Mathematics 1

(BAS011)

1- Basic Information:

Program Title	All programs
Department Offering the Program	Basic Science and Engineering Department
Department Responsible for the Course	Basic Science and Engineering Department
Course Title	Mathematics1
Course Code	BAS011
Year/Level	Level: 0
Specialization	Major
Authorization Date of Course Specification	10/2022

Teaching hours	**Lectures**	**Exercise**	**laboratory**	**Student's load**
	2	2	-	4

2- Course Aims

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

3- Competencies:

Competencies	Learning Outcomes (LO'S)
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 Algebra and Calculus. **b1** Use the mathematical engineering principles and theories that apply in the most fundamental problems. **a3** Explain the basic concepts of derivative and algebra.

4. Course Contents:

No.	Topics	Lecture	Exercise	laboratory	Student load
1	Algebra: vectors algebra- partial fractions – equations theory – vectors	4	4	-	7
2	mathematical deduction – numerical solutions methods (simple repetitive method	2	2	-	7
3	Newton and modified Newton's method – intersection method – False position method	4	4	-	7
4	Arrays – linear equations systems – Gauss Jordan method for deletion.	4	4	-	7
5	Derivation: function (definition – theories) – basic trigonometric functions and its inverse	4	4	-	7
6	exponential and logarithmic functions – hyperbolic functions and its inverse – connection (definition – theories)- limits (definition – theories)	4	4	-	7
7	derivatives (definition – theories – higher order types) – curves drawing – mathematical and engineering derivative applications - undefined formulas	4	4	-	7
8	Taylor expansion –Maclaren expansion – approximation – introduction in partial derivation	2	2	-	7
Total		**28**	**28**		**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

Vectors - Vectors Algebra- partial fractions	x	x			x	x	X							
The Concept of functions	x	x			x	x	X							
Equation's 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 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

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Periodic exams	C1	a1, b1
2	Student load	C1	b1
3	Final term examination	C1	a1, b1, a3

7.2 Evaluation Schedule:

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

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exams	20%
2	Student load	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; First Edition, (2016).

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 fracti	1	C1	a1, b1
2	• The Concept of functions	1	C1	a1, b1
3	• Equation's 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. Khaled Samir

Date of Approval: 10/2022

Mechanics 1

(BAS012)

1- Basic Information:

Program Title	All programs
Department Offering the Program	Basic Science and Engineering Department
Department Responsible for the Course	Basic Science and Engineering Department
Course Title	Mechanics 1
Course Code	BAS012
Year/Level	Level: 0
Specialization	Major
Authorization Date of Course Specification	10/2022

Teaching hours	**Lectures**	**Exercise**	**laboratory**	**Student's load**
	2	2	-	4

2- Course Aims:

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

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	Lecture	Exercise	laboratory	Student load
1	Introduction to statics. Fundamental concept Basic quantities of unit dimension- System of units Space, Trigonometry and U.S. Customary units, Force. Statics of particle, Statics of Rigid Body, Free body diagrams. Types of forces, Types of system of forces	2	2	-	**4**
2	Statics of particles Forces on a particle, Addition of vectors, Resultant of several concurrent forces.	2	2	-	**4**
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**
4	Problem involving the equilibrium of a practice- free body diagram. Rectangular components of a forces in space, force defined by its magnitude and two points on its line of action. Addition of concurrent forces in space, equilibrium of a particle in space.	2	2	-	**4**
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	-	**4**
6	Moment of a force about a point.	4	4	-	**8**

	Varignon's theorem, rectangular components of the moment of a force, equivalent systems of forces.				
7	Equilibrium of rigid bodies Free- body diagram. Equilibrium of a rigid body in two dimensions.	2	2	-	**4**
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	-	**8**
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.	4	4		**8**
10	Analysis of structures Definition of truss Simple trusses Analysis of trusses by the method of joints	4	4		**8**
Total		**28**	**28**		**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
Introduction to statics. Fundamental concept Basic quantities of unit dimension-	**x**	**x**			**x**									

System of units Space, Trigonometry and U.S. Customary units, Force. Statics of particle, Statics of Rigid Body, Free body diagrams. Types of forces, Types of system of forces														
Statics of particles Forces on a particle, Addition of vectors, Resultant of several concurrent forces.	**x**	**x**				**x**								
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.	**x**	**x**					**x**							
Problem involving the equilibrium of a practice- free body diagram. Rectangular components of a forces in space, force	**x**	**x**			**x**									

defined by its magnitude and two points on its line of action. Addition of concurrent forces in space, equilibrium of a particle in space.														
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 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

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Periodic exams	C1	a1, b1
2	Student load	C1	a1, b1
3	Final term examination	C1	a1, a2, b1

7.2 Evaluation Schedule:

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

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exams	20%
2	Student load	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 knowledge and skills of the course:

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 particle, 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 forces in space, force defined by its magnitude and two points on its line of action. Addition of concurrent forces in space, equilibrium of a particle in space.	3	C1	a2
5	Rigid bodies: equivalent systems of forces. External and internal forces, principle of transmissibility and equivalent forces, vector product	1	C1	a1

	of two vectors, vector product expressed in terms of rectangular components			
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. Khaled Samir

Date of Approval: 10/2022

Physics1

(BAS013**)**

1- Basic Information:

Program Title	All programs
Department Offering the Program	Basic Science and Engineering Department
Department Responsible for the Course	Basic Science and Engineering Department
Course Title	Physics1
Course Code	BAS013
Year/Level	Level 0
Specialization	Major
Authorization Date of Course Specification	10/2022

Teaching hours	**Lectures**	**Exercise**	**laboratory**	**Student's load**
	2	2	2	4

2- Course Aims:

No.	Aims
1	Mastery of a broad range of engineering physics knowledge and specialized skills, as well as the ability to apply acquired knowledge in real-world situations by applying theories in critical and systemic analytical thinking to identify, diagnose, and solve engineering problems of varying complexity and variance.
2	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.	**b3** Analyze and interpret data

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	Online Lecture	Flipped	Presentation and	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and	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	x	X												X

	and the work in thermodynamics Practical: melting point of solid materials.														
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 disable 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	a1,a2
3	Practical exam	C2	b3
4	Final term examination	C1	a1,a2

7.2 Evaluation Schedule:

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

7.3 weighting of Evaluation:

No.	Evaluation method	Weights
1	final examination	50%
2	Practical examination	10%
3	Semester work	40%
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).
5	Bauer, Wolfgang, and Gary D. Westfall. University Physics. New York, NY: McGraw-Hill, 2011.

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	a1
2	Mechanical properties for materials Practical: Hooks' Law	1,4	C1	a2,b1
3	Oscillations Practical: simple pendulum.	1,4	C1	a1
4	Sounds. Practical: Resonance in the Air columns.	1,4	C1	a1
5	Fluids. Practical: Viscosity.	1,4	C1	a2
6	Heat transfer Practical: Heat& Specific Heat& thermo-electrical equivalent& the latent heat of melting ice.	1,4	C1	a1
7	The kinetic theory of gases and the work in thermodynamics Practical: melting point of solid materials.	1,4	C1	a1
8	The laws of thermodynamic Practical: heating and cooling curves.	1,4	C1	a1
9	Temperature and thermal expansion Practical: coefficient of linear thermal expansion.	1,4	C1	a1

Course Coordinator: Asso.prof. Amal Behairy/Dr. Ahmed Lotfy
Head of Department: Asso.prof. Amal Behairy
Date of Approval: 10/2022

Engineering chemistry

BAS014

1- Basic Information:

Program Title	All programs
Department Offering the Program	Basic Science and Engineering Department
Department Responsible for the Course	Basic Science and Engineering Department
Course Title	Engineering chemistry
Course Code	BAS014
Year/Level	Level:0
Specialization	Major
Authorization Date of Course Specification	10/2022

Teaching hours	**Lectures**	**Exercise**	**laboratory**	**Student's load**
	2	2	-	4

2- Course Aims:

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

1- 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.
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	Lecture	Exercise	laboratory	Student load
	Gaseous status. Practical: Chemistry Laboratory Equipment, Titrimetric Analysis.	4	4		8
2	Chemical thermodynamics. Practical: Preparation of standard solution of Na_2CO_3 (0.1N), Determination of normality of hclby using standard solution of oxalic acid.	4	4		8
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		8
4	Material balance in combustion processes. Practical: Standardization of potassium permanganate with oxalic acid.	2	2		4
5	Dynamic balance in physical and chemical operations. Practical: Determination of nitrites, precipitation titrations.	4	4		8
6	Kinetic chemical interactions. Practical: Preparation of 0.05N of sodium chloride.	2	2		4
7	Electrochemistry, corrosion and corrosion control. Practical: Determination of chloride ion by using Mohr method.	2	2		4
8	Fertilizers. Practical: Determining Molecule Weight by Freezing Point Depression Method.	2	2		4
9	Manufacturing and chemistry of Cement. Practical: Determining Molecule Weight by Freezing Point Depression Method.	2	2		4
10	Water processes. Practical: determination of water hardness by complex metric titration.	2	2		4
Total		**28**	**28**		**56**

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and meeting	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab
1	Gaseous status. Practical: Chemistry Laboratory Equipment, Titrimetric Analysis.	x	x			X									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 normality of acetic acid by using standard solution of sodium hydroxide, Determination of normality of sodium carbonate by using standard solution of Hcl.	x	x					x							X
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.	x	x			X									X

	Practical: Determination of nitrites, precipitation titrations.														
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. Practical: Determining Molecule Weight by Freezing Point Depression Method.	**x**	**x**				**X**								**X**
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 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

7. Student Evaluation:

7.1 Student Evaluation Method:

No.	Evaluation Method	Competencies	LO's
1	Periodic exams	C1	a1, c3
2	Student load	C1	c2, c3, d2
3	Practical Examination	C1, C10	c2, c3, d2
4	Final term examination	C1, C10	a1, c2, c3

7.2 Evaluation Schedule:

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

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exams	10%
2	Student load	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	Shriver and Atkins', Inorganic Chemistry, Oxford University Press, 2010.
3	Peter Atkins, Julio de Paula, James Keeler " Atkins' Physical Chemistry 11ed" Oxford University Press; 11th edition (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 knowledge and skills of the course:

No.	Topic	Aims	Competencies	LO's
1	Gaseous status. Practical: Chemistry Laboratory Equipment, Titrimetric Analysis.	1	C1	a1
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	a1
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	a1
4	Material balance in combustion processes. Practical: Standardization of potassium permanganate with oxalic acid.	1	C1	a1, c3
5	Dynamic balance in physical and chemical operations. Practical: Determination of nitrites, precipitation titrations.	1	C1	a1, c3
6	Kinetic chemical interactions. Practical: Preparation of 0.05N of sodium chloride.	1	C1	a1
7	Electrochemistry, corrosion and corrosion control. Practical: Determination of chloride ion by using Mohr method.	1,8	C10	a1, c2, c3, d2
8	Fertilizers. Practical: Determining Molecule Weight by Freezing Point Depression Method.	8	C10	c2, d2
9	Manufacturing and chemistry of Cement. Practical: Determining Molecule Weight by Freezing Point Depression Method.	8	C10	c2, d2
10	Water processes. Practical: determination of water hardness by complex metric titration.	8	C10	c2, d2

Course Coordinator: Assoc. prof. Khaled Samir
Head of Department: Assoc. prof. Hend Elsayed Gadow
Date of Approval: 10/2022

Engineering Drawing and Projection

(BAS015)

1- Basic Information:

Program Title	All programs
Department Offering the Program	Basic Science and Engineering Department
Department Responsible for the Course	Basic Science and Engineering Department
Course Title	Engineering Drawing and Projection
Course Code	BAS015
Year/Level	level 0
Specialization	Major
Authorization Date of Course Specification	10/2022

Teaching hours	**Lectures**	**Exercise**	**laboratory**	**Student's load**
	1	2	2	4

2- Course Aims:

No.	Aims
1	Apply knowledge, techniques and skills of engineering drawing, engineering operations.

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	Lecture	Exercise	laboratory	Student load
1	Techniques and skills of engineering drawing – engineering operations	4	4	-	
2	orthogonal projection – secondary orthogonal	2	2	-	
3	solid bodies – intersections (cutters for solid bodies – intersections of surfaces)	4	4	-	
4	personals – projections of simple bodies	4	4	-	
5	rules of writing dimensions – drawing of perspectives	4	4	-	
6	deduction of missing projections – drawing of engineering sections.	4	4	-	
7	Drawing of the steel frames - binding and fixing devices - the assembled drawing for some mechanical steel components.	4	4	-	
8	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.	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
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	X													x

	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.														

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	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		ILO's
1	Periodic exams	C1	a1, a2,b1,b2
2	Student load	C1	a1, a2,b1,b2
3	Final exam	C1	a1, a2,b1,b2

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks

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

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exams	10%
2	Practical examination	10%
3	Student load	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 knowledge and skills of the course:

No.	Topic	Aims	**Competencies**	**LO's**

1	Techniques and skills of engineering drawing	1	C1	a1, a2,b1,b2
2	Engineering operations	1	C1	a1, a2,b1,b2
3	Orthogonal projection – Secondary orthogonal	1	C1	a1, a2,b1,b2
4	Intersections	1	C1	a1, a2,b1,b2
5	Projections of simple bodies	1	C1	a1, a2,b1,b2
6	Rules of writing dimensions	1	C1	a1, a2,b1,b2
7	Deduction of missing projections	1	C1	a1, a2,b1,b2
8	Drawing of engineering sections.	1	C1	a1, a2,b1,b2
9	Steel frames	1	C1	a1, a2,b1,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	C1	a1, a2,b1,b2

Course Coordinator: Dr. Moataz Mostafa
Head of Department: Assoc. Prof. Aml Behairy
Date of Approval: 10/2022

Introductions to Computer Systems

(BAS016)

1- Basic Information:

Program Title	All programs
Department Offering the Program	Basic Science and EngineeringDepartment
Department Responsible for the Course	Basic Science and Engineering Department
Course Title	Introductions to Computer Systems
Course Code	BAS016
Year/Level	Level 0
Specialization	Major
Authorization Date of Course Specification	10/2022

Teaching hours	**Lectures**	**Exercise**	**laboratory**	**Student's load**
	2	2	-	3

2- Course Aims:

No.	Aims
1	Master a wide range of engineering knowledge and specialized skills, as well as the ability to apply that information in real-world situations using theories and analytical thinking.
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 system **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	Exercise	laboratory	Student load
1	Computer architecture. practical: Visual Studio C# Interface	2		2	3

	Writing simple statements				
2	Computer systems Practical: Variables, Data type	4		4	6
3	Files systems Practical: Input & Output	2		2	3
4	Computer networks Practical: Conditional Statements	4		4	6
5	Internet networks Practical: Arrays	4		4	6
6	Data systems and information technology Practical: Loop Statement (For, while & do -while)	4		4	6
7	Computer graphics – Multimedia systems Practical: Loop Statement (For, while & do -while)	2		2	3
8	Methods of solving problems and logical design for the programs and matrices. Practical: Nested loop	4		4	6
9	Engineering applications in programming using one structured programming language. Practical: Engineering Case Study.	2		2	3
Total		**28**		**28**	**42**

5. Teaching and learning methods:

No	Topics	Face-to-Face	Online Lecture	Flipped	Presentation	Discussion	Problem	Brain storming	Projects	Site visits	Self-learning	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.	x	x												X

	Practical: Engineering Case Study.														

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	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	Periodic exams	C1	c2, c3
2	Student load	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	Periodic exams	8^{th}
2	Student load	2^{nd} ,7^{th},9^{th},13^{th}
3	Practical Examination	14^{th}
4	Final term examination	15^{th}

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exams	10%
2	final examination	60%
3	Practical examination	10%
4	Student load	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	Computing essentials timothy, O' leary and linda, 2015.
3	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	5	White board
2	Computer lab	6	Data show system
3	Presenter	7	Wireless internet
4	Sound system		

10. Matrix of knowledge and skills of the course:

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: Dr / Amira El Sonbaty

Date of Approval: 10/2022

Mathematics 2

(BAS021)

1- Basic Information:

Program Title	All programs
Department Offering the Program	Basic Science and Engineering Department
Department Responsible for the Course	Basic Science and Engineering Department
Course Title	Mathematics 2
Course Code	BAS021
Year/Level	Level: 0
Specialization	Major
Authorization Date of Course Specification	10/2022

Teaching hours	**Lectures**	**Exercise**	**laboratory**	**Student's load**
	2	2	-	4

2- Course Aims:

No.	Aims
1	Apply knowledge of mathematics, concepts of main topics of calculus and analytic geometry basics to solve fundamental engineering problems.

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. **b1**. Use the mathematical engineering principles and theories that apply in the most fundamental problems. **a3**. Explain the basic concepts of Analytical geometry and Integration

	b3. Use the basics of integration and Geometry that are applicable to the field.

4. Course Contents:

No.	Topics	Lecture	Exercise	laboratory	Student load
1	Analytical geometry: equations of second degree and double equation for two straight lines – movement and rotation of axes	4	4	-	8
2	groups of unified axes circles – conical sectors (properties of conical sectors - parabola – ellipse – hyperbola)	6	6	-	12
3	analytical geometry in space – Cartesian coordinates – cylindrical – spherical – plane in space	2	2	-	4
4	Equations of surfaces in second order – rotation and movement of axes in space.	2	2	-	4
5	Integration: indefinite integration (basic functions – theories)	6	6	-	12
6	method of integration (direct – indirect)	4	4	-	8
7	definite integration (definition – properties - theories) – applications of definite integration (plain areas – circular volumes – plain technical length)	2	2	-	4
8	areas – circular surfaces – numerical integration	2	2	-	4
Total		**28**	**28**		**56**

5. Teaching and learning methods:

No	Topics	Face-to-Face	Online Lecture	Flipped	Presentation	Discussion	Problem	Brain storming	Projects	Site visits	Self-learning	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 –	x	x			x									

	properties - theories) Applications of definite integration (plain areas – circular volumes – plain technical length)														
7	Areas – Circular surfaces	x					X	x							
8	Numerical integration.	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

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Periodic exams	C1	a1, a3
2	Student load	C1	b1, b3
3	Final term examination	C1	a1, a3, b1, b3

7.2 Evaluation Schedule:

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

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exams	20%

2	Student load	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 knowledge and skills of the course:

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. Khaled Samir
Date of Approval: 10/2022

Mechanics 2

(BAS022)

1- Basic Information:

Program Title	All programs
Department Offering the Program	Basic Science and Engineering Department
Department Responsible for the Course	Basic Science and Engineering Department
Course Title	Mechanics 2
Course Code	BAS022
Year/Level	Level: 0
Specialization	Major
Authorization Date of Course Specification	10/2022

Teaching hours	**Lectures**	**Exercise**	**laboratory**	**Student's load**
	2	2	-	4

2- Course Aims:

No.	Aims
1	Apply knowledge of plane motion using Cartesian axis and relative motion between particles.

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	Lecture	Exercise	laboratory	Student load
1	Position, displacement, velocity, and acceleration of particle	4	4	-	8
2	plane motion path of particle – description of plane motion using Cartesian axes	2	2	-	12
3	projectiles – tied motion for particle in straight path	2	2	-	4
4	motion in fixed axes -motion in polar axes	4	4	-	4
5	relative motion between particles	4	4	-	12
6	tied motion for particle in circular path	4	4	-	8
7	principle of work and energy of motion– principle of conservation of mechanical energy	4	4	-	4
8	Principle of impulse and momentum of rigid body.	4	4	-	4
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	Brain storming	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 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

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Periodic exams	C1	a1, a2, b1
2	Student load	C1	b1, c1
3	Final term examination	C1	a1, a2, b1, c1

7.2 Evaluation Schedule:

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

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exams	20%
2	Student load	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" 1st edition, Dover Publications; (2016).
2	C. Hibbeler, Russell “Engineering Mechanics: Dynamics in SI Units, Global Edition" 14th edition, P&C ECS; 14th edition 2016).
3	Hibbeler, R. C. "Engineering Mechanics: Statics and Dynamics 13/e." (2013).

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	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. Khaled Samir
Date of Approval: 10/2022

Physics 2
(BAS023**)**

1- Basic Information:

Program Title	All programs
Department Offering the Program	Basic Science and Engineering Department
Department Responsible for the Course	Basic Science and Engineering Department
Course Title	Physics 2
Course Code	BAS023
Year/Level	level 0
Specialization	Major
Authorization Date of Course Specification	10/2022

Teaching hours	**Lectures**	**Exercise**	**laboratory**	**Student's load**
	2	2	2	4

2- Course Aims:

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

3- Competencies :

Competencies	**Learning Outcomes (LO'S)**
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 objective engineering judgment to draw conclusions.	**b3** Analyze and interpret data

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 colour 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 propogation 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	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	lab
1	Basic of electricity. Practical: measurement devices in electrical conductivity.	**x**	**x**			X									**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.	**x**	**x**			**X**	**X**								**X**

	Practical: ohm's law - series connection &parallel connection & resistance colour code& meter bridge - voltmeter resistance.														
5	Magnetic field and magnetic force. Practical: the inverse square law in magnetism.	x	x			x									x
6	The nature and propogation of light. Prac tical: 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 disable 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	a1,a3
3	Final term examination	C1	a1,a2,b2
4	Practical exam	C2	b3

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Midterm examination	8^{th}
2	Semester work	5^{th} ,7^{th} ,14^{th}
3	Final term examination	15^{th}

7.3 weighting of Evaluation:

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

8. List of References:

No.	Reference List
1	Shankar, Ramamurti. Fundamentals of Physics II. Yale University Press, 2020.
2	Peter J. Williams ; Firas Mansour ; Robert L. Hawkes ; (Nuclear physicist) Javed Iqbal ; Marina Milner-Bolotin. Physics for scientists and engineers : an interactive approach, Nelson Education Ltd., Year: 2019
3	David Halliday, Robert Resnick, Jearl Walker. Fundamentals of Physics, 9th Edition, Binder Ready Version,2019
4	Serway, Raymond A., and John W. Jewett. Physics for scientists and engineers. Cengage learning, 2018.
5	*Laser and Fiber Optic Gas Absorption Spectroscopy*, G. Stewart (Cambridge U. Press, 2021).
6	*Fundamentals of Quantum Computing: Theory and Practice*, V. Kasirajan (Springer, 2021)
7	*Detection of Light*, G. H. Rieke (Cambridge U. Press, 2021)

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	a1,a3
2	Column's law and Gauss's law. Practical: sensitivity of galvanometer.	1	C1	a1
3	capacitors and capacitance. Practical: capacitors and capacitance	1	C1	a1
4	Currents and Resistance. Practical: ohm's law - series connection &parallel connection& resistance colour	1	C1	a1,a3

	code& meter bridge - voltmeter resistance.			
5	Magnetic field and magnetic force. Practical: the inverse square law in magnetism.	1	C1	a1
6	The nature and propogation of light. Prac tical: the glass prism.	1	C1	a2
7	Optical fiber. Practical: the glass prism.	1	C1	b2
8	Introduction to Quantum theory.	1	C1	**a2**
9	Laser. Practical:	1	C1 C2	b2 b3
10	Lenses and mirrors. Practical: spherometer- mirrors and lenses.	1	C1 C2	a2,b2 b3

Course Coordinator: Assoc. Prof. Amal Bahiry / Dr. Ahmed Lotfy

Head of Department: Assoc. Prof. Amal Bahiry

Date of Approval: 10/2022

Production Engineering

(BAS024)

1- Basic Information:

Program Title	All Programs
Department Offering the Program	Basic Science and Engineering Department
Department Responsible for the Course	Basic Science and Engineering Department
Course Title	Production Engineering
Course Code	BAS024
Year/Level	Level 0
Specialization	Major
Authorization Date of Course Specification	10/2022

Teaching hours	**Lectures**	**Exercise**	**laboratory**	**Student's load**
	3	-	2	4

2- Course Aims:

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

3- Competencies:

Competencies	Learning Outcomes (LO'S)
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, cultural, social, economic and environmental.	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. 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	Lecture	Exercise	laboratory	Student load
1	The engineering substances and its properties - heating and cooling diagrams – heating equilibrium diagrams.	3	-	2	4
2	alloys - casting operation (sand casting and the preparation of the mold)	3		2	4
3	forming processes (cold and hot forming: forging - rolling – wire drawing – blanking and piercing - deep drawing - the extrusion)	6	-	4	8
4	processes of metal connections (the riveting – welding with its types sticking)	6	-	4	8
5	cutting processes (cutting elements – processes – hand machining – automatic	6	--	4	8
6	cutting machining: lathing - shaping – drilling – milling - grinding – work piece fixation - cutting tools fixation	6	--	4	8
7	specifications of the operating machine) – measuring tools (venire caliper – micrometers and its types)	6	-	4	8
8	Engineering specifications – production cycle – production	6	-	4	8

	efficiency - industrial safety – practical training in the different workshops.				
Total		**42**		28	**56**

5. Teaching and learning methods:

No	Topics	Face-to-Face	Online Lecture	Flipped Classroom	Presentation and	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and	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) Practical: metal casting & mold for a sand casting& carpenter workshop	**x**													**x**
5	Forming processes (cold and hot forming: forging rolling – Wire drawing – Blanking and piercing - Deep drawing - The extrusion)	**X**	**X**												**x**

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

6. Teaching and learning methods for disable 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 C6	a1,b3,a3 a1,c2

7.2 Evaluation Schedule:

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

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exams	10%
2	final examination	60%
3	Practical examination	10%
4	Student load	20%
	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 knowledge and skills of the course:

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	Measuring tools (venire caliper – micrometers and its types)	1,3	C1	b3

No.	Topic	Aims	Competencies	LO's
	Practical: measurement tools			

Course Coordinator: Dr. Abdu El-Naquib

Head of Department: Assoc. prof. Khaled Samir

Date of Approval: 10/2022

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

1- Basic Information:

Program Title	All programs
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Basic Science and Engineering Department
Course Title	Introduction to Engineering and Environment
Course Code	BAS025
Year/Level	level 0
Specialization	Basics
Authorization Date of Course Specification	10/2022

Teaching hours	**Lectures**	**Tutorial**	**Practical**
	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	**a2** Understand the professional ethics and impacts of engineering solutions on society and environment.

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 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.

4. Course Contents:

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

5. Teaching and learning methods:

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

2	Introduction to environmental science: the importance of studying environmental science	x	X							X				
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	x	X	x						X				

	environment protection.														

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	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	a2,a3,b2,c3
2	Semester work(quizzes, sheets, report)	C3	a2,a3,b1,c1
3	Final Term Examination	C1,C3,	a2, 3,b2,c3,a2,a3,b1,c1

7.2 Evaluation Schedule:

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

7.3 Weighting of Evaluation:

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

8. List of References:

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

9. Facilities required for teaching and learning:

No.	Facility

1	Seminar
2	Lecture Classroom
3	White Board
4	Data Show system

10. Matrix of Competencies and LO's:

No.	Topic	Aims	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. Osamy Rageh / Assoc. Prof. Dr. Ramadan Elkateb
Head of Department: Asso.prof.Amal Bahiry
Date of Approval: 10/2022

Technical English Language 1

(BAS026)

1- Basic Information:

Program Title	All Programs
Department Offering the Program	Basic Science and Engineering Department
Department Responsible for the Course	Basic Science and Engineering Department
Course Title	Technical English Language 1
Course Code	BAS026
Year/Level	level 0
Specialization	Major
Authorization Date of Course Specification	10/2022

Teaching hours	**Lectures**	**Exercise**	**laboratory**	**Student's load**
	2	-	2	3

2- Course Aims:

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

3- Competencies:

Competencies	Learning Outcomes (LO'S)
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	Lecture	Exercise	laboratory	Student load
1	Engineering Lab.: skills in English Lesson 1 Bob's Day at work & Lesson 2 Bob returns home with bad news	6	-	6	3
2	A private flat Lab.: skills in English	2	-	2	6

	Lesson 3 Ted's Day at school				
3	Book shelves Lab.: skills in English Lesson 4 Nicole's day at school	2	-	2	3
4	Bridges Lab.: skills in English Lesson 5 Ted goes out for the evening Grammar Topics	4	-	4	6
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	4	-	4	6
6	Surveying Lab.: skills in English Lesson 8 Ted forms a rock band & Lesson 9 Nicole for president	4	-	4	6
7	Hydraulic works Lab.: skills in English Lesson 10 Bob visits the village market	4	-	4	6
8	Soil mechanics and foundations Lab.: skills in English Grammar topics	2		2	6
Total		**28**	**-**	**28**	**42**

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and	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	x	x												x

	Lesson 3 Ted's Day at school														
3	Book shelves Lab.: skills in English Lesson 4 Nicole's day at school	x	x												x
4	Bridges Lab.: skills in English Lesson 5 Ted goes out for the evening Grammar Topics	x	x		x										x
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 disable 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	Periodic exams	C8	d1
2	Student load	C8	d1
3	Practical exam	C8	d1
4	Final term examination	C8	d1

7.2 Evaluation Schedule:

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

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exams	10%
2	Practical examination	10%
3	Student load	20%
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
2	Computer lab.
3	Seminar
4	White board
5	Data Show system

10. Matrix of knowledge and skills of the course:

No.	Topic	Aims	Competencies	LO's
1	Engineering Lab.: skills in English Lesson 1 Bob's Day at work & Lesson 2 Bob returns home with bad news	5	C8	d1
2	A private flat Lab.: skills in English Lesson 3 Ted's Day at school	5	C8	d1
3	Book shelves 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: Mr. / Emad Abo Elnga

Head of Department: Assoc. prof. Khaled Samir

Date of Approval: 10/2022

(BAS027)

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	BAS027
Year/Level	level 0
Specialization	Major
Authorization Date of Course Specification	10/2022

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

2- Course Aims:

No.	**Aims**
1	Apply knowledge of engineering technology to express one's said and write technical reports

3- Intended Learning Outcomes (ILO'S):

Competency	**Elements**
A8. 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**	**Lecture**	**Exercise**	**laboratory**	**Student load**
1	الإلمام بأهمية حقوق الإنسان والنشأة التاريخية لتلك الحقوق والمدارس الفقهية لتأصيل تلك الحقوق.	1	-	-	**1**
2	أحكام الاتفاقيات الدولية الخاصة بحقوق الإنسان، والمنظمات الدولية العالمية والإقليمية القائمة على حماية تلك الحقوق، وموقف الدستور المصري من حقوق الإنسان، والحماية القانونية لها على الصعيد الوطني والصعيد الدولي، بالإضافة إلى حقوق الإنسان في الشريعة الإسلامية	2	-	-	**2**

3	الأصول التاريخية الفلسفية لحقوق الإنسان المصادر الدولية لحقوق الإنسان (العالمية والإقليمية) المصادر الوطنية لحقوق الإنسان	2	-	-	**2**
4	الأجهزة العالمية القائمة على حماية حقوق الإنسان (أجهزة الأمم المتحدة) الحماية الوطنية لحقوق الإنسان	3	-	-	**3**
5	حقوق الإنسان في الشريعة الإسلامية عرض لبعض طوائف حقوق الإنسان	6	-	-	**6**
Total				-	

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and	Cooperative	Discovering	Modeling	lab
1	الإلمام بأهمية حقوق الإنسان والنشأة التاريخية لتلك الحقوق والمدارس الفقهية لتأصيل تلك الحقوق	**x**	**x**		**x**										**x**
2	أحكام الاتفاقيات الدولية الخاصة بحقوق الإنسان، والمنظمات الدولية العالمية والإقليمية القائمة على حماية تلك الحقوق، وموقف الدستور المصري من حقوق الإنسان، والحماية القانونية لها على الصعيد الوطني والصعيد الدولي، بالإضافة إلى حقوق الإنسان في الشريعة الإسلامية	**x**	**x**												**x**
3	الأصول التاريخية الفلسفية لحقوق الإنسان المصادر الدولية لحقوق الإنسان) العالمية والإقليمية (المصادر الوطنية لحقوق الإنسان	**x**	**x**												**x**
4	الأجهزة العالمية القائمة على حماية حقوق الإنسان	**x**	**x**		**x**										**x**

	(أجهزة الأمم المتحدة) الحماية الوطنية لحقوق الإنسان														
5	حقوق الإنسان في الشريعة الإسلامية عرض لبعض طوائف حقوق الإنسان	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	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	Periodic exams	A8	d1
2	Semester work (quizzes, sheets, report)	A8	d1
3	Practical exam	A8	d1
4	Final term examination	A8	d1

7.2 Evaluation Schedule:

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

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exams	10
2	Student load	5
3	Semester work	5
4	Final-term examination	30
Total		**50**

8. List of References:

No.	Reference List
1	Fundamental of Engineering, HK H Dass- 2009
2	Bridges if the World, Charles S. Whitney - 2003
3	History of Reinforced Concrete, Samuel A.Berg-2005
4	Surveying, Heribert Kahmen , 1988

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 knowledge and skills of the course:

NO.	Topic	Aims	Competencies	LO's
1	الإلمام بأهمية حقوق الإنسان والنشأة التاريخية لتلك الحقوق والمدارس الفقهية لتأصيل تلك الحقوق	1	A8	d1
2	أحكام الاتفاقيات الدولية الخاصة بحقوق الإنسان، والمنظمات الدولية العالمية والإقليمية القائمة على حماية تلك الحقوق، وموقف الدستور المصري من حقوق الإنسان، والحماية القانونية لها على الصعيد الوطني والصعيد الدولي، بالإضافة إلى حقوق الإنسان في الشريعة الإسلامية	1	A8	d1
3	الأصول التاريخية الفلسفية لحقوق الإنسان المصادر الدولية لحقوق الإنسان) العالمية والإقليمية (المصادر الوطنية لحقوق الإنسان	1	A8	d1
4	الأجهزة العالمية القائمة على حماية حقوق الإنسان (أجهزة الأمم المتحدة) الحماية الوطنية لحقوق الإنسان	1	A8	d1
5	حقوق الإنسان في الشريعة الإسلامية عرض لبعض طوائف حقوق الإنسان	1	A8	d1

Course Coordinator: ASSOC. PROF. / Assoc. prof. Khaled Samir

Head of Department: Assoc. prof. Khaled Samir

Date of Approval: 10/2022

Mathematics 3

(BAS111)

1- Basic Information:

Program Title	Chemical Engineering Program
Department Offering the Program	Chemical EngineeringDepartment
Department Responsible for the Course	Basic Science and Engineering Department
Course Title	Mathematics 3
Course Code	BAS111
Year/Level	Level: 1
Specialization	Major
Authorization Date of Course Specification	10/2022

Teaching hours	**Lectures**	**Exercise**	**laboratory**	**Student's load**
	2	2	-	4

2- Course Aims:

No.	Aims
1	Apply knowledge of concepts ordinary differential equations and multivariable calculus to solve engineering problems to analysis engineering systems

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.	Topics	Lecture	Exercise	laboratory	Student load

1	Partial differentiation applications: maximum and minimum values in more than one variable	2	2	-	4
2	directional analysis - the directional differential effects	4	4	-	8
3	the multiintegrations and its applications (the curved and the orthogonal axis)	2	2	-	4
4	Gauss-Stokes theory - the endless series and function expansion – basic concepts for the convergence and divergence.	4	4	-	8
5	Ordinary differential equations: The first order (the equations which can be separated, homogeneous, exact and linear)	4	4	-	8
6	the ordinary differential equations from the second order and higher orders (with constant and variable coefficients)	4	4	-	8
7	systems from the ordinary differential equations	4	4	-	8
8	Laplace transfer and its applications in the solution of differential equations.	4	4	-	8
Total		**28**	**28**		**56**

5. Teaching and learning methods:

No	Topics	Face-to-Face	Online Lecture	Flipped Classroom	Presentation and	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and	Cooperative	Discovering	Modeling	lab
1	• Functions of severa variables • Limits of functions several variables. • Continuity in multivariable functions	x	x			X	X								
2	• Partial derivatives of higher order	x	x			X		X							

	extreme for functions of two variables														
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 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

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Periodic exams	C1	a1, a2
2	Student load	C1	a2, a3
3	Final term examination	C1	a1, a2, a3, b1

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	Weights
1	Periodic exams	20%
2	Student load	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" 1st edition, Springer-Verlag New York (2016).
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 knowledge and skills of the course:

4	Topic	Aims	Competencies	LO's
1	• Functions of several variables • Limits of functions of several variables. • Continuity in multivariable functions	1	C1	a1, a2
2	• Partial derivatives of higher order extreme for functions of two variables	1		
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	1	C1	b1

	• Important properties of la-place transform • Laplace transforms of derivatives • Inverse la-place transform			

Course Coordinator: Dr / Reda Abdo

Head of Department: Assoc. prof. Khaled Samir

Date of Approval: 10/2022

Electrical Engineering Fundamentals

(BAS112)

1- Basic Information:

Program Title	Chemical Engineering Program
Department Offering the Program	Chemical EngineeringDepartment
Department Responsible for the Course	Basic Science and Engineering Department
Course Title	Electrical Engineering Fundamentals
Course Code	BAS112
Year/Level	Level 1
Specialization	Major
Authorization Date of Course Specification	10/2022

Teaching hours	**Lectures**	**Exercise**	**laboratory**	**Student's load**
	3	2	-	4

2- Course Aims:

No.	Aims
4	Use the modern electrical engineering techniques, skills, and current engineering tools required for engineering practice related to electrical engineering techniques by taking full responsibility for one's own learning and development.
7	Design a system, component, and process to meet recent technological advancements using computer systems in Electrical, Electronics and Communication 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**. Describe the relevant mathematical principles and theories related to electrical engineering fundamentals. **a2**. Explain the scientific principles and theories that apply to the electrical engineering. **b1**. Use math ideas and theories that are applicable to the electrical engineering. **b2**. Use scientific concepts and theories that are relevant to electrical engineering. **c1**. Solve complex engineering problems related to electrical engineering 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 electrical 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.	**a1**. Define electrical engineering principles. **b3**. Analyze data to interpret it **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.

4. Course Contents:

No.	Topics	Lecture	Exercise	laboratory	Student load
1	Direct Current	3	2	-	5
2	Theory of electric circuits	8	6	-	14
3	Delta and Star connections	2	1	-	3
4	Sine A.C and D.C circuits	8	5	-	13
5	Time vectors diagram	3	2	-	5
6	Electric power and power factor in A.C circuits	3	2	-	5
7	3-Phase current - Electric machines - D.C machines	6	4	-	10
8	Transformers	3	2	-	5
9	Induction and synchronous machines	3	2	-	5
10	Fractional power machine	3	2	-	5
Total		**42**	**28**		**70**

5. Teaching and learning methods:

No	Topics	Face-to-Face	Online Lecture	Flipped Classroom	Presentation and	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and	Cooperative	Discovering	Modeling	lab
1	Direct Current	x	x			X									

2	Theory of electric circuits	x	x			X									
3	Delta and Star connections	x	x			X	X								
4	Sine A.C and D.C circuits	x	x			X		X							
5	Time vectors diagram	x	x			X	X								
6	Electric power and power factor in A.C circuits	x	x			X									
7	3-Phase current - Electric machines - D.C machines	x	x			X	X								
8	Transformers	x	x			X									
9	Induction and synchronous machines	x	x			X									
10	Fractional power machine	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	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	Periodic exams	C1	a1, a2, b1, b2
2	Student load	C1, C2	b1, c1, c2
3	Final term examination	C1, C2	a1, b3, b4

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exams	8^{th}
2	Student load	2^{nd} ,7^{th},9^{th},14^{th}

3	Final term examination	15th

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exams	20%
2	Student load	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
3	Thomas Talavage (Author), T. Arthur Terlep "Electrical Engineering Fundamentals" Independently published (2019).
4	Viktor Hacker and Christof Sumereder " Electrical Engineering: Fundamentals" De Gruyter Oldenbourg (2019).

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 knowledge and skills of the course:

No.	Topic	Aims	Competencies	LO's
1	Direct Current	4	C1	a1, a2, b1, b2
2	Theory of electric circuits	4	C1	a1, a2, b1, b2
3	Delta and Star connections	4	C1	a1, a2, b1, b2
4	Sine A.C and D.C circuits	4	C1	a1, a2, b1, b2
5	Time vectors diagram	4	C1	a1, a2, b1, b2
6	Electric power and power factor in A.C circuits	4	C1	c1, c2
7	3-Phase current - Electric machines - D.C machines	7	C1	a1, b3
8	Transformers	7	C1	b4, c1
9	Induction and synchronous machines	7	C1	B3, c1

10	Fractional power machine	7	C1	a1, c1

Course Coordinator: Dr. Hossam Abdelfattah

Head of Department: Dr. Amira Sonbaty

Date of Approval: 10/2022

Engineering Thermodynamics

(BAS113)

1- Basic Information:

Program Title	Chemical Engineering Program
Department Offering the Program	Chemical EngineeringDepartment
Department Responsible for the Course	Basic Science and Engineering Department
Course Title	Engineering Thermodynamics
Course Code	BAS113
Year/Level	level 1
Specialization	Major
Authorization Date of Course Specification	10/2022

Teaching hours	**Lectures**	**Exercise**	**laboratory**	**Student's load**
	3	2	-	4

2- Course Aims:

No.	**Aims**
1	Apply knowledge of mathematics, science and engineering concepts to understand the energy transfer concept between different systems and it`s applications.

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	Lecture	Exercise	laboratory	Student load
1	Fundamental concepts - Properties of a pure substance	3	2	-	4
2	Equation of state -thermodynamic systems	3	2	-	4
3	Work and heat - First law of thermodynamics; Applications to Systems and Control Volumes	9	6	-	12
4	Second Law of Thermodynamics; Principle of Carnot cycles; Heat engines, Refrigerators and heat pumps	6	4	-	8
5	Principle of the increase of entropy	6	4	-	8
6	Applications to systems and control volumes	9	6	-	12
7	Irreversibility and availability - Power and refrigeration cycles.	6	4	-	8
Total		**42**	**28**	**-**	**56**

5. Teaching and learning methods:

No	Topics	Face-to-Face	Online Lecture	Flipped Classroom	Presentation and	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and	Cooperative	Discovering	Modeling	lab
1	Fundamental concepts - Properties of a pure substance	x	x			X									
2	Equation of state - thermodynamic systems - Work and heat	x	x			X	x								
3	First law of thermodynamics; Applications to Systems and Control Volumes	x	x			X	x								
4	Second Law of Thermodynamics;	x	x			X	x								

	Principle of Carnot cycles														
5	Heat engines, Refrigerators and heat pumps - Principle of the increase of entropy	**x**	**x**			**X**									
6	Applications to systems and control volumes - Irreversibility and availability	**x**	**x**			**X**									
7	Power and refrigeration cycles	**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	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	Periodic exams	C1	a1, a2, b1
2	Student load	C1	c1, c2
3	Final term examination	C1	b1, a3

7.2 Evaluation Schedule:

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

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exams	20%

2	final examination	60%
3	Student load	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 knowledge and skills of the course:

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
4	Second Law of Thermodynamics; Principle of Carnot cycles	1	C1	b1, 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: Dr. A. E. Kabel
Head of Department: Assoc. prof. Khaled Samir
Date of Approval: 10/2022

Technical English Language 2

(BAS114)

1- Basic Information:

Program Title	Chemical Engineering Program
Department Offering the Program	Chemical EngineeringDepartment
Department Responsible for the Course	Basic Science and Engineering Department
Course Title	Technical English Language 2
Course Code	BAS114
Year/Level	level 1
Specialization	Major
Authorization Date of Course Specification	10/2022

Teaching hours	**Lectures**	**Exercise**	**laboratory**	**Student's load**
	2	-	2	3

2- Course Aims:

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

3- Competencies:

Competencies	Learning Outcomes (LO'S)
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.	Topics	Lecture	Exercise	laboratory	Student load
1	Water Lab skills in English: Lesson 1 Bob drives a hard bargain& Lesson 2 Bob's big coolie order& grammar topics	4	-	4	3
2	Chemical and physical properties.	4	-	4	6

	Lab skills in English Lesson 3 Amber comes over to bake cookies & Lesson 4Amber and Ted heat up the kitchen& grammar topics				
3	Water cycle Lab skills in English lesson 5 Nicole practices her election speech& grammar topics	2	-	2	3
4	Human uses Lab skills in English: Grammar topics	4	-	4	6
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	4	-	4	6
6	Graphic language Lab skills in English: lesson 8 Every one bakes cookies & lesson 9 Nicole's close election & grammar topics	4	-	4	6
7	Energy Lab Skills in English lesson 10 Bob gets any angry call from Carol & Grammar topics	4	-	4	6
8	Automatic Control Lab Skills in English Grammar topics	2		2	6
Total		**28**	**-**	**28**	**42**

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and	Cooperative	Discovering	Modeling	lab
1	Water Lab skills in English: Lesson 1 Bob drives a hard bargain & Lesson 2 Bob's big coolie	**x**	**X**		**X**										**x**

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

8	Automatic Control Lab Skills in English Grammar topics	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	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	Periodic exams	C8, C10	d1, d2
2	Student load	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	Periodic exams	8^{th}
2	Student load	7^{th},9^{th}
3	Practical examination	14^{th}
4	Final term examination	15^{th}

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exams	10%
2	Student load	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
2	Computer lab.
3	Seminar
4	White board
5	Data Show system

10. Matrix of knowledge and skills of the course:

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 Every one bakes cookies & lesson 9 Nicole's close election & grammar topics	5	C10	d2
7	Energy Lab Skills in English lesson 10 Bob gets any angry call from Carol & Grammar topics	5	C10	d1,d2
8	Automatic Control Lab Skills in English Grammar topics	5	C10	d1,d2

Course Coordinator: Mr. Emad Abo El-Naga

Head of Department: Assoc. prof. Khaled Samir

Date of Approval: 10/2022

Structures analysis (1)
(CIE111)

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	CIE111
Year/Level	Level 1
Specialization	Major
Authorization Date of Course Specification	10/2022

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

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.
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	**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.

mechanics, properties and strength of materials, surveying, soil mechanics, hydrology and fluid mechanics.	

4. Course Contents:

No.	Topics	Lectures	Lab.	Exercise	Contact	Student's load
1	Basic concept in structural analyses	3	-	2	5	4
2	Loads and reactions	6	-	4	10	8
3	Statically determinate beams	6	-	4	10	8
4	Statically determinate rigid frames	6	-	4	10	8
5	Statically determinate arches	6	-	4	10	8
6	Statically determinate trusses.	9	-	6	15	12
7	Influence lines for Statically determinate structures	6	-	4	10	8
Total		**42**	**-**	**28**	**70**	**56**

5. Teaching and learning methods:

Topics	Face to face	Online Lecture	Flipped	Presentation	Discussion	Problem	Brain storming	Projects	Site visits	Self-learning	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 disable 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	Periodic exam	C1 C11	a3, b3, c3 a1, c1
2	Practical/oral	-	-
3	Final Exam	C1 C11	a3, b3, c3 a1, c1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	3^{rd}, 7^{th} , 10^{th}
2	Practical/oral	-
3	Final Exam	15^{th}

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	40%
2	Practical/oral	-
3	Final Exam	60%
Total		**100%**

8. List of References:

No.	Reference List
1	Essential books (text books) • *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, 2022.* • *Structural Analysis 1: Statically Determinate Structures, S. Khalafallah -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 skills of the course:

No	Topic	Aims	Competencies	ILO'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, C11	a1, c3
4	Statically determinate rigid frames	1,10	C1, C11	a1, c3
5	Statically determinate arches	1,10	C1, C11	a1, c3
6	Statically determinate trusses.	1,10	C1	c3
7	Influence lines for Statically determinate structures	1,10	C1	c3

Course Coordinator: Dr. Rafik Wadia
Head of Department: Prof. Dr. Mohamed Elkiki
Date of Approval: 10/2022

Civil Engineering Drawing
(CIE112)

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	CIE112
Year/Level	level 1
Specialization	Major
Authorization Date of Course Specification	10/2022

Teaching hours	**Lectures**	**laboratory**	**Exercise**	**Student's load**
	2	-	2	3

2- Course Aims

No.	**Aims**
4	Use the engineering techniques, skills to sketch different views of an irrigation canals and hydraulic structures layout and produce quality neat drawings.

3- Graduate Competencies:

Competencies	**Learning Outcomes (LO'S)**
C3 Select appropriate and sustainable technologies for drawing structures; using either numerical technique	**c1**. Sketch irrigation drawings elements effectively in limited time (retaining walls, earth works), and irrigation works (Reinforced concrete Bridges – Culverts – Syphons – Aqueducts – Weirs – Regulators – Escapes).
C8. Communicate effectively-graphically, verbally and in writing – with a range of audiences using contemporary tools.	d1 Communicate effectively to achieve civil drawing knowledge and competences.
C13 Plan and drawing details of irrigation canals and irrigation works.	**b1** Plan and drawing the layout of irrigation canals and irrigation works (Reinforced concrete Bridges –

	Culverts – Syphons – Aqueducts – Weirs – Regulators – Escapes)

4. Course Contents:

No.	Topics	Lectures	Exercise	lab	Contact	Student's load
1	Introduction to civil engineering drawings (canals and crossing of roads)- drawing earth works.	6	6	-	12	9
2	Retaining walls (plain concrete and reinforced concrete) drawing	4	4	-	8	6
3	R. C. bridges drawing	2	2	-	4	3
4	Culverts drawing	4	4	-	8	6
5	Syphons drawing	2	2	-	4	3
6	Aqueducts drawing	2	2	-	4	3
7	Weirs drawing	2	2	-	4	3
8	Regulators drawing	4	4	-	8	6
9	Escapes drawing	2	2	-	4	3
Total		**28**	**28**	**-**	**56**	**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

Introduction to civil engineering drawings (canals and crossing of roads)- drawing earth works	x	**x**		**x**	x	x	**x**							
Retaining walls (plain concrete and reinforced concrete) drawing	x	**x**		**x**	x	x	**x**							
R. C. bridges drawing	x	**x**		**x**	x	x	**x**	**x**						
Culverts drawing	x	**x**		**x**	x	x	**x**	**x**						
Syphons drawing	x	**x**		**x**	x	x	**x**	**x**						
Aqueducts drawing	x	**x**		**x**	x	x	**x**							
Weir's drawing	x	**x**		**x**	x	x	**x**							
Regulators drawing	x	**x**		**x**	x	x	**x**							
Escapes drawing	x	**x**		**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.	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 exam	C3 C13	c1 b1
2	Practical/Oral	-	-
4	Final Exam	C3 C13	c1 b1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	2^{nd},7^{th} , 9^{th}
2	Practical/Oral	–
3	Final Exam	15^{th}

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	40%
2	Practical /Oral	-
3	Final term examination	60%
Total		**100%**

8. List of References:

No.	Reference List
1	A. M. Mobasher, 2013, Civil Engineering Drawing, Al-Azhar University.
2	K. S. El-Alfy., 2011, Civil Engineering Drawing, Mansoura University.
3	A. A. El-Masry., 2006, Civil Engineering Drawing, Mansoura University.
4	T. M. Owis, (1978), Engineering Drawing and Constructional Works, Mansoura University.
5	M. EL-RABAWI, 1973, Civil Drawing, Ain Shams University.

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	ILO's
1	Introduction to civil engineering drawings (canals a crossing of roads)- drawing earth works	4	C3	c1
2	Retaining walls (plain concrete and reinforced concrete) drawing	4	C3	c1
3	R. C. bridges drawing	4	C3 C13 C8	c1 b1 d1
4	Culverts drawing	4	C3 C13 C8	c1 b1 d1
5	Syphons drawing	4	C3 C13 C8	c1 b1 d1
6	Aqueducts drawing	4	C3 C13	c1 b1
7	Weirs drawing	4	C3 C13	c1 b1
8	Regulators drawing	4	C3 C13	c1 b1
9	Escapes drawing	4	C3 C13	c1 b1

Course Coordinator: Assoc. Prof / Mohammed Gabr

Head of Department: Prof / Mohammed Elkiki

Date of Approval: 10/2022

Mathematics4
(BAS121)

1- Basic Information:

Program Title	Chemical Engineering Program
Department Offering the Program	Chemical EngineeringDepartment
Department Responsible for the Course	Basic Science and Engineering Department
Course Title	Mathematics 4
Course Code	BAS121
Year/Level	Level: 1
Specialization	Major
Authorization Date of Course Specification	10/2022

Teaching hours	**Lectures**	**Exercise**	**laboratory**	**Student's load**
	2	2	-	4

2- Course Aims:

No.	Aims
1	Apply knowledge of concepts of complex analysis, Fourier analysis, partial differential equations and special functions to solve and analysis engineering systems.

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

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and	Cooperative	Discovering	Modeling	lab
1	Special functions Fourier series	x	x			x	x	X							
2	periodic functions and Euler's laws	x	x			x	x	X							
3	Fourier's integrations	x	x			x	x	X							
4	solutions of the differential equations by series	x	x			x	x	X							
5	solving the partial differential equations using variables separation	x	x			x	x	X							

6	Functions with complex variables	x	x			x	x	X							
7	complex quantities algebra	x	x			x	x	X							
8	multiple values functions	x	x			x	x	X							
9	the analytical functions and Koshi's theorem	x	x			x	x	X							
10	the complex series and Taylor and Lorant series	x	x			x	x	X							
11	the zeros, unique points and the rest	x	x			x	x	X							
12	the infinite series	x	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

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Periodic exams	C1	a1, a2, a3, b1
2	Student load	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	Weights
1	Periodic exams	20%
2	Student load	20%
3	Final term examination	60%
Total		**100%**

8. List of References:

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

9. Facilities required for teaching and learning:

	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	Special functions Fourier series	1	C1	a1, b1
2	periodic functions and Euler's laws	1	C1	a1, a2
3	Fourier's integrations	1	C1	a3
4	solutions of the differential equations by series	1	C1	c1
5	solving the partial differential equations using variables separation	1	C1	c1

6	Functions with complex variables	1	C1	b1
7	complex quantities algebra	1	C1	b1
8	multiple values functions	1	C1	b1
9	the analytical functions and Koshi'st heorem	1	C1	a3
10	the complex series and Taylor and Lorant series	1	C1	b1
11	the zeros, unique points and the rest	1	C1	c1
12	the infinite series	1	C1	a3

Course Coordinator: Dr. Reda Abdo

Head of Department: Assoc. prof. Khaled Samir

Date of Approval:2022

Technical Report Writing

(BAS122)

1- Basic Information:

Program Title	Chemical Engineering Program
Department Offering the Program	Chemical EngineeringDepartment
Department Responsible for the Course	Basic Science and Engineering Department
Course Title	Technical Report Writing
Course Code	BAS122
Year/Level	Level 1
Specialization	Major
Authorization Date of Course Specification	10/2022

Teaching hours	**Lectures**	**Exercise**	**laboratory**	**Student's load**
	2	-	2	4

2- Course Aims:

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

3- Competencies:

Competencies	Learning Outcomes (LO'S)
C5. Practice research techniques and methods of investigation as an inherent part of learning.	**a1**. Define technical language and report writing. **a2.** Write technical language and technical report writing through sequence steps (identify report section, present your report, cite reference and add figures and tables). **b1**. Assess different ideas, views, and knowledge from a range of sources. **b2**. Evaluate results of report models by analyzing percentage of plagiarism and rules of scientific report and rules of presentation. **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	Lecture	Exercise	laboratory	Student load
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	-	4
2	Common components of a technical report ❖ Organization of report sections Section's function and content	2	2	-	4
3	How to write a technical report ❖ Identify layout, Determine Audience ❖ Assign reference, add non text component ❖ Mechanics of report writing. Quantitative Writing	2	2	-	4
4	Equations, Tables and Figures	2	2		4
5	Literature citations	4	4		8
6	Using word processing for Writing Report	4	4		8
7	Creating slides with presentation graphics programs	4	4		8
8	MS Excel Application and power view report command	4	4		8
9	Database Report using MS SQL	4	4		8
Total		**28**	**28**		**56**

5. Teaching and learning methods:

No	Topics	Face-to-Face	Online Lecture	Flipped	Presentation	Discussion	Problem	Brain storming	Projects	Site visits	Self-learning	Cooperative	Discovering	Modeling	lab
1	Introduction to technical writing. ❖ Define a report, Types of reports, Aim ❖ Common concepts: clarity of Writing, Consistency ❖ Supporting Material ❖ Language rules (voice, tense) and Style	x	x		x	X									
2	Common components of a technical report ❖ Organization of report sections ❖ Sections function and content	x	x		x	X									
3	How to write a technical report ❖ Identify layout, Determine Audience ❖ Assign reference, add non text component ❖ Mechanics of report writing. ❖ Quantitative Writing	x	x			X									

4	Equations, Tables and Figures	x	x			X									
5	Literature citations	x	x			X									
6	Using word processing for Writing Report	x	x			x									
7	Creating slides with presentation graphics programs	x	x			x									
8	MS Excel Application and power view report command	x	x			x									
9	Database Report using MS SQL	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	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	Periodic exams	C5	a1, a2
2	Student load	C5, C8	c1, d1, d2
3	Practical Examination	C5, C8	c1, d1, d2
4	Final term examination	C5, C8	b1, b2, a1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exams	8^{th}
2	Student load	2^{nd} ,7^{th},9^{th},13^{th}
3	Practical Examination	14^{th}

4	Final term examination	15th

7.3 weighting of Evaluation:

No.	Evaluation method	Weights
1	Periodic exams	10%
2	final examination	60%
3	Practical examination	10%
4	Student load	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 knowledge and skills of the course:

No	Topic	Aims	Competencies	LO's
1	Introduction to technical writing	5	C5	a1
2	Common components of a technical report	5	C5	a2
3	How to write a technical report	5	C5	c1
4	Equations, Tables and Figures	5	C5	a2
5	Literature citations	5	C5	b1, d1
6	Using word processing for Writing Report	5	C5	b2
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 / Salah Dafea

Head of Department: Dr. Amira Sonbaty

Date of Approval: 10/2022

Introductions to Information Technology

(BAS123)

1- Basic Information:

Program Title	Chemical Engineering Program
Department Offering the Program	Chemical EngineeringDepartment
Department Responsible for the Course	Basic Science and Engineering Department
Course Title	Introductions to Information Technology
Course Code	BAS123
Year/Level	Level 1
Specialization	Major
Authorization Date of Course Specification	10/2022

Teaching hours	**Lectures**	**Exercise**	**laboratory**	**Student's load**
	2	2	-	4

2- Course Aims:

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

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. a3. Define contemporary engineering technologies and their applications in relation to engineering field & applications C3. Utilize modern technologies related by different engineering fields
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	Lecture	Exercise	laboratory	Student load
1	Introduction to the design and use of computer-based information systems - Software and hardware used in information systems - information requirements	4	4	-	8
2	Communication systems – Networking - The internet; the foundations, resources and uses of the internet	6	4	-	10
3	emphasizing practical skills for finding, reading and authorizing materials	4	4	-	8
4	Fundamentals of computer communication networks - Introduction to computer networking elements; communications architectures and protocols	6	6	-	12
5	HTML principles and applications - Case studies.	8	8	-	16
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	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	lab
1	Introduction to information systems	x	x			X									

2	Software and hardware used in information systems	x	x			X									
3	Communication and Networks	x	x			X									
4	Computer Networking	x	x			X									
5	The internet; the foundations, Resources and uses of the internet, emphasizing practical skills for finding, Reading and authorizing materials	x	x			x									
6	Privacy Security and Ethics	x	x			x									
7	Web Design using HTML Language and applications	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	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	Periodic exams	C4	a2, a3, c3
2	Student load	C4, C8	d1, d2, c3
3	Practical Examination	C4, C8	d1, d2, c3
4	Final term examination	C4, C8	c3, a3, a2

7.2 Evaluation Schedule:

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

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exams	10%
2	final examination	60%
3	Practical examination	10%
4	Student load	20%
Total		**100%**

8. List of References:

No.	Reference List
1	Computing essentials timothy, O' leary and linda ,2014.

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 knowledge and skills of the course:

No.	Topic	Aims	Competencies	LO's
1	Introduction to information systems	4	C4	a2
2	Software and hardware used in information systems	4	C4	a2
3	Communication and Networks	4	C4	c3, a3
4	Computer Networking	4	C4	c3, a3
5	The internet;	4	C4	c3, a3
6	Privacy Security and Ethics	4	C4	c3, a3

7	Web Design using HTML Language and applications	4	C8	d1, d2

Course Coordinator: Dr. Amira Sonbaty

Head of Department: Assoc. prof. Khaled Samir

Date of Approval: 10/2022

Strength of Materials

(BAS124)

1-Basic Information:

Program Title	Civil Engineering Program
Department Offering the Program	Civil EngineeringDepartment
Department Responsible for the Course	Basic Science and Engineering Department
Course Title	Strength of Materials
Course Code	BAS124
Year/Level	level 1
Specialization	Major
Authorization Date of Course Specification	10/2022

Teaching hours	**Lectures**	**Exercise**	**laboratory**	**Contact**	**Student's load**
	2	2	-	4	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-Learning Outcomes (ILO'S):

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.
C11 Select appropriate and sustainable technologies for	**a1.** Recognize the fundamentals of structural analysis and mechanics, properties and strength of materials.

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.	**a2.** Summarize, appropriate and sustainable technologies for construction of buildings. **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.

4. Course Contents:

No.	Topics	Lecture	Exercise	laboratory	Student load
1	Simple states of stress and strain	4	4	-	8
2	Torsion stresses - Bending and shearing stresses in beams	6	6	-	10
3	Compound stresses - Analysis of plane stress - Combined stresses	6	6	-	8
4	Analysis of thin-walled pressure vessels	6	6	-	12
5	Deflection of beams	6	6	-	16
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	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	lab
1	Simple states of stress and strain	x	x			X									x
2	Tension and compression stress	x	x			X									x
3	Shear stress in bolts	x	X			x	X								x
4	Bending and shearing stresses in beams	x	X			x	X								x
5	Torsion stresses	x	x			x	X								x
6	Deflection of Beams	x	x			x	X								x
7	Analysis of thin-walled pressure vessels	x	x			x	X								x
8	Analysis of plane stress	x	x			x	X								x

6. Teaching and learning methods for disable students:

No	Teaching Methods	Reason
1	Additional tutorials	Additional tutorials
2	Online lectures and assignments	Online lectures and assignments

7. Student evaluation:

7.1 Student evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Periodic exams	C1 C11	a1, b1,c2,c3 a1,a2,c1
2	Practical/ Oral	-	-
3	Final term examination	C1 C11	a1, b1,c2,c3 a1,a2,c1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exams	2^{nd}, 7^{th}, 9^{th}

2	Practical/ Oral	–
3	Final term examination	15^{th}

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exams	40%
2	Practical/ Oral	-
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 (2018).
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 knowledge and skills of the course:

No.	Topic	Aims	Competencies	LO’s
1	Simple states of stress and strain	2	C1 C11	a1, b1,c2,c3 a1,a2,c1
2	Tension and compression stress	2	C1 C11	a1, b1,c2,c3 a1,a2,c1
3	Shear stress in bolts	2	C1 C11	a1, b1,c2,c3 a1,a2,c1
4	Bending and shearing stresses in beams	2	C1 C11	a1, b1,c2,c3 a1,a2,c1
5	Torsion stresses	2	C1 C11	a1, b1,c2,c3 a1,a2,c1
6	Deflection of Beams	2	C1 C11	a1, b1,c2,c3 a1,a2,c1
7	Analysis of thin-walled pressure vessels	2	C1	a1, b1,c2,c3

			C11	a1,a2,c1
8	Analysis of plane stress	2	C1 C11	a1, b1,c2,c3 a1,a2,c1

Course Coordinator: Dr. Nesreen Elawadly

Head of Department: Assoc. prof. Aml behairy

Date of Approval: 10/2022

Structures analysis (2)
(CIE121)

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	CIE121
Year/Level	Level 1
Specialization	Major
Authorization Date of Course Specification	10/2022

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

2- Course Aims:

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

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 how to solve structure problems using relevant mathematical principles and theories. **b3** Applying engineering fundamentals to structure-related issues.

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, as well as material properties and strength.

4. Course Contents:

No.	Topics	Lectures	Lab.	Exercise	Contact	Student's load
1	Basic concepts in structure mechanics	9	-	6	15	15
2	Normal Stresses	3	-	2	5	5
3	Shear Stresses	3	-	2	5	5
4	Combined and Principal Stresses	6	-	4	10	10
5	Elastic deformations of statically determined structures	15	-	10	25	25
6	Statically indeterminate structures using the three moments equation.	6	-	4	10	10
Total		**42**	**-**	**28**	**70**	**70**

5. Teaching and learning methods:

Topics	Face-to-Face	Online Lecture	Flipped Classroom	Presentation and	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and	Cooperative	Discovering	Modeling	lab
Basic concepts in structure mechanics	x	x			x	x								
Normal Stresses	x	x			x	x								
Shear Stresses	x	x			x	x								

Combined and Principal Stresses	x	x			x	x								
Elastic deformations of statically determined structures	x	x			x	x								
Statically indeterminate structures using the three moments equation.	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	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	Periodic exam	C1 C11	a1, b3 a1
2	Practical/oral	-	-
3	Final Exam	C1 C11	a1, b3 a1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	3^{rd},7^{th} , 10^{th}
2	Practical/oral	-
3	Final Exam	15^{th}

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	%40
2	Practical/oral	-

3	Final Exam	%60
Total		**%100**

8. List of References:

No.	Reference List
1	Essential books (text books) • *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, 2022.* • *Structural Analysis 1: Statically Determinate Structures, S. Khalafallah -2018* *Structural Analysis, R. C. Hibbeler, 2018*
3	Structural Engineering Web Sites -ASCE Periodicals.

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	Basic concepts in structure mechanics	1	C1	b3
2	Normal Stresses	1	C1	b3
3	Shear Stresses	1	C1	b3
4	Combined and Principal Stresses	1	C1	b3
5	Elastic deformation of statically determinate structures	1	C11	a1
6	Analysis of statically indeterminate structures using the equation of three moments	1	C11	a1

Course Coordinator: Dr. Rafik Wadia

Head of Department: Prof. Dr. Mohamed Elkiki

Date of Approval: 10/2022

Civil Engineering Drawing 2

(CIE122)

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	CIE122
Year/Level	level 1
Specialization	Major
Authorization Date of Course Specification	10/2022

Teaching hours	**Lectures**	**laboratory**	**Exercise**	**Student's load**
	2	1	1	3

2- Course Aims

No.	Aims
4	Use the techniques, skills, and current engineering tools required for engineering drawing practice
10	Select appropriate and sustainable technologies for construction of buildings, infrastructures and water structures; using numerical techniques (CAD program)

3- Competencies:

Competencies	Learning Outcomes (LO'S)
C3 Select appropriate and sustainable technologies for drawing structures for reinforced concrete and steel structures	**c1**. Sketch reinforced concrete structures drawings elements effectively in limited time (slabs – beams – columns – foundations), and steel works (Beams and columns sections – compound sections – Beam connections – Beams and columns connections – column bases – trusses).
C8. Communicate effectively-graphically, verbally and in writing – with a range of audiences using contemporary tools.	**d1** Communicate effectively to achieve civil drawing knowledge and competences.
C11 Select appropriate and sustainable technologies for drawing structures; using numerical technique.	**c1** Using drawings software such as the CAD program to draw concrete and steel works.

C13 Plan and drawing details of concrete and steel works.	**b1** Plan and drawing the design drawings of reinforced concrete works elements effectively in limited time (slabs – beams – columns – foundations), and steel works (Beams and columns sections – compound sections – Beam connections – Beams and columns connections – column bases – trusses).

4. Course Contents:

No.	Topics	Lectures	laboratory	Exercise	Contact	Student's load
1	Introduction to drawings of reinforced concrete works (Slabs – Beams – Columns – Foundations).	4	2	2	8	6
2	Concrete slab drawing	2	1	1	4	3
3	Concrete beams drawings	2	1	1	4	3
4	Concrete columns drawings	2	1	1	4	3
5	Concrete foundations drawings	2	1	1	4	3
6	Introduction regarding steel drawings and identification - Define different steel profiles and cross sections used in steel structures.	4	2	2	8	6
7	Steel compound sections drawings to draw concrete and steel works	2	1	1	4	3
8	Steel beam and column connections drawing	2	1	1	4	3
9	Drawing steel truss	2	1	1	4	3
10	Basic features and capabilities of CAD software	6	3	3	12	9
Total		**28**	**14**	**14**	**56**	**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
Introduction to drawings of reinforced concrete works (Slabs – Beams – Columns – Foundations).	x	x		**x**	x	x								
Concrete slab drawing	x	x		**x**	x	x								**x**
Concrete beams drawings	x	x		**x**	x	x								**x**
Concrete columns drawings	x	x			x	x								**x**
Concrete foundations drawings	x	x		**x**	x	x		**x**						
Introduction regarding steel drawings and identification - Define different steel profiles and cross sections used in steel structures.	x	x		**x**	x	x								

Steel compound sections drawings to draw concrete and steel works	x	x		**x**	x	x								
Steel beam and column connections drawing	x	x		**x**	x	x								
Drawing steel truss	x	x		**x**	x	x								**x**
Basic features and capabilities of CAD software	x	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.	

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Periodic exam	C3 C11 C13	c1 c1 b1
2	Practical/Oral	C3 C11 C8	c1 c1 d1
3	Final Exam	C3 C13	c1 b1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	2^{nd}, 7^{th} , 8^{th} 9^{th}
2	Practical /Oral	14^{th}
3	Final Exam	15^{th}

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	40%
2	Practical /Oral	10%
3	Final term examination	50%
Total		**100%**

8. List of References:

No.	Reference List
1	A. M. Mobasher, 2013, Civil Engineering Drawing, Al-Azhar University.
2	K. S. El-Alfy., 2011, Civil Engineering Drawing, Mansoura University.
3	A. A. El-Masry., 2006, Civil Engineering Drawing, Mansoura University.
4	T. M. Owis, (1978), Engineering Drawing and Constructional Works, Mansoura University.
5	M. EL-RABAWI, 1973, Civil Drawing, Ain Shams University.

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	ILO's
1	Introduction to drawings of reinforced concrete works (Slabs – Beams – Columns – Foundations).	4	C3	c1
2	Concrete slab drawing	4	C3 C13	c1 b1
3	Concrete beams drawings	4	C3 C13	c1 b1
4	Concrete columns drawings	4	C3 C13	c1 b1
5	Concrete foundations drawings	4	C3 C13 C8	c1 b1 d1

6	Introduction regarding steel drawings and identification - Define different steel profiles and cross sections used in steel structures.	4	C3	c1
7	Steel compound sections drawings	4	C3 C13	c1 b1
8	Steel beam and column connections drawing	4	C3 C13	c1 b1
9	Drawing steel truss	4	C3 C13 C8	c1 b1 d1
10	Basic features and capabilities of CAD software to draw concrete and steel works	4, 10	C11 C13	c1 b1

Course Coordinator: Assoc. Prof / Mohammed Gabr

Head of Department: Prof / Mohammed Elkiki

Date of Approval: 10/2022

Engineering Probability and Statistics

(BAS211)

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	BAS211
Year/Level	Level: 1
Specialization	Major
Authorization Date of Course Specification	10/2022

Teaching hours	**Lectures**	**laboratory**	**Exercise**	**contact**	**Student's load**
	2	0	2	4	4

2- Course Aims:

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

3- Competencies:

Competencies	Learning Outcomes (LO'S)
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.
C2 Develop and conduct appropriate experimentation and/or simulation, analyze and	**b2** Conduct basic experiments to learn about the applications of structural analysis and

interpret data, assess and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.	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 **c3** Applying statistical analyses and objective engineering judgment to draw conclusions.

4- Course Contents:

No.	Topics	Lecture	laboratory	Exercise	contact	Student's load
1	Probability theory	4	-	**4**	8	8
2	Discrete and continuous probability distributions	4	-	**4**	8	8
3	Statistics in engineering	4	-	**4**	8	8
4	Descriptive Statistics Sampling distributions	4	-	**4**	8	8
5	Estimation and confidence intervals	4	-	**4**	8	8
6	Hypothesis testing	4	-	**4**	8	8
7	Simple regression	4	-	**4**	8	8
Total		**28**	**-**	**28**	**56**	**56**

5- Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	lab
1	Probability theory	x	X			X	x	X							
2	Discrete and continuous probability distributions	x	X			X	x	X							
3	Statistics in engineering	x	X			X	x	X							
4	Descriptive Statistics Sampling distribution	x	X			X	x	X							
5	Estimation and confidence intervals	x	X			X	x	X							
6	Hypothesis testing	x	X			X	x	X							
7	Simple regression	x	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	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	Periodic Exam	C1	a1, a2, b3
2	Semester work (quizzes, sheets, report)	C1	a1, c2
3	Final exam	C1 C2	a2, b1, b3 b2,b3,c3

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic Exam	8^{th}
2	Semester work (quizzes, sheets, report)	2^{nd} -7^{th} - 9^{th} -14^{th}
3	Final exam	15^{th}

7.3 Weighting of Evaluation:

No.	Assessment Method	Weights
1	Periodic Exam	40%
2	Practical/ Oral	-
3	Final Term Exam	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" 2nd 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

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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 C2	b1 b2
5	Estimation and confidence intervals	1	C1	c2
6	Hypothesis testing	6	C1 C2	c2 b3
7	Simple regression	6	C1 C2	c2 c3

Course Coordinator: Asso.prof. Dr .Samar Madian

Head of Department: Asso.prof. Dr. Aml Elbehiry

Date of Approval:2023

Fluid Mechanics
(BAS212)

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	BAS212
Year/Level	Level 2
Specialization	Major
Authorization Date of Course Specification	10/2022

Teaching hours	**Lectures**	**laboratory**	**Exercise**	**Contact**	**Student's load**
	2	1	1	4	4

2- Course Aims:

No.	Aims
1	Master a broad range of Fluid Mechanics knowledge and specialized skills, as well as the ability to understand and apply physical concept knowledge in real-world situations by applying fluid mechanics basic theories. Also, to Apply knowledge of science and engineering concepts to study fluid properties, fluid statics and fluid dynamics and to abstract course knowledge that give the ability to think, identify, diagnose, and solve hydraulic 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 in fluid mechanics field.
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	**a1** Define concepts of fluid properties, energy, momentum equations, dimensional analysis, Compressible, laminar and turbulent flow.

fundamentals, basic science and mathematics.	**a2** Explain the basic principles of fluid mechanics engineering and dimensional analysis and similarity. **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 and pipe flow. **b3** Applying engineering basics that are relevant to Fluid statics, kinematics and dynamics.
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.
C11. Select appropriate and sustainable technologies by using physical measurements and/or testing by applying a full range of civil engineering concepts and techniques of fluid mechanics.	**a1** Recognize the fundamentals of fluid mechanics. **c1** Using physical measurements and/or testing by applying a full range of civil engineering concepts and techniques of fluid mechanics.

4- Course Contents:

No.	Topics	Lecture	Lab.	Exercise	Contact	Student load
1	Fluid Properties	2	1	1	4	4
2	Fluid Statics	2	1	1	4	4
3	Forces on Immersed Bodies (Lab.: Center of Pressure)	4	2	2	8	8
4	Fluid Kinematics	2	1	1	4	4
5	Fluid Dynamics including Energy and Momentum Equations (Lab.: Flow Measuring Apparatus	4	2	2	8	8
6	Dimensional Analysis and Similarity	4	2	2	8	8

7	Laminar and Turbulent Flow and its Applications (Lab.: Friction Losses in Pipes)	4	2	2	8	8
8	Introduction to Compressible Flow	2	1	1	4	4
9	Pipe Flow (Lab.: Multi-Pump Test (Pump Characteristics))	4	2	2	8	8
Total		**28**	**14**	**14**	**56**	**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
Fluid Properties	x			x	x	x	x			x				x
Fluid Statics	x			x	x	x	x							x
Forces on Immersed Bodies (Lab.: Center of Pressure)	x			x	x	x	x			x	x	x	x	x
Fluid Kinematics	x			x	x	x	x							x
Fluid Dynamics including Energy and Momentum Equations (Lab.: Flow Measuring Apparatus	x			x	x	x	x			x	x			x

Dimensional Analysis and Similarity	x			x	x	x	x					x		x
Laminar and Turbulent Flow and its Applications (Lab.: Friction Losses in Pipes)	x			x	x	x	x			x	x			x
Introduction to Compressible Flow	x			x	x	x	x							x
Pipe Flow (Lab.: Multi-Pump Test (Pump Characteristics))	x			x	x	x	x			x	x		x	x

6. Teaching and learning methods for disable students:

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

7- Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Periodic exam	C1 C2 C11	a1, a2, b1, b2, b3 a1, a2, b1 a1, c1
2	Practical/ Oral	C1 C2 C11	b1, b3 a1, a2, b1 a1, c1
3	Final term examination	C1 C2 C11	a1, a2, b1, b2, b3 a1, a2, b1 a1, c1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	2^{nd} ,4^{th},8^{th},10^{th}, 12^{th},14^{th}

2	Practical/ Oral	3rd ,4th,6th, 7th 10th, 11th,13th,14th
3	Final term examination	15th

7.3 Weighting of Evaluation:

No.	Evaluation method	Weights
1	Periodic exam	40%
2	Practical/ Oral	10%
3	Final term examination	50%
Total		**100%**

8- List of References:

No.	Reference List
1	Er R.K. Rajput, "A Textbook of Fluid Mechanics and Hydraulic Machines", 11th Eds, S. Chand & Company Ltd., 2011.
2	Yunus A. Cengel, John M. Cimbala, "Fluid Mechanics: Fundamentals and Applications". 4th Ed., McGraw Hill, 2020.
3	Tropea C., Yarin A.L., Foss J.F., "Springer handbook of experimental fluid mechanics", Springer, 2007.

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	Fluid Properties	1	C1	a1
2	Fluid Statics	1	C1 C2	a2, b2, b3 b1
3	Forces on Immersed Bodies (Lab.: Center of Pressure)	1, 4, 8	C1 C2 C11	b1 b1 a1, c1
4	Fluid Kinematics	1	C1	a2, b3
5	Fluid Dynamics including Energy and Momentum Equations (Lab.: Flow Measuring Apparatus	1, 4, 8	C1 C2 C11	b3 a1, b1 a1, c1

6	Dimensional Analysis and Similarity	4, 8	C1	a1, a2
7	Laminar and Turbulent Flow and its Applications (Lab.: Friction Losses in Pipes)	1, 4, 8	C1 C2 C11	a1, b2 a1, a2 a1, c1
8	Introduction to Compressible Flow	4	C1	a1
9	Pipe Flow (Lab.: Multi-Pump Test (Pump Characteristics))	1, 4, 8	C1 C2 C11	b2 a1, a2 a1, c1

Course Coordinator: Prof. Dr. Mohamed Elkiki
Head of Department: Assoc. Prof. Dr. Amal Bahiry
Date of Approval: 10/2022

Engineering Economy
(BAS213**)**

1-Basic Information:

Program Title	Communications and Electronics Engineering program
Department Offering the Program	Communications and Electronics Engineering Department
Department Responsible for the Course	Basic Science and Engineering Department
Course Title	Engineering Economy
Course Code	BAS213
Year/Level	Level 2
Specialization	Major
Authorization Date of Course Specification	10/2022

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

2-Course Aims:

No.	Aims
2	Work in and manage a diverse team of professionals from various engineering disciplines, taking responsibility for own and team performance; and Behave professionally and adhere to engineering ethics and standards.
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 appropriate to the discipline and within the principles and contexts of sustainable design and development.	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 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.
C6. Plan, supervise and monitor implementation of engineering projects, taking into consideration other trades requirements.	C2 Acquire entrepreneurial skills.
C9. Use creative, innovative and flexible thinking and acquire entrepreneurial and leadership skills to anticipate and respond to new situations.	d1Think creatively in solving problems of design. d2 Effectively manage tasks, time, and resources. d3 Refer to relevant literatures.
C14 Deal with 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	**Lectures**	**Lab.**	**Exercise**
1	Basic concepts of engineering economy as applied to the evaluation of capital investment alternatives in both the private and public sectors of our economy	6	---	3
2	Attention is given to the time value of money by showing the concepts and techniques for evaluating the worth of products, systems, structures, and services in relation to their cost	8	---	4
3	Economic and cost concepts: calculating economic equivalence, comparison of alternatives and replacement economy	8	---	4

4	Economic optimization in design and operations. Cost estimation of products and systems	6	---	3
Total		28	---	14

5. Teaching and learning methods:

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

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

	and systems														

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	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	Periodic exam	C3 C4	a1,a2,b1,c1 a2,b1,c2
2	Student load (quizzes, sheets, report)	C3 C6	c1,a1 c2
3	Final term examination	C3 C9 C14	a1,a2,b1,c1 d1,d2,d3 c1

7.2 Evaluation Schedule:

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

7.3 weighting of Evaluation:

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

8. List of References:

No.	Reference List

1	Engineering Economic Analysis, Donald G. Newnan ،Ted G. Eschenbach ،Jerome P. Lavelle ،Neal A. Lewis, 14th edition, 2020
2	Engineering Economics: Decisions and Solutions from Eurasian Perspective, Marek Vochozka ،Svetlana Igorevna Ashmarina ،Valentina Vyacheslavovna Mantulenko, Springer International Publishing, 2020.
3	Principles of Engineering Economics with Applications, Zahid A. Khan ،Arshad N. Siddiquee ،Brajesh Kumar ،Mustufa H. Abidi, 2nd edition, Cambridge University Press, 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 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,a2,b1,c1
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 C4 C9	a1,a2,b1,c1 a2,b1,c2 d1,d2,d3
3	Economic and cost concepts: calculating economic equivalence, comparison of alternatives and replacement economy	2	C3 C4 C6	a1,a2,b1,c1 a2,b1,c2 c2
4	Economic optimization in design and operations. Cost estimation of products and systems	2	C3 C14	a1,a2,b1,c1 c1

Course Coordinator: Dr. Hany hashish and Dr. Rania Hamdy
Head of Department: Assoc. prof. Dr. Amal Bahiry
Date of Approval: 10 / 2022

Computer Programming

(BAS214)

1- Basic Information:

Program Title	Chemical Engineering Program
Department Offering the Program	Chemical EngineeringDepartment
Department Responsible for the Course	Basic science and Engineering Department
Course Title	Computer Programming
Course Code	BAS214
Year/Level	Level 2
Specialization	Major
Authorization Date of Course Specification	-
Pre- request	-

Teaching hours	**Lectures**	**Exercise**	**laboratory**	**Student's load**
	2	-	2	4

4- Course Aims:

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

5- Learning Outcomes (LO'S):

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.

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. d3 Refer to relevant literatures.

4. Course Contents:

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

5. Teaching and learning methods:

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

4	**Lecture:** Hardware used in information systems **Practical:** Font Tags	X			X		X	X			X	X			X
5	**Lecture:** Software used in information systems **Practical: paragraph tags**	X			X			X			X				X
6	**Lecture:** Introduction of data communicatio n system **Practical:** order lists	X			X		X	X			X	X			X
7	**Lecture:** Introduction of Computer Networking **Practical:** unorder lists	X			X		X	X			X	X			X
8	**Lecture:** The internet; the foundations, Resources and uses of the internet, **Practical:** Image tag	X			X			X			X				X

10	**Lecture:** Privacy Security and Ethics **Practical:** horizontal &vertical Rules	X			X			X			X				X
11	**Lecture:** Emphasizing practical skills for finding, Reading and authorizing materials **Practical:** Frames	X			X		X	X			X	X			X
12	**Lecture:** Introduction of Artificial Intelligence **Practical:** Tables	X			X		X	X			X	X			X
13	**Lecture:** introduction of cloud computing **Practical:** Hyper Links	X			X		X	X			X	X			X
14	**Lecture: Html Projects**	X	X		X		X	X			X	X			X

6. Teaching and learning methods for disable 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.	
2	Moodle	Better communication with certain cases
3	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 methods:

No.	Evaluation Method	Competencies	LO's
1	Periodic exam	C4	a2, c3
2	Student load (quizzes, sheets, report)	C8 C9	d1, .d2 d1, d2, d3
3	Practical Examination	C4	c3
4	Final term examination	C4	a2, a3, c3

7.2 Evaluation Schedule:

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

7.3 weighting of Evaluation:

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

8. List of References:

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

9. Facilities required for teaching and learning:

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

10. Matrix of competences of the course:

No.	Topics	Aims	C4.a2	C4.a3	C4.c3	C4.d1	C8.d1	C8.d2	C9.d1	C9.d2	C9.d3
1	**Lecture:** Introduction to information systems & information technology **Practical:** Introduction of html	**7**	**X**	**X**							
2	**Lecture:** information systems & information technology (Fields- Applications - Examples) **Practical:** html structure code	**7**	**X**	**X**	**X**	**X**					
3	**Lecture:** Computer systems	**7**	**X**					**X**			

	Practical: Font Tags										
4	**Lecture:** Hardware used in information systems **Practical:** Font Tags	**7**		**X**				**X**			
5	**Lecture:** Software used in information systems **Practical: paragraph tags**	**7**			**X**			**X**			
6	**Lecture:** Introduction of data communicatio n system **Practical:** order lists	**7**	**X**	**X**							
7	**Lecture:** Introduction of Computer Networking **Practical:** unorder lists	**7**	**X**	**X**	**X**	**X**					
8	**Lecture:** The internet; the foundations, Resources and uses of the internet, **Practical:** Image tag	**7**	**X**					**X**			
10	**Lecture:** Privacy	**7**		**X**				**X**			

	Security and Ethics **Practical:** horizontal &vertical Rules										
11	**Lecture:** Emphasizing practical skills for finding, Reading and authorizing materials **Practical:** Frames	**7**			**X**			**X**			
12	**Lecture:** Introduction of Artificial Intelligence **Practical:** Tables	**7**	**X**	**X**					**X**	**X**	**X**
13	**Lecture:** introduction of cloud computing **Practical:** Hyper Links	**7**	**X**	**X**	**X**	**X**			**X**	**X**	**X**
14	**Lecture: Html Projects**	**7**	**X**					**X**	**X**	**X**	**X**

Course Coordinator: Dr. Amira Elsonbaty
Head of Department: Prof. Mohamed Fouad
Date of Approval: 10/2022

Structures analysis (3)
(CIE211)

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	CIE211
Year/Level	level 2
Specialization	Major
Authorization Date of Course Specification	10/2022

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

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.
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	**a1** Recognize the fundamentals of structural analysis and mechanics. **c1** Using either numerical techniques or physical measurements and/or testing

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.	by applying a full range of civil engineering concepts and techniques of: structural analysis and mechanics.

4. Course Contents:

No.	Topics	Lectures	Lab.	Exercise	Contact	Student's load
1	Statically Indeterminate Structures using force method	6	-	6	12	12
2	Slope Deflection Method	8	-	8	16	16
3	Moment Distribution Method	8	-	8	16	16
4	Introduction to Stiffness Method	6	-	6	12	12
Total		**28**	**-**	**28**	**56**	**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
Statically Indeterminate Structures using force method	x			x	x	x	x			x				
Slope Deflection Method	x			x	x	x	x			x				
Moment Distribution Method	x			x	x	x	x			x				
Introduction to Stiffness Method	x			x	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	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	Periodic exam	C1 C11	a3,b3,c2,c3 a1,c1
2	Practical /Oral	-	-
3	Final term examination	C1 C11	a3,b3,c2,c3 a1,c1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	3^{rd}, 7^{th} , $9^{th}10^{th}$
2	Practical /Oral	-
3	Final term examination	15^{th}

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	40%
2	Practical /Oral	-
3	Final term examination	60%
Total		**100%**

8. List of References:

No.	Reference List
1	Essential books (text books) • *W. M. El-dakhakhni, "Theory of Structures", Part One, AssiutUniversity, 2016.* • *W. M. El-dakhakhni, "Theory of Structures", Part Two, AssiutUniversity, 2016.* • *El-Kasaby and 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, 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 skills of the course:

No	Topic	Aims	Competencies	LO's
1	Statically Indeterminate Structures using force method	10	C1	a3
2	Slope Deflection Method	10	C1	c3
3	Moment Distribution Method	10	C1 C11	c3 a1,c1
4	Introduction to Stiffness Method	10	C1 C11	a3, c3 a1,c1

Course Coordinator: Dr/ Rafik Wadia

Head of Department: Prof. Dr / Mohamed Elkiki

Date of Approval: 10/2022

Properties and strength of materials

(CIE212)

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	CIE212
Year/Level	level 2
Specialization	Major
Authorization Date of Course Specification	10/2022

Teaching hours	**Lectures**	**laboratory**	**Exercise**	**Student's load**
	2	1	1	4

2- Course Aims

No.	**Aims**
8	Plan and manage construction processes maintain safety measures in construction and materials; and assess environmental impacts of projects.
10	Select appropriate and sustainable technologies for construction of buildings, infrastructures 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.	**a1** Define, basic characteristics, properties, concepts, and techniques of properties and strength of materials. **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 properties and strength of materials. **b2** Conduct basic experiments to learn about the applications of properties and strength of materials.

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.
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. **b1** Address construction defects, instability and quality issues

4. Course Contents:

No.	Topics	Lectures	laboratory	Exercise	contact	Student's load
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	6	4	4	14	14
2	Manufacture and types of cement Practical: fineness modulus of cement –compression strength – initial and final setting time	4	2	2	8	8

3	Fresh concrete, concrete workability tests and factors affecting the workability	4	2	2	8	8
4	Hardened concrete, factors affecting concrete strength in tension, compression and flexure	6	2	2	10	10
5	durability of concrete, mix design	6	2	4	12	12
6	Different construction materials (Manufacture of steel, composition and structure of steel, heat treatment of steel, alloy steels), (bituminous)	2	2	-	4	4
Total		**28**	**14**	**14**	**56**	**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**
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	✓			✓	✓	✓						✓	✓
Fresh concrete, concrete workability tests and factors affecting the workability	✓			✓	✓	✓		✓				✓	✓
Hardened concrete, factors affecting concrete strength in tension, compression and flexure	✓			✓	✓	✓						✓	✓
durability of concrete, mix design	✓				✓	✓							✓
Different construction materials (Manufacture of steel, composition and structure of steel, heat treatment of steel, alloy steels), (bituminous)	✓				✓	✓							✓

6. Teaching and learning methods for disable students:

No.	Teaching Methods
1	Additional tutorials
2	Online lectures and assignments

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Periodic exam	C2 C4 C11 C13	a1,a2,b1,b2 a1,a3 a1,a2 a1,b1

2	Practical /Oral	C2 C4 C11 C13	a1,a2,b1,b2 a1,a3 a1,a2 a1,b1
3	Final term examination	C2 C4 C11 C13	a1,a2,b1,b2 a1,a3 a1,a2 a1,b1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
2	Periodic exam	2^{nd},7^{th} , $9^{th}8^{th}$
3	Practical /Oral	14^{th}
4	Final term examination	15^{th}

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	40%
2	Practical /Oral	10%
3	Final term examination	50%
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 الاختبارات المعملية للخرسانة، وزارة الإسكان والمرفقات 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 Text Book 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	Teaching and Learning Strategy
1	Introduction to properties and strength of materials, properties and grading of aggregates (fine – coarse) Practical: Sieve analysis – adsorption – specific gravity – specific volume – fineness modu	8,10	C2 C4 C11	a1,a2,b1,b2 a1,a3 a1,a2	Face-to-Face Lecture Brain storming
2	Manufacture and types of cement Practical: fineness modulus of cement –compression strength – initial and final setting time	8,10	C2 C4 C11	a1,a2,b1,b2 a1,a3 a1,a2	Face-to-Face Lecture Brain storming Discussion sessions
3	Fresh concrete, concrete workability tests and factors affecting the workability	8,10	C2 C4 C11 C13	a1,a2,b1,b2 a1,a3 a1,a2 a1,b1	Face-to-Face Lecture Brain storming Discussion sessions Lab

4	Hardened concrete, factors affecting concrete strength in tension, compression and flexure	8,10	C2 C4 C11 C13	a1,a2,b1,b2 a1,a3 a1,a2 a1,b1	Face-to-Face Lecture Brain storming Discussion sessions Problem solving
5	durability of concrete, mix design	8,10	C2 C4 C11 C13	a1,a2,b1,b2 a1,a3 a1,a2 a1,b1	Face-to-Face Lecture. Brain storming. Discussion sessions. Problem solving. Self-learning and Research.
6	Manufacture of bituminous binders, properties of bituminous binders and mixtures, design and uses of bituminous mixtures	8,10	C2 C4 C11	a1,a2,b1,b2 a1,a3 a1,a2	Discussion sessions. Problem solving. Self-learning and Research. Lab.
7	Manufacture of steel, composition and structure of steel, heat treatment of steel, alloy steels	8,10	C2 C4 C11	a1,a2,b1,b2 a1,a3 a1,a2	Discussion sessions. Problem solving. Self-learning and Research. Lab

Course Coordinator: Dr. Nasreen El-awadly.

Head of Department: Assoc. Prof. Mohamed Gabr.

Date of Approval: 10/2022.

Surveying (1)
(CIE213)

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	**CIE213**
Year/Level	level 2
Specialization	Major
Authorization Date of Course Specification	10/2022

Teaching hours	**Lectures**	**laboratory**	**Exercise**	**Student's load**
	2	1	1	4

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.
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	laboratory	Exercise	Student's load
1	Introduction to Surveying: basic definitions, classification of maps and scales. Mapping using linear measurements Practical: measuring some buildings and details inside the institute using the tape	4	2	2	8
2	Introduction to leveling. Types of levels Practical: Learn about levels devices	2	1	1	4
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	8	3	3	14
4	Compass surveying and traverse computation area determination Practical: Make a landline and calculate an area adjacent to it	4	2	2	8
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	4	1	1	6
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	4
6	Tachometric surveying: Stadia and Tangential method, Substance bar. Practical: Using theodolite to measure vertical and horizontal distances by tacheometry	4	4	4	12
Total		**28**	**14**	**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	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	x			x	x								x

institute using the tape													
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
Compass surveying and traverse computation area determination Practical: Make a landline and	x			x	x								x

calculate an area adjacent to it													
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	x			x	x								x

as a model to identify permanent errors in theory													

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	ILO's
1	Periodic exam	C1 C11	a2 a1
2	Practical /Oral	C11	a1, c1
3	Final term examination	C1 C11	a2, b1 a1, c1

7.2 Evaluation Schedule:

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

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	40%
2	Practical /Oral	10%
3	Final term examination	50%
Total		**100%**

8. List of References:

No.	Reference List
1	Walker, J., and Awange, J. L. (2022) 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	Teaching and Learning Strategy
1	Introduction to Surveying: basic definitions, classification of maps and scales. Mapping using linear measurements Practical: measuring some buildings and details inside the institute using the tape	1, 10	C1 C11	a2, b1	Face-to-Face Lecture Brain storming Site visits
2	Introduction to leveling. Types of levels Practical: Learn about levels devices	1, 10	C1	a2	Face-to-Face Lecture Brain storming Discussion sessions Site visits
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	Face-to-Face Lecture Brain storming Discussion sessions Site visits

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	Face-to-Face Lecture Brain storming Discussion sessions Problem solving
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	1, 10	C1 C11	b1 C1	Face-to-Face Lecture. Brain storming Discussion sessions. Problem solving Self-learning and Research Site visits
6	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	Face-to-Face Lecture Brain storming Discussion sessions Problem solving
7	Tachometric surveying: Stadia and Tangential method, Substance bar. Practical: Using theodolite to measure vertical and horizontal distances by tacheometry	1, 10	C1 C11	a2, b1 a1, C1	Face-to-Face Lecture Brain storming Discussion sessions Problem solving

Course Coordinator: Dr / Ayman Helal

Head of Department: Prof/ Mohamed Elkiki

Date of Approval: 10/2022

Numerical Methods in Engineering
BAS22

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	BAS221
Year/Level	Level: 1
Specialization	Major
Authorization Date of Course Specification	**10/2022**

Teaching hours	**Lectures**	**laboratory**	**Exercise**	**contact**	**Student's load**
	2	0	2	4	4

2- Course Aims:

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

3- Competencies:

Competencies	**Learning Outcomes (LO'S)**
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.
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. **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.

4- Course Contents:

No.	Topics	Lecture	Laboratory	Exercise	contact	Student's load
1	Numerical solution of linear	4	-	4	8	8
2	Numerical solution of nonlinear systems	4	-	4	8	8
3	Numerical differentiation and integration	4	-	4	8	8
4	Curve fitting	4	-	4	8	8
5	Interpolation	4	-	4	8	8
6	Numerical solution of initial value problems	4	-	4	8	8

7	Boundary and Eigen value problems	4	-	4	8	8
Total		**28**	**-**	**28**	**56**	**56**

5- Teaching and learning methods:

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

7	Boundary and Eigen value problems	x	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	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	a2, c1, c2
3	Final term examination	C1 C2	b1, b2 a2,b2

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic Exam	8^{th}
2	Semester work (quizzes, sheets, report)	2^{nd} -7^{th} - 9^{th} -14^{th}
3	Final exam	15^{th}

7.3 Weighting of Evaluation:

No.	Assessment Method	Weights
1	Periodic Exam	40%
2	Practical/ Oral	-
3	Final Term Exam	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	1	C1	a1
2	Numerical solution of nonlinear systems	1	C1	a2
	Numerical differentiation and integration	1	C1 C2	a2 a2,b2
3	Curve fitting	1	C1	b1
	Interpolation	1	C1 C2	b1 a2, b2
4	Numerical solution of initial value problems	1	C1, C2	b2 a2,b2
5	Boundary and eigen value problems	1	C1	c1, c2

Course Coordinator: Asso.prof. Dr .Samar Madian

Head of Department: Asso.prof. Dr. Aml Elbehiry

Date of Approval:2023

Hydrology and Irrigation Engineering
(CIE 221)

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 221
Year/Level	level 2
Specialization	Major
Authorization Date of Course Specification	**10/2022**

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

2- Course Aims

No.	Aims
4	Use the techniques, skills, and current engineering tools required for irrigation engineering practices and Hydrological measurements.
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** Define the principles, basic properties, and features of water resources, soil, and hydrology **a3.** Define the principles types of irrigation systems – surface irrigation systems, Drainage and Hydrological cycle **b1** Estimating of water requirements for crops and managing and distribution of irrigation systems and drainage. **b2** Using scientific concepts and theories that are relevant Precipitation, Hydrological losses, Hydrograph, Crops, Soil and Water relation..

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.	**a1** Define basic characteristics, properties, concepts, and techniques of Irrigation and Drainage Engineering. **b1** Conduct basic experiments to learn about the basic characteristics and features of flow types in open channels, Precipitation and Hydrological losses. **b2** Conduct basic experiments to learn about the applications of Hydraulic, Hydrology and fluid mechanics in the fields of Irrigation and Drainage Engineering and Canal Design.
C11 Select appropriate and sustainable technologies for construction of Irrigation networks, using either numerical techniques or physical measurements and/or testing by applying a full range of civil engineering concepts and techniques of: hydrology and fluid mechanics.	**a1.** Recognize the fundamentals of Irrigation Canal Design, Canal lining, Modern Irrigation Systems, Hydrology and Hydrological losses. **c1** Using either numerical techniques or physical measurements and/or testing by applying a full range of civil engineering concepts and techniques of Irrigation and Drainage Canal Design, Sprinkler and Trickle Irrigation parts, Precipitation and Hydrological losses.
C12 Achieve an optimum design of irrigation and drainage engineering, and hydrology.	**b1** Achieve an optimum Planning and design of open channel for irrigation and drainage networks, and design of modern irrigation systems (sprinkler and drip). **b2** Achieve an optimum Planning and design of water resources with respect to applied hydrology (Precipitation, Hydrograph, and Hydrological losses).

4. Course Contents:

No.	Topics	Lecture	Lab.	Exercise	Contact	Student's load
1	Definitions – water resources – Hydrological cycle	2	-	2	4	4
2	Precipitation	2	-	2	4	4
3	Hydrological losses	2	-	2	4	4
4	Hydrograph	2	-	2	4	4
5	Estimating of water requirements	2	-	2	4	4
6	Soil – Plant – Water relationship	2	-	2	4	4

7	Managing and distribution of irrigation systems	4	-	4	8	8
8	Introduction to various types of irrigation systems – surface irrigation systems	2	-	2	4	4
9	Planning and design of surface irrigation and drainage network systems	4	-	4	8	8
10	Sprinkler irrigation	2	-	2	4	4
11	Drip irrigation	2	-	2	4	4
12	Drainage Engineering	2	-	2	4	4
Total		**28**	**-**	**28**	**56**	**56**

6- 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
Definitions – water resources – Hydrological cycle	x			x	x	x	x			x				
Precipitation	x			x	x	x	x			x				
Hydrological losses	x			x	x	x				x		x	x	
Hydrograph	x			x	x	x	x		x	x	x			
Estimating of water requirements	x			x	x	x	x		x	x	x			

Soil – Plant – Water relationship	x			x	x	x	x			x		x		
Managing and distribution of irrigation systems	x			x	x	x	x	x		x	x			
Introduction to various types of irrigation systems – surface irrigation systems	x			x	x	x	x	x		x	x			
Planning and design of surface irrigation and drainage network systems	x			x	x	x	x			x			x	
Sprinkler irrigation	x			x	x	x	x			x			x	
Drip irrigation	x			x	x	x	x			x			x	
Drainage Engineering	x			x	x	x	x			x			x	

6. Teaching and learning methods for disable students:

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

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Periodic exam	C1 C2 C11 C12	a2, a3, b1, b2 a1, b1, b2 a1, c1 b1, b2
2	Practical/ Oral	-	-
3	Final term examination	C1 C2 C11	a2, a3, b1, b2 a1, b1, b2 a1, c1

		C12	b1, b2

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	3^{rd},8^{th} , 12^{th}
2	Practical /Oral	-
3	Final term examination	15^{th}

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	40%
2	Practical /Oral	-
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	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	Han, D., (2010). "Concise Hydrology". Download free Textbook at BOOKBOON.COM. P.145.
5	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	Definitions – water resources – Hydrological cycle	4	C1	a2, a3
2	Precipitation	4	C1 C2 C11	a3, b2 b1 a1, c1

			C12	b2
3	Hydrological losses	4	C1 C2 C11 C12	a3, b2 b1 a1, c1 b2
4	Hydrograph	4,7	C1 C12	b2 b2
5	Estimating of water requirements	4	C1 C11	a2, b1, b2 c1
6	Soil – Plant – Water relationship	4	C1 C11	a2, b1, b2 c1
7	Managing and distribution of irrigation systems	4,7	C1 C2 C11 C12	a3, b1 a1, b1, b2 a1, c1 b1
8	Introduction to various types of irrigation systems – surface irrigation systems	4,7	C1 C2 C11 C12	a3, b1 a1, b2 a1, c1 b1
9	Planning and design of surface irrigation and drainage network systems	4,7	C1 C2 C11 C12	a3, b1 a1, b2 a1, c1 b1
10	Sprinkler irrigation	4,7	C1 C2 C11 C12	b1 a1, b2 a1, c1 b1
11	Drip irrigation	4,7	C1 C2 C11 C12	b1 a1, b2 a1, c1 b1
12	Drainage Engineering	7	C1 C2 C11 C12	a3, b1 a1, b2 c1 b1

Course Coordinator: Prof. Dr. Mohamed Elkiki
Head of Department: Prof. Dr. Mohamed Elkiki

Reinforced Concrete (1)
CIE222

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	CIE222
Year/Level	Level 2
Specialization	Major
Authorization Date of Course Specification	10/2022

Teaching hours	**Lectures**	**laboratory**	**Exercise**	**Student's load**
	4	-	2	5

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.
2	Achieve an optimum design of Reinforced Concrete.

1- 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 Load calculation in slabs and beams. **c2** solve problems by applying the design criteria.
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 and basic properties of Design of sections and Bond length between concrete and steel bars. **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. **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, health and safety requirements,	**a1** Describe 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 testing by applying a full range of civil engineering concepts and techniques of reinforced concrete design.
C12 Achieve an optimum design of Reinforced Concrete.	**b1** Achieve an optimum design of Reinforced Concrete.

4. Course Contents:

No.	Topics	Lectures	laboratory	Exercise	Student's load
1	Introduction, materials, properties	4	2	-	8
2	Design methods and requirements.	4	2	-	8
3	Load distribution	8	4	-	8
4	Bond length between concrete and steel bars	8	4	-	8
5	Loading analysis and design	8	4	-	8
6	Limit state design method (Flexural analysis and design, shear and design, etc. Loading analysis and design)	8	4	-	10

7	Design of Beams and design of solid slabs One- and two-way slabs	8	4	-	10
8	Short columns	8	4	-	10
Total		**56**	**28**	**-**	**70**

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
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	x			x	x								x

analysis and design)													
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 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	Periodic exam	C1 C2 C3 C4 C11 C12	a3,c2 a2,c3 a1,c2 a1 c1 b1
2	Practical /Oral	-	-
3	Final term examination	C1 C2 C3 C4 C11 C12	a3,c2 a2,c3 a1,c2 a1 c1 b1

7.2 Evaluation Schedule:

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

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	40%
2	Practical /Oral	-
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 (text books / 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 to reinforced concre	1,7	C1	a3
2	Design criteria	1,7	C1 C2	c2 a2, c3

			C3 C4 C12	a1,c2 a1 b1
3	Design of sections subjected to moments	1,7	C2	a2
4	Bond length between concrete and steel bars	1,7	C2 C4	a2, c3 a1
5	Shear in beams	1,7	C2 C3 C4 C12	a2, c3 a1,c2 a1 b1
6	Design of one way and two-way slabs	1,7	C2 C3 C4 C12	a2, c3 a1,c2 a1 b1
7	Load calculation in slabs and beams.	1,7	C2 C3 C4 C12	a2, c3 a1,c2 a1 b1

Course Coordinator: Prof. Dr. Khaled Fawzy
Head of Department: Prof. Dr. Mohamed ElKiki
Date of Approval: 10/2022

Surveying (2)
(CIE223)

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	CIE223
Year/Level	Level 2
Specialization	Major
Authorization Date of Course Specification	10/2022

Teaching hours	**Lectures**	**laboratory**	**Exercise**	**Student's load**
	2	1	1	4

2- Course Aims:

No.	Aims
1	Master a broad range of engineering knowledge and specialized skills, as well as the ability to apply acquired knowledge in real-world situations by applying 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 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	**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.

civil engineering concepts and techniques of: structural analysis and mechanics, properties and strength of materials, surveying, soil mechanics, hydrology and fluid mechanics.	

4- Course Contents:

No.	Topics	Lectures	laboratory	Exercise	Student's load
1	Indirect methods for distance measurement: Stadia method-tangent methods-substance bar.	2	1	1	4
2	Setting out of horizontal and vertical curves	4	2	2	8
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	12
4	Coordinate systems and transformations coordinate computations: Polar method-intersection-resection	4	2	2	8
5	Modern methods for distance measurements: Distance measurement (EDM) and total stations.	4	2	2	8
6	Setting out of engineering projects.	2	1	1	4
7	Introduction to Geodesy	2	1	1	4
8	Course Project	4	2	2	8
Total		**28**	**14**	**14**	**56**

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling
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 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	ILO's
1	Periodic exam	C1 C11	a2 a1
2	Practical /Oral	C10	d1, d2
3	Final term examination	C1 C11	a2, b1 a1, c1

7.2 Evaluation Schedule:

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

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	40%
2	Practical /Oral	12%
3	Final term examination	48%
Total		**100%**

8. List of References:

No.	Reference List
1	Walker, J., and Awange, J. L. (2017) Surveying for Civil and Mine Engineers.
2	Recommended books 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	Teaching and Learning Strategy
1	Indirect methods for distance measurement: Stadia method-tangent methods-substance bar.	1, 9,10	C1	a3, b1	Face-to-Face Lecture Brain storming Site visits
2	Setting out of horizontal and vertical curves	1, 9,10	C1 C11	a3 a1, c4	Face-to-Face Lecture Brain storming Discussion sessions Site visits
3	Introduction to theory of errors and error analysis of surveying measurements. Computations of areas and volumes of earth work in construction sites.	1, 9,10	C11	a1	Face-to-Face Lecture Brain storming Discussion sessions Site visits
4	Coordinate systems and transformations coordinate computations: Polar method-intersection-resection	1, 9,10	C1 C11	a3 a1	Face-to-Face Lecture Brain storming Discussion sessions Problem solving
a	Modern methods for distance measurements: Distance measurement (EDM) and total stations.	1, 9,10	C1 C11	b1 C4	Face-to-Face Lecture. Brain storming. Discussion sessions. Problem solving. Self-learning and Research. Site visits
6	Setting out of engineering projects.	1, 9,10	C1 C11	a3, b1 a1, C4	Face-to-Face Lecture Brain storming Discussion sessions

					Problem solving
7	Introduction to Geodesy	1, 9,10	C1 C11	a3 a1	Face-to-Face Lecture Brain storming Discussion sessions Problem solving
8	Course Project	1, 9,10	C1 C11	a3, b1 a1, C1	Face-to-Face Lecture Brain storming Discussion sessions Problem solving

Course Coordinator: Dr / Ayman Helal
Head of Department: Assoc. Prof/ Mohamed Gabr.
Date of Approval: 10/2022

Traffic and Transportation Engineering
(CIE224)

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	CIE224
Year/Level	level 2
Specialization	Major
Authorization Date of Course Specification	10/2022

Teaching hours	**Lectures**	**laboratory**	**Exercise**	**Student's load**
	2	-	2	4

1. 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 Transportation and Traffic, Roadways and Airports, Railways, or any other emerging field relevant to the discipline.

2. 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 related to the Traffic and Transportation Engineering. **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.
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. **c3** Utilize modern technologies.
C6 Plan, supervise and monitor implementation of engineering projects, taking into consideration other trades requirements.	**a1** Show the appropriate and sustainable technologies for traffic design.
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.
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 quality issues related to traffic design**.**

3. Course Contents:

No.	Topics	Lecture	Lab.	Exercise	Contact	Student's load
1	Principles of traffic engineering	2	-	2	4	4
2	Road-user and vehicle characteristics	2	-	2	4	4
3	Travel time, speed and volume studies	2	-	2	4	4
4	Highway capacity	2	-	2	4	4
5	Pedestrian, parking and accident studies	2	-	2	4	4
6	Traffic control devices	2	-	2	4	4

7	Intersections and Grade-separations	2	-	2	4	4
8	Cross-section elements and sight distances	2	-	2	4	4
9	Horizontal and vertical alignments	4	-	4	8	8
10	Principles of transportation planning, and transportation systems planning, and demand analysis	4	-	4	8	8
11	The 3-steps model of urban transportation planning	4	-	4	8	8
Total		**28**	**-**	**28**	**56**	**56**

4. 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 traffic engineering	√	√		√	√	√				√				
Road-user and vehicle characteristics	√	√		√	√	√				√				
Travel time, speed and volume studies	√	√		√	√	√				√				
Highway capacity	√	√		√	√	√				√				

Pedestrian, parking and accident studies	√	√		√	√	√				√				
Traffic control devices	√	√		√	√	√				√				
Intersections and Grade-separations	√	√		√	√	√				√				
Cross-section elements and sight distances	√	√		√	√	√				√				
Horizontal and vertical alignments	√	√		√	√	√				√				
Principles of transportation planning, and transportation systems planning, and demand analysis	√	√		√	√	√				√				
The 3-steps model of urban transportation planning	√	√		√	√	√				√				

5. 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

6. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Periodic Exam	C1 C2 C4	a2, c2 a2, b2, b3, c3 a1, c3

		C6 C11 C12 C13	a1 a2 b2 b1
2	Practical\Oral	-	-
3	Final Exam	C1 C2 C4 C6 C11 C12 C13	a2, c2 a2, b2, b3, c3 a1, c3 a1 a2 b2 b1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic Exam	3^{rd},8^{th} , 12^{th}
2	Practical\Oral	-
3	Final Exam	15^{th}

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	40%
2	Practical /Oral	-
3	Final term examination	60%
Total		**100%**

7. 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.

8. Facilities required for teaching and learning:

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

9. Matrix of knowledge and skills of the course:

No	Topic	Aims	Competencies	LO's
1	Principles of traffic engineering	1, 7	C1 C2 C4	a2 a2, b3 a1, c3
2	Road-user and vehicle characteristics	1, 7	C2	a2, c3
3	Travel time, speed and volume studies	1,7	C2 C12	a2, b2 b2
4	Highway capacity	1, 7	C1 C2 C12	c2 a2 b2
5	Pedestrian, parking and accident studies	1, 7	C2 C12	a2, c3 b2
6	Traffic control devices	1, 7	C2 C11 C13	a2, c3 a2 b1
7	Intersections and Grade-separations	1, 7	C1 C2 C6	a2, c2 a2, b3, c3 a1
8	Cross-section elements and sight distances	1, 7	C2	a2, b2
9	Horizontal and vertical alignments	1, 7	C2 C11 C12	a2, b2, c3 a2 b2
10	Principles of transportation planning, and transportation systems planning, and demand analysis	1, 7	C2 C4	a2, b2 a1, c3
11	The 3-steps model of urban transportation planning	1, 7	C2 C6	a2, b2 a1

Course Coordinator: Assoc. Prof. Dr. Alaa Gabr

Head of Department: Prof. Dr. Mohamed ElKiki

Date of Approval: 10/2022

Principles of Building Constructions
(CIE225)

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 constructions
Course Code	CIE225
Year/Level	level 2
Specialization	Major
Authorization Date of Course Specification	10/2022

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

2- Course Aims

No.	Aims
1	Master a broad range of engineering knowledge and specialized skills, as well as the ability to apply acquired knowledge in real-world situations by applying 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 environmental impacts of projects.
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	**a2** Define the principles, basic properties, and features of construction material, as well as their use in sustainable technologies for

use statistical analyses and objective engineering judgment to draw conclusions	construction of buildings, infrastructures and water structures.
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 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.
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** Define the principles, basic properties, and features of construction material, as well as their use in sustainable technologies for construction of buildings, infrastructures. **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,
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. **b1** Address construction defects, instability and quality issues

4. Course Contents:

No.	Topics	Lectures	laboratory	Exercise	Contact	Student's load
1	Construction technology of different types of projects	2		2	4	4

2	Conventional construction methods	2		2	4	4
3	Construction Equipment	2		2	4	4
4	Pre-fabricated construction methods	2		2	4	4
5	Effect of environment on methods of construction	2		2	4	4
6	Architectural principals (utilities – services – properties)	2		2	4	4
7	Safety issues during different stages of construction	2		2	4	4
8	Examples of construction of different types of projects (buildings, roads, RCC dams, marine works, underground structures, etc.)	4		4	8	8
9	Building materials technology (steel, concrete, wood and natural stones)	2		2	4	4
10	Developing new materials (Fiber reinforced polymers, high strength concrete and ultra-high strength concrete)	4		4	8	8
11	Architectural drawings and details	4		4	8	8
Total		**28**		**28**	**56**	**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
Construction technology of different types of projects	✓				✓	✓								
Conventional construction methods	✓				✓	✓								
Construction Equipment	✓				✓	✓								
Pre-fabricated construction methods	✓				✓	✓								
Effect of environment on methods of construction	✓				✓	✓								
Architectural principals (utilities – services – properties)	✓				✓	✓								
Safety issues during different stages of construction	✓				✓	✓								
Examples of construction of different types of projects (buildings, roads, RCC dams, marine works, underground structures, etc.)	✓				✓	✓								
Building materials technology (steel, concrete, wood and natural stones)	✓				✓	✓	✓						✓	
Developing new materials (Fiber reinforced polymers, high strength concrete and	✓				✓	✓								

ultra-high strength concrete)														
Architectural drawings and details	✓				✓	✓								

6. Teaching and learning methods for disable students:

No.	Teaching Methods
1	Additional Tutorials 2 Online lectures and assignments
2	Additional Tutorials 2 Online lectures and assignments

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Periodic exam	C2 C4 C11	a2 a3 a1
2	Practical /Oral	-	-
3	Final term examination	C4 C11	a1, a3 a2

7.2 Evaluation Schedule:

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

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	40%
2	Practical /Oral	-
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 (text books / 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

10. Matrix of knowledge and skills of the course:

No	Topic	Aims	Competencies	LO's	Teaching and Learning Strategy
1	Construction technology of different ty of projects	1	C4	a3, a1	Face-to-Face Lecture Brain storming
2	Conventional construction methods	1	C4 C11	a3 a1, a2	Face-to-Face Lecture Brain storming Discussion sessions

3	Construction Equipment	1	C4 C11	a3 a1, a2	Face-to-Face Lecture Brain storming Discussion sessions
4	Pre-fabricated construction methods	1	C4 C11	a3 a1, a2	Face-to-Face Lecture Brain storming Discussion sessions Problem solving
5	Effect of environment on methods of construction	1	C4 C11	a3 a1, a2	Face-to-Face Lecture. Brain storming. Problem solving. Self-learning and Research.
6	Architectural principals (utilities – services – properties)	1	C4 C11	a3 a1, a2	Face-to-Face Lecture Brain storming Discussion sessions
7	Safety issues during different stages of construction	1	C4 C11	a3 a1, a2	Face-to-Face Lecture Brain storming Discussion sessions
8	Examples of construction of different types of projects (buildings, roads, RCC dams, marine works, underground structures, etc.)	1	C2 C11	a3 a1, a2	Face-to-Face Lecture Brain storming Discussion sessions
9	Building materials technology (steel, concrete, wood and natural stones)	1	C2 C11	a3 a1, a2	Face-to-Face Lecture Brain storming Discussion sessions

10	Developing new materials (Fiber reinforced polymers, high strength concrete and ultra-high strength concrete)	1	C4 C11	a3 a1, a2	Face-to-Face Lecture Brain storming Discussion sessions

Course Coordinator: Dr. Ayman Helal.

Head of Department: Prof. Dr. Mohamed Elkiki.

Date of Approval: 10/2022.

Training 1
(CIE226)

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	Training1
Course Code	CIE226
Year/Level	Level: 2
Specialization	Major
Authorization Date of Course Specification	10/2022

Teaching hours	**Lectures**	**laboratory**	**Exercise**	**Contact**	**Student's load**
	-	-	-	-	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,	**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.

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 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.	-	68
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.	-	12
Total		**-**	**80**

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 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 disable 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	Periodic exam	C3 C9	a1, b1, c2 d1
2	Practical/ Oral	-	-
3	Final term examination (presentation, Report)	C3 C5 C7 C9	a1, b1, c2 a1, c1, d1 d1, d3 d1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic Exam.	During the training
2	Practical/ Oral	-
3	Final term examination (presentation, Report)	6^{th}

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic Exam.	60%
2	Practical/ Oral	-
3	Final term examination (presentation, Report)	40%
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	Site visiting
4	Lab.

10- 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 department in a combined manner, that reflects identity and creativity in all its preliminary and analytical phases.	2,5,7,8	C3 C5 C6 C9	a2, a3, c2 b1 a1 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

Reinforced Concrete (2)
(CIE311)

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	CIE 311
Year/Level	Level 3
Specialization	Major
Authorization Date of Course Specification	10/2022

Teaching hours	**Lectures**	**laboratory**	**Exercise**	**Student's load**
	4	-	2	4

2- Course Aims:

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

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.	**a1** Describe codes of practice **c3** Utilize modern technologies. **c4** Apply quality assurance procedures and follow codes.
C12 Achieve an optimum design of Reinforced Concrete.	**b1** Achieve an optimum design of Reinforced Concrete.

4. Course Contents:

No.	**Topics**	**Lectures**	**Lab.**	**Exercise**	**Contact**	**Student's load**
1	Design of hollow block slabs	12	-	6	18	12
2	Design of sections subjected to torsion	12	-	6	18	12

3	Design of flat slabs	12	-	6	18	12
4	Design of paneled beam slabs	12	-	6	18	12
5	Design of stairs.	8	-	4	12	8
Total		**56**	**-**	**28**	**84**	**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
Design of hollow block slabs	✓			✓	✓	✓	✓			✓	✓			
Design of sections subjected to torsion	✓			✓	✓	✓	✓			✓	✓			
Design of flat slabs	✓			✓	✓	✓	✓			✓	✓			
Design of paneled beam slabs	✓			✓	✓	✓	✓			✓	✓			
Design of stairs.	✓			✓	✓	✓	✓			✓	✓			

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	ILO's
1	Periodic exam	C4 C12	a1,c3,c4 b1
2	Practical/ Oral	-	-
3	Final term examination	C4 C12	a1,c3,c4 b1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	2^{nd},7^{th} , 9^{th}
2	Practical/ Oral	–
3	Final term examination	15^{th}

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	40%
2	Practical /Oral	-
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 (ECCS203-2001)."Cairo 2001.
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
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 hollow block slabs	7	C4 C12	a1,c3,c4 b1
2	Design of sections subjected to torsion	7	C4 C12	a1,c3,c4 b1
3	Design of flat slabs	7	C4 C12	a1,c3,c4 b1
4	Design of paneled beam slabs	7	C4 C12	a1,c3,c4 b1
5	Design of stairs.	7	C4 C12	a1,c3,c4 b1

Course Coordinator: Dr. Hamdi Abd Alaty

Head of Department: Prof. Dr. Mohamed ElKiki

Date of Approval: 10/2022

Geology and Soil Mechanics 1
(CIE 312)

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	CIE 312
Year/Level	level 3
Specialization	Major
Authorization Date of Course Specification	10/2022

Teaching hours	**Lectures**	**laboratory**	**Exercise**	**Student's load**
	2	1	1	4

2- Course Aims:

No.	Aims
1	Master a broad range of engineering knowledge and specialized skills, as well as the ability to apply acquired knowledge in real-world situations by applying 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 and solve complex engineering problems by applying geology and soil mechanics fundamentals.
C2. Develop and conduct appropriate experimentation, analyze and interpret data, assess and evaluate findings, and use	**a1.** Define, basic characteristics, properties, concepts, and techniques of soil mechanics.

statistical analyses and objective engineering	**b1.** Conduct basic experiments to learn about the basic characteristics and features of soil mechanics.
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 Soil mechanics and Foundations
C4: Utilize contemporary technologies, codes of practice and standards, quality guidelines, geotechnical issues and foundations principles.	**a1:** Describe quality assurance systems, codes of practice, and standards, as well as environmental concerns for geotechnical behavior.
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	Lectures	laboratory	Exercise	contacts	Student's load
1	Introduction and basics o Geology	2	1	1	4	4
2	Basic geological properties of rocks	2	1	1	4	4
3	Basic engineering properties of soils Practical: water content – specific gravity – sieve analysis – hydrometer – Casagrande – sand cone test – standard proctor – modified proctor test	12	6	6	24	24

4	Permeability and Seepage	4	2	2	8	8
5	Effective stresses and pore water pressure	2	1	1	4	4
6	Stresses and strains in continuous body and shear stress of soil Practical: un-confined test	2	1	1	4	4
7	Consolidation Practical: oedometer	2	1	1	4	4
8	Stability analysis	2	1	1	4	4
Total		**28**	**14**	**14**	**56**	**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.
Introduction and basics of Geology	✓			✓	✓	✓	✓			✓				
Basic geological properties of rocks	✓			✓	✓	✓	✓			✓				✓
Basic engineering properties of soils Practical: water content – specific gravity – sieve analysis – hydrometer – Casagrande – sand cone test – standard proctor – modified proctor test	✓			✓	✓	✓	✓			✓				✓
Permeability and Seepage	✓			✓	✓	✓	✓			✓				✓
Effective stresses and pore water pressure	✓			✓	✓	✓	✓			✓				

Stresses and strains in continuous body and shear stress of soil Practical: un-confined test	✓			✓	✓	✓	✓			✓				
Consolidation Practical: oedometer	✓			✓	✓	✓	✓			✓				✓
Stability analysis	✓			✓	✓	✓	✓			✓				

6. Teaching and learning methods for disable students:

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

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Periodic exam	C1 C3 C4 C2 C11	a3, b3, c3 a1 a1 a1, b1 a1, c1
2	Practical/ Oral	C1 C2 C11	a3, b3, c3 a1, b1 a1, c1
3	Final Exam	C1 C2 C3 C4 C11	a3, b3, c3 a1, b1 a1 a1 a1, c1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic Exam	3^{rd},8^{th} , 12^{th}
2	Practical /Oral	14^{th}
3	Final Exam	15^{th}

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights

1	Periodic exam	32 %
2	Practical /Oral	8 %
3	Final Exam	60 %
Total		**100%**

8. List of References:

No.	Reference List
1	Das, B., M. (2017), "Principles of geotechnical Engineering " Eighth Edition, CENGAGE Learning,
2	Knappett, J.A. and Craige R. F. (2012), “Craig’s Soil Mechanics" Eighth Edition, Spon Press.
3	Course notes: Lecture notes prepared by the course coordinator +Solved examples.
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
3	Lab.		

10. Matrix of knowledge and skills of the course:

No	Topic	Aims	Competencies	LO’s
1	Introduction and basics of Geology	1	C1 C3	a3 a1
2	Basic geological properties of rocks	1,10	C2 C11	a1 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 C3 C4 C11	a1 a1 a1 a1, c1
4	Permeability and Seepage	1,10	C11	c1
5	Effective stresses and pore water pressure	1,10	C11	c1

6	Stresses and strains in continuous body and shear stress of soil Practical: un-confined test	1,10	C4 C11	a1 c1
7	Consolidation Practical: oedometer	1,10	C2 C3 C4 C11	a1 a1 a1 a1, c1
8	Stability analysis	1,10	C3 C4 C11	a1 a1 c1

Course Coordinator: Dr. Hany Hashish.

Head of Department: Prof. Dr. Mohamed ElKiki

Date of Approval: 10/2022

Open channel hydraulics
(CIE313)

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	CIE 313
Year/Level	level 3
Specialization	Major
Authorization Date of Course Specification	10/2022

Teaching hours	**Lectures**	**laboratory**	**Exercise**	**Student's load**
	2	1	1	4

2-Course Aims

No.	**Aims**
7	Achieve an optimum design of open channel flow, surface water profiles related to hydraulic structures, selection apported pumps and turbines.

1- Graduate 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. **b1** Conduct basic experiments to learn about the basic characteristics and features of flow types in open channels, hydraulic jump.
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 related to open channel hydraulics. **c3** Utilize modern technologies in open channel hydraulics

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.

2- Course Contents:

No.	Topics	Lec.	Lab.	Exercise	Contact	Student's load
1	Basic concepts (section properties – classification of flow – parallel and curvilinear flow – Saint Venant equations velocity distribution – velocity coefficients – boundary layer).	4	2	2	8	8
2	The energy principles (specific energy and specific discharge –the transition problem – choking phenomena – control section – discharge measuring).	4	2	2	8	8
3	The momentum principles (hydraulic jump – momentum function – jump classification – surge in open channel).	6	3	3	12	12
4	Flow resistance (shear stress on wetted perimeter – resistance equations – channels with composite roughness).	4	2	2	8	8
5	Gradually varied flow (types of slopes – dynamic equation of G.V.F – classification of flow profile – methods of computations).	6	3	3	12	12
6	Design of channel for uniform flow (erodible and non-erodible channels – best hydraulic sections – maximum permissible velocity method –tractive force method).	4	2	2	8	8
Total		**28**	**14**	**14**	**56**	**56**

3- Teaching and learning methods:

Topic	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Lab	Modeling
Basic concepts (section properties – classification of flow – parallel and curvilinear flow – Saint Venant equations velocity distribution – velocity coefficients – boundary layer)	X			X	X	X							
The energy principles (specific energy and specific discharge –the transition problem – choking phenomena – control section – discharge measuring).	X			X	X	X						x	
The momentum principles (hydraulic jump – momentum function – jump classification – surge in open channel)	X			X	X	X						x	
Flow resistance (shear stress on wetted perimeter – resistance equations – channels with composite roughness)	X			X	X	X							
Gradually varied flow (types of slopes – dynamic equation of G.V.F – classification of flow profile – methods of computations)	X			X	X	X						x	
Design of channel for uniform flow (erodible and non-erodible channels – best hydraulic sections – maximum permissible velocity method –tractive force method).	X			X	X	X							

4- Teaching and learning methods for disable students:

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

5- Student Evaluation:

7.1 Student Evaluation method:

No.	Assessment Method	Competencies	LO's
1	Periodic Exam	C2 C4 C12	a2, b1 a1 b1, b2
2	Practical\Oral	C2 C4 C12	a2, b1 a1, c3 b1, b2
3	Final Term Examination	C2 C4 C12	a2, b1 a1 b1, b2

7.2 Evaluation Schedule:

No.	Assessment Method	Weeks
1	Periodic Exam	2^{nd},7^{th} , 9^{th}
2	Practical/ Oral	14^{th}
3	Final Term Exam	15th

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	30%
2	Practical /Oral	10%
3	Final term examination	60%
Total		**100%**

6- List of References:

No.	Reference List

1	Khurmi, R.S. (2014). " A text book of hydraulics, fluid mechanics and hydraulic machines" S. Chanel and company Ltd. P.990
2	Subramanya, K. (2008) "Flow in open channels" McGary- Hill Education (India). P.602
3	Glenn E. Moglen. 2015.Fundamentals of Open Channel Flow. CRC Press. Available on Taylor & Francis eBooks.

7- Facilities required for teaching and learning:

No.	Facility
1	Lecture Classroom
2	Lab Facilities
3	White Board
4	Data Show System
5	Presenter

8- Matrix of knowledge and skills of the course:

No.	Topic	Aims	Competencies	LO's
1	Basic concepts (section properties – classification of flow – parallel and curvilinear flow – Saint Venant equations velocity distribution – velocity coefficients – boundary layer).	7	C2 C12	a2, b1 b1, b2
2	The energy principles (specific energy and specific discharge –the transition problem – choking phenomena – control section – discharge measuring).	7	C2 C4 C12	a2, b1 a1, c3 b1, b2
3	The momentum principles (hydraulic jump – momentum function – jump classification – surge in open channel).	7	C2 C12	a2, b1 b1, b2
4	Flow resistance (shear stress on wetted perimeter – resistance equations – channels with composite roughness).	7	C2 C12	a2, b1 b1, b2
5	Gradually varied flow (types of slopes – dynamic equation of G.V.F – classification of flow profile – methods of computations).	7	C2 C4 C12	a2, b1 a1,c3 b1, b2
6	Design of channel for uniform flow (erodible and non-erodible channels – best hydraulic sections – maximum	7	C2 C12	a2, b1 b1, b2

	permissible velocity method –tractive force method).			

Course coordinator: Assoc. Prof. Dr. Mohamed Gabr

Head of Department: Prof. Dr. Mohamed ElKiki

Date of Approval: 10/2022

Steel structures Design (1)
(CIE314)

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	CIE 314
Year/Level	level 3
Specialization	Major
Authorization Date of Course Specification	10/2022

Teaching hours	**Lectures**	**laboratory**	**Exercise**	**Contact**	**Student's load**
	4	-	2	6	4

2- Course Aims:

No.	Aims
1	Master a broad range of engineering knowledge and specialized skills, as well as the ability to apply acquired knowledge in real-world situations by applying 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.
C3. Apply engineering design processes to produce cost-effective solutions that meet specified needs	**a1** Learn the general principles of design techniques specific to reinforced concrete and steel structures, foundations and earth retaining structures

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 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.
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. **a3** Define contemporary engineering technologies and their applications in relation to disciplines. **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.
C12 Achieve an optimum design of steel structures.	**b1** Achieve an optimum design of steel structures.

4. Course Contents:

No.	Topics	Lectures	labs	Exercise	Contact	Student's load
1	Design of steel structures	4	-	2	6	4
2	Tension and compression members	8	-	4	12	8
3	Beams	4	-	2	6	4
4	Beam-columns	6	-	3	9	6
5	Built-up members	4	-	2	6	4
6	Plate girders	4	-	2	6	4
7	Connection	4	-	2	6	4
8	Design practice	4	-	2	6	4
9	Tutorial design workshops	4	-	2	6	4
Total		**42**	**-**	**21**	**63**	**42**

5. Teaching and learning methods:

Topics	Face-to-Face	Online Lecture	Flipped	Presentation and	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and	Cooperative	Discovering	Modeling	Lab
Design of steel structures	x			x	x	x								
Tension and compression members	x			x	x	x								
Beams	x			x	x	x								
Beam-columns	x			x	x	x								
Built-up members	x			x	x	x								
Plate girders	x			x	x	x								
Connection	x			x	x	x								
Design practice	x			x	x	x								
Tutorial design workshops	x			x	x	x								
Design of steel structures	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	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	Periodic exam	C1 C3 C4	a3,b3,c3 a1,a2, a3 a2, a3, b1, c1

		C12	b1
2	Practical/oral	-	-
3	Final Exam	C1 C3 C4 C12	a3,b3,c3 a1,a2, a3 a2, a3, b1, c1 b1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	3^{rd}, 7^{th} , 10^{th}
2	Practical/oral	-
3	Final Exam	15^{th}

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	40%
2	Practical/oral	-
3	Final Exam	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 (text books) - Egyptian Code of Practice for Steel Construction and Bridges (2018)
3	Recommended books • E. B. Machaly, "Behavior, analysis and design of steel work connections ", vol. 3, 2016 • E. B. Machaly, "Behavior, analysis and design of structural steel element ", vol. 1, 2016
4	Periodicals, Web sites, etc. - www.**steelconstruction**.org - www.modern**steel**.com - www.berlin**steel**.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	Design of steel structures	1.10	C1	a3
2	Tension and compression members	1.7	C1	c3
3	Beams	1.7	C1, C3, C4	a1, c3
4	Beam-columns	1.7	C1, C3, C4	a1, a2, b3, c3
5	Built-up members	1.7	C1	a3
6	Plate girders	1.7	C1	c3
7	Connection	1.7	C1,C3, C4	a1,a3, b1, c1
8	Design practice	1.7	C1, C3, C4	a1,a3, b1, c1

Course Coordinator: Assoc. Prof. Dr. Ashraf Elsabagh

Head of Department: Prof. Dr. Mohamed Elkiki

Date of Approval: 10/2022

Highway and Airport Engineering

(CIE315)

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	CIE315
Year/Level	level 3
Specialization	Major
Authorization Date of Course Specification	10/2022

Teaching hours	**Lectures**	**laboratory**	**Exercise**	**Student's load**
	2	-	2	4

2- Course Aims

No.	Aims
7	Achieve an optimum design of Roadways and Airports.
10	Select appropriate and sustainable technologies for road construction and infrastructures; 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 materials and use the sustainable technologies. **b2** Conduct basic experiments to learn about pavement materials for structural 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, cultural,	**a1** Learn the general principles of design techniques specific to soil materials and highways structures using national highways codes.

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,
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 related to pavement design. **c3** Utilize modern technologies.
C6 Plan, supervise and monitor implementation of engineering projects, taking into consideration other trades requirements.	**a1** Show the appropriate and sustainable technologies for pavement construction.
C11 Select appropriate and sustainable technologies for road construction	**a2** Summarize, appropriate and sustainable technologies for construction of highways and airports
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.
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 pavement distresses and instability.

4- Course Contents:

No.	Topics	Lectures	Lab.	Exercise	Contact	Student's load
1	Introduction to highway Engineering	Introduction to highway Engineering	-	2	4	4
2	Strength and stabilization of subgrade soils	Strength and stabilization of subgrade soils	-	4	8	8
3	Unbound materials characterization	Unbound materials characterization	-	2	4	4
4	Sources and characteristics of asphalt binder	Sources and characteristics of asphalt binder	-	2	4	4

5	Asphalt mixtures characteristics and design methods.	Asphalt mixtures characteristics and design methods.	-	4	8	8
6	Design of Flexible and Rigid pavements	Design of Flexible and Rigid pavements	-	4	8	8
7	Pavement drainage	Pavement drainage	-	2	4	4
8	Introduction to Airport Engineering	Introduction to Airport Engineering	-	2	4	4
9	Aircraft characteristics and air traffic control.	Aircraft characteristics and air traffic control.	-	2	4	4
10	Airport configuration, components, and capacity	Airport configuration, components, and capacity	-	2	4	4
11	Design of airport components	Design of airport components	-	2	4	4
Total		**28**	**-**	**28**	**56**	**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
Introduction to highway Engineering	√	√		√	√	√				√				
Strength and stabilization of subgrade soils	√	√		√	√	√				√				
Unbound materials characterization	√	√		√	√	√				√				

Sources and characteristics of asphalt binder	√	√		√	√	√				√				
Asphalt mixtures characteristics and design methods.	√	√		√	√	√				√				
Design of Flexible and Rigid pavements	√	√		√	√	√				√				
Pavement drainage	√	√		√	√	√				√				
Introduction to Airport Engineering	√	√		√	√	√				√				
Aircraft characteristics and air traffic control.	√	√		√	√	√				√				
Airport configuration, components, and capacity	√	√		√	√	√				√				
Design of airport components	√	√		√	√	√				√				

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:

4.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's

1	Periodic Exam	C2 C3 C4 C6 C11 C12 C13	a2, b2, b3 a1, a3, b1 a1, c3 a1 a2 b2 b1
2	Practical\Oral	-	-
3	Final Exam	C2 C3 C4 C6 C11 C12 C13	a2, b2, b3 a1, a3, b1 a1, c3 a1 a2 b2 b1

4.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic Exam	3^{rd},8^{th} , 12^{th}
2	Practical\Oral	-
3	Final Exam	15^{th}

4.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic Exam	40%
2	Practical\Oral	-
3	Final Exam	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	Introduction to highway Engineering	7,10	C2 C4 C13	a2 a1, c3 b1
2	Strength and stabilization of subgrade soils	7,10	C2 C6	a2, b2, b3 a1
3	Unbound materials characterization	7,10	C2 C12	a2, b2 b2
4	Sources and characteristics of asphalt binder	7,10	C2 C4 C12	a2 a1, c3 b2
5	Asphalt mixtures characteristics and design methods.	7,10	C3 C12	a1, a3, b1 b2
6	Design of Flexible and Rigid pavements	7,10	C2 C11 C12	a2, c3 a2 b2
7	Pavement drainage	7,10	C2 C3 C6	a2, b2, b3 a1 a1
8	Introduction to Airport Engineering	7,10	C2 C6	a2, b2 a1

			C11	a2
9	Aircraft characteristics and air traffic control.	7,10	C2 C11	a2, b2, b3 a2
10	Airport configuration, components, and capacity	7,10	C2 C4	a2, b2 a1, c3
11	Design of airport components	7,10	C2 C3 C12	a2, b2 a1 b2

Course Coordinator: Assoc. Prof. Dr. Alaa Gabr

Head of Department: Prof. Dr. Mohamed ElKiki

Date of Approval: 10/2022

Water Supply Engineering
(CIE316)

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 Engineering
Course Code	CIE 316
Level	Level 3
Specialization	Major
Authorization Date of Course Specification	10/2022

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

2- Course Aims:

No.	Aims
1	Master a broad range of engineering knowledge and specialized skills, regarding sources of water supply - drinking water standards, quality requirement, groundwater collecting
7	Achieve an optimum design of groundwater collecting works, water purification works, water supply distribution works and cold-water systems.

3- Graduate 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 sources, drinking water standards, quality requirement, groundwater collecting. **b2** Using scientific concepts and theories that are relevant to purification of drinking water and water distribution system.
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 engineering concepts and techniques of hydraulics and fluid mechanics	**a2** Summarize, appropriate and sustainable technologies for water purification works and ground water collecting technologies

C12 Achieve an optimum design of water supply and sanitary works.	**b2** Achieve an optimum design of purification works, water supply distribution works and cold-water systems.

4. Course Contents:

No.	Topics	Lectures	laboratory	Exercise	Contact	Student's load
1	Sources of water supply	2	-	2	4	4
2	Drinking water standards, quality requirement	4	-	4	16	16
3	Ground water collecting	2	-	2	4	4
4	Water purification systems: - Collecting works - Coagulation/flocculation tanks - Sedimentation tank - Filtration - Disinfection and ground tank	10	-	10	20	20
5	Water distribution system design	6	-	6	12	12
6	Cold water system design	4	-	4	8	8
Total		**28**		**28**	**64**	**64**

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
Sources of water supply		x			x	x		**x**						
Drinking water standards, quality requirement		x			x	x								

Ground water collecting		x			x	x	**x**							
Water purification systems: - Collecting works - Coagulation/flocculation tanks - Sedimentation tank - Filtration Disinfection and ground tank		x			x	x			**x**	**x**				
Water distribution system design		x			x	x								
Cold water system design		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	Periodic exam	C1 C11 C12	a3, b2 a2 b2
2	Practical /Oral	-	-
3	Final exam	C1 C11 C12	a3, b2 a2 b2

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	8th
2	Practical/Oral	-
3	Final exam	15th

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	40%
2	Practical /Oral	-
3	Final term examination	60%
Total		**100%**

8. List of References:

No.	Reference List
1	U.S. Environmental Protection Agency (2016), "Constructed Wetlands and Aquatic Plant Systems for Municipal Wastewater Treatment", Center for Environmental Research Information, Cincinnati, OH.
2	الكود المصري لأسس تصميم وتنفيذ محطات تنقية مياه الشرب والصرف الصحي ومحطات الرفع – قرار وزاري رقم 16لسنة 1997-الطبعة الثالثة 2004
3	مراجعة تصميم محطات معالجة مياه الصرف الصحي. أ.د محمود عبد العظيم .2010
4	الهندسة الصحية، محمد على فرج. استاذ الهندسة الصحية جامعة الإسكندرية، 1990

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 supply	1, 7	C1	a3, b2
2	Drinking water standards, quality requirement	1, 7	C1	a3
3	Ground water collecting	1,7	C11	a2
4	Water purification systems: - Collecting works - Coagulation/flocculation tanks - Sedimentation tank - Filtration Disinfection and ground tank	1, 7	C11 C12	a2 b2
5	Water distribution system design	1, 7	C1 C11 C12	a3, b2 a2 b2
6	Cold water system design	1,7	C12	b2

Course Coordinator: Assoc. Prof. Dr./ Mohamed Gabr

Head of Department: Prof./ Mohamed Elkiki

Date of Approval: 10/2022

Project Management and Control

(BAS321)

1. Basic Information:

Program Title	Civil Engineering Program
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	BAS 321
Year/Level	level 3
Specialization	Major
Authorization Date of Course Specification	10/2022

Teaching hours	**Lectures**	**Laboratory**	**Exercise**	**Contact**	**Student's Load**
	2	-	2	4	4

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 (LO'S)
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. **a2** List the engineering-related business and management principles. **a3** Define contemporary engineering technologies and their applications in relation to disciplines. **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. **c2** Use fundamental organizational and project management abilities. **c3** Utilize modern technologies. **c4** Apply quality assurance procedures and follow codes and standards.
C6 Planned, supervise, and monitor the implementation of engineering projects, taking into consideration other trade requirements.	**a1** Show the appropriate and sustainable technologies for the construction of buildings, infrastructures, and water structures. **b1** 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 reinforced concrete, steel structures, foundations, and earth-retaining structures. **c2** Acquire entrepreneurial skills.
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 bidding, 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	laboratory	Exercise	Contact	Student's load
1	Introduction to Project Management	2	-	2	4	4

2	Project Planning and Scheduling	4	-	4	8	8
3	Network Based Scheduling	4	-	4	8	8
4	Critical Path Method (CPM)	2	-	2	4	4
5	Program Evaluation & Review Technique (PERT)	4	-	4	8	8
6	Probability Aspects of Project Completion Time	2	-	2	4	4
7	Project Cost Control	4	-	4	8	8
8	Resource Allocation	4	-	4	8	8
9	Forecasting Funds Requirements	2	-	2	4	4
Total		**28**	**-**	**28**	**56**	**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	Introduction to Project Management	x	x			x	x		x						
2	Project Planning and Scheduling	x	x			x	x		x						
3	Network Based Scheduling	x	x			x	x		x						

4	Critical Path Method (CPM)	x	x			x	x		x						
5	Program Evaluation & Review Technique (PERT)	x	x			x	x		x						
6	Probability Aspects of Project Completion Time	x	x			x	x		x						
7	Project Cost Control	x	x			x	x		x						
8	Resource Allocation	x	x			x	x		x						
9	Forecasting Funds Requirements	x	x			x	x		x						

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	LO's
1	Periodic Exams	C4 C6 C9 C13 C14	a1, a2, a3, b1, c1, c2, c3, c4 a1, b1, c1, c2 d2 a1 a1, b1, c1

2	Practical /Oral	-	-
3	Final Term Examination	C4 C6 C9 C13 C14	a1, a2, a3, b1, c1, c2, c3, c4 a1, b1, c1, c2 d2 a1 a1, b1, c1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic Exams	3^{rd} ,8^{th} , 12^{th}
2	Practical /Oral	-
3	Final Term Examination	15^{th}

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic Exams	40%
2	Practical /Oral	-
3	Final Term Examination	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 of The Course:

No.	Topic	Aims	Competencies	LO's
1	Introduction to Project Management	6, 8, 9	C4 C6 C9 C13 C14	a1, a2, a3, b1, c1, c2, c3, c4 a1, b1, c1, c2 d2 a1 a1, b1, c1
2	Project Planning and Scheduling	6, 8, 9	C4 C6 C9 C13 C14	a1, a2, a3, b1, c1, c2, c3, c4 a1, b1, c1, c2 d2 a1 a1, b1, c1
3	Network Based Scheduling	6, 8, 9	C4 C6 C9 C13 C14	a1, a2, a3, b1, c1, c2, c3, c4 a1, b1, c1, c2 d2 a1 a1, b1, c1
4	Critical Path Method (CPM)	6, 8, 9	C4 C6 C9 C13 C14	a1, a2, a3, b1, c1, c2, c3, c4 a1, b1, c1, c2 d2 a1 a1, b1, c1
5	Program Evaluation & Review Technique (PERT)	6, 8, 9	C4 C6 C9 C13 C14	a1, a2, a3, b1, c1, c2, c3, c4 a1, b1, c1, c2 d2 a1 a1, b1, c1
6	Probability Aspects of Project Completion Time	6, 8, 9	C4 C6 C9 C13 C14	a1, a2, a3, b1, c1, c2, c3, c4 a1, b1, c1, c2 d2 a1 a1, b1, c1

7	Project Cost Control	6, 8, 9	C4 C6 C9 C13 C14	a1, a2, a3, b1, c1, c2, c3, c4 a1, b1, c1, c2 d2 a1 a1, b1, c1
8	Resource Allocation	6, 8, 9	C4 C6 C9 C13 C14	a1, a2, a3, b1, c1, c2, c3, c4 a1, b1, c1, c2 d2 a1 a1, b1, c1
9	Forecasting Funds Requirements	6, 8, 9	C4 C6 C9 C13 C14	a1, a2, a3, b1, c1, c2, c3, c4 a1, b1, c1, c2 d2 a1 a1, b1, c1

Course Coordinator: Dr. Hamdy Abd Elaty
Head of Department: Assoc. Prof. Dr. Amal Behairy
Date of Approval: 10/2022

Reinforced Concrete (3)
(CIE321)

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	CIE 321
Year/Level	level 3
Specialization	Major
Authorization Date of Course Specification	10/2022

Teaching hours	**Lectures**	**laboratory**	**Exercise**	**Student's load**
	3	-	2	4

2- Course Aims

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

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. **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, health and safety requirements, environmental issues and risk management principles.	**a1** Describe codes of practice **c3** Utilize modern technologies. **c4** Apply quality assurance procedures and follow codes.
C12 Achieve an optimum design of Reinforced Concrete.	**b1** Achieve an optimum design of Reinforced Concrete.

4- Course Contents:

No.	Topics	Lectures	Lab.	Exercise	Contact	Student's load
1	Design of halls with beam girde	9	-	6	15	12
2	Design of frames	9	-	6	15	12
3	Design of arches	9	-	6	15	12
4	Design of trusses and Vierendeel girder	9	-	6	15	12
5	Design of saw tooth roofs.	6	-	4	10	8
Total		**42**	**-**	**28**	**70**	**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
Design of halls with beam girders	✓			✓	✓	✓	✓			✓	✓			
Design of frames	✓			✓	✓	✓	✓			✓	✓			
Design of arches	✓			✓	✓	✓	✓			✓	✓			
Design of trusses and	✓			✓	✓	✓	✓			✓	✓			

Vierende el girder														
Design of saw tooth roofs.	✓			✓	✓	✓	✓			✓	✓			

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	ILO's
1	Periodic exam	C3 C4 C12	a1,c2 a1,c3,c4 b1
2	Practical/ Oral	-	-
3	Final term examination	C3 C4 C12	a1,c2 a1,c3,c4 b1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	3^{rd},7^{th} , 9^{th}
2	Practical/ Oral	–
3	Final term examination	15^{th}

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	40%
2	Practical /Oral	-
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 (text books / 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 203-2008.

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	7	C3 C4 C12	a1,c2 a1,c3,c4 b1
2	Design of frames	7	C3 C4 C12	a1,c2 a1,c3,c4 b1
3	Design of arches	7	C3 C4 C12	a1,c2 a1,c3,c4 b1
4	Design of trusses and Vierendeel girder	7	C3 C4 C12	a1,c2 a1,c3,c4 b1
5	Design of saw tooth roofs.	7	C3 C4 C12	a1,c2 a1,c3,c4 b1

Course Coordinator: Dr. Hamdi Abd Alaty

Head of Department: Prof. Dr. Mohamed ElKiki

Date of Approval: 10/2022

Soil Mechanics and Foundation

(CIE322)

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	CIE322
Year/Level	level 3
Specialization	Major
Authorization Date of Course Specification	10/2022

Teaching hours	**Lectures**	**laboratory**	**Exercise**	**Student's load**
	2	-	2	4

2- Course Aims

No.	Aims
1	Master a broad range of engineering knowledge and specialized skills, as well as the ability to apply acquired knowledge in soil mechanics and foundations by applying theories in analytic; solve the geotechnical problems of varying complexity and variation. Geotechnical design of various types of shallow foundations
7	Achieve an optimum geotechnical design of foundations and earth retaining structures.
10	Select appropriate and sustainable technologies for construction of buildings, using experiment measurements of soil mechanics, and testing by applying a full range of civil engineering fields such soil 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 soil mechanics. **b2.** Using scientific concepts and theories that are relevant to soil works.
C3: Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global, economic, environmental, ethical	**a1:** Learn the general principles of design techniques specific to Foundations

and other aspects as appropriate the principles and contexts of sustainable design and development.	
C4: Utilize contemporary technologies, codes of practice and standards, quality guidelines, geotechnical issues and foundations principles.	**a1:** Describe quality assurance systems, codes of practice, and standards, as well as environmental concerns for geotechnical behavior.
C6. Plan, supervise and monitor implementation of engineering projects, taking into consideration other trades requirements.	**b1** interpret data derived from laboratory observation from flow sheets, charts and curves to interpret data derived from laboratory observation
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 soil 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	Lectures	laboratory	Exercise	Contact	Student's load
1	Stresses in soil mass	4	-	4	8	8
2	Consolidation of soil and Settlement and contact pressure	6	-	6	12	12
3	Soil bearing capacity	6	-	6	12	12
4	Lateral earth pressure, Retaining walls and sheet piles	4	-	4	8	8

5	Slope stability	4	-	4	8	8
6	Introduction to Foundation Engineering	4	-	4	8	8
Total		**28**		**28**	**56**	**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.
Stresses in soil mass	✓			✓	✓	✓	✓			✓				
Consolidation of soil	✓			✓	✓	✓	✓			✓				
Settlement and contact pressure	✓			✓	✓	✓	✓			✓				
Lateral earth pressure	✓	✓		✓	✓	✓	✓			✓				
Slope stability	✓	✓		✓	✓	✓	✓			✓				
Retaining walls – sheet piles	✓	✓		✓	✓	✓	✓			✓				
Soil bearing capacity	✓	✓		✓	✓	✓	✓			✓				
Introduction to Foundation Engineering	✓	✓		✓	✓	✓	✓			✓				

6- Teaching and learning methods for disable students:

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

7- Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Periodic exam	C1 C3 C4 C6 C11 C12	a3 a1 a1 b1 a1, a2 b2
2	Practical/ Oral	-	-
3	Final Exam	C1 C3 C4 C6 C11 C12	a3 a1 a1 b1 a2 b2

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic Exam	3^{rd},8^{th} , 12^{th}
2	Practical /Oral	–
3	Final Exam	15^{th}

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	40 %
2	Practical /Oral	-
3	Final Exam	60 %
Total		**100%**

8- List of References:

No.	Reference List
1	Das, B., M. (2017), "Principles of geotechnical Engineering " Eighth Edition, CENGAGE Learning,
2	Knappett, J.A. and Craige R. F. (2012), "Craig's Soil Mechanics" Eighth Edition, Spon Press.
3	Course notes: Lecture notes prepared by the course coordinator +Solved examples.
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	7,10	C1 C3 C4 C6 C11 C12	a3, b2 a1 a1 b1 a1, a2 b2
2	Consolidation of soil and Settlement and contact pressure	7,10	C4 C6 C11 C12	a1 b1 a1, a2 b2
3	Soil bearing capacity	7,10	C11 C3 C6 C12	a1, a2 a1 b1 b2
4	Lateral earth pressure, Retaining walls and sheet piles	7,10	C4 C11 C12	a1 a1, a2 b2
5	Slope stability	7,10	C1 C4 C6	a3, b2 a1 b1
6	Introduction to Foundation Engineering	1,10	C4 C11 C12	a1 a1, a2 b2

Course Coordinator: Dr. Hany Hashish.

Head of Department: Prof. Dr. Mohamed ElKiki

Date of Approval: 10/2022

Computer applications in civil engineering
(CIE323)

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	CIE323
Year/Level	level 3
Specialization	Major
Authorization Date of Course Specification	10/2022

Teaching hours	**Lectures**	**laboratory**	**Exercise**	**Student's load**
	2	2	-	4

4- 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.

5- Graduate 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) using computer application. **c1.** Choose relevant mathematical and computer-based methodologies for problem modelling and analysis in civil engineering.

C4 Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues and risk management principles.	**c3.** Utilize modern technologies to simulate hydraulic engineering, sanitary Engineering and constructions.
C11. Select appropriate and sustainable technologies to design reinforced concrete and steel structures, hydraulic applications and sanitary works using either numerical technique and design software programs.	**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 sanitary works (such as storm water network and water distribution system).

4. Course Contents:

No.	Topics	Lecture	Lab.	Exercise	Contact	Student's load
1	Study of theoretical models for the analysis of structures. Practical: analyze beams, frames, trusses and slabs	4	4	-	8	8
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	-	8	8
3	Preparation of simple programs based on these models. Practical: design programs for structu analysis using excel or Matlab	4	4	-	8	8
4	Study of available programs and modifying them for analysis of certain problems. Practical: solving some hydraulic problems	6	6	-	12	12
5	Training on the use of available commercial software programs. Practical: using SAP 2000, Excel, and EPANET	6	6	-	12	12
6	Computer applications. Practical: choosing a civil engineering case study for structural	4	4	-	8	8

	analysis, pipe network design, hydraulics, and sanitary engineering. Practical: choosing a civil engineering case					
Total		**28**	**28**	**-**	**56**	**56**

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling
Study of theoretical mo for the analysis of 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	√	√			√	√	√			√				√
Preparation of simple programs based on these models. Practical: design programs for structure analysis using Excel or MATLAB	√	√			√	√	√			√				√

Study of available programs and modifying them for analysis of certain problems.	√	√			√	√	√			√				√
Training on the use of available commercial software programs. Practical: using sap, excel, EPANET	√	√			√	√	√			√				√
Computer applications. Practical: choosing a civil engineering case study for structural analysis, pipe network design, hydraulics, and sanitary engineering.	√	√			√	√	√			√				√

6. Teaching and learning methods for disable students:

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

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Periodic exam	C2 C4 C11	a1, c1 c1 c1
2	Practical/ Oral	C2 C4 C11	a1, c1 c1 c1
3	Final Exam	C2 C4 C11	a1, c1 c1 c1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic Exam	3^{rd},8^{th} , 12^{th}
2	Practical /Oral	14^{th}
3	Final Exam	15^{th}

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	40 %
2	Practical /Oral	10 %
3	Final Exam	50 %
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.		

11. 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 C4 C11	a1, c1 c1 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 hydraulic, reinforced concrete and steel structures and sanitary engineering problems.	7, 10	C2 C4 C11	a1, c1 c1 c1
5	Training on the use of available commercial software programs. Practical: using SAP, Excel, and EPANET	7,10	C2 C4 C11	a1, c1 c1 c1
6	Computer applications. Practical: choosing a civil engineering case study for structural analysis, pipe network design, hydraulics, and sanitary engineering.	10	C2 C4 C11	a1, c1 c1 c1

Course Coordinator: Assoc. Prof. Dr. Mohamed Gaber
Head of Department: Prof. Dr. Mohamed Elkiki
Date of Approval: 10/2022

Steel structures Design (2)
(CIE 324)

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	CIE 324
Year/Level	level 3
Specialization	Major
Authorization Date of Course Specification	10/2022

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

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)**
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.
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. **a3** Define contemporary engineering technologies and their applications in relation to disciplines. **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.
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.
C12 Achieve an optimum design of steel structures.	**b1** Achieve an optimum design of steel structures.

4. Course Contents:

No.	Topics	Lectures	Lab.	Exercise	Contact	Student's load
1	Steel frames design	9	-	6	15	12
2	Riveted and bolted connections	3	-	2	5	4
3	High strength bolted connections	3	-	2	5	4
4	Welded connections	6	-	4	10	8
5	Base connections	9	-	6	15	12
6	Roof trusses	3	-	2	5	4
7	Rigid frames design	9	-	6	15	12
Total		42	-	28	70	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
Steel frames design	x			x	x	x								
Riveted and bolted	x			x	x	x								

connections														
High strength bolted connections	x			x	x	x								
Welded connections	x			x	x	x								
Base connections	x			x	x	x								
Roof trusses	x			x	x	x								
Rigid frames design	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	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	Periodic exam	C3 C4	a1,a2, a3 a2, a3, b1, c1

		C5 C12	d1 b1
2	Practical/oral	-	-
3	Final Exam	C3 C4 C5 C12	a1,a2, a3 a2, a3, b1, c1 d1 b1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	3^{rd}, 7^{th} , 10^{th}
2	Practical/oral	-
3	Final Exam	15^{th}

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	40%
2	Practical/oral	-
3	Final Exam	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 (text books) - Egyptian Code of Practice for Steel Construction and Bridges (2018)
3	Recommended books • E. B. Machaly, "Behavior, analysis and design of steel work connections ", vol. 3, 2016 • E. B. Machaly, "Behavior, analysis and design of structural steel element ", vol. 1, 2016
4	Periodicals, Web sites, etc. - www.**steelconstruction**.org

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 frames design	6,10	C12	b1
2	Riveted and bolted connections	6,7	C3 ,C4 C12	a1,a2, a3 a2, a3, b1, c1 b1
3	High strength bolted connections	6,7	C3 ,C4 C12	a1,a2, a3 a2, a3, b1, c1 b1
4	Welded connections	6,7	C3 ,C4 C12	a1,a2, a3 a2, a3, b1, c1 b1
5	Base connections	6,7	C3 C4 C12	a1,a2, a3 a2, a3, b1, c1 b1
6	Roof trusses	6,10	C5, C12	d1 b1
7	Rigid frames design	6,10	C5, C12	d1 b1

Course Coordinator: Assoc. Prof. Dr. Ashraf Elsabagh

Head of Department: Prof. Dr. Mohamed Elkiki

Date of Approval: 10/2022

Training 2
(CIE325)

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	Training2
Course Code	CIE325
Year/Level	Level: 3
Specialization	Major
Authorization Date of Course Specification	10/2022

Teaching hours	**Lectures**	**laboratory**	**Exercise**	**Contact**	**Student's load**
	-	-	-	-	80

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,	**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.

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 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.	-	68
2	Presentations will be emphasizing the technical contents.	-	12
Total		**-**	**80**

15- 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 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 disable 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	Periodic exam	C3 C9	a1, b1, c2 d1
2	Practical/ Oral	-	-
3	Final term examination (presentation, Report)	C3 C5 C7 C9	a1, b1, c2 a1, c1, d1 d1, d3 d1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic Exam.	During the training
2	Practical/ Oral	-
3	Final term examination (presentation, Report)	6^{th}

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic Exam.	60%
2	Practical/ Oral	-
3	Final term examination (presentation, Report)	40%
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	Site visiting
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 department in a combined manner, that reflects identity and creativity in all its preliminary and analytical phases.	2,5,7,8	C3 C5 C6 C9	a2, a3, c2 b1 a1 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

Water and wastewater treatment
(CIE326)

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 and wastewater treatment
Course Code	CIE 326
Level	Level 3 -Semester 2
Specialization	Major
Authorization Date of Course Specification	10/2022

Teaching hours	Lectures	laboratory	Exercise	Contact	Student's load
	2	-	2	4	3

2- Course Aims

No.	Aims
7	Achieve an optimum design for wastewater treatment plants and sewerage system.
8	Plan and manage construction processes for wastewater treatment plants, pollution control and assess environmental impacts of projects.

3- Graduate 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.	**a2** Understand the characteristics and sources of wastewater; domestic, industrial, rain and infiltration. **c1** Incorporate environmental, and pollution control 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 for wastewater treatment systems .

C12 Achieve an optimum design of sanitary works such as wastewater treatment plants	**b2** Achieve an optimum design of wastewater treatment plants and sewerage system.
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** Plan, design and manage of the wastewater treatment plants and sewerage systems.

4. Course Contents:

No.	Topics	Lectures	laboratory	Exercise	Contact	Student's load
1	Introduction to sewerage system works and design	4	4	-	8	6
2	Characteristics and sources of wastewater; domestic, industrial, rain and infiltration.	4	4	-	8	6
3	Calculation of discharges. Design of sewer pipes and manholes. Pump stations.	4	4	-	8	6
4	Design of Pump stations and collection works of sewerage system.	4	4	-	8	6
5	Wastewater treatment plant design (Primary treatment, deceleration tank, screen, approach channel, grit removal chamber, design of proportional weir, and primary sedimentation tank, secondary treatment, and sludge treatment and disposal).	12	12	-	24	18
Total		**28**	**28**	**-**	**56**	**42**

5. Teaching and learning methods:

No	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 sewer system works and design	x	x			x	x								
Characteristics and sources of wastewater; domestic, industrial, rain and infiltration.	x	x			x	x								
Calculation of discharges. Design of sewer pipes and manholes. Pump stations.	x	x			x	x	x	x	x					
Design of Pump stations and collection works of sewerage system.	x	x			x	x	x							
Wastewater treatment plant design (Primary treatment, deceleration tank, screen, approach channel, grit removal chamber, design of proportional weir, and primary sedimentation tank, secondary treatment, and sludge treatment and disposal).	x	x			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	Periodic exam	C3 C4 C12	a2, c1 a1 b2
2	Practical/Oral	-	-
3	Final exam	C3 C4 C12 C13	a2, c1 A1 b2 c1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	8th
2	Practical/Oral	-
3	Final exam	15th

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	40%
2	Practical /Oral	-
3	Final exam	60%
Total		**100%**

8. List of References:

No.	Reference List
1	U.S. Environmental Protection Agency (2016), "Constructed Wetlands and Aquatic Plant Systems for Municipal Wastewater Treatment", Center for Environmental Research Information, Cincinnati, OH.
2	الكود المصري لأسس تصميم وتنفيذ محطات تنقية مياه الشرب والصرف الصحي ومحطات الرفع – قرار وزاري رقم 169 لسنة 1997-الطبعة الثالثة 2004
3	مراجعة تصميم محطات معالجة مياه الصرف الصحي. أ.د محمود عبد العظيم 2010
4	الهندسة الصحية، محمد على فرج. استاذ الهندسة الصحية جامعة الإسكندرية، 1990.

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 sewerage system works and design	7, 8	C3	a2, c1

2	Characteristics and sources of wastewater; domestic, industrial, rain and infiltration.	7, 8	C4 C12	a1 b2
3	Calculation of discharges. Design of sewer pipes and manholes. Pump stations.	7, 8	C4 C12	a1 b2
4	Design of pump stations and collection works of sewerage system.	7, 8	C4 C12 C13	a1 b2 c1
5	Wastewater treatment plant design (Primary treatment, deceleration tank, screen, approach channel, grit removal chamber, design of proportional weir, and primary sedimentation tank, secondary treatment, and sludge treatment and disposal).	7,8	C4 C12 C13	a1 b2 c1

Course Coordinator: Assoc. Prof/ Mohamed Gabr**.**

Head of Department: Prof./ Mohamed Elkiki

Date of Approval: 10/2022.

Foundation Engineering 1
(CIE 411)

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	CIE 411
Year/Level	level 4
Specialization	Major
Authorization Date of Course Specification	10/2022

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

2- Course Aims

No.	Aims
7	Achieve an optimum structural design of shallow foundations and earth retaining structures
10	Select appropriate and sustainable technologies for construction of shallow foundations

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, 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 Soil mechanics and Foundations
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 of foundations engineering.
C12. Achieve an optimum design of Foundations.	**b1.** Achieve an optimum design of Foundations and Earth Retaining Structures.

4- Course Contents:

No.	Topics	Lectures	laboratory	Exercise	Contact	Student's load
1	Design of strip footing	4	-	4	8	10
2	Design Isolated footing	6	-	6	12	15
3	Design combined footing	4	-	4	8	10
4	Design of strap beam	4	-	4	8	10
5	Design of raft foundations	6	-	6	12	15
6	Pile cap - pile Foundation	4	-	4	8	10
Total		**28**	**-**	**28**	**56**	**70**

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 strip footing	✓	✓		✓	✓	✓	✓			✓				
Design of Isolated footing	✓	✓		✓	✓	✓	✓			✓				
Design of combined footing	✓	✓		✓	✓	✓	✓			✓				
Design of strap beam	✓	✓		✓	✓	✓	✓			✓				

Design of raft foundations	✓	✓		✓	✓	✓	✓			✓				
Pile cap - pile Foundation	✓	✓		✓	✓	✓	✓			✓				

6- Teaching and learning methods for disable students:

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

7- Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Periodic exam	C3 C4 C12	a1 a1 b1
2	Practical/ Oral	-	-
3	Final Exam	C3 C4 C12	a1 a1 b1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic Exam	3^{rd},8^{th} , 12^{th}
2	Practical /Oral	–
3	Final Exam	15^{th}

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	40 %
2	Practical /Oral	-

3	Final Exam	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	7,10	C3 C4 C12	a1 a1 b1
2	Design Isolated footing	7,10	C3 C4 C12	a1 a1 b1
3	Design combined footing	7,10	C3 C4 C12	a1 a1 b1
4	Design of strap beam	7,10	C3 C4 C12	a1 a1 b1
5	Design of raft foundations	7,10	C3 C4 C12	a1 a1 b1
6	Pile cap - pile Foundation	7,10	C3 C4	a1 a1

Course Coordinator: Dr. Hany Hashish.

Head of Department: Prof. Dr. Mohamed Elkiki

Date of Approval: 10/2022

Inland Navigation and Harbor Engineering
(CIE 412)

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	CIE 412
Year/Level	Level 4
Specialization	Major
Authorization Date of Course Specification	10/2022

Teaching hours	**Lectures**	**laboratory**	**Exercise**	**Student's load**
	2	-	2	4

2- Course Aims:

No.	**Aims**
1	Apply knowledge of mathematics, engineering concepts, and construct structures to solve fundamental engineering problems related to harbors and navigations.

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, 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:	**a1:** Recognize the fundamentals of structural analysis and mechanics, properties and strength of materials, surveying, soil mechanics, hydrology and fluid mechanics.

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. **b2:** Achieve an optimum design of works for harbors
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	laboratory	Exercise	Student's load
1	Wind and current – tide Wave theories	8		8	8
2	Surf zone hydrodynamics	2		2	2
3	Wave forces	4		4	4
5	Harbor planning	2		2	2
6	Design of breakwater	4		4	4
7	Design of quay walls	4		4	4
8	Ship repair structures	2		2	2
9	Inland navigation	2		2	2
Total		**28**		**28**	**56**

5- Teaching and Learning Methods:

No	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.

Wind and current – Tide - Wave theories	x				x	x								x
Surf zone hydrodynamics	x				x	x								x
Wave forces	x				x	x								x
Harbor planning	x				x	x								x
Design of breakwater	x				x	x								x
Design of quay walls	x				x	x								x
Ship repair structures	x				x	x								x
Inland navigation	x				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 Assessment Methods:

No.	Assessment Method	Competencies	LOs
1	Periodic exam (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	a1 a1 a1, a2, c1

		C12 C13	b1, b2 c1

7.2 Assessment Schedule:

No.	Assessment Method	Weeks
1	Periodic Exam	8th
2	Practical/ Oral	15th
3	Final Term Exam	Decided by Faculty Council

7.3 Weighting of Assessments:

No.	Assessment Method	Weights
1	Periodic Exam	40%
2	Practical/ Oral	-
3	Final Term Exam	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	C11 C13	a2 c1
2	Surf zone hydrodynamics	1	C11 C13	c1 c1
3	Wave forces	1	C3	a1
4	Harbor planning	1	C11 C12	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: 10/2022.

Design of Irrigation works
(CIE 413)

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	CIE 413
Year/Level	Level 4
Specialization	Major
Authorization Date of Course	10/2022

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

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, aqueducts, 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)
C3 Apply engineering design processes for irrigation works problems to produce cost-effective solutions that meet specified needs with consideration for economic, and environmental aspects.	**a1** Learn the general principles of design techniques specific to bridges, culverts, syphons, aqueducts and earth retaining structures. **b1** Judge engineering decisions for design of weirs and locks considering safety quality and environmental impact.
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 retaining walls, bridges, culverts, syphons, aqueducts, weirs and locks.

C12 Achieve an optimum design of irrigation works: Earth Retaining Structures, 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, aqueducts, weirs, and locks.

4- Course Contents:

No.	Topics	Lectures	laboratory	Exercise	Contact	Student's load
1	Introduction: design of irrigation works	2	-	2	4	4
2	Classification of retaining walls (R.W)	2	-	2	4	4
3	Design of gravity retaining walls	2	-	2	4	4
4	Design of reinforced concrete R.W.	2	-	2	4	4
5	Design of reinforced concrete bridges	4	-	4	8	8
6	Design of rolled steel joist bridge	2	-	2	4	4
7	Design of culverts	4	-	4	8	8
8	Design of syphons	4	-	4	8	8
9	Design of aqueducts	2	-	2	4	4
10	Design of floor for Heading up works (weirs)	2	-	2	4	4
11	Types and parts of locks	2	-	2	4	4
Total		**28**	**-**	**28**	**56**	**56**

5- Teaching and Learning Methods:

Topics	Face-to-face lecture	On line lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site Visits	Self learning and Research	Cooperative	Discovering	Modeling	Lab
Introduction: design of irrigation works	x			x	x	x								
Classification of retaining walls (R.W)	x			x	x	x	x			x				
Design of gravity retaining walls	x				x	x								
Design of reinforced concrete R.W.	x				x	x								
Design of reinforced concrete bridges	x				x	x		x						
Design of rolled steel joist bridge	x				x	x								
Design of culverts	x				x	x		x						
Design of syphons	x				x	x		x						

Design of aqueducts	x				x	x								
Design of floor for Heading up works (weirs)	x				x	x				x				
Types and parts of locks	x			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 Assessment Methods:

No.	Assessment Method	Competencies	LOs
1	Periodic exam	C3 C11 C12	a1, b1 a2 b1, b2
2	Practical/ Oral	-	-
3	Final term examination	C3 C11 C12	a1, b1 a2 b1, b2

7.2 Assessment Schedule:

No.	Assessment Method	Weeks
1	Periodic Exams	3^{rd},8^{th} , 12^{th}
2	Practical/ Oral	-
3	Final Term Exam	15^{th}

7.3 Weighting of Assessments:

No.	Assessment Method	Weights
1	Periodic Exam	40%
2	Practical/ Oral	-
3	Final Term Exam	60%

Total	100%

8- List of References:

No.	Reference List
1	P C Punmia Et Al. Irrigation And Water Power Engineering, Sixteenth Edition, 2009
2	الكود المصري للموارد المائية وأعمال الري المجلد السابع الطبعة الأولى 2003
3	YOUNAN, N.A. (1991), "Design Textbook in Irrigation Structures", Delta press Center, Alex, Egypt.
4	LELIAVSKY, S, (1981), " Design Textbooks in civil Engineering", Chapman and Hall, London, UK.
5	El-Kateb, M.H. (1984), "Irrigation Design I: Escapes, Culverts, Syphons and Aqueducts, Class Notes, Faculty of Engin., Cairo University.
6	Mays, L.W. (1999), "Hydraulic Design Handbook, McGraw Hill Book Company, NewYork, U.S.A.
7	El-Kateb, M.H., (1984), "Irrigation Design II: Weirs and Regulators". Class Notes. Cairo University, Faculty of Engineering, Giza, Egypt.

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	C3 C11	a1, b1 a2
2	Classification of retaining walls (R.W)	4, 10	C3 C11	a1 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	C3 C11 C12	a1 a2 b1
6	Design of rolled steel joist bridge	4, 7, 10	C3 C11 C12	a1 a2 b1
7	Design of culverts	4, 7, 10	C3 C11 C12	a1 a2 b1
8	Design of syphons	4, 7, 10	C3 C11 C12	a1 a2 b2
9	Design of aqueducts	4, 7, 10	C3 C11 C12	a1 a2 b2
10	Design of floor for Heading up works (weirs)	4, 7, 10	C3 C11 C12	b1 a2 b2
11	Types and parts of locks	4, 10	C3 C11 C12	b1 a2 b2

Course Coordinator: Prof. Dr. Mohamed Elkiki
Head of Department: Prof. Dr. Mohamed Elkiki
Date of Approval: 10/2022

Project 1
(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	Project 1
Course Code	CIE414
Year/Level	Level 4
Specialization	Major
Authorization Date of Course Specification	10/2022

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

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	**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

analyses and objective engineering judgment to draw conclusions.	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	**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.

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	Lab.	Exercise	Contact	Student's load
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	12	-	8	20	20
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.	15	-	10	25	25
3	A complete set of appropriately presented drawings, accompanied by a detailed report of the project's attributable studies and potential	15	-	10	25	25

	considerations should be implemented by each student					
Total		**42**	**-**	**28**	**70**	**70**

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 address and manage architectural and technical issues associated with a large-scale design pro	x			x	x	x	x		x		x			x
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	x			x	x	x		x			x			x

preliminary and analytical phases.														
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			x

6. Teaching and learning methods for disable students:

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

7- Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Periodic exam	C2 C3 C4 C5 C7 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, d3 d1, d2 a1, a2, c1 b1, b2 a1, b1, c1 a1, b1, c1
2	Practical/ Oral	-	-
3	Final term examination	C2 C3 C4 C5	a1, a2, b1, b2, b3, b4, c1, c2, c3 a1, a2, a3, b1 a1, a3, c2, c3 b1, c1, d1

		C7 C8 C11 C12 C13 C14	d1, d2, d3 d1, d2 a1, a2, c1 b1, b2 a1, b1, c1 a1, b1, c1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	2nd -7th - 9th -14th
2	Practical/ Oral	-
3	Final term examination	at the end of CIE423

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	40%
	Practical/ Oral	-
2	Final term examination	60%
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 C7 C8 C11 C12 C13 C14	a1, a2, a3, b1 a1, a3, c2, c3 b1, c1, d1 d1, d2, d3 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: 10/2022

Research and analytical skills
(BAS421)

1- Basic Information:

Program Title	Civil Engineering Program
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Basic Science and Engineering Department
Course Title	Research and analytical skills
Course Code	BAS 421
Year/Level	level 4
Specialization	Major
Authorization Date of Course Specification	10/2022

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

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.	**b3** Analyze and interpret data. **c3** Applying statistical analyses and objective engineering judgment to draw conclusions.
C5. Practice research techniques and methods of investigation as an inherent part of learning.	**c1** Prepare technical reports. **d1** Search for information to engage in lifelong self-learning discipline.

4- Course Contents:

No.	Topics	Lectures	laboratory	Exercise	Student's load
1	مهارات التحليل: إطار التحليل للمسائل الهندسية مع الاخذ في الاعتبار النواحي الفنية، الاقتصادية، البيئية، والاخلاقية.	4		4	4
2	أطوار حل المسائل) فهم المسألة وصياغتها، خطة الحل، تنفيذ الخطة، التقييم، والمراجعة. (دور الابداع في التحليل.	6		6	6
3	تحليل (SWOT أوجه القوة، أوجه الضعف، الفرص، والمخاطر) بالنسبة للبدائل المختلفة. التحليل التفصيلي للتكلفة الفائدة، وكذلك تحليل- المخاطر دور التعاون وعمل الفريق في تحليل المسائل الكبيرة.	6		6	6
4	اهمية العثور على البيانات والمعلومات والمعارف المناسبة.	4		4	4
5	.مهارات البحث: الطرق الاساسية للبحث باستخدام الروابط المنطقية مثل (AND,OR,NOT () كيفية البحث باستخدام العبارات، العناوين، المجال، الحاسب المضيف، URLوكذلك الروابط.	4		4	4
6	تقييم نتائج البحث اختيار محرك البحث المناسب. أهمية تقييم مصداقية الاماكن المتاحة على الشبكة المعرفية العالمية.	4		4	4
Total		28		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

مهارات التحليل: إطار التحليل للمسائل الهندسية مع الاخذ في النواحي الفنية، الاعتبار الاقتصادية، البيئية، والاخلاقية.	✓	✓	✓		✓	✓								
أطوار حل المسائل) فهم المسألة وصياغتها، خطة الحل، تنفيذ الخطة، التقييم، والمراجعة. (دور الابداع في التحليل.	✓	✓			✓	✓	✓							
أوجه القوة، أوجه (SWOT تحليل الضعف، الفرص، والمخاطر بالنسبة للبدائل المختلفة. التحليل (التفصيلي للتكلفة الفائدة، وكذلك المخاطر دور التعاون - تحليل وعمل الفريق في تحليل المسائل الكبيرة.	✓	✓			✓	✓				✓				
اهمية العثور على البيانات والمعلومات والمعارف المناسبة.	✓	✓	✓		✓									
مهارات البحث: الطرق الاساسية . للبحث باستخدام الروابط المنطقية كيفية () AND,OR,NOT (مثل البحث باستخدام العبارات، العناوين، URLالمجال، الحاسب المضيف، وكذلك الروابط.	✓	✓			✓	✓								
تقييم نتائج البحث اختيار محرك البحث المناسب. أهمية تقييم الاماكن المتاحة على مصداقية الشبكة المعرفية العالمية.	✓	✓	✓							✓				

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	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	ILO's
1	Periodic exam	C2 (b3, c3)
2	Practical /Oral	C2(b3, c3), C5(C1)
3	Final term examination	C2(b3, c3), C5(d1)

7.2 Evaluation Schedule:

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

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	20%
2	Practical /Oral	-
3	Final term examination	80%
Total		**100%**

8- Facilities required for teaching and learning:

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

9- Matrix of knowledge and skills of the course:

No.	Topic	Aims	A2	
			B3	C3
1	مهارات التحليل: إطار التحليل للمسائل الهندسية النواحي الفنية، مع الاخذ في الاعتبار الاقتصادية، البيئية، والاخلاقية.	1	✓	✓
2	أطوار حل المسائل) فهم المسألة وصياغتها، التقييم، والمراجعة. خطة الحل، تنفيذ الخطة، دور الابداع في التحليل).	1	✓	✓

3	تحليل SWOT) أوجه القوة، أوجه الضعف، الفرص، والمخاطر) بالنسبة للبدائل المختلفة. - التحليل التفصيلي للتكلفة الفائدة، وكذلك تحليل المخاطر دور التعاون وعمل الفريق في تحليل المسائل الكبيرة.	1	✓	✓
4	اهمية العثور على البيانات والمعلومات والمعارف المناسبة.	1		✓
5	مهارات البحث: الطرق الاساسية للبحث . باستخدام الروابط المنطقية مثل) AND,OR,NOT () كيفية البحث باستخدام العبارات، العناوين، المجال، الحاسب المضيف، وكذلك الروابط URL.	1	✓	✓
6	تقييم نتائج البحث اختيار محرك البحث الاماكن المتاحة المناسب. أهمية تقييم مصداقية على الشبكة المعرفية العالمية.	1	x	x

Course Coordinator: Assoc. Prof. Dr. Amal Bahiry/Dr. Ahmed Lotfy
Head of Department: Assoc. Prof. Dr. Amal Bahiry
Date of Approval: 10/2022

Environmental Management
(BAS422)

1. Basic Information:

Program Title	All Programs
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Basic Science and Engineering Department
Course Title	Environmental Management
Course Code	BAS422
Year/Level	Level 4
Specialization	Major – Compulsory Course

Teaching hours	**Lectures**	**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.
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, 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 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.

	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.
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	The importance of studying environmental science – modern technology and its effect on the environment	8	-	-
2	quality of the environment and development elements	2	-	-
3	sources of environmental pollution and method of control (air pollution – water pollution)	8	14	-
4	Solid wastes pollution – noise – economics of environmental pollution control – legislations for the environment protection- Environmental impact assessment.	10	-	-
Total		**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
The importance of studying environmental science – modern technology and its effect on the environment		x			x	x								
Quality of the environment and development elements		x			x	x								
Sources of environmental pollution and method of control (air pollution – water pollution		x			x	x								
Solid wastes pollution – noise) – economics of environmental pollution control – legislations for the environment protection – Environmental impact assessment		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	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	C3, C4	a1, b1
2	Semester work (report, quizzes, presentation)	C4, C10	d1, c1, c3
3	Final Term Examination	C3, C4, C10, C13	a2, a3, a1, d1, 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	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	دليل أسس وإجراءات تقييم الأثر البيئى، وزارة الدولة لشؤون البيئة، جهاز شؤون البيئة، يناير 2009
2	د.زكريا طاحون , ادارة البيئة نحو الانتاج الأنظف, الهيئة المصرية العامة للكتاب,القاهرة,2018
3	محمد اسماعيل خضر,مقدمة في علوم البيئة ,الهيئة العامة للكتاب ,القاهرة 2018
4	ماتيزا فارجاس ، مركز البيئة للمدن العربية، 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	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- Environmental impact assessment	2,3	C3, C4 C13	c1, c3 c1

Course Coordinator: Assoc. Prof. Dr. Ramadan Elkateb
Head of Department: Assoc. Prof. Dr. Amal Bahiry
Date of Approval: 10/2022

Legislation and contracts
CIE421

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	Legislation and Contracts
Course Code	CIE 421
Year/Level	level 4
Specialization	Major
Authorization Date of Course Specification	10/2022

Teaching hours	**Lectures**	**Laboratory**	**Exercise**	**Contact**	**Student's Load**
	2	-	1	3	4

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 (LO'S)
[C6] Planned, supervise, and monitor the implementation of engineering projects, taking into consideration other trade requirements.	**(a1)** Show the appropriate and sustainable technologies for the construction of buildings, infrastructures, and water structures. **(b1)** 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 reinforced concrete, steel structures, foundations, and earth-retaining structures. **(c2)** Acquire entrepreneurial skills.

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.
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 engineering knowledge, understanding, and feedback to improve design, products, and/or services.
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 bidding, 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	laboratory	Exercise	Contact	Student's load
1	Legislation and Laws in Construction Industry	2	-	2	4	4
2	Definitions (Legislative and Legal Aspects of The Construction Industry)	4	-	4	8	8
3	Legal Concepts in The Field of The Construction Contracts	4	-	4	8	8
4	Construction Contracts and Their Types	4	-	4	8	8
5	The Different Types of Contracting Contracts	2	-	2	4	4
6	Types of Obligation in The Contracting Contract (The Engineer's Insight into His	4	-	4	8	8

	Responsibilities and Rights That are Regulated by Law and Determine His Relationship with The Parties to The Construction Triangle (Owner - Contractor - Engineer))					
7	Reviewing The Provisions of The Civil Law Related to The Contracting Contract from Article (646) to Article (667)	4	-	4	8	8
8	Reviewing Some Laws and Legislations That Deal with Engineering Work and Their Regulations, Explaining Them Theoretically, and Giving Some Practical Examples, for example, the Unified Building Law and the Tenders and Auctions Law	4	-	4	8	8
Total		**28**	**-**	**28**	**56**	**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	Legislation and Laws in	x	x			x			x						

	Construction Industry														
2	Definitions (Legislative and Legal Aspects of The Construction Industry)	**x**	**x**			**x**			**x**						
3	Legal Concepts in The Field of The Construction Contracts	**x**	**x**			**x**			**x**						
4	Construction Contracts and Their Types	**x**	**x**			**x**			**x**						
5	The Different Types of Contracting Contracts	**x**	**x**			**x**			**x**						
6	Types of Obligation in The Contracting Contract (The Engineer's Insight into His Responsibilities and Rights That are Regulated by Law and Determine His Relationship with The Parties to The Construction Triangle (Owner - Contractor - Engineer))	**x**	**x**			**x**			**x**						

7	Reviewing The Provisions of The Civil Law Related to The Contracting Contract from Article (646) to Article (667)	**x**	**x**			**x**			**x**						
8	Reviewing Some Laws and Legislations That Deal with Engineering Work and Their Regulations, Explaining Them Theoretically, and Giving Some Practical Examples, for example, the Unified Building Law and the Tenders and Auctions Law	**x**	**x**			**x**			**x**						

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	LO's
1	Periodic Exams	C6 C9 C10 C13 C14	a1, b1, c1, c2 d2 d1, d2 a1 a1, b1, c1
2	Practical /Oral	-	-
3	Final Term Examination	C6 C9 C10 C13 C14	a1, b1, c1, c2 d2 d1, d2 a1 a1, b1, c1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic Exams	3^{rd} ,8^{th} , 12^{th}
2	Practical /Oral	-
3	Final Term Examination	15^{th}

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic Exams	40%
2	Practical /Oral	-
3	Final Term Examination	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 of The Course:

No	Topic	Aims	Competencies	LO's
1	Legislation and Laws in Construction Industry	6, 8, 9	C6 C9 C10 C13 C14	a1, b1, c1, c2 d2 d1, d2 a1 a1, b1, c1
2	Definitions (Legislative and Legal Aspects of The Construction Industry)	6, 8, 9	C6 C9 C10 C13 C14	a1, b1, c1, c2 d2 d1, d2 a1 a1, b1, c1
3	Legal Concepts in The Field of The Construction Contracts	6, 8, 9	C6 C9 C10 C13 C14	a1, b1, c1, c2 d2 d1, d2 a1 a1, b1, c1
4	Construction Contracts and Their Types	6, 8, 9	C6 C9 C10 C13 C14	a1, b1, c1, c2 d2 d1, d2 a1 a1, b1, c1
5	The Different Types of Contracting Contracts	6, 8, 9	C6 C9 C10 C13 C14	a1, b1, c1, c2 d2 d1, d2 a1 a1, b1, c1
6	Types of Obligation in The Contracting Contract (The Engineer's Insight into His Responsibilities and Rights That are	6, 8, 9	C6 C9 C10	a1, b1, c1, c2 d2 d1, d2

	Regulated by Law and Determine His Relationship with The Parties to The Construction Triangle (Owner - Contractor - Engineer))		C13 C14	a1 a1, b1, c1
7	Reviewing The Provisions of The Civil Law Related to The Contracting Contract from Article (646) to Article (667)	6, 8, 9	C6 C9 C10 C13 C14	a1, b1, c1, c2 d2 d1, d2 a1 a1, b1, c1
8	Reviewing Some Laws and Legislations That Deal with Engineering Work and Their Regulations, Explaining Them Theoretically, and Giving Some Practical Examples, for example, the Unified Building Law and the Tenders and Auctions Law	6, 8, 9	C6 C9 C10 C13 C14	a1, b1, c1, c2 d2 d1, d2 a1 a1, b1, c1

Course Coordinator: Dr. Abdo El-Naquib
Head of Department: Assoc. Prof. Dr. Mohamed Gabr
Date of Approval: 10/2022

Reinforced concrete 4
CIE422

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	CIE422
Year/Level	Level 4
Specialization	Major
Authorization Date of Course Specification	10/2022

Teaching hours	**Lectures**	**laboratory**	**Exercise**	**Student's load**
	2	-	2	4

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 by using elastic theory and practical methods for analysis and design water structure system.
10	For water structures, select appropriate and sustainable technologies by applying a full range of civil engineering fields such as structural analysis and mechanics, material properties

3- Intended Learning Outcomes (ILO'S):

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. **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.	**a1** Show the 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	Lab.	Exercise	Content	Student's load
1	Design of water structures	2	-	2	4	4
2	Design of concrete sections subjected to moments without cracking	6	-	6	12	12
3	Design of rectangular tanks	8	-	8	16	16
4	Design of circular tanks	6	-	6	12	12
5	Design of elevated tanks	6	-	6	12	12
Total		**28**	**-**	**28**	**56**	**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
Design of water structures	✓			✓	✓	✓	✓			✓	✓			

Design of concrete sections subjected to moments without cracking	✓			✓	✓	✓	✓			✓	✓			
Design of rectangular tanks	✓			✓	✓	✓	✓			✓	✓			
Design of circular tanks	✓			✓	✓	✓	✓			✓	✓			
Design of elevated tanks	✓			✓	✓	✓	✓			✓	✓			

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	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	Periodic exam	C3 C6 C12	a1,c2 a1 b1
2	Practical/ Oral	-	-
3	Final Term Examination	C3 C6 C12	a1,c2 a1 b1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	3^{rd},7^{th} , 9^{th}
2	Practical/ Oral	-
3	Final term examination	15^{th}

7.3 weighting of Evaluation:

No.	Evaluation method	Weights
1	Periodic exam	40%
2	Practical/ Oral	-

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 (2022): 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 (2018)
3	Design of Reinforced Concrete Structures | Design of reinforced concrete structures, Magdy Abd EL-Hameed Tayel, 2016

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 water structures	4,7	C6	a1
2	Design of concrete sections subjected to moments without cracking	7,10	C3 C6 C12	a1,c2 a1 b1
3	Design of rectangular tanks	7,10	C3 C6 C12	a1,c2 a1 b1
4	Design of circular tanks	7,10	C3 C6 C12	a1,c2 a1 b1
5	Design of elevated tanks	7,10	C3 C6	a1,c2 a1

			C12	b1

Course Coordinator: Dr. Hamdi Abd Alaty

Head of Department: Prof. Dr. Mohamed Elkiki

Date of Approval: 10/2022

Project 2
(CIE423)

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	CIE 423
Year/Level	Level 4
Specialization	Major
Authorization Date of Course Specification	10/2022

Teaching hours	**Lectures**	**laboratory**	**Exercise**	**Contact**	**Student's load**
	2	-	4	6	5

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)
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 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	Lab.	Exercise	Contact	Student's load
1	Continuation and conclusion of the investigations on the civil engineering problems of Project I; written reports and team presentations are required.	28	-	56	84	84
Total		**28**	**-**	**56**	**84**	**84**

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 engineering problems of Project I; written reports and team presentation are required.	x			x	x	x	x	x			x			x

6. Teaching and learning methods for disable students:

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

11- Student Evaluation:

11.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Periodic exam	C2 C3 C4 C5 C7 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, d3 d1, d2 a1, a2, c1 b1, b2 a1, b1, c1 a1, b1, c1

2	Practical/ Oral	-	-
3	Final term examination	C2 C3 C4 C5 C7 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, d3 d1, d2 a1, a2, c1 b1, b2 a1, b1, c1 a1, b1, c1

11.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	2nd -7th - 9th -14th
2	Practical/ Oral	-
3	Final term examination	15th

11.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	40%
	Practical/ Oral	-
2	Final term examination	60%
Total		**100%**

12- List of References:

No.	Reference List
1	Subject studies

13- Facilities required for teaching and learning:

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

14- Matrix of knowledge and skills of the course:

No	Topic	Aims	Competencies	LO's

1	Continuation and conclusion of the investigations on the civil engineering problems of Project I; written reports and team presentations are required.	2, 3, 5, 7, 8, 10	C2 C3 C4 C5 C7 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, d3 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: 10/2022

Bridge Engineering
CIE415A

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	CIE 415A
Year/Level	Level 4
Specialization	Elective
Authorization Date of Course Specification	10/2022

Teaching hours	**Lectures**	**laboratory**	**Exercise**	**Student's load**
	2	-	2	4

2- Course Aims:

No.	Aims
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 (ILO'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; and at least three of the following civil engineering topics: Transportation and Traffic, Roadways and Airports, Railways, Sanitary	**b1** Achieve an optimum design of bridges.

Works, Irrigation, Water Resources and Harbors; or any other emerging field relevant to the discipline.	

4- Course Contents:

No.	Topics	Lectures	laboratory	Exercise	Student's load
1	Different types of bridges	2		2	4
2	different methods in bridges construction	4		4	8
3	load calculations and its different effects	4		4	8
4	methods of bridges design using the standard specifications codes	4		4	8
5	methods of bridges design using commercial computer packages.	4		4	8
6	Planning of bridge projects; Design, analysis and construction of various types of bridges including reinforced and prestressed concrete bridges, steel bridges, composite bridges, and cable supported bridges	10		10	20
Total		**28**		**28**	**56**

5- Teaching and learning methods:

No	Topics	Face-to-Face	Online Lecture	Flipped Classroom	Presentation and	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and	Cooperative	Discovering	Modeling
Different types of bridges	x	x			x	x	x							
different methods in bridges construction	x	x			x	x	x							
load calculations and its different effects	x	x			x	x	x							
methods of bridges design using the standard specifications codes	x	x			x	x	x							

using commercial computer packages for bridge design	x	x			x	x	x							
Planning of bridge projects; Design, analysis and construction of various types of bridges including reinforced and prestressed concrete bridges, steel bridges, composite bridges, and cable	x	x			x	x	x							
supported bridges	x	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	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	Periodic exam	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	Periodic exam	7 th
3	Final examination	15 th

7.3 weighting of Evaluation:

No.	Evaluation Method	degrees
1	Periodic exam	40

2	Practical /Oral	-
3	Final term examination	60
Total		**100**

8- List of References:

No.	Reference List
1	Concrete Segmental Bridges: Theory, Design, and Construction, Dongzhou Huang, Bo Hu · 2022
2	The Design of Highway Bridges of Steel, Timber and Concrete, Milo Smith Ketchum · 2017
3	Design and Construction of Modern Steel Railway, John F. Unsworth · 2017
4	Egyptian Code of practice for steel construction and bridges (allowable stress design) code No (205) 2008.
5	Metwally Abu Hamid "Steel bridges". Faculty of engineering, Cairo University. “Cairo 2007.

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	Teaching and Learning Strategy
1	Different types of bridges	7	C2	a1	Face-to-Face Lecture Brain storming
2	different methods in bridges construction	10	C2	a1	Face-to-Face Lecture Brain storming
3	load calculations and its different effects	10	C9 C12	d1 b1	Face-to-Face Lecture Brain storming Discussion sessions
4	methods of bridges design using the standard specifications codes	10	C9 C12	d1 b1	Face-to-Face Lecture Brain storming

					Discussion sessions
5	methods of bridges design using commercial computer packages.	7	C2	a1	Face-to-Face Lecture Brain storming
6	Planning of bridge projects; Design, analysis and construction of various types of bridges including reinforced and prestressed concrete bridges, steel bridges, composite bridges, and cable supported bridges	10	C9 C12	d1 b1	Face-to-Face Lecture Brain storming Discussion sessions

Course Coordinator: Assoc. Prof/ Mohamed Gabr

Head of Department: Prof. Dr. Mohamed Elkiki

Date of Approval: 10/2022

Coastal Engineering Fundamentals
(CIE 415B)

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	CIE 415B
Year/Level	Level 4
Specialization	Elective
Authorization Date of Course Specification	10/2022

Teaching hours	**Lectures**	**laboratory**	**Exercise**	**Student's load**
	2	-	2	4

2- Course Aims:

No.	Aims
1	Apply knowledge of mathematics, science, engineering concepts, and construct structures to solve fundamental engineering problems for design harbors and marine structures.

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, 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	**a1:** Recognize the fundamentals of structural analysis and mechanics, properties and strength of materials, surveying, soil mechanics, hydrology and fluid mechanics.

engineering concepts and techniques 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. **b2:** Achieve an optimum design of works for harbors
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	Exercise	laboratory	Student's load
1	Effect of waves on coastal structures	6	6	-	12
2	Design of seawalls, jetties, harbors, ship channels and pipelines	6	6	-	12
3	Diffusion and spreading	4	4	-	8
4	Oil spill containment and collection	6	6	-	12
5	Analysis of wave data.	6	6	-	12
Total		**28**	**28**	**-**	**56**

5- Teaching and learning methods:

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

Effect of waves on coastal structures	x	x			x	x	x							
design of seawalls, jetties, harbors, ship channels and pipelines	x	x			x	x	x							
diffusion and spreading	x	x			x	x	x							
oil spill containment and collection	x	x			x	x	x							
Analysis of wave data.	x	x			x	x	x							

6- Teaching and learning methods for disable 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	Periodic exam (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 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Semester work	$2nd, 7th$, $9th$
2	Periodic exam	7 th
3	Final examination	15 th

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	40%
2	Practical /Oral	-

3	Final term examination	60%
Total		**100%**

8- List of References:

Essential Books (Textbooks)	▪ Carl A. Thoresen, port Designers Handbook Third edition, 2014. ▪ الكود المصري للموارد المائية وأعمال الري المجلد السابع الطبعة الأولى 2003
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	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	a2 b2
5	Analysis of wave data.	1	C3	a1

Course coordinator: Prof. Dr. Osami Rageh

Head of Department: Prof. Dr. Mohamed Elkiki

Date of Approval: 10/2022

Concrete Structures Technology
(CIE 415C)

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 Structures Technology
Course Code	CIE 415C
Year/Level	Level 4
Specialization	Elective
Authorization Date of Course Specification	10/2022

Teaching hours	**Lectures**	**laboratory**	**Exercise**	**Student's load**
	2	-	2	4

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.
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	**a1** Describe codes of practice, and standards, as well as health and safety regulations

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.
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	Exercise	laboratory	Student's load
1	Concrete mixing method, mixing time, delivery, pumping and casting. Concrete casting method and precautions. Concrete compaction method. Concrete surface finishing.	8	8	-	16
2	Concrete curing method, curing time and precautions. Casting concrete in hot weather and its precautions. Self-compact concrete manufacturing, pumping, casting and testing. Hot weather concrete	12	10	-	20
3	. Special type of concrete. Quality control	8	10	-	20
Total		**28**	**28**	**-**	**56**

5- Teaching and learning methods:

No	Topics	Face-to-Face	Online Lecture	Flipped	Presentation and	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning	Cooperative	Discovering	Modeling
Advantages and limitations of concrete, types of	x	x			x	x	x							

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	x	x			x	x	x							
Durability, repair and maintenance of concrete.	x	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	Periodic exam	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	Periodic exam	8th
2	Semester work	7th - 9th
3	Final term examination	15th

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	40%
2	Practical /Oral	-
3	Final term examination	60%
Total		**100%**

8- List of References:

No.	Reference List
1	Eric Fleming (2014), construction technology an illustrated introduction, black well publishing.
2	محمود امام ومحمد امين "خواص ومقاومة المواد" – الجزء الثاني، كلية الهندسة جامعة المنصورة.
3	"الكود المصري لتصميم وتنفيذ المنشآت الخرسانية المسلحة كود رقم 203" - (التحديث الثاني 2018) وزارة الإسكان والمرافق والمجتمعات العمرانية – مركز بحوث الإسكان والبناء والتخطيط العمراني – 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	Teaching and Learning Strategy
1	Concrete mixing method, mixing time, delivery, pumping and casting. Concrete casting method and precautions. Concrete compaction method. Concrete surface finishing.	4,10	C4	a3, a1	Face-to-Face Lecture Brain storming
2	Concrete curing method, curing time and precautions. Casting concrete in hot weather and its precautions. Self-compact	4,10	C4 C11	a3 a1, a2	Face-to-Face Lecture Brain storming Discussion sessions

	concrete manufacturing, pumping, casting and testing. Hot weather concrete				
3	. Special type of concrete. Quality control	4,10	C11	a1, a2	Face-to-Face Lecture Brain storming Discussion sessions

Course coordinator: Dr. / Nessren El-awadly.
Head of Department: Prof. Dr. Mohamed Elkiki
Date of Approval: 10/2022

Construction Contracting
(CIE 415D)

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	CIE 415D
Year/Level	Level 4
Specialization	Elective 1
Authorization Date of Course Specification	10/2022

Teaching hours	**Lectures**	**Laboratory**	**Exercise**	**Contact**	**Student's Load**
	2	-	2	4	4

2. Course Aims:

No.	Aims
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.
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.	**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.
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. **a2** List the engineering-related business and management principles. **a3** Define contemporary engineering technologies and their applications in relation to disciplines. **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. **c2** Use fundamental organizational and project management abilities. **c3** Utilize modern technologies.

	c4 Apply quality assurance procedures and follow codes 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.	**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.

4. Course Contents:

No.	Topics	Lecture	laboratory	Exercise	Contact	Student's load
1	Construction Contracting for Contractors, Architects, Owners	2	-	2	4	4
2	Organization and Administration; Industry Structure	2	-	2	4	4
3	Construction Contracts, Bonds, Insurance	4	-	4	8	8
4	Planning, Estimating, and Control	4	-	4	8	8
5	Quantity Takeoff and Pricing, Labor and Equipment Estimates	4	-	4	8	8
6	Estimating Excavation and Concrete	4	-	4	8	8
7	Proposal Preparation	4	-	4	8	8
8	Scheduling, Accounting and Cost Control	4	-	4	8	8
Total		**28**	**-**	**28**	**56**	**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
1	Construction Contracting for Contractors, Architects, Owners	x	x			x	x		x					
2	Organization and Administration; Industry Structure	x	x			x	x		x					
3	Construction Contracts, Bonds, Insurance	x	x			x	x		x					
4	Planning, Estimating, and Control	x	x			x	x		x					
5	Quantity Takeoff and Pricing, Labor and Equipment Estimates	x	x			x	x		x					
6	Estimating Excavation and Concrete	x	x			x	x		x					
7	Proposal Preparation	x	x			x	x		x					
8	Scheduling, Accounting and Cost Control	x	x			x	x		x					

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	LO's
1	Periodic Exams	C2 C4 C11	
2	Practical /Oral	-	-
3	Final Term Examination	C2 C4 C11	

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic Exams	3^{rd} ,8^{th} , 12^{th}
2	Practical /Oral	-
3	Final Term Examination	15^{th}

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic Exams	40%
2	Practical /Oral	-
3	Final Term Examination	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 of The Course:

No	Topic	Aims	Competencies	LO's
1	Construction Contracting for Contractors, Architects, Owners	8, 10	C2 C4 C11	
2	Organization and Administration; Industry Structure	8, 10	C2 C4 C11	
3	Construction Contracts, Bonds, Insurance	8, 10	C2 C4 C11	
4	Planning, Estimating, and Control	8, 10	C2 C4 C11	
5	Quantity Takeoff and Pricing, Labor and Equipment Estimates	8, 10	C2 C4 C11	
6	Estimating Excavation and Concrete	8, 10	C2 C4 C11	
7	Proposal Preparation	8, 10	C2 C4 C11	
8	Scheduling, Accounting and Cost Control	8, 10	C2	

			C4 C11	

Course Coordinator: Dr. Abdo El-Naquib
Head of Department: Prof. Dr. Mohamed Elkiki
Date of Approval: 10/2022

Cost Analysis for Structure projects
(CIE 415E)

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	CIE 415E
Year/Level	Level 4
Specialization	Elective 1
Authorization Date of Course Specification	10/2022

Teaching hours	**Lectures**	**Laboratory**	**Exercise**	**Contact**	**Student's Load**
	2	-	2	4	4

2. Course Aims:

No.	Aims
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.
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.	**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.
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. **a2** List the engineering-related business and management principles. **a3** Define contemporary engineering technologies and their applications in relation to disciplines. **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. **c2** Use fundamental organizational and project management abilities. **c3** Utilize modern technologies.

	c4 Apply quality assurance procedures and follow codes 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.	**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.

4. Course Contents:

No.	Topics	Lecture	laboratory	Exercise	Contact	Student's load
1	Direct Costs	4	-	4	8	8
2	Indirect Costs	4	-	4	8	8
3	Collective Systems	4	-	4	8	8
4	Comparisons Between Projects	4	-	4	8	8
5	Fundamentals of Cost Analysis for Wood, Steel and Concrete Buildings	4	-	4	8	8
6	Preparing Project and Report Writing	4	-	4	8	8
7	Case Study	4	-	4	8	8
Total		**28**	**-**	**28**	**56**	**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
1	Direct Costs	x	x			x	x		x					
2	Indirect Costs	x	x			x	x		x					
3	Collective Systems	x	x			x	x		x					
4	Comparisons Between Projects	x	x			x	x		x					
5	Fundamentals of Cost Analysis for Wood, Steel and Concrete Buildings	x	x			x	x		x					
6	Preparing Project and Report Writing	x	x			x	x		x					
7	Case Study	x	x			x	x		x					

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	LO's
1	Periodic Exams	C2	

		C4 C11	
2	Practical /Oral	-	-
3	Final Term Examination	C2 C4 C11	

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic Exams	3^{rd} ,8^{th}, 12^{th}
2	Practical /Oral	-
3	Final Term Examination	15^{th}

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic Exams	40%
2	Practical /Oral	-
3	Final Term Examination	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 of The Course:

No	Topic	Aims	Competencies	LO's
1	Direct Costs	8, 10	C2 C4 C11	
2	Indirect Costs	8, 10	C2 C4 C11	
3	Collective Systems	8, 10	C2 C4 C11	
4	Comparisons Between Projects	8, 10	C2 C4 C11	
5	Fundamentals of Cost Analysis for Wood, Steel and Concrete Buildings	8, 10	C2 C4 C11	
6	Preparing Project and Report Writing	8, 10	C2 C4 C11	
7	Case Study	8, 10	C2 C4 C11	

Course Coordinator: Dr. Abdo El-Naquib
Head of Department: Prof. Dr. Mohamed Elkiki
Date of Approval: 10/2022

Highway Materials and Construction
(CIE 415F)

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	CIE 415F
Year/Level	Level 4
Specialization	Elective
Authorization Date of Course Specification	10/2022

Teaching hours	**Lectures**	**laboratory**	**Exercise**	**Student's load**
	2	-	2	4

2- Course Aims

No.	Aims
1	Master a broad range of engineering knowledge and specialized skills, as well as the ability to apply acquired knowledge in real-world situations by applying 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

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 construction road works and rehabilitation of roads.	**a2**. Summarize, appropriate and sustainable technologies for roads construction and rehabilitation, bituminous materials and concrete mixtures
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	Exercise	laboratory	Student's load
1	Application of soil classification methods, material characterization, sub-grade and sub-base stabilization, material variability and quality control	12	12	-	24
2	pavement evaluation and rehabilitation, highway construction	16	16	-	32
Total		***28***	***28***	***-***	***56***

5- Teaching and learning methods:

No	Topics	Face-to-Face	Online Lecture	Flipped Classroom	Presentation and	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and	Cooperative	Discovering	Modeling
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 disable 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	Periodic exam	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	Periodic exam	$8th$
3	Final term examination	$15th$

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	40%
2	Practical /Oral	-
3	Final term examination	60%
Total		**100%**

8- List of References:

No.	Reference List
1	**Essential books (text books / 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, 2022

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	Teaching and Learning Strategy
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	Face-to-Face Lecture Brain storming Discussion sessions
2	pavement evaluation and rehabilitation, highway construction	1, 7	C1 C11 C12	a3, b2 a2 b2	Face-to-Face Lecture Brain storming Discussion sessions

Course Coordinator: Assoc. Prof /Alaa Gabr

Head of Department: Prof. Dr. Mohamed Elkiki

Date of Approval: 10/2022

Modern Structure Materials
(CIE 415G)

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	CIE 415G
Year/Level	Level 4
Specialization	Elective
Authorization Date of Course Specification	10/2022

Teaching hours	Lectures	laboratory	Exercise	Student's load
	2	-	2	4

2- Course Aims

No.	Aims
1	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.
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.
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	**a2** Define the principles, basic properties, and features of construction material, as well as

and interpret data, assess and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions	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	Exercise	laboratory	Student's load
1	High strength concrete. High performance concrete. Ultra-high strength concrete. Ultra-high-performance concrete.	8	8	-	16
2	Light weight concrete. Supplementary cementing materials.	8	8	-	16
3	Compound materials and their applications. Insulating materials.	10	10	-	20
Total		**28**	**28**	**-**	**56**

5- Teaching and learning methods:

No	Topics	Face-to-Face	Online Lecture	Flipped Classroom	Presentation and	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and	Cooperative	Discovering	Modeling
General introduction for the technological development of material science	x	x			x	x	x							
general classification of the modern materials in the structure field – compound materials and their applications	x	x			x	x	x							
carbon fibers and its use in structures – insulating materials – ant fire materials	x	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	Periodic exam	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	Periodic exam	8th
2	Semester work	7th - 9th
3	Final term examination	15th

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	40%
2	Practical /Oral	-
3	Final term examination	60%
Total		**100%**

8- List of References:

No.	Reference List
1	**Essential books (text books / 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	Teaching and Learning Strategy
1	High strength concrete. High performance concrete. Ultra-high strength concrete. Ultra-high-performance concrete.	4,10	C4	a3, a1	Face-to-Face Lecture Brain storming

2	Light weight concrete. Supplementary cementing materials.	4,10	C4 C11	a3 a1	Face-to-Face Lecture Brain storming Discussion sessions
3	Compound materials and their applications. Insulating materials.	4,10	C11	a1, a2	Face-to-Face Lecture Brain storming Discussion sessions

Course Coordinator: Dr. / Nasreen El-awadly.

Head of Department: Prof. Dr. Mohamed Elkiki.

Date of Approval: 10/2022.

Planning of buildings maintenance and Protection
(CIE 415H)

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	CIE 415H
Year/Level	Level 4
Specialization	Elective
Authorization Date of Course Specification	10/2022

Teaching hours	Lectures	laboratory	Exercise	Student's load
	2	-	2	4

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.
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)
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
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	Lectures	Exercise	laboratory	Student's load
1	Review on of deterioration of building materials	4	4	-	8
2	Concept of life cycle cost- Protection methods against deterioration and corrosion of building materials	8	8	-	16
3	Types of defects and damages. Non-destructive tests	6	6	-	12
4	Partially destructive tests. Load tests. Materials for repair and isolation. Methods and techniques of repair. Rehabilitation and retrofitting.	10	10	-	20
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	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling
Review on of deterioration of building materials	x	x			x	x	x							
Concept of life cycle cost- Protection methods against deterioration and corrosion of building materials	x	x			x	x	x							
Types of defects and damages. Non-destructive tests	x	x			x	x	x							
Partially destructive tests. Load tests. Materials for repair and selection.	x	x			x	x	x							

Methods and techniques of repair. Rehabilitation and retrofitting.														

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	ILO's
1	Periodic exam	C3	a1
2	Semester work (quizzes, sheets, report)	C3	a1
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	Periodic exam	8^{th}
3	Final term examination	15^{th}

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	40%
2	Practical /Oral	-
3	Final term examination	60%
Total		**100%**

8- List of References:

No.	Reference List
1	Using and understanding engineering service and constructing john Clark / 2016

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	Teaching and Learning Strategy
1	Review on of deterioration of building materials	4	C13	a1, c1	Face-to-Face Lecture Brain storming Discussion sessions
2	Concept of life cycle cost- Protection methods against deterioration and corrosion of building materials	3	C3, C13	b1, c1	Face-to-Face Lecture Brain storming Discussion sessions
3	Types of defects and damages. Non-destructive tests	4	C13	a1, c1	Face-to-Face Lecture Brain storming Discussion sessions
4	Partially destructive tests. Load tests. Materials for repair and selection. Methods and techniques of repair. Rehabilitation and retrofitting.	3	C3, C13	b1, c1	Face-to-Face Lecture Brain storming Discussion sessions

Course Coordinator: Dr/ Ayman Helal

Head of Department: Prof. Dr. Mohamed Elkiki.

Date of Approval: 10/2022

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	CIE 415I
Year/Level	Level 4
Specialization	Elective
Authorization Date of Course Specification	10/2022

Teaching hours	**Lectures**	**laboratory**	**Exercise**	**Student's load**
	2	-	2	4

2- Course Aims

No.	Aims
3	1- 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.
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
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.
C12 Achieve an optimum design of Reinforced Concrete.	**b1** Achieve an optimum design of Reinforced Concrete

4- Course Contents:

No.	Topics	Lectures	Exercise	laboratory	Student's load
1	Fundamental concepts related to structura reliability, safety measures, load models, resistance models, system reliability	14	14	-	28
2	optimum safety levels, and optimization of design codes	14	14	-	28
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	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab
1	Fundamental concepts related to structural reliability, safety measures, load models, resistance models, system reliability	x	x	x		x	x								
2	optimum safety levels, and optimization of design codes	x	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	Periodic exam	C3 C4	a1, a2 a1
2	Semester work (quizzes, sheets, report)	C3 C4	a1, a2 a1
3	Final term examination	C3 C4 C12	a1, a2 a1 b1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	semester work	5^{th}, 7^{th} , 9^{th}
2	Periodic exam	8^{th}
3	Final term examination	15^{th}

7.3 weighting of Evaluation:

No.	Evaluation Method	degrees
1	Periodic exam	40
2	Practical /Oral	-
3	Final term examination	60
Total		**100**

8- List of References:

No.	Reference List

1	**Essential books (text books / 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	ILO's	Teaching and Learning Strategy
1	Fundamental concepts related to structural reliability, safety measures, load models, resistance models, system reliability	3,8	C3	a1, a2	Face-to-Face Lecture Brain storming
2	optimum safety levels, and optimization of design codes	3,8	C4 C12	a1 b1	Face-to-Face Lecture Brain storming Discussion sessions

Course Coordinator: Assoc. Prof/ Mohamed Gabr.

Head of Department: Prof. Dr. Mohamed Elkiki

Date of Approval: 10/2022

Environmental Pollution Control
(CIE415J)

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	CIE415J
Year/Level	Level 4
Specialization	Elective
Authorization Date of Course Specification	10/2022

Teaching hours	**Lectures**	**laboratory**	**Exercise**	**Student's load**
	2	-	2	4

2- Course Aims

No.	Aims
8	Plan and manage construction processes for wastewater treatment plants, pollution control and assess environmental impacts of projects.
10	Select appropriate and sustainable technologies for wastewater treatment plants, pollution control and assess environmental impacts of projects.

3- Graduate 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 professional ethics and impacts of engineering solutions on society and environment.
C4 Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues and risk management principles	**a1** Describe quality factors for environmental control, as well as pollution resources and environmental concerns. **a3** Define contemporary engineering technologies and their applications in environmental control.

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	**c1** Assess environmental impacts of projects. **a1** Recognize the fundamentals of environmental control, population and resources, prediction and assessment of environmental impact and problems of developing nations **a2** Summarize, appropriate and sustainable technologies for environmental pollution control

4- Course Contents:

No.	Topics	Lectures	Exercise	laboratory	Contact	Student's load
1	Quality factors for environme control. Population and resource use.	4	4	-	8	8
2	Air pollution, water pollution, land pollution. Solid waste management.	4	4	-	8	8
3	Solid waste management. Thermal pollution, noise pollution. Radiation.	12	12	-	24	24
4	Energy and the environment. Prediction and assessment of environmental impact.	4	4	-	8	8
5	Problems of developing nations. Case studies	4	4	-	8	8
Total		**28**	**28**	**-**	**56**	**56**

5- Teaching and learning methods:

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

Quality factors for environmental control. Population and resource use.	x			x	x								
Air pollution, water pollution, land pollution. Solid waste management.	x			x	x								
Thermal pollution, noise pollution. Radiation.	x			x	x	x							
Energy and the environment. Prediction and assessment of environmental impact.	x			x	x								
Problems of developing nations. Case studies	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- 7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Periodic exam	C2 C4 C11	a2 a1, a3 a1, a2
2	Practical/Oral	-	-
3	Final exam	C3 C12 C13	a2 a1, a3 a1, a2

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	8th
2	Practical/Oral	-

3	Final exam	15th

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	40%
2	Practical /Oral	-
3	Final exam	60%
Total		**100%**

8- List of References:

No.	Reference List
1	U.S. Environmental Protection Agency (2016), "Constructed Wetlands and Aquatic Plant Systems for Municipal Wastewater Treatment", Center for Environmental Research Information, Cincinnati, OH.
2	الكود المصري لأسس تصميم وتنفيذ محطات تنقية مياه الشرب والصرف الصحي ومحطات الرفع – قرار وزاري رقم 169 لسنة 1997-الطبعة الثالثة 2004
3	مراجعة تصميم محطات معالجة مياه الصرف الصحي. أ.د محمود عبد العظيم. 2010
4	الهندسة الصحية، محمد على فرج. استاذ الهندسة الصحية جامعة الإسكندرية، 1990.

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	Quality factors for environmental control. Population and resource use.	8, 10	C2	a2
2	Air pollution, water pollution, land pollution. Solid waste management	8, 10	C4	a1, a3
3	Thermal pollution, noise pollution. Radiation.	8, 10	C4	a1, a3
4	Energy and the environment. Prediction and assessment of environmental impact.	8, 10	C4 C11	a1, a3 a1, a2
5	Problems of developing nations. Case studies	8,10	C2 C4 C11	a2 a1, a3 a1, a2

Course Coordinator: Assoc. Prof/ Mohamed Gabr**.**

Head of Department: Prof. Dr. Mohamed Elkiki**.**

Date of Approval: 10/2022.

Design of Earthquake Structures
(CIE 416A)

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	CIE 416A
Year/Level	Level 4
Specialization	Elective
Authorization Date of Course Specification	10/2022

Teaching hours	**Lectures**	**laboratory**	**Exercise**	**Student's load**
	2	-	2	4

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 (ILO'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	Exercise	laboratory	Student's load
1	Causes of earthquakes	2	2	-	4
2	Seismic waves, scales of earthquakes	4	4	-	8
3	Equation of motion for single degree of freedom and multi-degree of freedom systems	4	4	-	8
4	Structural behavior under random forces	4	4	-	8
5	Spectral analysis depending on soil conditions	4	4	-	8
6	Modal analysis for multi strong buildings	4	4	-	8
7	Design principles for earthquake structures according to the Egyptian code	6	6	-	12
Total		**28**	**28**	**-**	**56**

5- Teaching and learning methods:

No	Face-to-Face	Online Lecture	Flipped Classroom	Presentation and	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and	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 disable 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	Periodic exam	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	Periodic exam	$8th$
3	Final term examination	$15th$

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	40
2	Practical /Oral	-
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 (text books / 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.**
4	Seismic Design of Concrete Buildings to Eurocode, Michael Fardis, Eduardo ,Carvalho · Peter Fajfar **2015**
3	Seismic Isolation, Structural Health Monitoring, Azer A. Kasimzade, Erdal ,Şafak Carlos· E. Ventura **2018**
5	Structural Dynamics in Earthquake and Blast Resistant Design, BK Raghu Prasad · 2022
6	Chu-Kia Wang and Charles G. Salmon, "Reinforced Concrete Design," 4th Edition, Harper and Row Publishers, New York, 1985.

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	ILO's	Teaching and Learning Strategy
1	Causes of earthquakes	7	C6	a1	Face-to-Face Lecture Brain storming
2	Seismic waves, scales of earthquakes	10	C11	a1	Face-to-Face Lecture Brain storming Discussion sessions
3	Equation of motion for single degree of freedom and multi-degree of freedom systems	10	C11 C12	a1 a1, b1	Face-to-Face Lecture Brain storming Discussion sessions
4	Structural behavior under random forces	10	C11	a2	Face-to-Face Lecture Brain storming Discussion sessions Problem solving
5	Spectral analysis depending on soil conditions	10	C11	a1	Face-to-Face Lecture Brain storming Discussion sessions Problem solving
6	Modal analysis for multi strong buildings	10	C11	a1, a2	Face-to-Face Lecture Brain storming Discussion sessions Problem solving
7	Design principles for earthquake structures according to the Egyptian code	10	C12	a1, b1	Face-to-Face Lecture Brain storming Discussion sessions Problem solving

Course Coordinator: Dr. Rafik Wadia

Head of Department: Prof. Dr. Mohamed Elkiki**.**

Date of Approval: 10/2022

Design of Marine Platforms
(CIE 416B)

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	CIE 416B
Year/Level	Level 4
Specialization	Elective
Authorization Date of Course Specification	10/2022

Teaching hours	**Lectures**	**laboratory**	**Exercise**	**Student's load**
	2	-	2	4

2- Course Aims:

No.	Aims
1	Apply knowledge of mathematics, science, engineering concepts, and construct structures to solve fundamental engineering problems for design harbors and marine structures.

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, 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 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. **b2:** Achieve an optimum design of works for harbors

4- Course Contents:

No.	Topics	Lectures	Exercise	laboratory	Student's load
1	Marine platform (definition – types)	6	6	-	12
2	Loads affecting the marine platforms	8	8		16
2	Tide and wind forces	6	6	-	12
3	Design of fixed marine platforms	8	8	-	16
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	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab
1	Marine platform (definition – types)	x	x	x		x	x								
2	Loads affecting the marine platforms	x	x			x	x	x							
3	Tide and wind forces	x	x			x	x				x				
4	Design of fixed marine platforms	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	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	Periodic exam (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	Periodic exam (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.	Evaluation Method	Weights
1	Periodic exam	40%
2	Practical /Oral	-
3	Final term examination	60%
Total		**100%**

8- List of References:

No.	Reference List
1	Carl A. Thoresen, port Designers Handbook Third edition, 2014
2	Gregory Tsinker, Handbook of port and Harbor Engineering: Geotechnical and structural and structural Aspects, 2014.
3	الكود المصرى للموارد المائيه وأعمال الرى المجلد السابع الطبعه الأولى 2003

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	Marine platform (definition – types)	1	C11 C12	a2 b2
2	Loads affecting the marine platforms	1	C3 C11	a1 a2
3	Tide and wind forces	1	C3	a1
4	Design of fixed marine platforms	1	C4	a1

Course coordinator: Prof. Dr. Osami Rageh

Head of Department: Prof. Dr. Mohamed Elkiki**.**

Date of Approval: 10/2022

Design of shell structures
(CIE 416C)

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	CIE 416C
Year/Level	Level 4
Specialization	Elective
Authorization Date of Course Specification	10/2022

Teaching hours	**Lectures**	**laboratory**	**Exercise**	**Student's load**
	2	-	2	4

2- Course Aims:

No.	Aims
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 (ILO'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; and at least three of the following civil engineering topics: Transportation and Traffic, Roadways and Airports, Railways, Sanitary	**b1** Achieve an optimum design of Reinforced Concrete structures.

Works, Irrigation, Water Resources and Harbors; or any other emerging field relevant to the discipline.	

4- Course Contents:

No.	Topics	Lectures	Exercise	laboratory	Student's load
1	forces and stresses affecting the shell structures	8	8	-	16
2	analysis of shell structures	10	10	-	20
3	design of shell structures	10	10	-	20
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	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab
1	forces and stresses affecting the shell structures	x	x	x		x	x								
2	analysis of shell structures	x	x			x	x	x							
3	design of shell structures	x	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	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	Periodic exam	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	Periodic exam	$8th$
3	Final term examination	$15th$

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	40%
2	Practical /Oral	-
3	Final term examination	60%
Total		**100%**

8- List of References:

No.	Reference List
	• Design Principles and Analysis of Thin Concrete Shells, Iakov Iskhakov, Yuri Ribakov · 2022 • Processing of Slender Concrete Shells – Fabrication, Eisenbach, Philipp · 2017
1	**Recommended books:** • Theory and design of concrete shells by Dr. BBINOY KUMARI CHATTERIEE. • Reinforced concrete designers hand book 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	Teaching and Learning Strategy
1	forces and stresses affecting the shell structures	7	C2	a1	Face-to-Face Lecture Brain storming
2	analysis of shell structures	10	C2 C9	a1 d1	Face-to-Face Lecture Brain storming Discussion sessions
3	design of shell structures	10	C9 C12	d1 b1	Face-to-Face Lecture Brain storming Discussion sessions

Course Coordinator: Dr. Rafik Wadia

Head of Department: Prof. Dr. Mohamed Elkiki**.**

Date of Approval: 10/2022

Engineering Project Evaluation
(CIE 416D)

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	CIE 416D
Year/Level	Level 4
Specialization	Elective 2
Authorization Date of Course Specification	10/2022

Teaching hours	**Lectures**	**Laboratory**	**Exercise**	**Contact**	**Student's Load**
	2	-	2	4	4

2. Course Aims:

No.	Aims
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.
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.	**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.
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. **a2** List the engineering-related business and management principles. **a3** Define contemporary engineering technologies and their applications in relation to disciplines. **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. **c2** Use fundamental organizational and project management abilities. **c3** Utilize modern technologies.

	c4 Apply quality assurance procedures and follow codes 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.	**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.

4. Course Contents:

No.	Topics	Lecture	laboratory	Exercise	Contact	Student's load
1	Fundamentals of Project Appraisal and Feasibility Study	4	-	4	8	8
2	Planning of Civil Engineering Projects	8	-	8	16	16
3	Economic Analysis of Civil Engineering Projects	8	-	8	16	16
4	Introduction to Environmental Impact Assessment and Social Impact Assessment; Case Studies on Civil Engineering Project Appraisal	8	-	8	16	16
Total		**28**	**-**	**28**	**56**	**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
1	Fundamentals of Project Appraisal and Feasibility Study	x	x			x	x		x					
2	Planning of Civil Engineering Projects	x	x			x	x		x					
3	Economic Analysis of Civil Engineering Projects	x	x			x	x		x					
4	Introduction to Environmental Impact Assessment and Social Impact Assessment; Case Studies on Civil Engineering Project Appraisal	x	x			x	x		x					

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	ILO's
1	Periodic Exams	C2 C4 C11	
2	Practical /Oral	-	-
3	Final Term Examination	C2 C4 C11	

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic Exams	3^{rd} ,8^{th} , 12^{th}
2	Practical /Oral	-
3	Final Term Examination	15^{th}

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic Exams	40%
2	Practical /Oral	-
3	Final Term Examination	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 of The Course:

No	Topic	Aims	Competencies	LO's
1	Fundamentals of Project Appraisal and Feasibility Study	8, 10	C2 C4 C11	
2	Planning of Civil Engineering Projects	8, 10	C2 C4 C11	
3	Economic Analysis of Civil Engineering Projects	8, 10	C2 C4 C11	
4	Introduction to Environmental Impact Assessment and Social Impact Assessment; Case Studies on Civil Engineering Project Appraisal	8, 10	C2 C4 C11	

Course Coordinator: Dr. Abdo El-Naquib
Head of Department: Prof. Dr. Mohamed Elkiki**.**
Date of Approval: 10/2022

Fiber Reinforced Cement Composites
(CIE 416E)

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	CIE 416E
Year/Level	Level 4
Specialization	Elective
Authorization Date of Course Specification	10/2022

Teaching hours	**Lectures**	**laboratory**	**Exercise**	**Student's load**
	2	-	2	4

2- Course Aims

No.	Aims
1	Master a broad range of engineering knowledge and specialized skills, as well as the ability to apply acquired knowledge in real-world situations by applying theories and abstract thinking in analytic critical and systemic thinking to identify, diagnose, and solve engineering problems of varying complexity and variation.
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.
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.
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	Exercise	laboratory	Student's load
1	Fiber-reinforcement of cement-based matrices, continuous and discontinuous fibers, and meshes.	4	4	-	8
2	Fiber-reinforced concrete and Ferro-cement	4	4	-	8
3	Laminated cementations composites	2	2	-	4
4	Behavior and mechanical properties. Mechanics of fiber reinforcement	6	6	-	12
5	Constitutive models. High-strength, high-performance fiber composites.	4	4	-	8
6	Hybrid and smart composites	4	4	-	8
7	Lectures, projects and laboratory	4	4	-	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	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling
Fiber-reinforcement of cement-based matrices, continuous and discontinuous fibers, and meshes.	x	x			x	x	x							
Fiber-reinforced concrete and Ferro-cement	x	x			x	x	x							
Laminated cementations composites	x	x			x	x	x							
Behavior and mechanical properties. Mechanics of fiber reinforcement	x	x			x	x	x							
Constitutive models. High-strength, high-performance fiber composites.	x	x			x	x	x							
Hybrid and smart composites	x	x			x	x	x							
Lectures, projects and laboratory	x	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:

4.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Periodic exam	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

4.2 Evaluation Schedule:

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

4.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	40%
2	Practical /Oral	-
3	Final term examination	60%
Total		**100%**

8- List of References:

No.	Reference List
1	High performance fiber reinforced cement composite / 2012 / 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	Teaching and Learning Strategy
1	Fiber-reinforcement of cement-based matrices, continuous and discontinuous fibers, and meshes.	4,10	C4	a3, a1	Face-to-Face Lecture Brain storming
2	Fiber-reinforced concrete and Ferro-cement	4,10	C4 C11	a3 a1, a2	Face-to-Face Lecture Discussion sessions
3	Laminated cementations composites	4,10	C11	a1, a2	Face-to-Face Lecture Brain storming Discussion sessions
4	Behavior and mechanical properties. Mechanics of fiber reinforcement	4,10	C4 C11	a3 a1, a2	Face-to-Face Lecture Brain storming
5	Constitutive models. High-strength, high-performance fiber composites.	4,10	C4 C11	a3 a1, a2	Face-to-Face Lecture Brain storming
6	Hybrid and smart composites	4,10	C11	a1, a2	Face-to-Face Lecture Brain storming
7	Lectures, projects and laboratory	4,10	C11	a1, a2	Face-to-Face Lecture Brain storming

Course Coordinator: Dr. / Nessren El-awadly.

Head of Department: Prof. Dr. Mohamed Elkiki**.**

Date of Approval: 10/2022.

Project Decision Analysis
(CIE 416F)

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	CIE 416F
Year/Level	Level 4
Specialization	Elective 2
Authorization Date of Course Specification	10/2022

Teaching hours	**Lectures**	**Laboratory**	**Exercise**	**Contact**	**Student's Load**
	2	-	2	4	4

2. Course Aims:

No.	Aims
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.
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.	**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.
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. **a2** List the engineering-related business and management principles. **a3** Define contemporary engineering technologies and their applications in relation to disciplines. **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. **c2** Use fundamental organizational and project management abilities. **c3** Utilize modern technologies.

	c4 Apply quality assurance procedures and follow codes 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.	**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.

4. Course Contents:

No.	Topics	Lecture	laboratory	Exercise	Contact	Student's load
1	Quantitative Methods of Decision-Making	4	-	4	8	8
2	Important Mathematical Models Useful in Decision Processes	8	-	8	16	16
3	Model-Structure Assumptions, Limitations and Methods for Use	8	-	8	16	16
4	Concepts and Models of Support Systems for Management Decision Problems	8	-	8	16	16
Total		**28**	**-**	**28**	**56**	**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
1	Quantitative Methods of Decision-Making	x	x			x	x		x					
2	Important Mathematical Models Useful in Decision Processes	x	x			x	x		x					
3	Model-Structure Assumptions, Limitations and Methods for Use	x	x			x	x		x					
4	Concepts and Models of Support Systems for Management Decision Problems	x	x			x	x		x					

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	LO's
1	Periodic Exams	C2 C4 C11	
2	Practical /Oral	-	-
3	Final Term Examination	C2 C4 C11	

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic Exams	3^{rd} ,8^{th} , 12^{th}
2	Practical /Oral	-
3	Final Term Examination	15^{th}

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic Exams	40%
2	Practical /Oral	-
3	Final Term Examination	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 of The Course:

No	Topic	Aims	Competencies	LO's
1	Quantitative Methods of Decision-Making	8, 10	C2 C4 C11	
2	Important Mathematical Models Useful in Decision Processes	8, 10	C2 C4 C11	
3	Model-Structure Assumptions, Limitations and Methods for Use	8, 10	C2 C4 C11	
4	Concepts and Models of Support Systems for Management Decision Problems	8, 10	C2 C4 C11	

Course Coordinator: Dr. Abdo El-Naquib
Head of Department: Prof. Dr. Mohamed Elkiki.
Date of Approval: 10/2022

Project financial Management
(CIE 416G)

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	CIE 416G
Year/Level	Level 4
Specialization	Elective 2
Authorization Date of Course Specification	10/2022

Teaching hours	**Lectures**	**Laboratory**	**Exercise**	**Contact**	**Student's Load**
	2	-	2	4	4

2. Course Aims:

No.	Aims
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.
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)
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. **a2** List the engineering-related business and management principles. **a3** Define contemporary engineering technologies and their applications in relation to disciplines. **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. **c2** Use fundamental organizational and project management abilities. **c3** Utilize modern technologies. **c4** Apply quality assurance procedures and follow codes 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.	**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.

4. Course Contents:

No.	Topics	Lecture	laboratory	Exercise	Contact	Student's load
1	Cash Flow and its Analysis	2	-	2	4	4
2	Project Budget	2	-	2	4	4
3	Project Financial Methods	4	-	4	8	8
4	Risk and Cost Control	4	-	4	8	8
5	Financial Path for Project	4	-	4	8	8
6	Time Value	4	-	4	8	8
7	Profit Rate	4	-	4	8	8
8	Inflation Effects	4	-	4	8	8
Total		**28**	**-**	**28**	**56**	**56**

5. Teaching and Learning Methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling
1	Cash Flow and its Analysis	x	x			x	x		x					
2	Project Budget	x	x			x	x		x					
3	Project Financial Methods	x	x			x	x		x					
4	Risk and Cost Control	x	x			x	x		x					
5	Financial Path for Project	x	x			x	x		x					
6	Time Value	x	x			x	x		x					
7	Profit Rate	x	x			x	x		x					
8	Inflation Effects	x	x			x	x		x					

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	LO's
1	Periodic Exams	C4	

		C11	
2	Practical /Oral	-	-
3	Final Term Examination	C4 C11	

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic Exams	3^{rd} ,8^{th} , 12^{th}
2	Practical /Oral	-
3	Final Term Examination	15^{th}

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic Exams	40%
2	Practical /Oral	-
3	Final Term Examination	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 of The Course:

No	Topic	Aims	Competencies	LO's
1	Cash Flow and its Analysis	8, 10	C4 C11	
2	Project Budget	8, 10	C4 C11	
3	Project Financial Methods	8, 10	C4 C11	
4	Risk and Cost Control	8, 10	C4 C11	
5	Financial Path for Project	8, 10	C4 C11	
6	Time Value	8, 10	C4 C11	
7	Profit Rate	8, 10	C4 C11	
8	Inflation Effects	8, 10	C4 C11	

Course Coordinator: Dr. Abdo El-Naquib
Head of Department: Prof. Dr. Mohamed Elkiki**.**
Date of Approval: 10/2022

Risk Management and Constructions Safety
(CIE 416H)

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 Constructions Safety
Course Code	CIE 416H
Year/Level	Level 4
Specialization	Elective 2
Authorization Date of Course Specification	10/2022

Teaching hours	**Lectures**	**Laboratory**	**Exercise**	**Contact**	**Student's Load**
	2	-	2	4	4

2. Course Aims:

No.	Aims
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.
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)
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. **a2** List the engineering-related business and management principles. **a3** Define contemporary engineering technologies and their applications in relation to disciplines. **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. **c2** Use fundamental organizational and project management abilities. **c3** Utilize modern technologies. **c4** Apply quality assurance procedures and follow codes 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.	**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.

4. Course Contents:

No.	Topics	Lecture	laboratory	Exercise	Contact	Student's load
1	Principles and Practice Regarding Safety in Building	4	-	4	**8**	**8**
2	Accidental Prevention and Safety Control	6	-	6	12	12
3	Fire Control	4	-	4	**8**	**8**
4	Fire Resistance of Building Materials, Safety Provisions for Fire and Other Hazards in Building	4	-	4	8	8
5	Safety Standards and Codes	6	-	6	12	12
6	Governmental Regulations and Inspection Procedures	4	-	4	8	8
Total		**28**	**-**	**28**	**56**	**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	Principles and Practice Regarding Safety in Building	x	x			x	x		x						
2	Accidental Prevention and Safety Control	x	x			x	x		x						
3	Fire Control	x	x			x	x		x						
4	Fire Resistance of Building Materials, Safety Provisions for Fire and Other Hazards in Building	x	x			x	x		x						
5	Safety Standards and Codes	x	x			x	x		x						
	Governmental Regulations and Inspection Procedures	x	x			x	x		x						

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	LO's
1	Periodic Exams	C4 C11	
2	Practical /Oral	-	-
3	Final Term Examination	C4 C11	

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic Exams	3^{rd} ,8^{th} , 12^{th}
2	Practical /Oral	-
3	Final Term Examination	15^{th}

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic Exams	40%
2	Practical /Oral	-
3	Final Term Examination	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 of The Course:

No	Topic	Aims	Competencies	LO's
1	Principles and Practice Regarding Safety in Building	8, 10	C4 C11	
2	Accidental Prevention and Safety Control	8, 10	C4 C11	
3	Fire Control	8, 10	C4 C11	
4	Fire Resistance of Building Materials, Safety Provisions for Fire and Other Hazards in Building	8, 10	C4 C11	
5	Safety Standards and Codes	8, 10	C4 C11	
6	Governmental Regulations and Inspection Procedures	8, 10	C4 C11	

Course Coordinator: Dr. Abdo El-Naquib
Head of Department: Prof. Dr. Mohamed Elkiki**.**
Date of Approval: 10/2022

Air conditioning Systems for Building
(CIE 416I)

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	CIE 416I
Year/Level	Level 4
Specialization	Minor – Elective Course
Authorization Date of Course Specification	10/2022

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

2. Course Aims

No.	Aims
1	Provide an understanding of the heating systems via hot water and air.
2	Enhance knowledge of insulation methods and materials used in buildings.
7	Explain methods and tools of in and exfiltration and exchange of air, ventilation and artificial air conditioning.

3. Competencies:

Competencies	Learning Outcomes (LO'S)
C1. Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.	**b1** State the principle of conservation of energy and give examples of conversions state the principle of conservation of energy and give examples of conversions.
C3. Apply engineering design processes to produce cost effective solution 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** Describe the different analyzing procedures to handle problems related to heating systems via hot water and air.
C4. Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and	**a1** Utilize contemporary technologies, codes of practice and standards, quality guidelines, health

safety requirements, environmental issues and risk management principles.	and safety requirements, environmental issues and risk management principles.

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	✓	✓			✓									
Cooling load estimation	✓	✓			✓	✓								
Refrigeration cycles.	✓	✓		✓	✓	✓								
Water chiller systems	✓	✓		✓	✓						✓			
Air handling system	✓	✓		✓	✓		✓							
Cooling towers	✓	✓		✓	✓		✓							
Equipment selection.	✓	✓		✓	✓					✓				

Installation, operation and maintenance of air conditioning systems	✓	✓	✓	✓	✓					✓				

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 C3 C4	b1 a3 a1
2	Semester work (quizzes, sheets, report)	C3 C4	a3 a1
3	Final term examination	C1 C3 C4	b1 a3 a1

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	Ronald H. Howell, Principles of Heating Ventilating and Air conditioning,8th edition, ASHRAE, 2017.

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	C1, C3	b1, a3
2	Cooling load estimation	3	C1, C3	b1, a3
3	Refrigeration cycles.	4	C1, C4	b1, a1
4	Water chiller systems	3	C3, C4	a3, a1
5	Air handling system	4	C3, C4	a3, a1
6	Cooling towers	3	C3, C4	a3, a1
7	Equipment selection.	4	C3, C4	a3, a1
8	Installation, operation and maintenance of air conditioning systems	3	C3, C4	a3, a1

Course Coordinator: Dr. Moataz Mostafa
Head of Department: Prof. Dr. Mohamed Elkiki
Date of Approval: 10/2022

Construction Estimating and Tendering
(CIE 416J)

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	CIE 416J
Year/Level	Level 4
Specialization	Elective 2
Authorization Date of Course Specification	10/2022

Teaching hours	**Lectures**	**Laboratory**	**Exercise**	**Contact**	**Student's Load**
	2	-	2	4	4

2. Course Aims:

No.	Aims
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.
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)
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. **a2** List the engineering-related business and management principles. **a3** Define contemporary engineering technologies and their applications in relation to disciplines. **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. **c2** Use fundamental organizational and project management abilities. **c3** Utilize modern technologies. **c4** Apply quality assurance procedures and follow codes 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.	**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.

4. Course Contents:

No.	Topics	Lecture	laboratory	Exercise	Contact	Student's load
1	Principles of Construction Cost Estimating	4	-	4	8	8
2	Quantity Take Off	4	-	4	8	8
3	Methods of Detailed Cost Estimating	4	-	4	8	8
4	Analysis of Labor and Equipment Costs	4	-	4	8	8
5	Construction Tendering Process;	4	-	4	8	8
6	Bidding and Contracting Systems for Construction Projects	4	-	4	8	8
7	Laws and Regulations Related to The Construction Industry	4	-	4	8	8
Total		**28**	**-**	**28**	**56**	**56**

5. Teaching and Learning Methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling
1	Principles of Construction Cost Estimating	**x**	**x**			**x**	**x**		**x**					
2	Quantity Take Off	**x**	**x**			**x**	**x**		**x**					
3	Methods of Detailed Cost Estimating	**x**	**x**			**x**	**x**		**x**					
4	Analysis of Labor and Equipment Costs	**x**	**x**			**x**	**x**		**x**					
5	Construction Tendering Process;	**x**	**x**			**x**	**x**		**x**					
6	Bidding and Contracting Systems for Construction Projects	**x**	**x**			**x**	**x**		**x**					
7	Laws and Regulations Related to The Construction Industry	**x**	**x**			**x**	**x**		**x**					

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	LO's
1	Periodic Exams	C4 C11	
2	Practical /Oral	-	-
3	Final Term Examination	C4 C11	

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic Exams	3^{rd} ,8^{th} , 12^{th}
2	Practical /Oral	-
3	Final Term Examination	15^{th}

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic Exams	40%
2	Practical /Oral	-
3	Final Term Examination	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 of The Course:

No	Topic	Aims	Competencies	LO's
1	Principles of Construction Cost Estimating	8, 10	C4 C11	
2	Quantity Take Off	8, 10	C4 C11	
3	Methods of Detailed Cost Estimating	8, 10	C4 C11	
4	Analysis of Labor and Equipment Costs	8, 10	C4 C11	
5	Construction Tendering Process;	8, 10	C4 C11	
6	Bidding and Contracting Systems for Construction Projects	8, 10	C4 C11	
7	Laws and Regulations Related to The Construction Industry	8, 10	C4 C11	

Course Coordinator: Dr. Abdo El-Naquib
Head of Department: Prof. Dr. Mohamed Elkiki.
Date of Approval: 10/2022

Groundwater Hydraulics
(CIE424A)

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	Groundwater hydraulics
Course Code	CIE424A
Year/Level	level 4
Specialization	Elective
Authorization Date of Course Specification	10/2022

Teaching hours	Lectures	laboratory	Exercise	Student's load
	2	-	2	4

1- Course Aims

No.	Aims
7	Achieve an optimum solution of groundwater problems and design abstraction groundwater wells.
10	Select appropriate and sustainable technologies for groundwater abstraction and utilization.

2- Graduate Competencies:

Competencies	Learning Outcomes (LO'S)
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 the groundwater aquifer system– porosity – rock and water – degree of saturation – hydraulic conductivity and intrinsic permeability- Groundwater movement and well hydraulics (Darcy law – direction of the hydraulic gradient – groundwater recharge – seepage through porous media – homogeneity and isotropy –flow in stratified media – steady and unsteady flow toward a well in various types of aquifers)
C4: Utilize contemporary technologies, codes of practice and standards, quality guidelines, health	**a1:** Describe contemporary technologies for groundwater wells. Define the Ghyben-Herzberg equation – formulation of saltwater intrusion.

and safety requirements, environmental issues and risk management principles.	
C12 Achieve an optimum design of groundwater abstraction wells, seepage problem through dams, and saltwater intrusion assessment.	**b1** Achieve an optimum planning, design and construction of groundwater wells.
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:** Manage saltwater intrusion in coastal aquifers (modeling of saltwater intrusion – theory of images – controlling of saltwater intrusion)

3- Course Contents:

No.	Topics	Lectures	laboratory	Exercise	Contact	Student's load
1	Fundamentals of Groundwater properties of soil (types of aquifers –porosity – rock and water – degree of saturation – hydraulic conductivity and intrinsic permeability)	6	-	6	12	12
2	Groundwater movement and well hydraulics (Darcy law – direction of the hydraulic gradient – groundwater recharge – seepage through porous media – homogeneity and isotropy –flow in stratified media – steady and unsteady flow toward a well in various types of aquifers)	6	-	6	12	12
3	Well design and construction (well design – well construction and maintenance)	8	-	8	16	16
4	Saltwater intrusion in coastal aquifers (introduction –	8	-	8	16	16

	Ghyben-Herzberg equation – formulation of saltwater intrusion – modeling of saltwater intrusion – theory of images –controlling of saltwater intrusion).					
Total		**28**	**-**	**28**	**56**	**56**

4- Teaching and learning methods:

No	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
Fundamentals of Groundwater and properties of Soil (types of aquifers –porosity – rock and water – degree of saturation – hydraulic conductivity and intrinsic permeability).	x			x		x	x						
Groundwater movement and well hydraulics (Darcy law – direction of the hydraulic gradient – groundwater recharge – seepage through porous media – homogeneity and isotropy –flow in stratified media – steady and unsteady flow toward a well in various types of aquifers).	x			x	x	x	x						
Well design and construction (well design –	x			x	x	x	x						

well construction and maintenance)													
Saltwater intrusion in coastal aquifers (introduction – Ghyben-Herzberg equation – formulation of saltwater intrusion – modeling of saltwater intrusion – theory of images – controlling of saltwater intrusion).	x			x		x							x

5- Teaching and learning methods for disable students:

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

6- Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Periodic exam	C3 C4 C12 C13	a1 a1 b1 c1
2	Practical /Oral	-	-
4	Final term examination	C3 C4 C12 C13	a1 a1 b1 c1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	7^{th} ,8^{th}, 9^{th}

2	Practical /Oral	–
3	Final term examination	15^{th}

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	40%
2	Practical /Oral	-
3	Final term examination	60%
Total		**100%**

7- List of References:

No.	Reference List
1	El–Ghandour, H.A., (2005). "Analysis and Optimization of Salt Water 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., (2005). "Groundwater Hydrology". Willy India
3	John H. Cushman, Daniel M. Tartakovsky. (2017) The Handbook of Groundwater Engineering. Available on Taylor & Francis eBooks
4	El–Ghandour, H.A., (2005). "Analysis and Optimization of Salt Water Intrusion in Coastal Aquifers". M.Sc. Thesis, Irrigation and Hydraulics Dept., Faculty of Engineering, El-Mansoura University, P. 177.

8- Facilities required for teaching and learning:

No.	Facility
1	Lecture Classroom
2	Lab Facilities
3	White Board
4	Data Show System

5	Presenter

9- Matrix of knowledge and skills of the course:

No.	Topic	Aims	Competencies	LO's
1	Fundamentals of Groundwater and properties of Soil (types of aquifers – porosity – rock and water – degree of saturation – hydraulic conductivity and intrinsic permeability)	7, 10	C3 C4	a1 a1
2	Groundwater movement and well hydraulics (Darcy law – direction of the hydraulic gradient – groundwater recharge – seepage through porous media – homogeneity and isotropy – flow in stratified media – steady and unsteady flow toward a well in various types of aquifers)	7, 10	C3 C4 C12	a1 a1 b1
3	Well design and construction (well design – well construction and maintenance)	7, 10	C3 C4 C12	a1 a1 b1
4	Saltwater intrusion in coastal aquifers (introduction – Ghyben-Herzberg equation – formulation of saltwater intrusion – modeling of saltwater intrusion – theory of images – controlling of saltwater intrusion).	7, 10	C4 C13	a1 c1

Course coordinator: Assoc. Prof. Dr. Mohamed Gabr

Head of Department: Prof. Dr. Mohamed ElKiki

Date of Approval: 10/2022

Pavement Design
(CIE424B)

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	CIE424B
Year/Level	level 4
Specialization	Elective
Authorization Date of Course Specification	10/2022

Teaching hours	**Lectures**	**laboratory**	**Exercise**	**Student's load**
	2	-	2	4

2- Course Aims

No.	Aims
1	Master a broad range of engineering knowledge and specialized skills regarding the optimum design of Roadways and Airports.
7	Achieve an optimum design of Roadways and Airports.

3- Competencies:

Competencies	Learning Outcomes (LO'S)
C11 Select appropriate and sustainable technologies for Transportation, Roadways and Airports.	**a1.** Recognize the fundamentals of Transportation, Roadways and Airports. **a2.** Summarize, appropriate and sustainable technologies for Transportation, Roadways and Airports. **c1** testing and analysis properties and strength of materials of Transportation, Roadways and Airports.
C12 Achieve an optimum design of Transportation, Roadways and Airports.	**b2** Achieve an optimum design of Transportation, Roadways and Airports.

4. Course Contents:

No.	Topics	Lectures	Exercise	laboratory	Student's load
1	Characteristics of pavement loads.	4	4	-	8
2	Stress analysis in pavements.	4	4	-	8
3	Design practices, construction, rehabilitation and maintenance.	4	4	-	8
4	Optimization of the design of rigid and flexible pavements systems.	4	4	-	8
5	Empirical and mechanistic stochastic structural subsystems.	4	4	-	8
6	Utility theory, serviceability concept, cost studies, traffic delay, environmental deterioration, rehabilitation and maintenance optimization systems.	8	8	-	16
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	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling
Characteristics of pavement loads.	x	x			x	x	x							
Stress analysis in pavements.	x	x			x	x	x							
Design practices, construction, rehabilitation and maintenance.	x	x			x	x	x							
Optimization of the design of rigid and	x	x			x	x	x							

flexible pavements systems.														
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 disable 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	Periodic exam	C11 C12	a1, a2, c1 b2
2	Practical /Oral	C11 C12	a1, a2, c1 b2
3	Final term examination	C11 C12	a1, a2, c1 b2

7.2 Evaluation Schedule: -

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

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	40%
2	Practical /Oral	-
3	Final term examination	60%
Total		**100%**

8. List of References:

No.	Reference List
1	Khurmi, R.S. (2014). " A text book of hydraulics, fluid mechanics and hydraulic machines" S. Chanel and company Ltd. P.990
2	Subramanya, K. (2008) "Flow in open channels" McGraw- 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
5	Lab.		

10. Matrix of knowledge and skills of the course:

No	Topic	Aims	Competencies	LO's	Teaching and Learning Strategy
1	Characteristics of pavement loads.	1, 7	C11	a1, a2, c1	Face-to-Face Lecture Brain storming
2	Stress analysis in pavements.	1, 7	C11	a1, a2, c1	Face-to-Face Lecture Brain storming Discussion sessions
3	Design practices, construction, rehabilitation and maintenance.	1,7	C11	a1, a2, c1	Face-to-Face Lecture Brain storming Discussion sessions Lab

4	Optimization of the design of rigid and flexible pavements systems.	1, 7	C12	b2	Face-to-Face Lecture Brain storming Discussion sessions Lab
5	Empirical and mechanistic stochastic structural subsystems.	1, 7	C12	b2	Face-to-Face Lecture Brain storming
6	Utility theory, serviceability concept, cost studies, traffic delay, environmental deterioration, rehabilitation and maintenance optimization systems.	1, 7	C12	b2	Face-to-Face Lecture Brain storming Discussion sessions Problem solving Lab.

Course Coordinator: Assoc. Prof. Dr. Alaa Gabr

Head of Department: Prof. Dr. Mohamed Elkiki**.**

Date of Approval: 10/2022.

Pre-Fabricated Concrete Frames
(CIE424C)

1. Basic Information:

Program Title	Civil Engineering Department
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Civil Engineering Department
Course Title	Pre-Fabricated Concrete Frames
Course Code	CIE424C
Year/Level	Level 4
Specialization	Elective
Authorization Date of Course Specification	10/2022

Teaching hours	**Lectures**	**laboratory**	**Exercise**	**Student's load**
	2	-	2	4

4- 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.
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 Pre-Fabricated Concrete Frames.

5- 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	Exercise	laboratory	Student's load
1	Performance of prefabricated concrete	4	4	-	8
2	Design of concrete supported to shear stress	4	4	-	8
3	Design of columns	4	4	-	8
4	Design of roofs	4	4	-	8
5	Design of building frames	4	4	-	8
6	Design projects using the computer	4	4	-	8
7	Detailed reports	4	4	-	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	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling
Performance of prefabricated concrete	x	x			x	x	x							
Design of concrete supported to shear stress	x	x			x	x	x							

Design of columns	x	x			x	x	x							
Design of roofs	x	x			x	x	x							
Design of building frames	x	x			x	x	x							
Design projects using the computer	x	x			x	x	x							
Detailed reports	x	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	Periodic exam	C2 C4 C11	a2 a3 a1 a1, a2
2	Practical /Oral	-	-
3	Final term examination	C4 C11	a1, a3 a2

7.2 Evaluation Schedule: -

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

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	40%
2	Practical /Oral	-
3	Final term examination	60%
Total		**100%**

8. List of References:

No.	Reference List
1	**Essential books (text books / 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, 1988.

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	Teaching and Learning Strategy
1	Performance of prefabricated concrete	4,10	C4	a3, a1	Face-to-Face Lecture Brain storming
2	Design of concrete supported to shear stress	4,10	C4 C11	a3 a1, a2	Face-to-Face Lecture Brain storming Discussion sessions
3	Design of columns	4,10	C11	a1, a2	Face-to-Face Lecture Brain storming Discussion sessions

4	Design of roofs	4,10	C4 C11	a3 a1, a2	Face-to-Face Lecture Brain storming
5	Design of building frames	4,10	C4 C11	a3 a1, a2	Face-to-Face Lecture Brain storming
6	Design projects using the computer	4,10	C11	a1, a2	Face-to-Face Lecture Brain storming
7	Detailed reports	4,10	C11	a1, a2	Face-to-Face Lecture Brain storming

Course Coordinator: Dr. / Nessren El-awadly.

Head of Department: Prof. Dr. Mohamed Elkiki**.**

Date of Approval: 10/2022

Project Management2
(CIE424D)

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	CIE 424D
Year/Level	level 4
Specialization	Elective 3
Authorization Date of Course Specification	10/2022

Teaching hours	**Lectures**	**Laboratory**	**Exercise**	**Contact**	**Student's Load**
	2	-	2	4	4

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)
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. **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 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.	**a1** Describe quality assurance systems, codes of practice, and standards, as well as health and safety regulations and environmental concerns. **a2** List the engineering-related business and management principles. **a3** Define contemporary engineering technologies and their applications in relation to disciplines. **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. **c2** Use fundamental organizational and project management abilities. **c3** Utilize modern technologies. **c4** Apply quality assurance procedures and follow codes and standards.
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	**a1** define plain and mange construction process. **b1** Address construction defects, instability and quality issues

safety measures in construction and materials; and assess environmental impacts of projects.	**c1** Assess environmental impacts of projects.

4. Course Contents:

No.	Topics	Lecture	laboratory	Exercise	Contact	Student's load
1	Construction Projects Work Breakdown Structure (WBS)	4	-	4	**8**	**8**
2	Time Planning and Scheduling Techniques: "Networks –Line of Balance Method for Repetitive Units Projects"	6	-	6	12	12
3	Cash Flow	6	-	6	12	12
4	Cost Planning: "Cost Estimation – Cost Control"	6	-	6	12	12
5	Using Computer Programs in Construction Project Management	6	-	6	12	12
Total		**28**	**-**	**28**	**56**	**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
1	Construction Projects Work Breakdown Structure (WBS)	**x**	**x**			**x**	**x**		**x**					
2	Time Planning and Scheduling Techniques:	**x**	**x**			**x**	**x**		**x**					

	"Networks –Line of Balance Method for Repetitive Units Projects"													
3	Cash Flow	x	x			x	x		x					
4	Cost Planning: "Cost Estimation – Cost Control"	x	x			x	x		x					
5	Using Computer Programs in Construction Project Management	x	x			x	x		x					
6	Construction Projects Work Breakdown Structure (WBS)	x	x			x	x		x					

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	LO's
1	Periodic Exams	C3 C4 C12 C13	
2	Practical /Oral	-	-
3	Final Term Examination	C3 C4	

		C12 C13	

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic Exams	3^{rd} ,8^{th} , 12^{th}
2	Practical /Oral	-
3	Final Term Examination	15^{th}

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic Exams	40%
2	Practical /Oral	-
3	Final Term Examination	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 of The Course:

No	Topic	Aims	Competencies	LO's

1	Construction Projects Work Breakdown Structure (WBS)	7, 10	C3 C4 C12 C13	
2	Time Planning and Scheduling Techniques: “Networks –Line of Balance Method for Repetitive Units Projects”	7, 10	C3 C4 C12 C13	
3	Cash Flow	7, 10	C3 C4 C12 C13	
4	Cost Planning: “Cost Estimation – Cost Control”	7, 10	C3 C4 C12 C13	
5	Using Computer Programs in Construction Project Management	7, 10	C3 C4 C12 C13	

Course Coordinator: Dr. Hamdy Abd Elaty
Head of Department: Prof. Dr. Mohamed Elkiki**.**
Date of Approval: 10/2022

Project Visibility Study
(CIE424E)

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	CIE 424E
Year/Level	level 4
Specialization	Elective 3
Authorization Date of Course Specification	10/2022

Teaching hours	**Lectures**	**Laboratory**	**Exercise**	**Contact**	**Student's Load**
	2	-	2	4	4

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)
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. **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 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.	**a1** Describe quality assurance systems, codes of practice, and standards, as well as health and safety regulations and environmental concerns. **a2** List the engineering-related business and management principles. **a3** Define contemporary engineering technologies and their applications in relation to disciplines. **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. **c2** Use fundamental organizational and project management abilities. **c3** Utilize modern technologies. **c4** Apply quality assurance procedures and follow codes and standards.
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 assess environmental impacts of projects.	**a1** defines plain and mange construction process. **b1** Address construction defects, instability, and quality issues **c1** Assess environmental impacts of projects.

4. Course Contents:

No.	Topics	Lecture	laboratory	Exercise	Contact	Student's load
1	The Importance of Visibility Study for The Projects	2	-	2	4	4
2	The Definition of The Visibility Study and The Historical Development for It	2	-	2	4	4
3	The Project Essence and Its Principles and Forms	2	-	2	4	4
4	Initial Visibility Studies and Its Elements	2	-	2	4	4
5	Environmental Visibility Studies	2	-	2	4	4
6	Important Financial Sides in Visibility Study	2	-	2	4	4
7	The Important Monetary Sides in Visibility Study	2	-	2	4	4
8	The Important Marketing Sides	2	-	2	4	4
9	The Exhibition of The Products and The Effective Parameters in It	2	-	2	4	4
10	The Pricing Policies	2	-	2	4	4
11	The Situation of The Government The Consumer and The Competitive Projects	2	-	2	4	4
12	The Engineering and Technical Visibility for The Project	2	-	2	4	4

13	Study of The Social Visibility	2	-	2	4	4
14	Evaluation Methods of The Visibility Study	2	-	2	4	4
Total		**28**	**-**	**28**	**56**	**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
1	The Importance of Visibility Study for The Projects	x	x			x	x		x					
2	The Definition of The Visibility Study and The Historical Development for It	x	x			x	x		x					
3	The Project Essence and Its Principles and Forms	x	x			x	x		x					
4	Initial Visibility Studies and Its Elements	x	x			x	x		x					
5	Environmental Visibility Studies	x	x			x	x		x					
6	Important Financial Sides in Visibility Study	x	x			x	x		x					

7	The Important Monetary Sides in Visibility Study	x	x			x	x		x					
8	The Important Marketing Sides	x	x			x	x		x					
9	The Exhibition of The Products and The Effective Parameters in It	x	x			x	x		x					
10	The Pricing Policies	x	x			x	x		x					
11	The Situation of The Government The Consumer and The Competitive Projects	x	x			x	x		x					
12	The Engineering and Technical Visibility for The Project	x	x			x	x		x					
13	Study of The Social Visibility	x	x			x	x		x					
14	Evaluation Methods of The Visibility Study	x	x			x	x		x					

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	LO's
1	Periodic Exams	C3	

		C4 C12 C13	
2	Practical /Oral	-	-
3	Final Term Examination	C3 C4 C12 C13	

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic Exams	3^{rd} ,8^{th} , 12^{th}
2	Practical /Oral	-
3	Final Term Examination	15^{th}

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic Exams	40%
2	Practical /Oral	-
3	Final Term Examination	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 of The Course:

No	Topic	Aims	Competencies	LO's
1	The Importance of Visibility Study for The Projects	7, 10	C3 C4 C12 C13	
2	The Definition of The Visibility Study and The Historical Development for It	7, 10	C3 C4 C12 C13	
3	The Project Essence and Its Principles and Forms	7, 10	C3 C4 C12 C13	
4	Initial Visibility Studies and Its Elements	7, 10	C3 C4 C12 C13	
5	Environmental Visibility Studies	7, 10	C3 C4 C12 C13	
6	Important Financial Sides in Visibility Study	7, 10	C3 C4 C12 C13	
7	The Important Monetary Sides in Visibility Study	7, 10	C3 C4 C12 C13	
8	The Important Marketing Sides	7, 10	C3 C4 C12 C13	

9	The Exhibition of The Products and The Effective Parameters in It	7, 10	C3 C4 C12 C13	
10	The Pricing Policies	7, 10	C3 C4 C12 C13	
11	The Situation of The Government The Consumer and The Competitive Projects	7, 10	C3 C4 C12 C13	
12	The Engineering and Technical Visibility for The Project	7, 10	C3 C4 C12 C13	
13	Study of The Social Visibility	7, 10	C3 C4 C12 C13	
14	Evaluation Methods of The Visibility Study	7, 10	C3 C4 C12 C13	

Course Coordinator: Dr. Abdo El-Naquib
Head of Department: Prof. Dr. Mohamed Elkiki**.**
Date of Approval: 10/2022

Urban Transportation Planning
(CIE424F)

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	CIE424F
Year/Level	level 4
Specialization	Elective
Authorization Date of Course Specification	10/2022

Teaching hours	**Lectures**	**laboratory**	**Exercise**	**Student's load**
	2	-	2	4

2-Course Aims:

No.	Aims
1	Master a broad range of engineering knowledge and specialized skills regarding the optimum design of Roadways and Airports.
7	Achieve an optimum design of Roadways and Airports.

3-Competencies:

Competencies	Learning Outcomes (LO'S)
C11 Select appropriate and sustainable technologies for Transportation, Roadways and Airports.	**a1.** Recognize the fundamentals of Transportation, Roadways and Airports. **a2.** Summarize, appropriate and sustainable technologies for Transportation, Roadways and Airports. **c1** testing and analysis properties and strength of materials of Transportation, Roadways and Airports.
C12 Achieve an optimum design of Transportation, Roadways and Airports.	**b2** Achieve an optimum design of Transportation, Roadways and Airports.

4- Contents:

No.	Topics	Lectures	Exercise	laboratory	Student's load
1	Land use-transportation interaction.	4	4	-	8
2	The process of urban transportation planning,	4	4	-	8
3	urban transport problems, goals, objectives, data and information.	4	4	-	8
4	survey design.	4	4	-	8
5	travel demand forecasting: 1) trip generation, 2) trip distribution,3) modal choice, 4) route assignment.	4	4	-	8
6	The evaluation of urban transport systems.	4	4	-	8
7	transport system management, demand management, and control.	4	4	-	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	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling
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, vehicle and road. Route location	x	x			x	x	x							

, 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 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	Periodic exam	C11 C12	a1, a2, c1 b2
2	Practical /Oral	C11 C12	a1, a2, c1 b2

3	Final term examination	C11 C12	a1, a2, c1 b2

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	7th - 8th -9th
2	Practical /Oral	-
3	Final term examination	15th

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	40%
2	Practical /Oral	-
3	Final term examination	60%
Total		**100%**

8-List of References:

No.	Reference List
1	Recommended books: Ott, Introduction to Statistical Methods and Data Analysis, PWS-Kent, 1990.
2	Simulation of urban transport system, slim hammed and mekkiksouri , fib 2014
3	Urban dynamics and simulation models, densipumai, romainreuillon , 2022

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	Teaching and Learning Strategy
1	Land use-transportation interaction.	1, 7	C11	a1, a2, c1	Face-to-Face Lecture Brain storming

2	The process of urban transportation planning,	1, 7	C11	a1, a2, c1	Face-to-Face Lecture Brain storming Discussion sessions
3	urban transport problems, goals, objectives, data and information.	1,7	C11	a1, a2, c1	Face-to-Face Lecture Brain storming Discussion sessions Lab
4	survey design.	1, 7	C12	b2	Face-to-Face Lecture Brain storming Discussion sessions Lab
5	travel demand forecasting: 1) trip generation, 2) trip distribution,3) modal choice, 4) route assignment.	1, 7	C12	b2	Face-to-Face Lecture Brain storming
6	The evaluation of urban transport systems.	1, 7	C12	b2	Face-to-Face Lecture Brain storming
7	transport system management, demand management, and control.	1, 7	C12	b2	Face-to-Face Lecture Brain storming

Course Coordinator: Assoc. Prof / Alaa Gabr

Head of Department: Prof. Dr. Mohamed Elkiki**.**

Date of Approval: 10/2022

Special Concrete Structures 1
CIE424G

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	CIE424G
Year/Level	Level 4
Specialization	Elective
Authorization Date of Course Specification	10/2022

Teaching hours	**Lectures**	**laboratory**	**Exercise**	**Student's load**
	2	-	2	4

2- Course Aims

No.	Aims
1	Master a broad range of engineering knowledge and specialized skills, as well as the ability to apply acquired knowledge in real-world situations by applying 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 Concrete structures.

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.
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	Total	Total	Total	Total
1	Introduction to tall building structures	4	4	-	8
2	Design criteria for tall building structures – loading - structural formation – modeling for analysis – braced frames – rigid frames – shear walls	24	24	-	48
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	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling
Introduction to tall building structures	x	x			x	x	x							
Design criteria for tall building structures – loading - structural formation – modeling for analysis – braced frames – rigid frames – shear walls	x	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	ILO's
1	Periodic exam	C2 C9	a2, c3 d1
2	Practical /Oral	-	-
3	Final term examination	C2 C9 C12	a2, c3 d1 b1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	$2nd$,$7th$, $8th$, $9th$
2	Practical /Oral	-
3	Final term examination	$15th$

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	40%
2	Practical /Oral	-
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 2022.
2	Cairo. 2014. EL-Behairy, S., "Reinforced Concrete Design Hand Book, ". 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	Teaching and Learning Strategy
1	Introduction to tall building structures	1,7	C2	a2	Face-to-Face Lecture Brain storming Discussion sessions
2	Design criteria for tall building structures – loading - structural formation – modeling for analysis – braced frames – rigid frames – shear walls	1,7	C2 C9 C12	a2, c3 d1 b1	Face-to-Face Lecture Brain storming

Course Coordinator: Dr / shady Ragheb

Head of Department: Prof. Dr. Mohamed Elkiki.

Date of Approval: 10/2022

Foundation Engineering 2
(CIE424H)

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 2
Course Code	CIE424H
Year/Level	level 4
Specialization	Elective
Authorization Date of Course Specification	10/2022

Teaching hours	**Lectures**	**laboratory**	**Exercise**	**Student's load**
	2	-	2	4

2- Course Aims

No.	Aims
7	Achieve an optimum design of Foundations and Earth Retaining Structures
10	Select appropriate and sustainable technologies for construction of 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. **b3** Applying engineering basics that are relevant to the subject**.** **c3** Identify, formulate, and solve complex engineering problems by applying engineering fundamentals.
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	laboratory	Exercise	Student's load
1	Introduction to soil hydraulics	4	4	-	8
2	hydraulic Conductivity determination - Flow through porous media -	6	6	-	12
3	One dimensional flow two dimensional flows	6	6	-	12
4	Retaining walls.	6	6	-	12
5	Sheet piles design	6	6	-	12
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	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling
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 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	Periodic exam	C1, C4	b3, a1
2	Practical /Oral	-	-
3	Final term examination	C1 C2 C10 C11 C12	a3, b2 a1 d1, d2 a2 b2

7.2 Evaluation Schedule:

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

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	40%
2	Practical /Oral	-
3	Final term examination	60%
Total		**100%**

8. List of References:

No.	Reference List
1	Gulati, S.K. and Datta, M. (2015), "Geotechnical Engineering ", Tata McGraw-Hill, New Delhi.
2	الكود المصري لميكانيكا التربة وتصميم وتنفيذ الاساسات كودECP 202-2011

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	Teaching and Learning Strategy
1	Introduction to soil hydraulics	1, 7	C1, C4	b3, a1	Face-to-Face Lecture Brain storming
2	hydraulic Conductivity determination - Flow through porous media -	1, 7	C1, C4	a1	Face-to-Face Lecture Brain storming Discussion sessions
3	One dimensional flow two dimensional flows	1,7	C1, C4	a1	Face-to-Face Lecture Brain storming Discussion sessions
4	Retaining walls.	1, 7	C1, C4	a1 a3 b3	Face-to-Face Lecture Brain storming Discussion sessions Problem solving
5	Sheet piles design	1, 7	C1 C2 C10 C11 C12	a3, b2 a1 d1, d2 a2 b2	Face-to-Face Lecture. Brain storming. Problem solving. Self-learning and Research.

Course Coordinator: Dr/ Hany Hashish

Head of Department: Prof. Dr. Mohamed Elkiki**.**

Date of Approval: 10/2022.

Productivity Enhancement Methods
(CIE424I)

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	CIE 424I
Year/Level	level 4
Specialization	Elective 3
Authorization Date of Course Specification	10/2022

Teaching hours	**Lectures**	**Laboratory**	**Exercise**	**Contact**	**Student's Load**
	2	-	2	4	4

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)
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	**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.

the principles and contexts of sustainable design and development.	**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. **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 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.	**a1** Describe quality assurance systems, codes of practice, and standards, as well as health and safety regulations and environmental concerns. **a2** List the engineering-related business and management principles. **a3** Define contemporary engineering technologies and their applications in relation to disciplines. **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. **c2** Use fundamental organizational and project management abilities. **c3** Utilize modern technologies. **c4** Apply quality assurance procedures and follow codes and standards.
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 assess environmental impacts of projects.	**a1** defines plain and mange construction process. **b1** Address construction defects, instability, and quality issues **c1** Assess environmental impacts of projects.

4. Course Contents:

No.	Topics	Lecture	laboratory	Exercise	Contact	Student's load
1	Identification of Bottlenecks	4	-	4	8	8
2	Impact of Human Performance on Productivity	8	-	8	16	16
3	Effect of The Interaction Between Technological Advances and Human Capabilities on Performance and Productivity	8	-	8	16	16
4	Cost Reduction and Productivity Improvement Programs	8	-	8	16	16
Total		**28**	**-**	**28**	**56**	**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
1	Identification of Bottlenecks	x	x			x	x		x					

2	Impact of Human Performance on Productivity	x	x			x	x		x					
3	Effect of The Interaction Between Technological Advances and Human Capabilities on Performance and Productivity	x	x			x	x		x					
4	Cost Reduction and Productivity Improvement Programs	x	x			x	x		x					

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	LO's
1	Periodic Exams	C3 C4 C12 C13	
2	Practical /Oral	-	-
3	Final Term Examination	C3 C4 C12 C13	

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic Exams	3^{rd} ,8^{th} , 12^{th}
2	Practical /Oral	-
3	Final Term Examination	15^{th}

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic Exams	40%
2	Practical /Oral	-
3	Final Term Examination	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 of The Course:

No	Topic	Aims	Competencies	LO's
1	Identification of Bottlenecks	7, 10	C3 C4 C12	

			C13	
2	Impact of Human Performance on Productivity	7, 10	C3 C4 C12 C13	
3	Effect of The Interaction Between Technological Advances and Human Capabilities on Performance and Productivity	7, 10	C3 C4 C12 C13	
4	Cost Reduction and Productivity Improvement Programs	7, 10	C3 C4 C12 C13	

Course Coordinator: Dr. Abdo El-Naquib
Head of Department: Prof. Dr. Mohamed Elkiki**.**
Date of Approval: 10/2022

Quality Assurance
(CIE424J)

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
Course Code	CIE424J
Year/Level	level 4
Specialization	Elective
Authorization Date of Course Specification	10/2022

Teaching hours	**Lectures**	**laboratory**	**Exercise**	**Student's load**
	2	-	2	4

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)**
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
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.

	c2 Use fundamental organizational and project management abilities.
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

4. Course Contents:

No.	Topics	Lectures	laboratory	Exercise	Student's load
1	Reliability of parallel and serial engineering systems	8	8	-	16
2	Life testing. Impact of reliability on the design process in engineering fields such as mechanical, electrical and structural engineering.	10	10	-	20
3	Studies the effect of equipment reliability on product quality.	10	10	-	20
Total	**28**	**28**	**28**		**56**

5. Teaching and learning methods:

No	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.
Reliability of parallel and serial engineering systems	x			x	x								x	
Life testing. Impact of reliability on the	x			x	x								x	

design process in engineering fields such as mechanical, electrical and structural engineering.														
Studies the effect of equipment reliability on product quality.	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	Periodic exam	C3 C4	a1, a2 a1, c2
2	Practical /Oral	-	-
3	Final term examination	C3 C4 C14	a1, a2 a1, c2 a1, b1

7.2 Evaluation Schedule:

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

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	40%
2	Practical /Oral	-
3	Final term examination	60%
Total		**100%**

8. List of References:

No.	Reference List
1	**Essential books (text books / 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	Teaching and Learning Strategy
1	Reliability of parallel and serial engineering systems	4	C3	a1, a2	Face-to-Face Lecture Brain storming
2	Life testing. Impact of reliability on the design process in engineering fields such as mechanical, electrical and structural engineering.	4	C4 C14	a1 b1	Face-to-Face Lecture Brain storming Discussion sessions

3	Studies the effect of equipment reliability on product quality.	4	C4 C14	a1 b1 C2	Face-to-Face Lecture Brain storming Discussion sessions

Course Coordinator: Dr / Abdo EL Naquib

Head of Department: Prof. Dr. Mohamed Elkiki

Date of Approval: 10/2022

River engineering
(CIE425A)

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	CIE425A
Year/Level	Level 4
Specialization	Elective 4-Semester 2
Authorization Date of Course Specification	10/2022

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

2- Course Aims:

No.	Aims
7	Achieve an optimum design of hydraulic structures on rivers.
8	Plan and manage instability and quality issues and materials related to hydraulic structures on rivers
10	Select appropriate and sustainable technologies for dike, spillway, dam, gate, pumping stations, sheet pile

3- Graduate Competencies:

Competencies	Learning outcomes (LO'S)
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 Classifications of rivers, data collection method; velocity and flow rate measurements, counter measure on sediment control; and corrosion deposition scour
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 to design of hydraulic structures: dike, spillway, and dam.
C12: Achieve an optimum design of hydraulic structures on rivers.	**b1:** Achieve an optimum design of dike, spillway, and dam prepare bill of quantity

	and cost estimation, operation and maintenance.
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 on rivers.

4. Course Contents:

No.	Topics	Lectures	Exercise	Lab	Contact	Student's load
1	Classifications of rivers, data collection method; velocity and flow rate measurements.	6	6	-	12	12
2	Design of hydraulic structures: dike, spillway, dam	10	10	-	20	20
3	Design of pumping station, sheet pile.	4	4	-	8	8
4	Counter measure on sediment control; corrosion deposition scour, bill of quantity and cost estimation, operation and maintenance.	8	8	-	16	16
Total		**28**	**28**	**-**	**56**	**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
Classifications of rivers, data collection method; velocity and flow rate measurements.	*x*			x	x	x							
Design of hydraulic structures: dike, spillway, dam	x			x	x	x	x						
Countermeasure on sediment control; corrosion deposition scour, bill of quantity and cost estimation, operation and maintenance.	x			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 Assessment Methods:

No.	Assessment Method	Competencies	LOs
1	Periodic exam	C3 C4 C12 C13	a1 a1 b1 c1
2	Practical/Oral	-	-
3	Final Exam	C3 C4 C12 C13	a1 a1 b1 c1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	7^{th}, 8^{th}, 9^{th}
2	Practical /Oral	-
3	Final exam	15^{th}

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	40%
2	Practical /Oral	-
3	Final exam	60%
Total		**100%**

8. List of References:

1	EBEED, G.s. “Lecture Notes on Design of irrigation Structures” Ain shams University, faculty of Engineering, 2014.
2	ASWA G.L., “irrigation and water Resources Engineering”, New international (p) limited, publishers, Ansari Road Daryagauj, New Delhi,2005.

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	Classifications of rivers, data collection method; velocity and flow rate measurements.	7,8,10	C3	a1
2	Design of hydraulic structures: dike, spillway, dam, gate, pumping stations, sheet pile.	7,8,10	C4 C12	a1 b1
3	Countermeasure on sediment control; corrosion deposition scour, bill of quantity and cost estimation, operation and maintenance.	7,8,10	C12 C13	b1 c1

Course Coordinator: Assoc. Prof. Dr./ Mohamed Gabr

Head of Department: Prof Dr. / Mohamed El kiki

Date of Approval: 10/2022

Hydraulics Engineering
(CIE425B)

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	CIE425B
Year/Level	Level 4
Specialization	Elective
Authorization Date of Course Specification	10/2022

Teaching hours	**Lectures**	**laboratory**	**Exercise**	**Student's load**
	2	-	2	4

2-Course Aims:

No.	Aims
7	Achieve an optimum design of water control structures and water distribution systems.
8	Plan and manage construction processes for water distribution systems and pump stations
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 hydrology and fluid mechanics

3-Graduate Competencies:

Competencies	Learning outcomes (LO'S)
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 Basic governing equations of fluid flow (Bernoulli – continuity – application)
C4: Utilize contemporary technologies, codes of practice and standards, quality guidelines,	**a1:** Describe contemporary technologies and codes of practice for flow through orifices (types of orifices – vena contracta –

health and safety requirements, environmental issues and risk management principles.	hydraulic coefficients – flow through different types of orifices – time for filling and emptying tanks
C12: Achieve an optimum design of hydraulic structures, pump stations, and pipe networks.	**b1:** Achieve an optimum design for orifices, weirs, pump stations, and pipe networks.
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:** Plan and manage construction processes of water control structures and pipe net works projects.

4. Course Contents:

No.	Topics	Lectures	Exercise	Lab	Contact	Students load
1	Basic governing equations (Bernoulli and Continuity) – Applications	4	4	-	8	8
2	Flow through orifices (types – equations – time of filling and emptying tanks)	4	4	-	8	8
3	Flow over weirs (types – equations)	4	4	-	8	8
4	Application of Momentum equation	2	2	-	4	4
5	Steady flow in pipe lines (Basics) – Hydraulic analysis of pipe line networks.	10	10	-	20	20
6	Unsteady flow in pipeline networks.	4	4	-	8	8

	Hydraulic machinery (design of pump station)					
Total		**28**	**28**	**-**	**56**	**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**
Basic governing equations (Bernoulli and Continuity) – Applications	x			x	x	x							
Flow through orifices (types – equations – time of filling and emptying tanks)	x			x	x	x							
Flow over weirs (types – equations)	x			x	x	x							
Application of Momentum equation	x			x	x	x							
Steady flow in pipe lines (Basics) – Hydraulic	x			x	x	x							

analysis of pipe line networks													
Unsteady flow in pipeline networks. Hydraulic machinery (design of pump station)	x			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 Assessment Methods:

No.	Assessment Method	Competencies	LOs
1	Periodic exam	C3 C4 C12 C13	a1 a1 b1 c1
2	Practical/Oral	-	-
3	Final Exam	C3 C4 C12 C13	a1 a1 b1 c1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	$7^{th}, 8^{th}, 9^{th}$

2	Practical /Oral	-
3	Final Exam	15^{th}

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	40%
2	Practical /Oral	-
3	Final Exam	60%
Total		**100%**

8. List of References:

1 2	Fluid mechanics through problems R.J GARDE, New AGE publishers- 2006 Flow in open channels K. Subramanya. Tata Mcgraw hill education private limited, NEW DELHI 2011

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	7,8,10	C3	a1
2	Flow through orifices (types – equations – time of filling and emptying tanks)	7,8,10	C4 C12	a1 b1

3	Flow over weirs (types – equations)	7,8,10	C12	b1
4	Application of Momentum equation	7,8,10	C12	b2
5	Steady flow in pipe lines (Basics) – Hydraulic analysis of pipe line networks	7,8,10	C12 C13	b1 c1
6	Unsteady flow in pipeline networks. Hydraulic machinery (design of pump station)	7,8,10	C12 C13	b1 c1

Course coordinator: Assoc. Prof. Dr./ Mohamed Gabr

Head of Department: Prof. / Mohamed El-kiki

Date of Approval: 10/2022

Traffic Control Systems
(CIE425C)

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	CIE425C
Year/Level	level 4
Specialization	Elective
Authorization Date of Course Specification	10/2022

Teaching hours	**Lectures**	**laboratory**	**Exercise**	**Student's load**
	2	-	2	4

2- Course Aims

No.	**Aims**
7	Achieve an optimum design of the following civil engineering topics: Transportation and Traffic, Roadways and Airports.
8	Plan and manage traffic processes; address high traffic flow roads; maintain safety measures in roads; and assess traffic impacts on transportation.

3- Competencies:

Competencies	**Learning Outcomes (LO'S)**
C11 Select appropriate and sustainable technologies for construction road and airports works.	**a2**. Summarize, appropriate and sustainable technologies for roads construction, bituminous materials, airports layout and pavement design
C12 Plan and manage traffic processes; address high traffic flow roads, maintain safety measures in construction of new roads; and assess traffic impacts on transportation.	**b2** Achieve an optimum design of traffic signals

4- Course Contents:

No.	**Topics**	**Lectures**	**laboratory**	**Exercise**	**Student's load**
1	Introduction to existing and new traffic control systems strategies	8	8	-	16

	including both off-line signal optimization techniques and real-time computer traffic-responsive control concepts.				
2	Control concepts and methods for signal intersections, arterial systems and area traffic networks.	10	10	-	20
3	Traffic control system evaluation techniques using measures of effectiveness (M.O.E) for signal intersections, arterial, and networks.	10	10	-	20
Total		**28**	**28**	**-**	**56**

5- Teaching and learning methods:

No	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	
Introduction to existing and new traffic control systems strategies including both off-line signal optimization techniques and real-time computer traffic-responsive control concepts	x	x			x	x	x							
Control concepts and methods for	x	x			x	x	x							

signal intersections, arterial systems and area traffic networks.														
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 disable 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	Periodic exam	C11	a2
2	Practical /Oral	C11	a2
3	Final term examination	C11 C12	a2 b2

7.2 Evaluation Schedule:

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

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	40%
2	Practical /Oral	-
3	Final term examination	60%
Total		**100%**

8- List of References:

No.	Reference List
1	Essential books (text books): - Transportation Engineering, an Introduction, C. JotinKhisty, 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.
3	Control of traffic systems in buildings, 2006 sandboarder

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	Teaching and Learning Strategy
1	Introduction to existing and new traffic control systems strategies including both offline signal optimization techniques and real-time computer traffic-responsive control concepts	7, 8	C11	a2	Face-to-Face Lecture Brain storming Discussion sessions
2	Control concepts and methods for signal intersections, arterial systems and area traffic networks.	7, 8	C11 C12	a2 b2	Face-to-Face Lecture Brain storming Discussion

3	Traffic control system evaluation techniques using measures of effectiveness (M.O.E) for signal intersections, arterial, and networks.	7, 8	C11 C12	a2 b2	Face-to-Face Lecture Brain storming Discussion sessions

Course Coordinator: Assoc. Prof /Alaa Gabr

Head of Department: Prof. Dr. Mohamed Elkiki

Date of Approval: 10/2022

Tunneling and underground Excavation
(CIE425D)

1- Basic Information:

Program Title	Civil Engineering Department
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Civil Engineering Department
Course Title	Tunneling and underground Excavation
Course Code	CIE425D
Year/Level	level 4
Specialization	Elective
Authorization Date of Course Specification	10/2022

Teaching hours	**Lectures**	**laboratory**	**Exercise**	**Student's load**
	2	-	2	4

2- Course Aims

No.	Aims
1	Master a broad range of engineering knowledge and specialized skills, as well as the ability to apply acquired knowledge in real-world situations by applying 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 infrastructures

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.
C9 Utilize codes of practice	**a1** 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	Lectures	laboratory	Exercise	Student's load
1	Introduction to tunnels	2	2	-	4
2	numerical methods in tunnel constructions	4	4	-	8
3	Computer software packages and its applications in tunnels.	4	4	-	8
4	Tunneling and excavations in hard rock	4	4	-	8
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	-	8
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	-	8
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	-	12
Total		**28**	**28**	**-**	**56**

5. Teaching and learning methods:

No	Face-to-Face	Online Lecture	Flipped Classroom	Presentation and	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and	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 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

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	ILO's
1	Periodic exam	C2	a2
2	Practical /Oral	C2, C9	a1, a2
3	Final term examination	C2 C9 C12	a2, c3, a1, b1

7.2 Evaluation Schedule:

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

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	40%
2	Practical /Oral	-
3	Final term examination	60%
Total		**100%**

8. List of References:

No.	Reference List
1	Design and construction of tunnels, pietrolanaridi, 2016
2	Tunneling and tunnel mechanio, Dimitrioskolymbas 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	Teaching and Learning Strategy
1	Introduction to tunnels	1,10	C2	a2	Face-to-Face Lecture Brain storming Discussion sessions
2	numerical methods in tunnel constructions	1,10	C2 C9 C12	a2, c3 a1 b1	Face-to-Face Lecture Brain storming
3	Computer software packages and its applications in tunnels.	1,10	C2	a2	Face-to-Face Lecture Brain storming Discussion sessions
4	Tunneling and excavations in hard rock	1,10	C2 C9	a2, c3 a1	Face-to-Face Lecture Brain storming Discussion sessions
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.	1,10	C2 C9 C12	a2, c3 a1 b1	Face-to-Face Lecture. Brain storming. Discussion sessions. Problem solving. Self-learning

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	1,10	C2 C9 C12	a1, c3 a1 b1	Discussion sessions. Problem solving. Self-learning
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.	1,10	C2 C9 C12	a1, c3 a1 b1	Face-to-Face Lecture. Discussion sessions. Problem solving.

Course Coordinator: Dr/ Hamdi Abd- Alaty

Head of Department: Prof. Dr. Mohamed Elkiki.

Date of Approval: 10/2022

Special Concrete Structures 2
(CIE425E)

1- Basic Information:

Program Title	Civil Engineering Department
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Civil Engineering Department
Course Title	Special Concrete Structures 2
Course Code	CIE425E
Year/Level	level 4
Specialization	Elective
Authorization Date of Course Specification	10/2022

Teaching hours	**Lectures**	**laboratory**	**Exercise**	**Student's load**
	3	-	2	4

2- Course Aims

No.	Aims
1	Master a broad range of engineering knowledge and specialized skills, as well as the ability to apply acquired knowledge in real-world situations by applying 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 Reinforced Concrete structure.

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.
C4 Utilize codes of practice	**a1** 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	Lectures	laboratory	Exercise	Student's load
1	Introduction to composite construction	2	2	-	4
2	Materials of composite structures	6	6	-	12
3	Simply supported composite beams	6	6	-	12
4	Continuous supported composite beams	6	6	-	12
5	Shear connections – composite columns – composite slabs	8	8	-	16
Total		**28**	**28**	**-**	**56**

5. Teaching and learning methods:

No	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 composite construction	x	x		x	x	x								
Materials of composite structures	x	x		x	x	x								
Simply supported composite beams	x	x		x	x	x								
Continuous supported composite beams	x	x		x	x	x								
Shear connections – composite columns – composite slabs	x	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	ILO's
1	Periodic exam	C2 C4	a2, c3 a1
2	Practical /Oral	C2 C4	a2, c3 a1
3	Final term examination	C2 C4 C12	a2, c3 a1 b1

7.2 Evaluation Schedule:

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

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	40%
2	Practical /Oral	-
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 2022.
2	Hilal.M. ,"Reinforced Concrete Water Tanks." Marcou Hilal M., "Design of Reinforced Concrete Halls," 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	Teaching and Learning Strategy
1	Introduction to composite construction	1,7	C2	a2	Face-to-Face Lecture Brain storming Discussion sessions
2	Materials of composite structures	1,7	C2 C4 C12	a2, c3 a1 b1	Face-to-Face Lecture Brain storming
3	Simply supported composite beams	1,7	C2	a2	Face-to-Face Lecture Brain storming
4	Continuous supported composite beams	1,7	C2 C4	a2, c3 a1	Face-to-Face Lecture Brain storming Discussion sessions
5	Shear connections – composite columns – composite slabs	1,7	C2 C4 C12	a2, c3 a1 b1	Face-to-Face Lecture. Brain storming. Discussion sessions. Problem solving.

Course Coordinator: Assoc. Prof/ Mohamed Gabr

Head of Department: Prof. Dr. Mohamed Elkiki.

Date of Approval: 10/2022

Railway Engineering
(CIE425F)

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	CIE425F
Year/Level	level 4
Specialization	Elective
Authorization Date of Course Specification	10/2022

Teaching hours	**Lectures**	**laboratory**	**Exercise**	**Student's load**
	2	-	2	4

2- Course Aims

No.	Aims
1	Master a broad range of engineering knowledge and specialized skills, as well as the ability to apply acquired knowledge in real-world situations by applying 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: Railway Engineering

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.
C11 Select appropriate and sustainable technologies for construction railways lines	**a2**. Summarize, appropriate and sustainable technologies for railways planning and railways components and specifications
C12 Achieve an optimum design of different parts of railways	**b2** Achieve an optimum design of different parts of railways included railways stations and railways signals

4. Course Contents:

No.	Topics	Lectures	laboratory	Exercise	Student's load
1	Engineering principals for railway planning	2	2	-	4
2	Railway's components and specifications	4	4	-	8
3	Design of different parts of railway	6	6	-	12
4	Types of stations	2	2	-	4
5	Types of signals	2	2	-	4
6	Maintenance	4	4	-	8
7	Planning of railways lines	4	4	-	8
8	Transportation economy	2	2	-	4
9	Management and insurance.	2	2	-	4
Total		**28**	**28**	**-**	**56**

5. Teaching and learning methods:

No	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	
Engineering principals for railways planning	x	x			x	x	x							
Railway's 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 disable 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	Periodic exam	C1 C11	a3, b2 a2
2	Semester work	C1 C11	a3 a2
3	Final term examination	C1 C11	a3, b2 a2 b2

7.2 Evaluation Schedule:

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

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	40%
2	Practical /Oral	-
3	Final term examination	60%
Total		**100%**

8. List of References:

No.	Reference List
1	Recommended books

	□ E. B. Machaly, "Behavior, analysis and design of steel work connections ", vol. 3, 2022 □ Railway development 2018, Dr frank pruinsma and DR Irik pills.

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	Teaching and Learning Strategy
1	Engineering principles for railways planning	1	C1	a3, b2	Face-to-Face Lecture Brain storming Discussion sessions
2	Railway's components and specifications	1	C1	a3, b2	Face-to-Face Lecture Brain storming Discussion sessions
3	Design of different parts of railways	7	C11 C12	a2 b2	Face-to-Face Lecture Brain storming Discussion sessions Problem solving
4	Types of stations	1,7	C1 C11 C12	a3,b2 a2 b2	Face-to-Face Lecture Brain storming Discussion sessions
5	Types of signals	1,7	C1 C11 C12	a3, b2 a2, b2	Face-to-Face Lecture Brain storming Discussion sessions
6	maintenance	1,7	C11 C12	a2 b2	Face-to-Face Lecture Brain storming Discussion sessions
7	Planning of railways lines	1,7	C11 C12	a2 b2	Face-to-Face Lecture Brain storming Discussion sessions Problem solving
8	Transportation economy	1	C1	a3, b2	Face-to-Face Lecture Brain storming Discussion sessions Problem solving

9	Management and insurance.	1	C1	a3, b2	Face-to-Face Lecture Brain storming Discussion sessions

Course Coordinator: Assoc. Prof /Alaa Gabr
Head of Department: Prof. Dr. Mohamed Elkiki
Date of Approval: 10/2022

Reinforced Concrete (5)
(CIE425G)

1- Basic Information:

Program Title	Civil Engineering Department
Department Offering the Program	Civil Engineering Department
Department Responsible for the Course	Civil Engineering Department
Course Title	Reinforced Concrete (5)
Course Code	CIE425G
Year/Level	level 4
Specialization	Elective
Authorization Date of Course Specification	10/2022

Teaching hours	**Lectures**	**laboratory**	**Exercise**	**Student's load**
	2	-	2	4

2- Course Aims

No.	Aims
1	Master a broad range of engineering knowledge and specialized skills, as well as the ability to apply acquired knowledge in real-world situations by applying 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 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.
C4 Utilize codes of practice	**a1** 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	Lectures	laboratory	Exercise	Student's load
1	Design shell structure	12	12	-	24
2	design of pre-stressed reinforced concrete	16	16	-	32
Total		**28**	**28**	**-**	**56**

5. Teaching and learning methods:

No	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	
Design shell structure	x	x			x	x	x							
design of pre-stressed reinforced concrete	x	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	ILO's
1	Periodic exam	C2 C4	a2, c3 a1
2	Practical /Oral	C2 C4	a2, c3 a1
3	Final term examination	C2	a2, c3

		C4 C12	a1 b1

7.2 Evaluation Schedule:

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

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	40%
2	Practical /Oral	-
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 2022.
2	Hilal.M.,"Reinforced Concrete Water Tanks." Marcou Hilal M., "Design of Reinforced Concrete Halls," 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	Teaching and Learning Strategy
1	Design shell structure	1,7	C2 C4 C12	a2, c3 a1 b1	Face-to-Face Lecture Brain storming

					Discussion sessions Problem solving.
2	Design of pre-stressed reinforced concrete	1,7	C2 C4 C12	a2, c3 a1 b1	Face-to-Face Lecture Brain storming Problem solving.

Course Coordinator: Assoc. Prof/ Mohamed Gabr
Head of Department: Prof. Dr. Mohamed Elkiki.
Date of Approval: 10/2022

Design of lighting Systems for buildings
(CIE425H)

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	CIE425H
Year/Level	level 4
Specialization	Elective
Authorization Date of Course Specification	10/2022

Teaching hours	Lectures	laboratory	Exercise	Student's load
	2	-	2	4

1- 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.

2- 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.

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.

3- Course Contents:

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**	**-**

4- 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	✓				✓	✓								✓
lighting design for buildings which includes artificial lighting, point, line and area light sources,	✓				✓	✓								✓

types and properties of luminaries, polar curves														
design methods and calculations, glare index	✓				✓	✓								✓
lighting design standard	✓				✓	✓								✓
luminaire heat recovery system and lighting energy management	✓				✓	✓								✓
hybrid lighting	✓				✓	✓								✓
daylighting of buildings,	✓				✓	✓								✓
effect of climate on lighting	✓				✓	✓								✓

5- Teaching and learning methods for disable students:

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

6- 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)	C13	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	Periodic exam	40%
2	Practical /Oral	-
3	Final term examination	60%
Total		**100%**

7- List of References:

No.	Reference List
1	الكود المصري لاسس تصميم وشروط تنفيذ اعمال اناره الطرق والانفاق كود(2/308)- 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
3	نظم الحماية الكهربية علم وفن, 2007 محمود الجيلانى
4	الكود المصري للمنشات الكهربائية 2018

8- Facilities required for teaching and learning:

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

9- 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	C3	c2
5	luminaire heat recovery system and lighting energy management	4	C3	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: 10/2022

Soil Dynamics
CIE425I

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	Introduction to Earthquake Engineering
Course Code	CIE425I
Year/Level	Level 4
Specialization	Elective
Authorization Date of Course Specification	10/2022

Teaching hours	**Lectures**	**laboratory**	**Exercise**	**Student's load**
	2	-	2	4

2. Course Aims

No.	Aims
1	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 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)
C1. Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.	**a3** Explain the basic principles of soil mechanics. **b2** Using scientific concepts and theories that are relevant to soil works.
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	**a2**. Summarize, appropriate and sustainable technologies for soil mechanics.

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.	**b2** Achieve an optimum design of soil mechanics and retaining structures.

4. Course Contents:

No.	Topics	Lectures	laboratory	Exercise	Student's load
1	Introduction to Soil Dynamics:	2	2	-	4
2	Fundamentals of vibrations	4	4	-	8
3	Soil dynamic properties	4	4	-	8
4	Soil liquefaction	4	4	-	8
5	Propagation of waves	4	4	-	8
6	Analysis of seismic response	4	4	-	8
7	Soil –structure dynamic interaction	6	6	-	12
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	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab

1	Introduction to Soil Dynamics:	x	x	x		x	x								
2	Fundamentals of vibrations	x	x			x	x	x							
3	Soil dynamic properties	x	x			x	x				x				
4	Soil liquefaction	x	x	x		x									
5	Propagation of waves	x	x			x	x								
6	Analysis of seismic response	x	x	x							x				
7	Soil –structure dynamic interaction	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	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	Periodic exam	C1 C11 C12	a3 a1, a2 b2
2	Practical /Oral	-	-
3	Final term examination	C1 C11 C12	a3 a2 b2

7.2 Evaluation Schedule:

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

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exam	40%

2	Practical /Oral	-
3	Final term examination	60%
Total		**100%**

8. List of References:

No.	Reference List
1	Das, B., M. (2017), "Principles of geotechnical Engineering " Eighth Edition, CENGAGE Learning,
2	Knappett, J.A. and Craige R. F. (2012), “Craig’s Soil Mechanics" Eighth Edition, Spon Press.
3	Brain R. Hunt et al. A Guide to MATLAB for Beginners and Experienced Users, 2013

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	Teaching and Learning Strategy
1	Introduction to Soil Dynamics:	1, 7	C1	a3, b2	Face-to-Face Lecture Brain storming
2	Fundamentals of vibrations	1, 7	C11	a2	Face-to-Face Lecture Brain storming
3	Soil dynamic properties	1,7	C11	a2	Face-to-Face Lecture Brain storming Online Lectures
4	Soil liquefaction	1, 7	C11 C12	a2 b2	Face-to-Face Lecture Brain storming Problem solving
5	Propagation of waves	1, 7	C1	a3, b2	Face-to-Face Lecture. Problem solving. Online Lectures

7	Analysis of seismic response	1, 7	C11 C12	a2 b2	Face-to-Face Lecture Brain storming Discussion sessions

Course Coordinator: Dr. / Hany Hashish.
Head of Department: Prof. Dr. Mohamed Elkiki
Date of Approval: 10/2022

Introduction to Earthquake Engineering
(CIE425J)

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	Introduction to Earthquake Engineering
Course Code	CIE425J
Year/Level	Level 4
Specialization	Elective
Authorization Date of Course Specification	10/2022

Teaching hours	**Lectures**	**laboratory**	**Exercise**	**Student's load**
	2	-	2	4

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. 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	laboratory	Exercise	Student's load
1	Introduction to Earthquake Engineering	2	2	-	4
2	Properties of earth motion – Tectonic Plates –	4	4	-	8
3	Seismic waves – Faults – Magnitude scale Intensity scale Tectonic Plates – Seismic waves – Faults – Magnitude scale Intensity scale	4	4	-	8
4	Measuring earthquake	4	4	-	8
5	Earthquake risks	4	4	-	8
6	seismic maps	4	4	-	8
7	International codes provisions for seismic design of structures included Egyptian code of practice for Soil Mechanics and Foundation Design.	6	6	-	12
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	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab
1	Introduction to Earthquake Engineering	x	x	x		x	x								

2	Properties of earth motion – Tectonic Plates –	x	x			x	x	x							
3	Seismic waves – Faults – Magnitude scale Intensity scale Tectonic Plates – Seismic waves – Faults – Magnitude scale Intensity scale	x	x			x	x				x				
4	Measuring earthquake	x	x	x		x									
5	Earthquake risks	x	x			x	x								
6	seismic maps	x	x	x							x				
7	International codes provisions for seismic design of structures included Egyptian code of practice for Soil Mechanics and Foundation Design.	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	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	Periodic exam	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	Periodic exam	7^{th}, 8^{th}, 9^{th}
2	Practical /Oral	-
3	Final term examination	15^{th}

7.3 weighting of Evaluation:

No.	Evaluation Method	degrees
1	Periodic exam	40
2	Practical /Oral	-
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 (text books / 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.**
4	Seismic Design of Concrete Buildings to Eurocode, Michael Fardis, Eduardo ,Carvalho · Peter Fajfar **2015**
3	Seismic Isolation, Structural Health Monitoring, Azer A. Kasimzade, Erdal ,Şafak Carlos· E. Ventura **2018**
5	Structural Dynamics in Earthquake and Blast Resistant Design, BK Raghu Prasad · 2022
6	**Recommended books:** Chu-Kia Wang and Charles G. Salmon, "Reinforced Concrete Design," 4th Edition, Harper and Row Publishers, New York, 1985.

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	Teaching and Learning Strategy
1	Introduction to Earthquake Engineering	7	C6	a1	Face-to-Face Lecture Brain storming
2	Properties of earth motion – Tectonic Plates –	10	C11	a1	Face-to-Face Lecture Brain storming Discussion sessions
3	Seismic waves – Faults – Magnitude scale Intensity scale Tectonic Plates – Seismic waves – Faults – Magnitude scale Intensity scale	10	C11 C12	a1 a1, b1	Face-to-Face Lecture Brain storming Discussion sessions
4	Measuring earthquake	10	C11	a2	Face-to-Face Lecture Brain storming Discussion sessions Problem solving
5	Earthquake risks	10	C11	a1	Face-to-Face Lecture Brain storming Discussion sessions Problem solving
6	seismic maps	10	C11	a1, a2	Face-to-Face Lecture Brain storming Discussion sessions Problem solving
7	International codes provisions for seismic design of structures included Egyptian code of practice for Soil Mechanics and Foundation Design.	10	C12	a1, b1	Face-to-Face Lecture Brain storming Discussion sessions Problem solving

Course Coordinator: Dr. Rafik Wadia

Head of Department: Prof. Dr. Mohamed Elkiki

Date of Approval: 10/2022