term examination	15^{th}

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Midterm examination	20%

2	Semester work	20%
3	Final term examination	60%
Total		**100%**

8. List of References:

No.	Reference List
1	Course notes: Lecture notes prepared by the course coordinator. Solved examples.
2	Essential books (textbooks): Egyptian Code of Practice for Steel Construction and Bridges (ASD), Code No. 205, HBRC, 2003.
3	Recommended books E. B. Machaly, “Behavior, analysis and design of structural steel element”, vol. 1, 2019. E. B. Machaly, “Behavior, analysis and design of steel work connections”, vol. 3, 2019.
4	Periodicals, Web sites, etc. www.steelconstruction.org www.modernsteel.com www.berlinsteel.com

9. Facilities required for teaching and learning:

Facility			
1	Seminar	3	teaching aids as interactive (smart) board
2	discussions rooms with internet connections	4	Data Show

10. Matrix of knowledge and skills of the course:

No	Topic	Aims	Competencies	LO’s
1	Steel frame design: - Rafter and crane girder design. - Column design, single columns, built-up columns.	6,10	C1, C2, C11 C12	a3, b3, c3 a1, c3 c1 b1
2	Riveted and bolted connections.	6,7	C1, C11, C12	c3 c1 b1
3	High strength bolted connections.	6,7	C1, C11, C12	c3 c1 b1
4	Welded connections.	6,7	C1,	c3

			C11, C12	c1 b1
5	Base connections.	6,7	C1, C11, C12	c3 c1 b1
6	Roof truss structures' applications.	6,10	C1, C5, C11, C12	a3, b3, c3 d1 a1, c1 b1
7	Rigid frame structures' applications.	6,10	C1, C5, C11, C12	a3, b3, c3 d1 a1, c1 b1

Course Coordinator: Assoc. Prof. Dr. Ashraf Elsabagh
Head of Department: Prof. Dr. Mohamed Elkiki
Date of Approval: 2022

Reinforced Concrete (3)
(CIE408)

1. Basic Information:

Program Title	Civil Engineering Program
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Civil Engineering Department
Course Title	Reinforced Concrete (3)
Course Code	CIE408
Year/Level	Level 4
Specialization	Major – Compulsory Course
Authorization Date of Course Specification	-
Pre- request	CIE403

Teaching hours	**Lectures**	**Tutorial**	**Practical**
	3	**2**	**-**

2. Course Aims

No.	**Aims**
7	Achieve an optimum design of Reinforced Concrete.

3. Competencies:

Competencies	**Learning Outcomes (LO'S)**
C2 Develop and conduct appropriate simulation, analyze, and interpret data, assess, and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions. .	**a2** Define the principles, basic properties, and features of construction material, as well as their use in sustainable technologies for construction of buildings, infrastructures. **b1** Conduct basic experiments to learn about the basic characteristics and features of structural analysis and mechanics, properties, and strength of materials. **c3** Applying statistical analyses and objective engineering judgment to draw conclusions.
C11 Select appropriate and sustainable technologies for construction of buildings, infrastructures, and water structures; using either numerical techniques or physical measurements and/or testing by applying a full range of civil engineering concepts and techniques	**a1** Recognize the fundamentals of structural analysis and mechanics, properties and strength of materials, surveying, soil mechanics, hydrology, and fluid mechanics. **a2** Summarize, appropriate and sustainable technologies for construction of buildings, infrastructures, and water structures.

of structural analysis and mechanics, properties and strength of materials, surveying, soil mechanics, hydrology, and fluid mechanics.	
C12 Achieve an optimum design of Reinforced Concrete.	**b1** Achieve an optimum design of Reinforced Concrete

4. Course Contents:

No.	Topics	Lecture	Tutorial	Practical
1	Design of halls with beam girders and long column	9	6	-
2	Design of frames	9	6	-
3	Design of arches (slab and girder)	9	6	-
4	Design of trusses	6	4	-
5	Design of Vierendeel girder	6	4	-
6	Design of saw tooth roofs	3	2	-
Total		**42**	**28**	**-**

5. Teaching and learning methods:

Topics	Face -to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self -learning and Research	Cooperative	Discovering	Modeling	lab
Design of halls with beam girders and long column		x			x			x						x
Design of frames		x			x			x						x
Design of arches (slab and girder)		x			x			x						x
Design of trusses		x			x			x						x
Design of Vierendeel girder		x			x			x						x
Design of saw tooth roofs		x			x			x						x

6. Teaching and learning methods for disabled students:

No.	Teaching Methods	Reason
1	Presentation of the course in digital material	Better access any time
2	Wed communication with students	Better communication with certain cases
3	Asking small groups to do assignments; each composed of low, medium, and high-performance students	Knowledge and skills transfer among different levels of students
4	Electronic model system for the Institution.	E. learning

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Mid-term examination	C2 C11	a2 a1
2	Semester work	C2 C12	a2 b1
3	Final term examination	C2 C11 C12	a2, c3, b1 a1, a2 b1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	semester work	$2^{nd}, 7^{th}, 9^{th}$
2	Mid Term examination	8^{th}
3	Practical Examination	14th
4	Final term examination	15^{th}

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Mid-term examination	20%
2	Semester work	20%
3	Final-term examination	60%
	Total	**100%**

8. List of References:

No.	Reference List
1	**Course notes:** Are delivered during the lecture, including handout materials such as solved problems, design charts, tables, etc.
2	**Essential books (textbooks / design codes):**

	Egyptian Code for Design and Construction of Reinforced Concrete Structures 203-2001. Design Aids and Examples in Accordance with the Egyptian Code for Design and Construction of Reinforced Concrete Structures 203-2020.

9. Facilities required for teaching and learning:

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

10. Matrix of knowledge and skills of the course:

No	Topic	Aims	Competencies	LO's
1	Design of halls with beam girders and long column	7	C2 C11	a2, c3 a1
2	Design of frames	7	C2 C12	a2, c3 b1
3	Design of arches (slab and girder)	7	C11 C12	a1 b1
4	Design of trusses	7	C2 C11 C12	a2, c3 a1 b1
5	Design of Vierendeel girder	7	C2 C11 C12	b1, b2 a1 b1
6	Design of saw tooth roofs	7	C2 C11 C12	b1, b2 a1 b1

Course Coordinator: Dr. Hamdy Abd Elaty
Head of Department: Prof. Dr. Mohamed Elkiki
Date of Approval: 2022

Environmental Management
(ENG401)

1. Basic Information:

Program Title	All Programs
Department Offering the Program	Basic Science and Engineering Department
Department Responsible for the Course	Basic Science and Engineering Department
Course Title	Environmental Management
Course Code	ENG401
Year/Level	Level 4
Specialization	Major – Compulsory Course
Authorization Date of Course Specification	-
Pre-request	-

Teaching hours	**Lectures**	**Tutorial**	**Practical**
	3	-	-

2. Course Aims:

No.	Aims
2	Work in and manage a diverse team of professionals from various engineering disciplines, taking responsibility for own and team performance; and behave professionally and adhere to engineering ethics and standards.
3	Recognize his or her role in promoting engineering and contributing to the profession's and community's development; by appreciating the importance of the environment, both physical and natural, and working to promote sustainability concepts;

3. Competencies:

Competencies	Learning Outcomes (LO'S)
C3 Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global, cultural,	**a2** Understand the professional ethics and impacts of engineering solutions on society and environment.

social, economic, environmental, ethical, and other aspects as appropriate to the discipline and within the principles and contexts of sustainable design and development.	**a3** Recognizes the environmental and economic impact of various industries, waste minimization, and industrial facility remediation. **b1** Judge engineering decisions considering balanced costs, benefits, safety, quality, reliability, and environmental impact. **c1** Incorporate economic, societal, global, environmental, and risk management factors into design.
C4 Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues, and risk management principles.	**a1** Describe quality assurance systems, codes of practice, and standards, as well as health and safety regulations and environmental concerns. **c1** Apply safe systems at work by taking the necessary precautions to manage hazards. **c3** Utilize modern technologies.
C10 Acquire and apply new knowledge; and practice self, lifelong and other learning strategies.	**d1** Search for information to engage in lifelong self-learning discipline.

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	The importance of studying environmental science – modern technology and its effect on the environment	12	-	-
2	quality of the environment and development elements	6	-	-
3	sources of environmental pollution and method of control (air pollution – water pollution)	12	-	-
4	Solid wastes pollution – noise) – economics of environmental pollution control – legislations for the environment protection.	12	-	-
Total		**42**	**-**	**-**

5. Teaching and learning methods:

Topics	Face -to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self -learning and Research	Cooperative	Discovering	Modeling	lab

The importance of studying environmental science – modern technology and its effect on the environment		x			x	x								x
Quality of the environment and development elements		x			x	x								x
Sources of environmental pollution and method of control (air pollution – water pollution		x			x	x								x
Solid wastes pollution – noise) – economics of environmental pollution control – legislations for the environment protection.		x			x	x								x

6. Teaching and learning methods for disabled students:

No.	Teaching Methods	Reason
1	Presentation of the course in digital material.	Better access any time.
2	Asking small groups to do assignments; each composed of low, medium, and high-performance students.	Knowledge and skills transfer among different levels of students.

7. Student evaluation:

7.1 Student evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Mid Term Examination	A3, A4	a1, b1
2	Semester work (report, quizzes, presentation(	A4, A10	d1, c1, c3
3	Final Term Examination	A3, A4, A10	a2, a3, a1, d1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Semester work	$2^{nd}, 7^{th}, 9^{th}$
2	Mid Term Examination	8^{th}

3	Final Term Examination	15^{th}

7.3 Weighting of Evaluation:

No.	evaluation method	Weights
1	Mid-term examination	20%
2	Semester work	20%
3	Final-term examination	60%
Total		**100%**

8. List of References:

No.	Reference List
1	د.زكريا طاحون , ادارة البيئة نحو الانتاج الأنظف, الهيئة المصرية العامة للكتاب,القاهرة,2018
2	محمد اسماعيل خضر,مقدمة في علوم البيئة, الهيئة العامة للكتاب, القاهرة 2018

9. Facilities required for teaching and learning:

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

10. Matrix of Competencies and LO's:

No.	Topic	Aims	Competencies	LO's
1	The importance of studying environmental science – modern technology and its effect on the environment	2, 3	C3, C10	d1, a2
2	Quality of the environment and development elements	2, 3	C3, C10, C4	d1, b1, a1
3	Sources of environmental pollution and method of control (air pollution – water pollution	2, 3	C3, C4	a3, c1
4	Solid wastes pollution – noise) – economics of environmental pollution control – legislations for the environment protection.	2, 3	C3, C4	c1, c3

Course Coordinator: Assoc. Prof. Dr. Ramadan Elkateb
Head of Department: Assoc. Prof. Dr. Amal Bahiry
Date of Approval: 2022

Construction Estimating and Tendering (CIE411)

1. Basic Information:

Program Title	Civil Engineering Program
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Civil Engineering Department
Course Title	Construction Estimating and Tendering
Course Code	CIE411
Year/Level	Level 5 – Semester 2
Specialization	Minor – Elective Course
Authorization Date of Course Specification	-
Prerequisite	Complete 100 CH

Teaching Hours	**Lectures**	**Tutorial**	**Practical**
	2	2	-

2. Course Aims

No.	Aims
6	Analyze data from the intended tests to manage resources creatively.
8	Plan and manage construction processes; address construction defects, instability, and quality issues; maintain safety measures in construction and materials; and assess the environmental impacts of projects.
9	Deal with biddings, contracts, and financial issues including project insurance and guarantees.

3. Competencies:

Competencies	Learning Outcomes (LOs)
C9 Use creative, innovative, and flexible thinking and acquire entrepreneurial and leadership skills to anticipate and respond to new situations.	**d2** Effectively manage tasks, time, and resources.
C13 Plan and manage construction processes; address construction defects, instability, and quality issues; maintain safety measures in construction and materials; and assess the environmental impacts of projects.	**a1** Define the plan and manage the construction process.
C14 Deal with biddings, contracts, and financial issues including project insurance and guarantees.	**a1** Define biddings, contracts, and financial issues. **b1** Address biddings, contracts, and financial issues including project insurance and guarantees.

	c1 Apply biddings, contracts, and financial issues on civil engineering projects.

4. Course Contents:

No.	Topics	Lecture	Tutorial	Practical
1	Principles of Construction Cost Estimating, Methods of Detailed Cost Estimating	8	8	-
2	Quantity Takeoff	4	4	-
3	Analysis of Labor and Equipment Costs	4	4	-
4	Construction Tendering Process, Bidding and Contracting Systems for Construction Projects	8	8	-
5	Laws and Regulations Related to the Construction Industry	4	4	-
Total		**28**	**28**	**-**

5. Teaching and Learning Methods:

No.	Topics	Face-To-Face Lecture	Online Lecture	Flipped Classroom	Presentation and Movies	Discussion	Problem-Solving	Brain Storming	Projects	Site Visits	Self-Learning and Research	Cooperative	Discovering	Modeling	Lab
1	Principles of Construction Cost Estimating, Methods of Detailed Cost Estimating		√		√										
2	Quantity Takeoff	√					√								
3	Analysis of Labor and Equipment Costs	√					√								

4	Construction Tendering Process, Bidding and Contracting Systems for Construction Projects		√		√										
5	Laws and Regulations Related to the Construction Industry		√		√										

6. Teaching and Learning Methods for Disabled Students:

No.	Teaching Method	Reason
1	Presentation of The Course in Digital Material	Better Access at Any Time
2	Wed Communication with Students	Better Communication with Certain Cases
3	Asking Small Groups to Do Assignments; Each Composed of Low, Medium, and High-Performance Students	Knowledge and Skills Transfer Among Different Levels of Students
4	An Electronic Model System for The Institution	E. Learning

7. Student Evaluation:

7.1 Student Evaluation Method:

No.	Evaluation Method	Competencies	LOs
1	Semester Works (Quizzes, Sheets, Reports)	C9 C13 C14	d2 a1 a1, b1, c1
2	Mid-Term Exam	C9 C13	d2 a1
3	Final-Term Exam	C9 C13 C14	d2 a1 a1, b1, c1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Semester Works (Quizzes, Sheets, Reports)	4th, 11th
2	Mid-Term Exam	8th
3	Final-Term Exam	15th

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Semester Works (Quizzes, Sheets, Reports)	20%
2	Mid-Term Exam	20%
3	Final-Term Exam	60%
Total		**100%**

8. List of References:

No.	Reference List
1	Wiley-Blackwell. Code of Practice for Project Management for Construction and Development. Chartered Institute of Building (Great Britain).
2	Kerzner, Harold. Project Management Workbook. A System Approach to Planning, Scheduling, and Control.
3	de Marco, A. Project Management for Facility Constructions A Guide for Engineers, and Architects.
4	Project Management Institute and Project Management Institute. A Guide to the Project Management Body of Knowledge (PMBOK Guide).
5	Lester, Albert. Project Management, Planning, and Control. Managing Engineering, Construction, and Manufacturing Projects to PMI, APM, and BSI Standards.
6	Vanhoucke, M. Management for Professionals Integrated Project Management and Control.

9. Facilities Required for Teaching and Learning:

Facility			
1	Lecture Classroom	3	White Board
2	Seminar	4	Data Show System

10. Matrix of Knowledge and Skills:

No.	Topic	Aims	Competencies	LOs
1	Principles of Construction Cost Estimating, Methods of Detailed Cost Estimating	6, 8	C9 C13	d2 a1
2	Quantity Takeoff	6, 8	C9 C13	d2 a1
3	Analysis of Labor and Equipment Costs	6, 8	C9 C13	d2 a1
4	Construction Tendering Process, Bidding and Contracting Systems for Construction Projects	9	C14	a1, b1, c1
5	Laws and Regulations Related to the Construction Industry	9	C14	a1, b1, c1

Course Coordinator: Prof. Dr. Mohamed Elkiki
Head of Department: Prof. Dr. Mohamed Elkiki
Date of Approval: 2022

Air Conditioning Systems for Building
(CIE412)

1. Basic Information:

Program Title	Civil Engineering Program
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Civil Engineering Department
Course Title	Air Conditioning systems for Building
Course Code	CIE412
Year/Level	Level 4
Specialization	Minor – Elective Course
Authorization Date of Course Specification	-
Prerequisite	Complete 100 h

Teaching hours	**Lectures**	**Tutorial**	**Practical**
	2	**2**	**-**

2. Course Aims

No.	Aims
4	Use the techniques, skills, and current engineering tools required for engineering practice by taking full responsibility for one's own learning and development, participating in lifelong learning, and demonstrating the ability to pursue postgraduate and research studies.
5	Communicate effectively with a variety of audiences using a variety of forms, methods, and languages; cope with academic and professional issues in a critical and creative manner; and display leadership, business administration, and entrepreneurial abilities.

3. Competencies:

Competencies	Learning Outcomes (LO'S)
C2 Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.	**b1** Conduct basic experiments to learn about the basic characteristics and features of structural analysis and mechanics, properties and strength of materials, surveying, soil mechanics, hydrology and fluid mechanics.
C3 Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global, cultural, social, economic, environmental, ethical and other aspects as appropriate	**b1** Judge engineering decisions considering balanced costs, benefits, safety, quality.

to the discipline and within the principles and contexts of sustainable design and development.	
C4 Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues and risk management principles.	**a3** Define contemporary engineering technologies and their applications in relation to disciplines.
C13 Plan and manage construction processes; address construction defects, instability and quality issues; maintain safety measures in construction and materials; and assess environmental impacts of projects.	**b1** Address construction defects, instability and quality issues **c1** Assess environmental impacts of projects.

4. Course Contents:

No.	Topics	Lecture	Tutorial	Practical
1	Psychometric and process of air	2	2	-
2	Cooling load estimation	4	4	-
3	Refrigeration cycles.	4	4	-
4	Water chiller systems	4	4	-
5	Air handling system	2	2	-
6	Cooling towers	4	4	-
7	Equipment selection.	2	2	-
8	Installation, operation and maintenance of air conditioning systems	6	6	-
Total		**28**	**28**	**-**

5. Teaching and learning methods:

Topics	Face -to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self -learning and Research	Cooperative	Discovering	Modeling	lab
Psychometric and process of air	x	x			x									
Cooling load estimation	x	x			x	x								
Refrigeration cycles.	x	x		x	x	x								
Water chiller systems	x	x		x	x						x			

Air handling system	x	x		x	x		x							
Cooling towers	x	x		x	x		x							
Equipment selection.	x	x		x	x					x				
Installation, operation, and maintenance of air conditioning systems	x	x	x	x	x					x				

6. Teaching and learning methods for disabled students:

No.	Teaching Methods	Reason
1	Presentation of the course in digital material	Better access any time
2	Wed communication with students	Better communication with certain cases
3	Asking small groups to do assignments; each composed of low, medium and high-performance students	Knowledge and skills transfer among different levels of students
4	Electronic model system for the Institution.	E-learning

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO’s
1	Midterm examination	C2 C3 C13	b1 b1 c1
2	Semester work (quizzes, sheets, report)	C3 C13	b1 b1, c1
3	Final term examination	C3 C13	b1 b1, c1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	semester work	7^{th} , 13^{th}
2	Mid Term examination	8^{th}
3	Final term examination	15^{th}

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Midterm examination	20%
2	Semester work	20%
3	Final term examination	60%
Total		**100%**

8. List of References:

No.	Reference List
1	Heat and mass transfer pk Nag, tata McGraw Hill Education private limited, New delhi- 2011 Engineering thermodynamics on karsingh , new AGE Publisher, new delhi -2007

9. Facilities required for teaching and learning:

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

10. 10. Matrix of knowledge and skills of the course:

No	Topic	Aims	Competencies	LO's
1	Psychometric and process of air	4	C13	b1, c1, a3
2	Cooling load estimation	3	C3, C13	b1, c1
3	Refrigeration cycles.	4	C2, C13	b1, c1
4	Water chiller systems	3	C3, C13	b1, c1
5	Air handling system	4	C2, C13	b1, c1
6	Cooling towers	3	C3, C13	b1, c1
7	Equipment selection.	4	C4, C13	b1, c1
8	Installation, operation and maintenance of air conditioning systems	3	C3, C13	b1, c1

Course Coordinator: Dr. Moataz Mostafa
Head of Department: Prof. Dr. Mohamed Elkiki
Date of Approval: 2022

Design of Lighting Systems for Buildings (CIE413)

1. Basic Information:

Program Title	Civil Engineering Program
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Civil Engineering Department
Course Title	Design of Lighting Systems for Buildings
Course Code	CIE413
Year/Level	Level 4
Specialization	Minor – Elective Course
Authorization Date of Course Specification	-
Pre-request	Complete 100 h

Teaching hours	Lectures	Tutorial	Practical
	2	2	-

2. Course Aims:

No.	Aims
4	Use the techniques, skills, and codes of practice effectively and professionally to design lighting system for buildings.
5	Communicate effectively with a variety of audiences using a variety of forms, methods, and languages; cope with academic and professional issues in a critical and creative manner; and display leadership, business administration, and entrepreneurial abilities.
8	Plan and manage construction processes; address construction defects, instability and quality issues; maintain safety measures in construction and materials; and assess environmental impacts of projects.

3. Competencies:

Competencies	Learning Outcomes (LO'S)

C2 Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.	**c1** Choose relevant mathematical and computer-based methodologies for problem modelling and analysis.
C3 Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global, cultural, social, economic, environmental, ethical and other aspects as appropriate to the discipline and within the principles and contexts of sustainable design and development.	**c2** Applying engineering design procedures to generate cost-effective solutions while adhering to the principles and contexts of sustainable design and development.
C6 Plan, supervise and monitor implementation of engineering projects, taking into consideration other trades requirements.	**c2** Acquire entrepreneurial skills.
C13 Plan and manage construction processes; address construction defects, instability and quality issues; maintain safety measures in construction and materials; and assess environmental impacts of projects.	**a1** define plan and mange construction process.

4. Table of Content

No.	Topics	Lectures	Tutorial	Practical
1	Principles of lighting	2	2	-
2	lighting design for buildings which includes artificial lighting, point, line and area light sources, types and properties of luminaries, polar curves	6	6	-
3	design methods and calculations, glare index	4	4	-
4	lighting design standard	4	4	-
5	luminaire heat recovery system and lighting energy management	6	6	-
6	hybrid lighting	2	2	-
7	daylighting of buildings,	2	2	-
8	effect of climate on lighting	2	2	-
Total		**28**	**28**	**-**

5. Teaching and learning methods:

Topics	Face -to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self -learning and Research	Cooperative	Discovering	Modeling	lab
Principles of lighting		x			x	x								x
lighting design for buildings which includes artificial lighting, point, line and area light sources, types and properties of luminaries, polar curves		x			x	x								x
design methods and calculations, glare index		x			x	x								x
lighting design standard		x			x	x								x
luminaire heat recovery system and lighting energy management		x			x	x								x
hybrid lighting		x			x	x								x
daylighting of buildings,		x			x	x								x
effect of climate on lighting		x			x	x								x

6. Teaching and learning methods for disabled students:

No.	Teaching Methods	Reason
1	Presentation of the course in digital material	Better access any time
2	Asking small groups to do assignments; each composed of low, medium, and high-performance students.	Knowledge and skills transfer among different level of students.

7. Student evaluation:

7.1 Student evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Midterm examination	C2 C13	c1 a1
2	Semester work (quizzes, sheets, report)	C6 C13	c2 a1
3	Final term examination	C3 C13	c2 a1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Semester work	$2^{nd}, 7^{th}, 9^{th}$
2	Mid Term examination	8^{th}
3	Final term examination	15^{th}

7.3 Weighting of Evaluation:

No.	Evaluation method	Weights
1	Mid-term examination	20%
2	Semester work	20%
3	Final-term examination	60%
	Total	**100%**

8. List of References:

No.	Reference List
1	الكود المصري لاسس تصميم وشروط تنفيذ اعمال اناره الطرق والانفاق كود(308/2)- المركز القومي لبحوث الاسكان والبناء – وزاره الاسكان والمرافق والتنميه العمرانيه 2012
2	الاضاءه الطبيعيه في ضوء محددات قانون البناء في مصر-د.خالد محمد الحديدي – كليه هندسه شبرا – جامعه بنها-2010

9. Facilities required for teaching and learning:

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

10. Matrix of knowledge and skills of the course:

No	Topic	Aims	Competencies	LO's
1	Principles of lighting	4	C2	c1
2	lighting design for buildings which includes artificial lighting, point, line and area light sources, types and properties of luminaries, polar curves	4	C3	c2

3	design methods and calculations, glare index	4	C13	a1
4	lighting design standard	4	C6	c2
5	luminaire heat recovery system and lighting energy management	4	C6	c2
6	hybrid lighting	4	C13	a1
7	daylighting of buildings,	4	C13	a1
8	effect of climate on lighting	4	C13	a1

Course Coordinator: Dr. Rabab Reda
Head of Department: Prof. Dr. Mohamed Elkiki
Date of Approval: 2022

Productivity Enhancement Methods (CIE414)

1. Basic Information

Program Title	Civil Engineering Program
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Civil Engineering Department
Course Title	Productivity Enhancement Methods
Course Code	CIE414
Year/Level	Level 4
Specialization	Minor – Elective Course
Authorization Date of Course Specification	-
Prerequisite	Complete 100 CH

Teaching Hours	**Lectures**	**Tutorial**	**Practical**
	2	2	-

2. Course Aims

No.	Aims
2	Work in and manage a diverse team of professionals from various engineering disciplines, taking responsibility for own and team performance, behaving professionally, and adhering to engineering ethics and standards.
5	Communicate effectively with various audiences using various forms, methods, and languages; cope with academic and professional issues critically and creatively; and display leadership, business administration, and entrepreneurial abilities.
6	Analyze data from the intended tests to manage resources creatively.
8	Plan and manage construction processes; address construction defects, instability, and quality issues; maintain safety measures in construction and materials; and assess the environmental impacts of projects.

3. Competencies:

Competencies	Learning Outcomes (LOs)
C3 Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global, cultural, social, economic, environmental, ethical, and other aspects as appropriate to the discipline, and within the principles and contexts of sustainable design and development.	**b1** Judge engineering decisions considering balanced costs, benefits, safety, quality, reliability, and environmental impact.

C4 Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues, and risk management principles.	**b1** Create methodical approaches when dealing with new and advancing technology. **c1** Apply safe systems at work by taking the necessary precautions to manage hazards. **c3** Utilize modern technologies**.**
C7 Function efficiently as an individual and as a member of multi-disciplinary and multicultural teams.	**d1** Collaborate effectively within a multidisciplinary team. **d2** Work in stressful environments and within constraints. **d3** Motivate individuals.
C9 Use creative, innovative, and flexible thinking and acquire entrepreneurial and leadership skills to anticipate and respond to new situations.	**d2** Effectively manage tasks, time, and resources.

4. Course Contents:

No.	Topics	Lecture	Tutorial	Practical
1	Identification of Bottlenecks	6	6	-
2	Impact of Human Performance on Productivity	6	6	-
3	Effect of the Interaction Between Technological Advances and Human Capabilities on Performance and Productivity	8	8	-
4	Cost Reduction and Productivity Improvement Programs	8	8	-
Total		**28**	**28**	**-**

5. Teaching and Learning Methods:

No.	Topics	Face-To-Face Lecture	Online Lecture	Flipped Classroom	Presentation and Movies	Discussion	Problem-Solving	Brain Storming	Projects	Site Visits	Self-Learning and Research	Cooperative	Discovering	Modeling	Lab
1	Identification of Bottlenecks	√				√									

2	Impact of Human Performance on Productivity		√		√										
3	Effect of the Interaction Between Technological Advances and Human Capabilities on Performance and Productivity	√					√								
4	Cost Reduction and Productivity Improvement Programs	√							√						

6. Teaching and Learning Methods for Disabled Students:

No.	Teaching Method	Reason
1	Presentation of The Course in Digital Material	Better Access at Any Time
2	Wed Communication with Students	Better Communication with Certain Cases
3	Asking Small Groups to Do Assignments; Each Composed of Low, Medium, and High-Performance Students	Knowledge and Skills Transfer Among Different Levels of Students
4	An Electronic Model System for The Institution	E. Learning

7. Student Evaluation:

7.1 Student Evaluation Method:

No.	Evaluation Method	Competencies	LOs
1	Semester Works (Quizzes, Sheets, Reports)	C3 C4 C7 C9	b1 b1, c1, c3 d1, d2, d3 d2
2	Mid-Term Exam	C7 C9	d1, d2, d3 d2
3	Final-Term Exam	C3 C4 C7 C9	b1 b1, c1, c3 d1, d2, d3 d2

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Semester Works (Quizzes, Sheets, Reports)	4^{th}, 11^{th}
2	Mid-Term Exam	8^{th}
3	Final-Term Exam	15^{th}

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Semester Works (Quizzes, Sheets, Reports)	20%
2	Mid-Term Exam	20%
3	Final-Term Exam	60%
	Total	**100%**

8. List of References:

No.	Reference List
1	Wiley-Blackwell. Code of Practice for Project Management for Construction and Development. Chartered Institute of Building (Great Britain).
2	Kerzner, Harold. Project Management Workbook. A System Approach to Planning, Scheduling, and Control.
3	de Marco, A. Project Management for Facility Constructions A Guide for Engineers, and Architects.
4	Project Management Institute and Project Management Institute. A Guide to the Project Management Body of Knowledge (PMBOK Guide).
5	Lester, Albert. Project Management, Planning, and Control. Managing Engineering, Construction, and Manufacturing Projects to PMI, APM, and BSI Standards.
6	Vanhoucke, M. Management for Professionals Integrated Project Management and Control.

9. Facilities Required for Teaching and Learning:

Facility			
1	Lecture Classroom	3	White Board
2	Seminar	4	Data Show System

10. Matrix of Knowledge and Skills:

No.	Topic	Aims	Competencies	LOs
1	Identification of Bottlenecks	6, 8	C9	d2
2	Impact of Human Performance on Productivity	2, 5	C7	d1, d2, d3
3	Effect of the Interaction Between Technological Advances and Human Capabilities on Performance and Productivity	2, 5	C4 C7 C9	b1, c1, c3 d1, d2, d3 d2

4	Cost Reduction and Productivity Improvement Programs	6, 8	C3 C4 C9	b1 b1, c1, c3 d2

Course Coordinator: Prof. Dr. Mohamed Elkiki
Head of Department: Prof. Dr. Mohamed Elkiki
Date of Approval: 2022

Quality Assurance and Engineering Reliability (CIE415)

1. Basic Information:

Program Title	Civil Engineering Program
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Civil Engineering Department
Course Title	Quality Assurance and Engineering Reliability
Course Code	CIE415
Year/Level	Level 4
Specialization	Minor – Elective Course
Authorization Date of Course Specification	-
Prerequisite	Complete 100 CH

Teaching Hours	**Lectures**	**Tutorial**	**Practical**
	2	2	-

2. Course Aims:

No.	Aims
1	Master a broad range of engineering knowledge and specialized skills, as well as the ability to apply acquired knowledge in real-world situations by applying theories and abstract thinking in analytic critical and systemic thinking to identify, diagnose, and solve engineering problems of varying complexity and variation.
8	Plan and manage construction processes; address construction defects, instability, and quality issues; maintain safety measures in construction and materials; and assess the environmental impacts of projects.

3. Competencies:

Competencies	Learning Outcomes (LOs)
C3 Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global, cultural, social, economic, environmental, ethical, and other aspects as appropriate to the discipline, and within the principles and contexts of sustainable design and development.	**a3** Recognizes the various construction defects, instability, and quality issues and assesses the environmental impacts of projects. **b1** Judge engineering decisions considering balanced costs, benefits, safety, quality, reliability, and environmental impact.
C4 Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues, and risk management principles.	**a1** Describe quality assurance systems, codes of practice, standards, health and safety regulations, and environmental concerns. **c4** Apply quality assurance procedures and follow codes and standards.

C13 Plan and manage construction processes; address construction defects, instability, and quality issues; maintain safety measures in construction and materials; and assess the environmental impacts of projects.	**b1** Address construction defects, instability, and quality issues.

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	Reliability of Parallel and Serial Engineering Systems	6	6	-
2	Life Testing	6	6	-
3	Impact of Reliability on the Design Process in Engineering Fields Such as Mechanical, Electrical and Structural Engineering	8	8	-
4	Studies the Effect of Equipment Reliability on Product Quality	8	8	-
Total		**28**	**28**	**-**

5. Teaching and Learning Methods:

No.	Topics	Face-To-Face Lecture	Online Lecture	Flipped Classroom	Presentation and Movies	Discussion	Problem-Solving	Brain Storming	Projects	Site Visits	Self-Learning and Research	Cooperative	Discovering	Modeling	Lab
1	Reliability of Parallel and Serial Engineering Systems	√			√										
2	Life Testing		√			√									
3	Impact of Reliability on the Design Process in Engineering Fields Such as Mechanical,	√				√									

	Electrical and Structural Engineering														
4	Studies the Effect of Equipment Reliability on Product Quality	√					√								

6. Teaching and Learning Methods for Disabled Students:

No.	Teaching Method	Reason
1	Presentation of The Course in Digital Material	Better Access at Any Time
2	Wed Communication with Students	Better Communication with Certain Cases
3	Asking Small Groups to Do Assignments; Each Composed of Low, Medium, and High-Performance Students	Knowledge and Skills Transfer Among Different Levels of Students
4	An Electronic Model System for The Institution	E. Learning

7. Student Evaluation:

7.1 Student Evaluation Method:

No.	Evaluation Method	Competencies	LOs
1	Semester Works (Quizzes, Sheets, Reports)	C3 C4 C13	a3, b1 a1, c4 b1
2	Mid-Term Exam	C4 C13	a1, c4 b1
3	Final-Term Exam	C3 C4 C13	a3, b1 a1, c4 b1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Semester Works (Quizzes, Sheets, Reports)	4^{th}, 11^{th}
2	Mid-Term Exam	8^{th}
3	Final-Term Exam	15^{th}

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Semester Works (Quizzes, Sheets, Reports)	20%
2	Mid-Term Exam	20%
3	Final-Term Exam	60%
Total		**100%**

8. List of References:

No.	Reference List
1	Wiley-Blackwell. Code of Practice for Project Management for Construction and Development. Chartered Institute of Building (Great Britain).
2	Kerzner, Harold. Project Management Workbook. A System Approach to Planning, Scheduling, and Control.
3	de Marco, A. Project Management for Facility Constructions A Guide for Engineers, and Architects.
4	Project Management Institute and Project Management Institute. A Guide to the Project Management Body of Knowledge (PMBOK Guide).
5	Lester, Albert. Project Management, Planning, and Control. Managing Engineering, Construction, and Manufacturing Projects to PMI, APM, and BSI Standards.
6	Vanhoucke, M. Management for Professionals Integrated Project Management and Control.

9. Facilities Required for Teaching and Learning:

Facility			
1	Lecture Classroom	3	White Board
2	Seminar	4	Data Show System

10. Matrix of Knowledge and Skills:

No.	Topic	Aims	Competencies	LOs
1	Reliability of Parallel and Serial Engineering Systems	1, 8	C4 C13	a1, c4 b1
2	Life Testing	1, 8	C4 C13	a1, c4 b1
3	Impact of Reliability on the Design Process in Engineering Fields Such as Mechanical, Electrical and Structural Engineering	1, 8	C3 C4 C13	a3, b1 a1, c4 b1
4	Studies the Effect of Equipment Reliability on Product Quality	1, 8	C3 C4 C13	a3, b1 a1, c4 b1

Course Coordinator: Prof. Dr. Mohamed Elkiki
Head of Department: Prof. Dr. Mohamed Elkiki
Date of Approval: 2022

Quality Control
(CIE416)

1. Basic Information:

Program Title	Civil Engineering Program
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Civil Engineering Department
Course Title	Quality Control
Course Code	CIE416
Year/Level	Level 4
Specialization	Minor – Elective Course
Authorization Date of Course Specification	-
Prerequisite	Complete 100 CH

	Lectures	Tutorial	Practical
Teaching Hours	2	2	-

2. Course Aims:

No.	Aims
1	Master a broad range of engineering knowledge and specialized skills, as well as the ability to apply acquired knowledge in real-world situations by applying theories and abstract thinking in analytic critical and systemic thinking to identify, diagnose, and solve engineering problems of varying complexity and variation.
8	Plan and manage construction processes; address construction defects, instability, and quality issues; maintain safety measures in construction and materials; and assess the environmental impacts of projects.

3. Competencies:

Competencies	Learning Outcomes (LOs)
C3 Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global, cultural, social, economic, environmental, ethical, and other aspects as appropriate to the discipline, and within	**a3** Recognizes the various construction defects, instability, and quality issues and assesses the environmental impacts of projects.

the principles and contexts of sustainable design and development.	**b1** Judge engineering decisions considering balanced costs, benefits, safety, quality, reliability, and environmental impact.
C4 Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues, and risk management principles.	**a1** Describe quality assurance systems, codes of practice, standards, health and safety regulations, and environmental concerns. **c4** Apply quality assurance procedures and follow codes and standards.
C13 Plan and manage construction processes; address construction defects, instability, and quality issues; maintain safety measures in construction and materials; and assess the environmental impacts of projects.	**b1** Address construction defects, instability, and quality issues.

4. Course Contents:

No.	Topics	Lecture	Tutorial	Practical
1	Design of Quality Control Systems	4	4	-
2	Quality Methods for Establishing Product Specifications	4	4	-
3	Process Control	4	4	-
4	Variables and Attributes Charts, Acceptance Sampling	6	6	-
5	Operating Characteristics Curves, and Process Capabilities	6	6	-
6	QC Software	4	4	-
Total		**28**	**28**	**-**

5. Teaching and Learning Methods:

No.	Topics	Face-To-Face Lecture	Online Lecture	Flipped Classroom	Presentation and Movies	Discussion	Problem-Solving	Brain Storming	Projects	Site Visits	Self-Learning and Research	Cooperative	Discovering	Modeling	Lab
1	Design of Quality Control Systems	√					√								

2	Quality Methods for Establishing Product Specifications		√			√									
3	Process Control	√			√										
4	Variables and Attributes Charts, Acceptance Sampling	√			√										
5	Operating Characteristics Curves, and Process Capabilities					√		√							
6	QC Software	√			√										

6. Teaching and Learning Methods for Disabled Students:

No.	Teaching Method	Reason
1	Presentation of The Course in Digital Material	Better Access at Any Time
2	Wed Communication with Students	Better Communication with Certain Cases
3	Asking Small Groups to Do Assignments; Each Composed of Low, Medium, and High-Performance Students	Knowledge and Skills Transfer Among Different Levels of Students
4	An Electronic Model System for The Institution	E. Learning

7. Student Evaluation:

7.1 Student Evaluation Method:

No.	Evaluation Method	Competencies	LOs
1	Semester Works (Quizzes, Sheets, Reports)	C3 C4 C13	a3, b1 a1, c4 b1
2	Mid-Term Exam	C3 C4	a3, b1 a1, c4
3	Final-Term Exam	C3 C4 C13	a3, b1 a1, c4 b1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Semester Works (Quizzes, Sheets, Reports)	4^{th}, 11^{th}
2	Mid-Term Exam	8^{th}
3	Final-Term Exam	15^{th}

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Semester Works (Quizzes, Sheets, Reports)	20%
2	Mid-Term Exam	20%
3	Final-Term Exam	60%
Total		**100%**

8. List of References:

No.	Reference List
1	Wiley-Blackwell. Code of Practice for Project Management for Construction and Development. Chartered Institute of Building (Great Britain).
2	Kerzner, Harold. Project Management Workbook. A System Approach to Planning, Scheduling, and Control.
3	de Marco, A. Project Management for Facility Constructions A Guide for Engineers, and Architects.
4	Project Management Institute and Project Management Institute. A Guide to the Project Management Body of Knowledge (PMBOK Guide).
5	Lester, Albert. Project Management, Planning, and Control. Managing Engineering, Construction, and Manufacturing Projects to PMI, APM, and BSI Standards.
6	Vanhoucke, M. Management for Professionals Integrated Project Management and Control.

9. Facilities Required for Teaching and Learning:

Facility			
1	Lecture Classroom	3	White Board
2	Seminar	4	Data Show System

10. Matrix of Knowledge and Skills:

No.	Topic	Aims	Competencies	LOs
1	Design of Quality Control Systems	1, 8	C3 C4	a3, b1 a1, c4
2	Quality Methods for Establishing Product Specifications	1, 8	C3	a3, b1
3	Process Control	1, 8	C4	a1, c4
4	Variables and Attributes Charts, Acceptance Sampling	1, 8	C3 C4 C13	a3, b1 a1, c4 b1

5	Operating Characteristics Curves, and Process Capabilities	1, 8	C3 C4 C13	a3, b1 a1, c4 b1
6	QC Software	1, 8	C3 C4 C13	a3, b1 a1, c4 b1

Course Coordinator: Prof. Dr. Mohamed Elkiki
Head of Department: Prof. Dr. Mohamed Elkiki
Date of Approval: 2022

Reliability of Structures
(CIE417)

1. Basic Information:

Program Title	Civil Engineering Program
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Civil Engineering Department
Course Title	Reliability of Structures
Course Code	CIE417
Year/Level	Level 4
Specialization	Minor – Elective Course
Authorization Date of Course Specification	-
Pre- request	Complete 100 h

Teaching hours	**Lectures**	**Tutorial**	**Practical**
	2	**2**	**-**

2. Course Aims

No.	Aims
1	The ability to apply probability theories and hypothesis testing in analytic critical and systemic thinking to solve engineering problems of varying complexity and variation.
8	Plan and manage construction processes; address construction defects, instability and quality issues; maintain safety measures in construction and materials; and assess environmental impacts of projects.

3. Competencies:

Competencies	Learning Outcomes (LO'S)
C3 Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global, cultural, social, economic, environmental, ethical, and other aspects as appropriate to the discipline and within the principles and contexts of sustainable design and development.	**a1** Learn the general principles of Reliability of Structures. **a2** Understand the professional ethics and impacts of engineering solutions on society and environment. **c1** Incorporate economic, societal, global, environmental, and risk management factors into design.
C4 Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues, and risk management principles.	**a1** Describe quality assurance systems, codes of practice, and standards, as well as health and safety regulations and environmental concerns. **c1** Apply safe systems at work by taking the necessary precautions to manage hazards.

C12 Achieve an optimum design of Reinforced Concrete.	**b1** Achieve an optimum design of Reinforced Concrete

4. Course Contents:

No.	Topics	Lecture	Tutorial	Practical
1	Fundamental concepts related to structural reliability, safety measures, load models, resistance models, system reliability	14	14	-
2	optimum safety levels, and optimization of design codes	14	14	-
Total		**28**	**28**	**-**

5. Teaching and learning methods:

No.	Teaching Methods
1	Face-to-Face Lecture
2	Discussion sessions
3	Information collection from different sources
4	Research assignment
5	Online Lecture
6	Problem solving
7	Brain storming
8	Site visits
9	Self-learning and Research

6. Teaching and learning methods for disabled students:

No.	Teaching Methods	Reason
1	Presentation of the course in digital material	Better access any time
2	Wed communication with students	Better communication with certain cases
3	Asking small groups to do assignments; each composed of low, medium, and high-performance students	Knowledge and skills transfer among different levels of students
4	Electronic model system for the Institution.	E. learning

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO’s
1	Midterm examination	C3	a1, a2
2	Semester work (quizzes, sheets, report)	C3	a1, a2, c2

		C4 C9	a1, c1 d 2
3	Final term examination	C4 C12	a1 b1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	semester work	all
2	Mid Term examination	8^{th}
3	Final term examination	15^{th}

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Midterm examination	20%
2	Semester work	20%
3	Final term examination	60%
Total		**100%**

8. List of References:

No.	Reference List
1	**Essential books (textbooks / design codes):** Egyptian Code for Design and Construction of Reinforced Concrete Structures 203-2010. Design Aids and Examples in Accordance with the Egyptian Code for Design and Construction of Reinforced Concrete Structures 203-2012.

9. Facilities required for teaching and learning:

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

10. Matrix of knowledge and skills of the course:

No	Topic	Aims	Competencies	LO's
1	Fundamental concepts related to structural reliability, safety measures, load models, resistance models, system reliability	1	C3 C4 C9	a1, a2, c 1 a1, c1 d2
2	optimum safety levels, and optimization of design codes	1	C3 C4 C9	a1, a2, c 1 a1, c1 d2

Course Coordinator: Dr. Nesreen Elawadly
Head of Department: Prof. Dr. Mohamed Elkiki
Date of Approval: 2022

Risk Management and Structures Safety (CIE418)

1. Basic Information:

Program Title	Civil Engineering Program
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Civil Engineering Department
Course Title	Risk Management and Structures Safety
Course Code	CIE418
Year/Level	Level 4
Specialization	Minor – Elective Course
Authorization Date of Course Specification	-
Prerequisite	Complete 100 CH

Teaching Hours	**Lectures**	**Tutorial**	**Practical**
	2	2	-

2. Course Aims:

No.	Aims
1	Master a broad range of engineering knowledge and specialized skills, as well as the ability to apply acquired knowledge in real-world situations by applying theories and abstract thinking in analytic critical and systemic thinking to identify, diagnose, and solve engineering problems of varying complexity and variation.
8	Plan and manage construction processes; address construction defects, instability, and quality issues; maintain safety measures in construction and materials; and assess the environmental impacts of projects.

3. Competencies:

Competencies	Learning Outcomes (LOs)
C3 Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global, cultural, social, economic, environmental, ethical, and other aspects as appropriate to the	**a3** Recognizes the various construction defects, instability, and quality issues and assesses the environmental impacts of projects. **b1** Judge engineering decisions considering balanced costs, benefits, safety, quality, reliability, and environmental impact.

discipline, and within the principles and contexts of sustainable design and development.	**c1** Incorporate economic, societal, global, environmental, and risk management factors into design.
C4 Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues, and risk management principles.	**a1** Describe quality assurance systems, codes of practice, standards, health and safety regulations, and environmental concerns. **c1** Apply safe systems at work by taking the necessary precautions to manage hazards. **c4** Apply quality assurance procedures and follow codes and standards.

4. Course Contents:

No.	Topics	Lecture	Tutorial	Practical
1	Principles and Practice Regarding Safety in Building	4	4	-
2	Accidental Prevention and Safety Control	4	4	-
3	Fire Control, and Fire Resistance of Building Materials	8	8	-
4	Safety Provisions for Fire and Other Hazards in Building, Safety Standards and Codes	8	8	-
5	Governmental Regulations and Inspection Procedures	4	4	-
Total		**28**	**28**	**-**

5. Teaching and Learning Methods:

No.	Topics	Face-To-Face Lecture	Online Lecture	Flipped Classroom	Presentation and Movies	Discussion	Problem-Solving	Brain Storming	Projects	Site Visits	Self-Learning and Research	Cooperative	Discovering	Modeling	Lab
1	Principles and Practice Regarding Safety in Building	√			√										

2	Accidental Prevention and Safety Control		√			√									
3	Fire Control, and Fire Resistance of Building Materials	√				√									
4	Safety Provisions for Fire and Other Hazards in Building, Safety Standards and Codes	√		√											
5	Governmental Regulations and Inspection Procedures	√				√									

6. Teaching and Learning Methods for Disabled Students:

No.	Teaching Method	Reason
1	Presentation of The Course in Digital Material	Better Access at Any Time
2	Wed Communication with Students	Better Communication with Certain Cases
3	Asking Small Groups to Do Assignments; Each Composed of Low, Medium, and High-Performance Students	Knowledge and Skills Transfer Among Different Levels of Students
4	An Electronic Model System for The Institution	E. Learning

7. Student Evaluation:

7.1 Student Evaluation Method:

No.	Evaluation Method	Competencies	LOs
1	Semester Works (Quizzes, Sheets, Reports)	C3 C4	a3, b1, c1 a1, c1, c4
2	Mid-Term Exam	C3 C4	a3, b1, c1 a1, c1, c4
3	Final-Term Exam	C3 C4	a3, b1, c1 a1, c1, c4

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Semester Works (Quizzes, Sheets, Reports)	4^{th}, 11^{th}
2	Mid-Term Exam	8^{th}
3	Final-Term Exam	15^{th}

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Semester Works (Quizzes, Sheets, Reports)	20%
2	Mid-Term Exam	20%
3	Final-Term Exam	60%
Total		**100%**

8. List of References:

No.	Reference List
1	Wiley-Blackwell. Code of Practice for Project Management for Construction and Development. Chartered Institute of Building (Great Britain).
2	Kerzner, Harold. Project Management Workbook. A System Approach to Planning, Scheduling, and Control.
3	de Marco, A. Project Management for Facility Constructions A Guide for Engineers, and Architects.
4	Project Management Institute and Project Management Institute. A Guide to the Project Management Body of Knowledge (PMBOK Guide).
5	Lester, Albert. Project Management, Planning, and Control. Managing Engineering, Construction, and Manufacturing Projects to PMI, APM, and BSI Standards.
6	Vanhoucke, M. Management for Professionals Integrated Project Management and Control.

9. Facilities Required for Teaching and Learning:

Facility			
1	Lecture Classroom	3	White Board
2	Seminar	4	Data Show System

10. Matrix of Knowledge and Skills:

No.	Topic	Aims	Competencies	LOs
1	Principles and Practice Regarding Safety in Building	1, 8	C3 C4	a3, b1, c1 a1, c1, c4
2	Accidental Prevention and Safety Control	1, 8	C3 C4	a3, b1, c1 a1, c1, c4
3	Fire Control, and Fire Resistance of Building Materials	1, 8	C3 C4	a3, b1, c1 a1, c1, c4
4	Safety Provisions for Fire and Other Hazards in Building, Safety Standards and Codes	1, 8	C3 C4	a3, b1, c1 a1, c1, c4
5	Governmental Regulations and Inspection Procedures	1, 8	C3 C4	a3, b1, c1 a1, c1, c4

Course Coordinator: Prof. Dr. Mohamed Elkiki
Head of Department: Prof. Dr. Mohamed Elkiki
Date of Approval: 2022

Soil Mechanics and Foundation
(CIE501)

1. Basic Information:

Program Title	Civil Engineering Program
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Civil Engineering Department
Course Title	Soil Mechanics and Foundation
Course Code	CIE501
Year/Level	Level 5
Specialization	Major
Authorization Date of Course Specification	-
Pre- request	CIE404

Teaching hours	**Lectures**	**Tutorial**	**Practical**
	2	2	-

2. Course Aims

No.	Aims
7	Achieve an optimum design of foundations and earth retaining structures.
10	Acquire and apply new knowledge; and practice self, lifelong and other learning strategies

3. Competencies:

Competencies	Learning Outcomes (LO'S)
C1 Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science, and mathematics.	**a1** Describe the relevant mathematical principles and theories in the discipline. **a2** Explain the scientific principles and theories that apply to the topic. **a3** Explain the basic principles of soil mechanics. **b2** Using scientific concepts and theories that are relevant to soil mechanics and foundation.
C2 Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess, and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.	**a2** Define the principles, basic properties, and features of soil mechanics and foundation and use the sustainable technologies. **b3** Analyze and interpret data
C10 Acquire and apply new knowledge, and practice self, lifelong and other learning strategies.	**d1** Search for information to engage in lifelong self-learning discipline.

	d2 Professionally merge the engineering fundamentals, understanding, and feedback to improve design, products and/or services.
C11 Select appropriate and sustainable technologies for construction of buildings, infrastructures and water structures; using either numerical techniques or physical measurements and/or testing by applying a full range of civil engineering concepts and techniques of structural analysis and mechanics, properties and strength of materials, surveying, soil mechanics, hydrology and fluid mechanics.	**a1** Recognize the fundamentals of structural analysis and mechanics, properties and strength of materials, surveying, soil mechanics, hydrology, and fluid mechanics. **a2** Summarize, appropriate and sustainable technologies for soil mechanics.
C12 Achieve an optimum design of Reinforced Concrete and Steel Structures, Foundations and Earth Retaining Structures; and at least three of the following civil engineering topics: Transportation and Traffic, Roadways and Airports, Railways, Sanitary Works, Irrigation, Water Resources and Harbors; or any other emerging field relevant to the discipline.	**b2** Achieve an optimum design of soil mechanics and retaining structures.

4. Course Contents:

No.	Topics	Lecture	Tutorial	Practical
1	Stresses in soil mass	4	4	-
2	Consolidation of soil	4	4	-
3	Settlement and contact pressure	4	4	-
4	Lateral earth pressure	4	4	-
5	Slope stability	4	4	-
6	Retaining walls – sheet piles	4	4	-
7	Soil bearing capacity	4	4	-
Total		**28**	**28**	**-**

5. Teaching and learning methods:

Topics	Face to face lecture	Online lecture	Flipped classroom	Presentation and movies	Discussion	Problem solving	Brainstorming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab
Stresses in soil mass	x	x		x	x	x								
Consolidation of soil	x	x		x	x	x								
Settlement and contact pressure	x	x		x	x	x				x				
Lateral earth pressure	x	x		x	x	x								
Slope stability	x	x		x	x	x				x				
Retaining walls – sheet piles	x	x		x	x	x								
Soil bearing capacity	x	x		x	x	x								

6. Teaching and learning methods for disabled students:

No.	Teaching Methods	Reason
1	Presentation of the course in digital material	Better access any time
2	Wed communication with students	Better communication with certain cases
3	Asking small groups to do assignments; each composed of low, medium, and high-performance students	Knowledge and skills transfer among different levels of students
4	Electronic model system for the Institution.	E. learning

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation method	Competencies	LO’s
1	Midterm examination	C1 C2 C11 C12	a1,a2,a3,b2 a2,a3 a1, a2 b2
2	Semester work (quizzes, sheets, report)	C10	d1, d2

3	Final term examination	C1 C2 C11 C12	a1,a2,a3,b2 a2,a3 a1, a2 b2

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Midterm examination	8th
2	Semester work	*continuous evaluation*
3	Final term examination	15^{th}

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Midterm examination	20%
2	Semester work	20%
3	Final term examination	60%
	Total	**100%**

8. List of References:

No.	Reference List
	Course notes: Lecture notes prepared by the course coordinator +Solved examples.
2	Das, B., M. (2017), "Principles of geotechnical Engineering " Eighth Edition, CENGAGE Learning,
3	Knappett, J.A. and Craige R. F. (2012), " Craig’s Soil Mechanics" Eighth Edition, Spon Press.
4	Essential books (textbooks): Egyptian Code of Practice for Soil Mechanics and Foundations (2002)

9. Facilities required for teaching and learning:

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

10. Matrix of knowledge and skills of the course:

No	Topic	Aims	Competencies	LO’s
1	Stresses in soil mass	4, 7,10	C1	a3, b2
2	Consolidation of soil	4, 7,10	C11	a2

3	Settlement and contact pressure	4, 7,10	C11	a2
4	Lateral earth pressure	4, 7,10	C2 C11 C12	a2 a2 b2
5	Slope stability	4, 7,10	C1 C10	a3, b2 d1, d2
7	Retaining walls – sheet piles	4, 7,10	C2 C11 C12	a2 a2 b2
8	Soil bearing capacity	4, 7,10	C11	a2

Course Coordinator: Dr. Hany Hashish
Head of Department: Prof. Dr. Mohamed Elkiki
Date of Approval: 2022

Highway and Airport Engineering
(CIE502)

1. Basic Information:

Program Title	Civil Engineering Program
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Civil Engineering Department
Course Title	Highway and Airport Engineering
Course Code	CIE502
Year/Level	Level 5
Specialization	Major
Authorization Date of Course Specification	-
Pre- request	CIE308

Teaching hours	**Lectures**	**Tutorial**	**Practical**
	2	2	-

2. Course Aims

No.	Aims
4	Use the techniques, skills, and current engineering tools required for engineering practice by taking full responsibility for one's own learning and development, participating in lifelong learning.
7	Achieve an optimum design of Roadways and Airports.
10	Select appropriate and sustainable technologies for construction of buildings, infrastructures and water structures; using modern techniques, experiment measurements, and testing by applying a full range of civil engineering fields such as properties and strength of soil materials, surveying.

3. Competencies:

Competencies	Learning Outcomes (LO'S)
C2 Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess, and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.	**a2** Define the principles and basic highway's structure materials and use the sustainable technologies. **b2** Conduct basic experiments to learn about highways structural materials and surveying for geometric design or other emerging field relevant to the discipline. **b3** Analyze and interpret data.
C3 Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global,	**a1** Learn the general principles of design techniques specific to soil materials and highways structures using national highways codes.

cultural, social, economic, environmental, ethical, and other aspects as appropriate to the discipline and within the principles and contexts of sustainable design and development.	**a3** Recognizes the various pavement construction defects. **b1** Judge engineering decisions considering balanced quality of pavement,
C6 Plan, supervise and monitor implementation of highways engineering projects	**a1** Show the appropriate and sustainable technologies for construction of highways and airports,
C11 Select appropriate and sustainable technologies for road construction	**a2** Summarize, appropriate and sustainable technologies for highways construction
C12 Achieve an optimum design Roadways and Airports,	**b2** Achieve an optimum design of works for highway alignment and pavement and or any other emerging field relevant to the discipline.

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	Basic design control	2	2	-
2	Geometric design of highways (sight distance, intersection, alignment, vertical curves	2	2	-
3	Soils and materials, classification, stabilization, design of flexible and rigid pavement, highway drainage	2	2	-
4	Introduction to Airport Engineering	2	2	-
5	Aircraft characteristics	2	2	-
6	Air traffic control and capacity	2	2	-
7	Airport configuration	2	2	-
8	Design of the landing area	4	4	-
9	Airport terminals	4	4	-
10	Design of airport pavements, landing, wind rose, airport land scape, terminals, capacity, control	4	4	-
11	Lighting and markings	2	2	-
Total		**28**	**28**	**-**

5. Teaching and learning methods:

Topics	Face -to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self -learning and Research	Cooperative	Discovering	Modeling	lab
Basic design control		x			x	x								x
Geometric design of highways		x			x	x								x
Soils and materials		x			x	x								x
Introduction to Airport Engineering		x			x	x								x
Aircraft characteristics		x			x	x								x
Air traffic control and capacity		x			x	x								x
Airport configuration		x			x	x								x
Design of the landing area		x			x	x								x
Airport terminals		x			x	x								x
Design of airport pavements		x			x	x								x
Lighting and markings		x			x	x								x

6. Teaching and learning methods for disabled students:

No.	Teaching Methods	Reason
1	Presentation of the course in digital material	Better access any time
2	Wed communication with students	Better communication with certain cases
3	Asking small groups to do assignments; each composed of low, medium, and high-performance students	Knowledge and skills transfer among different levels of students
4	Electronic model system for the Institution.	E. learning

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Midterm examination	C2 C12	a2, b2 b2
2	Semester work (quizzes, sheets, report)	C2	a2 c3
3	Final term examination	C2 C11 C12	a2, b2, c3 a2 b2

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Midterm examination	8th
2	Semester work	7th - 9th
3	Final term examination	15th

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Midterm examination	20%
2	Semester work	20%
3	Final term examination	60%
Total		**100%**

8. List of References:

No.	Reference List
1	Materials for Civil and Construction Engineers, Mamlouk and Zaniwski, ISBN:0-13147714-5, 2016
2	Egyptian Code of Practice for Urban and Rural Roads, 2018
3	Huang, S. C., and Di Benedetto, H. (Eds.). (2015). Advances in asphalt materials: Road and pavement construction. Wood head Publishing.
4	Papagiannakis, A. T., &Masad, E. A. (2020). Pavement design and materials. John Wiley & Sons.

9. Facilities required for teaching and learning:

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

10. Matrix of knowledge and skills of the course:

No	Topic	Aims	Competencies	LO's

1	Basic design control	1, 7	C2	a2
2	Geometric design of highways	1, 7	C2, C6	a1, a2 c3
3	Soils and materials	1,7	C2 C12	a2, b2 b2
4	Introduction to Airport Engineering	1, 7	C2 C12	a2 b2
5	Aircraft characteristics	1, 7	C2 C12	a2, c3 b2
6	Air traffic control and capacity	1, 7	C2 C11	a2, c3 a2
7	Airport configuration	1, 7	C2	a2 b3 c3
8	Design of the landing area	1, 7	C2 C6	a2 a1 b2
9	Airport terminals	1, 7	C2 C11 C12	a2, b2, c3 a2 b2
10	Design of airport pavements	1, 7	C2	a2, b2
11	Lighting and markings	1, 7	C2	a2, b2

Course Coordinator: Assoc. Prof. Dr. Alaa Gabr
Head of Department: Prof. Dr. Mohamed Elkiki
Date of Approval: 2022

Legal, Professional, and Social Aspects of Engineering (CIE503)

1. Basic Information:

Program Title	Civil Engineering Program
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Civil Engineering Department
Course Title	Legal, Professional, and Social Aspects of Engineering
Course Code	CIE503
Year/Level	Level 5
Specialization	Major
Authorization Date of Course Specification	-
Pre- request	-

Teaching hours	Lectures	Tutorial	Practical
	2	2	1

2. Course Aims

No.	Aims
2	Work in and manage a diverse team of professionals from various engineering disciplines, taking responsibility for own and team performance; and behave professionally and adhere to engineering ethics and standards.
9	Deal with biddings, contracts and financial issues including project insurance and guarantees.

3. Competencies:

Competencies	Learning Outcomes (LO'S)
C2 Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess, and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.	**a2** List the engineering-related business and management principles address construction defects, instability, and quality issues. **b1** Address construction defects, instability, and quality issues.
C4 Utilize contemporary technologies, codes of practice and standards, quality guidelines, environmental issues, and risk management principles	**b1** Create methodical approaches when dealing with new and advancing technology.

C14 Deal with biddings, contracts and financial issues including project insurance and guarantees.	**a1** define biddings, contracts, and financial issue

4. Course Contents:

No.	Topics	Lecture	Tutorial	Practical
1	Building and construction contracts procedure	4	2	-
2	Types of construction contracts	4	4	-
3	General conditions of contracts and contract documents	6	4	-
4	Legal obligations and governing international and Egyptian legislation	4	6	-
5	The role of the architect/ engineer in the construction process	2	4	-
6	The developments of the concepts of professionalism and ethics	4	2	-
7	Case historical will be discussed	4	2	-
total		**28**	**28**	**-**

5. Teaching and learning methods:

Topics	Face -to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self -learning and Research	Cooperative	Discovering	Modeling	lab
Building and construction contracts procedure	x				x	x								
Types of construction contracts	x				x	x								
General conditions of contracts and contract documents.	x				x	x								

Legal obligations and governing international and Egyptian legislation	x				x	x								
The role of the architect/ engineer in the construction process.	x				x	x								
The developments of the concepts of professionalism and ethics	x				x	x								
Case historical will be discussed	x				x	x								

6. Teaching and learning methods for disabled students:

No.	Teaching Methods	Reason
1	Presentation of the course in digital material	Better access any time
2	Asking small groups to do assignments; each composed of low, medium, and high-performance students.	Knowledge and skills transfer among different level of students.

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Mid-term examination	C2, C4	a2, b1, b1
2	Semester work	C2, C4, C14	a2, b1, b1, a1
3	Final term examination	C2, C4, C14	a2, b1, b1, a1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Semester work	$2nd$, $7th$, $9th$
2	Mid Term examination	$8th$
3	Practical Examination	14^{th}
4	Final term examination	$15th$

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Mid-term examination	20%

2	Semester work	20%
3	Final-term examination	60%
Total		**100%**

8. List of References:

No.	Reference List
1	Khurmi, R.S. (2014). '' A textbook of hydraulics, fluid mechanics and hydraulic machines'' S. Chanel and company Ltd. P.990
2	Subramanya, K. (2008) ''Flow in open channels'' McGra- Hill Education (India). P.602
3	Glenn E. Moglen. 2015. Fundamentals of Open Channel Flow. CRC Press. Available on Taylor & Francis eBooks.

9. Facilities required for teaching and learning:

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

10. Matrix of knowledge and skills of the course:

No	Topic	Aims	Competencies	LO's
1	Building and construction contracts procedure	2, 9	C2, C4, C14	a2, b1, b1, a1
2	Types of construction contracts	2, 9	C2, C4, C14	a2, b1, b1, a1
3	General conditions of contracts and contract documents.	2, 9	C2, C4, C14	a2, b1, b1, a1
4	Legal obligations and governing international and Egyptian legislation	2, 9	C2, C4, C14	a2, b1, b1, a1
5	The role of the architect/ engineer in the construction process.	2, 9	C2, C4, C14	a2, b1, b1, a1
6	The developments of the concepts of professionalism and ethics	2, 9	C2, C4, C14	a2, b1, b1, a1
7	Case historical will be discussed	2, 9	C2, C4, C14	a2, b1, b1, a1

Course Coordinator: Dr. Ayman Helal
Head of Department: Prof. Dr. Mohamed Elkiki
Date of Approval: 2022

Design of Irrigation Works
(CIE504)

1. Basic Information:

Program Title	Civil Engineering Program
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Civil Engineering Department
Course Title	Design of Irrigation Works
Course Code	CIE504
Year/Level	Level 5
Specialization	Major
Authorization Date of Course Specification	-
Pre-request	CIE401

Teaching hours	Lectures	Tutorial	Practical
	2	2	-

2. Course Aims:

No.	Aims
4	Use the techniques, skills, and current engineering tools required for the design of irrigation works (bridges, culverts, syphons, locks, dams and heading up works).
7	Achieve the optimum design for the irrigation works (bridges, culverts, syphons, dams, and heading up works).
10	Select appropriate and sustainable technologies for the irrigation works (retaining walls, bridges, culverts, syphons, locks and heading up works).

3. Competencies:

Competencies	Learning outcomes (LO'S)
C1 Identify, formulate, and solve complex design of irrigation works problems by applying engineering fundamentals, basic science and mathematics.	**a1** Describe the relevant mathematical principles and theories in the discipline concepts regarding retaining walls, Bligh's and Lane's weighted creep theories, and the water losses through irrigation works. **a3** Explain the principles types of retaining walls, and classification of irrigation woks structures.
C11 Select appropriate and sustainable technologies for irrigation works (bridges, culverts, syphons, weirs, and dams)	**a2** Summarize, appropriate and sustainable technologies for the construction of bridges, culverts, syphons, weirs, locks and dams.

C12 Achieve an optimum design of irrigation works bridges, culverts, syphons, weirs, locks and dams.	**b1** Achieve an optimum design of retaining walls, culverts, and bridges. **b2** Achieve an optimum design of irrigation works syphons, weirs, locks and dams.

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	Introduction: design of irrigation works	2	2	-
2	Classification of retaining walls (R.W)	4	4	-
3	Design of gravity retaining walls	2	2	-
4	Design of reinforced concrete R.W.	2	2	-
5	Design of reinforced concrete bridges	2	2	-
6	Design of rolled steel joist bridge	2	2	-
7	Design of culverts	2	2	-
8	Design of syphons	4	4	-
9	Design of Heading up works (weirs)	4	4	-
10	Design of dams	2	2	-
11	Types and design of locks	2	2	
Total		**28**	**28**	**-**

5. Teaching and Learning Methods:

Topics	Face-to-face lecture	Online lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brainstorming	Projects	Site Visits	Self learning and Research	Cooperative	Discovering	Modeling	Lab
Introduction: design of irrigation works	x	x		x	x	x								

Classification of retaining walls (R.W)	x	x		x	x	x								
Design of gravity retaining walls	x	x			x	x								
Design of reinforced concrete R.W.	x	x			x	x								
Design of reinforced concrete bridges	x	x			x	x		x						
Design of rolled steel joist bridge	x	x			x	x								
Design of culvert	x	x			x	x		x						
Design of syphons	x	x			x	x		x						
Design of heading up works (weirs)	x	x			x	x								
Design of dams	x	x			x	x								
Types and design of locks	x	x		x										

6. Teaching and Learning Methods of Disable Students:

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

7. Student assessment:

7.1 Student Evaluation Method:

No.	Evaluation Method	Competencies	LOs
1	Mid Term Examination (written/ online)	C1 C11 C12	a1, a3 a2 b1
2	Formative (quizzes- online quizzes- presentation)	C1 C11 C12	a1, a3 a2 b1
3	Final Term Examination (written)	C1 C11 C12	a1, a3 a2 b1, b2

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Mid Term Examination (written/ online)	8th
2	Practical/ Oral Examination	15th
3	Formative (quizzes- online quizzes presentation-Tutorial and report assessment)	Every week
4	Final Term Examination (written)	Decided by Faculty Council

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Mid Term Examination (written/ online)	20%
2	Formative (quizzes- online quizzes presentation-Tutorial and report assessment)	20%
3	Final Term Examination (written)	60%
Total		100%

8. List of References:

No.	Reference List
1	Santosh Kumar Garg, “Irrigation Engineering and Hydraulic Structures: Water Resources Engineering”, Vol. II, Khanna Publishers Pvt. Ltd, 2016.
2	Novak P., Moffat A.I.B., Nalluri C., Narayanan R., “Hydraulic Strucures”, 4th Ed., Taylor & Francis, 2007.
3	Liu Zhi Ming, “Handbook of Hydraulic Structure: Design”, 2nd Ed., China Water Press, 2000.
4	الكود المصري للموارد المائية وأعمال الري المجلد السابع الطبعة الأولى 2003

9. Facilities Required for Teaching and Learning:

No.	Facility
1	Lecture Classroom
2	Lab Facilities
3	White Board
4	Data Show System
5	Presenter

10. Matrix of Knowledge and Skills of the Course

No.	Topic	Aims	Competencies	LO's
1	Introduction: design of irrigation works	4, 7, 10	C1 C11	a3 a2
2	Classification of retaining walls (R.W)	4, 10	C1 C11	a3 a2
3	Design of gravity retaining walls	4, 10	C12	b1
4	Design of reinforced concrete R.W.	4, 10	C12	b1
5	Design of reinforced concrete bridges	4, 7, 10	C1 C11 C12	a1 a2 b1
6	Design of rolled steel joist bridge	4, 7, 10	C1 C11 C12	a1 a2 b1
7	Design of culverts	4, 7, 10	C1 C11 C12	a1 a2 b1
8	Design of syphons	4, 7, 10	C1 C11 C12	a1 a2 b1
9	Design of Heading up works (weirs)	4, 7, 10	C1 C11 C12	a1 a2 b1
10	Design of Dams	4, 7	C1 C11 C12	a1 a2 b1
11	Types and design of locks	4, 10	C11 C12	a2 b2

Course Coordinator: Prof. Dr. Mohamed Elkiki

Head of Department: Prof. Dr. Mohamed Elkiki
Date of Approval: 2022

Foundation Engineering (1)
(CIE505)

1. Basic Information:

Program Title	Civil Engineering Program
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Civil Engineering Department
Course Title	Foundation (1)
Course Code	CIE505
Year/Level	Level 5
Specialization	Major
Authorization Date of Course Specification	-
Pre- request	CIE501

Teaching hours	**Lectures**	**Tutorial**	**Practical**
	2	2	-

2. Course Aims

No.	Aims
6	Analyze data from the intended tests to manage resources creatively.
7	Achieve an optimum design of Foundations and Earth Retaining Structures
10	10- Select appropriate and sustainable technologies for construction of buildings, infrastructures, and water structures; using numerical techniques, experiment measurements, and testing by applying a full range of civil engineering fields such as structural analysis and mechanics, properties and strength of materials, surveying, soil mechanics, hydrology and fluid mechanics.

3. Competencies:

Competencies	Learning Outcomes (LO'S)
C1 Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science, and mathematics.	**a1** Describe the relevant mathematical principles and theories in the discipline. **a2** Explain the scientific principles and theories that apply to the topic. **a3** Explain the basic principles of engineering. **b1** Using math ideas and theories that are applicable to the field. **b2** Using scientific concepts and theories that are relevant to the profession. **b3** Applying engineering basics that are relevant to the subject.

	c1 Identify, formulate, and solve complex engineering problems by -applying the concepts and the theories of mathematics. **c2** Identify, formulate, and solve complex engineering problems by applying the concepts and the theories of sciences, appropriate to the discipline. **c3** Identify, formulate, and solve complex engineering problems by applying engineering fundamentals.
C2 Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess, and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.	**a1** Define, basic characteristics, properties, concepts, and techniques of structural analysis and mechanics, properties and strength of materials, surveying, soil mechanics, hydrology, and fluid mechanics. **a2** Define the principles, basic properties, and features of construction material, as well as their use in sustainable technologies for construction of buildings, infrastructures, and water structures.
C4 Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues, and risk management principles.	**a1** Describe quality assurance systems, codes of practice, and standards.
C9 Use creative, innovative, and flexible thinking and acquire entrepreneurial and leadership skills to anticipate and respond to new situations.	**d3** Refer to relevant literatures**.**
C12 Achieve an optimum design of Foundations.	**b1** Achieve an optimum design of Reinforced Concrete and Steel Structures, Foundations and Earth Retaining Structures.

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	Design of strip footing	2	2	-
2	Design Isolated and combined footing	8	8	-
3	Design of strap beam	2	2	-
4	Design of raft foundations	8	8	-
5	Pile cap - pile Foundation	8	8	-
Total		28	28	-

5. Teaching and learning methods:

Topics	Face to face lecture	Online lecture	Flipped classroom	Presentation and movies	Discussion	Problem solving	Brainstorming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab
Design of strip footing	x	x		x	x	x								
Design Isolated and combined footing	x	x		x	x	x								
Design of strap beam	x	x		x	x	x				x				
Design of raft foundations	x	x		x	x	x				x				
Pile cap - pile Foundation	x	x		x	x	x				x				

6. Teaching and learning methods for disabled students:

No.	Teaching Methods	Reason
1	Presentation of the course in digital material	Better access any time
2	Wed communication with students	Better communication with certain cases
3	Asking small groups to do assignments; each composed of low, medium and high-performance students	Knowledge and skills transfer among different levels of students
4	Electronic model system for the Institution.	E. learning

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO’s

1	Midterm examination	C1 C4	a1 b1 c1 a2 b2 c2 a3 b3 c3 a1
2	Semester work (quizzes, sheets, report)	C1 C4	a1 b1 c1 a2 b2 c2 a3 b3 c3 a1
3	Final term examination	C1 C4 C9 C12	a1 b1 c1 a2 b2 c2 a3 b3 c3 a1 d3 b1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Midterm examination	8th
2	Semester work	*continuous evaluation*
3	Final term examination	15^{th}

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Midterm examination	20%
2	Semester work	20%
3	Final term examination	60%
Total		**100%**

8. List of References:

No.	Reference List
1	Course notes: Lecture notes prepared by the course coordinator +Solved examples.
2	Das, B., M. (2017), "Principles of Foundation Engineering ", CENGAGE Learning,
3	Gulhati, S.K. and Datta, M. (2015), "Geotechnical Engineering ", Tata McGraw-Hill, New Delhi.
4	Essential books (textbooks): Egyptian Code of Practice for Soil Mechanics and Foundations (2002)

9. Facilities required for teaching and learning:

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

10. Matrix of knowledge and skills of the course:

No	Topic	Aims	Competencies	LO's
1	Design of strip footing	6, 7, 10	C1 C4	a1 b1 c1 a2 b2 c2 a3 b3 c3 a1
2	Design Isolated and combined footing	6, 7, 10	C1 C4	a1 b1 c1 a2 b2 c2 a3 b3 c3 a1
3	Design of strap beam	6, 7, 10	C1 C4	a1 b1 c1 a2 b2 c2 a3 b3 c3 a1
4	Design of raft foundations	6, 7, 10	C1 C4 C9 C12	a1 b1 c1 a2 b2 c2 a3 b3 c3 a1 d3 b1
5	Pile cap - pile Foundation	6, 7, 10	C1 C4 C9 C12	a1 b1 c1 a2 b2 c2 a3 b3 c3 a1 d3 b1

Course Coordinator: Dr. Hany Hashish
Head of Department: Prof. Dr. Mohamed Elkiki
Date of Approval: 2022

Inland Navigation and Harbor Engineering (CIE506)

1. Basic Information:

Program Title	Civil Engineering Program
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Civil Engineering Department
Course Title	Inland Navigation and Harbor Engineering
Course Code	CIE506
Year/Level	Level 5
Specialization	Major
Authorization Date of Course Specification	-
Pre-request	ENG301

Teaching hours	Lectures	Tutorial	Practical
	2	2	-

2. Course Aims:

No.	Aims
6	Analyze data from the intended tests to manage resources creatively.
7	Achieve an optimum design of earth Retaining Structures
10	Select appropriate and sustainable technologies for construction of marine structures

3. Competencies:

Competencies	Learning outcomes (LO'S)
C1 Identify, formulate, and solve complex problems by applying engineering fundamentals, basic science, and mathematics.	**c1** Identify, formulate, and solve complex problems by applying the concepts and the theories of mathematics.
C2 Analyze data, assess, and evaluate findings, and use statistical analyses and objective engineering judgment to study coastal hydrodynamics.	**b3** Analyze and interpret data
C3 Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global, economic, environmental, ethical, and other aspects as appropriate the principles and	**a1** Learn the general principles of design techniques specific to harbors and marine structures.

contexts of sustainable design and development.	
C4 Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues, and risk management principles.	**a1** Describe quality assurance systems, codes of practice, and standards, as well as health and safety regulations and environmental concerns.
C5 Practice research techniques and methods of investigation as an inherent part of learning.	**d1** Search for information to engage in lifelong self-learning discipline.
C6 Plan, supervise and monitor implementation of marine projects	**a1** Show the appropriate and sustainable technologies for construction of marine structures.
C11 Select appropriate and sustainable technologies for construction of marine structures	**a1** Recognize the fundamentals of structural analysis. **a2** Summarize, appropriate and sustainable technologies for construction of marine structures. **c1** Using either numerical techniques or physical measurements and/or testing for coastal hydrodynamics
C12 Achieve an optimum design of marine structures and Harbors.	**b1** Achieve an optimum design of marine structures. **b2** Achieve an optimum design for works of harbors
C13 Plan and manage construction processes and environmental impacts of projects.	**c1** Assess environmental impacts of projects.

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	Wind and current – tide Wave theories	8	8	-
2	Surf zone hydrodynamics	2	2	-
3	Wave forces	4	4	-
5	Harbor planning	2	2	-
6	Design of breakwater	4	4	-
7	Design of quay walls	4	4	-
8	Ship repair structures	2	2	-
9	Inland navigation	2	2	-
Total		**28**	**28**	**-**

5. Teaching and Learning Methods:

Topics	Face-to-face lecture	Online lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brainstorming	Projects	Site Visits	Self learning and Research	Cooperative	Discovering	Modeling	Lab
Wind and current – Tide -Wave theories	x	x			x	x								
Surf zone hydrodynamics	x	x		x	x	x	x							
Wave forces	x	x			x	x								
Harbor planning	x	x			x	x			x					
Design of breakwater	x	x		x	x	x								
Design of quay walls	x	x		x	x	x							x	
Ship repair structures	x	x			x	x				x	x			
Inland navigation	x	x			x	x	x							x

6. Teaching and Learning Methods of disabled Students:

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

7. Student assessment:

7.1 Student Assessment Methods:

No.	Assessment Method	Competencies	LOs
1	Mid Term Examination (written/ online)	C1 C2 C3 C11 C13	c1 b3 a1 a2, c1 c1
2	Formative (quizzes- online quizzes- presentation)	C3 C4	a1 a1
3	Final Term Examination (written)	C3 C4 C5 C6 C11 C12	a1 a1 d1 a1 a2 b1, b2

7.2 Assessment Schedule:

No.	Assessment Method	Weeks
1	Mid Term Examination (written/ online)	8th
2	Practical/ Oral Examination	15th
3	Formative (quizzes- online quizzes presentation-Tutorial and report assessment)	Every week
4	Final Term Examination (written)	Decided by Faculty Council

7.3 Weighting of Assessments:

No.	Assessment Method	Weights
1	Mid Term Examination (written/ online)	20%
2	Formative (quizzes- online quizzes presentation Tutorial and report assessment)	20%
3	Final Term Examination (written)	60%
	Total	**100%**

8. List of References:

Essential Books (Textbooks)	Carl A. Thoresen, port Designers Handbook Third edition, 2014.
Recommended books	Gregory Tsinker, Handbook of port and Harbor Engineering: Geotechnical and structural and structural Aspects, 2014.
Periodicals, Web sites, etc	Journal of Geotechnical Engineering (ASCE). Journal of Hydraulic Division (ASCE).

9. Facilities Required for Teaching and Learning:

No.	Facility
1	Lecture Classroom
2	Lab Facilities
3	White Board
4	Data Show System
5	Presenter

10. Matrix of Knowledge and Skills of the Course

No.	Topic	Aims	Competencies	LO's
1	Wind and current – Tide -Wave theories	1	C1 C2 C11 C13	c1 b3 a2 c1
2	Surf zone hydrodynamics	1	C11 C13	c1 c1
3	Wave forces	1	C3	a1
4	Harbor planning	1	C5 C6 C11 C12	d1 a1 a2 b2
5	Design of breakwater	1	C12	b1
6	Design of quay walls	1	C4	a1
7	Ship repair structures	1	C3	a1
8	Inland navigation	1	C3	a1

Course Coordinator: Prof. Dr. Osami Rageh
Head of Department: Prof. Dr. Mohamed Elkiki
Date of Approval: 2022

Project (1)
(CIE509)

1. Basic Information:

Program Title	Civil Engineering Program
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Civil Engineering Department
Course Title	Project (1)
Course Code	CIE509
Year/Level	Level 5
Specialization	Major
Authorization Date of Course Specification	-
Pre- request	Complete 140 hr.

Teaching hours	Lectures	Tutorial	Practical
	2	-	2

2. Course Aims

No.	Aims
2	Work in and manage a diverse team of professionals from various engineering disciplines, taking responsibility for own and team performance; and behave professionally and adhere to engineering ethics and standards.
5	Communicate effectively with a variety of audiences using a variety of forms, methods, and languages; cope with academic and professional issues in a critical and creative manner; and display leadership, business administration, and entrepreneurial abilities.
7	Achieve an optimum design of Reinforced Concrete and Steel Structures, Foundations and Earth Retaining Structures; and at least three of the following civil engineering topics: Transportation and Traffic, Roadways and Airports, Railways, Sanitary Works, Irrigation, Water Resources and Harbors; or any other emerging field relevant to the discipline.

3. Competencies:

Competencies	Learning Outcomes (LO'S)
C2 Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess, and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.	**a1** Define, basic characteristics, properties, concepts, and techniques of structural analysis and mechanics, properties and strength of materials, surveying, soil mechanics, hydrology and fluid mechanics. **a2** Define the principles, basic properties, and features of construction material, as well as their use in sustainable

	technologies for construction of buildings, infrastructures, and water structures. **b1** Conduct basic experiments to learn about the basic characteristics and features of structural analysis and mechanics, properties and strength of materials, surveying, soil mechanics, hydrology and fluid mechanics. **b2** Conduct basic experiments to learn about the applications of structural analysis and mechanics, properties and strength of materials, surveying, soil mechanics, hydrology, and fluid mechanics in the fields of transportation and traffic, roadways and airports, railways, sanitary works, irrigation, water resources and harbors, or any other emerging field relevant to the discipline. **b3** Analyze and interpret data. **b4** Evaluate components, systems, and processes are evaluated for their characteristics and performance. **c1** Choose relevant mathematical and computer- based methodologies for problem modelling and analysis. **c2** Develop suitable experimentation and/or simulation. **c3** Applying statistical analyses and objective engineering judgment to draw conclusions.
C3 Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global, cultural, social, economic, environmental, ethical, and other aspects as appropriate to the discipline and within the principles and contexts of sustainable design and development.	**a1** Learn the general principles of design techniques specific to reinforced concrete and steel structures, foundations and earth retaining structures. **a2** Understand the professional ethics and impacts of engineering solutions on society and environment. **a3** Recognizes the various construction defects, instability and quality issues and assess environmental impacts of projects. **b1** Judge engineering decisions considering. balanced costs, benefits, safety, quality,
C4 Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues, and risk management principles.	**a1** Describe quality assurance systems, codes of practice, and standards, as well as health and safety regulations and environmental concerns. **a3** Define contemporary engineering technologies and their applications in relation to disciplines. **c2** Use fundamental organizational and project management abilities. **c3** Utilize modern technologies**.**

C5 Practice research techniques and methods of investigation as an inherent part of learning.	**b1** Assess different ideas, views, and knowledge from a range of sources. **c1** Prepare technical reports. **d1** Search for information to engage in lifelong self-learning discipline.
C7 Function efficiently as an individual and as a member of multi-disciplinary and multicultural teams.	**d1** Collaborate effectively within multidisciplinary team. **d2** Work in stressful environment and within constraints. **d3** Motivate individuals.
C8 Communicate effectively – graphically, verbally and in writing – with a range of audiences using contemporary tools.	**d1** Communicate effectively. **d2** Demonstrate efficient IT capabilities.
C11 Select appropriate and sustainable technologies for construction of buildings, infrastructures and water structures; using either numerical techniques or physical measurements and/or testing by applying a full range of civil engineering concepts and techniques of structural analysis and mechanics, properties and strength of materials, surveying, soil mechanics, hydrology and fluid mechanics.	**a1** Recognize the fundamentals of structural analysis and mechanics, properties and strength of materials, surveying, soil mechanics, hydrology, and fluid mechanics. **a2.** Summarize, appropriate and sustainable technologies for construction of buildings, infrastructures, and water structures. **c1** Using either numerical techniques or physical measurements and/or testing by applying a full range of civil engineering concepts and techniques of structural analysis and mechanics, properties and strength of materials, surveying, soil mechanics, hydrology and fluid mechanics.
C12 Achieve an optimum design of Reinforced Concrete and Steel Structures, Foundations and Earth Retaining Structures; and at least three of the following civil engineering topics: Transportation and Traffic, Roadways and Airports, Railways, Sanitary Works, Irrigation, Water Resources and Harbors; or any other emerging field relevant to the discipline.	**b1** Achieve an optimum design of Reinforced Concrete and Steel Structures, Foundations and Earth Retaining Structures. **b2** Achieve an optimum design of works for transportation and traffic, roadways and airports, railways, sanitary works, irrigation, water resources and harbors, or any other emerging field relevant to the discipline.
C13 Plan and manage construction processes; address construction defects, instability, and quality issues; maintain safety measures in construction and materials; and	**a1** define plain and mange construction process. **b1** Address construction defects, instability, and quality issues **c1** Assess environmental impacts of projects.

assess environmental impacts of projects.	
C14 Deal with biddings, contracts and financial issues including project insurance and guarantees.	**a1** define biddings, contracts, and financial issues. **b1** Address biddings, contracts and financial issues including project insurance and guarantees. **c1** Apply biddings, contracts, and financial issues on civil engineering projects

4. Course Contents:

No.	Topics	Lecture	Tutorial	Practical
1	The graduation project aims to explore students' ability and skills to comprehensively address and manage architectural and technical issues associate with a large-scale design project	8	-	8
2	The project examines and measures students' knowledge, skills, and collective outputs gained throughout their study in the faculty and department in a combined manner, that reflects identity and creativity in all its preliminary and analytical phases.	10	-	10
3	A complete set of appropriately presented drawings, accompanied by a detailed report of the project's attributable studies and potential considerations should be implemented by each student	10	-	10
Total		**28**	**-**	**28**

5. Teaching and learning methods:

Topics	Face -to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self -learning and Research	Cooperative	Discovering	Modeling	lab
The graduation project aims to explore students' ability and skills to comprehensively	x			x	x	x			x		x			x

address and manage architectural and technical issues associated with a large-scale design pro														
The project examines and measures students' knowledge, skills, and collective outputs gained throughout their study in the faculty and department in a combined manner, that reflects identity and creativity in all its preliminary and analytical phases.	x			x	x	x					x			x
A complete set of appropriately presented drawings, accompanied by a detailed report of the project's attributable studies and potential considerations should be implemented by each student	x			x	x	x					x			x

6. Teaching and learning methods for disabled students:

No.	Teaching Methods	Reason
1	Presentation of the course in digital material	Better access any time
2	Wed communication with students	Better communication with certain cases
3	Asking small groups to do assignments; each composed of low, medium, and high-performance students	Knowledge and skills transfer among different levels of students

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Oral Examination	C2	a1, a2, b1, b2, b3, b4, c1, c2, c3

		C3 C4 C5 C11 C12 C13 C14	a1, a2, a3, b1 a1, a3, c2, c3 b1, c1 a1, a2, c1 b1, b2, a1, b1, c1 a1, b1, c1
2	Semester work	C2 C3 C4 C5 C8 C11 C12 C13 C14	a1, a2, b1, b2, b3, b4, c1, c2, c3 a1, a2, a3, b1 a1, a3, c2, c3 b1, c1, d1 d1, d2 a1, a2, c1 b1, b2, a1, b1, c1 a1, b1, c1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Oral Examination	at the end of CIE510
2	Semester work	2^{nd} -7^{th} - 9^{th} -14^{th}

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Oral Examination	50%
2	Semester work (Presentation, Report)	50%
Total		**100%**

8. List of References:

No.	Reference List
1	Subject studies

9. Facilities required for teaching and learning:

Facility			
1	Lecture classroom	3	White board
2	Seminar	4	Data show system
5	Lab.		

10. Matrix of knowledge and skills of the course:

No	Topic	Aims	Competencies	LO's

1	The graduation project aims to explore students' ability and skills to comprehensively address and manage architectural and technical issues associated with a large-scale design pro	2, 3, 5, 7, 8, 10	C2 C3 C4 C5 C11 C12	a1, a2, b1, b3, b4, c1, c2 a1, a2, a3, b1 a1, a3, c2, c3 b1, c1 a1, a2, c1 b1, b2
2	The project examines and measures students' knowledge, skills, and collective outputs gained throughout their study in the faculty and department in a combined manner, that reflects identity and creativity in all its preliminary and analytical phases.	2, 3, 5, 7, 8, 10	C4 C5 C8 C11 C12 C13 C14	a1, a3, c2, c3 b1, c1, d1 d1, d2 a1, a2, c1 b1, b2 a1, b1, c1 a1, b1, c1
3	A complete set of appropriately presented drawings, accompanied by a detailed report of the project's attributable studies and potential considerations should be implemented by each student	2, 3, 5, 7, 8, 10	C3 C4 C5 C8 C11 C12 C13 C14	a1, a2, a3, b1 a1, a3, c2, c3 b1, c1, d1 d1, d2 a1, a2, c1 b1, b2 a1, b1, c1 a1, b1, c1

Course Coordinator: Prof. Dr. Mohamed Elkiki
Head of Department: Prof. Dr. Mohamed Elkiki
Date of Approval: 2022

Project (2)
(CIE510)

1. Basic Information:

Program Title	Civil Engineering Program
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Civil Engineering Department
Course Title	Project (2)
Course Code	CIE510
Year/Level	Level 5
Specialization	Major
Authorization Date of Course Specification	-
Pre- request	CIE509

Teaching hours	**Lectures**	**Tutorial**	**Practical**
	1	4	-

2. Course Aims

No.	Aims
2	Work in and manage a diverse team of professionals from various engineering disciplines, taking responsibility for own and team performance; and behave professionally and adhere to engineering ethics and standards.
3	Recognize his or her role in promoting engineering and contributing to the profession's and community's development; by appreciating the importance of the environment, both physical and natural, and working to promote sustainability concepts;
5	Communicate effectively with a variety of audiences using a variety of forms, methods, and languages; cope with academic and professional issues in a critical and creative manner; and display leadership, business administration, and entrepreneurial abilities.
7	Achieve an optimum design of reinforced concrete and steel structures, foundations and earth retaining structures; and at least three of the following civil engineering topics: Transportation and traffic, roadways and airports, railways, sanitary works, irrigation, water resources and harbors; or any other emerging field relevant to the discipline.
10	Select appropriate and sustainable technologies for construction of buildings, infrastructures and water structures, using numerical techniques, experiment measurements, and testing by applying a full range of civil engineering fields such as structural analysis and mechanics, properties and strength of materials, surveying, soil mechanics, hydrology and fluid mechanics.

3. Competencies:

Competencies	Learning Outcomes (LO'S)

	a1 Define, basic characteristics, properties, concepts, and techniques of structural analysis and mechanics, properties and strength of materials, surveying, soil mechanics, hydrology and fluid mechanics. **a2** Define the principles, basic properties, and features of construction material, as well as their use in sustainable technologies for construction of buildings, infrastructures, and water structures. **b1** Conduct basic experiments to learn about the basic characteristics and features of structural analysis and mechanics, properties and strength of materials, surveying, soil mechanics, hydrology, and fluid mechanics. **b2** Conduct basic experiments to learn about the applications of structural analysis and mechanics, properties and strength of materials, surveying, soil mechanics, hydrology and fluid mechanics in the fields of transportation and traffic, roadways and airports, railways, sanitary works, irrigation, water resources and harbors, or any other emerging field relevant to the discipline. **b3** Analyze and interpret data. **b4** Evaluate components, systems, and processes are evaluated for their characteristics and performance. **c1** Choose relevant mathematical and computer-based methodologies for problem modelling and analysis. **c2** Develop suitable experimentation and/or simulation. **c3** Applying statistical analyses and objective engineering judgment to draw conclusions.
C2 Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess, and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions	
C3 Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global, cultural, social, economic, environmental, ethical, and other aspects as appropriate to the discipline and within the principles and contexts of sustainable design and development.	**a1** Learn the general principles of design techniques specific to reinforced concrete and steel structures, foundations and earth retaining structures. **a2** Understand the professional ethics and impacts of engineering solutions on society and environment. **a3** Recognizes the various construction defects, instability and quality issues and assess environmental impacts of projects.

	b1 Judge engineering decisions considering. balanced costs, benefits, safety, quality
C4 Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues, and risk management principles.	**a1** Describe quality assurance systems, codes of practice, and standards, as well as health and safety regulations and environmental concerns. **a3** Define contemporary engineering technologies and their applications in relation to disciplines. **c2** Use fundamental organizational and project management abilities. **c3** Utilize modern technologies.
C5 Practice research techniques and methods of investigation as an inherent part of learning.	**b1** Assess different ideas, views, and knowledge from a range of sources. **c1** Prepare technical reports. **d1** Search for information to engage in lifelong self-learning discipline.
C7 Function efficiently as an individual and as a member of multi-disciplinary and multicultural teams.	**d1** Collaborate effectively within multidisciplinary team. **d2** Work in stressful environment and within constraints. **d3** Motivate individuals.
C8 Communicate effectively – graphically, verbally and in writing – with a range of audiences using contemporary tools.	**d1** Communicate effectively. **d2** Demonstrate efficient IT capabilities
C11 Select appropriate and sustainable technologies for construction of buildings, infrastructures and water structures; using either numerical techniques or physical measurements and/or testing by applying a full range of civil engineering concepts and techniques of structural analysis and mechanics, properties and strength of materials, surveying, soil mechanics, hydrology and fluid mechanics.	**a1** Recognize the fundamentals of structural analysis and mechanics, properties and strength of materials, surveying, soil mechanics, hydrology, and fluid mechanics. **a2** Summarize, appropriate and sustainable technologies for construction of buildings, infrastructures, and water structures. **c1** Using either numerical techniques or physical measurements and/or testing by applying a full range of civil engineering concepts and techniques of structural analysis and mechanics, properties and strength of materials, surveying, soil mechanics, hydrology and fluid mechanics.
C12 Achieve an optimum design of Reinforced Concrete and Steel Structures, Foundations and Earth Retaining Structures; and at least three of the following civil engineering topics: Transportation and Traffic, Roadways and Airports, Railways,	**b1** Achieve an optimum design of Reinforced Concrete and Steel Structures, Foundations and Earth Retaining Structures. **b2** Achieve an optimum design of works for transportation and traffic, roadways and airports, railways, sanitary works, irrigation, water resources

Sanitary Works, Irrigation, Water Resources and Harbors; or any other emerging field relevant to the discipline.	and harbors, or any other emerging field relevant to the discipline.
C13 Plan and manage construction processes; address construction defects, instability, and quality issues; maintain safety measures in construction and materials; and assess environmental impacts of projects.	**a1** define plain and mange construction process. **b1** Address construction defects, instability, and quality issues **c1** Assess environmental impacts of projects.
C14 Deal with biddings, contracts and financial issues including project insurance and guarantees.	**a1** define biddings, contracts, and financial issues. **b1** Address biddings, contracts and financial issues including project insurance and guarantees. **c1** Apply biddings, contracts, and financial issues on civil engineering projects

4. Course Contents:

No.	Topics	Lecture	Tutorial	Practical
1	Continuation and conclusion of the investigations on the civil engineering problems of Project I; written reports and team presentations are required.	14	56	-
	Total	**14**	**56**	**-**

5. Teaching and learning methods:

Topics	Face -to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self -learning and Research	Cooperative	Discovering	Modeling	lab
Continuation and conclusion of the investigations on the civil industrial problems		x		x	x	x					x			x

of Project I; written reports and team presentation are required.														

6. Teaching and learning methods for disabled students:

No.	Teaching Methods	Reason
1	Presentation of the course in digital material	Better access any time
2	Wed communication with students	Better communication with certain cases
3	Asking small groups to do assignments; each composed of low, medium, and high-performance students	Knowledge and skills transfer among different levels of students

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Oral Examination	C3 C4 C11 C12 C13 C14	a1, a2, a3, b1 a1, a3, c2, c3 a1, a2, c1 b1, b2 a1, b1, c1 a1, b1, c1
2	Semester work	C3 C4 C11 C12 C13 C14	a1, a2, a3, b1 a1, a3, c2, c3 a1, a2, c1 b1, b2 a1, b1, c1 a1, b1, c1
3	Report evaluation	C5	b1, c1, d1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Oral Examination	at the end of IE 510
2	Semester work	2nd -7th - 9th -14th

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Oral Examination	50%
2	Semester work (Presentation, Report)	50%
	Total	**100%**

8. List of References:

No.	Reference List
1	Subject studies

9. Facilities required for teaching and learning:

facility			
1	Lecture classroom	3	White board
2	Seminar	4	Data show system
5	Lab.		

10. Matrix of knowledge and skills of the course:

No	Topic	Aims	Competencies	LO's
1	Continuation and conclusion of the investigations on the chemical industrial problems of Project I; written reports and team presentation are required.	2, 3, 5, 7, 8, 10	C3 C4 C5 C11 C12 C13 C14	a1, a2, a3, b1 a1, a3, c2, c3 b1, c1, d1 a1, a2, c1 b1, b2 a1, b1, c1 a1, b1, c1

Course Coordinator: Prof. Dr. Mohamed Elkiki
Head of Department: Prof. Dr. Mohamed Elkiki
Date of Approval: 2022

Bridge Engineering
(CIE511)

1. Basic Information:

Program Title	Civil Engineering Program
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Civil Engineering Department
Course Title	Bridge Engineering
Course Code	CIE511
Year/Level	Level 5
Specialization	Major
Authorization Date of Course Specification	-
Pre-request	Complete 100 h

Teaching hours	**Lectures**	**Tutorial**	**Practical**
	2	2	-

2. Course Aims:

No.	Aims
4	Use the techniques, skills, and current engineering tools required for engineering practice by taking full responsibility for one's own learning and development, participating in lifelong learning, and demonstrating the ability to pursue postgraduate and research studies.
7	Achieve an optimum design for bridges, by using elastic theory and practical methods for analysis and design bridges.
10	Use the techniques, skills, and codes of practice effectively and professionally in designing bridges.

3. Intended Learning Outcomes (LO'S):

Competencies	Learning Outcomes (LO'S)
C2 Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess, and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.	**a1** Define, basic characteristics, properties, concepts, and techniques of: structural analysis and mechanics, properties and strength of materials. **b3** Analyze and interpret data
C9 Use creative, innovative, and flexible thinking and acquire entrepreneurial and leadership skills to anticipate and respond to new situations.	**d1** Think creatively in solving problems of design.
C12 Achieve an optimum design of Reinforced Concrete and Steel Structures, Foundations and Earth Retaining Structures; and at least three of	**b1** Achieve an optimum design of bridges.

the following civil engineering topics: Transportation and Traffic, Roadways and Airports, Railways, Sanitary Works, Irrigation, Water Resources and Harbors; or any other emerging field relevant to the discipline.	

4. Course Contents:

No.	Topics	Lecture	Tutorial	Practical
1	Different types of bridges.	4	4	-
2	Planning of bridges: - Parts of bridges. - Layout of bridges.	4	4	-
3	Load calculations and its different effects.	4	4	-
4	Methods of bridge design using the standard specifications codes.	10	10	-
5	Using commercial computer packages for bridge design.	2	2	-
6	Different construction methods in bridges.	4	4	-
Total		**28**	**28**	**-**

5. Teaching and learning methods:

Topics	Face to face lecture	Online lecture	Flipped classroom	Presentation and movies	Discussion	Problem solving	Brainstorming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab
Different types of bridges.	x			x	x									x
Planning of bridges: Parts of bridges - Layout of bridges.	x			x	x									x
Load calculations and its different effects.	x			x	x									x
Methods of bridge design using the standard specifications codes.	x			x	x									x
Using commercial computer packages for bridge design.	x			x	x					x				x

Different construction methods in bridges.	x			x	x					x				x

6. Teaching and learning methods for disabled students:

No.	Teaching Methods	Reason
1	Presentation of the course in digital material	Better access any time
2	Asking small groups to do assignments; each composed of low, medium, and high-performance students.	Knowledge and skills transfer among different level of students.

7. Student evaluation:

7.1 Student evaluation method:

No.	Evaluation Method	Competencies	LO’s
1	Midterm examination	C2 C9 C12	a1, b3 d1 b1
2	Semester work (quizzes, sheets, report)	C2 C9 C12	a1, b3, c1 d1 b1
3	Final term examination	C2 C9 C12	a1, b3 d1 b1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Midterm examination	8^{th}
2	Semester work	$continuous\ evaluation$
3	Final term examination	15^{th}

7.3 Weighting of Evaluation:

No.	Evaluation method	Weights
1	Mid-term examination	20%
2	Semester work	20%
3	Final-term examination	60%
Total		**100%**

8. List of References:

No.	Reference List
1	Course notes: ●Lecture notes prepared by the course coordinator. ●Solved examples.
2	Essential books (textbooks):

	● Egyptian Code of Practice for Steel Construction and Bridges (ASD), Code No. 205, HBRC, 2003. ● Egyptian Code for Planning, Design & Construction of Bridges and Elevated Intersections, Code No. 207-2001, HBRC, 2015.
3	Recommended books: ● John F. Unsworth, "Design and Construction of Modern Steel Railway Bridges", 2nd Ed., CRC Press, 2018. ● Metwally Abu-Hamd "Steel Bridges", Cairo University, 2010.
4	Periodicals, Web sites, etc. o www.bridgeweb.com o www.bridgeengineer.org

9. Facilities required for teaching and learning:

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

10. Matrix of knowledge and skills of the course:

No	Topic	Aims	Competencies	LO's
1	Different types of bridges.	4	C2	a1, b3
2	Planning of bridges: - Parts of bridges. - Layout of bridges.	4,7	C2, C9	a1, b3 d1
3	Load calculations and its different effects.	7,10	C2, C9,	a1, b3 d1
4	Methods of bridge design using the standard specifications codes.	7,10	C2, C9, C12	a1, b3 d1 b1
5	Using commercial computer packages for bridge design.	7,10	C2, C9, C12	c1 d1 b1
6	Different construction methods in bridges.	4	C2, C9,	a1, b3 d1

Course Coordinator: Assoc. Prof. Dr. Ashraf Elsabagh
Head of Department: Prof. Dr. Mohamed Elkiki
Date of Approval: 2022

Coastal Engineering Fundamentals
(CIE512)

1. Basic Information

Program Title	Civil Engineering Program
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Civil Engineering Department
Course Title	Coastal Engineering Fundamentals
Course Code	CIE512
Year/Level	Level 5
Specialization	Major
Authorization Date of Course Specification	-
Pre-request	Complete 100 h

Teaching hours	**Lectures**	**Tutorial**	**Practical**
	2	2	-

2. Course Aims:

No.	Aims
4	Apply knowledge of mathematics, science, engineering concepts, and construct structures to solve fundamental engineering problems for design harbors and marine structures.
7	Achieve an optimum design of coastal protection structures.
10	Select appropriate and sustainable technologies for construction of coastal protection structures

3. Competencies:

Competencies	Learning outcomes (LO'S)
C2 Develop and conduct appropriate analyze and interpret data and use statistical analyses to draw conclusions.	**b4** Evaluate components, systems, and processes are evaluated for their characteristics and performance.

C3 Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global, economic, environmental, ethical, and other aspects as appropriate the principles and contexts of sustainable design and development.	**a1** Learn the general principles of design techniques specific to harbors and marine structures.
C4 Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues, and risk management principles.	**a1** Describe quality assurance systems, codes of practice, and standards, as well as health and safety regulations and environmental concerns.
C11 Select appropriate and sustainable technologies for construction of buildings, infrastructures, and water structures; using either numerical techniques or physical measurements and/or testing by applying a full range of civil engineering concepts and techniques of structural analysis and mechanics, properties and strength of materials, surveying, soil mechanics, hydrology and fluid mechanics.	**a1** Recognize the fundamentals of structural analysis and mechanics, properties and strength of materials, surveying, soil mechanics, hydrology, and fluid mechanics. **a2** Summarize, appropriate and sustainable technologies for construction of marine structures. **c1** Using either numerical techniques or physical measurements and/or testing for coastal hydrodynamics
C12 Achieve an optimum design of marine structures and Harbors.	**b1** Achieve an optimum design of marine structures.
C13 Plan and manage construction processes; address construction defects, instability, and quality issues; maintain safety measures in construction and materials; and assess environmental impacts of projects.	**c1** Assess environmental impacts of projects.

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	Effect of waves on coastal structures	6	6	-

2	design of seawalls, jetties, harbors, ship channels and pipelines	6	6	-
3	diffusion and spreading	4	4	-
4	oil spill containment and collection	6	6	-
6	Analysis of wave data.	6	6	-
Total		**28**	**28**	**-**

5. Teaching and learning methods:

Topics	**Face-to-face lecture**	**Online lecture**	**Flipped Classroom**	**Presentation and movies**	**Discussion**	**Problem solving**	**Brainstorming**	**Projects**	**Site Visits**	**Self learning and Research**	**Cooperative**	**Discovering**	**Modeling**	**Lab**
Effect of waves on coastal structures	x	x			x	x								
design of seawalls, jetties, harbors, ship channels and pipelines	x	x		x	x	x	x						x	
diffusion and spreading	x	x			x	x			x					
oil spill containmen	x	x			x	x			x					

t and collection														
Analysis of wave data.	x	x		x	x	x								

6. Teaching and learning methods for disabled students:

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

7. Student assessment:

7.1 Student Assessment Methods:

No.	Assessment Method	Competencies	LOs
1	Mid Term Examination (written/ online)	C11 C13	a2, c1 c1
2	Formative (quizzes- online quizzes- presentation)	C3 C4	a1 a1
3	Final Term Examination (written)	C3 C4 C11 C12 C13	a1 a1 a1, a2, c1 b1, b2 c1

7.2 Assessment Schedule:

No.	Assessment Method	Weeks
1	Mid Term Examination (written/ online)	8th
2	Practical/ Oral Examination	15th
3	Formative (quizzes- online quizzes presentation-Tutorial and report assessment)	Every week
4	Final Term Examination (written)	Decided by Faculty Council

7.3 Weighting of Assessments:

No.	Assessment Method	Weights
1	Mid Term Examination (written/ online)	20%
2	Formative (quizzes- online quizzes presentation-Tutorial and report assessment)	20%
3	Final Term Examination (written)	60%
Total		100%

8. List of References:

No.	Reference List
1	الكود المصرى للموارد المائيه وأعمال الرى المجلد السابع الطبعه الأولى 2003

2	Carl A. Thoresen, port Designers Handbook Third edition, 2018.
3	Gregory Tsinker, Handbook of port and Harbor Engineering: Geotechnical and structural and structural Aspects, 2018.
4	Journal of Geotechnical Engineering (ASCE).
5	Journal of Hydraulic Division (ASCE).

9. Facilities Required for Teaching and Learning:

No.	Facility
1	Lecture Classroom
2	Lab Facilities
3	White Board
4	Data Show System
5	Presenter

10. Matrix of knowledge and skills of the course:

No.	Topic	Aims	Competencies	LO's
1	Effect of waves on coastal structures	1	C11 C13	a2 c1
2	Design of seawalls, jetties, harbors, ship channels and pipelines	1	C4	a1
3	Diffusion and spreading	1	C11 C13	c1 c1
4	Oil spill containment and collection	1	C11 C12	a1 b1
5	Analysis of wave data.	1	C3 C2	a1 b4

Course Coordinator: Prof. Dr. Osami Rageh
Head of Department: Prof. Dr. Mohamed Elkiki
Date of Approval: 2022

Concrete Structures Technology
(CIE513)

1. Basic Information:

Program Title	Civil Engineering Program
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Civil Engineering Department
Course Title	Concrete Structure Technology
Course Code	CIE513
Year/Level	Level 5
Specialization	Minor – Elective Course
Authorization Date of Course Specification	-
Pre- request	Complete 100 h

Teaching hours	Lectures	Tutorial	Practical
	2	2	-

2. Course Aims

No.	Aims
8	Select appropriate and sustainable technologies for construction of buildings, infrastructures, and water structures, using numerical techniques, experiment measurements, and testing by applying a full range of civil engineering fields such as properties and strength of materials
10	Select appropriate and sustainable technologies for construction of buildings, infrastructures, and water structures, using numerical techniques, experiment measurements, and testing by applying a full range of civil engineering fields such as properties and strength of materials

3. Competencies:

Competencies	Learning Outcomes (LO'S)
C2 Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess, and evaluate findings, and use statistical analyses and objective. engineering judgment to draw conclusions	**a2** Define the principles, basic properties, and features of construction material, as well as their use in sustainable technologies for construction of buildings.
C4 Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements,	**a1** Describe codes of practice, and standards, as well as health and safety regulations.

environmental issues, and risk management principles	**a3** Define contemporary engineering technologies and their applications in relation to disciplines.
C11 Select appropriate and sustainable technologies for construction of buildings, infrastructures, and water structures, using either numerical techniques or physical measurements and/or testing by applying a full range of civil engineering concepts and techniques of properties and strength of materials	**a1** Recognize the fundamentals of properties and strength of materials. **a2** Summarize, appropriate and sustainable technologies for construction of buildings,

4. Course Contents:

No.	Topics	Lecture	Tutorial	Practical
1	Advantages and limitations of concrete, types of cements admixtures, batching equipment, types of mixers, ready mixed concrete, pumping equipment, slip forming, concreting	8	8	-
2	Casting in lifts, finishing concrete, hot weather concreting, formwork design, methods of curing, strength of concrete, destructive and nondestructive testing of concrete	12	12	-
3	Durability, repair, and maintenance of concrete.	8	8	-
Total		**28**	**28**	**-**

5. Teaching and learning methods:

Topics	Face -to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self -learning and Research	Cooperative	Discovering	Modeling	lab
Advantages and limitations of concrete, types of cements admixtures,	√			√	√	√	√						√	

batching equipment, types of mixers, ready mixed concrete, pumping equipment, slip forming, concreting														
Casting in lifts, finishing concrete, hot weather concreting, formwork design, methods of curing, strength of concrete, destructive and nondestructive testing of concrete	√				√	√	√			√			√	
Durability, repair, and maintenance of concrete.	√				√	√	√		√					√

6. Teaching and learning methods for disabled students:

No.	Teaching Methods	Reason
1	Presentation of the course in digital material	Better access any time
2	Wed communication with students	Better communication with certain cases
3	Asking small groups to do assignments; each composed of low, medium, and high-performance students	Knowledge and skills transfer among different levels of students
4	Electronic model system for the Institution.	E. learning

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Midterm examination	C2 C11	a2 a1, a2
2	Semester work (quizzes, sheets, report)	C4	a1 a3

		C11	a1 a2
3	Final term examination	C2 C4 C11	a 2 a1, a3 a1, a2

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Midterm examination	8th
2	Semester work	all
3	Final term examination	15th

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Midterm examination	20%
2	Semester work	20%
3	Final term examination	60%
	Total	**100%**

8. List of References:

Reference List
Eric Fleming (2018), construction technology an illustrated introduction, black well publishing.
محمود امام ومحمد امين "خواص ومقاومة المواد" – الجزء الثانى ، كلية الهندسة جامعة المنصورة.
"الكود المصرى لتصميم وتنفيذ المنشآت الخرسانية المسلحة كود رقم203" التحديث الثانى(2018) وزارة الإسكان والمرافق والمجتمعات العمرانية – مركز بحوث الإسكان والبناء والتخطيط العمرانى – جمهورية مصر العربية.

9. Facilities required for teaching and learning:

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

10. Matrix of knowledge and skills of the course:

No	Topic	Aims	Competencies	LO's
1	Advantages and limitations of concrete, types of cements and admixtures, batching equipment, types of mixers, ready-mixed concrete, pumping equipment, slip forming, concreting	8,10	C4 C11	a3, a1 a1, a2
2	Casting in lifts, finishing concrete, hot weather concreting, formwork design, methods of curing, strength of concrete, destructive and nondestructive testing of concrete	8,10	C4 C11 C2	a 3, a 1 a1 a2 a2
3	Durability, repair, and maintenance of concrete.	8,10	C11	a1, a2

			C2	a 2

Course Coordinator: Dr. Nesreen Elawadly
Head of Department: Prof. Dr. Mohamed Elkiki
Date of Approval: 2022

Construction Contracting
(CIE514)

1. Basic Information

Program Title	Civil Engineering Program
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Civil Engineering Department
Course Title	Construction Contracting
Course Code	CIE514
Year/Level	Level 5
Specialization	Minor – Elective Course
Authorization Date of Course Specification	-
Prerequisite	Complete 100 CH

Teaching Hours	**Lectures**	**Tutorial**	**Practical**
	2	2	-

2. Course Aims:

No.	Aims
6	Analyze data from the intended tests to manage resources creatively.
8	Plan and manage construction processes; address construction defects, instability, and quality issues; maintain safety measures in construction and materials; and assess the environmental impacts of projects.
9	Deal with biddings, contracts, and financial issues including project insurance and guarantees.

3. Competencies:

Competencies	Learning Outcomes (LOs)
C3 Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global, cultural, social, economic, environmental, ethical, and other aspects as appropriate to the discipline, and within the principles and contexts of sustainable design and development.	**b1** Judge engineering decisions considering balanced costs, benefits, safety, quality, reliability, and environmental impact. **c2** Applying engineering design procedures to generate cost-effective solutions while adhering to sustainable design and development principles and contexts.
C9 Use creative, innovative, and flexible thinking and acquire entrepreneurial and leadership skills to anticipate and respond to new situations.	**d2** Effectively manage tasks, time, and resources.

C13 Plan and manage construction processes; address construction defects, instability, and quality issues; maintain safety measures in construction and materials; and assess the environmental impacts of projects.	**a1** Define the plan and manage the construction process.
C14 Deal with biddings, contracts, and financial issues including project insurance and guarantees.	**a1** Define biddings, contracts, and financial issues. **b1** Address biddings, contracts, and financial issues including project insurance and guarantees. **c1** Apply biddings, contracts, and financial issues on civil engineering projects.

4. Course Contents:

No.	Topics	Lecture	Tutorial	Practical
1	Construction Contracting for Contracts, Architects, and Owners	2	2	-
2	Organization and Administration Industry Structure	2	2	-
3	Construction Contracts, Bonds, and Insurance	2	2	-
4	Planning, Estimating, and Control	4	4	-
5	Quantity Takeoff and Pricing	4	4	-
6	Labor, Equipment, Excavation and Concrete Estimate	6	6	-
7	Proposal Preparation	2	2	-
8	Scheduling, Accounting, and Cost Control	4	4	-
9	Contract Documents to Prepare Detailed Estimate	2	2	-
Total		**28**	**28**	**-**

5. Teaching and Learning Methods:

No.	Topics	Face-To-Face Lecture	Online Lecture	Flipped Classroom	Presentation and Movies	Discussion	Problem-Solving	Brain Storming	Projects	Site Visits	Self-Learning and Research	Cooperative	Discovering	Modeling	Lab
1	Construction Contracting for		√			√									

	Contracts, Architects, and Owners														
2	Organization and Administration Industry Structure	√			√										
3	Construction Contracts, Bonds, and Insurance		√			√									
4	Planning, Estimating, and Control	√			√										
5	Quantity Takeoff and Pricing		√				√								
6	Labor, Equipment, Excavation and Concrete Estimate	√							√						
7	Proposal Preparation	√							√						
8	Scheduling, Accounting, and Cost Control		√			√									
9	Contract Documents to Prepare Detailed Estimate	√			√										

6. Teaching and Learning Methods for Disabled Students:

No.	Teaching Method	Reason
1	Presentation of The Course in Digital Material	Better Access at Any Time
2	Wed Communication with Students	Better Communication with Certain Cases
3	Asking Small Groups to Do Assignments; Each Composed of Low, Medium, and High-Performance Students	Knowledge and Skills Transfer Among Different Levels of Students
4	An Electronic Model System for The Institution	E. Learning

7. Student Evaluation:

7.1 Student Evaluation Method:

No.	Evaluation Method	Competencies	LOs
1	Semester Works (Quizzes, Sheets, Reports)	C3 C9	b1, c2 d2

		C13 C14	a1 a1, b1, c1
2	Mid-Term Exam	C9 C13 C14	d2 a1 a1, b1, c1
3	Final-Term Exam	C3 C9 C13 C14	b1, c2 d2 a1 a1, b1, c1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Semester Works (Quizzes, Sheets, Reports)	4^{th}, 11^{th}
2	Mid-Term Exam	8^{th}
3	Final-Term Exam	15^{th}

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Semester Works (Quizzes, Sheets, Reports)	20%
2	Mid-Term Exam	20%
3	Final-Term Exam	60%
Total		**100%**

8. List of References:

No.	Reference List
1	Wiley-Blackwell. Code of Practice for Project Management for Construction and Development. Chartered Institute of Building (Great Britain).
2	Kerzner, Harold. Project Management Workbook. A System Approach to Planning, Scheduling, and Control.
3	de Marco, A. Project Management for Facility Constructions A Guide for Engineers, and Architects.
4	Project Management Institute and Project Management Institute. A Guide to the Project Management Body of Knowledge (PMBOK Guide).
5	Lester, Albert. Project Management, Planning, and Control. Managing Engineering, Construction, and Manufacturing Projects to PMI, APM, and BSI Standards.
6	Vanhoucke, M. Management for Professionals Integrated Project Management and Control.

9. Facilities Required for Teaching and Learning:

Facility			
1	Lecture Classroom	**3**	White Board
2	Seminar	**4**	Data Show System

10. Matrix of Knowledge and Skills:

No.	Topic	Aims	Competencies	LOs
1	Construction Contracting for Contracts, Architects, and Owners	9	C14	a1, b1, c1
2	Organization and Administration Industry Structure	6, 8	C9 C13	d2 a1
3	Construction Contracts, Bonds, and Insurance	9	C14	a1, b1, c1
4	Planning, Estimating, and Control	6, 8	C9 C13	d2 a1
5	Quantity Takeoff and Pricing	6, 8	C3 C9 C13	b1, c2 d2 a1
6	Labor, Equipment, Excavation and Concrete Estimate	6, 8	C3 C9 C13	b1, c2 d2 a1
7	Proposal Preparation	9	C14	a1, b1, c1
8	Scheduling, Accounting, and Cost Control	6, 8	C3 C9 C13	b1, c2 d2 a1
9	Contract Documents to Prepare Detailed Estimate	9	C14	a1, b1, c1

Course Coordinator: Prof. Dr. Mohamed Elkiki
Head of Department: Prof. Dr. Mohamed Elkiki
Date of Approval: 2022

Cost Analysis for Structure Projects (CIE515)

1. Basic Information:

Program Title	Civil Engineering Program
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Civil Engineering Department
Course Title	Cost Analysis for Structure Projects
Course Code	CIE515
Year/Level	Level 5
Specialization	Minor – Elective Course
Authorization Date of Course Specification	-
Prerequisite	Complete 100 CH

	Lectures	Tutorial	Practical
Teaching Hours	2	2	-

2. Course Aims:

No.	Aims
6	Analyze data from the intended tests to manage resources creatively.
8	Plan and manage construction processes; address construction defects, instability, and quality issues; maintain safety measures in construction and materials; and assess the environmental impacts of projects.

3. Competencies:

Competencies	Learning Outcomes (LOs)
C3 Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global, cultural, social, economic, environmental, ethical, and other aspects as appropriate to the discipline, and within the principles and contexts of sustainable design and development.	**b1** Judge engineering decisions considering balanced costs, benefits, safety, quality, reliability, and environmental impact. **c1** Incorporate economic, societal, global, environmental, and risk management factors into design. **c2** Applying engineering design procedures to generate cost-effective solutions while adhering to sustainable design and development principles and contexts.
C5 Practice research techniques and methods of investigation as an inherent part of learning.	**c1** Prepare technical reports.
C9 Use creative, innovative, and flexible thinking and acquire entrepreneurial	**d2** Effectively manage tasks, time, and resources.

and leadership skills to anticipate and respond to new situations.	
C13 Plan and manage construction processes; address construction defects, instability, and quality issues; maintain safety measures in construction and materials; and assess the environmental impacts of projects.	**a1** Define the plan and manage the construction process.

4. Course Contents:

No.	Topics	Lecture	Tutorial	Practical
1	Direct and Indirect Costs	4	4	-
2	Collective Systems, and Comparisons Between Projects	8	8	-
3	Fundamentals of Cost Analysis for Wood, Steel, and Concrete Buildings	6	6	-
4	Preparing Projects and Report Writing	6	6	-
5	Case Study	4	4	-
Total		**28**	**28**	**-**

5. Teaching and Learning Methods:

No.	Topics	Face-To-Face Lecture	Online Lecture	Flipped Classroom	Presentation and Movies	Discussion	Problem-Solving	Brain Storming	Projects	Site Visits	Self-Learning and Research	Cooperative	Discovering	Modeling	Lab
1	Direct and Indirect Costs	√				√									
2	Collective Systems, and Comparisons Between Projects		√		√										
3	Fundamentals of Cost Analysis for		√				√								

	Wood, Steel, and Concrete Buildings														
4	Preparing Projects and Report Writing	√			√										
5	Case Study		√						√						

6. Teaching and Learning Methods for Disabled Students:

No.	Teaching Method	Reason
1	Presentation of The Course in Digital Material	Better Access at Any Time
2	Wed Communication with Students	Better Communication with Certain Cases
3	Asking Small Groups to Do Assignments; Each Composed of Low, Medium, and High-Performance Students	Knowledge and Skills Transfer Among Different Levels of Students
4	An Electronic Model System for The Institution	E. Learning

7. Student Evaluation:

7.1 Student Evaluation Method:

No.	Evaluation Method	Competencies	LOs
1	Semester Works (Quizzes, Sheets, Reports)	C3 C5 C9 C13	b1, c1, c2 c1 d2 a1
2	Mid-Term Exam	C3 C9 C13	b1, c1, c2 d2 a1
3	Final-Term Exam	C3 C5 C9 C13	b1, c1, c2 c1 d2 a1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Semester Works (Quizzes, Sheets, Reports)	4^{th}, 11^{th}
2	Mid-Term Exam	8^{th}
3	Final-Term Exam	15^{th}

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Semester Works (Quizzes, Sheets, Reports)	20%
2	Mid-Term Exam	20%
3	Final-Term Exam	60%

Total	**100%**

8. List of References:

No.	Reference List
1	Wiley-Blackwell. Code of Practice for Project Management for Construction and Development. Chartered Institute of Building (Great Britain).
2	Kerzner, Harold. Project Management Workbook. A System Approach to Planning, Scheduling, and Control.
3	de Marco, A. Project Management for Facility Constructions A Guide for Engineers, and Architects.
4	Project Management Institute and Project Management Institute. A Guide to the Project Management Body of Knowledge (PMBOK Guide).
5	Lester, Albert. Project Management, Planning, and Control. Managing Engineering, Construction, and Manufacturing Projects to PMI, APM, and BSI Standards.
6	Vanhoucke, M. Management for Professionals Integrated Project Management and Control.

9. Facilities Required for Teaching and Learning:

Facility			
1	Lecture Classroom	3	White Board
2	Seminar	4	Data Show System

10. Matrix of Knowledge and Skills:

No.	Topic	Aims	Competencies	LOs
1	Direct and Indirect Costs	6, 8	C3	b1, c1, c2
2	Collective Systems, and Comparisons Between Projects	6, 8	C3 C9 C13	b1, c1, c2 d2 a1
3	Fundamentals of Cost Analysis for Wood, Steel, and Concrete Buildings	6, 8	C3 C9 C13	b1, c1, c2 d2 a1
4	Preparing Projects and Report Writing	6, 8	C5	c1
5	Case Study	6, 8	C3 C5 C9 C13	b1, c1, c2 c1 d2 a1

Course Coordinator: Prof. Dr. Mohamed Elkiki
Head of Department: Prof. Dr. Mohamed Elkiki
Date of Approval: 2022

Design of Earthquake Structures (CIE516)

1. Basic Information:

Program Title	Civil Engineering Program
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Civil Engineering Department
Course Title	Design of Earthquake Structures
Course Code	CIE516
Year/Level	Level 5
Specialization	Major
Authorization Date of Course Specification	-
Pre-request	Complete 100 h

Teaching hours	**Lectures**	**Tutorial**	**Practical**
	2	2	-

2. Course Aims:

No.	Aims
7	Achieve an optimum design of Reinforced Concrete and Steel Structures, by using elastic theory and practical methods for analysis and design earthquake structures.
10	Use the techniques, skills, and codes of practice effectively and professionally in Designing earthquake structures.

3. Intended Learning Outcomes (LO'S):

Competencies	Learning Outcomes (LO'S)
C6 Plan, supervise and monitor implementation of engineering projects, taking into consideration other trades requirements.	**a1** Show the appropriate and sustainable technologies for design of reinforced concrete and metallic structures.
C11 Select appropriate and sustainable technologies for construction of buildings, infrastructures and water structures; using either numerical techniques or physical measurements and/or testing by applying a full range of civil engineering concepts and techniques of structural analysis and mechanics, properties and strength of materials, surveying, soil mechanics, hydrology and fluid mechanics.	**a1** Recognize the different engineering principles related to the design of reinforced concrete and metallic structures to geotechnical and foundations. **a2** Summarize, appropriate and sustainable technologies for construction and design of reinforced concrete and metallic structures to geotechnical and foundations

C12 Achieve an optimum design of Reinforced Concrete and Steel Structures, Foundations and Earth Retaining Structures; and at least three of the following civil engineering topics: Transportation and Traffic, Roadways and Airports, Railways, Sanitary Works, Irrigation, Water Resources and Harbors; or any other emerging field relevant to the discipline.	**b1** Achieve an optimum design of reinforced concrete and metallic structures to geo-technical and foundations

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	Causes of earthquakes	2	2	-
2	Seismic waves, scales of earthquakes	4	4	-
3	Equation of motion for single degree of freedom and multi-degree of freedom systems	4	4	-
4	Structural behavior under random forces	4	4	-
5	Spectral analysis depending on soil conditions	4	4	-
6	Modal analysis for multi strong buildings	4	4	-
7	Design principles for earthquake structures according to the Egyptian code	6	6	-
Total		**28**	**28**	**-**

5. Teaching and learning methods:

Topics	Face to face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problems solving	Brainstorming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	lab
Causes of earthquakes	x	x			x	x	x							
Seismic waves, scales of earthquakes	x	x			x	x	x							

Equation of motion for single degree of freedom and multi-degree of freedom systems	x	x			x	x	x							
Structural behavior under random forces	x	x			x	x	x							
Spectral analysis depending on soil conditions	x	x			x	x	x							
Modal analysis for multi strong buildings	x	x			x	x	x							
Design principles for earthquake structures according to the Egyptian code	x	x			x	x	x							

6. Teaching and learning methods for disabled students:

No.	Teaching Methods	Reason
1	Presentation of the course in digital material	Better access any time
2	Asking small groups to do assignments; each composed of low, medium, and high-performance students.	Knowledge and skills transfer among different level of students.

7. Student evaluation:

7.1 Student evaluation method:

No.	Evaluation Method	Competencies	LO’s
1	Mid Term Examination	C6 C11	a1 a1
2	Semester work	C11	a1, a2
3	Final Term Examination	C6 C11 C12	a1 a1, a2 b1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Semester work	$2nd, 7th$, $9th$
2	Mid Term examination	$8th$
3	Final term examination	$15th$

7.3 Weighting of Evaluation:

No.	Evaluation method	Weights

1	Mid-term examination	20%
2	Semester work	20%
3	Final-term examination	60%
Total		**100%**

8. List of References:

No.	Reference List
1	**Course notes:** Are delivered during the lecture, including handout materials such as solved problems, design charts, tables, etc.
2	**Essential books (textbooks / design codes):** Egyptian Code for Design and Construction of Reinforced Concrete Structures 2032001. Design Aids and Examples in Accordance with the Egyptian Code for Design and Construction of Reinforced Concrete Structures 203-2018. Seismic Design of Concrete Buildings to Eurocode, Michael Fardis, Eduardo Carvalho, Peter Fajfar · 2018 Seismic Isolation, Structural Health Monitoring, Azer A. Kasimzade, Erdal Şafak, Carlos E. Ventura · 2018 Structural Dynamics in Earthquake and Blast Resistant Design, BK Raghu Prasad · 2020
3	**Recommended books:** Chu-Kia Wang and Charles G. Salmon, "Reinforced Concrete Design," 4th Edition, Harper and Row Publishers, New York, 2018.

9. Facilities required for teaching and learning:

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

10. Matrix of knowledge and skills of the course:

No.	Topic	Aims	Competencies	LO's
1	Causes of earthquakes	7	C6	a1
2	Seismic waves, scales of earthquakes	10	C11	a1
3	Equation of motion for single degree of freedom and multi-degree of freedom systems	10	C11 C12	a1 a1, b1
4	Structural behavior under random forces	10	C11	a2
5	Spectral analysis depending on soil conditions	10	C11	a1
6	Modal analysis for multi strong buildings	10	C11	a1, a2

7	Design principles for earthquake structures according to the Egyptian code	10	C12	a1, b1

Course Coordinator: Dr. Rafeek Wadieh
Head of Department: Prof. Dr. Mohamed Elkiki
Date of Approval: 2022

Design of Marine Platforms
(CIE517)

1. Basic Information:

Program Title	Civil Engineering Program
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Civil Engineering Department
Course Title	Design of Marine Platforms
Course Code	CIE517
Year/Level	Level 5
Specialization	Major
Authorization Date of Course Specification	-
Pre-request	Complete 100 h

Teaching hours	**Lectures**	**Tutorial**	**Practical**
	2	2	-

2. Course Aims:

No.	Aims
4	Apply knowledge of mathematics, science, engineering concepts, and construct structures to solve fundamental engineering problems for design harbors and marine structures.
7	Achieve an optimum design of marine platforms
10	Select appropriate and sustainable technologies for construction of of marine platforms

3. Competencies:

Competencies	Learning outcomes (LO'S)
C2 Develop and conduct appropriate analyze and interpret for coastal data to draw conclusions.	**b3** Analyze and interpret data
C3 Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global, economic, environmental, ethical, and other aspects as appropriate the principles and contexts of sustainable design and development.	**a1** Learn the general principles of design techniques specific to harbors and marine structures.
C4 Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues, and risk management principles.	**a1** Describe quality assurance systems, codes of practice, and standards, as well as health and safety regulations and environmental concerns.

C6 Plan, supervise and monitor implementation of engineering projects, taking into consideration other requirements	**a1** Show the appropriate and sustainable technologies for construction of marine platforms
C11 Select appropriate and sustainable technologies for construction of marine platforms	**a2** Summarize, appropriate and sustainable technologies for construction of marine structures.
C12 Achieve an optimum design of marine structures and Harbors.	**b1** Achieve an optimum design of marine structures.

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	Marine platform (definition – types)	6	6	-
2	Loads affecting the marine platforms – tide and wind forces	8	8	
2	Loads affecting the marine platforms	6	6	-
3	Design of fixed marine platforms	8	8	-
Total		**28**	**28**	**-**

5. Teaching and learning methods:

Topics	Face-to-face lecture	Online lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brainstorming	Projects	Site Visits	Self learning and Research	Cooperative	Discovering	Modeling	Lab
Marine platform (definition – types)	x	x			x	x								

Loads affecting the marine platforms – tide and wind forces	x	x		x	x	x								
Loads affecting the marine platforms	x	x			x	x								
Design of fixed marine platforms	x	x			x	x								

6. Teaching and learning methods for disabled students:

No.	Teaching Methods	Reason
1	Presentation of the course in digital material.	Better access any time.
2	Asking small groups to do assignments; each composed of low, medium, and high-performance students.	Knowledge and skills transfer among different levels of students.

7. Student assessment:

7.1 Student Assessment Methods:

No.	Evaluation Method	Competencies	LOs
1	Mid Term Examination (written/ online)	C11	a2
2	Formative (quizzes- online quizzes- presentation)	C12 C3 C4	b2 a1 a1
3	Final Term Examination (written)	C3 C4 C11	a1 a1 a2

7.2 Assessment Schedule:

No.	Assessment Method	Weeks
1	Mid Term Examination (written/ online)	8th
2	Practical/ Oral Examination	15th
3	Formative (quizzes- online quizzes presentation-Tutorial and report assessment)	Every week
4	Final Term Examination (written)	Decided by Faculty Council

7.3 Weighting of Assessments:

No.	Assessment Method	Weights
1	Mid Term Examination (written/ online)	20%
2	Formative (quizzes- online quizzes presentation Tutorial and report assessment)	20%

3	Final Term Examination (written)	60%
Total		100%

8. List of References:

No.	Reference List
1	Carl A. Thoresen, port Designers Handbook Third edition, 2018
2	Gregory Tsinker, Handbook of port and Harbor Engineering: Geotechnical and structural and structural Aspects, 2018.

9. Facilities required for teaching and learning:

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

10. Matrix of knowledge and skills of the course:

No.	Topic	Aims	Competencies	LO's
1	Marine platform (definition – types)	1	C11 C12	a2 b1
2	Loads affecting the marine platforms – tide and wind forces	1	C3 C11	a1 a2
3	loads affecting the marine platforms	1	C3 C2	a1 b3
4	design of fixed marine platforms	1	C4 C6	a1 a1

Course Coordinator: Prof. Dr. Osami Rageh
Head of Department: Prof. Dr. Mohamed Elkiki
Date of Approval: 2022

Design of Shell Structures
(CIE519)

1. Basic Information:

Program Title	Civil Engineering Program
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Civil Engineering Department
Course Title	Design of Shell Structures
Course Code	CIE519
Year/Level	Level 5
Specialization	Minor – Elective Course
Authorization Date of Course Specification	-
Pre-request	Complete 100 h

Teaching hours	**Lectures**	**Tutorial**	**Practical**
	2	1	-

2. Course Aims:

No.	Aims
4	Use the techniques, skills, and current engineering tools required for engineering practice by taking full responsibility for one's own learning and development, participating in lifelong learning, and demonstrating the ability to pursue postgraduate and research studies.
7	Achieve an optimum design a system for components, process, constraints, construct, and protect all types of shell structures.
10	For reinforced concrete structures, select appropriate and sustainable technologies by applying a full range of civil engineering fields such as structural analysis and mechanics, material properties, hydrology and fluid mechanics.

3. Intended Learning Outcomes (LO'S):

Competencies	Learning Outcomes (LO'S)
C2 Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess, and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.	**a1** Define, basic characteristics, properties, concepts, and techniques of structural analysis and mechanics, properties, and strength of materials.
C9 Use creative, innovative, and flexible thinking and acquire entrepreneurial and leadership skills to anticipate and respond to new situations.	**d1** Think creatively in solving problems of design.

C12 Achieve an optimum design of Reinforced Concrete and Steel Structures, Foundations and Earth Retaining Structures.	**b1** Achieve an optimum design of Reinforced Concrete structures.

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	forces and stresses affecting the shell structures	8	8	-
2	analysis of shell structures	10	10	-
3	design of shell structures	10	10	-
Total		**28**	**28**	-

5. Teaching and learning methods:

Topics	Face -to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self -learning and Research	Cooperative	Discovering	Modeling	lab
forces and stresses affecting the shell structures		x			x			x						x
analysis of shell structures		x			x			x						x
design of shell structures		x			x			x						x

6. Teaching and learning methods for disabled students:

No.	Teaching Methods	Reason
1	Presentation of the course in digital material	Better access any time
2	Asking small groups to do assignments; each composed of low, medium, and high-performance students.	Knowledge and skills transfer among different level of students.

7. Student evaluation:

7.1 Student evaluation method:

No.	Evaluation Method	Competencies	LO’s
1	Mid Term Examination	C2 C9	a1 d1
2	Semester work	C9	d1
3	Final Term Examination	C2 C9 C12	a1 d1 b1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Semester work	$2nd$, $7th$, $9th$
2	Mid Term examination	$8th$
3	Final term examination	$15th$

7.3 Weighting of Evaluation:

No.	Evaluation method	Weights
1	Mid-term examination	20%
2	Semester work	20%
3	Final-term examination	60%
	Total	**100%**

8. List of References:

No.	Reference List
1	**Essential books:** Design Principles and Analysis of Thin Concrete Shells, Iakov Iskhakov, Yuri Ribakov · 2020 Processing of Slender Concrete Shells – Fabrication, Eisenbach, Philipp · 2018
2	**Recommended books:** Theory and design of concrete shells by Dr. BBINOY KUMARI CHATTERIEE. Reinforced concrete designer’s handbook by CHARL - REYNOLDS

9. Facilities required for teaching and learning:

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

10. Matrix of knowledge and skills of the course:

No.	Topic	Aims	Competencies	LO’s

1	forces and stresses affecting the shell structures	7	C2	a1
2	analysis of shell structures	10	C2 C9	a1 d1
3	design of shell structures	10	C9 C12	d1 b1

Course Coordinator: Dr. Rafeek Wadieh
Head of Department: Prof. Dr. Mohamed Elkiki
Date of Approval: 2022

Engineering Project Evaluation (CIE520)

1. Basic Information:

Program Title	Civil Engineering Program
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Civil Engineering Department
Course Title	Engineering Project Evaluation
Course Code	CIE520
Year/Level	Level 5
Specialization	Minor – Elective Course
Authorization Date of Course Specification	-
Prerequisite	Complete 100 CH

Teaching Hours	**Lectures**	**Tutorial**	**Practical**
	2	2	-

2. Course Aims:

No.	Aims
6	Analyze data from the intended tests to manage resources creatively.
8	Plan and manage construction processes; address construction defects, instability, and quality issues; maintain safety measures in construction and materials; and assess the environmental impacts of projects.

3. Competencies:

Competencies	Learning Outcomes (LOs)
C3 Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global, cultural, social, economic, environmental, ethical, and other aspects as appropriate to the discipline, and within the principles and contexts of sustainable design and development.	**a3** Recognizes the various construction defects, instability, and quality issues and assesses the environmental impacts of projects. **b1** Judge engineering decisions considering balanced costs, benefits, safety, quality, reliability, and environmental impact. **c1** Incorporate economic, societal, global, environmental, and risk management factors into design.
C4 Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements,	**a1** Describe quality assurance systems, codes of practice, standards, health and safety regulations, and environmental concerns.

environmental issues, and risk management principles.	**c2** Use fundamental organizational and project management abilities.
C13 Plan and manage construction processes; address construction defects, instability, and quality issues; maintain safety measures in construction and materials; and assess the environmental impacts of projects.	**(a1)** Define the plan and manage the construction process. **(c1)** Assess the environmental impacts of projects.

4. Course Contents:

No.	Topics	Lecture	Tutorial	Practical
1	Fundamentals of Project Appraisal and Feasibility Study	6	6	-
2	Planning of Civil Engineering Projects	6	6	-
3	Economic Analysis of Civil Engineering Projects	6	6	-
4	Introduction to Environmental and Social Impact Assessment	6	6	-
5	Case Studies on Civil Engineering Project Appraisal	4	4	-
Total		**28**	**28**	**-**

5. Teaching and Learning Methods:

No.	Topics	Face-To-Face Lecture	Online Lecture	Flipped Classroom	Presentation and Movies	Discussion	Problem-Solving	Brainstorming	Projects	Site Visits	Self-Learning and Research	Cooperative	Discovering	Modeling	Lab
1	Fundamentals of Project Appraisal and Feasibility Study	√			√										
2	Planning of Civil Engineering Projects		√			√									
3	Economic Analysis of Civil Engineering Projects	√			√										

4	Introduction to Environmental and Social Impact Assessment		√								√				
5	Case Studies on Civil Engineering Project Appraisal		√						√						

6. Teaching and Learning Methods for Disabled Students:

No.	Teaching Method	Reason
1	Presentation of The Course in Digital Material	Better Access at Any Time
2	Wed Communication with Students	Better Communication with Certain Cases
3	Asking Small Groups to Do Assignments; Each Composed of Low, Medium, and High-Performance Students	Knowledge and Skills Transfer Among Different Levels of Students
4	An Electronic Model System for The Institution	E. Learning

7. Student Evaluation:

7.1 Student Evaluation Method:

No.	Evaluation Method	Competencies	LOs
1	Semester Works (Quizzes, Sheets, Reports)	C3 C4 C13	a3, b1, c1 a1, c2 a1, c1
2	Mid-Term Exam	C3 C4 C13	a3, b1, c1 a1, c2 a1, c1
3	Final-Term Exam	C3 C4 C13	a3, b1, c1 a1, c2 a1, c1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Semester Works (Quizzes, Sheets, Reports)	4^{th}, 11^{th}
2	Mid-Term Exam	8^{th}
3	Final-Term Exam	15^{th}

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Semester Works (Quizzes, Sheets, Reports)	20%
2	Mid-Term Exam	20%
3	Final-Term Exam	60%
Total		**100%**

8. List of References:

No.	Reference List
1	Wiley-Blackwell. Code of Practice for Project Management for Construction and Development. Chartered Institute of Building (Great Britain).
2	Kerzner, Harold. Project Management Workbook. A System Approach to Planning, Scheduling, and Control.
3	de Marco, A. Project Management for Facility Constructions A Guide for Engineers, and Architects.
4	Project Management Institute and Project Management Institute. A Guide to the Project Management Body of Knowledge (PMBOK Guide).
5	Lester, Albert. Project Management, Planning, and Control. Managing Engineering, Construction, and Manufacturing Projects to PMI, APM, and BSI Standards.
6	Vanhoucke, M. Management for Professionals Integrated Project Management and Control.

9. Facilities Required for Teaching and Learning:

Facility			
1	Lecture Classroom	3	White Board
2	Seminar	4	Data Show System

10. Matrix of Knowledge and Skills:

No.	Topic	Aims	Competencies	LOs
1	Fundamentals of Project Appraisal and Feasibility Study	6, 8	C3 C4 C13	a3, b1, c1 a1, c2 a1, c1
2	Planning of Civil Engineering Projects	6, 8	C13	a1, c1
3	Economic Analysis of Civil Engineering Projects	6, 8	C3	a3, b1, c1
4	Introduction to Environmental and Social Impact Assessment	6, 8	C3 C4 C13	a3, b1, c1 a1, c2 a1, c1
5	Case Studies on Civil Engineering Project Appraisal	6, 8	C3 C4 C13	a3, b1, c1 a1, c2 a1, c1

Course Coordinator: Prof. Dr. Mohamed Elkiki
Head of Department: Prof. Dr. Mohamed Elkiki
Date of Approval: 2022

Environmental Pollution Control
(CIE521)

1. Basic Information:

Program Title	Civil Engineering Program
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Civil Engineering Department
Course Title	Environmental Pollution Control
Course Code	CIE521
Year/Level	Level 5
Specialization	Minor – Elective Course
Authorization Date of Course Specification	-
Pre- request	Complete 100 h

Teaching hours	Lectures	Tutorial	Practical
	2	2	-

2. Course Aims

No.	Aims
4	Use the techniques, skills, and current engineering tools required for wastewater engineering practice by taking full responsibility for one's own learning and development, participating in lifelong learning, and demonstrating the ability to pursue research studies.
7	Achieve an optimum design for wastewater treatment plants and sewerage system.
10	Plan and manage construction processes for wastewater treatment plants, pollution control and assess environmental impacts of projects.

3. Competencies:

Competencies	Learning Outcomes (LO'S)
C1 Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science, and mathematics.	**a3** Explain the basic principles of wastewater engineering works. **b2** Using scientific concepts and theories that are relevant to wastewater and pollution control works.
C3 Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for environmental, and other aspects as appropriate to the discipline and within the principles and contexts of sustainable design and development.	**a2** Understand the professional ethics and impacts of engineering solutions on the environment. **a3** Recognize the various construction defects, instability, and quality issues and assess the project's environmental impacts. **c1** Incorporate environmental, and pollution control into the design.

C12 Achieve an optimum design of wastewater treatment works for environmental control and protection.	**b2** Achieve an optimum design of wastewater treatment plants and sewerage systems.
C13 Plan and manage appropriate processes; address construction defects, instability, and quality issues; maintain safety measures in construction and materials; and assess the environmental impacts of projects	**c1** Assess the environmental impacts of different types of projects.

4. Course Contents:

No.	Topics	Lecture	Tutorial	Practical
1	Introduction to the Soil, Water, and Air pollution	2	2	-
2	Sewage sources as a pollution source	2	2	-
3	Sewage characteristics, and detailed planning and design of sewerage system	2	2	
4	Design of pump stations	2	2	-
5	Wastewater treatment plant design (Primary treatment, deceleration tank, screen, approach channel, grit removal chamber, and primary sedimentation tank)	4	4	-
6	Wastewater treatment plant (Biological treatment)	4	4	-
7	Wastewater treatment plant (Tertiary treatment)	4	4	-
8	Sludge treatment, disposal, and reuse	4	4	-
9	Introduction to environmental control and assessment of environmental impact. Case studies	4	4	
Total		**28**	**28**	**-**

5. Teaching and learning methods:

Topics	Face to face lecture	Online lecture	Flipped classroom	Presentation and movies	Discussion	Problem solving	Brainstorming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Tutorial
Introduction to the Soil, Water, and Air pollution	x			x	x			x		X				x
Sewage sources as a pollution source	x			x	x			x						x

Sewage characteristics, and detailed planning and design of sewerage system	x			x	x			x						x
Design of pump stations	x			x	x			x		x				x
Wastewater treatment plant design (Primary treatment, deceleration tank, screen, approach channel, grit removal chamber, and primary sedimentation tank)	x			x	x			x						x
Wastewater treatment plant (Biological treatment)	x			x	x			x						x
Wastewater treatment plant (Tertiary treatment)	x			x	x			x		x				x
Sludge treatment, disposal, and reuse	x			x	x			x						x
Introduction to environmental control and assessment of environmental impact. Case studies	x			x	x			x						x

6. Teaching and learning methods for disabled students:

No.	Teaching Methods	Reason
1	Presentation of the course in digital material	Better access any time
2	Wed communication with students	Better communication with certain cases
3	Asking small groups to do assignments; each composed of low, medium, and high-performance students	Knowledge and skills transfer among different levels of students
4	Electronic model system for the Institution.	E. learning

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO’s
1	Midterm examination	C1 C3	a3, b2 a2, a3, c1
2	Semester work (quizzes, sheets, reports)	C1 C3 C12 C13	a3, b2 a2, a3, c1 b2, c1 c1
3	Final term examination	C1 C3 C12 C13	a3, b2 a2, a3, c1 b2, c1 c1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Midterm examination	8^{th}
2	Semester work	*Continuous*

3	Final term examination	15^{th}

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Midterm examination	20%
2	Semester work	20%
3	Final term examination	60%
Total		100%

8. List of References:

No.	Reference List
1	Course notes: Lecture notes prepared by the course coordinator. Solved examples.
2	Essential books (textbooks): • الكود المصري لأسس تصميم وتنفيذ محطات تنقية مياه الشرب والصرف الصحي ومحطات الرفع – قرار وزاري رقم 169 لسنة 1997-الطبعة الثالثة 2004.
3	Recommended books Wastewater Engineering: Treatment and Reuse (McGraw-Hill Series in Civil and Environmental Engineering)–16 May 2002-by N/A Metcalf & Eddy, Inc., George Tchobanoglous, Franklin Burton, H. David Stensel
4	1- د /محمد صادق العدوى "هندسة امداد المياه" دار صادق للنشر – كلية الهندسة جامعة القاهرة 2- د /محمد سعيد الخولى "الهندسة الصحية للمبانى " – كلية الهندسة جامعة عين شمس 3- د /محمد على على فرج "الهندسة الصحية" منشأة المعارف بالاسكندرية – كلية الهندسة جامعة الاسكندرية 4- د/ احمد فاضل عشرى "امداد المدن بالمياه – تنقية مياه الشرب – معالجة المخلفات السائلة" – كلية الهندسة – قسم الاشغال العامة – جامعة المنصورة
5	Periodicals, Web sites, etc. www.awwa.org www.epa.gov www.wef.org

9. Facilities required for teaching and learning:

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

10. Matrix of knowledge and skills of the course:

No	Topic	Aims	Competencies	LO's
1	Introduction to the Soil, Water, and Air pollution	4	C1	a3, b2
2	Sewage sources as a pollution source	4, 7	C1, C3	a2, a3, c1

3	Sewage characteristics, and detailed planning and design of sewerage system	4, 7, 10	C12, C13	b2, c1
4	Design of pump stations	7, 10	C3, C12, C13	a2, a3, c1, b2
5	Wastewater treatment plant design (Primary treatment, deceleration tank, screen, approach channel, grit removal chamber, and primary sedimentation tank)	7, 10	C3, C12, C13	a2, a3, c1, b2
6	Wastewater treatment plant (Biological treatment)	7, 10	C3, C12, C13	a2, a3, c1, b2
7	Wastewater treatment plant (Tertiary treatment)	7, 10	C3, C12, C13	a2, a3, c1, b2
8	Sludge treatment, disposal, and reuse	7, 10	C1, C3, C12, C13	a2, a3, c1, b2
9	Introduction to environmental control and assessment of environmental impact. Case studies	7, 10	C1, C3	a2, a3, c1

Course Coordinator: Assoc. Prof. Dr. Medhat Elzahar
Head of Department: Prof. Dr. Mohamed Elkiki
Date of Approval: 2022

Fiber Reinforced Cement Composites (CIE522)

1. Basic Information:

Program Title	Civil Engineering Program
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Civil Engineering Department
Course Title	Fiber Reinforced Cement Composites
Course Code	CIE522
Year/Level	Level 5
Specialization	Minor – Elective Course
Authorization Date of Course Specification	-
Pre- request	Complete 100 h

Teaching hours	**Lectures**	**Tutorial**	**Practical**
	2	2	-

2. Course Aims

No.	Aims
8	Select appropriate and sustainable technologies for construction of buildings, infrastructures, and water structures, using numerical techniques, experiment measurements, and testing by applying a full range of civil engineering fields such as properties and strength of materials
10	Select appropriate and sustainable technologies for construction of buildings, infrastructures and water structures, using numerical techniques, experiment measurements, and testing by applying a full range of civil engineering fields such as properties and strength of materials

3. Competencies:

Competencies	Learning Outcomes (LO'S)
C2 Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess, and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions	**a2** Define the principles, basic properties, and features of construction material, as well as their use in sustainable technologies for construction of buildings
C4 Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues, and risk management principles	**a1** Describe codes of practice, and standards, as well as health and safety regulations.

	a3 Define contemporary engineering technologies and their applications in relation to disciplines. **b1c**reate methodical approaches when dealing with new and advancing technology.
C11 Select appropriate and sustainable technologies for construction of buildings, infrastructures and water structures, using either numerical techniques or physical measurements and/or testing by applying a full range of civil engineering concepts and techniques of properties and strength of materials	**a1** Recognize the fundamentals of properties and strength of materials, **a2** Summarize, appropriate and sustainable technologies for construction of buildings,

4. Course Contents:

No.	Topics	Lecture	Tutorial	Practical
1	Fiber-reinforcement of cement-based matrices, continuous and discontinuous fibers, and meshes.	4	4	-
2	Fiber-reinforced concrete and Ferro-cement	2	2	-
3	Laminated cementations composites	2	2	-
4	Behavior and mechanical properties. Mechanics of fiber reinforcement	8	8	-
5	Constitutive models. High-strength, high-performance fiber composites.	4	4	-
6	Hybrid and smart composites	4	4	-
7	Lectures, projects and laboratory	4	4	-
Total		**28**	**28**	**-**

5. Teaching and learning methods:

Topics	Face -to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self -learning and Research	Cooperative	Discovering	Modeling	lab
Fiber-reinforcement of cement-based	√			√	√	√	√						√	

matrices, continuous and discontinuous fibers, and meshes.														
Fiber-reinforced concrete and Ferro-cement	√				√	√	√						√	
Laminated cementations composites	√			√	√	√	√						√	
Behavior and mechanical properties. Mechanics of fiber reinforcement	√				√	√	√						√	
Constitutive models. High-strength, high-performance fiber composites.	√			√	√	√	√						√	
Hybrid and smart composites	√	√			√	√	√						√	
Lectures, projects, and laboratory	√	√		√	√	√	√			x			√	

6. Teaching and learning methods for disabled students:

No.	Teaching Methods	Reason
1	Presentation of the course in digital material	Better access any time
2	Wed communication with students	Better communication with certain cases
3	Asking small groups to do assignments; each composed of low, medium, and high-performance students	Knowledge and skills transfer among different levels of students
4	Electronic model system for the Institution.	E. learning

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO’s
1	Midterm examination	C2 C4	a2 a3

		C11	a1
2	Semester work (quizzes, sheets, report)	C4 C11	a1, b 1, a3 a2
3	Final term examination	C4 C11 C2	a1, a3 a2 a 2

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Midterm examination	8th
2	Semester work	all
3	Final term examination	15th

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Midterm examination	20%
2	Semester work	20%
3	Final term examination	60%
Total		**100%**

8. List of References:

No.	Reference List
1	High performance fiber reinforced cement composite / 2018 / gustavoj.puraa

9. Facilities required for teaching and learning:

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

10. Matrix of knowledge and skills of the course:

No	Topic	Aims	Competencies	LO's
1	Fiber-reinforcement of cement-based matrices, continuous and discontinuous fibers, and meshes.	8,10	C2 C4	a 2 a3, a1
2	Fiber-reinforced concrete and Ferro-cement	8,10	C2 C4 C11	a 2 a1, a2 a1, a2
3	Laminated cementations composites	8,10	C2 C4 C11	a 2 a1, a2 a1, a2
4	Behavior and mechanical properties. Mechanics of fiber reinforcement	8,10	C2 C4	a 2 a1, a2

			C11	a1, a2
5	Constitutive models. High-strength, high-performance fiber composites.	8,10	C2 C4 C11	a 2 a1, a2 a1, a2
6	Hybrid and smart composites	8,10	C11	a1, a2
7	Lectures, projects, and laboratory	8,10	C11	a1, a2

Course Coordinator: Dr. Nesreen Elawadly
Head of Department: Prof. Dr. Mohamed Elkiki
Date of Approval: 2022

Ground Water Hydraulics
(CIE523)

1. Basic Information:

Program Title	Civil Engineering Program
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Civil Engineering Department
Course Title	Ground Water hydraulics
Course Code	CIE523
Year/Level	Level 5
Specialization	Minor – Elective Course
Authorization Date of Course Specification	-
Pre- request	Complete 100 h

Teaching hours	**Lectures**	**Tutorial**	**Practical**
	2	2	-

2. Course Aims

No.	Aims
4	Use the techniques, skills, and current engineering tools required for the groundwater hydraulics applications (aquifers systems, wells constructions operation and maintenance).
7	Achieve an optimum solution of groundwater problems and design abstraction groundwater wells.
10	Select appropriate and sustainable technologies for construction of groundwater wells, drilling and testing, saltwater intrusion mitigation.

3. Competencies:

Competencies	Learning Outcomes (LO'S)
C1 Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science, and mathematics.	**a2** Define the principles, basic properties, and features of groundwater and the types of aquifers, saltwater intrusion. **b1** Estimating mechanics of flow through porous media. **b2** Using scientific concepts and theories that are relevant to groundwater such as Darcy's law – application – direct of ground water flow
C12 Achieve an optimum design of groundwater abstraction wells, seepage problem through dams, and saltwater intrusion assessment.	**b1** Achieve an optimum planning and design of seepage problem through dams and saltwater intrusion. **b2** Achieve an optimum planning and design of groundwater abstraction wells and drilling and testing of wells.

4. Course Contents:

No.	Topics	Lecture	Tutorial	Practical
1	Introduction – groundwater- types of aquifers	2	2	-
2	Mechanics of flow through porous media	4	4	-
3	Darcy's law – application – direct of ground water flow	4	4	-
4	Case studies (Seepage through dam – seepage through confined aquifer – seepage under a dike)	2	2	-
5	Steady and unsteady flow to wells – fully and partially penetrating of wells	4	4	-
6	Saltwater intrusion (potential flow theory – boundary effects – theory of images – numerical methods – analytical methods)	8	8	-
7	Practical aspects of well design	2	2	-
8	Drilling and testing	2	2	-
Total		**28**	**28**	**-**

5. Teaching and learning methods:

Topics	Face -to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self -learning and Research	Cooperative	Discovering	Modeling	lab
Introduction – groundwater- types of aquifers	x	x			x	x	x							
Mechanics of flow through porous media	x	x			x	x	x							
Darcy's law – application – direct of ground water flow	x	x			x	x	x							
Case studies (Seepage through	x	x			x	x	x							

dam – seepage through confined aquifer – seepage under a dike)														
Steady and unsteady flow to wells – fully and partially penetrating of wells	x	x			x	x	x							
Saltwater intrusion (potential flow theory – boundary effects – theory of images – numerical methods – analytical methods)	x	x			x	x	x							
Practical aspects of well design	x	x			x	x	x							
Drilling and testing	x	x			x	x	x							

6. Teaching and learning methods for disabled students:

No.	Teaching Methods	Reason
1	Presentation of the course in digital material	Better access any time
2	Wed communication with students	Better communication with certain cases
3	Asking small groups to do assignments; each composed of low, medium, and high-performance students	Knowledge and skills transfer among different levels of students
4	Electronic model system for the Institution.	

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Mid-term examination	C1 C12	a2, b1, b2 b1,
2	Semester work	C1 C12	a2, b1, b2 b1, b2
4	Final term examination	C1 C12	a2, b1, b2 b1, b2

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	semester work	$2^{nd}, 7^{th}, 9^{th}$
2	Mid Term examination	8^{th}
3	Final term examination	15^{th}

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Mid-term examination	20%
2	Semester work	20%
3	Final-term examination	60%
Total		**100%**

8. List of References:

No.	Reference List
1	El–Ghandour, H.A., (2020). "Analysis and Optimization of Saltwater Intrusion in Coastal Aquifers". M.Sc. Thesis, Irrigation and Hydraulics Dept., Faculty of Engineering, El-Mansoura University, P. 177.
2	Todd, D.K., Mays, L.W., (2020). "Groundwater Hydrology". Willy India
3	John H. Cushman, Daniel M. Tartakovsky. (2018) The Handbook of Groundwater Engineering. Available on Taylor & Francis eBooks
4	El–Ghandour, H.A., (2018). "Analysis and Optimization of Saltwater Intrusion in Coastal Aquifers". M.Sc. Thesis, Irrigation and Hydraulics Dept., Faculty of Engineering, El-Mansoura University, P. 177.

9. Facilities required for teaching and learning:

.			
1	Lecture classroom	3	White board
2	Seminar	4	Data show system

10. Matrix of knowledge and skills of the course:

No	Topic	Aims	Competencies	LO's
1	Introduction – groundwater- types of aquifers	4, 10	C1	a2
2	Mechanics of flow through porous media	7	C1	a2, b1
3	Darcy's law – application – direct of ground water flow	7	C1	b2
4	Case studies (Seepage through dam – seepage through confined aquifer – seepage under a dike)	7	C12	b1

5	Steady and unsteady flow to wells – fully and partially penetrating of wells	7	C12	b2
6	Saltwater intrusion (potential flow theory – boundary effects – theory of images – numerical methods – analytical methods)	4, 7	C1 C12	a2, b1
7	Practical aspects of well design	7, 10	C12	b2
8	Drilling and testing	7, 10	C12	b2

Course Coordinator: Assoc. Prof. Mohammed Gabr
Head of Department: Prof. Mohammed Elkiki
Date of Approval: 2022.

Highway Materials and Construction
(CIE524)

1. Basic Information:

Program Title	Civil Engineering Program
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Civil Engineering Department
Course Title	Highway Materials and Construction
Course Code	CIE524
Year/Level	Level 5
Specialization	Minor – Elective Course
Authorization Date of Course Specification	-
Pre- request	Complete 100 h

Teaching hours	**Lectures**	**Tutorial**	**Practical**
	2	2	-

2. Course Aims

No.	Aims
4	Master a broad range of engineering knowledge and specialized skills, as well as the ability to apply acquired knowledge in real-world situations by applying theories and abstract thinking in analytic critical and systemic thinking to identify, diagnose, and solve engineering problems of varying complexity and variation.
7	Achieve an optimum design of civil engineering works such as: flexible pavement and rigid pavement
10	Select appropriate and sustainable technologies for construction of highways infrastructures experiment measurements and testing by applying a full range of civil engineering fields such as structural analysis and mechanics, properties, and strength of materials.

3. Competencies:

Competencies	Learning Outcomes (LO'S)
C1 Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science, and mathematics.	**a3** Explain the basic principles of engineering for road materials included hot mix asphalt (flexible pavement) and concrete mixture (rigid pavement). **b2** Using scientific concepts and theories that are relevant to road materials to select the appropriate thickness of road layers
C11 Select appropriate and sustainable technologies for	**a2** Summarize, appropriate and sustainable technologies for roads construction and rehabilitation, bituminous materials, and concrete mixtures.

construction road works and rehabilitation of roads.	
C12 Achieve an optimum design of pavement layers.	**b2** Achieve an optimum design of flexible pavement and rigid pavement based on the appropriate selection of materials and their strengths

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	Application of soil classification methods, material characterization, sub-grade and sub-base stabilization, material variability and quality control	12	12	-
2	pavement evaluation and rehabilitation, highway construction	16	16	-
Total		**28**	**28**	**-**

5. Teaching and learning methods:

Topics	Face -to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self -learning and Research	Cooperative	Discovering	Modeling	lab
Application of soil classification methods, material characterization, sub-grade and sub-base stabilization, material variability and quality control	x	x			x	x	x							
pavement evaluation and rehabilitation, highway construction	x	x			x	x	x							

6. Teaching and learning methods for disabled students:

No.	Teaching Methods	Reason
1	Presentation of the course in digital material	Better access any time
2	Asking small groups to do assignments; each composed of low, medium, and high-performance students.	Knowledge and skills transfer among different level of students.

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Mid-term examination	C1 C11	a3, b2 a2
2	Semester work	C11 C12	a2 b2
3	Final term examination	C1 C11 C12	a3, b2 a2 b2

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Semester work	$2nd, 7th$, $9th$
2	Mid Term examination	$8th$
3	Final term examination	$15th$

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Mid-term examination	20%
2	Semester work	20%
3	Final-term examination	60%
Total		**100%**

8. List of References:

No.	Reference List
1	**Essential books (textbooks / design codes):** Egyptian Code for Design and Construction of Reinforced Concrete Structures 203-2018. Design Aids and Examples in Accordance with the Egyptian Code for Design and Construction of Reinforced Concrete Structures 203-2018.
2	Advanced structural materials, 2020

9. Facilities required for teaching and learning:

Facility

1	Lecture classroom	3	White board
2	Seminar	4	Data show system

10. Matrix of knowledge and skills of the course:

No.	Topic	Aims	Competencies	LO's
1	Application of soil classification methods, material characterization, sub-grade and sub-base stabilization, material variability and quality control	1, 7	C1 C11	a3, b2 a2
2	pavement evaluation and rehabilitation, highway construction	1, 7	C1 C11 C12	a3, b2 a2 b2

Course Coordinator: Assoc. Prof. Dr. Alaa Gabr
Head of Department: Prof. Dr. Mohamed Elkiki
Date of Approval: 2022

Modern Structure Materials
(CIE525)

1. Basic Information:

Program Title	Civil Engineering Program
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Civil Engineering Department
Course Title	Modern Structure Materials
Course Code	CIE525
Year/Level	Level 5
Specialization	Minor – Elective Course
Authorization Date of Course Specification	-
Pre-request	Complete 100 h

Teaching hours	**Lectures**	**Tutorial**	**Practical**
	2	2	-

2. Course Aims

No.	Aims
8	Select appropriate and sustainable technologies for construction of buildings, infrastructures, and water structures, using numerical techniques, experiment measurements, and testing by applying a full range of civil engineering fields such as properties and strength of materials
10	Achieve an optimum design of Reinforced Concrete and Steel Structures, Foundations and Earth Retaining Structures; and at least three of the following civil engineering topics: Transportation and Traffic, Roadways and Airports, Railways, Sanitary Works, Irrigation, Water Resources and Harbors; or any other emerging field relevant to the discipline.

3. Competencies:

Competencies	Learning Outcomes (LO'S)
C2 Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess, and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions	**a2** Define the principles, basic properties, and features of construction material, as well as their use in sustainable technologies for construction of buildings. **c2** Develop suitable experimentation and/or simulation.
C4 Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues, and risk management principles	**a1** Describe codes of practice, and standards, as well as health and safety regulations.

	a3 Define contemporary engineering technologies and their applications in relation to disciplines. **b1**Create methodical approaches when dealing with new and advancing technology
C11 Select appropriate and sustainable technologies for construction of buildings, infrastructures and water structures, using either numerical techniques or physical measurements and/or testing by applying a full range of civil engineering concepts and techniques of properties and strength of materials	**a1** Recognize the fundamentals of properties and strength of materials, **a2** Summarize, appropriate and sustainable technologies for construction of buildings.

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	General introduction for the technological development of material science	8	8	-
2	general classification of the modern materials in the structure field – compound materials and their applications	10	10	-
3	carbon fibers and its use in structures – insulating materials – ant fire materials	10	10	-
Total		**28**	**28**	**-**

5. Teaching and learning methods:

Topics	Face -to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self -learning and Research	Cooperative	Discovering	Modeling	lab
General introduction for the technological development of material science	√	√			√	√	√							

general classification of the modern materials in the structure field – compound materials and their applications	√	√			√	√	√							
carbon fibers and its use in structures – insulating materials – ant fire materials	√	√			√	√	√							

6. Teaching and learning methods for disabled students:

No.	Teaching Methods	Reason
1	Presentation of the course in digital material	Better access any time
2	Wed communication with students	Better communication with certain cases
3	Asking small groups to do assignments; each composed of low, medium, and high-performance students	Knowledge and skills transfer among different levels of students
4	Electronic model system for the Institution.	E. learning

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Midterm examination	C2 C4 C11	a2, c2 a1, a3 a1, a 2
2	Semester work (quizzes, sheets, report)	C2 C4 C11	a2, c2 a1, a 3 a1, a2
3	Final term examination	C2 C4 C11	a2, c2 a1, a3 a1, a2

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Midterm examination	8th
2	Semester work	all

3	Final term examination	15^{th}

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Midterm examination	20%
2	Semester work	20%
3	Final term examination	60%
Total		**100%**

8. List of References:

No.	Reference List
1	**Essential books (textbooks / design codes):** Egyptian Code for Design and Construction of Reinforced Concrete Structures 203-2018. Design Aids and Examples in Accordance with the Egyptian Code for Design and Construction of Reinforced Concrete Structures 203-2018.
2	Advanced structural materials, 2010

9. Facilities required for teaching and learning:

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

10. Matrix of knowledge and skills of the course:

No	Topic	Aims	Competencies	LO's
1	General introduction for the technological development material science	8,10	C4	a3, a1
2	general classification of the modern materials in the structure field – compound materials and their applications	8,10	C4 C11	a3 a1, a2
3	carbon fibers and its use in structures – insulating materials – ant fire materials	8,10	C11	a1, a2

Course Coordinator: Dr. Nesreen Elawadly
Head of Department: Prof. Dr. Mohamed Elkiki
Date of Approval: 2022

Hydraulics Engineering
(CIE526)

1. Basic Information:

Program Title	Civil Engineering Program
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Civil Engineering Department
Course Title	Hydraulic Engineering
Course Code	CIE526
Year/Level	Level 5
Specialization	Minor – Elective Course
Authorization Date of Course Specification	-
Pre-request	Complete 100 h

Teaching hours	**Lectures**	**Tutorial**	**Practical**
	2	3	-

2. Course Aims:

No.	Aims
1	Master a broad range of engineering knowledge and specialized skills by applying theories and thinking to identify and solve engineering problems regarding to the applications of hydraulic engineering.
7	Achieve an optimum design for steady flow in pipelines (Basics), hydraulic analysis of pipeline networks, and unsteady flow in pipeline networks.
10	Select appropriate and sustainable technologies for the pipeline networks.

3. Competencies:

Competencies	Learning outcomes (LO'S)
C1 Identify, formulate, and solve complex design of hydraulics engineering by applying engineering fundamentals, basic science, and mathematics.	**a1** Describe the relevant mathematical principles and theories in the discipline concepts regarding the flow through orifices (types – time of filling and emptying tanks), and the flow over weirs. **a2** Explain the principal types of the governing flow equations (Bernoulli and Continuity) theories; and the momentum equation and its applications fields.
C11 Select appropriate and sustainable technologies for construction of the pipeline networks	**a2** Summarize, appropriate and sustainable technologies for the pipeline networks constructions.
C12 Achieve an optimum design of marine structures and Harbors.	**b1** Achieve an optimum design of orifices and the pipeline networks. **b2** Achieve an optimum design of the orifices and wires

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	Governing equations (Bernoulli and Continuity) – Applications	4	4	-
2	Flow through orifices (types – equations – time of filling and emptying tanks)	4	4	-
3	Flow over weirs (types – equations)	4	4	-
4	Application of Momentum equation	2	2	-
5	Steady flow in pipelines (Basics) – Hydraulic analysis of pipe line networks	10	10	-
6	Unsteady flow in pipeline networks	4	4	-
Total		**28**	**28**	**-**

5. Teaching and Learning Methods:

Topics	Face -to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self -learning and Research	Cooperative	Discovering	Modeling	lab
Governing equations (Bernoulli and Continuity) – Applications	x	x			x	x	x							
Flow through orifices (types – equations – time of filling and emptying tanks)	x	x			x	x	x							
Flow over weirs (types – equations)	x	x			x	x	x							
Application of Momentum equation	x	x			x	x	x							

Steady flow in pipelines (Basics) – Hydraulic analysis of pipeline networks	x	x			x	x	x						
Unsteady flow in pipeline networks	x	x			x	x	x						

6. Teaching and Learning Methods of disabled Students:

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

7. Student assessment:

7.1 Student Assessment Methods:

No.	Assessment Method	Competencies	LOs
1	Mid Term Examination (written)	C1 C11 C12	a1, a2 a2 b1, b2
2	Formative (quizzes- online quizzes- presentation)	C1 C11 C12	a1, a2 a2 b1, b2
3	Final Term Examination (written)	C1 C11 C12	a1, a2 a2 b1, b2

7.2 Assessment Schedule:

No.	Assessment Method	Weeks
1	Mid Term Examination (written/ online)	8th
2	Practical/ Oral Examination	15th
3	Formative (quizzes- online quizzes presentation-Tutorial and report assessment)	Every week
4	Final Term Examination (written)	Decided by Faculty Council

7.3 Weighting of Assessments:

No.	Assessment Method	Weights
1	Mid Term Examination (written/ online)	20%
2	Formative (quizzes- online quizzes presentation-Tutorial and report assessment)	20%
3	Final Term Examination (written)	60%
Total		100%

8. List of References:

No.	Reference List
1	Fluid mechanics through problems R.J GARDE, New AGE publishers- 2018
2	Flow in open channels K. Subramanya. Tata Mcgraw hill education private limited, NEW DELHI 2020

9. Facilities Required for Teaching and Learning:

No.	Facility
1	Lecture Classroom
2	Lab Facilities
3	White Board
4	Data Show System
5	Presenter

10. Matrix of Knowledge and Skills of the Course

No.	Topic	Aims	Competencies	LO's
1	Governing equations (Bernoulli and Continuity) - Applications	1	C1	a2
2	Flow through orifices (types – equations – time of filling and emptying tanks)	7	C1 C12	a1 b1
3	Flow over weirs (types – equations)	7	C1 C12	a1 b2
4	Application of Momentum equation	1	C1	a2
5	Steady flow in pipelines (Basics) – Hydraulic analysis of pipeline networks	7, 10	C11 C12	a2 b1
6	Unsteady flow in pipeline networks	7, 10	C11 C12	a2 b1

Course Coordinator Assoc. Prof. Dr. Mohammed Gabr
Head of Department: Prof. Dr. Mohamed Elkiki
Date of Approval: 2022

Pavement Design
(CIE527)

1. Basic Information:

Program Title	Civil Engineering Program
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Civil Engineering Department
Course Title	Pavement Design
Course Code	CIE527
Year/Level	Level 5
Specialization	Minor – Elective Course
Authorization Date of Course Specification	-
Pre- request	Complete 100 h

Teaching hours	**Lectures**	**Tutorial**	**Practical**
	2	2	-

2. Course Aims

No.	**Aims**
4	Use the techniques, skills, and current engineering tools required for design practice by taking full responsibility for one's own learning and development, participating in lifelong learning, and demonstrating the ability to pursue postgraduate and research studies.
7	Achieve an optimum design of pavement.
10	Select appropriate and sustainable technologies for construction of pavement using numerical techniques.

3. Competencies:

Competencies	**Learning Outcomes (LO'S)**
C4 Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues, and risk management principles	**a2** Summarize, appropriate of Pavement materials and sustainable technologies for construction of highways
C6 Plan, supervise and monitor implementation of engineering projects, taking into consideration other trades requirements.	**b1** interpret data derived from laboratory observation from equipment flow sheets, charts, and curves to interpret data derived from laboratory observation. **c2** Acquire entrepreneurial skills.
C11 Select appropriate and sustainable technologies for construction of buildings, infrastructures, and water structures; using	**a1** Recognize the fundamentals of structural analysis and mechanics, properties and

either numerical techniques or physical measurements and/or testing by applying a full range of civil engineering concepts and techniques of structural analysis and mechanics, properties and strength of materials, surveying, soil mechanics, hydrology, and fluid mechanics.	strength of pavement materials, stress analysis. **a2** Summarize, appropriate and sustainable technologies for construction of highways, infrastructures.

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	Characteristics of pavement loads.	4	4	-
2	Stress analysis in pavements.	4	4	-
3	Design practices, construction, rehabilitation, and maintenance.	4	4	-
4	Optimization of the design of rigid and flexible pavements systems.	4	4	-
5	Empirical and mechanistic stochastic structural subsystems.	4	4	-
6	Utility theory, serviceability concept, cost studies, traffic delay, environmental deterioration, rehabilitation, and maintenance optimization systems.	8	8	-
Total		**28**	**28**	**-**

5. Teaching and learning methods:

Topics	Face -to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self -learning and Research	Cooperative	Discovering	Modeling	lab
Characteristics of pavement loads.	x	x			x	x	x							
Stress analysis in pavements.	x	x			x	x	x							
Design practices, construction,	x	x			x	x	x							

rehabilitation, and maintenance.														
Optimization of the design of rigid and flexible pavements systems.	x	x			x	x	x							
Empirical and mechanistic stochastic structural subsystems.	x	x			x	x	x							
Utility theory, serviceability concept, cost studies, traffic delay, environmental deterioration, rehabilitation, and maintenance optimization systems.	x	x			x	x	x							

6. Teaching and learning methods for disabled students:

No.	Teaching Methods	Reason
1	Presentation of the course in digital material.	Better access any time.
2	Asking small groups to do assignments each composed of low, medium, and high-performance students.	Knowledge and skills transfer among different levels of students.

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Mid-term examination	C4 C6 C11	a2 b1, c2 a1, a2
2	Semester work	C4 C6 C11	a2 b1, c2 a1, a2
3	Practical Examination	C4	a2

		C6 C11	b1, c2 a1, a2
4	Final term examination	C4 C6 C11	a2 b1, c2 a1, a2

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Semester work	$2nd, 7th, 9th$
2	Mid Term examination	$8th$
3	Practical Examination	$14th$
4	Final term examination	$15th$

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Mid-term examination	10%
2	Semester work	20%
3	Practical Examination	10%
4	Final-term examination	60%
	Total	**100%**

8. List of References:

No.	Reference List
1	Khurmi, R.S. (2018). '' A textbook of hydraulics, fluid mechanics and hydraulic machines'' S. Chanel and company Ltd. P.990
2	Subramanya, K. (2018) ''Flow in open channels'' McGra- Hill Education (India). P.602
3	Glenn E. Moglen. 2020.Fundamentals of Open Channel Flow. CRC Press. Available on Taylor & Francis eBooks.

9. Facilities required for teaching and learning:

Facility			
1	Lecture classroom	3	White board
2	Seminar	4	Data show system
5	Lab.		

10. Matrix of knowledge and skills of the course:

No	Topic	Aims	Competencies	LO’s
1	Characteristics of pavement loads	7	C4 C6 C11	a2 b1, c2 a1, a2
2	Stress analysis in pavements	7	C4 C6	a2 b1, c2

			C11	a1, a2
3	Design practices, construction, rehabilitation, and maintenance	7	C4 C6 C11	a2 b1, c2 a1, a2
4	Optimization of the design of rigid and flexible pavements systems	7	C4 C6 C11	a2 b1, c2 a1, a2
5	Empirical and mechanistic stochastic structural subsystems	7	C4 C6 C11	a2 b1, c2 a1, a2
6	Utility theory, serviceability concept, cost studies, traffic delay, environmental deterioration, rehabilitation and maintenance optimization systems.	7	C4 C6 C11	a2 b1, c2 a1, a2

Course Coordinator: Assoc. Prof. Dr. Alaa Gabr
Head of Department: Prof. Mohamed Elkiki
Date of Approval: 2022

Planning of Buildings Maintenance and Protection (CIE529)

1. Basic Information:

Program Title	Civil Engineering Program
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Civil Engineering Department
Course Title	Planning of buildings maintenance and Protection
Course Code	CIE529
Year/Level	Level 5
Specialization	Major
Authorization Date of Course Specification	-
Pre-request	Complete 100 h

Teaching hours	Lectures	Tutorial	Practical
	2	2	-

2. Course Aims

No.	Aims
4	Use the techniques, skills, and current engineering tools required for engineering practice by taking full responsibility for one's own learning and development, participating in lifelong learning, and demonstrating the ability to pursue postgraduate and research studies.
7	Achieve an optimum design of Reinforced Concrete and Steel Structures, Foundations and Earth Retaining Structures; and at least three of the following civil engineering topics: Transportation and Traffic, Roadways and Airports, Railways, Sanitary Works, Irrigation, Water Resources and Harbors; or any other emerging field relevant to the discipline.
10	Select appropriate and sustainable technologies for construction of buildings, infrastructures, and water structures; using numerical techniques, experiment measurements, and testing by applying a full range of civil engineering fields such as structural analysis and mechanics, properties and strength of materials, surveying, soil mechanics, hydrology and fluid mechanics.

3. Competencies:

Competencies	Learning Outcomes (LO'S)
C2 Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess, and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.	**b4** Evaluate components, systems, and processes are evaluated for their characteristics and performance.

C4 Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues, and risk management principles.	**c1** Apply safe systems at work by taking the necessary precautions to manage hazards.
C13 Plan and manage construction processes; address construction defects, instability, and quality issues; maintain safety measures in construction and materials; and assess environmental impacts of projects.	**b1** Address construction defects, instability, and quality issues **c1** Assess environmental impacts of projects.

4. Course Contents:

No.	Topics	Lecture	Tutorial	Practical
1	Review on of deterioration of building materials	4	4	-
2	Concept of life cycle cost- Protection methods against deterioration and corrosion of building materials	8	8	-
3	Types of defects and damages. Non-destructive tests	6	6	-
4	Partially destructive tests. Load tests. Materials for repair and selection. Methods and techniques of repair. Rehabilitation and retrofitting.	10	10	-
Total		**28**	**28**	**-**

5. Teaching and learning methods:

Topics	Face -to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self -learning and Research	Cooperative	Discovering	Modeling	lab
Review on of deterioration of building materials	x	x			x	x	x							
Concept of life cycle cost- Protection	x	x			x	x	x							

methods against deterioration and corrosion of building materials														
Types of defects and damages. Non-destructive tests	x	x			x	x	x							
Partially destructive tests. Load tests. Materials for repair and selection. Methods and techniques of repair. Rehabilitation and retrofitting.	x	x			x	x	x							

6. Teaching and learning methods for disabled students:

No.	Teaching Methods	Reason
1	Presentation of the course in digital material	Better access any time
2	Wed communication with students	Better communication with certain cases
3	Asking small groups to do assignments; each composed of low, medium, and high-performance students	Knowledge and skills transfer among different levels of students
4	Electronic model system for the Institution.	E. learning

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Midterm examination	C13	b1, c1
2	Semester work (quizzes, sheets, report)	C13	b1, c1
3	Final term examination	C3, C13	a1, b1, c1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	semester work	7^{th} , 9^{th}
2	Mid Term examination	8^{th}
3	Final term examination	15^{th}

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Midterm examination	20%
2	Semester work	20%
3	Final term examination	60%
Total		**100%**

8. List of References:

No.	Reference List
1	Using and understanding engineering service and constructing john Clark 2018

9. Facilities required for teaching and learning:

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

10. Matrix of knowledge and skills of the course:

No	Topic	Aims	Competencies	LO's
1	Review on of deterioration of building materials	4	C13	a1, c1
2	Concept of life cycle cost- Protection methods against deterioration and corrosion of building materials	3	C3, C13	b1, c1
3	Types of defects and damages. Non-destructive tests	4	C13	a1, c1
4	Partially destructive tests. Load tests. Materials for repair and selection. Methods and techniques of repair. Rehabilitation and retrofitting.	3	C3, C13	b1, c1

Course Coordinator: Dr. Ayman Helal
Head of Department: Prof. Dr. Mohamed Elkiki
Date of Approval: 2022

Prefabricated Concrete Frames
(CIE530)

1. Basic Information:

Program Title	Civil Engineering Program
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Civil Engineering Department
Course Title	Prefabricated Concrete Frames
Course Code	CIE530
Year/Level	Level 5
Specialization	Minor – Elective Course
Authorization Date of Course Specification	-
Pre-request	Complete 100 h

Teaching hours	Lectures	Tutorial	Practical
	2	2	-

2. Course Aims

No.	Aims
4	Use the techniques, skills, and current engineering tools required for engineering practice by taking full responsibility for one's own learning and development, participating in lifelong learning, and demonstrating the ability to pursue postgraduate and research studies.
7	Achieve an optimum design of Reinforced Concrete and Steel Structures, Foundations and Earth Retaining Structures; and at least three of the following civil engineering topics: Transportation and Traffic, Roadways and Airports, Railways, Sanitary Works, Irrigation, Water Resources and Harbors; or any other emerging field relevant to the discipline.
10	Select appropriate and sustainable technologies for construction of buildings; using numerical techniques, experiment measurements, and testing by applying a full range of civil engineering fields such as structural analysis and mechanics, properties, and strength of materials.

3. Competencies:

Competencies	Learning Outcomes (LO'S)
C2 Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions	**a2** Define the principles, basic properties, and features of construction material, as well as their use in sustainable technologies for construction of buildings

C4 Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues, and risk management principles	**a1** Describe codes of practice, and standards, as well as health and safety regulations. **a3** Define contemporary engineering technologies and their applications in relation to disciplines.
C11 Select appropriate and sustainable technologies for construction of buildings, infrastructures and water structures; using either numerical techniques or physical measurements and/or testing by applying a full range of civil engineering concepts and techniques of: properties and strength of materials	**a1** Recognize the fundamentals of properties and strength of materials. **a2** Summarize, appropriate and sustainable technologies for construction of buildings.

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	Performance of prefabricated concrete	4	4	-
2	Design of concrete supported to shear stress	4	4	-
3	Design of columns	4	4	-
4	Design of roofs	4	4	-
5	Design of building frames	4	4	-
6	Design projects using the computer	4	4	-
7	Detailed reports	4	4	-
Total		**28**	**28**	**-**

5. Teaching and learning methods:

Topics	Face -to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self -learning and Research	Cooperative	Discovering	Modeling	lab
Performance of prefabricated concrete		x			x	x	x	x						x

Design of concrete supported to shear stress		x			x	x	x	x						x
Design of columns		x			x	x	x	x						x
Design of roofs		x			x	x	x	x						x
Design of building frames		x			x	x	x	x						x
Design projects using the computer		x			x	x	x	x						x
Detailed reports		x			x	x	x	x						x

6. Teaching and learning methods for disabled students:

No.	Teaching Methods	Reason
1	Presentation of the course in digital material	Better access any time
2	Wed communication with students	Better communication with certain cases
3	Asking small groups to do assignments; each composed of low, medium, and high-performance students	Knowledge and skills transfer among different levels of students
4	Electronic model system for the Institution.	E. learning

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Midterm examination	C2 C4 C11	a2 a3 a1
2	Semester work (quizzes, sheets, report)	C4 C11	a1 a2
3	Final term examination	C4 C11	a1, a3 a2

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Midterm examination	8th
2	Semester work	7th - 9th
3	Final term examination	15^{th}

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Midterm examination	20%
2	Semester work	20%
3	Final term examination	60%
Total		**100%**

8. List of References:

No.	Reference List
1	**Essential books (textbooks / design codes):** Egyptian Code for Design and Construction of Reinforced Concrete Structures 2032018. Design Aids and Examples in Accordance with the Egyptian Code for Design and Construction of Reinforced Concrete Structures 203-2018.
2	**Recommended books:** MacGregor J., "Reinforced Concrete: Mechanics and Design," Printice Hall, New Jersey, 2018.

9. Facilities required for teaching and learning:

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

10. Matrix of knowledge and skills of the course:

No	Topic	Aims	Competencies	LO's
1	Performance of prefabricated concrete	4,7,10	C4	a3, a1
2	Design of concrete supported to shear stress	4,7,10	C4 C11	a3 a1, a2
3	Design of columns	4,7,10	C11	a1, a2
4	Design of roofs	4,7,10	C4 C11	a3 a1, a2
5	Design of building frames	4,7,10	C4 C11	a3 a1, a2
6	Design projects using the computer	4,7,10	C11	a1, a2
7	Detailed reports	4,7,10	C11	a1, a2

Course Coordinator: Dr. Nesreen Elawadly
Head of Department: Prof. Dr. Mohamed Elkiki
Date of Approval: 2022

Project Decision Analysis (CIE531)

1. Basic Information:

Program Title	Civil Engineering Program
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Civil Engineering Department
Course Title	Project Decision Analysis
Course Code	CIE531
Year/Level	Level 5
Specialization	Minor – Elective Course
Authorization Date of Course Specification	-
Prerequisite	Complete 100 CH

Teaching Hours	Lectures	Tutorial	Practical
	2	2	-

2. Course Aims:

No.	Aims
1	Master a broad range of engineering knowledge and specialized skills, as well as the ability to apply acquired knowledge in real-world situations by applying theories and abstract thinking in analytic critical and systemic thinking to identify, diagnose, and solve engineering problems of varying complexity and variation.
3	Recognize his role in promoting engineering and contributing to the profession's and community's development; by appreciating the physical and natural environment's importance and working to promote sustainability concepts.

3. Competencies:

Competencies	Learning Outcomes (LOs)
C1 Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science, and mathematics.	**c1** Identify, formulate, and solve complex engineering problems by applying the concepts and the theories of mathematics. **c2** Identify, formulate, and solve complex engineering problems by applying the concepts and the theories of sciences, appropriate to the discipline. **c3** Identify, formulate, and solve complex engineering problems by applying engineering fundamentals.
C2 Develop and conduct appropriate experimentation and/or	**b3** Analyze and interpret data.

simulation, analyze and interpret data, assess, and evaluate findings, and use statistical analyses and objective engineering judgment to conclude.	**b4** Evaluate components, systems, and processes are evaluated for their characteristics and performance. **c1** Choose relevant mathematical and computer-based problem modeling and analysis methodologies. **c3** Applying statistical analyses and objective engineering judgment to conclude.
C3 Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global, cultural, social, economic, environmental, ethical, and other aspects as appropriate to the discipline, and within the principles and contexts of sustainable design and development.	**a2** Understand engineering solutions' professional ethics and impacts on society and the environment. **b1** Judge engineering decisions considering balanced costs, benefits, safety, quality, reliability, and environmental impact.
C4 Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues, and risk management principles.	**a2** List the engineering-related business and management principles. **c2** Use fundamental organizational and project management abilities.

4. Course Contents:

No.	Topics	Lecture	Tutorial	Practical
1	Quantitative Methods of Decision-Making	6	6	-
2	Important Mathematical Models Useful in Decision Processes	6	6	-
3	Model-Structure Assumptions, Limitations, and Methods for Use	8	8	-
4	Concepts and Models of Support Systems for Management Decision Problems	8	8	-
Total		**28**	**28**	**-**

5. Teaching and Learning Methods:

No.	Topics	Face-To-Face Lecture	Online Lecture	Flipped Classroom	Presentation and Movies	Discussion	Problem-Solving	Brainstorming	Projects	Site Visits	Self-Learning and Research	Cooperative	Discovering	Modeling	Lab
1	Quantitative Methods of Decision-Making	√			√										
2	Important Mathematical Models Useful in Decision Processes		√			√									
3	Model-Structure Assumptions, Limitations, and Methods for Use	√												√	
4	Concepts and Models of Support Systems for Management Decision Problems	√												√	

6. Teaching and Learning Methods for Disabled Students:

No.	Teaching Method	Reason
1	Presentation of The Course in Digital Material	Better Access at Any Time
2	Wed Communication with Students	Better Communication with Certain Cases
3	Asking Small Groups to Do Assignments; Each Composed of Low, Medium, and High-Performance Students	Knowledge and Skills Transfer Among Different Levels of Students
4	An Electronic Model System for The Institution	E. Learning

7. Student Evaluation:

7.1 Student Evaluation Method:

No.	Evaluation Method	Competencies	LOs
1	Semester Works (Quizzes, Sheets, Reports)	C1	c1, c2, c3

		C2 C3 C4	b3, b4, c1, c3 a2, b1 a2, c2
2	Mid-Term Exam	C1	c1, c2, c3
3	Final-Term Exam	C1 C2 C3 C4	c1, c2, c3 b3, b4, c1, c3 a2, b1 a2, c2

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Semester Works (Quizzes, Sheets, Reports)	4^{th}, 11^{th}
2	Mid-Term Exam	8^{th}
3	Final-Term Exam	15^{th}

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Semester Works (Quizzes, Sheets, Reports)	20%
2	Mid-Term Exam	20%
3	Final-Term Exam	60%
Total		**100%**

8. List of References:

No.	Reference List
1	Wiley-Blackwell. Code of Practice for Project Management for Construction and Development. Chartered Institute of Building (Great Britain).
2	Kerzner, Harold. Project Management Workbook. A System Approach to Planning, Scheduling, and Control.
3	de Marco, A. Project Management for Facility Constructions A Guide for Engineers, and Architects.
4	Project Management Institute and Project Management Institute. A Guide to the Project Management Body of Knowledge (PMBOK Guide).
5	Lester, Albert. Project Management, Planning, and Control. Managing Engineering, Construction, and Manufacturing Projects to PMI, APM, and BSI Standards.
6	Vanhoucke, M. Management for Professionals Integrated Project Management and Control.

9. Facilities Required for Teaching and Learning:

Facility			
1	Lecture Classroom	3	White Board
2	Seminar	4	Data Show System

10. Matrix of Knowledge and Skills:

No.	Topic	Aims	Competencies	LOs

1	Quantitative Methods of Decision-Making	1, 3	C1	c1, c2, c3
2	Important Mathematical Models Useful in Decision Processes	1, 3	C1	c1, c2, c3
3	Model-Structure Assumptions, Limitations, and Methods for Use	1, 3	C2 C3 C4	b3, b4, c1, c3 a2, b1 a2, c2
4	Concepts and Models of Support Systems for Management Decision Problems	1, 3	C2 C3 C4	b3, b4, c1, c3 a2, b1 a2, c2

Course Coordinator: Prof. Dr. Mohamed Elkiki
Head of Department: Prof. Dr. Mohamed Elkiki
Date of Approval: 2022

Project Financial Management
(CIE532)

1. Basic Information:

Program Title	Civil Engineering Program
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Civil Engineering Department
Course Title	Project Financial Management
Course Code	CIE532
Year/Level	Level 5
Specialization	Minor – Elective Course
Authorization Date of Course Specification	-
Prerequisite	Complete 100 CH

Teaching Hours	Lectures	Tutorial	Practical
	2	2	-

2. Course Aims:

No.	Aims
6	Analyze data from the intended tests to manage resources creatively.
8	Plan and manage construction processes; address construction defects, instability, and quality issues; maintain safety measures in construction and materials; and assess the environmental impacts of projects.

3. Competencies:

Competencies	Learning Outcomes (LOs)
C3 Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global, cultural, social, economic, environmental, ethical, and other aspects as appropriate to the discipline, and within the principles and contexts of sustainable design and development.	**b1** Judge engineering decisions considering balanced costs, benefits, safety, quality, reliability, and environmental impact. **c1** Incorporate economic, societal, global, environmental, and risk management factors into design.
C9 Use creative, innovative, and flexible thinking and acquire entrepreneurial and leadership skills to anticipate and respond to new situations.	**d2** Effectively manage tasks, time, and resources.
C13 Plan and manage construction processes; address construction defects, instability, and quality issues; maintain safety measures in	**a1** Define the plan and manage the construction process.

construction and materials; and assess the environmental impacts of projects.	

4. Course Contents:

No.	Topics	Lecture	Tutorial	Practical
1	Cash Flow and Its Analysis	4	4	-
2	Project Budget and Financial Methods	6	6	-
3	Risk and Cost Control	4	4	-
4	Financial Path for Project	4	2	-
5	Time Value	4	2	-
6	Profit Rate and Inflation Effects	6	6	-
Total		**28**	**28**	**-**

5. Teaching and Learning Methods:

No.	Topics	Face-To-Face Lecture	Online Lecture	Flipped Classroom	Presentation and Movies	Discussion	Problem-Solving	Brainstorming	Projects	Site Visits	Self-Learning and Research	Cooperative	Discovering	Modeling	Lab
1	Cash Flow and Its Analysis	√			√										
2	Project Budget and Financial Methods		√			√									
3	Risk and Cost Control		√			√									
4	Financial Path for Project	√				√									
5	Time Value	√					√								
6	Profit Rate and Inflation Effects		√			√									

6. Teaching and Learning Methods for Disabled Students:

No.	Teaching Method	Reason
1	Presentation of The Course in Digital Material	Better Access at Any Time

2	Wed Communication with Students	Better Communication with Certain Cases
3	Asking Small Groups to Do Assignments; Each Composed of Low, Medium, and High-Performance Students	Knowledge and Skills Transfer Among Different Levels of Students
4	An Electronic Model System for The Institution	E. Learning

7. Student Evaluation:

7.1 Student Evaluation Method:

No.	Evaluation Method	Competencies	LOs
1	Semester Works (Quizzes, Sheets, Reports)	C3 C9 C13	b1, c1 d2 a1
2	Mid-Term Exam	C3 C9 C13	b1, c1 d2 a1
3	Final-Term Exam	C3 C9 C13	b1, c1 d2 a1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Semester Works (Quizzes, Sheets, Reports)	4^{th}, 11^{th}
2	Mid-Term Exam	8^{th}
3	Final-Term Exam	15^{th}

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Semester Works (Quizzes, Sheets, Reports)	20%
2	Mid-Term Exam	20%
3	Final-Term Exam	60%
Total		**100%**

8. List of References:

No.	Reference List
1	Wiley-Blackwell. Code of Practice for Project Management for Construction and Development. Chartered Institute of Building (Great Britain).
2	Kerzner, Harold. Project Management Workbook. A System Approach to Planning, Scheduling, and Control.
3	de Marco, A. Project Management for Facility Constructions A Guide for Engineers, and Architects.
4	Project Management Institute and Project Management Institute. A Guide to the Project Management Body of Knowledge (PMBOK Guide).

5	Lester, Albert. Project Management, Planning, and Control. Managing Engineering, Construction, and Manufacturing Projects to PMI, APM, and BSI Standards.
6	Vanhoucke, M. Management for Professionals Integrated Project Management and Control.

9. Facilities Required for Teaching and Learning:

Facility			
1	Lecture Classroom	3	White Board
2	Seminar	4	Data Show System

10. Matrix of Knowledge and Skills:

No.	Topic	Aims	Competencies	LOs
1	Cash Flow and Its Analysis	6, 8	C3 C9 C13	b1, c1 d2 a1
2	Project Budget and Financial Methods	6, 8	C3	b1, c1
3	Risk and Cost Control	6, 8	C3	b1, c1
4	Financial Path for Project	6, 8	C3 C9 C13	b1, c1 d2 a1
5	Time Value	6, 8	C3 C9 C13	b1, c1 d2 a1
6	Profit Rate and Inflation Effects	6, 8	C3 C9 C13	b1, c1 d2 a1

Course Coordinator: Prof. Dr. Mohamed Elkiki
Head of Department: Prof. Dr. Mohamed Elkiki
Date of Approval: 2022

Project Management (2)
(CIE533)

1. Basic Information:

Program Title	Civil Engineering Program
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Civil Engineering Department
Course Title	Project Management (2)
Course Code	CIE533
Year/Level	Level 5
Specialization	Minor – Elective Course
Authorization Date of Course Specification	-
Prerequisite	Complete 100 CH

Teaching Hours	**Lectures**	**Tutorial**	**Practical**
	2	2	-

2. Course Aims:

No.	Aims
2	Work in and manage a diverse team of professionals from various engineering disciplines, taking responsibility for own and team performance, behaving professionally, and adhering to engineering ethics and standards.
5	Communicate effectively with various audiences using various forms, methods, and languages; cope with academic and professional issues critically and creatively; and display leadership, business administration, and entrepreneurial abilities.
6	Analyze data from the intended tests to manage resources creatively.
8	Plan and manage construction processes; address construction defects, instability, and quality issues; maintain safety measures in construction and materials; and assess the environmental impacts of projects.
9	Deal with biddings, contracts, and financial issues including project insurance and guarantees.

3. Competencies:

Competencies	Learning Outcomes (LOs)

C3 Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global, cultural, social, economic, environmental, ethical, and other aspects as appropriate to the discipline, and within the principles and contexts of sustainable design and development.	**b1** Judge engineering decisions considering balanced costs, benefits, safety, quality, reliability, and environmental impact. **c1** Incorporate economic, societal, global, environmental, and risk management factors into design. **c2** Applying engineering design procedures to generate cost-effective solutions while adhering to sustainable design and development principles and contexts.
C7 Function efficiently as an individual and as a member of multi-disciplinary and multicultural teams.	**d1** Collaborate effectively within a multidisciplinary team. **d2** Work in stressful environments and within constraints. **d3** Motivate individuals.
C9 Use creative, innovative, and flexible thinking and acquire entrepreneurial and leadership skills to anticipate and respond to new situations.	**d2** Effectively manage tasks, time, and resources.
C13 Plan and manage construction processes; address construction defects, instability, and quality issues; maintain safety measures in construction and materials; and assess the environmental impacts of projects.	**a1** Define the plan and manage the construction process.
C14 Deal with biddings, contracts, and financial issues including project insurance and guarantees.	**a1** Define biddings, contracts, and financial issues. **b1** Address biddings, contracts, and financial issues including project insurance and guarantees. **c1** Apply biddings, contracts, and financial issues on civil engineering projects.

4. Course Contents:

No.	Topics	Lecture	Tutorial	Practical
1	Evaluation and Performance Development for Construction Projects	2	2	-
2	Productivity in Construction Works	8	8	-
3	The Efficient Utilization of Project Resources	4	4	-
4	Construction Economies	8	8	-

5	Tender's Strategies	4	4	-
6	Different Field Application	2	2	-
Total		**28**	**28**	**-**

5. Teaching and Learning Methods:

No.	Topics	Face-To-Face Lecture	Online Lecture	Flipped Classroom	Presentation and Movies	Discussion	Problem-Solving	Brain Storming	Projects	Site Visits	Self-Learning and Research	Cooperative	Discovering	Modeling	Lab
1	Evaluation and Performance Development for Construction Projects		√			√									
2	Productivity in Construction Works	√					√								
3	The Efficient Utilization of Project Resources	√			√										
4	Construction Economies	√				√									
5	Tender's Strategies		√		√										
6	Different Field Application		√						√						

6. Teaching and Learning Methods for Disabled Students:

No.	Teaching Method	Reason
1	Presentation of The Course in Digital Material	Better Access at Any Time
2	Wed Communication with Students	Better Communication with Certain Cases
3	Asking Small Groups to Do Assignments; Each Composed of Low, Medium, and High-Performance Students	Knowledge and Skills Transfer Among Different Levels of Students
4	An Electronic Model System for The Institution	E. Learning

7. Student Evaluation:

7.1 Student Evaluation Method:

No.	Evaluation Method	Competencies	LOs
1	Semester Works (Quizzes, Sheets, Reports)	C3 C7 C9 C13 C14	b1, c1, c2 d1, d2, d3 d2 a1 a1, b1, c1
2	Mid-Term Exam	C7 C9 C13	d1, d2, d3 d2 a1
3	Final-Term Exam	C3 C7 C9 C13 C14	b1, c1, c2 d1, d2, d3 d2 a1 a1, b1, c1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Semester Works (Quizzes, Sheets, Reports)	4^{th}, 11^{th}
2	Mid-Term Exam	8^{th}
3	Final-Term Exam	15^{th}

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Semester Works (Quizzes, Sheets, Reports)	20%
2	Mid-Term Exam	20%
3	Final-Term Exam	60%
Total		**100%**

8. List of References:

No.	Reference List
1	Wiley-Blackwell. Code of Practice for Project Management for Construction and Development. Chartered Institute of Building (Great Britain).
2	Kerzner, Harold. Project Management Workbook. A System Approach to Planning, Scheduling, and Control.
3	de Marco, A. Project Management for Facility Constructions A Guide for Engineers, and Architects.
4	Project Management Institute and Project Management Institute. A Guide to the Project Management Body of Knowledge (PMBOK Guide).
5	Lester, Albert. Project Management, Planning, and Control. Managing Engineering, Construction, and Manufacturing Projects to PMI, APM, and BSI Standards.

6	Vanhoucke, M. Management for Professionals Integrated Project Management and Control.

9. Facilities Required for Teaching and Learning:

Facility			
1	Lecture Classroom	3	White Board
2	Seminar	4	Data Show System

10. Matrix of Knowledge and Skills:

No.	Topic	Aims	Competencies	LOs
1	Evaluation and Performance Development for Construction Projects	6, 8	C9 C13	d2 a1
2	Productivity in Construction Works	2, 5, 6, 8	C7 C9 C13	d1, d2, d3 d2 a1
3	The Efficient Utilization of Project Resources	6, 8	C9 C13	d2 a1
4	Construction Economies	6, 8	C3	b1, c1, c2
5	Tender's Strategies	9	C14	a1, b1, c1
6	Different Field Application	2, 5, 6, 8	C3 C7 C9 C13	b1, c1, c2 d1, d2, d3 d2 a1

Course Coordinator: Dr. Hamdy Abd Elaty
Head of Department: Prof. Dr. Mohamed Elkiki
Date of Approval: 2022

Project Visibility Study
(CIE534)

1. Basic Information:

Program Title	Civil Engineering Program
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Civil Engineering Department
Course Title	Project Visibility Study
Course Code	CIE534
Year/Level	Level 5
Specialization	Minor – Elective Course
Authorization Date of Course Specification	-
Prerequisite	Complete 100 CH

Teaching Hours	**Lectures**	**Tutorial**	**Practical**
	2	2	-

2. Course Aims:

No.	Aims
6	Analyze data from the intended tests to manage resources creatively.
8	Plan and manage construction processes; address construction defects, instability, and quality issues; maintain safety measures in construction and materials; and assess the environmental impacts of projects.

3. Competencies:

Competencies	Learning Outcomes (LOs)
C3 Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global, cultural, social, economic, environmental, ethical, and other aspects as appropriate to the discipline, and within the principles and contexts of sustainable design and development.	**a2** Understand engineering solutions' professional ethics and impacts on society and the environment. **b1** Judge engineering decisions considering balanced costs, benefits, safety, quality, reliability, and environmental impact. **c2** Applying engineering design procedures to generate cost-effective solutions while adhering to sustainable design and development principles and contexts.
C4 Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements,	**a2** List the engineering-related business and management principles. **c2)** Use fundamental organizational and project management abilities.

environmental issues, and risk management principles.	

4. Course Contents:

No.	Topics	Lecture	Tutorial	Practical
1	Importance, Definition, and Historical Development for Visibility Study	2	2	-
2	Project Essence and Its Principles and Forms	4	4	-
3	Initial Visibility Studies and Its Elements	2	2	-
4	Environmental Visibility Study	2	2	-
5	Important Financial, Monetary, and Marketing Sides in Visibility Study	4	4	-
6	Exhibition of Products and Effective Parameters in It	2	2	-
7	Pricing Policies	2	2	-
8	The Situation of Government, Consumer, and Competitive Projects	2	2	-
9	Engineering and Technical Visibility for The Project	4	4	-
10	Social Visibility Study	2	2	-
11	Evaluation Methods of Visibility Study	2	2	-
Total		**28**	**28**	**-**

5. Teaching and Learning Methods:

No.	Topics	Face-To-Face Lecture	Online Lecture	Flipped Classroom	Presentation and Movies	Discussion	Problem-Solving	Brain Storming	Projects	Site Visits	Self-Learning and Research	Cooperative	Discovering	Modeling	Lab
1	Importance, Definition, and Historical Development for Visibility Study		√		√										
2	Project Essence and Its Principles and Forms	√				√									

3	Initial Visibility Studies and Its Elements	√				√									
4	Environmental Visibility Study		√		√										
5	Important Financial, Monetary, and Marketing Sides in Visibility Study	√						√							
6	Exhibition of Products and Effective Parameters in It		√		√										
7	Pricing Policies	√							√						
8	The Situation of Government, Consumer, and Competitive Projects		√		√										
9	Engineering and Technical Visibility for The Project	√				√									
10	Social Visibility Study		√		√										
11	Evaluation Methods of Visibility Study	√							√						

6. Teaching and Learning Methods for Disabled Students:

No.	Teaching Method	Reason
1	Presentation of The Course in Digital Material	Better Access at Any Time
2	Wed Communication with Students	Better Communication with Certain Cases
3	Asking Small Groups to Do Assignments; Each Composed of Low, Medium, and High-Performance Students	Knowledge and Skills Transfer Among Different Levels of Students
4	An Electronic Model System for The Institution	E. Learning

7. Student Evaluation:

7.1 Student Evaluation Method:

No.	Evaluation Method	Competencies	LOs
1	Semester Works (Quizzes, Sheets, Reports)	C3 C4	a2, b1, c2 a2, c2
2	Mid-Term Exam	C3 C4	a2, b1, c2 a2, c2
3	Final-Term Exam	C3 C4	a2, b1, c2 a2, c2

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Semester Works (Quizzes, Sheets, Reports)	4^{th}, 11^{th}
2	Mid-Term Exam	8^{th}
3	Final-Term Exam	15^{th}

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Semester Works (Quizzes, Sheets, Reports)	20%
2	Mid-Term Exam	20%
3	Final-Term Exam	60%
	Total	**100%**

8. List of References:

No.	Reference List
1	Wiley-Blackwell. Code of Practice for Project Management for Construction and Development. Chartered Institute of Building (Great Britain).
2	Kerzner, Harold. Project Management Workbook. A System Approach to Planning, Scheduling, and Control.
3	de Marco, A. Project Management for Facility Constructions A Guide for Engineers, and Architects.
4	Project Management Institute and Project Management Institute. A Guide to the Project Management Body of Knowledge (PMBOK Guide).
5	Lester, Albert. Project Management, Planning, and Control. Managing Engineering, Construction, and Manufacturing Projects to PMI, APM, and BSI Standards.
6	Vanhoucke, M. Management for Professionals Integrated Project Management and Control.

9. Facilities Required for Teaching and Learning:

Facility			
1	Lecture Classroom	3	White Board
2	Seminar	4	Data Show System

10. Matrix of Knowledge and Skills:

No.	Topic	Aims	Competencies	LOs

1	Importance, Definition, and Historical Development for Visibility Study	6, 8	C3 C4	a2, b1, c2 a2, c2
2	Project Essence and Its Principles and Forms	6, 8	C3 C4	a2, b1, c2 a2, c2
3	Initial Visibility Studies and Its Elements	6, 8	C3 C4	a2, b1, c2 a2, c2
4	Environmental Visibility Study	6, 8	C3	a2, b1, c2
5	Important Financial, Monetary, and Marketing Sides in Visibility Study	6, 8	C3	a2, b1, c2
6	Exhibition of Products and Effective Parameters in It	6, 8	C3 C4	a2, b1, c2 a2, c2
7	Pricing Policies	6, 8	C3	a2, b1, c2
8	The Situation of Government, Consumer, and Competitive Projects	6, 8	C3 C4	a2, b1, c2 a2, c2
9	Engineering and Technical Visibility for The Project	6, 8	C3 C4	a2, b1, c2 a2, c2
10	Social Visibility Study	6, 8	C3	a2, b1, c2
11	Evaluation Methods of Visibility Study	6, 8	C3 C4	a2, b1, c2 a2, c2

Course Coordinator: Prof. Dr. Mohamed Elkiki
Head of Department: Prof. Dr. Mohamed Elkiki
Date of Approval: 2022

River Engineering
(CIE535)

1. Basic Information

Program Title	Civil Engineering Program
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Civil Engineering Department
Course Title	River Engineering
Course Code	CIE535
Year/Level	Level 5
Specialization	Minor – Elective Course
Authorization Date of Course Specification	-
Pre-request	Complete 100 h

Teaching hours	**Lectures**	**Tutorial**	**Practical**
	2	4	-

2. Course Aims:

No.	Aims
4	Use the techniques, skills, and current engineering tools required for river engineering problems regarding the classifications of rivers, velocity, and flow rate measurements.
7	Achieve an optimum design for hydraulics structures on rivers such as dams, spillways, gates, and pumping stations.
10	Select appropriate and sustainable technologies for river velocity, flow rate measurements, and sediment control

3. Competencies:

Competencies	Learning outcomes (LO'S)
C1 Identify, formulate, and solve complex river engineering problems by applying	**a1** Describe the relevant mathematical.

engineering fundamentals, basic science, and mathematics.	principles and theories in the discipline concepts regarding velocity, and flow rate measurements, and sediment control. **a3** Explain the principal types of river hydraulic structures as dams, spillways, and gates.
C11 Select appropriate and sustainable technologies for river velocity, sedimentation, and flow rate measurements.	**a1** Recognize the fundamentals of technologies for river velocity, sedimentation control, and flow rate measurements. **a2** Summarize, appropriate and sustainable technologies for dam and spillway construction. **c1** Using numerical techniques for rivers, velocity, and flow rate measurements.
C12 Achieve an optimum design of dams, gates, and spillway construction.	**b1** Achieve an optimum design of dams, and spillway structures. **b2** Achieve an optimum design of hydraulic structures gates.

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	Classifications of rivers, data collection method; velocity and flow rate measurements.	6	6	-
2	Design of hydraulic structures: dike, spillway, dam	14	14	-
3	Countermeasure on sediment control; corrosion deposition scour	8	8	-
Total		**28**	**28**	**-**

5. Teaching and Learning Methods:

Topics	Face -to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self -learning and Research	Cooperative	Discovering	Modeling	lab

Classifications of rivers, data collection method; velocity and flow rate measurements.	x	x			x	x	x							
Design of hydraulic structures: dike, spillway, dam	x	x			x	x	x							
Countermeasure on sediment control; corrosion deposition scour	x	x			x	x	x							

6. Teaching and Learning Methods of disabled Students:

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

7. Student assessment:

7.1 Student Assessment Methods:

No.	Assessment Method	Competencies	LOs
1	Mid Term Examination (written/ online)	C1, C11, C12	a1, a3 a1, a2, c1 b1
2	Formative (quizzes- online quizzes- presentation)	C1, C11, C12	a1, a3 a1, a2, c1 b1
3	Final Term Examination (written)	C1, C11, C12	a1, a3 a1, a2, c1 b1, b2

7.2 Assessment Schedule:

No.	Assessment Method	Weeks
1	Mid Term Examination (written/ online)	8th
2	Practical/ Oral Examination	15th
3	Formative (quizzes- online quizzes presentation-Tutorial and report assessment)	Every week

4	Final Term Examination (written)	Decided by Faculty Council

7.3 Weighting of Assessments:

No.	Assessment Method	Weights
1	Mid Term Examination (written/ online)	20%
2	Formative (quizzes- online quizzes presentation-Tutorial and report assessment)	20%
3	Final Term Examination (written)	60%
Total		100%

8. List of References:

No.	References
1	EBEED, G.s. "Lecture Notes on Design of irrigation Structures" Ain shams University, faculty of Engineering, 2020.
2	ASWA G.L., "irrigation and water Resources Engineering", New international (p) limited, publishers, Ansari Road Daryagauj, New Delhi,2018.

9. Facilities Required for Teaching and Learning:

No.	Facility		
1	Lecture Classroom	3	White Board
2	Lab Facilities	4	Data Show System
5	Presenter		

10. Matrix of Knowledge and Skills of the Course

No.	Topic	Aims	Competencies	LO's
1	Classifications of rivers, data collection method; velocity and flow rate measurements.	4	C1 C11	a1 a1, a2, c1
2	Design of hydraulic structures: dike, spillway, dam, gate, pumping stations, sheet pile.	7	C1, C11, C12	a3 a1, a2 b1
3	Countermeasure on sediment control; corrosion deposition scour, bill of quantity	4, 10	C1 C11	a1 a1

Course Coordinator Assoc. Prof. Dr. Mohammed Gabr
Head of Department: Prof. Dr. Mohammed Elkiki
Date of Approval: 2022

Traffic Control Systems
(CIE538)

1. Basic Information:

Program Title	Civil Engineering Program
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Civil Engineering Department
Course Title	Traffic Control Systems
Course Code	CIE538
Year/Level	Level 5
Specialization	Minor – Elective Course
Authorization Date of Course Specification	-
Pre- request	Complete 100 h

Teaching hours	**Lectures**	**Tutorial**	**Practical**
	2	2	-

2. Course Aims

No.	Aims
4	Use the techniques, skills, and current engineering tools required for engineering practice by taking full responsibility for one's own learning and development, participating in lifelong learning, and demonstrating the ability to pursue postgraduate and research studies.
7	Achieve an optimum design of traffic control systems strategies for intersections and arterials or any other emerging field relevant to the discipline.

3. Competencies:

Competencies	Learning Outcomes (LO'S)
C1. Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science, and mathematics.	**a2** Explain the scientific principles and theories that apply to the topic. **b3** Applying engineering basics that are relevant to the subject.
C2 Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess, and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.	**b2** Conduct basic experiments to learn about the applications of traffic control strategies and concepts. **b4** Evaluate components, systems, and processes are evaluated for their characteristics and performance.

	c1 Choose relevant mathematical and computer-based methodologies for problem modelling and analysis.
C11 Select appropriate and sustainable technologies for traffic networks control systems	**a2** Summarize, appropriate and sustainable technologies for evaluating effectiveness of traffic control systems.

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	Introduction to existing and new traffic control systems strategies including both off-line signal optimization techniques and real-time computer traffic-responsive control concepts	8	8	-
2	Control concepts and methods for signal intersections, arterial systems, and area traffic networks.	10	10	-
3	Traffic control system evaluation techniques using measures of effectiveness (M.O.E) for signal intersections, arterial, and networks.	10	10	-
Total		**28**	**28**	**-**

5. Teaching and learning methods:

Topics	Face -to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self -learning and Research	Cooperative	Discovering	Modeling	lab
Introduction to existing and new traffic control systems strategies including both off-line signal optimization techniques and real-time computer	x	x			x	x	x							

traffic-responsive control concepts														
Control concepts and methods for signal intersections, arterial systems and area traffic networks.	x	x			x	x	x							
Traffic control system evaluation techniques using measures of effectiveness (M.O.E) for signal intersections, arterial, and networks.	x	x			x	x	x							

6. Teaching and learning methods for disabled students:

No.	Teaching Methods	Reason
1	Presentation of the course in digital material	Better access any time
2	Asking small groups to do assignments; each composed of low, medium, and high-performance students.	Knowledge and skills transfer among different level of students.

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO’s
1	Mid-term examination	C1 C2 C11	a2, b3 b2, b4, c1 a2
2	Semester work	C1 C2 C11	a2, b3 b2, b4, c1 a2
3	Final term examination	C1 C2 C11	a2, b3 b2, b4, c1 a2

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Semester work	$2nd, 7th, 9th$
2	Mid Term examination	$8th$
3	Final term examination	$15th$

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Mid-term examination	20%
2	Semester work	20%
3	Final-term examination	60%
Total		**100%**

8. List of References:

No.	Reference List
1	**Essential books (textbooks):** Transportation Engineering, an Introduction, C. Jotin Khisty, Prentice Hall, Englewood Cliffs, New Jersey, 1990. Traffic Engineering, William R. McShane, Prentice Hall, Englewood Cliffs, New Jersey, 1990.
2	**Recommended books:** Ott, Introduction to Statistical Methods and Data Analysis, PWS-Kent, 1990. Control of traffic systems in buildings, 2006 sandro marken

9. Facilities required for teaching and learning:

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

10. Matrix of knowledge and skills of the course:

No.	Topic	Aims	Competencies	LO's
1	Introduction to existing and new traffic control systems strategies including both offline signal optimization techniques and real-time computer traffic-responsive control concepts	4, 7	C1 C2 C11	a2, b3 b2, b4, c1 a2
2	Control concepts and methods for signal intersections, arterial systems, and area traffic networks.	4, 7	C1 C2 C11	a2, b3 b2, b4, c1 a2

3	Traffic control system evaluation techniques using measures of effectiveness (M.O.E) for signal intersections, arterial, and networks.	4, 7	C1 C2 C11	a2, b3 b2, b4, c1 a2

Course Coordinator: Assoc. Prof. Dr. Alaa Gabr
Head of Department: Prof. Dr. Mohamed Elkiki
Date of Approval: 2022

Reinforced Concrete (4)
(CIE539)

1. Basic Information:

Program Title	Civil Engineering Program
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Civil Engineering Department
Course Title	Reinforced Concrete (4)
Course Code	CIE539
Year/Level	Level 5
Specialization	Minor – Elective Course
Authorization Date of Course Specification	-
Pre-request	Complete 100 h

Teaching hours	**Lectures**	**Tutorial**	**Practical**
	2	2	-

2. Course Aims:

No.	Aims
4	Use the techniques, skills, and current engineering tools required for engineering practice by taking full responsibility for one's own learning and development, participating in lifelong learning, and demonstrating the ability to pursue postgraduate and research studies.
7	Achieve an optimum design of Reinforced.
10	Select appropriate and sustainable technologies for construction of buildings, infrastructures and water structures; using numerical techniques, experiment measurements, and testing by applying a full range of civil engineering fields such as structural analysis and mechanics, properties and strength of materials, surveying, soil mechanics, hydrology and fluid mechanics.

3. Intended Learning Outcomes (LO'S):

Competencies	Learning Outcomes (LO'S)

C6 Plan, supervise and monitor implementation of engineering projects, taking into consideration other trades requirements.	**a1** Show the appropriate and sustainable technologies for construction of buildings, infrastructures, and water structures.
C11 Select appropriate and sustainable technologies for construction of buildings, infrastructures and water structures; using either numerical techniques or physical measurements and/or testing by applying a full range of civil engineering concepts and techniques of structural analysis and mechanics, properties and strength of materials, surveying, soil mechanics, hydrology and fluid mechanics.	**a1** Recognize the different engineering principles related to the design of reinforced concrete. **a2** Summarize, appropriate and sustainable technologies for construction of buildings, infrastructures, and water structures.
C12 Achieve an optimum design of Reinforced Concrete and Steel Structures, Foundations and Earth Retaining Structures; and at least three of the following civil engineering topics: Transportation and Traffic, Roadways and Airports, Railways, Sanitary Works, Irrigation, Water Resources and Harbors; or any other emerging field relevant to the discipline.	**b1** Achieve an optimum design of Reinforced Concrete structures.

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	Introduction	2	2	-
2	Design of un-cracked sections	6	6	-
3	Design of rectangular tanks	6	6	-
4	Design of Circular tanks	6	6	-
5	Design of elevated tanks	8	8	-
Total		**28**	**28**	**-**

5. Teaching and learning methods:

Topics	Face -to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self -learning and Research	Cooperative	Discovering	Modeling	lab
Introductio n		x						x						x
Design of un-cracked sections		x						x						x
Design of rectangular tanks		x						x						x
Design of Circular tanks		x						x						x
Design of elevated tanks		x						x						x

6. Teaching and learning methods for disabled students:

No.	Teaching Methods	Reason
1	Presentation of the course in digital material	Better access any time
2	Asking small groups to do assignments; each composed of low, medium, and high-performance students.	Knowledge and skills transfer among different level of students.

7. Student evaluation:

7.1 Student evaluation method:

No.	Evaluation Method	Competencies	LO’s
1	Mid Term Examination	C6 C11	a1 a1
2	Semester work	C11	a1, a2
3	Final Term Examination	C6 C11 C12	a1 a1, a2 b1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Semester work	$2^{nd}, 7^{th}, 9^{th}$
2	Mid Term examination	8^{th}
3	Final term examination	15^{th}

7.3 Weighting of Evaluation:

No.	Evaluation method	Weights
1	Mid-term examination	20%
2	Semester work	20%
3	Final-term examination	60%
Total		**100%**

8. List of References:

No.	Reference List
1	Chmielewski, Ryszard, Leopold Kruszka, and Paweł Muzolf. "The selection of methods for strengthening of the reinforced-concrete structure of the open tank." Case Studies in Construction Materials 12 (2020): e00343.
2	Nallanathel, Mr Manoj, Mr B. Ramesh, and L. Jagadeesh. "Effective Utilization of Staad Pro in The Design and Analysis of Water Tank." International Journal of Pure and Applied Mathematics 119.17 (2019)
3	Design of Reinforced Concrete Structures | Design of reinforced concrete structures, Magdy Abd EL-Hameed Tayel, 2019
4	Design of reinforced concrete Water Tanks, Khalil Ibrahim Waked, Scientific Book House for Publishing& Distributing, 2018
5	Simple Examples of Reinforced Concrete Design, Oscar Faber, Edition 4, Oxford University Press, 1952, 2018

9. Facilities required for teaching and learning:

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

10. Matrix of knowledge and skills of the course:

No.	Topic	Aims	Competencies	LO's
1	Introduction	7	C6	a1

2	Design of un-cracked sections	10	C11 C12	a1, b1 a1
3	Design of rectangular tanks	10	C11 C12	a1, b1 a1
4	Design of Circular tanks	10	C11 C12	a1, b1 a1
5	Design of swimming pools	10	C11 C12	a1, b1 a1

Course Coordinator: Prof. Dr. Khaled Fawzy
Head of Department: Prof. Dr. Mohamed Elkiki
Date of Approval: 2022

Tunneling and Underground Excavation
(CIE540)

1. Basic Information:

Program Title	Civil Engineering Program
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Civil Engineering Department
Course Title	Tunneling and Underground Excavation
Course Code	CIE540
Year/Level	Level 5
Specialization	Major
Authorization Date of Course Specification	-
Pre- request	Complete 100 h

Teaching hours	Lectures	Tutorial	Practical
	2	2	-

2. Course Aims

No.	Aims
4	Use the techniques, skills, and current engineering tools required for engineering practice by taking full responsibility for one's own learning and development, participating in lifelong learning, and demonstrating the ability to pursue postgraduate and research studies.
7	Achieve an optimum design of Reinforced Concrete and Steel Structures, Foundations and Earth Retaining Structures; and at least three of the following civil engineering topics: Transportation and Traffic, Roadways and Airports, Railways, Sanitary Works, Irrigation, Water Resources and Harbors; or any other emerging field relevant to the discipline.
10	Select appropriate and sustainable technologies for construction of buildings, infrastructures, and water structures; using numerical techniques, experiment measurements, and testing by applying a full range of civil engineering fields such as structural analysis and mechanics, properties and strength of materials, surveying, soil mechanics, hydrology and fluid mechanics.

3. Competencies:

Competencies	Learning Outcomes (LO'S)
C2 Develop and conduct appropriate simulation, analyze, and interpret data, assess, and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.	**a2** Define the principles, basic properties, and features of construction material, as well as their use in sustainable technologies for construction of buildings, infrastructures.

	c3 Applying statistical analyses and objective engineering judgment to draw conclusions.
C4 Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues, and risk management principles.	**b1** Create methodical approaches when dealing with new and advancing technology.
C6 Plan, supervise and monitor implementation of engineering projects, taking into consideration other trades requirements	**a1** Show the appropriate and sustainable technologies for construction of buildings, infrastructures, and water structures.
C9 Utilize codes of practice	**d1** Describe codes of practice.
C12 Achieve an optimum design of Tunneling and underground Excavation	**b1** Achieve an optimum design of Reinforced Concrete

4. Course Contents:

No.	Topics	Lecture	Tutorial	Practical
1	Introduction to tunnels	2	2	-
2	numerical methods in tunnel constructions	4	4	-
3	Computer software packages and its applications in tunnels.	4	4	-
4	Tunneling and excavations in hard rock	4	4	-
5	Basic rock mechanics, shape, size and orientation of an opening, elastic deformation and the Kirsch solution, rock mass classification, support design and ground reaction curve, drill and blast method, NATM tunneling method. Tunneling in soft ground	4	4	-
6	problems of urban tunneling, deformation and surface settlement, load on liners, face stability, methods of soft ground tunneling including EPB and slurry shield methods	4	4	-
7	Selection of methods of attack for excavation of tunnels and deep vertical sided openings. Tunneling procedures based on behavioral characteristics of soil and rock, study of tunnel boring machines, shielded and drill-and-blast operations, linings, soil linear interaction. Deep excavation procedures related to support of excavation systems, methods of installation and dewatering.	6	6	-
Total		**28**	**28**	**-**

5. Teaching and learning methods:

Topics	Face to face lecture	Online lecture	Flipped classroom	Presentation and movies	Discussion	Problem solving	Brainstorming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab
Introduction to tunnels	x	x			x	x	x							
numerical methods in tunnel constructions	x	x			x	x	x							
Computer software packages and its applications in tunnels.	x	x			x	x	x							
Tunneling and excavations in hard rock	x	x			x	x	x							
Basic rock mechanics, shape, size and orientation of an opening, elastic deformation and the Kirsch solution, rock mass classification, support design and ground reaction curve, drill, and blast method, NATM tunneling method. Tunneling in soft ground	x	x			x	x	x							
problems of urban tunneling, deformation and surface settlement, load on liners, face stability, methods of soft ground tunneling including EPB and slurry shield methods	x	x			x	x	x							

Selection of methods of attack for excavation of tunnels and deep vertical sided openings. Tunneling procedures based on behavioral characteristics of soil and rock, study of tunnel boring machines, shielded and drill-and-blast operations, linings, soil linear interaction. Deep excavation procedures related to support of excavation systems, methods of installation and dewatering.	x	x			x	x	x							

6. Teaching and learning methods for disabled students:

No.	Teaching Methods	Reason
1	Presentation of the course in digital material	Better access any time
2	Wed communication with students	Better communication with certain cases
3	Asking small groups to do assignments; each composed of low, medium, and high-performance students	Knowledge and skills transfer among different levels of students

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Mid-term examination	C2 C4 C6	a2, c3 b1 a1
2	Semester work	C2 C4 C6 C9	a2, c3 b1 a1 d1
3	Final term examination	C2 C4 C6 C9 C12	a2, c3 b1 a1 d1 b1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	semester work	*continuous evaluation*

2	Mid Term examination	$8th$
4	Final term examination	$15th$

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Mid-term examination	20%
2	Semester work	20%
3	Final-term examination	60%
	Total	**100%**

8. List of References:

No.	Reference List
1	Design and construction of tunnels, pietrolanaridi, 2018
2	Tunneling and tunnel mechanio, Dimitrioskolymbas 2020
3	Course notes: Lecture notes prepared by the course coordinator +Solved examples.
4	Das, B., M. (2017), "Principles of Foundation Engineering ", CENGAGE Learning,
5	Gulhati, S.K. and Datta, M. (2015), “Geotechnical Engineering “, Tata McGraw-Hill, New Delhi.
6	Essential books (textbooks): Egyptian Code of Practice for Soil Mechanics and Foundations (2002)

9. Facilities required for teaching and learning:

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

10. Matrix of knowledge and skills of the course:

No	Topic	Aims	Competencies	LO’s
1	Introduction to tunnels	4,7,10	C2 C4	a2, c3 b1
2	numerical methods in tunnel constructions	4,7,10	C2	a2, c3

			C9	d1
3	Computer software packages and its applications in tunnels.	4,7,10	C2 C9 C12	a2, c3 d1 b1
4	Tunneling and excavations in hard rock	4,7,10	C2 C9	a2, c3 d1
5	Basic rock mechanics, shape, size and orientation of an opening, elastic deformation and the Kirsch solution, rock mass classification, support design and ground reaction curve, drill, and blast method, NATM tunneling method. Tunneling in soft ground.	4,7,10	C2 C9 C12	a2, c3 d1 b1
6	load on liners, face stability, problems of urban tunneling, deformation and surface settlement methods of soft ground tunneling including EPB and slurry shield methods	4,7,10	C2 C9 C12	a2, c3 d1 b1
7	Selection of methods of attack for excavation of tunnels and deep vertical sided openings. Tunneling procedures based on behavioral characteristics of soil and rock, study of tunnel boring machines, shielded and drill-and-blast operations, linings, soil linear interaction. Deep excavation procedures related to support of excavation systems, methods of installation.	4,7,10	C2 C9 C12	a2, c3 d1 b1

Course Coordinator: Dr. Hany Hashish
Head of Department: Prof. Dr. Mohamed Elkiki
Date of Approval: 2022

Urban Transportation Planning
(CIE541)

1. Basic Information

Program Title	Civil Engineering Program
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Civil Engineering Department
Course Title	Urban Transportation Planning
Course Code	CIE541
Year/Level	Level 5
Specialization	Minor – Elective Course
Authorization Date of Course Specification	-
Pre- request	Complete 100 h

Teaching hours	**Lectures**	**Tutorial**	**Practical**
	2	2	-

2. Course Aims:

No.	**Aims**
4	Use the techniques, skills, and current engineering tools required for engineering practice by taking full responsibility for one's own learning and development, participating in lifelong learning, and demonstrating the ability to pursue postgraduate and research studies.

3. Competencies:

Competencies	**Learning Outcomes (LO'S)**
C2 Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess, and evaluate transportation systems,	**a2** Summarize, appropriate of sustainable technologies for urban planning. **b2** Conduct basic experiments to learn about the applications of urban planning, transportation planning
C3 Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global, cultural, social, economic, environmental, ethical, and other aspects as appropriate to the discipline and within the principles and contexts of sustainable design and development.	**c1** Incorporate economic, societal, global, environmental impact of urban planning techniques.
C11 Select appropriate and sustainable technologies for urban planning design	**a2** Achieve an optimum design of works for urban planning, city streets, and environments.

C12 Achieve an optimum design for Transportation and Traffic, Roadways and	**b1** Achieve the design of road. **b2** Achieve an optimum design of works for transportation and traffic, roadways and airports, railways, sanitary works, irrigation, water resources and harbors; or any other emerging field relevant to the discipline.
C13 Plan and manage planning processes; maintain safety measures in urban planning process; and assess environmental impacts of projects.	**a1** define plan and mange urban planning process and transportation systems. **c1** Assess environmental impacts of transportation projects.

4. Contents:

No.	Topics	Lectures	Tutorial	Practical
1	Measures of flow, speed, and Density	2	2	-
2	Statically of traffic characteristics (travel time, delay, speed, pedestrians, parking, and accident studies	2	2	-
3	Traffic signals	2	2	-
4	Parking garages and terminals design	2	2	-
5	Freeway surveillance and control	2	2	-
6	General characteristics of transportation: streets, highways, rail, transit, water, and pipelines. Egypt transport system: on overview	2	2	-
7	Fundamentals of traffic flow: time space diagrams, capacity analysis	2	2	-
8	control, IVHS, public issues and administration	4	4	-
9	Transport system design: characteristics of driver, vehicle, and road. Route location , horizontal, an. Vertical alignment, earthwork, drainage, and pavements	2	2	-
10	Economic evaluation, system operation, maintenance, and rehabilitation	4	4	-
11	Environmental impacts, various laboratory experiments and design projects supplement the subject matter	4	4	-
Total		28	28	-

5. Teaching and learning methods:

Topics	Face to face lecture	Online lecture	Flipped classroom	Presentation and movies	Discussion	Problem solving	Brainstorming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab
Measures of flow, speed, and Density	x	x			x	x	x							
Statically of traffic characteristics (travel time, delay, speed, pedestrians, parking and accident studies	x	x			x	x	x							
Traffic signals	x	x			x	x	x							
Parking garages and terminals design	x	x			x	x	x							
Freeway surveillance and control	x	x			x	x	x							
General characteristics of transportation: streets, highways, rail, transit, water, and pipelines. Egypt transport system: on overview	x	x			x	x	x							
Fundamentals of traffic flow: time space diagrams, capacity analysis	x	x			x	x	x							
control, IVHS, public issues and administration	x	x			x	x	x							
Transport system design: characteristics of driver,	x	x			x	x	x							

vehicle, and road. Route location , horizontal, an. Vertical alignment, earthwork, drainage and pavements														
Economic evaluation, system operation, maintenance, and rehabilitation	x	x			x	x	x							
Environmental impacts, various laboratory experiments and design projects supplement the subject matter	x	x			x	x	x							

6. Teaching and learning methods for disabled students:

No.	Teaching Methods	Reason
1	Presentation of the course in digital material	Better access any time
2	Wed communication with students	Better communication with certain cases
3	Asking small groups to do assignments; each. composed of low, medium, and high-performance students	Knowledge and skills transfer among different levels of students
4	Electronic model system for the Institution.	E. learning

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Midterm examination	C2 C12	a2, b2 b2
2	Semester work (quizzes, sheets, report)	C2	a2, c2
3	Final term examination	C2 C11 C12	a2, b2, c2 a1 b2

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Midterm examination	8th

2	Semester work	7th - 9th
3	Final term examination	15th

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Midterm examination	20%
2	Semester work	20%
3	Final term examination	60%
Total		**100%**

8. 8-List of References:

No.	Reference List
1	Ott, Introduction to Statistical Methods and Data Analysis, PWS-Kent, 2019
2	Simulation of urban transport system, slim hammed and mekkiksouri , fib 2021
3	Urban dynamics and simulation models, densipumai, romainreuillon , 2020

9. Facilities required for teaching and learning:

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

10. Matrix of knowledge and skills of the course:

No.	Topic	Aims	Competencies	LO's
1	Land use-transportation interaction	2, 8	C2	a2
2	The process of Urbana transportation planning, urban transport problems, goals, and objectives, data and information, Survey design, travel demand for casting: 1) trip generations, 2) trip distribution, 3) modal choice, 4) route assignment.	2, 8	C2, C13	a2, c2 a1
3	The evaluation of urban transport system,	2,8	C2 C12	a2, b2 b2
4	transport system management	2, 8	C2 C12	a2 b2
5	demand management, and control	2, 8	C2 C12 C13	a2, c2 b2, c1

Course Coordinator: Assoc. Prof. Dr. Alaa Gabr
Head of Department: Prof. Dr. Mohamed Elkiki
Date of Approval: 2022

Special Concrete Structures (1)
(CIE542)

1. Basic Information:

Program Title	Civil Engineering Program
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Civil Engineering Department
Course Title	Special Concrete Structures (1)
Course Code	CIE542
Year/Level	Level 5
Specialization	Minor – Elective Course
Authorization Date of Course Specification	-
Pre- request	Complete 100 h

Teaching hours	**Lectures**	**Tutorial**	**Practical**
	2	2	-

2. Course Aims

No.	Aims
4	Use the techniques, skills, and current engineering tools required for engineering practice by taking full responsibility for one's own learning and development, participating in lifelong learning, and demonstrating the ability to pursue postgraduate and research studies.
7	Achieve an optimum design of Reinforced Concrete and Steel Structures, Foundations and Earth Retaining Structures; and at least three of the following civil engineering topics: Transportation and Traffic, Roadways and Airports, Railways, Sanitary Works, Irrigation, Water Resources and Harbors; or any other emerging field relevant to the discipline.
10	Select appropriate and sustainable technologies for construction of buildings. using numerical techniques, experiment measurements, and testing by applying a full range of civil engineering fields such as structural analysis and mechanics, properties and strength of materials, surveying.

3. Competencies:

Competencies	Learning Outcomes (LO'S)
C2 Develop and conduct appropriate simulation, analyze, and interpret data, assess and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.	**a2** Define the principles, basic properties, and features of construction material, as well as their use in sustainable technologies for construction of buildings, infrastructures. **c3** Applying statistical analyses and objective engineering judgment to draw conclusions.

C4 Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues, and risk management principles.	**b1** Create methodical approaches when dealing with new and advancing technology.
C6 Plan, supervise and monitor implementation of engineering projects, taking into consideration other trades requirements.	**a1** Show the appropriate and sustainable technologies for construction of buildings, infrastructures, and water structures. **c1** Conduct experimental work related to the reinforced concrete and steel structures, foundations and earth retaining structures.
C9 Utilize codes of practice	**d1** Describe codes of practice.
C12 Achieve an optimum design of Concrete structure.	**b1** Achieve an optimum design of Reinforced Concrete

4. Course Contents:

No.	Topics	Lecture	Tutorial	Practical
1	Introduction to tall building structures	14	14	-
2	Design criteria for tall building structures – loading - structural formation – modeling for analysis – braced frames – rigid frames – shear walls	14	14	-
Total		**28**	**28**	**-**

5. Teaching and learning methods:

Topics	Face to face lecture	Online lecture	Flipped classroom	Presentation and movies	Discussion	Problem solving	Brainstorming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab
Introduction to tall building structures		x					x	x						x
Design criteria for tall building structures –		x					x	x						x

loading - structural formation – modeling for analysis – braced frames – rigid frames – shear walls														

6. Teaching and learning methods for disabled students:

No.	Teaching Methods	Reason
1	Presentation of the course in digital material	Better access any time
2	Wed communication with students	Better communication with certain cases
3	Asking small groups to do assignments; each composed of low, medium, and high-performance students	Knowledge and skills transfer among different levels of students
4	Electronic model system for the Institution.	E. learning

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Mid-term examination	C2 C9	a2, c3 a1
2	Semester work	C2 C9	a2, c3 a1
3	Final term examination	C2 C9 C12	a2, c3 a1 b1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	semester work	$2nd, 7th, 9th$
2	Mid Term examination	$8th$
3	Practical Examination	$14th$
4	Final term examination	$15th$

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Mid-term examination	20%
2	Semester work	20%
3	Final-term examination	60%

Total	**100%**

8. List of References:

No.	Reference List
1	EL-Metwally, S.E., and Hosny, H.M.H., "Design Fundamental of Structure Concrete.”. Utilities and Urban Communities, "Egyptian Code for Design and Construction of Reinforced Concrete Structures."Cairo 2020.
2	Cairo. 2018. EL-Behairy, S., "Reinforced Concrete Design Handbook, ". Gouda M. A., Helmy, M., and Korshe, I., "Basic Design of Reinforced Concrete Structures. "Alexandria. 2015.

9. Facilities required for teaching and learning:

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

10. Matrix of knowledge and skills of the course:

No	Topic	Aims	Competencies	LO’s
1	Introduction to tall building structures	4,7,10	C2	a2
2	Design criteria for tall building structures – loading - structural formation – modeling for analysis – braced frames – rigid frames – shear walls	4,7,10	C2 C9 C12	a2, c3 a1 b1

Course Coordinator: Dr. Shady Ragheb
Head of Department: Prof. Dr. Mohamed Elkiki
Date of Approval: 2022

Foundation Engineering (2)
(CIE543)

1. Basic Information:

Program Title	Civil Engineering Program
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Civil Engineering Department
Course Title	Foundation Engineering (2)
Course Code	CIE543
Year/Level	Level 5
Specialization	Major
Authorization Date of Course Specification	-
Pre- request	Completing of 100 hr. + CIE505

Teaching hours	Lectures	Tutorial	Practical
	2	2	-

2. Course Aims

No.	Aims
4	Use the techniques, skills, and current engineering tools required for engineering practice by taking full responsibility for one's own learning and development, participating in lifelong learning, and demonstrating the ability to pursue postgraduate and research studies.
7	Achieve an optimum design of Reinforced Concrete and Steel Structures, Foundations and Earth Retaining Structures; and at least three of the following civil engineering topics: Transportation and Traffic, Roadways and Airports, Railways, Sanitary Works, Irrigation, Water Resources and Harbors; or any other emerging field relevant to the discipline.
10	Select appropriate and sustainable technologies for construction of buildings, infrastructures, and water structures; using numerical techniques, experiment measurements, and testing by applying a full range of civil engineering fields such as structural analysis and mechanics, properties and strength of materials, surveying, soil mechanics, hydrology and fluid mechanics.

3. Competencies:

Competencies	Learning Outcomes (LO'S)
C1 Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science, and mathematics.	**a3** Explain the basic principles of engineering. **b3** Applying engineering basics that are relevant to the subject. **c3** Identify, formulate, and solve complex engineering problems by applying engineering fundamentals.

C2 Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess, and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.	**c2** Develop suitable experimentation and/or simulation.
C3 Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global, cultural, social, economic, environmental, ethical, and other aspects as appropriate to the discipline and within the principles and contexts of sustainable design and development.	**c2** Applying engineering design procedures to generate cost-effective solutions while adhering to the principles and contexts of sustainable design and development
C4 Utilize contemporary technologies, codes of practice and standards, quality guidelines and safety requirements.	**a1** Describe quality assurance systems, codes of practice, and standards.
C12 Achieve an optimum design of foundations.	**b1** Achieve an optimum design of Reinforced Concrete and Steel Structures, Foundations and Earth Retaining Structures.

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	Hydraulics of soils	4	4	-
2	Flow net in soil	6	6	-
3	Application of flow	6	6	-
4	Deep foundation	6	6	-
5	Sheet piles	6	6	-
Total		**28**	**28**	**-**

5. Teaching and learning methods:

Topics	Face to face lecture	Online lecture	Flipped classroom	Presentation and mov	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Rese	Cooperative	Discovering	Modeling	Lab

				ie s						ar ch				
Hydraulics of soils	x	x			x	x	x							
Flow net in soil	x	x			x	x	x							
Application of flow	x	x			x	x	x							
Deep foundation	x	x			x	x	x							
Sheet piles	x	x			x	x	x							

6. Teaching and learning methods for disabled students:

No.	Teaching Methods	Reason
1	Presentation of the course in digital material	Better access any time
2	Wed communication with students	Better communication with certain cases
3	Asking small groups to do assignments; each composed of low, medium, and high-performance students	Knowledge and skills transfer among different levels of students
4	Electronic model system for the Institution.	E. learning

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Midterm examination	C1 C2 C3	a3, b3, c3 c2 c2
2	Semester work (quizzes, sheets, report)	C2 C3 C4	c2 c2 a1
3	Final term examination	C1 C2 C3 C4 C12	a3, b3, c3 c2 c2 a1 b1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Midterm examination	8th
2	Semester work	*continuous evaluation*
3	Final term examination	15^{th}

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights

1	Midterm examination	20%
2	Semester work	20%
3	Final term examination	60%
Total		**100%**

8. List of References:

No.	Reference List
1	Course notes: Lecture notes prepared by the course coordinator +Solved examples.
2	Das, B., M. (2017), "Principles of Foundation Engineering ", CENGAGE Learning,
3	Gulhati, S.K. and Datta, M. (2015), "Geotechnical Engineering ", Tata McGraw-Hill, New Delhi.
4	Essential books (textbooks): Egyptian Code of Practice for Soil Mechanics and Foundations (2002)

9. Facilities required for teaching and learning:

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

10. Matrix of knowledge and skills of the course:

No	Topic	Aims	Competencies	LO's
1	Hydraulics of soil	4,7,10	C1 C2 C3	a3, b3, c3 c2 c2
2	Flow net in soil	4,7,10	C1 C2 C3	a3, b3, c3 c2 c2
3	Application of flow	4,7,10	C2 C3 C4	c2 c2 a1
4	Deep foundation	4,7,10	C2 C3 C4	c2 c2 a1
5	Sheet pile	4,7,10	C1	a3, b3, c3

			C2 C3 C4 C12	c2 c2 a1 b1

Course Coordinator: Dr. Hany Hashish
Head of Department: Prof. Dr. Mohamed Elkiki
Date of Approval: 2022

Special Concrete Structures (2)
(CIE544)

1. Basic Information:

Program Title	Civil Engineering Program
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Civil Engineering Department
Course Title	Special Concrete Structures (2)
Course Code	CIE544
Year/Level	Level 5
Specialization	Minor – Elective Course
Authorization Date of Course Specification	-
Pre- request	Complete 100 h + CIE539

Teaching hours	Lectures	Tutorial	Practical
	2	2	-

2. Course Aims

No.	Aims
4	Use the techniques, skills, and current engineering tools required for engineering practice by taking full responsibility for one's own learning and development, participating in lifelong learning, and demonstrating the ability to pursue postgraduate and research studies.
7	Achieve an optimum design of Reinforced Concrete and Steel Structures, Foundations and Earth Retaining Structures; and at least three of the following civil engineering topics: Transportation and Traffic, Roadways and Airports, Railways, Sanitary Works, Irrigation, Water Resources and Harbors; or any other emerging field relevant to the discipline.
10	Select appropriate and sustainable technologies for construction of buildings. using numerical techniques, experiment measurements, and testing by applying a full range of civil engineering fields such as structural analysis and mechanics, properties, and strength of materials.

3. Competencies:

Competencies	Learning Outcomes (LO'S)
C2 Develop and conduct appropriate simulation, analyze, and interpret data, assess and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.	**a2** Define the principles, basic properties, and features of construction material, as well as their use in sustainable technologies for construction of buildings, infrastructures, and water structures. **c3** Applying statistical analyses and objective engineering judgment to draw conclusions.

C3 Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global, cultural, social, economic, environmental, ethical, and other aspects as appropriate to the discipline and within the principles and contexts of sustainable design and development.	**c2** Applying engineering design procedures to generate cost-effective solutions while adhering to the principles and contexts of sustainable design and development.
C4 Utilize codes of practice	**c3** Describe codes of practice.
C6 Plan, supervise and monitor implementation of engineering projects, taking into consideration other trades requirements	**c1** Conduct experimental work related to the reinforced concrete and steel structures, foundations and earth retaining structures.
C9 Achieve an optimum design of Reinforced Concrete.	**d1** Achieve an optimum design of Reinforced Concrete
C12 Achieve an optimum design of Reinforced Concrete and Steel Structures, Foundations and Earth Retaining Structures; and at least three of the following civil engineering topics: Transportation and Traffic, Roadways and Airports, Railways, Sanitary Works, Irrigation, Water Resources and Harbors; or any other emerging field relevant to the discipline.	**b1** Achieve an optimum design of Reinforced Concrete and Steel Structures, Foundations and Earth Retaining Structures.

4. Course Contents:

No.	Topics	Lecture	Tutorial	Practical
1	Introduction to composite construction	2	2	-
2	Materials of composite structures	6	6	-
3	Simply supported composite beams	6	6	-
4	Continuous supported composite beams	6	6	-
5	Shear connections – composite columns – composite slabs	8	8	-
Total		**28**	**28**	**-**

5. Teaching and learning methods:

Topics	Face to face lecture	Online lecture	Flipped classroom	Presentation and movies	Discussion	Problem solving	Brainstorming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab
Introduction to composite construction		x			x			x						x
Materials of composite structures		x			x			x						x
Simply supported composite beams		x			x			x						x
Continuous supported composite beams		x			x			x						x
Shear connections – composite columns – composite slabs		x			x			x						x

6. Teaching and learning methods for disabled students:

No.	Teaching Methods	Reason
1	Presentation of the course in digital material	Better access any time
2	Wed communication with students	Better communication with certain cases
3	Asking small groups to do assignments; each composed of low, medium, and high-performance students	Knowledge and skills transfer among different levels of students
4	Electronic model system for the Institution.	E. learning

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Mid-term examination	C2 C9	a2, c3 a1, b1
2	Semester work	C2 C9	a2, c3 a1
3	Final term examination	C2 C9 C12	a2, c3 a1 b1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	semester work	$2nd$,$7th$, $9th$
2	Mid Term examination	$8th$
3	Practical Examination	14^{th}
4	Final term examination	$15th$

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Mid-term examination	20%
2	Semester work	20%
3	Final-term examination	60%
	Total	**100%**

8. List of References:

No.	Reference List
1	EL-Metwally, S.E., and Hosny, H.M.H., "Design Fundamental of Structure Concrete." Ministry of Housing. Utilities and Urban Communities, "Egyptian Code for Design and Construction of Reinforced Concrete Structures. "Cairo 2020.
2	Hilal.M.,"Reinforced Concrete Water Tanks." Marcou
3	Hilal M., "Design of Reinforced Concrete Halls," 2018

9. Facilities required for teaching and learning:

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

10. Matrix of knowledge and skills of the course:

No	Topic	Aims	Competencies	LO's
1	Introduction to composite construction	4,7,10	C2	a2
2	Materials of composite structures	4,7,10	C2 C9 C12	a2, c3 a1 b1
3	Simply supported composite beams	4,7,10	C2	a2
4	Continuous supported composite beams	4,7,10	C2 C9	a2, c3 a1
5	Shear connections – composite columns composite slabs	4,7,10	C2 C9 C12	a2, c3 a1 b1

Course Coordinator: Assoc. Prof. Dr. Mohamed Gabr
Head of Department: Prof. Dr. Mohamed Elkiki
Date of Approval: 2022

Railway Engineering
(CIE545)

1. Basic Information:

Program Title	Civil Engineering Program
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Civil Engineering Department
Course Title	Railway Engineering
Course Code	CIE545
Year/Level	Level 5
Specialization	Major
Authorization Date of Course Specification	-
Pre- request	Complete 100 h

Teaching hours	Lectures	Tutorial	Practical
	2	2	-

2. Course Aims

No.	Aims
7	Achieve an optimum design of Reinforced Concrete and Steel Structures, Foundations and Earth Retaining Structures; and at least three of the following civil engineering topics: Transportation and Traffic, Roadways and Airports, Railways, Sanitary Works, Irrigation, Water Resources and Harbors; or any other emerging field relevant to the discipline.
10	Select appropriate and sustainable technologies for construction of buildings, infrastructures, and water structures; using numerical techniques, experiment measurements, and testing by applying a full range of civil engineering fields such as structural analysis and mechanics, properties and strength of materials, surveying, soil mechanics, hydrology and fluid mechanics.

3. Competencies:

Competencies	Learning Outcomes (LO'S)
C1 Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science, and mathematics.	**a3** Explain the basic principles of engineering for railways planning. **b2** Using scientific concepts and theories that are relevant to railway engineering.
C2 Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess, and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.	**b2** Conduct basic experiments to learn about the applications of structural analysis and mechanics, properties and strength of materials, surveying, soil mechanics, hydrology, and fluid mechanics in the fields of transportation and traffic, roadways and airports, railways, sanitary works, irrigation, water

	resources and harbors; or any other emerging field relevant to the discipline.
C12 Achieve an optimum design of Reinforced Concrete and Steel Structures, Foundations and Earth Retaining Structures; and at least three of the following civil engineering topics: Transportation and Traffic, Roadways and Airports, Railways, Sanitary Works, Irrigation, Water Resources and Harbors; or any other emerging field relevant to the discipline.	**b2** Achieve an optimum design of works for transportation and traffic, roadways and airports, railways, sanitary works, irrigation, water resources and harbors; or any other emerging field relevant to the discipline.

4. Course Contents:

No.	Topics	Lecture	Tutorial	Practical
1	Engineering principals for railways planning	2	2	-
2	Railways components and specifications	4	4	-
3	Design of different parts of railways	6	6	-
4	Types of stations	2	2	-
5	Types of signals	2	2	-
6	Maintenance	4	4	-
7	Planning of railways lines	4	4	-
8	Transportation economy	2	2	-
9	Management and insurance.	2	2	-
Total		**28**	**28**	**-**

5. Teaching and learning methods:

Topics	Face -to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self -learning and Research	Cooperative	Discovering	Modeling	lab
Engineering principals for railways planning	x	x			x	x	x							

Railways components and specifications	x	x			x	x	x							
Design of different parts of railways	x	x			x	x	x							
Types of stations	x	x			x	x	x							
Types of signals	x	x			x	x	x							
Maintenance	x	x			x	x	x							
Planning of railways lines	x	x			x	x	x							
Transportation economy	x	x			x	x	x							
Management and insurance.	x	x			x	x	x							

6. Teaching and learning methods for disabled students:

No.	Teaching Methods	Reason
1	Presentation of the course in digital material	Better access any time
2	Asking small groups to do assignments; each composed of low, medium, and high-performance students.	Knowledge and skills transfer among different level of students.

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Mid-term examination	C1 C2 C12	a3, b2 b2 b2
2	Semester work	C1 C2 C12	a3, b2 b2 b2
3	Final term examination	C1 C2 C12	a3, b2 b2 b2

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	semester work	2nd,7th, 9th
2	Mid Term examination	8th
3	Final term examination	15th

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Mid-term examination	20%
2	Semester work	20%
3	Final-term examination	60%
	Total	**100%**

8. List of References:

No.	Reference List
1	E. B. Machaly, "Behavior, analysis and design of steel work connections ", vol. 3, 2020
2	Railway development 2018, Dr frank pruinsma and DR Irik pills.

9. Facilities required for teaching and learning:

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

10. Matrix of knowledge and skills of the course:

No	Topic	Aims	Competencies	LO's
1	Engineering principles for railways planning	7	C1	a3, b2
2	Railways components and specifications	10	C1	a3, b2
3	Design of different parts of railways	7	C2 C12	b2 b2
4	Types of stations	7, 10	C1 C2 C12	a3, b2 b2 b2
5	Types of signals	7	C1 C2 C12	a3, b2 b2 b2
6	maintenance	10	C2 C12	b2 b2
7	Planning of railways lines	7	C2 C12	b2 b2
8	Transportation economy	10	C1	a3, b2

9	Management and insurance.	10	C1	a3, b2

Course Coordinator: Prof. Dr. Mohamed Elkiki
Head of Department: Prof. Dr. Mohamed Elkiki
Date of Approval: 2022

Reinforced Concrete (5)
(CIE546)

1. Basic Information

Program Title	Civil Engineering Program
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Civil Engineering Department
Course Title	Reinforced Concrete (5)
Course Code	CIE546
Year/Level	Level 5
Specialization	Minor – Elective Course
Authorization Date of Course Specification	-
Pre- request	Complete 100 h + CIE539

Teaching hours	Lectures	Tutorial	Practical
	2	2	-

2. Course Aims

No.	Aims
4	Use the techniques, skills, and current engineering tools required for engineering practice by taking full responsibility for one's own learning and development, participating in lifelong learning, and demonstrating the ability to pursue postgraduate and research studies.
7	Achieve an optimum design of Reinforced Concrete.
10	Select appropriate and sustainable technologies for construction of buildings. using numerical techniques, experiment measurements, and testing by applying a full range of civil engineering fields such as structural analysis and mechanics, properties, and strength of materials.

3. Competencies:

Competencies	Learning Outcomes (LO'S)
C2 Develop and conduct appropriate simulation, analyze, and interpret data, assess and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.	**a2** Define the principles, basic properties, and features of construction material, as well as their use in sustainable technologies for construction of buildings. **c3** Applying statistical analyses and objective engineering judgment to draw conclusions.
C9 Utilize codes of practice	**d1** Describe codes of practice.
C12 Achieve an optimum design of Reinforced Concrete.	**b1** Achieve an optimum design of Reinforced Concrete

4. Course Contents:

No.	Topics	Lecture	Tutorial	Practical
1	Design shell structure	12	12	-
2	design of pre-stressed reinforced concrete	16	16	-
Total		**28**	**28**	**-**

5. Teaching and learning methods:

Topics	Face to face lecture	Online lecture	Flipped classroom	Presentation and movies	Discussion	Problem solving	Brainstorming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab
Design shell structure		x					x							x
design of pre-stressed reinforced concrete		x					x							x

6. Teaching and learning methods for disabled students:

No.	Teaching Methods	Reason
1	Presentation of the course in digital material	Better access any time
2	Wed communication with students	Better communication with certain cases
3	Asking small groups to do assignments; each composed of low, medium, and high-performance students	Knowledge and skills transfer among different levels of students
4	Electronic model system for the Institution.	E. learning

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Mid-term examination	C2 C9	a2, c3 a1

2	Semester work	C2 C9	a2, c3 a1
3	Final term examination	C2 C9 C12	a2, c3 a1 b1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	semester work	$2nd, 7th$, $9th$
2	Mid Term examination	$8th$
3	Practical Examination	14^{th}
4	Final term examination	$15th$

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Mid-term examination	20%
2	Semester work	20%
3	Final-term examination	60%
Total		**100%**

8. List of References:

No.	Reference List
1	Hilal.M.,"Reinforced Concrete Water Tanks." Marcou,
2	Hilal M., "Design of Reinforced Concrete Halls," 2018
3	Reinforced Concrete Design," Cairo Univ., 2019.Abdel Rahman, A.,
4	"Fundamental of Reinforced Concrete Incorporating the Egyptian Code of 2020."

9. Facilities required for teaching and learning:

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

10. Matrix of knowledge and skills of the course:

No	Topic	Aims	Competencies	LO's
1	Design shell structure	4,7,10	C2 C9 C12	a2, c3 a1 b1

2	Design of pre-stressed reinforced concrete	4,7 ,10	C2 C9 C12	a2, c3 a1 b1

Course Coordinator: Prof. Dr. Khaled Fawzy
Head of Department: Prof. Dr. Mohamed Elkiki
Date of Approval: 2022

Training (1)
(ENG430)

1. Basic Information

Program Title	Civil Engineering Program
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Civil Engineering Department
Course Title	Training (1)
Course Code	ENG430
Year/Level	Level 4
Specialization	Major
Authorization Date of Course Specification	-
Pre- request	Complete Previous Level

Teaching hours	**Lectures**	**Tutorial**	**Practical**
	-	-	80

2. Course Aims

No.	Aims
2	Work in and manage a diverse team of professionals from various engineering disciplines, taking responsibility for own and team performance; and behave professionally and adhere to engineering ethics and standards.
5	Communicate effectively with a variety of audiences using a variety of forms, methods, and languages; cope with academic and professional issues in a critical and creative manner; and display leadership, business administration, and entrepreneurial abilities.
7	Achieve an optimum design of Reinforced Concrete and Steel Structures, Foundations and Earth Retaining Structures; and at least three of the following civil engineering topics: Transportation and Traffic, Roadways and Airports, Railways, Sanitary Works, Irrigation, Water Resources and Harbors; or any other emerging field relevant to the discipline.
8	Plan and manage construction processes; address construction defects, instability and quality issues; maintain safety measures in construction and materials; and assess environmental impacts of projects.

3. Competencies:

Competencies	Learning Outcomes (LO'S)
C3 Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global, cultural, social, economic, environmental, ethical, and other aspects as appropriate to the discipline and within the principles and contexts of sustainable design and development.	**a1** Learn the general principles of design techniques specific to reinforced concrete and steel structures, foundations and earth retaining structures. **a2** Understand the professional ethics and impacts of engineering solutions on society and environment. **a3** Recognizes the various construction defects, instability and quality issues and assess environmental impacts of projects. **b1** Judge engineering decisions considering balanced costs, benefits, safety, quality, reliability, and environmental impact. **c2** Applying engineering design procedures to generate cost-effective solutions while adhering to the principles and contexts of sustainable design and development.
C5 Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues, and risk management principles.	**a1** Define technical language and report writing. **b1** Assess different ideas, views, and knowledge from a range of sources. **c1** Prepare technical reports. **d1** Search for information to engage in lifelong self-learning discipline.
C6 Plan, supervise and monitor implementation of engineering projects, taking into consideration other trades requirements.	**a1** Show the appropriate and sustainable technologies for construction of buildings, infrastructures, and water structures. **c2** Acquire entrepreneurial skills.
C7 Function efficiently as an individual and as a member of multi-disciplinary and multicultural teams.	**d1** Collaborate effectively within multidisciplinary team. **d2** Work in stressful environment and within constraints. **d3** Motivate individuals.
C9 Use creative, innovative, and flexible thinking and acquire entrepreneurial and leadership skills to anticipate and respond to new situations.	**d1**Think creatively in solving problems of design. **d2** Effectively manage tasks, time, and resources.

4. Course Contents:

No.	Topics	Tutorial	Practical
1	The training aims to explore students' ability and skills to comprehensively address and manage architectural and technical issues.	-	37

2	A complete set of appropriately presented drawings, accompanied by a detailed report of the training's attributable studies and potential considerations should be implemented by each student.	-	5
Total		**-**	**42**

5. Teaching and learning methods:

Topics	Face to face lecture	Online lecture	Flipped classroom	Presentation and movies	Discussion	Problem solving	Brainstorming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab
The training aims to explore students' ability and skills to comprehensively address and manage architectural and technical issues	x				x	x	x		x	x	x			
A complete set of appropriately presented drawings, accompanied by a detailed report of the training's attributable studies and potential considerations should be implemented by each student	x			x	x		x	x						

6. Teaching and learning methods for disabled students:

No.	Teaching Methods	Reason
1	Presentation of the course in digital material.	Better access any time.
2	Asking small groups to do assignments; each composed of low, medium and high-performance students	Knowledge and skills transfer among different levels of students.
3	Electronic model system for the Institution.	E. learning.

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Oral Examination	C3 C9	a1, b1, c2 d1
2	Final work (presentation, Report)	C3 C5 C7 C9	a1, b1, c2 a1, c1, d1 d1, d3 d1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Oral Examination	at the end of training
2	Final work (presentation, Report)	4^{th}

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Oral Examination	50%
2	Final work (presentation, Report)	50%
	Total	**100%**

8. List of References:

No.	Reference List
1	Subject studies

9. Facilities required for teaching and learning:

No.	Facility
1	Lecture classroom
2	Seminar
3	White board
4	Lab.

10. Matrix of knowledge and skills of the course:

No	Topic	Aims	Competencies	LO's
1	The training aims to explore students' ability and skills to comprehensively address and manage architectural and technical issues.	2,5	C3 C5 C6	a2, a3, c2 b1 a1
2	A complete set of appropriately presented drawings, accompanied by a detailed report of the training's attributable studies and potential considerations should be implemented by each student.	7,8	C5 C7 C9	a1, c1, d1 d1, d2, d3 d1, d2

Course Coordinator: Prof. Dr. Mohamed Elkiki
Head of Department: Prof. Dr. Mohamed Elkiki
Date of Approval: 2022

Training (2)
(ENG530)

11. Basic Information

Program Title	Civil Engineering Program
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Civil Engineering Department
Course Title	Training (2)
Course Code	ENG530
Year/Level	Level 5
Specialization	Major
Authorization Date of Course Specification	-
Pre- request	Complete Previous Level

Teaching hours	Lectures	Tutorial	Practical
	-	-	42

12. Course Aims

No.	Aims
2	Work in and manage a diverse team of professionals from various engineering disciplines, taking responsibility for own and team performance; and behave professionally and adhere to engineering ethics and standards.
5	Communicate effectively with a variety of audiences using a variety of forms, methods, and languages; cope with academic and professional issues in a critical and creative manner; and display leadership, business administration, and entrepreneurial abilities.
7	Achieve an optimum design of Reinforced Concrete and Steel Structures, Foundations and Earth Retaining Structures; and at least three of the following civil engineering topics: Transportation and Traffic, Roadways and Airports, Railways, Sanitary Works, Irrigation, Water Resources and Harbors; or any other emerging field relevant to the discipline.
8	Plan and manage construction processes; address construction defects, instability, and quality issues; maintain safety measures in construction and materials; and assess environmental impacts of projects.

13. Competencies:

Competencies	Learning Outcomes (LO'S)
C3 Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global, cultural, social, economic, environmental, ethical, and other aspects as appropriate to the discipline and within the principles and contexts of sustainable design and development.	**a1** Learn the general principles of design techniques specific to reinforced concrete and steel structures, foundations and earth retaining structures. **a2** Understand the professional ethics and impacts of engineering solutions on society and environment. **a3** Recognizes the various construction defects, instability and quality issues and assess environmental impacts of projects. **b1** Judge engineering decisions considering balanced costs, benefits, safety, quality, reliability, and environmental impact. **c2** Applying engineering design procedures to generate cost-effective solutions while adhering to the principles and contexts of sustainable design and development.
C5 Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues, and risk management principles.	**a1** Define technical language and report writing. **b1** Assess different ideas, views, and knowledge from a range of sources. **c1** Prepare technical reports. **d1** Search for information to engage in lifelong self-learning discipline.
C6 Plan, supervise and monitor implementation of engineering projects, taking into consideration other trades requirements.	**a1** Show the appropriate and sustainable technologies for construction of buildings, infrastructures, and water structures. **c2** Acquire entrepreneurial skills.
C7 Function efficiently as an individual and as a member of multi-disciplinary and multicultural teams.	**d1** Collaborate effectively within multidisciplinary team. **d2** Work in stressful environment and within constraints. **d3** Motivate individuals.
C9 Use creative, innovative, and flexible thinking and acquire entrepreneurial and leadership skills to anticipate and respond to new situations.	**d1**Think creatively in solving problems of design. **d2** Effectively manage tasks, time, and resources.

14. Course Contents:

No.	Topics	Tutorial	Practical
1	The training examines and measures students' knowledge, skills, and collective outputs gained throughout their study in the faculty and department in a combined manner, that reflects identity and creativity in all its preliminary and analytical phases.	-	37

2	Presentations will be emphasizing the technical contents.	-	5
Total		**-**	**42**

15. Teaching and learning methods:

Topics	Face to face lecture	Online lecture	Flipped classroom	Presentation and movies	Discussion	Problem solving	Brainstorming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab
The training aims to explore students' ability and skills to comprehensively address and manage architectural and technical issues	x				x	x	x		x	x	x			
A complete set of appropriately presented drawings, accompanied by a detailed report of the training's attributable studies and potential considerations should be implemented by each student	x			x	x		x	x						

16. Teaching and learning methods for disabled students:

No.	Teaching Methods	Reason

1	Presentation of the course in digital material	Better access any time
2	Asking small groups to do assignments; each composed of low, medium, and high-performance students	Knowledge and skills transfer among different levels of students
3	Electronic model system for the Institution.	E. learning

17. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Oral Examination	C3 C9	a1, b1, c2 d1
2	Final work (presentation, Report)	C3 C5 C7 C9	a1, b1, c2 a1, c1, d1 d1, d3 d1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Oral Examination	at the end of training
2	Final work (presentation, Report)	4^{th}

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Oral Examination	50%
2	Final work (presentation, Report)	50%
	Total	**100%**

18. List of References:

No.	Reference List
1	Subject studies

19. Facilities required for teaching and learning:

No.	Facility
1	Lecture classroom
2	Seminar
3	White board
4	Lab.

20. Matrix of knowledge and skills of the course:

No	Topic	Aims	Competencies	LO's
1	The training examines and measures students' knowledge, skills, and collective outputs gained throughout their study in the faculty and	2,5,7, 8	C3 C5 C6	a2, a3, c2 b1 a1

	department in a combined manner, that reflects identity and creativity in all its preliminary and analytical phases.		C9	d1, d2
2	Presentations will be emphasizing the technical contents.	2,5	C5 C7	a1, c1, d1 d1, d2, d3

Course Coordinator: Prof. Dr. Mohamed Elkiki
Head of Department: Prof. Dr. Mohamed Elkiki
Date of Approval: 2022