Mathematics 1
(BAS011)

1- Basic Information:

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

Teaching hours	**Lectures**	**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)
A1. 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	vectors algebra - partial fractions - equations theory	2	2	-	**8**
2	vectors - mathematical induction	2	2	-	**4**
3	Equations theory –Mathematical Deduction	4	4	-	**8**
4	numerical solutions methods (simple repetitive method - Newton and modified Newton's method - intersection method - False position method	4	4	-	**8**
5	• Arrays - linear equations systems - Gauss Jordan method for deletion.	4	4	-	**8**
6	function (definition - theories) - basic trigonometric functions and its inverse - exponential and logarithmic functions	4	4	-	**8**
7	hyperbolic functions and its inverse - connection (definition - theories) - limits (definition - theories) - derivatives (definition - theories - higher order types)	4	4	-	**8**
8	- curves drawing - mathematical and engineering derivative applications - undefined formulas - Taylor expansion - MacLean expansion - approximation - introduction in partial derivation.	4	4	-	**4**
Total		**28**	**28**	**-**	**56**

5. Teaching and learning methods:

Topics	Face-to-FaceLecture	OnlineLecture	FlippedClassroom	Presentationandmovies	Discussion	Problemsolving	Brainstorming	Projects	Sitevisits	Self-learningandResearch	Cooperative	Discovering	Modeling	lab
tors algebra - partial tions - equations ory	x	x			x	x	x							
tors - mathematical uction	x	x			x	x	x							
ations theory athematical luction	x	x			x	x	x							
nerical solutions thods (simple etitive method - vton and modified vton's method - rsection method - e position method	x	x			x	x	x							
arrays - linear equations systems - Gauss Jordan method for deletion.	x	x			x	x	x							

ction (definition - ories) - basic onometric functions its inverse - onential and arithmic functions	x	x			x	x	x							
hyperbolic ctions and its inverse - nection (definition - ories) - limits finition - theories) - vatives (definition - ories - higher order es)	x	x			x	x	x							
rves drawing - thematical and ineering derivative lications - undefined mulas - Taylor ansion - MacLean ansion - roximation - oduction in partial vation.	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 methods:

No.	Evaluation Method	Competencies	LO's
1	Periodic exams	A1	a1,b1
2	Semester work(quizzes, sheets, report)	A1	b1
3	Final term examination	A1	a1,b1,a3

7.2 Evaluation Schedule:

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

7.3 weighting of Evaluation:

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

8. List of References:

No.	Reference List
1	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 algebra - partial fractions - equation theory	1	A1	a1,b1
2	● vectors - mathematical induction	1	A1	a1, b1
3	●Equations theory –Mathematical Deduction	1	A1	a1,b1
4	●numerical solutions methods (simple repetitive method - Newton and modified Newton's method - intersection method - False position method	1	A1	a1, b1
5	● arrays - linear equations systems - Gauss Jordan method for deletion.	1	A1	a1,b1

6	● function (definition - theories) - basic trigonometric functions and its inverse - exponential and logarithmic functions	1	A1	a3, b1
7	● hyperbolic functions and its inverse - connection (definition - theories) - limits (definition - theories) - derivatives (definition - theories - higher order types)	1	A1	a3, b1
8	● - curves drawing - mathematical and engineering derivative applications - undefined formulas - Taylor expansion - MacLean expansion - approximation - introduction in partial derivation.	1	A1	a1, b1

Course Coordinator: Dr / Reda Abdo
Head of Department: Asso. Prof. Amal behairy
Date of Approval: 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	-

Teaching hours	**Lectures**	Exer.	Contact	Student's load
	2	2	4	4

2- Course Aims:

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

3-Competencies :

Competencies	Learning Outcomes (LO'S)
A1. Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.	**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:

MNo.	Topics	Lectures	Tutorial	Practical
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	-
2	Statics of particles Forces on a particle, Addition of vectors, Resultant of several concurrent forces.	2	2	-
3	Resolution of a forces into components Rectangular components of a forces, (unit vectors). Addition of forces by summing X and Y components. Equilibrium of a particle, and Newton's first law of motion.	2	2	-
4	Problem involving the equilibrium of a practice- free body diagram. Rectangular components of a 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	-
5	Rigid bodies: equivalent systems of forces. External and internal forces, principle of transmissibility and equivalent forces, vector product of two vectors, vector product expressed in terms of rectangular components	2	2	-
6	Moment of a force about a point. Varignon's theorem, rectangular components of the moment of a force, equivalent systems of forces.	4	4	-
7	Equilibrium of rigid bodies Free- body diagram. Equilibrium of a rigid body in two dimensions.	2	2	-
8	Equilibrium of three- dimension force body. Reduction of a system of forces to one force and one couple. Equilibrium of a rigid body in three dimensions. Reactions at supports and connections for a two-dimensional and for a three- dimensional structure.	4	4	-
9	Centroids and centers of gravity. Centre of gravity of a two- dimensional body, centroids of area and lines, first moments of areas and lines, composite plates and wires.	4	4	-
10	Analysis of structures Definition of truss Simple trusses	4	4	-

	Analysis of trusses by the method of joints			
Total		**28**	**28**	**-**

5. Teaching and learning methods:

Topics	Face-to-FaceLecture	OnlineLecture	FlippedClassroom	Presentationandmovies	Discussion	Problemsolving	Brainstorming	Projects	Sitevisits	Self-learningandResearch	Cooperative	Discovering	Modeling	lab
Introduction to statics. Fundamental concept Basic quantities of unit dimension- System of units Space, Trigonometry and U.S. Customary units, Force. Statics of particle, Statics of Rigid Body, Free body diagrams. Types of forces, Types of system of forces	x	x			x									
Statics of particles	x	x				x								

Forces on a particle, Addition of vectors, Resultant of several concurrent forces.														
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 defined by its magnitude and two points on its line of action. Addition of concurrent forces in space, equilibrium of a particle in space.	**x**	**x**			**x**									
Rigid bodies: equivalent systems of forces. External and internal forces, principle of transmissibility and equivalent forces, vector product of two vectors, vector product expressed in terms of rectangular components	**x**	**x**			**x**	**x**								
Moment of a force about a point. Varignon's theorem, rectangular components of the moment of a force,	**x**	**x**			**x**									

equivalent systems of forces.														
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	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	A1	a1,b1
2	Semester work(quizzes, sheets, report)	A1	a1,b1
3	Final term examination	A1	a1,a2,b1

7.2 Evaluation Schedule:

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

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Semester work	40%
2	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

0. Matrix of Competencies and LO's :

No.	Topic	Aims	Competencies	LO's
1	Introduction to statics. Fundamental concept Basic quantities of unit dimension- System of units Space, Trigonometry and U.S. Customary units, Force. Statics of particle, Statics of Rigid Body, Free body diagrams. Types of forces, Types of system of forces	1	A1	a1
2	Statics of particles Forces on a particle, Addition of vectors, Resultant of several concurrent forces.	1	A1	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	A1	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	A1	a2
5	Rigid bodies: equivalent systems of forces. External and internal forces, principle of transmissibility and equivalent forces, vector product of two vectors, vector product expressed in terms of rectangular components	1	A1	a1
6	Moment of a force about a point. Varignon's theorem, rectangular components of the moment of a force, equivalent systems of forces.	1	A1	a1
7	Equilibrium of rigid bodies Free- body diagram.	3	A1	a2

	Equilibrium of a rigid body in two dimensions.			
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	A1	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	A1	b1
10	Analysis of structures Definition of truss Simple trusses Analysis of trusses by the method of joints	3	A1	b1

Course Coordinator: Dr / Moataz Mostafa

Head of Department: Asso.prof. Aml Elbahery

Date of Approval: 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	-

Code	Course Name	Hours per week						Degrees			
		Lecture	Lab.	Exercise	Contact	Student's load	Total	Periodic Exam	Practical\Oral	Final Exam	Total
BAS023	Physics 2	2	2	2	6	4	10	60	15	75	150

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)
A1. 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.

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	4	4	2

	Practical: heating and cooling curves.			
9	Temperature and thermal expansion Practical: coefficient of linear thermal expansion.	2	2	2
Total		**28**	**28**	**28**

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brainstorming	Projects	Site visists	Self-learning and Research	Cooperative	Discovering	Modeling	Lab
1	Physics and Measurement Practical: measurement methods	x	X				X								X
2	Mechanical properties for materials Practical: Hooks' Law	x	X			X									X
3	Oscillations Practical: simple pendulum.	x	X					X							X
4	Sounds. Practical: Resonance in the Air columns.	x	X				X								X
5	Fluids. Practical: Viscosity.	x	X					X							X
6	Heat transfer Practical: Heat& Specific Heat& thermo-electrical equivalent& the latent heat of melting ice.	x	X			X									x

7	The kinetic theory of gases and the work in thermodynamics Practical: melting point of solid materials.	**x**	**X**												**X**
8	The laws of thermodynamic Practical: heating and cooling curves.	**x**	**X**				**X**								**X**
9	Temperature and thermal expansion Practical: coefficient of linear thermal expansion.	**x**	**x**					**X**							**X**

6. Teaching and learning methods for 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	A1	a1,a2,b1
2	Semester work(quizzes, sheets, report)	A1	a1,a2
3	Practical exam	A1	a2,b1
4	Final term examination	A1	a1,a2

7.2 Evaluation Schedule:

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

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	A1	a1
2	Mechanical properties for materials Practical: Hooks' Law	1,4	A1	a2,b1
3	Oscillations Practical: simple pendulum.	1,4	A1	a1
4	Sounds. Practical: Resonance in the Air columns.	1,4	A1	a1
5	Fluids. Practical: Viscosity.	1,4	A1	a2
6	Heat transfer Practical: Heat& Specific Heat& thermo-electrical equivalent& the latent heat of melting ice.	1,4	A1	a1
7	The kinetic theory of gases and the work in thermodynamics Practical: melting point of solid materials.	1,4	A1	a1
8	The laws of thermodynamic Practical: heating and cooling curves.	1,4	A1	a1
9	Temperature and thermal expansion Practical: coefficient of linear thermal expansion.	1,4	A1	a1

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

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

2- Course Aims:

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

3- Competencies:

Competencies	Learning Outcomes (LO'S)
A1. Identify, formulate, and solve complex engineering problems by applying engineering fundamentals and basic science.	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.
A10. 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	Contact	Student load
1	Gaseous status. Practical: Chemistry Laboratory Equipment, Titrimetric Analysis.	4	-	4	8	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	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	8
4	Material balance in combustion processes. Practical: Standardization of potassium permanganate with oxalic acid.	2	-	2	4	4
5	Dynamic balance in physical and chemical operations. Practical: Determination of nitrites, precipitation titrations.	4	-	4	8	8
6	Kinetic chemical interactions. Practical: Preparation of 0.05N of sodium chloride.	2	-	2	4	4
7	Electrochemistry, corrosion and corrosion control. Practical: Determination of chloride ion by using Mohr method.	2	-	2	4	4
8	Fertilizers. Practical: Determining Molecule Weight by Freezing Point Depression Method.	2	-	2	4	4
9	Manufacturing and chemistry of Cement. Practical: Determining Molecule Weight by Freezing Point Depression Method.	2	-	2	4	4
10	Water processes. Practical: determination of water hardness bycomplex metric titration.	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	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 $KMnO_4$ with oxalic acid	x	x				X								X
5	Dynamic balance in physical and chemical operations. Practical: Determination of nitrites, precipitation titrations.	x	x			x									x
6	Kinetic chemical interactions. Practical: Preparation of 0.05N of sodium chloride.	x	x			x									x
7	Electrochemistry, corrosion and corrosion control. Practical: Determination of chloride ion by using Mohr method.	x	x				x								x
8	Fertilizers. 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	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	A1,A10	c2,c3,d2
2	Practical Examination	A1,A10	c2,c3,d2
3	Final term examination	A1	a1,c2,c3

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exams	From second week to last week
2	Student load	All weeks
3	Practical Examination	14^{th}
4	Final term examination	15^{th}

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic exams	40%
3	Practical Examination	12%
4	Final term examination	48%
Total		100%

8. List of References:

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

9. Facilities required for teaching and learning:

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

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

No.	Topic	Aims	Competencies	LO's
1	Gaseous status. Practical: Chemistry Laboratory Equipment, Titrimetric Analysis.	1	A1	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	A1	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	A1	a1
4	Material balance in combustion processes. Practical: Standardization of potassium permanganate with oxalic acid.	1	A1	a1, c3
5	Dynamic balance in physical and chemical operations. Practical: Determination of nitrites, precipitation titrations.	1	A1	a1,c3
6	Kinetic chemical interactions. Practical: Preparation of 0.05N of sodium chloride.	1	A1	a1
7	Electrochemistry, corrosion and corrosion control.	1,8	A10	d2

	Practical: Determination of chloride ion by using Mohr method.			
8	Fertilizers. Practical: Determining Molecule Weight by Freezing Point Depression Method.	8	A10	d2
9	Manufacturing and chemistry of Cement. Practical: Determining Molecule Weight by Freezing Point Depression Method.	8	A10	d2
10	Water processes. Practical: determination of water hardness by complex metric titration.	8	A10	d2

Course Coordinator: Prof. Dr. Khaled Samir Mohamed
Head of Department: Asso. prof. Dr Aml Elbehiry

Date of Approval: 2-10-2022

(BAS015) Basic

Information:

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

Teaching hours	Lectures	Lab	Exercise	Contact	Student's load	Total
	1	2	2	5	4	9

2- Course Aims:

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

3- Competencies :

Competencies	Learning Outcomes (LO'S)
A1.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:

No	Topics	Face - to - Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self - learning and Research	Cooperative	Discovering	Modeling	lab
1	Techniques and skills of engineering drawing	x	x												
2	Engineering operations					x									
3	Orthogonal projection – Secondary orthogonal	x				x									
4	Intersections	x	x			x									
5	Projections of simple bodies	X				X									
6	Rules of writing dimensions	x	x			x									
7	Deduction of missing projections	x	x			x									

8	Drawing of engineering sections.	x				X								
9	Steel frames	x	X			X								
10	Introduction to AutoCAD Fundamentals of engineering drafting by way of computer aided drawing (CAD) software. Basic features and capabilities of CAD software and drafting fundamentals including orthographic projection, and isometric pictorials, part dimensioning in 2 dimensional drawings.	X												x

6. Teaching and learning methods for 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	A1,B1
2	Student load	C2, D2 , D5
3	Final exam	A1, A3, B1,C2

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	Knowledge and understanding	Intellectual Skills	Professional Skills	General Skills
1	Techniques and skills of engineering drawing	1	A1	B1	C2	D2, D5
2	Engineering operations	1	A1	B1	C2	D2, D5
3	Orthogonal projection – Secondary orthogonal	1	A1, A3	B1	C2	D2, D5
4	intersections	1	A1, A3	B1	C2	D2, D5
5	Projections of simple bodies	1	A1, A3	B1	C2	D2, D5
6	Rules of writing dimensions	1	A3	B1	C2	D2, D5
7	Deduction of missing projections	1	A3	B1	C2	D2, D5
8	Drawing of engineering sections.	1	A1	B1	C2	D2, D5
9	Steel frames	1	A1, A3	B1	C2	D2, D5
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	A1, A3	B1	C2	D2, D5

Course Coordinator: Dr. Moataz Mostafa

Head of Department: Assoc. Prof. Aml Behairy

Date of Approval: 2022

Introductions to Computer Systems
(BAS016)

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	Introductions to Computer Systems
Course Code	BAS016
Year/Level	Level 0
Specialization	Major
Authorization Date of Course Specification	-

Teaching hours	Lectures	Tutorial	Practical	contact	Student's load
	2	-	2	4	4

2- Course Aims:

No.	Aims
1	Apply the knowledge of engineering, physics, and math topics to the resolution of engineering issues.
6	Dealing with the computer's hardware, software, operating systems, and interfaces will show that you have a working knowledge of modern engineering issues.

3- Competencies :

Competencies	Learning Outcomes (LO'S)
A1. Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.	c2. Identify the concepts and theories of science necessary for engineering system c3. Applying engineering basics that are relevant to the subject.
A5. Practice research techniques and methods of investigation as an inherent part of learning.	b1. Assess different ideas, views, and knowledge from a range of sources.

4. Course Contents:

No.	Topics	Lecture	Practical	Tutorial
1	Computer systems Concepts Practical: Visual Studio C# Interface - Writing simple statements	1	2	-
2	The Architecture of Computer (hardware-software) Practical: Variables, Data type	2	4	-

3	The operating system - file systems and directories - characters and numbers are stored in bits/bytes in a computer. Practical: Input & Output	2	2	-
4	Computer networks - the different types of computer networks- Internet networks Practical: Conditional Statements	2	4	-
5	Introduction of Microsoft applications - Database Management System Practical: Arrays	2	2	-
6	Computer graphics – Multimedia systems Practical: Loop Statement (For, while & do -while)	1	4	-
7	Develop critical thinking skills- Methods of solving problems- logical design of the programs. Practical: Loop Statement (For, while & do -while)	2	4	-
8	Applications in programming using structured or visual languages - using this language in solving the engineering problems. Nested loop	2	4	-
Total		14	28	-

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brainstorming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	lab
1	Computer architecture. practical: Visual Studio C# Interface Writing simple statements	X	X	x											X

2	The Architecture of Computer (hardware-software) Practical: Variables, Data type	X	X			x										X
3	The operating system - file systems and directories - characters and numbers Practical: Input & Output	X	X			x										X
4	Computer networks - the different types of computer networks- Internet networks Practical: Conditional Statements	X		X												X
5	Introduction of Microsoft applications - Database Management System Practical:Arrays	X	X													X
6	Computer graphics – Multimedia systems Practical: Loop Statement (For, while & do -while)	X	X													X
7	Develop critical thinking skills- Methods of solving	X	X			x										X

		problems- logical design of the programs. Practical: Loop Statement (For, while & do -while)													
	8	Engineering applications in programming using one structured programming language. Practical: Practical: Nested loop Engineering Case Study.	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	A1	c2,c3
2	Student load (quizzes, sheets, report)	A5	b1,c3
3	Practical Examination	A1,A5	c2,c3
4	Final term examination	A1,A5	c3,b1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	8th

2	Student load	2nd ,7th,9th,13th
3	Practical Examination	14th
4	Final term examination	15th

7.3 weighting of Evaluation:

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

8. List of References:

No.	**Reference List**
1	Daniel A. O'Leary,, Timothy J. O'Leary, ”Computing Essentials 2021”,McGraw-Hill Education,2020
2	Daniel A. O'Leary, Timothy J. O'Leary, Linda I. O'Leary Computing Essentials 2019, McGraw-Hill Education,2018
3	Computing essentials timothy, O' leary and linda, 2015.
4	Darrell Hajek , Cesar Herrera "Introduction to Computers" CreateSpace Independent Publishing Platform (May 8, 2018).
5	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
2	Computer lab
3	Presenter
4	White board
5	Data show system
6	Wireless internet
7	Sound system

10. Matrix of Competencies and LO’s :

No.	Topic	Aims	Competencies	LO’s
1	Computer systems Concepts	1	A1	c2
2	The Architecture of Computer (hardware-software)	1	A1	c2
3	The operating system - file systems and directories - characters and numbers are stored in bits/bytes in a computer	1	A1	c3

4	Computer networks - the different types of computer networks- Internet networks	1	A1	c3
5	Introduction of Microsoft applications - Database Management System	1	A1	c3
6	Computer graphics – Multimedia systems	1,6	A1	c3
7	Develop critical thinking skills- Methods of solving problems- logical design of the programs.	1,6	A1	c3
8	Applications in programming using structured or visual languages- using this language in solving the engineering problems.	6	A5	b1

Course Coordinator: Dr. Amira Elsonbaty
Head of Department:
Date of Approval: 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

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

2- Course Aims:

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

3- Competencies :

Competencies	**Learning Outcomes (LO'S)**
A1. Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.	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	equations of second degree and double equation for two straight lines - movement and rotation of axes - groups of unified axes circles	4	4	-	**8**
2	conical sectors (properties of conical sectors - parabola - ellipse - hyperbola)	6	6	-	**12**
3	analytical geometry in space - Cartesian coordinates - cylindrical - spherical	2	2	-	**4**
4	Plane in space - equations of surfaces in second order - rotation and movement of axes in space.	2	2	-	**4**
5	indefinite integration (basic functions - theories) - method of integration (direct - indirect)	6	6	-	**12**
6	- definite integration (definition - properties - theories) -	4	4	-	**8**
7	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-FaceLecture	OnlineLecture	FlippedClassroom	Presentationandmovies	Discussion	Problemsolving	Brainstorming	Projects	Sitevisits	Self-learningandResearch	Cooperative	Discovering	Modeling	lab
1	equations of second degree and double equation for two straight lines - movement and rotation of axes - groups of unified axes circles	x	x			x									
2	conical sectors (properties of conical sectors - parabola - ellipse - hyperbola)	x	x				x								

3	analytical geometry in space - Cartesian coordinates - cylindrical - spherical	x	x					x							
4	plane in space - 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 (direct - indirect)	x	x			x	x								
6	- definite integration (definition - properties - theories) -	x	x			x									
7	applications of definite integration (plain areas - circular volumes - plain technical length)	x					x	x							
8	Areas - circular surfaces - 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	A1	a1,a3
2	Semester work(quizzes, sheets, report)	A1	b1,b3
3	Final term examination	A1	a1,a3,b1,b3

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exams	Any week
2	Student load	All weeks
3	Final term examination	15th

7.3 weighting of Evaluation:

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

8. List of References:

No.	Reference List
1	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

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

No	Topic	Aims	Competencies	LO's
1	equations of second degree and double equation for two straight lines - movement and rotation of axes - groups of unified axes circles	1	A1	a1,a3
2	conical sectors (properties of conical sectors - parabola - ellipse - hyperbola)	1	A1	a1,a3
3	analytical geometry in space - Cartesian coordinates - cylindrical - spherical	1	A1	a1,a3
4	Plane in space - equations of surfaces in second order - rotation and movement of axes in space.	1	A1	a1,a3
5	indefinite integration (basic functions - theories) - method of integration (direct - indirect)	1	A1	a1,a3

6	- definite integration (definition - properties - theories) -	1	A1	a1,a3
7	applications of definite integration (plain areas - circular volumes - plain technical length)	1	A1	b1,b3
8	Areas - circular surfaces - numerical integration.	1	A1	b1,b3

Course Coordinator: Dr. Reda Abdo

Head of Department: Asso.prof. Amal Behairy

Date of Approval: 2023

Mechanics 2
(BAS022**)**

1- Basic Information:

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

Code	Course Name	Hours per week						Degrees			
		Lecture	Lab.	Exercise	Contact	Student's load	Total	Periodic Exam	Practical\Oral	Final Exam	Total
BAS022	Mechanics 2	2	-	2	4	4	8	40	-	60	100

2- Course Aims:

No.	Aims
1	Apply knowledge of plane motion using Cartesian axis and relative motion between particles.
2	Apply knowledge of principle of work and principle of work and energy of motion and principle of conservation

3- Competencies :

Competencies	Learning Outcomes (LO'S)
A1. 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	-	
2	plane motion path of particle – description of plane motion using Cartesian axes	2	2	-	
3	projectiles – tied motion for particle in straight path	4	4	-	
4	motion in fixed axes -motion in polar axes	4	4	-	
5	relative motion between particles	4	4	-	
6	tied motion for particle in circular path	4	4	-	
7	principle of work and energy of motion– principle of conservation of mechanical energy	4	4	-	
8	Principle of impulse and momentum of rigid body.	2	2	-	
Total		**28**	**28**		

5. Teaching and learning methods:

Topics	Face-to-FaceLecture	OnlineLecture	FlippedClassroom	Presentationandmovies	Discussion	Problemsolving	Brainstorming	Projects	Sitevisits	Self-learningandResearch	Cooperative	Discovering	Modeling	lab
Position, Displacement, Velocity, and Acceleration of Particle	x	X			X	X	X							
Plane Motion path of Particle	x	X			X	X	X							
Description of plane Motion using Cartesian axes	x	X	x			X	X							
Projectiles	x	X				X	X							
Relative motion between particles	x	X			X	X	X							

Motion for particle in circular path	x	X			X	X	X							
Newton's second law of motion	x	X				X	X							
Principle of work and energy of motion	x	x	x			X	X							
Principle of conservation of mechanical energy	x	x			X	X	X							
Principle of impulse and momentum of rigid body	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	Midterm examination	A1	a1,a2,b1
2	Semester work(quizzes, sheets, report)	A1	b1
3	Final term examination	A1	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	40 degree
2	Final term examination	60 degree

Total	100 degree

8. List of References:

No.	Reference List
1	C. Hibbeler, Russell "Engineering Mechanics: Dynamics in SI Units, Global Edition" 15th edition, P&C ECS; 15th edition 2019).
2	Marcelo R. M. Crespo da Silva "Fundamentals of Dynamics and Analysis of Motion" 1st edition, Dover Publications; (2016).
3	J. Meriam and L. Kraige. "Engineering Mechanics- Dynamics 9th edition." (2018).

9. Facilities required for teaching and learning:

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

10. Matrix of knowledge and skills of the course:

No	Topic	Aims	Competencies	LO's
1	Position, Displacement, Velocity, and Acceleration of Particle	1	A1	a1
2	Plane Motion path of Particle	1	A1	a1
3	Description of plane Motion using Cartesian axes	1	A1	a2
4	Projectiles	1	A1	b1
5	Relative motion between particles	1	A1	b1
6	Motion for particle in circular path	1	A1	a2
7	Newton's second law of motion	1	A1	b1
8	Principle of work and energy of motion	1	A1	a2
9	Principle of conservation of mechanical energy	1	A1	a1
10	Principle of impulse and momentum of rigid body	1	A1	b1

Course Coordinator: Dr. Moataz Mostafa
Head of Department: Assoc. Prof. Dr. Amal Behiry
Date of Approval: 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	-

	Course Name	Hours per week						Degrees			
		Lecture	Lab.	Exercise	Contact	Student's load	Total	Periodic Exam	Practical\Oral	Final Exam	Total
A 0 3	Physics 2	2	2	2	6	4	10	60	15	75	150

2- Course Aims:

No.	Aims

1	Master a broad range of engineering physics knowledge and specialized skills, as well as the ability to apply acquired knowledge in real-world situations by applying theories in analytic critical and systemic thinking to identify, diagnose, and solve engineering problems of varying complexity and variation.

3- Competencies :

Competencies	Learning Outcomes (LO'S)
A1. Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.	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.

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:

Topics	Face-to-FaceLecture	OnlineLecture	FlippedClassroom	Presentationandmovies	Discussion	Problemsolving	Brainstorming	Projects	Sitevisits	Self-learningandResearch	Cooperative	Discovering	Modeling	lab
Basic of electricity. Practical: measurement devices in electrical conductivity.	**x**	**x**			X									**X**

Column's law and Gauss's law. Practical: sensitivity of galvanometer.	x	x				X								X
capacitors and capacitance. Practical: capacitors and capacitance	x	x					X							X
Currents and Resistance. Practical: ohm's law - series connection &parallel connection& resistance colour code& meter bridge - voltmeter resistance.	x	x			X	X								X
Magnetic field and magnetic force. Practical: the inverse square law in magnetism.	x	x			x									x
The nature and propogation of light. Prac tical: the glass prism.	x	x				X								x
Optical fiber. Practical: the glass prism.	x	x					X							x
Introduction to Quantum theory.	x	x				X								x
Laser. Practical:	x	x					x							x
Lenses and mirrors.	x	x				X								x

Practical: spherometer- mirrors and lenses.														

6. Teaching and learning methods for disable students:

No.	Teaching Methods	Reason
1	Presentation of the course in digital material	Better access anytime
2	Web communication wi	Better communication

	th st ud en ts	wi th ce rt ai n ca se s
3	As ki ng s m all gr ou ps to do as sig n m en ts, ea ch co m po se d of lo w, m ed iu m an d hi	Kn o wl ed ge an d ski lls tr an sf er a m on g dif fe re nt le ve ls of st ud en ts

	gh perf or m an ce st ud en ts.	

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Midterm examination	A1	a1,a3
2	Semester work(quizzes, sheets, report)	A1	a1,a3
3	Final term examination	A1	a1,a2,b2
4	Practical exam	A1	a2,b2

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	A1	a1,a3
2	Column's law and Gauss's law. Practical: sensitivity of galvanometer.	1	A1	a1
3	capacitors and capacitance. Practical: capacitors and capacitance	1	A1	a1
4	Currents and Resistance. Practical: ohm's law - series connection &parallel connection& resistance colour code& meter bridge - voltmeter resistance.	1	A1	a1,a3
5	Magnetic field and magnetic force. Practical: the inverse square law in magnetism.	1	A1	a1
6	The nature and propogation of light. Prac tical: the glass prism.	1	A1	a2
7	Optical fiber. Practical: the glass prism.	1	A1	b2

8	Introduction to Quantum theory.	1	A1	**a2**
9	Laser. Practical:	1	A1	b2
10	Lenses and mirrors. Practical: spherometer- mirrors and lenses.	1	A1	a2,b2

Course Coordinator: Assoc. Prof. / Amal Bahiry

Dr / Ahmed Lotfy

Head of Department: Assoc. Prof. / Amal Bahiry

Date of Approval: 2022

Production Engineering

(BAS105)

1- Basic Information:

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

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

2- Course Aims:

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

3- Competencies :

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

A1. Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.	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
A3. 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
A6. Plan, supervise and monitor of production process, taking into consideration other trades requirements.	a1. Show the conventional procedures and characterization of common engineering materials and components. c2. Acquire production skills.

4. Course Contents:

No.	Topics	Lectures	Exercise	laboratory	contact	Student's load
1	The engineering substances and its properties Practical: engineering materials	3	-	2	5	4

2	Heating and cooling diagrams Practical: iron and steel production	3		2	8	8
3	Heating equilibrium diagrams Practical : heat treatment	6	-	4	8	8
4	Alloys - Casting operation (sand casting and the preparation of the mold) Practical: metal casting & mold for a sand casting& carpenter workshop	6	-	4	8	8
5	Forming processes (cold and hot forming: forging rolling – Wire drawing – Blanking and piercing - Deep drawing - The extrusion) Practical: metal forming	6	--	4	8	8
6	Processes of metal connections (the riveting – welding with its types sticking) Practical: metal joining process	6	--	4	8	8
7	Cutting machining: Lathing - Shaping – Drilling –Milling - Grinding – Work Piece fixation - Cutting tools fixation - Specifications of the operating machine) Practical: carpenter workshop	6	-	**4**	**5**	**6**
8	Measuring tools (venire caliper – micrometers and its types) Practical: measurement tools	**6**	-	**4**	**6**	**6**
Total		**42**	**-**	**28**	56	56

5. Teaching and learning methods:

No	Topics	Face-to-FaceLecture	OnlineLecture	FlippedClassroom	Presentationandmovies	Discussion	Problemsolving	Brainstorming	Projects	Sitevisits	Self-learningandResearch	Cooperative	Discovering	Modeling	lab
1	The engineering substances and its properties Practical: engineering materials	x	X			x									x
2	Heating and cooling diagrams	x	X												x

	Practical: iron and steel production														
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) Practical: metal forming	**X**	**X**												**x**
6	Processes of metal connections (the riveting – welding with its types sticking)	**x**	**X**												**x**

	Practical: metal joining process														
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	**x**	**x**			**x**									**X**

	different workshops														

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	A1	a1,a3,b3
2	Semester work(quizzes, sheets report),	A3	c1,c2
3	Practical Exam	A3	c1,c2
4	Final term examination	A1	a1,b3,a3

7.2 Evaluation Schedule:

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

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights

1	final examination	60%
2	Practical/ Oral	-
3	Periodic exam	40%
	Total	**100%**

8. List of References:

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

9. Facilities required for teaching and learning:

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

10. Matrix of Competencies and LO's:

No.	Topic	Aims	Competencies	LO's
1	The engineering substances and its properties Practical: engineering materials	1	A1	a1,a3
2	Heating and cooling diagrams Practical: iron and steel production	1	A1	a3
3	Heating equilibrium diagrams Practical: heat treatment	1	A1	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	A3	c1,c2

No.	Topic	Aims	Competencies	LO's
5	Forming processes (cold and hot forming: forging rolling – Wire drawing – Blanking and piercing - Deep drawing - The extrusion) Practical: metal forming	1,2	A3	c1,c2
6	Processes of metal connections (the riveting – welding with its types sticking) Practical: metal joining process	1,3	A3	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	A6	a1,c2
8	Measuring tools (venire caliper – micrometers and its types) Practical: measurement tools	1,3	A1	b3

Course Coordinator: Dr. Motaza Mostafa

Head of Department: Asso.prof. Amal Bahiry

Date of Approval: 2022-2023

Introduction to Engineering and Environment (ENG106)

1- Basic Information:

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

Teaching hours	**Lectures**	**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)
A1. 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.
A3. Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global, cultural, social, economic, environmental, ethical and other aspects as	**a2** Understand the professional ethics and impacts of engineering solutions on society and environment.

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-FaceLecture	OnlineLecture	FlippedClassroom	Presentationandmovies	Discussion	Problemsolving	Brainstorming	Projects	Sitevisits	Self-learningandResearch	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 environment protection.	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	Mid Term Examination	A1,A3	a2,a3,b1,b2
2	Semester work(quizzes, sheets, report)	A3	c1,c3
3	Final Term Examination	A1,A3	b1,b2,c3

7.2 Evaluation Schedule:

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

3	Final Term Examination	15^{th}

7.3 Weighting of Evaluation:

No.	Evaluation Method	Weights
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	A3	a2,a3
2	Introduction to environmental science: the importance of studying environmental science	3	A1	a2,b2
3	Modern technology and its effect on the environment – quality of the environment and development elements	3	A3	b1,c1
4	Sources of environmental pollution and method of control (air pollution – water pollution – solid wastes pollution –noise) – economics of environmental	3	A1	b2,c3

	pollution control – legislations for the environment protection.			

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

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 Lesson 3 Ted's Day at school	2	-	2	6
3	Book shelves Lab.: skills in English	2	-	2	3

	Lesson 4 Nicole's day at school				
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:

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
Engineering Lab.: skills in English	✔	✔		✔										✔

Lesson 1 Bob's Day at work & Lesson 2 Bob returns home with bad news														
A private flat Lab.: skills in English Lesson 3 Ted's Day at school	✔	✔												✔
Book shelves Lab.: skills in English Lesson 4 Nicole's day at school	✔	✔												✔
Bridges Lab.: skills in English Lesson 5 Ted goes out for the evening Grammar Topics	✔	✔		✔										✔
Reinforced concrete Lab.: skills in English Lesson 6 Susan stays home and bake cookies & Lesson 7 Susan hires Bob to run her own business	✔	✔		✔										✔
Surveying Lab.: skills in English Lesson 8 Ted forms a rock band & Lesson 9 Nicole for president	✔	✔												✔
Hydraulic works Lab.: skills in English Lesson 10 Bob visits the village market	✔	✔												✔
Soil mechanics and foundations Lab.: skills in English Grammar topics	✔	✔												✔

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

No.	Topic	Aims	Competencies	LO's
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

Human Rights
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	-
Pre- request	-

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	2	-	-	**2**

	المصري من حقوق الإنسان، والحماية القانونية لها على الصعيد الوطني والصعيد الدولي، بالإضافة إلى حقوق الإنسان في الشريعة الإسلامية				
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:

Topics	Face-to-FaceLecture	OnlineLecture	FlippedClassroom	Presentationandmovies	Discussion	Problemsolving	Brainstorming	Projects	Sitevisits	Self-learningandResearch	Cooperative	Discovering	Modeling	lab
الإلمام بأهمية حقوق الإنسان والنشأة التاريخية لتلك الحقوق والمدارس الفقهية لتأصيل تلك الحقوق	✔	✔		✔										✔
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	✔	✔												✔
الأصول التاريخية الفلسفية لحقوق الإنسان المصادر الدولية لحقوق الإنسان) العالمية والإقليمية (المصادر الوطنية لحقوق الإنسان	✔	✔												✔

الأجهزة العالمية القائمة على حماية حقوق الإنسان (أجهزة الأمم المتحدة) الحماية الوطنية لحقوق الإنسان	✔	✔		✔										✔
حقوق الإنسان في الشريعة الإسلامية عرض لبعض طوائف حقوق الإنسان	✔	✔		✔										✔

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. Khaled Samir

Head of Department: Assoc. prof. Khaled Samir

Date of Approval: 10/2022

Mathematics 3
(BAS111)

1- Basic Information:

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

Teaching hours	Lectures	laboratory	Exercise	contact	Student's load	Total
	2	0	2	4	4	8

2- Course Aims:

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

3- Competencies :

Competencies	Learning Outcomes (LO'S)
A1. Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics**.**	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	laboratory	Exercise	contact	Student's load	Total
1	• maximum and minimum values in more than one variable	4	-	**4**	8	8	16
2	• directional analysis the directional differential effects	4	-	**4**	8	8	16
3	• multi integrations and its applications (the curved and the orthogonal axis)	4	-	**4**	8	8	16
4	Gauss- Stokes theory - the endless series and function expansion – basic concepts for the convergence and divergence.	4	-	**4**	8	8	16
5	• The first order (the equations which can be separated, homogeneous,	4	-	**4**	8	8	16
6	exact and linear) - the ordinary differential equations from the second order and higher orders (with constant and variable coefficients	4	-	**4**	8	8	16
7	systems from the ordinary differential	4	-	**4**	8	8	16

	equations– Laplace transfer and its applications in the solution of differential equations						
Total		**28**	**-**	**28**	**56**	**56**	**112**

5. Teaching and learning methods:

No	Topics	Face-to-FaceLecture	OnlineLecture	FlippedClassroom	Presentationandmovies	Discussion	Problemsolving	Brainstorming	Projects	Sitevisits	Self-learningandResearch	Cooperative	Discovering	Modeling	lab
1	maximum and minimum values in more than one variable	x	x			x	x								
2	• directional analysis the directional differential effects	x	x			x		x							
3	multi integrations and its applications (the curved and the orthogonal axis)	x	x			x	x								

4	Gauss- Stokes theory - the endless series and function expansion – basic concepts for the convergence and divergence.	**x**	**x**			**x**		**x**							
5	• The first order (the equations which can be separated,	**x**	**x**			**x**	**x**								
6	homogeneous, exact and linear) - the ordinary differential equations from the second order and higher orders (with constant and variable coefficients	x	x			x	x								
7	systems from the ordinary differential equations– Laplace transfer and its applications in the solution of differential equations	**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	A1	a1,a2
2	Semester work(quizzes, sheets, report)	A1	a2,a3
3	Final term examination	A1	a1,a2,a3,b1

7.2 Evaluation Schedule:

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

7.3 weighting of Evaluation:

No.	Evaluation Method	Weeks
1	Periodic Exam	8th
2	Student load (Practical /Oral)	2nd -7th -14th
3	Final exam	15th

7.3 weighting of Evaluation:

No.	Evaluation Method	Weights
1	Periodic Exam	20%
2	Student load (Practical /Oral)	20%
3	Final exam	60%
Total		**100%**

No.	Evaluation Method	degrees
1	Periodic Exam	30
2	Student load (Practical /Oral)	30
3	Final exam	90
Total		**150**

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 Competencies and LO's of the course:

No.	Topic	Aims	Competencies	LO's
1	maximum and minimum values in more tl one variable	1	A1	a1,a2
2	• directional analysis the directional differential effects	1		
3	multi integrations and its applications (the curved and the orthogonal axis)	1	A1	a2
4	Gauss- Stokes theory - the endless series and function expansion – basic concepts for the convergence and divergence.	1	A1	a1,a3
5	• The first order (the equations which can be separated, • .	1	A1	a3
6	homogeneous, exact and linear) - the ordinary differential equations from the second order and higher orders (with constant and variable coefficients	1	A1	a3
7	systems from the ordinary differential equations– Laplace transfer and its applications in the solution of differential equations	1	A1	b1

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

Electrical Engineering Fundamentals
(BAS112)

1- Basic Information:

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

		Hours per week						Degrees			
	Course Name	Lecture	Lab.	Exercise	Contact	Student's load	Total	Periodic Exam	Practical\Oral	Final Exam	Total
A 0 3	Physics 2	3	-	2	5	4	9	60	-	90	150

2- Course Aims:

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

1- Cometencies (LO'S):

Cometency	Learning Outcomes (LO'S)
A1.	**a1** Identify the mathematical principles and theories that are relevant to the electrical circuit. **C1** Solve engineering problems by applying mathematics and science concepts and theories appropriate to the discipline to identify, formulate and solve complex electrical engineering problems. **C2** Identify, formulate, and solve complex engineering problems by applying engineering fundamentals electrical
A2	b3 Analyze and interpret dat
B1.	a1. Describe principles of design including elements design, process and/or a system related to specific disciplines a2. Recognize methodologies of solving engineering problems c1. Use a wide range of analytical tools, techniques, equipment, and software packages pertaining to the discipline and develop required computer programs.

4. Course Contents:

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

5. Teaching and learning methods:

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
Direct Current	x	x		x	x		x				x			

Theory of electric circuits	x	x		x		x								
Delta and Star connections	x	x		x	x	x					x			
Sine A.C and D.C circuits	x	x		x		x	x				x			
Time vectors diagram	x	x		x	x		x							
Electric power and power factor in A.C circuits	x	x		x	x	x					x			
3-Phase current - Electric machines - D.C machines	x	x		x		x	x				x			
Transformers	x	x		x	x									
Induction and synchronous machines	x	x		x	x	x	x				x			
Fractional power machine	x	x		x			x				x			

6. Teaching and learning methods for disable students:

No.	Teaching Methods	Reason
1	Presentatio	Bettera cce

	nofthecourseindigitalmaterial	ssanytime
2	Webcommunicationwithstudents	Bettercommunicationwithcertai

		ncases
3	Askingsmallgroupstodoassignments;eachcompo	Knowledgeandskillstransferamongdifferentlevels

	sedoflow, mediumandhighperformancestudents.	ofstudents

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	LO's
1	Periodic exam	A_1(a1-c1-c2),A_2(b3)
2	Student load (quizzes, sheets, report)	A2(b3)
3	Final term examination	A_2(b3) B_1(a1,a2,c1)

7.2 Evaluation Schedule:

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

7.3 weighting of Evaluation:

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

8. List of References:

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

9. Facilities required for teaching and learning:

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

10. Matrix of knowledge and skills of the course:

No.	Topic	Aims	A1, a1	A1, c1	A1,c2	A2,b3	B1,a1	B1,a2	B1,c1
1	Direct Current	2	X			X			
2	Theory of electric circuits	2	X	X		X		X	
3	Delta and Star connections	7		X		X		X	
4	Sine A.C and D.C circuits	7			X	X		X	
5	Time vectors diagram	11		X				X	

6	Electric power and power factor in A.C circuits	7		X		X		X	
7	3-Phase current - Electric machines - D.C machines	7	X		X	X		X	
8	Transformers	7		X		X		X	
9	Induction and synchronous machines	7	X	X		X		X	
10	Fractional power machine	11	X		X	**A2**		X	

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

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 Thermodynamics
Course Code	BAS113
Year/Level	level 2
Specialization	Major
Authorization Date of Course Specification	-

Teaching hours	**Lectures**	**Exer.**	**Contact**	**Student's load**
	2	2	5	4

2- Course Aims:

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

3- Competencies :

Competencies	Learning Outcomes (LO'S)
A1. Identify, formulate, and solve complex engineering problems by applying	**a1**. Demonstrate the thermodynamics laws that apply to the engineering problems.

engineering fundamentals, basic science and mathematics.

a2. Explain the basic principles of engineering thermodynamics.

a3. Study the concepts and theories of mathematical, science necessary for engineering thermodynamic properties for different types of systems.

b1. Select the appropriate solutions for engineering problems and system design, gas power cycles, vapor cycles.

b2. Using scientific concepts and thermodynamics laws that are relevant to the real life.

c1. Modify engineering knowledge and understanding to improve design, products and services, gas power cycles, vapor cycles.

c2. Solve complex engineering problems by applying the concepts and the thermodynamics laws.

4. Course Contents:

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

5. Teaching and learning methods:

No	Topics	Face -to- Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	lab
1	Fundamental concepts - Properties of a pure substance	x	x			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; Principle of Carnot cycles	x	x			X	x								
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	Midterm examination	A1	a1,a2,b1
2	Semester work(quizzes, sheets)	A1	c1,c2
3	Final term examination	A1	a3 , b1,b2

7.2 Evaluation Schedule:

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

7.3 weighting of Evaluation:

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

8. List of References:

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

9. Facilities required for teaching and learning:

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

10. Matrix of Competencies and LO's:

No.	Topic	Aims	Competencies	LO's
1	Fundamental concepts - Properties of a pure substance	1	A1	a1,a2
2	Equation of state - thermodynamic systems - Work and heat	1	A1	a1,a2
3	First law of thermodynamics; Applications to Systems and Control Volumes	1	A1	a1,a2,b2
4	Second Law of Thermodynamics; Principle of Carnot cycles	1	A1	b1,b2,c1
5	Heat engines, Refrigerators and heat pumps - Principle of the increase of entropy	1	A1	b1,c1
6	Applications to systems and control volumes - Irreversibility and availability	1	A1	a3,c2
7	Power and refrigeration cycles	1	A1	b1,c1

Course Coordinator: Dr. A. E. Kabeel

Dr. Moataz Mostafa

Head of Department: Assoc. Prof. Dr. Aml Elbehery

Date of Approval: 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	-
Pre- request	LNG101

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. Lab skills in English Lesson 3 Amber comes over to bake cookies & Lesson 4Amber and Ted heat up the kitchen& grammar topics	4	-	4	6
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:

Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brainstorming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab
Water Lab skills in English: Lesson 1 Bob drives a hard bargain & Lesson 2 Bob's big coolie order & grammar topics	✔	✔		✔										✔
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	✔	✔		✔										✔
Water cycle Lab skills in English lesson 5 Nicole practices her election speech & grammar topics	✔	✔												✔
Human uses	✔	✔												✔

Lab skills in English: Grammar topics														
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	✔	✔												✔
Graphic language Lab skills in English: lesson 8 Every one bakes cookies & lesson 9 Nicole's close election & grammar topics	✔	✔												✔
Energy Lab Skills in English lesson 10 Bob gets any angry call from Carol & Grammar topics	✔	✔												✔
Automatic Control Lab Skills in English Grammar topics	✔	✔												✔

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	8th
2	Student load	7th,9th
3	Practical examination	14th
4	Final term examination	15th

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	-

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.
C2 Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.	**a1** Define, basic characteristics, properties, concepts, and techniques of: structural analysis and mechanics. **c3** Applying statistical analyses and objective engineering judgment to draw conclusions.

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

4. Course Contents:

No.	Topics	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 Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brainstorming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab
Basic concept in structural analyses	✔	✔			✔	✔								
Loads and reactions	✔	✔			✔	✔								
Statically determinate beams	✔	✔			✔	✔								
Statically determinate rigid frames	✔	✔			✔	✔								
Statically determinate arches	✔	✔			✔	✔								

Statically determinate trusses.	✔	✔			✔	✔								
Influence lines for Statically determinate structures	✔	✔			✔	✔								

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 C2 C11	a3, b3, c3 a1, c3 a1, c1
2	Practical/oral	-	-
3	Final Exam	C1 C2 C11	a3, b3, c3 a1, 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, C2, C11	a1, c3
4	Statically determinate rigid frames	1,10	C1, C2, C11	a1, c3
5	Statically determinate arches	1,10	C1, C2, C11	a1, c3
6	Statically determinate trusses.	1,10	C1, C2	c3
7	Influence lines for Statically determinate structures	1,10	C1, C2	c3

Course Coordinator: Dr. 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- Semester 1
Specialization	Major
Authorization Date of Course Specification	-

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

Competencies	Learning Outcomes (LO'S)
C1 Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.	**a2** Define the principles, (general concepts- legends and symbols – scales and drawing size – general layout and plants), retaining walls, and earth works **a3.** Identify different irrigation construction profiles, retaining walls, and cross sections.

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).
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	Brainstorming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	lab
Introduction to civil engineering drawings (canals and crossing of roads)- drawing earth works	✔	✔		✔	✔	✔	✔							
Retaining walls (plain concrete and reinforced concrete) drawing	✔	✔		✔	✔	✔	✔							
R. C. bridges drawing	✔	✔		✔	✔	✔	✔							
Culverts drawing	✔	✔		✔	✔	✔	✔							
Syphons drawing	✔	✔		✔	✔	✔	✔							
Aqueducts drawing	✔	✔		✔	✔	✔	✔							
Weirs drawing	✔	✔		✔	✔	✔	✔							
Regulators drawing	✔	✔		✔	✔	✔	✔							

Escapes drawing	✔	✔		✔	✔	✔	✔							

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	C1 C3 C13	a2, a3 c1 b1
2	Practical/Oral	-	-
4	Final Exam	C1 C3 C13	a2, a3 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 and crossing of roads)- drawing earth works	4	C1 C3	a2, a3 c1
2	Retaining walls (plain concrete and reinforced concre drawing	4	C1 C3	a2, a3 c1
3	R. C. bridges drawing	4	C3 C13	c1 b1
4	Culverts drawing	4	C3 C13	c1 b1
5	Syphons drawing	4	C3 C13	c1 b1
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	All Programs
Department Offering the Program	Basic Science and Engineering Department
Department Responsible for the Course	Basic Science and Engineering Department
Course Title	Mathematics 4
Course Code	BAS121
Year/Level	Level: 1
Specialization	Major
Authorization Date of Course Specification	-

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 fundamental Mathematical engineering knowledge and specialized skills of Complex Analysis and Special functions, as well as the ability to apply acquired knowledge of Complex Analysis and Special functions in real-world situations as Heat equation and Wave equation by applying theories and abstract thinking in analytic critical and systemic thinking to identify, diagnose, and solve mathematical engineering problems as by using complex series and Fourier series .

3-Competencies:

Competencies	Learning Outcomes (LO'S)
A1. Identify, formulate, and solve complex engineering problems by applying	a1. Learn the general principles of differential equations and series and it's applications in mathematical engineering.

engineering fundamentals, basic science and mathematics.	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	laboratory	Exercise	contact	Student's load
1	Special functions	4	-	4	8	8
2	Fourier series periodic functions and Euler's laws	4	-	4	8	8
3	Fourier's integrations – solutions of the differential	4	-	4	8	8
4	equations by series - solving the partial differential equations using variables separation	4	-	4	8	8
5	Functions with complex variables – complex quantities algebra multiple values functions - the analytical functions and Koshi's theorem	4	-	4	8	8

6	- the complex series	4	-	4	8	8
7	Taylor and Lorant series - the zeros, unique points and the rest - the infinite series.	4	-	4	8	8
Total		**28**	**-**	**28**	**56**	**56**

5. Teaching and learning methods:

No	Topics	Face-to-FaceLecture	OnlineLecture	FlippedClassroom	Presentationandmovies	Discussion	Problemsolving	Brainstorming	Projects	Sitevisits	Self-learningandResearch	Cooperative	Discovering	Modeling	lab
1	Special functions	x	x			x	x	x							
2	Fourier series	x	x			x	x	x							

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

6. Teaching and learning methods for 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	A1	a1,a2,a3,b1
2	Semester work(quizzes, sheets, report)	A1	a1,c1
3	Final term examination	A1	b1,a3,c1

7.2 Evaluation Schedule:

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

7.3 Weighting of Evaluation:

No.	Evaluation Method	degrees
1	Periodic Exam	60
3	Final exam	90
Total		**150**

8. List of References:

No.	Reference List

1	Brett Borden and James Luscombe "Fourier series and integrals" Morgan & Claypool Publishers (2017).
2	Chris McMullen “Essential Calculus Skills Practice Workbook with Full Solutions" Zishka Publishing (2018).

9. Facilities required for teaching and learning:

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

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

No.	Topic	Aims	Competencies	LO’s
1	Special functions	1	A1	a1,b1
2	Fourier series	1	A1	a1,a2
3	periodic functions and Euler's laws	1	A1	a3
4	Fourier's integrations – solutions of the differential	1	A1	c1
5	equations by series - solving the partial differential equations using variables separation	1	A1	c1
6	Functions with complex variables – complex quantities algebra	1	A1	b1
7	multiple values functions - the analytical functions and Koshi's theorem	1	A1	b1
8	- the complex series	1	A1	b1
9	Taylor and Lorant series - the zeros, unique points and the rest - the infinite series.	1	A1	a3

Course Coordinator: Asso.prof. Dr .Samar Madian

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

Date of Approval:2023

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	-

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-FaceLecture	OnlineLecture	FlippedClassroom	Presentationandmovies	Discussion	Problemsolving	Brainstorming	Projects	Sitevisits	Self-learningandResearch	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	x	**x**		**x**	**X**									

	❖ Sections function and content														
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	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	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. Mohamed Elbindary – Dr. Hany Hashesh

Head of Department: Dr. Aml Behairy

Date of Approval: 2022

- Introductions to Information Technology (BAS123)

1- Basic Information:

Program Title	All programs
Department Offering the Program	Communication and electronics Engineering Department
Department Responsible for the Course	Basic Science and Engineering Department
Course Title	Introductions to Information Technology
Course Code	BAS123- Semester2
Year/Level	Level 2
Specialization	Major
Authorization Date of Course Specification	-
Pre- request	-

Teaching hours	Lectures	Tutorial	Practical	contact	Student's load
	2	-	2	4	4

2- Course Aims:

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

3- Learning Outcomes (LO'S):

A_4	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 d1 Search for information and engage in life-long self-learning .
A_8	**. .d1 Communicate effectively.** **.d2 Demonstrate efficient IT capabilities.**

4. Course Contents:

No.	Topics	Lectures	Tutorial	Practical
1	**Lecture:** Introduction to information systems & information technology **Practical:** Introduction of html	2	-	2
2	**Lecture:** information systems & information technology (Fields- Applications -Examples) **Practical:** html structure code	2	-	2
3	**Lecture:** Computer systems **Practical:** Font Tags	2	-	2
4	**Lecture:** Hardware used in information systems **Practical:** Font Tags	2	-	2
5	**Lecture:** Software used in information systems **Practical: paragraph tags**	2	-	2
6	**Lecture:** Introduction of data communication system **Practical:** order lists	2	-	2
7	**Lecture:** Introduction of Computer Networking **Practical:** unorder lists	2	-	2
8	**Lecture:** The internet; the foundations, Resources and uses of the internet, **Practical:** Image tag	4	-	4
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	Brainstorming	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							X
2	**Lecture:** information systems & information technology (Fields-Applications -Examples) **Practical:** html structure code	X	X		X			X			X	X			X
3	**Lecture:** Computer systems **Practical:** Font Tags	X	X		X		X					X			X

4	**Lecture:** Hardware used in information systems **Practical:** Font Tags	X	X		X		X	X			X	X			X
5	**Lecture:** Software used in information systems **Practical: paragraph tags**	X	X		X			X			X				X
6	**Lecture:** Introduction of data communication system **Practical:** order lists	X	X		X		X	X			X	X			X
7	**Lecture:** Introduction of Computer Networking **Practical:** unorder lists	X	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				X
10	**Lecture:** Privacy Security and Ethics **Practical:** horizontal &vertical Rules	X	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		X
12	**Lecture:** Introduction of Artificial Intelligence **Practical:** Tables	X	X		X		X	X			X	X		X
13	**Lecture:** introduction of cloud computing **Practical:** Hyper Links	X	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	LO's
1	Periodic exam	A4.a2,A4.a3
2	Student load (quizzes, sheets, report)	A4.d1,A8.d1,A8.d2
3	Practical Examination	A4.c3
4	Final term examination	A4.a2,A4.a3, A4.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
2	Presenter
3	Computer lab.
4	White board
5	Data show system
6	Wireless internet
7	Sound system
8	Moodle

10. Matrix of competences of the course:

No.	Topics	Aims	A4.a2	A4.a3	A4.c3	A4.d1	A8.d1	A8.d2

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

13	**Lecture:** introduction of cloud computing **Practical:** Hyper Links	**7**	**X**	**X**	**X**	**X**		
14	**Lecture: Html Projects**	**7**	**X**					**X**

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

Strength of Materials

(BAS124)

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	Strength of Materials
Course Code	BAS124
Year/Level	level 1
Specialization	Major
Authorization Date of Course Specification	-

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.

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-FaceLecture	OnlineLecture	FlippedClassroom	Presentationandmovies	Discussion	Problemsolving	Brainstorming	Projects	Sitevisits	Self-learningandResearch	Cooperative	Discovering	Modeling	lab

1	Simple states of stress and strain	x	x			X									
2	Tension and compression stress	x	x			X									
3	Shear stress in bolts	x	X			x	X								
4	Bending and shearing stresses in beams	x	X			x	X								
5	Torsion stresses	x	x			x	X								
6	Deflection of Beams	x	x			x	X								
7	Analysis of thin-walled pressure vessels	x	x			x	X								
8	Analysis of plane stress	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	a1, b1
2	Practical/ Oral	-	-
3	Final term examination	C1	a1, b1

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	a1, b1
2	Tension and compression stress	2	C1	a1, b1
3	Shear stress in bolts	2	C1	a1, b1
4	Bending and shearing stresses in beams	2	C1	a1, b1
5	Torsion stresses	2	C1	a1, b1
6	Deflection of Beams	2	C1	c3
7	Analysis of thin-walled pressure vessels	2	C1	c2,c3
8	Analysis of plane stress	2	C1	c2,c3

Course Coordinator: Dr. Nesreen Elawadly

Head of Department: Assoc. prof. Aml behairy

Date of Approval: 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	-

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.
C2. Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.	**a1** Define structural analysis and mechanics' basic characteristics, properties, concepts, and techniques.

C11. Select appropriate and sustainable technologies for construction of buildings, infrastructures and water structures; using either numerical 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 Lecture	Online Lecture	Flipped Classsroom	Presentation and movies	Discussion	Problem solving	Brainstorming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	lab
Basic concepts in structure mechanics	✔	✔			✔	✔								
Normal Stresses	✔	✔			✔	✔								
Shear Stresses	✔	✔			✔	✔								
Combined and Principal Stresses	✔	✔			✔	✔								
Elastic deformations of statically determined structures	✔	✔			✔	✔								
Statically indeterminate structures using the three moments equation.	✔	✔			✔	✔								

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 C2 C11	a1, b3 a1 a1
2	Practical/oral	-	-
3	Final Exam	C1 C2 C11	a1, b3 a1 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 C2	b3 a1
2	Normal Stresses	1	C1 C2	b3 a1
3	Shear Stresses	1	C1 C2	b3 a1
4	Combined and Principal Stresses	1	C1 C2	b3 a1
5	Elastic deformation of statically determinate structures	1	C11	a1
6	Analysis of statically indeterminate structures using the equation of three moments	1	C2 C11	a1 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	CIE 122
Year/Level	Level 1- Semester 2
Specialization	Major
Authorization Date of Course Specification	-

Teaching hours	**Lectures**	**laboratory**	**Exercise**	**Contact**	**Student's load**
	2	1	1	4	3

1- Course Aims

No.	Aims
4	Use the engineering techniques, skills to sketch different views of concrete and steel structures layout and produce quality neat drawings.
10	Select appropriate drawing programs such as (CAD program) to draw reinforced concrete and steel buildings.

2- Competencies:

Competencies	Learning Outcomes (LO'S)
C1 Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.	**a2** Recognize different concrete elements profiles and cross sections used in concrete structures (Reinforced concrete works (slabs – beams – columns – foundations). **a3** Define different steel profiles and cross sections used in steel structures.

C3 Select appropriate and sustainable technologies for drawing structures; using either numerical technique	**c1**. Sketch reinforced concrete works 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).
C11 Select appropriate and sustainable technologies for drawing structures; using either 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	Brainstorming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	lab
Introduction to drawings of reinforced concrete works (Slabs – Beams – Columns – Foundations).	✔	✔		✔	✔	✔								
Concrete slab drawing	✔	✔		✔	✔	✔								
Concrete beams drawings	✔	✔		✔	✔	✔								

Concrete columns drawings	✔	✔			✔	✔								
Concrete foundations drawings	✔	✔		✔	✔	✔		✔						
Introduction regarding steel drawings and identification - Define different steel profiles and cross sections used in steel structures.	✔	✔		✔	✔	✔								
Steel compound sections drawings to draw concrete and steel works	✔	✔		✔	✔	✔								
Steel beam and column connections drawing	✔	✔		✔	✔	✔								
Drawing steel truss	✔	✔		✔	✔									
Basic features and capabilities of CAD software	✔	✔		✔	✔									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	C1 C3	a2, a3 c1

		C11 C13	c1 b1
2	Practical/Oral	C1 C3 C11	a2, a3 c1 c1
3	Final Exam	C1 C3 C13	a2, a3 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 (Sla – Beams – Columns – Foundations).	4	C1	a2, a3
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	c1 b1
6	Introduction regarding steel drawings and identification - Define different steel profiles and cross sections used in steel structures.	4	C1 C3	a2, a3 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	c1 b1
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	-

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.

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-FaceLecture	OnlineLecture	FlippedClassroom	Presentationandmovies	Discussion	Problemsolving	Brainstorming	Projects	Sitevisits	Self-learningandResearch	Cooperative	Discovering	Modeling	Iab
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 distributions	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	a2, b1, b3

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.	Evaluation Method	degrees
1	Periodic Exam	40
3	Final 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	b1
5	Estimation and confidence intervals	1	C1	c2
6	Hypothesis testing	6	C1	c2
7	Simple regression	6	C1	c2

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	-

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 fundamentals, basic science and mathematics.	**a1** Define concepts of fluid properties, energy, momentum equations, dimensional analysis, Compressible, laminar and turbulent flow. **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.
C10. Acquire and apply new knowledge; and practice self, lifelong and other learning strategies.	**d1** Search for information about fluid mechanics application in real world to engage in lifelong self-learning discipline.

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	Brainstorming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab
Fluid Properties	✔			✔	✔	✔	✔			✔				✔
Fluid Statics	✔			✔	✔	✔	✔			✔				✔
Forces on Immersed Bodies (Lab.: Center of Pressure)	✔			✔	✔	✔	✔			✔	✔	✔	✔	✔
Fluid Kinematics	✔			✔	✔	✔	✔			✔	✔			✔
Fluid Dynamics including Energy and Momentum Equations (Lab.: Flow Measuring Apparatus	✔			✔	✔	✔	✔			✔	✔			✔

Dimensional Analysis and Similarity	✔			✔	✔	✔	✔			✔	✔	✔		✔
Laminar and Turbulent Flow and its Applications (Lab.: Friction Losses in Pipes)	✔			✔	✔	✔	✔			✔	✔			✔
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 C10	a1, a2, b1, b2, b3 a1, a2, b1 d1
2	Practical/ Oral	C1 C2 C10	b1, b3 a1, a2, b1 d1
3	Final term examination	C1 C2 C10	a1, a2, b1, b2, b3 a1, a2, b1 d1

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 C10	b1 b1 d1
4	Fluid Kinematics	1	C1	a2, b3
5	Fluid Dynamics including Energy and Momentum Equations (Lab.: Flow Measuring Apparatus	1, 4, 8	C1 C2 C10	b3 a1, b1 d1
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 C10	a1, b2 a1, a2 d1
8	Introduction to Compressible Flow	4	C1	a1
9	Pipe Flow (Lab.: Multi-Pump Test (Pump Characteristics))	1, 4, 8	C1 C2 C10	b2 a1, a2 d1

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	-

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)
A3.Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global, cultural, social, economic,	a1. List the economic concepts related to characteristics in engineering analysis to improve the engineering process.

environmental, ethical and other aspects as appropriate to the discipline and within the principles and contexts of sustainable design and development.	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. b2.Judge engineering decision considering balanced cost, benefits, safety, quality, reliability, and environmental impact. c1. Assess economic, societal, and environmental dimensions and risk management in engineering design.
A4. Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues and risk management principles.	a2. List the engineering-related economy. b1. Innovate economy methodical approaches when dealing with new and advancing technology. c2 Use fundamental economy organizational abilities.

4. Course Contents:

No.	Topics	**Lectures**	**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-FaceLecture	OnlineLecture	FlippedClassroom	Presentationandmovies	Discussion	Problemsolving	Brainstorming	Projects	Sitevisits	Self-learningandResearch	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 showing the concepts and techniques for evaluating the worth of products, systems, structures, and services in relation to their cost	x	x			x	x								
3	Economic and cost concepts: calculating economic equivalence, comparison of alternatives and replacement economy	x	x			x		X							
4	Economic optimization in design and	x	x			x	x								

	operations. Cost estimation of products 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	A3	a1,a2
2	Student load (quizzes, sheets, report)	A3	c1,a1
3	Final term examination	A3	a2,b1,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	A3	a1
2	Attention is given to the time value of money by showing the concepts and techniques for evaluating the worth of products, systems, structures, and services in relation to their cost	2	A3	a1
3	Economic and cost concepts: calculating economic equivalence, comparison of alternatives and replacement economy	2	A3	a2
4	Economic optimization in design and operations. Cost estimation of products and systems	2	A3	a2

Course Coordinator: Dr. Rania Hamdy and Dr. Hany hashish
Head of Department: Assoc. prof. Dr. Amal Bahiry
Date of Approval: 07 / 2022

Computer Programming (BAS115)

2- Basic Information:

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

Teaching hours	Lectures	Tutorial	Practical	contact	Student's load
	2	-	2	4	4

3- Course Aims:

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

4- Learning Outcomes (LO'S):

A1	**.b3** Applying engineering basics that are relevant to the computer programing (java) **.C1** Solve engineering problems by applying different engineering algorithms . **C2** Identify, formulate, and solve complex engineering problems by applying engineering fundamentals.
A2	a1 Describe & Design an appropriate system by applying " java " language programming. b3 Analyze and interpret data problems to identify java programs C1.Choose relevant computer-based software for modelling and analysis java programs

4. Course Contents:

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

5. Teaching and learning methods:

No	Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brainstorming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	lab
1	**Lecture:** Basic concepts of programming. **Practical:** problem analysis& Developing the programs charts& Structured programming	x	x		x		x					x			x

2	**Lecture**: Introduction Java Applications **Practical:** Form of the Program& fundamentals of Java programming language and its syntax& Primitive data types, operators, variables & Joptionpane& scanner Classes.	x	x		x			x	x					x
3	**Lecture:** Branching[Control Statements]. **Practical**: programs about (If statement, If -Else, Nested IF, Switch)	x	x		x			x				x		x
4	**Lecture:** [Iterations] Control Statements. **Practical:** solved problems about (Repetition statements: for, while, do-while& Nested loop &Continue, Break.)	x	x		x		x		x			x		x

5	**Lecture:** Concepts of object-Oriented programming **Practical:** Examples of Classes, Inheritance Concept.	x	x		x		x		x						x
6	**Lecture:** Methods in java. **Practical**: problems of (Declare method& Message passing& Method overloading)	x	x		x			x					x		x
7	**Lecture:** Arrays and Array list **Practical**: Create Array& Matrix& Array List.	x	x		x		x		x				x		x
8	**Lecture:** Introduction to java Applets. **Practical**: java Applets programs.	x	x		x			x							x
	Lecture: Graphical user interface (GUI). **Practical:** GUI exercises.	x	x		x		x		x				x		x
9	**Lecture:** Graphical user interface (GUI). **Practical:** GUI exercises.	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.	Easy for complete task
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	LO's
1	Periodic exam	A1.c1,A1.b3
2	Student load (report, quizzes)	A1.c2,A2.c1,A2.a1
3	Final term examination	A1.b3,A1.c1,A1.c2,A2.a1,A2.b3
4	Practical	A2.c2,

7.2 Evaluation Schedule:

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

7.3 weighting of Evaluation:

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

8. List of References:

No.	Reference List
1	E Balagurusamy,"Programming with Java," McGraw-Hill Education · 2019
2	Andreas Göransson, Eric Foster-Johnson, David Cuartielles," **The Java Workshop: Learn object-oriented programming:,** Packt Publishing Ltd, 2019
3	Raymond Gallardo, Sharon Zakhour, et al, "Th,e Java Tutorials", Addison-Wesley Professional, 6 editions,2018
4	David J. Eck, "Introduction to Programming Using JAVA",2017

5	Patrick Niemeyer, Daniel Leuck”, Learning Java, 4th Edition", O'Reilly Media; 4 edition (July 2, 2020)

9. Facilities required for teaching and learning:

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

10. Matrix of competences of the course:

No.	Topic	Aims	A1.b3	A1.c1	A1.c2	A2.a1	A2.b3	A2.c1
1	Basic concepts of programming: problem analysis and developing the programs charts	2		X	X			
2	structured programming with one programming language	2	X				X	X
3	Concepts of object Oriented programming: Classes, inheritance and message passing, fundamentals of Java programming language and its syntax	2				X	X	X
4	fundamentals of Java programming language and its syntax	2	X	X			X	X
5	major class libraries in Java	2	X		X		X	
6	Java applets	2	X				X	
7	Graphic User Interface programming	2	X					
8	practice on Java programming language	2	X					

Course Coordinator: Dr. Amira Elsonbaty

Head of Department:
Date of Approval: 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	-

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

4. Course Contents:

No.	Topics	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	✔			✔	✔	✔	✔			✔				
Slope Deflection Method	✔			✔	✔	✔	✔			✔				
Moment Distribution Method	✔			✔	✔	✔	✔			✔				
Introduction to Stiffness Method	✔			✔	✔	✔	✔			✔				

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 C2 C11	a3,b3,c2,c3 a1,c3 a1,c1
2	Practical /Oral	-	-
3	Final term examination	C1 C2 C11	a3,b3,c2,c3 a1,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 C2 C11	c3 a1 a1,c1
4	Introduction to Stiffness Method	10	C1 C2 C11	a3, c3 a1,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	-

Teaching hours	**Lectures**	**laboratory**	**Exercise**	**contact**	**Student's load**
	2	1	1	2	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)**
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	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	Brainstorming	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	C4 C11	a1,a3 a1,a2
2	Practical /Oral	C4 C11	a1, a3 a1,a2
3	Final term examination	C4 C11	a1, a3 a1,a2

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)	8,10	C4	a3, a1	Face-to-Face Lecture Brain storming

	Practical: Sieve analysis – adsorptio specific gravity – specific volume fineness modulus				
2	Manufacture and types of cement Practical: fineness modulus of cement –compression strength – initial and final setting time	8,10	C4 C11	a3,a1 a1, a2	Face-to-Face Lecture Brain storming Discussion sessions
3	Fresh concrete, concrete workability tests and factors affecting the workability	8,10	C4 C11	a3,a1 a1, a2	Face-to-Face Lecture Brain storming Discussion sessions Lab
4	Hardened concrete, factors affecting concrete strength in tension, compression and flexure	8,10	C4 C11	a3,a1 a1, a2	Face-to-Face Lecture Brain storming Discussion sessions Problem solving
5	durability of concrete, mix design	8,10	C4 C11	a3,a1 a1, a2	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	C4 C11	a3,a1 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	C4 C11	a3,a1 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	-
Pre-request	-

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	**a1** Recognize the fundamentals of structural analysis and mechanics, properties and strength

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.	of materials, surveying, soil mechanics, hydrology and fluid mechanics. **c1** Using either numerical techniques or physical measurements and/or testing by applying a full range of civil engineering concepts and techniques of: structural analysis and mechanics, properties and strength of materials, surveying, soil mechanics, hydrology and fluid mechanics.

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	2	1	1	4

	Practical: Using theodolite as a model to identify permanent errors in theory				
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:

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 Surveying: basic definitions, classification of maps and scales. Introduction to leveling. Types of levels Practical: Learn about levels devices	✔			✔	✔								✔
Mapping using linear measurements Practical: measuring some buildings and details inside the 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	✔			✔	✔								✔
Compass surveying and traverse computation area determination Practical: Make a landline and 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	✔			✔	✔								✔
Permanent adjustment of theodolite, errors in measuring horizontal and vertical angles Practical: Using theodolite 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	C10	d1, d2
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, 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	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: Assoc. Prof. Mohamed Gabr

Date of Approval: 10/2022

Numerical Methods in Engineering
(BAS221)

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	-

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.

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-FaceLecture	OnlineLecture	FlippedClassroom	Presentationandmovies	Discussion	Problemsolving	Brainstorming	Projects	Sitevisits	Self-learningandResearch	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	b1, 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.	Evaluation Method	degrees
1	Periodic Exam	40
3	Final 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	a2
3	Curve fitting	1	C1	b1
	Interpolation	1	C1	b1
4	Numerical solution of initial value problems	1	C1	b2
5	Boundary and eigen value problems	1	C1	c1, c2

Course Coordinator: Asso.prof. Dr .Samar Madian

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

Date of Approval:2023

Hydrology and Irrigation Engineering
CIE221

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	-

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	Brainstorming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab
Definitions – water resources – Hydrological cycle	✔			✔	✔	✔	✔			✔				
Precipitation	✔			✔	✔	✔	✔			✔				✔
Hydrological losses	✔			✔	✔	✔				✔		✔	✔	
Hydrograph	✔			✔	✔	✔	✔		✔	✔	✔			
Estimating of water requirements	✔			✔	✔	✔	✔		✔	✔	✔			
Soil – Plant – Water relationship	✔			✔	✔	✔	✔			✔	✔	✔		
Managing and distribution of irrigation systems	✔			✔	✔	✔	✔	✔		✔	✔			
Introduction to various types of irrigation systems – surface irrigation systems	✔			✔	✔	✔	✔	✔		✔	✔			
Planning and design of surface irrigation and drainage network systems	✔			✔	✔	✔	✔			✔			✔	
Sprinkler irrigation	✔			✔	✔	✔	✔			✔			✔	
Drip irrigation	✔			✔	✔	✔	✔			✔			✔	
Drainage 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 C2 C11 C12	a2, a3, b1, b2 a1, b1, b2 a1, c1 b1, b2
2	Practical/ Oral	-	-
3	Final term examination	C1 C2 C11 C12	a2, a3, b1, b2 a1, b1, b2 a1, c1 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 C12	a3, b2 b1 a1, c1 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
Date of Approval: 10/2022

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	-

Teaching hours	**Lectures**	**laboratory**	**Exercise**	**Contact**	**Student's load**
	4	-	2	6	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.
7	Achieve an optimum design of Reinforced Concrete.

3- Competencies:

Competencies	**Learning Outcomes (LO'S)**
C1 Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.	**a3** Explain the basic principles of 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.
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	Lab.	Exercise	Contact	Student's load
1	Introduction to reinforced concrete	4	-	2	6	5
2	Design criteria	8	-	4	12	10
3	Design of sections subjected to moments	8	-	4	12	10
4	Bond length between concrete and steel bars	8	-	4	12	10
5	Shear in beams	8	-	4	12	10
6	Design of one way and two-way slabs	12	-	6	18	15

7	Load calculation in slabs and beams.	8	-	4	12	10
Total		**56**	**-**	**28**	**84**	**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
Introduction to reinforced concrete	✔			✔	✔	✔	✔			✔				
Design criteria	✔			✔	✔	✔	✔			✔				
Design of sections subjected to moments	✔			✔	✔	✔	✔			✔				
Bond length between concrete and steel bars	✔			✔	✔	✔	✔			✔				
Shear in beams	✔			✔	✔	✔	✔			✔				
Design of one way and two-way slabs	✔			✔	✔	✔	✔			✔				
Load calculation in slabs and beams.	✔			✔	✔	✔	✔			✔				

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 C4 C11 C12	a3,c2 a2,c3 a1 c1 b1
2	Practical /Oral	-	-
3	Final term examination	C1 C2 C4 C11 C12	a3,c2 a2,c3 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 concret	1,7	C1	a3
2	Design criteria	1,7	C1 C2 C4 C12	c2 a2, c3 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 C4 C12	a2, c3 a1 b1
6	Design of one way and two-way slabs	1,7	C2 C4 C12	a1, c3 a1 b1
7	Load calculation in slabs and beams.	1,7	C1 C2 C4	a3 a1, c3 a1

			C12	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	-

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.
10	Select appropriate and sustainable technologies for construction of buildings, infrastructures and water structures; using numerical techniques, experiment measurements, and testing by applying a full range of civil engineering fields such as structural analysis and mechanics, properties and strength of materials, surveying, soil mechanics, hydrology and fluid mechanics

3- Competencies:

Competencies	Learning Outcomes (LO'S)
C1 Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.	**a 3** Define contemporary engineering technologies and the introduction to theory of errors and error analysis of surveying measurements. **c2** Applying engineering design procedures to generate cost-effective solutions while adhering to the principles and contexts of sustainable design and development.
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 Indirect methods for distance measurement: Stadia method-tangent methods-substance bar. and/or testing by applying a full range of civil engineering concepts and techniques of surveying.

4- Course Contents:

No.	Topics	Lectures	laboratory	Exercise	Contact	Student's load
1	Indirect methods for distance measurement: Stadia method-tangent methods-substance bar.	2	1	1	4	4
2	Setting out of horizontal and vertical curves	4	2	2	8	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	12
4	C Coordinate systems and transformations coordinate computations: Polar method-intersection-resection	4	2	2	8	8
5	Modern methods for distance measurements: Distance measurement (EDM) and total stations.	4	2	2	8	8
6	Setting out of engineering projects.	2	1	1	4	4
7	Introduction to Geodesy	2	1	1	4	4
8	Course Project	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	Brainstorming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling

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

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	ILO's
1	Periodic exam	C1 C11	a3 a1
2	Practical /Oral	C1	b1, c4

3	Final term examination	C1 C11	a3, b1 a1, b1

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 – Compulsory Course
Authorization Date of Course Specification	-

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.
7	Achieve an optimum design of Transportation and Traffic, Roadways and Airports, Railways, or any other emerging field relevant to the discipline.

3. Competencies:

Competencies	Learning Outcomes (LO'S)
C1 Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.	**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.
C11 Select appropriate and sustainable technologies for road construction	**a2** Summarize, appropriate and sustainable technologies for road construction
C12 Achieve an optimum design for Transportation and Traffic, Roadways or any other emerging field relevant to the discipline.	**b2** Achieve an optimum design of works for transportation and traffic or any other emerging field relevant to the discipline.

4. Course Contents:

No.	Topics	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**

5. Teaching and learning methods:

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

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 C11 C12	a2, c2 a2, b2, b3, c3 a2 b2
2	Practical\Oral	-	-
3	Final Exam	C1 C2 C11 C12	a2, c2 a2, b2, b3, c3 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 term examination	60%
Total		**100%**

8. List of References:

No.	Reference List
1	Khisty C. J. and Lall B. K., Transportation Engineering – An Introduction,3rd Edition, Prentice-Hall, Inc., New Jersey, USA, 2018.
2	Wright, P. H. and Dixon K. K., Highway Engineering, 7th Edition, John Wiley & Sons, Inc., 2016.
3	Tom V. M., (2017) lecture notes in traffic engineering and management. Department of civil engineering, Bombay.

9. Facilities required for teaching and learning:

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

10. Matrix of knowledge and skills of the course:

No	Topic	Aims	Competencies	LO's
1	Principles of traffic engineering	1, 7	C1 C2	a2 a2, b3

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	a2, c3 a2
7	Intersections and Grade-separations	1, 7	C1 C2	a2, c2 a2, b3, c3
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	a2, b2
11	The 3-steps model of urban transportation planning	1, 7	C2	a2, b2

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	-

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 use statistical analyses and objective engineering judgment to draw conclusions	**a2** Define the principles, basic properties, and features of construction material, as well as their use in sustainable technologies for construction of buildings, infrastructures and water structures.
C4 Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues and risk management principles	**a1** Describe codes of practice, and standards, as well as health and safety regulations **a2** 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,

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	Brainstorming	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 typ 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: Assoc. Prof. Mohamed Gabr.

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	-

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, environmental, ethical and other aspects as appropriate to the discipline and within the principles and contexts of sustainable design and development.	**a1** Learn the general principles of design techniques specific to reinforced concrete and steel structures, foundations and earth retaining structures **a2** Understand the professional ethics and impacts of engineering solutions on society and environment. **a3** Recognizes the various construction defects, instability and quality issues and assess environmental impacts of projects. **b1** Judge engineering decisions considering balanced costs, benefits, safety, quality, reliability, and environmental impact. **c2** Applying engineering design procedures to generate cost-effective solutions while adhering to the principles and contexts of sustainable design and development.
C5 Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues and risk management principles.	**a1** Define technical language and report writing. **b1** Assess different ideas, views, and knowledge from a range of sources. **c1** Prepare technical reports. **d1** Search for information to engage in lifelong self-learning discipline.
C6 Plan, supervise and monitor implementation of engineering projects, taking into consideration other trades requirements.	**a1** Show the appropriate and sustainable technologies for construction of buildings, infrastructures and water structures. **c2** Acquire entrepreneurial skills.

C7 Function efficiently as an individual and as a member of multi-disciplinary and multicultural teams.	**d1** Collaborate effectively within multidisciplinary team. **d2** Work in stressful environment and within constraints. **d3** Motivate individuals.
C9 Use creative, innovative and flexible thinking and acquire entrepreneurial and leadership skills to anticipate and respond to new situations.	**d1**Think creatively in solving problems of design. **d2** Effectively manage tasks, time, and resources.

4- Course Contents:

No.	Topics	Tutorial	Practical
1	The training aims to explore students' ability and skills to comprehensively address and manage architectural and technical issues.	-	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 movi	Discussion	Problem solving	Brainstorming	Projects	Site visits	Self-learning and Rese	Cooperative	Discovering	Modeling	Lab

				es						arch				
The training aims to explore students' ability and skills to comprehensively address and manage architectural and technical issues	✔				✔	✔	✔		✔	✔	✔			
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	✔			✔	✔		✔	✔						

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	a1, b1, c2 a1, c1, d1 d1, d3

		C9	d1

7.2 Evaluation Schedule:

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

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	2,5,7,8	C3 C5	a2, a3, c2

	throughout their study in the faculty and department in a combined manner, that reflects identity and creativity in all its preliminary and analytical phases.		C6 C9	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: 10/2022

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	-

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

2- Course Aims:

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

3-Competencies:

Competencies	Learning Outcomes (LO'S)
C2 Develop and conduct appropriate simulation, analyze and interpret data, assess and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.	**a2** Define the principles and basic of different type of slab and use the sustainable technologies. **c3** Applying statistical analyses and objective engineering judgment to draw conclusions.
C9 Use creative, innovative and flexible thinking and acquire entrepreneurial and leadership skills to anticipate and respond to new situations.	**d1** Think creatively in solving problems of design **d3** Refer to relevant literatures.

C12 Achieve an optimum design of Reinforced Concrete.	**b1** Achieve an optimum design of Reinforced Concrete.

4. Course Contents:

No.	Topics	Lectures	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	C2 C9 C12	a2, c3 d1, d3 b1
2	Practical/ Oral	-	-
3	Final term examination	C2 C9 C12	a2, c3 d1,d3 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	C2 C9	a2, c3 d1,d3
2	Design of sections subjected to torsion	7	C2 C12	a2, c3 b1
3	Design of flat slabs	7	C9 C12	d1,d3 b1
4	Design of paneled beam slabs	7	C2 C9 C12	a2, c3 d1,d3 b1
5	Design of stairs.	7	C2 C9 C12	a2,c3 d1,d3 b1

Course Coordinator: Dr. Hamdi Abd Alaty

Head of Department: Prof. Dr. Mohamed ElKiki

Date of Approval: 10/2022

Geology and Soil Mechanics 1
CIE312

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	-

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 engineering knowledge and specialized skills, as well as the ability to apply acquired knowledge in geology and soil mechanics by applying theories and abstract thinking in analytic critical and solve the geotechnical problems of varying complexity and variation.
10	Select an appropriate and sustainable technologies for design and construction of buildings, infrastructures; using numerical techniques, geotechnical experiment measurements using soil mechanics laboratory.

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 statistical analyses and objective engineering	**a1.** Define, basic characteristics, properties, concepts, and techniques of soil mechanics. **b1.** Conduct basic experiments to learn about the basic characteristics and features of soil mechanics.
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	Brainstorming	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 C2 C11	a3, b3, c3 a1, b1 a1, c1
2	Practical/ Oral	C1 C2 C11	a3, b3, c3 a1, b1 a1, c1
3	Final Exam	C1 C2 C11	a3, b3, c3 a1, b1 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	a3
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 C11	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	C11	c1

7	Consolidation Practical: oedometer	1,10	C2 C11	a1 a1, c1
8	Stability analysis	1,10	C11	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-Semester 1
Specialization	Major
Authorization Date of Course Specification	-

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

3- Competencies:

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

4- Course Contents:

No.	Topics	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**

5- Teaching and learning methods:

Topic	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brainstorming	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)	✔			✔	✔	✔							
The energy principles (specific energy and specific discharge –the transition problem – choking phenomena – control section – discharge measuring).	✔			✔	✔	✔							

The momentum principles (hydraulic jump – momentum function – jump classification – surge in open channel)	✔			✔	✔	✔						✔	
Flow resistance (shear stress on wetted perimeter – resistance equations – channels with composite roughness)	✔			✔	✔	✔							
Gradually varied flow (types of slopes – dynamic equation of G.V.F – classification of flow profile – methods of computations)	✔			✔	✔	✔						✔	
Design of channel for uniform flow (erodible and non-erodible channels – best hydraulic sections – maximum permissible velocity method –tractive force method).	✔			✔	✔	✔							

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.	Assessment Method	Competencies	LO's
1	Periodic Exam	C2 C12	a2, b1 b1, b2
2	Practical\Oral	C2 C12	a2, b1 b1, b2
3	Final Term Examination	C2 C12	a2, b1 b1, b2

7.2 Evaluation Schedule:

No.	Assessment Method	Weeks
1	Periodic Exam	2^{nd},7^{th} , 9^{th}

2	Practical/ Oral	14th
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%**

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'' McGary- 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:

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	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	7	C2 C12	a2, b1 b1, b2

	problem – choking phenomena – control section – discharge measuring).			
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 C12	a2, b1 b1, b2
6	Design of channel for uniform flow (erodible and non-erodible channels – best hydraulic sections – maximum permissible velocity method –tractive force method).	7	C2 C12	a2, b1 b1, b2

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	-

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	**a3** Explain the basic principles of engineering in steel structures design.

engineering fundamentals, basic science and mathematics.	**b3** Applying engineering basics that are relevant to the steel structures design. **c3** Identify, formulate, and solve complex engineering problems by applying engineering fundamentals.
C2 Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.	**a1** Define, basic characteristics, properties, concepts, and techniques of structural analysis and mechanics, and properties and strength of materials of steel structures. **c3** Applying statistical analyses and objective engineering judgment to draw conclusions.
C9 Use creative, innovative and flexible thinking and acquire entrepreneurial and leadership skills to anticipate and respond to new situations.	**d3** Refer to relevant literatures.
C11 Select appropriate and sustainable technologies for construction of steel buildings using either numerical techniques or physical measurements and/or testing by applying a full range of civil engineering concepts and techniques of structural analysis and mechanics, and properties and strength of materials.	**a1** Recognize the fundamentals of structural analysis and mechanics, and properties and strength of materials of steel structures. **c1** Using either numerical techniques or physical measurements and/or testing by applying a full range of civil engineering concepts and techniques of structural analysis and mechanics, and properties and strength of materials of steel structures.
C12 Achieve an optimum design of steel structures.	**b1** Achieve an optimum design of steel structures.

4. Course Contents:

No.	Topics	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 Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brainstorming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab
Design of steel structures	✔			✔	✔	✔								
Tension and compression members	✔			✔	✔	✔								
Beams	✔			✔	✔	✔								
Beam-columns	✔			✔	✔	✔								
Built-up members	✔			✔	✔	✔								
Plate girders	✔			✔	✔	✔								
Connection	✔			✔	✔	✔								
Design practice	✔			✔	✔	✔								
Tutorial design workshops	✔			✔	✔	✔								
Design of steel structures	✔			✔	✔	✔								

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 C2 C9 C11 C12	a3,b3,c3 a1,c3 d3 a1,c1 b1
2	Practical/oral	-	-
3	Final Exam	C1 C2 C9 C11 C12	a3,b3,c3 a1,c3 d3 a1,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, C2, C11	a1, c3
4	Beam-columns	1.7	C1, C2, C11	a1, c3
5	Built-up members	1.7	C1	a3
6	Plate girders	1.7	C1	c3
7	Connection	1.7	C1, C2, C11	a1, c3

8	Design practice	1.7	C1, C2, C11	a1, c3

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	-

Teaching hours	Lectures	laboratory	Exercise	Contact	Student's load
	2	-	2	4	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, 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 soil materials and highways structures using national highways codes. **a3** Recognizes the various pavement construction defects **b1** Judge engineering decisions considering balanced quality of pavement,
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.

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	Brainstorming	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:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Periodic Exam	C2 C3 C11 C12	a2, b2, b3 a1, a3, b1 a2 b2
2	Practical\Oral	-	-
3	Final Exam	C2 C3 C11 C12	a2, b2, b3 a1, a3, 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	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	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	a2
2	Strength and stabilization of subgrade soils	7,10	C2	a2, b2, b3
3	Unbound materials characterization	7,10	C2 C12	a2, b2 b2

4	Sources and characteristics of asphalt binder	7,10	C2 C12	a2 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	a2, b3, c3 a1
8	Introduction to Airport Engineering	7,10	C2 C11	a2, a1, b2
9	Aircraft characteristics and air traffic control.	7,10	C2 C11	a2, b2, c3 a2
10	Airport configuration, components, and capacity	7,10	C2	a2, b2
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	

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- 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:

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	✔			✔	✔		✔						
Drinking water standards, quality requirement	✔			✔	✔								
Ground water collecting	✔			✔	✔	✔							
Water purification systems: - Collecting works - Coagulation/flocculation tanks - Sedimentation tank - Filtration Disinfection and ground tank	✔			✔	✔			✔	✔				
Water distribution system design	✔			✔	✔								
Cold water system design	✔			✔	✔								

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 (BAS 321)

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	-

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)
C3 Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global, cultural, social, economic, environmental, ethical, and other aspects as appropriate to the discipline, and within the principles and contexts of sustainable design and development.	**b1** Judge engineering decisions considering balanced costs, benefits, safety, quality, reliability, and environmental impact. **c2** Applying engineering design procedures to generate cost-effective solutions while adhering to sustainable design and development principles and contexts.

C9 Use creative, innovative, and flexible thinking and acquire entrepreneurial and leadership skills to anticipate and respond to new situations.	**d2** Effectively manage tasks, time, and resources.
C13 Plan and manage construction processes; address construction defects, instability, and quality issues; maintain safety measures in construction and materials; and assess the environmental impacts of projects.	**a1** Define the plan and manage the construction process.
C14 Deal with biddings, contracts, and financial issues including project insurance and guarantees.	**a1** Define biddings, contracts, and financial issues. **b1** Address 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	C3 C9 C13 C14	b1, c2 d2 a1 a1, b1, c1
2	Practical /Oral	-	-
3	Final Term Examination	C3 C9 C13 C14	b1, 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	C3 C9 C13	b1, c2 d2 a1

			C14	a1, b1, c1
2	Project Planning and Scheduling	6, 8, 9	C3 C9 C13 C14	b1, c2 d2 a1 a1, b1, c1
3	Network Based Scheduling	6, 8, 9	C3 C9 C13 C14	b1, c2 d2 a1 a1, b1, c1
4	Critical Path Method (CPM)	6, 8, 9	C3 C9 C13 C14	b1, c2 d2 a1 a1, b1, c1
5	Program Evaluation & Review Technique (PERT)	6, 8, 9	C3 C9 C13 C14	b1, c2 d2 a1 a1, b1, c1
6	Probability Aspects of Project Completion Time	6, 8, 9	C3 C9 C13 C14	b1, c2 d2 a1 a1, b1, c1
7	Project Cost Control	6, 8, 9	C3 C9 C13 C14	b1, c2 d2 a1 a1, b1, c1
8	Resource Allocation	6, 8, 9	C3 C9 C13 C14	b1, c2 d2 a1 a1, b1, c1
9	Forecasting Funds Requirements	6, 8, 9	C3 C9 C13 C14	b1, c2 d2 a1 a1, b1, c1

Course Coordinator: Dr. Hamdy Abd Elaty
Head of Department: Assoc. Prof. Dr. Khaled Samir
Date of Approval: 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	-

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

2- Course Aims

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

3- Competencies:

Competencies	**Learning Outcomes (LO'S)**
C2 Develop and conduct appropriate simulation, analyze and interpret data, assess and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions. .	**a2** Define the principles and basic of different type of halls and use the sustainable technologies. **b1** Conduct basic experiments to learn about the basic characteristics and features of different type of halls. **c3** Applying statistical analyses and objective engineering judgment to draw conclusions.
C11 Select appropriate and sustainable technologies for construction of buildings, infrastructures and water structures; using	**a1** Recognize the fundamentals of design of halls, frames, arches, truss, Vierendeel girder, and saw tooth roofs.

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.	**a2** Summarize, appropriate and sustainable technologies for halls and main girders.
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 girder	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 Vierendeel 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	C2 C11 C12	a1,b1,c3 a1,a2 b1
2	Practical/ Oral	-	-
3	Final term examination	C2 C11 C12	a1,b1,c3 a1,a2 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	C2 C11	a2, c3 a1
2	Design of frames	7	C2 C11 C12	a2, c3 a1 b1

3	Design of arches	7	C11 C12	a1 b1
4	Design of trusses and Vierendeel girder	7	C2 C11 C12	a2, c3 a1 b1
5	Design of saw tooth roofs.	7	C2 C11 C12	a2, b1 a1 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	CIE 322
Year/Level	level 3
Specialization	Major
Authorization Date of Course Specification	-

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 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.
C2. Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.	**a2.** Define the principles, basic properties, and features of soil mechanics works and use the sustainable technologies. **b2.** Conduct basic experiments to learn about the applications of soil mechanics. **c3.** Applying statistical analysis and objective engineering judgment to draw conclusions for soil works
C10. Acquire and apply new knowledge; and practice self, lifelong and other learning strategies.	**d1.** Search for information to engage in lifelong self-learning discipline in soil mechanics works. **d2.** Professionally merge the engineering knowledge, understanding, and feedback to improve soil mechanics 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 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	**b2.** Achieve an optimum design of soil mechanics and retaining structures.

Resources and Harbors; or any other emerging field relevant to the discipline.	

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	Brainstorming	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 C2 C10 C11 C12	a3 b2 d1, d2 a1, a2 b2
2	Practical/ Oral	-	-
3	Final Exam	C1 C2 C11 C12	a3 a1, b2 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 C2 C11 C12	a3, b2 a2 a1, a2 b2
2	Consolidation of soil and Settlement and contact pressure	7,10	C2 C11 C12	a2 a1, a2 b2
3	Soil bearing capacity	7,10	C11 C12	a1, a2 b2
4	Lateral earth pressure, Retaining walls and sheet piles	7,10	C2 C11 C12	a2 a1, a2 b2

5	Slope stability	7,10	C1 C10	a3, b2 d1,d2
6	Introduction to Foundation Engineering	1,10	C2 C11 C12	a2 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	CIE 323
Year/Level	Level 3 -Semester 2
Specialization	Major
Authorization Date of Course Specification	-

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

2- Course Aims

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

3- Competencies:

Competencies	Learning Outcomes (LO'S)
C2. Develop and conduct appropriate simulation, analyze and interpret data, assess and evaluate findings, and use statistical for computer applications in civil engineering.	**a1.** Define, basic characteristics, properties, concepts, and techniques to design reinforced concrete and steel structures, hydraulic applications (such as gradually and rapidly varied flow – channel cross-section) and sanitary works (such as water distribution system) using computer application.

	c1. Choose relevant mathematical and computer-based methodologies for problem modelling and analysis in civil engineering.
C11. Select appropriate and sustainable technologies to design reinforced concrete and steel structures, hydraulic applications and sanitary works using 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	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	Brainstorming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab
Study of theoretical models 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 C11	a1, c1 c1
2	Practical/ Oral	C2 C11	a1, c1 c1
3	Final Exam	C2 C11	a1, 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.		

10- Matrix of knowledge and skills of the course:

No	Topic	Aims	Competencies	LO's
1	Study of theoretical models for the analysis of structures. Practical: analyze beams, frames, trusses and slabs	7, 10	C2	a1, c1
2	Study of how to choose suitable methods for analysis of various structures. Practical: choose suitable methods for designing beams, frames, trusses and slabs	7, 10	C2	a1, c1
3	Preparation of simple programs based on these models.	7, 10	C2	a1, c1

	Practical: design programs for structure analysis using Excel or MATLAB		C11	c1
4	Study of available programs and modifying them for analysis of certain problems.	7, 10	C2 C11	a1, c1 c1
5	Training on the use of available commercial software programs. Practical: using sap, excel, EPANET	7,10	C2 C11	a1, c1 c1
6	Computer applications. Practical: choosing a civil engineering case study for structural analysis, pipe network design, hydraulics, and sanitary engineering.	10	C11	c1

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

Steel structures Design (2)
CIE324

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	-

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)**
C1 Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.	**a3** Explain the basic principles of engineering in steel structures design. **b3** Applying engineering basics that are relevant to the steel structures design.
C2 Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess	**a1** Define, basic characteristics, properties, concepts, and techniques of structural analysis and mechanics, and

and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.	properties and strength of materials of steel structures.
C5 Practice research techniques and methods of investigation as an inherent part of learning**.**	**d1** Search for information to engage in lifelong self-learning discipline.
C11 Select appropriate and sustainable technologies for construction of steel buildings using either numerical techniques or physical measurements and/or testing by applying a full range of civil engineering concepts and techniques of structural analysis and mechanics, and properties and strength of materials.	**a1** Recognize the fundamentals of structural analysis and mechanics, and properties and strength of materials of steel structures. **c1** Using either numerical techniques or physical measurements and/or testing by applying a full range of civil engineering concepts and techniques of structural analysis and mechanics, and properties and strength of materials of steel structures.
C12 Achieve an optimum design of steel structures.	**b1** Achieve an optimum design of steel structures.

4. Course Contents:

No.	Topics	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	✔			✔	✔	✔								
Riveted and bolted connections	✔			✔	✔	✔								
High strength bolted connections	✔			✔	✔	✔								
Welded connections	✔			✔	✔	✔								
Base connections	✔			✔	✔	✔								
Roof trusses	✔			✔	✔	✔								
Rigid frames design	✔			✔	✔	✔								

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 C2 C5 C11 C12	a3,b3 a1 d1 a1,c1 b1
2	Practical/oral	-	-

3	Final Exam	C1 C2 C5 C11 C12	a3,b3 a1 d1 a1,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

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	C1, C2, C11 C12	a3, b3 a1 a1,c1 b1
2	Riveted and bolted connections	6,7	C1, C11, C12	a3 c1 b1
3	High strength bolted connections	6,7	C1, C11, C12	a3 c1 b1
4	Welded connections	6,7	C1, C11, C12	a3 c1 b1
5	Base connections	6,7	C1, C11, C12	b3 c1 b1
6	Roof trusses	6,10	C1, C5, C11, C12	a3, b3 d1 a1, c1 b1
7	Rigid frames design	6,10	C1, C5, C11, C12	a3, b3 d1 a1, c1 b1

Course Coordinator: Assoc. Prof. Dr. Ashraf Elsabagh

Head of Department: Prof. Dr. Mohamed ElKiki

Date of Approval: 10/2022

Training 2
CIE325

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	Training2
Course Code	CIE325
Year/Level	Level: 4
Specialization	Major
Authorization Date of Course Specification	-

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, environmental, ethical and other aspects as appropriate to the discipline and within the principles and contexts of sustainable design and development.	**a1** Learn the general principles of design techniques specific to reinforced concrete and steel structures, foundations and earth retaining structures **a2** Understand the professional ethics and impacts of engineering solutions on society and environment. **a3** Recognizes the various construction defects, instability and quality issues and assess environmental impacts of projects. **b1** Judge engineering decisions considering balanced costs, benefits, safety, quality, reliability, and environmental impact. **c2** Applying engineering design procedures to generate cost-effective solutions while adhering to the principles and contexts of sustainable design and development.
C5 Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues and risk management principles.	**a1** Define technical language and report writing. **b1** Assess different ideas, views, and knowledge from a range of sources. **c1** Prepare technical reports. **d1** Search for information to engage in lifelong self-learning discipline.
C6 Plan, supervise and monitor implementation of engineering projects, taking into consideration other trades requirements.	**a1** Show the appropriate and sustainable technologies for construction of buildings, infrastructures and water structures. **c2** Acquire entrepreneurial skills.
C7 Function efficiently as an individual and as a member of multi-disciplinary and multicultural teams.	**d1** Collaborate effectively within multidisciplinary team. **d2** Work in stressful environment and within constraints.

	d3 Motivate individuals.
C9 Use creative, innovative and flexible thinking and acquire entrepreneurial and leadership skills to anticipate and respond to new situations.	**d1**Think creatively in solving problems of design. **d2** Effectively manage tasks, time, and resources.

4- Course Contents:

No.	Topics	Tutorial	Practical
1	The training 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**

5- Teaching and learning methods:

Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brainstorming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab
The training aims to explore students' ability and skills to comprehensively	✔				✔	✔	✔		✔	✔	✔			

address and manage architectural and technical issues														
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	✔			✔	✔		✔	✔						

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)	6th

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: 10/2022

Water and wastewater treatment
CIE 326

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	-

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- 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.
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:

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
Introduction to sewerage system works and design	✔			✔	✔								
Characteristics and sources of wastewater; domestic, industrial, rain and infiltration.	✔			✔	✔								
Calculation of discharges. Design of sewer pipes and manholes. Pump stations.	✔			✔	✔	✔							
Design of Pump stations and collection works of sewerage system.	✔			✔	✔	✔							
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).	✔			✔	✔	✔		✔					

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 C12	a2, c1 b2
2	Practical/Oral	-	-
3	Final exam	C3 C12 C13	a2, c1 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	C12	b2
3	Calculation of discharges. Design of sewer pipes and manholes. Pump stations.	7, 8	C12	b2
4	Design of pump stations and collection works of sewerage system.	7, 8	C12 C13	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	C12 C13	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 Engineering 1
Course Code	CIE 411
Year/Level	level 4
Specialization	Major
Authorization Date of Course Specification	-

Teaching hours	Lectures	laboratory	Exercise	Contact	Student's load
	2	-	2	4	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)
C1. Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.	**a3.** Explain the basic principles of foundations engineering. **b3.** Applying engineering basics that are relevant to the foundation design**.** **c3.** Identify, formulate, and solve complex engineering problems by applying engineering fundamentals of foundation works.
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	C1 C4 C12	a3, b3, c3 a1 b1
2	Practical/ Oral	-	-
3	Final Exam	C1 C4 C12	b3, c3 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	C1 C4 C12	a3, b3,c3 a1 b1
2	Design Isolated footing	7,10	C1 C4 C12	b3,c3 a1 b1
3	Design combined footing	7,10	C1 C4 C12	b3,c3 a1 b1
4	Design of strap beam	7,10	C1 C4	b3,c3 a1

			C12	b1
5	Design of raft foundations	7,10	C1 C4 C12	b3,c3 a1 b1
6	Pile cap - pile Foundation	7,10	C1 C4	a3, b3 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	-
Pre-request	ENG 301

Teaching hours	**Lectures**	**laboratory**	**Exercise**	**Contact**	**Student's load**
	2	-	2	4	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	**a1:** Describe quality assurance systems, codes of practice, and standards, as well

safety requirements, environmental issues and risk management principles.	as health and safety regulations and environmental concerns.
C11: Select appropriate and sustainable technologies for construction of buildings, infrastructures and water structures; using either numerical techniques or physical measurements and/or testing by applying a full range of civil engineering concepts and techniques of: structural analysis and mechanics, properties and strength of materials, surveying, soil mechanics, hydrology and fluid mechanics.	**a1:** Recognize the fundamentals of structural analysis and strength of material in marine structures. **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	Contact	Student's load
1	Kinds of Harbors	2	-	2	4	4
2	Studies of the Natural Phenomena	6	-	6	12	12
3	Quays	4	-	4	8	8
4	Hydraulic Model Studies	2	-	2	4	4
5	Planning of Harbors	2	-	2	4	4
6	Light Houses and Guiding Signals	2	-	2	4	4
7	Breakwaters	4	-	4	8	8
8	Spillways	2	-	2	4	4

9	Dry Docks	2		2	4	4
10	Inland Navigation	2		2	4	4
Total		**28**	**-**	**28**	56	**56**

5- Teaching and Learning Methods:

Topic	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
Kinds of Harbors	✔				✔								
Studies of the Natural Phenomena	✔				✔								
Quays	✔				✔								
Hydraulic Model Studies	✔			✔	✔				✔				✔
Planning of Harbors	✔			✔	✔				✔				✔
Light Houses and Guiding Signals	✔			✔	✔								✔

Breakwaters	✔			✔	✔				✔	✔			✔
Spillways					✔		✔			✔			
Dry Docks		✔					✔						
Inland Navigation	✔												

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	LO's
1	Periodic Exam	C3 C4 C11 C12 C13	a1 a1 a1, a2, c1 b1, b2 c1
2	Practical\Oral	-	-
3	Final Term Examination	C3 C4 C11 C12 C13	a1 a1 a1, a2, c1 b1 c1

7.2 Assessment Schedule:

No.	Assessment Method	Weeks
1	Periodic Exam	2nd, 4th, 6th, 10th, 12th
2	Practical/ Oral	-
3	Final Term Exam	15th

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	Kinds of Harbors	1	C13	c1
2	Studies of the Natural Phenomena	1	C3	a1
3	Quays	1	C11 C12	a1, a2 b1
4	Hydraulic Model Studies	1	C11	c1
5	Planning of Harbors	1	C4	a1

6	Light Houses and Guiding Signals	1	C4	a1
7	Breakwaters	1	C11 C12	a1, a2 b1
8	Spillways	1	C11 C12	a1, a2 b1
9	Dry Docks	1	C11 C12	a1, a2 b1
10	Inland Navigation	1	C12	b2

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 Specification	-

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)**
C1 Identify, formulate, and solve complex design of irrigation works problems by applying engineering fundamentals, basic science and mathematics.	**a1** Describe the relevant mathematical principles and theories in the discipline concepts regarding retaining walls, Bligh's and Lane's weighted creep theories, and the water losses through irrigation works. **a3** Explain the principles types of retaining walls, and classification of irrigation woks structures.

C11 Select appropriate and sustainable technologies for irrigation works (bridges, culverts, syphons, weirs, and dams)	**a2** Summarize, appropriate and sustainable technologies for the construction of 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	Online lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brainstorming	Projects	Site Visits	Self learning and Research	Cooperative	Discovering	Modeling	Lab
Introduction: design of irrigation works	✔			✔	✔	✔								
Classification of retaining walls (R.W)	✔			✔	✔	✔	✔			✔				
Design of gravity retaining walls	✔				✔	✔								
Design of reinforced concrete R.W.	✔				✔	✔								
Design of reinforced concrete bridges	✔				✔	✔		✔						
Design of rolled steel joist bridge	✔				✔	✔								

Design of culverts	✔				✔	✔		✔						
Design of syphons	✔				✔	✔		✔						
Design of aqueducts	✔				✔	✔								
Design of floor for Heading up works (weirs)	✔				✔	✔				✔				
Types and parts of locks	✔			✔			✔			✔				

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	C1 C11 C12	a1, a3 a2 b1, b2
2	Practical/ Oral	-	-
3	Final term examination	C1 C11 C12	a1, a3 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, New York, 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	C1 C11	a3 a2
2	Classification of retaining walls (R.W)	4, 10	C1 C11	a3 a2

3	Design of gravity retaining walls	4, 10	C12	b1
4	Design of reinforced concrete R.W.	4, 10	C12	b1
5	Design of reinforced concrete bridges	4, 7, 10	C1 C11 C12	a1 a2 b1
6	Design of rolled steel joist bridge	4, 7, 10	C1 C11 C12	a1 a2 b1
7	Design of culverts	4, 7, 10	C1 C11 C12	a1 a2 b1
8	Design of syphons	4, 7, 10	C1 C11 C12	a1 a2 b2
9	Design of aqueducts	4, 7, 10	C1 C11 C12	a1 a2 b2
10	Design of floor for Heading up works (weirs)	4, 7, 10	C1 C11 C12	a1 a2 b2
11	Types and parts of locks	4, 10	C11 C12	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	-

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.

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. **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,	**a1** Describe quality assurance systems, codes of practice, and standards, as well as health and safety regulations and environmental concerns.

environmental issues and risk management principles.	**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,	**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

Railways, Sanitary Works, Irrigation, Water Resources and Harbors; or any other emerging field relevant to the discipline.	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	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	15	-	10	25	25

	report of the project's attributable studies and potential 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	Brainstorming	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	✔			✔	✔	✔	✔		✔		✔			✔
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.														
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	✔			✔	✔	✔		✔			✔			✔

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 C7 C8	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

		C11 C12 C13 C14	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	-
Pre- Request	-

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.

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، URL وكذلك 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-FaceLecture	OnlineLecture	FlippedClassroom	Presentationandmovies	Discussion	Problemsolving	Brainstorming	Projects	Sitevisits	Self-learningandResearch	Cooperative	Discovering	Modeling	Lab
مهارات التحليل: إطار التحليل للمسائل الهندسية مع الاخذ في الاعتبار النواحي الفنية، 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 تحليل -المخاطر دور التعاون 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، URL ،المجال، الحاسب المضيف وكذلك الروابط.	✔	✔			✔	✔								
تقييم نتائج البحث اختيار محرك البحث المناسب. أهمية تقييم مصداقية الاماكن المتاحة على 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	A2 (b3, c3)
2	Practical /Oral	A2(b3, c3)
3	Final term examination	A2(b3, c3)

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 مع الاخذ في الاعتبار النواحي الفنية، الاقتصادية، البيئية، والاخلاقية.	1	✔	✔
2	أطوار حل المسائل) فهم المسألة وصياغتها، خطة الحل، تنفيذ الخطة، التقييم، والمراجعة. (دور الابداع في التحليل.	1	✔	✔
3	أوجه القوة، أوجه الضعف، (SWOT تحليل 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 المناسب. أهمية تقييم مصداقية الاماكن المتاحة على الشبكة المعرفية العالمية.	1	X	X

Course Coordinator:

Head of Department: Assoc. prof. Khaled Samir

Date of Approval: 10/2022

Environmental Management

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)
A3 Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global,	**a2** Understand the professional ethics and impacts of engineering solutions on society and environment.

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.
A4 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.
A10 Acquire and apply new knowledge; and practice self, lifelong and other learning strategies.	**d1** Search for information to engage in lifelong self-learning discipline.

4. Course Contents:

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

5. Teaching and learning methods:

Topics	Face -to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and movies	Discussion	Problem solving	Brain storming	Projects	Site visits	Self -learning and Research	Cooperative	Discovering	Modeling	lab
The importance of studying environmental science – modern technology and its effect on the environment		x			x	x								x
Quality of the environment and development elements		x			x	x								x
Sources of environmental pollution and method of control (air pollution – water pollution		x			x	x								x
Solid wastes pollution – noise) – economics of environmental pollution control – legislations for the environment protection.		x			x	x								x

6. Teaching and learning methods for 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	A3, A4	a1, b1
2	Semester work (report, quizzes, presentation(	A4, A10	d1, c1, c3
3	Final Term Examination	A3, A4, A10	a2, a3, a1, d1

7.2 Evaluation Schedule:

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

7.3 Weighting of Evaluation:

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

8. List of References:

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

9. Facilities required for teaching and learning:

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

10. Matrix of Competencies and LO's:

No.	Topic	Aims	Competencies	LO's
1	The importance of studying environmental science – modern technology and its effect on the environment	2,3	A3, A10	d1, a2
2	Quality of the environment and development elements	2,3	A3, A10, A4	d1, b1, a1
3	Sources of environmental pollution and method of control (air pollution – water pollution	2,3	A3, A4	a3, c1
4	Solid wastes pollution – noise) – economics of environmental pollution control – legislations for the environment protection.	2,3	A3, A4	c1, c3

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

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)
C3 Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global, cultural, social, economic, environmental, ethical, and other aspects as appropriate to the discipline, and within the principles and contexts of sustainable design and development.	**b1** Judge engineering decisions considering balanced costs, benefits, safety, quality, reliability, and environmental impact. **c2** Applying engineering design procedures to generate cost-effective solutions while adhering to sustainable design and development principles and contexts.
C9 Use creative, innovative, and flexible thinking and acquire entrepreneurial and leadership skills to anticipate and respond to new situations.	**d2** Effectively manage tasks, time, and resources.
C13 Plan and manage construction processes; address construction defects, instability, and quality issues; maintain safety measures in construction and materials; and assess the environmental impacts of projects.	**a1** Define the plan and manage the construction process.
C14 Deal with biddings, contracts, and financial issues including project insurance and guarantees.	**a1** Define biddings, contracts, and financial issues. **b1** Address biddings, contracts, and financial issues including project insurance and guarantees. **c1** Apply biddings, contracts, and financial issues on civil engineering projects.

4. Course Contents:

No.	Topics	Lecture	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 Responsibilities and Rights That are Regulated by Law and Determine His Relationship with The Parties to The Construction Triangle (Owner - Contractor - Engineer))	4	-	4	8	8
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:

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
Legislation and Laws in Construction Industry	✔	✔			✔			✔						
Definitions (Legislative and Legal Aspects of The Construction Industry)	✔	✔			✔			✔						
Legal Concepts in The Field of The Construction Contracts	✔	✔			✔			✔						
Construction Contracts and Their Types	✔	✔			✔			✔						

The Different Types of Contracting Contracts	✔	✔			✔			✔					
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))	✔	✔			✔			✔					
Reviewing The Provisions of The Civil Law Related to The Contracting Contract from Article (646) to Article (667)	✔	✔			✔			✔					
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. 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 C9 C13 C14	b1, c2 d2 a1 a1, b1, c1
2	Practical /Oral	-	-
3	Final Term Examination	C3 C9 C13 C14	b1, 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	Legislation and Laws in Construction Industry	6, 8, 9	C3 C9 C13 C14	b1, c2 d2 a1 a1, b1, c1
2	Definitions (Legislative and Legal Aspects of The Construction Industry)	6, 8, 9	C3 C9 C13 C14	b1, c2 d2 a1 a1, b1, c1
3	Legal Concepts in The Field of The Construction Contracts	6, 8, 9	C3 C9 C13 C14	b1, c2 d2 a1 a1, b1, c1
4	Construction Contracts and Their Types	6, 8, 9	C3 C9 C13 C14	b1, c2 d2 a1 a1, b1, c1

5	The Different Types of Contracting Contracts	6, 8, 9	C3 C9 C13 C14	b1, c2 d2 a1 a1, b1, c1
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))	6, 8, 9	C3 C9 C13 C14	b1, c2 d2 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	C3 C9 C13 C14	b1, c2 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	C3 C9 C13 C14	b1, c2 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	-

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 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)
C6 Plan, supervise and monitor implementation of engineering projects, taking into consideration other trades requirements.	**a1** Show the appropriate and sustainable technologies for construction of buildings, infrastructures and water structures.
C11 Select appropriate and sustainable technologies for construction of buildings, infrastructures and water	**a1** Recognize the different engineering principles related

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.	to the design of reinforced concrete. **a2** Summarize, appropriate and sustainable technologies for construction of buildings, infrastructures and water structures.
C12 Achieve an optimum design of Reinforced Concrete and Steel Structures, Foundations and Earth Retaining Structures; and at least three of the following civil engineering topics: Transportation and Traffic, Roadways and Airports, Railways, Sanitary Works, Irrigation, Water Resources and Harbors; or any other emerging field relevant to the discipline.	**b1** Achieve an optimum design of Reinforced Concrete structures.

4- Course Contents:

No.	Topics	Lectures	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	Brainstorming	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- 7. Student evaluation:

7.1 Student evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Periodic exam	C6 C11	a1 a1, a2

		C12	b1
2	Practical/ Oral	-	-
3	Final Term Examination	C6 C11 C12	a1 a1, a2 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	C11 C12	a1, a2 b1
3	Design of rectangular tanks	7,10	C11 C12	a1, a2 b1
4	Design of circular tanks	7,10	C11 C12	a1, a2 b1
5	Design of elevated tanks	7,10	C11 C12	a1, a2 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	-

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	Brainstorming	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.	✔			✔	✔	✔	✔	✔			✔			✔

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	a1, a2, b1, b2, b3, b4, c1, c2, c3
		C3	a1, a2, a3, b1
		C4	a1, a3, c2, c3
		C5	b1, c1, d1
		C7	d1, d2, d3
		C8	d1, d2
		C11	a1, a2, c1
		C12	b1, b2
		C13	a1, b1, c1
		C14	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

7.2 Evaluation Schedule:

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

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	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 1
Authorization Date of Course Specification	-

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.
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.	**a2** Define the principles, basic properties, and features of construction material, as well as their use in sustainable technologies for construction of bridges.
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 environmental concerns. **a3** Define contemporary engineering technologies and their applications in bridge engineering.
C11 Select appropriate and sustainable technologies for construction of buildings, infrastructures and	**a1.** Recognize the fundamentals of structural analysis and mechanics,

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.	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.

4- Course Contents:

No.	Topics	Lectures	Lab.	Exercise	Contact	Student's load
1	Different types of bridges	2	-	2	4	4
2	different methods in bridges construction	4	-	4	8	8
3	load calculations and its different effects	4	-	4	8	8
4	methods of bridges design using the standard specifications codes	4	-	4	8	8
5	using commercial computer packages for bridge design	4	-	4	8	8
6	Planning of bridge projects; Design, analysis and construction of various types of bridges including reinforced and pre-stressed concrete bridges.	4	-	4	8	8
7	steel bridges	2	-	2	4	4
8	composite bridges	2	-	2	4	4
9	cable-supported bridges.	2	-	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	Brainstorming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab
Different types of bridges	✔			✔	✔	✔	✔			✔				
different methods in bridges construction	✔			✔	✔	✔	✔			✔				
load calculations and its different effects	✔			✔	✔	✔	✔			✔				
methods of bridges design using the standard specifications codes	✔			✔	✔	✔	✔			✔				
using commercial computer packages for bridge design	✔			✔	✔	✔	✔			✔				
Planning of bridge projects; Design, analysis and construction of various types of bridges including reinforced and pre-stressed concrete bridges.	✔			✔	✔	✔	✔			✔				
steel bridges	✔			✔	✔	✔	✔			✔				
composite bridges	✔			✔	✔	✔	✔			✔				
cable-supported bridges.	✔			✔	✔	✔	✔			✔				

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 C4 C11	a2 a1,a3 a1,a2
2	Practical/ Oral	-	-
3	Final Term Examination	C2 C4 C11	a2 a1,a3 a1,a2

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	3rd,7th, 10th
2	Practical/ Oral	-
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:

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
1	Different types of bridges	8,10	C2	a2
2	different methods in bridges construction	8,10	C2 C4	a2 a1,a3
3	load calculations and its different effects	8,10	C2 C4	a2 a1,a3
4	methods of bridges design using the standard specifications codes	8,10	C2 C4 C11	a2 a1,a3 a1,a2
5	using commercial computer packages for bridge design	8,10	C2 C4 C11	a2 a1,a3 a1,a2
6	Planning of bridge projects; Design, analysis and construction of various types of bridges including reinforced and pre-stressed concrete bridges.	8,10	C2 C4	a2 a1,a3
7	steel bridges	8,10	C2 C4	a2 a1,a3
8	composite bridges	8,10	C2 C4	a2 a1,a3
9	cable-supported bridges.	8,10	C2 C4	a2 a1,a3

Course Coordinator: Dr. Ashraf Elsabagh

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	-

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

2- Course Aims:

No.	Aims
8	Plan and manage construction processes and assess environmental impacts of coastal projects
10	Select appropriate and sustainable technologies for the construction of coastal structures by using numerical techniques within applying a full range of civil engineering fields.

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 for coastal 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, and environmental concerns. **a3:** Define contemporary engineering technologies and their applications in relation to coastal engineering.
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 coastal engineering. **a2:** Summarize, appropriate and sustainable technologies for construction of coastal structures.

4- Course Contents:

No.	Topics	Lectures	laboratory	Exercise	Contact	Student's load
1	Effect of waves on coastal structures	4	-	4	8	8
2	Design of seawalls, breakwaters, and jetties	4	-	4	8	8
3	Design of harbors, ship channels and pipelines	4	-	4	8	8
4	Intentional and accidental discharge of pollutants, diffusion and spreading	4	-	4	8	8
5	Oil spill containment and collection	4	-	4	8	8
6	Wave theory and applications to engineering problems	4	-	4	8	8
7	Analysis of wave data	4	-	4	8	8
Total		**28**	**-**	**28**	**56**	**56**

5- Teaching and learning methods:

Topic	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
Effect of waves on coastal structures	✔			✔	✔	✔							
Design of seawalls, breakwaters, and jetties	✔			✔	✔	✔							✔
Design of harbors, ship channels and pipelines	✔			✔	✔	✔							✔
Intentional and accidental discharge of pollutants, diffusion and spreading	✔			✔	✔	✔							
Oil spill containment and collection	✔			✔	✔	✔							
Wave theory and applications to engineering problems	✔												
Analysis of wave data	✔												

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	C2 C4 C11	a2 a1, a3 a1, a1
2	Practical\Oral	-	-
3	Final Term Examination	C2 C4 C11	a2 a1, a3 a1, a1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	$2nd$,$7th$, $9th$
2	Practical\Oral	-
3	Final 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:

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	White Board
3	Data Show System
4	Presenter

10- Matrix of knowledge and skills of the course:

No.	Topic	Aims	Competencies	LO's
1	Effect of waves on coastal structures	8	C2 C4	a2 a1
2	Design of seawalls, breakwaters, and jetties	10	C11	a2
3	Design of harbors, ship channels and pipelines	10	C11	a2
4	Intentional and accidental discharge of pollutants, diffusion and spreading	8	C4	a3
5	Oil spill containment and collection	8	C4	a3
6	Wave theory and applications to engineering problems	8	C2 C4	a2 a1

7	Analysis of wave data	8	C4	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 1
Authorization Date of Course Specification	-

Teaching hours	**Lectures**	**laboratory**	**Exercise**	**Contact**	**Student's load**
	2	-	2	2	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	**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	contact	Student's load
1	Advantages and limitations of concrete, types of cements admixtures, batching equipment, types of mixers, ready mixed concrete, pumping equipment, slip forming, concreting	8	8	-	16	16
2	Casting in lifts, finishing concrete, hot weather concreting, formwork design, methods of curing, strength of concrete, destructive and nondestructive testing of concrete	12	12	-	24	24

3	Durability, repair and maintenance of concrete.	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	Brainstorming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab
Advantages and limitations of concrete, types of cements admixtures, batching equipment, types of mixers, ready mixed concrete, pumping equipment, slip forming, concreting	✔			✔	✔	✔	✔						✔	

Casting in lifts, finishing concrete, hot weather concreting, formwork design, methods of curing, strength of concrete, destructive and nondestructive testing of concrete	✔				✔	✔	✔			✔			✔	
Durability, repair and maintenance of concrete.	✔				✔	✔	✔		✔					

6- Teaching and learning methods for 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	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	8th
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	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	Advantages and limitations of concrete, types of cements admixtures, batching equipment, types of mixers, ready mixed concrete, pumping equipment, slip forming, concreting	**8,10**	C4	a3, a1	Face-to-Face Lecture Brain storming
2	Casting in lifts, finishing concrete, hot weather concreting, formwork design, methods of curing, strength of concrete, destructive and nondestructive testing of concrete	**8,10**	C4 C11	a3 a1, a2	Face-to-Face Lecture Brain storming Discussion sessions
3	Durability, repair and maintenance of concrete.	**8,10**	C11	a1, a2	Face-to-Face Lecture Brain storming Discussion sessions

Course coordinator: Dr. Nessren El-awadly.

Head of Department: Assoc. Prof. Mohamed Gabr
Date of Approval: 10/2022

Construction Contracting
CIE415D

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	-

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 environmental impacts of projects.
9	Deal with biddings, contracts, and financial issues including project insurance and guarantees.
10	Select appropriate and sustainable technologies for construction of buildings, infrastructures, and water structures; using numerical techniques, experiment measurements.

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 concepts and techniques of construction contracting. **c3** Applying 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.	**b1** Judge engineering decisions considering balanced costs, benefits, safety, quality, reliability, and environmental impact. **c2** Applying engineering design procedures to generate cost-effective solutions while adhering to sustainable design and development principles and contexts.
C4 Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues, and risk management principles.	**a1** Describe quality assurance systems, codes of practice, and standards, as well as safety regulations and environmental concerns. **a2** List the engineering-related business and management principles. **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.
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.
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 construction contracting. **a2** Summarize appropriate and sustainable technologies for construction of buildings, infrastructures, and water structures.
C13 Plan and manage construction processes; address construction defects, instability, and quality issues; maintain safety measures in construction and	**a1** Define the plan and manage the construction process.

materials; and assess the 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 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	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:

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
Construction Contracting for Contractors, Architects, Owners	✔	✔			✔	✔		✔					
Organization and Administration; Industry Structure	✔	✔			✔	✔		✔					
Construction Contracts, Bonds, Insurance	✔	✔			✔	✔		✔					
Planning, Estimating, and Control	✔	✔			✔	✔		✔					
Quantity Takeoff and Pricing, Labor and Equipment Estimates	✔	✔			✔	✔		✔					
Estimating Excavation and Concrete	✔	✔			✔	✔		✔					
Proposal Preparation	✔	✔			✔	✔		✔					

Scheduling, Accounting and Cost Control	✔	✔			✔	✔		✔					

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 C3 C4 C9 C11 C13 C14	a1, c3 b1, c2 a1, a2, c1, c2, c3, c4 d2 a1, a2 a1 a1, b1, c1
2	Practical /Oral	-	-
3	Final Term Examination	C2 C3 C4 C9 C11 C13 C14	a1, c3 b1, c2 a1, a2, c1, c2, c3, c4 d2 a1, a2 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	Construction Contracting for Contractors, Architects, Owners	6, 8, 9, 10	C2 C3 C4 C9 C11 C13 C14	a1, c3 b1, c2 a1, a2, c1, c2, c3, c4 d2 a1, a2 a1 a1, b1, c1
2	Organization and	6, 8, 9, 10	C2 C3	a1, c3 b1, c2

	Administration; Industry Structure		C4 C9 C11 C13 C14	a1, a2, c1, c2, c3, c4 d2 a1, a2 a1 a1, b1, c1
3	Construction Contracts, Bonds, Insurance	6, 8, 9, 10	C2 C3 C4 C9 C11 C13 C14	a1, c3 b1, c2 a1, a2, c1, c2, c3, c4 d2 a1, a2 a1 a1, b1, c1
4	Planning, Estimating, and Control	6, 8, 9, 10	C2 C3 C4 C9 C11 C13 C14	a1, c3 b1, c2 a1, a2, c1, c2, c3, c4 d2 a1, a2 a1 a1, b1, c1
5	Quantity Takeoff and Pricing, Labor and Equipment Estimates	6, 8, 9, 10	C2 C3 C4 C9 C11 C13 C14	a1, c3 b1, c2 a1, a2, c1, c2, c3, c4 d2 a1, a2 a1 a1, b1, c1
6	Estimating Excavation and Concrete	6, 8, 9, 10	C2 C3 C4 C9 C11 C13 C14	a1, c3 b1, c2 a1, a2, c1, c2, c3, c4 d2 a1, a2 a1 a1, b1, c1
7	Proposal Preparation	6, 8, 9, 10	C2 C3 C4 C9 C11	a1, c3 b1, c2 a1, a2, c1, c2, c3, c4 d2 a1, a2

			C13 C14	a1 a1, b1, c1
8	Scheduling, Accounting and Cost Control	6, 8, 9, 10	C2 C3 C4 C9 C11 C13 C14	a1, c3 b1, c2 a1, a2, c1, c2, c3, c4 d2 a1, a2 a1 a1, b1, c1

Course Coordinator: Dr. Abdo El-Naquib
Head of Department: Assoc. Prof. Dr. Mohamed Gabr
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	-

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. 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 environmental impacts of projects.
9	Deal with biddings, contracts, and financial issues including project insurance and guarantees.

10	Select appropriate and sustainable technologies for construction of buildings, infrastructures, and water structures; using numerical techniques, experiment measurements.

4. 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 concepts and techniques of construction contracting. **c3** Applying 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.	**b1** Judge engineering decisions considering balanced costs, benefits, safety, quality, reliability, and environmental impact. **c2** Applying engineering design procedures to generate cost-effective solutions while adhering to sustainable design and development principles and contexts.
C4 Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues, and risk management principles.	**a1** Describe quality assurance systems, codes of practice, and standards, as well as safety regulations and environmental concerns. **a2** List the engineering-related business and management principles. **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.
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.
C11 Select appropriate and sustainable technologies for construction of buildings, infrastructures, and water structures; using either numerical techniques or physical	**a1** Recognize the fundamentals of construction contracting.

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

5. 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**

6. 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	✔	✔			✔	✔		✔					
2	Indirect Costs	✔	✔			✔	✔		✔					
3	Collective Systems	✔	✔			✔	✔		✔					
4	Comparisons Between Projects	✔	✔			✔	✔		✔					
5	Fundamentals of Cost Analysis for Wood, Steel and Concrete Buildings	✔	✔			✔	✔		✔					
6	Preparing Project and Report Writing	✔	✔			✔	✔		✔					
7	Case Study	✔	✔			✔	✔		✔					

7. 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

8. Student Evaluation:

7.1 Student Evaluation Method:

No.	Evaluation Method	Competencies	LO's
1	Periodic Exams	C2 C3 C4 C9 C11 C13 C14	a1, c3 b1, c2 a1, a2, c1, c2, c3, c4 d2 a1, a2 a1 a1, b1, c1
2	Practical /Oral	-	-
3	Final Term Examination	C2 C3 C4 C9 C11 C13 C14	a1, c3 b1, c2 a1, a2, c1, c2, c3, c4 d2 a1, a2 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%**

9. 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.

10. Facilities Required for Teaching and Learning:

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

11. Matrix of Knowledge and Skills of The Course:

No	Topic	Aims	Competencies	LO's
1	Direct Costs	6, 8, 9, 10	C2 C3 C4 C9 C11 C13 C14	a1, c3 b1, c2 a1, a2, c1, c2, c3, c4 d2 a1, a2 a1 a1, b1, c1
2	Indirect Costs	6, 8, 9, 10	C2 C3 C4 C9 C11	a1, c3 b1, c2 a1, a2, c1, c2, c3, c4 d2 a1, a2

			C13 C14	a1 a1, b1, c1
3	Collective Systems	6, 8, 9, 10	C2 C3 C4 C9 C11 C13 C14	a1, c3 b1, c2 a1, a2, c1, c2, c3, c4 d2 a1, a2 a1 a1, b1, c1
4	Comparisons Between Projects	6, 8, 9, 10	C2 C3 C4 C9 C11 C13 C14	a1, c3 b1, c2 a1, a2, c1, c2, c3, c4 d2 a1, a2 a1 a1, b1, c1
5	Fundamentals of Cost Analysis for Wood, Steel and Concrete Buildings	6, 8, 9, 10	C2 C3 C4 C9 C11 C13 C14	a1, c3 b1, c2 a1, a2, c1, c2, c3, c4 d2 a1, a2 a1 a1, b1, c1
6	Preparing Project and Report Writing	6, 8, 9, 10	C2 C3 C4 C9 C11 C13 C14	a1, c3 b1, c2 a1, a2, c1, c2, c3, c4 d2 a1, a2 a1 a1, b1, c1
7	Case Study	6, 8, 9, 10	C2 C3 C4 C9 C11 C13 C14	a1, c3 b1, c2 a1, a2, c1, c2, c3, c4 d2 a1, a2 a1 a1, b1, c1

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

Highway Materials and Construction
CIE415F

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	CIE415F
Year/Level	Level 4
Specialization	Minor – Elective Course
Authorization Date of Course Specification	-

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

2. Course Aims

No.	Aims
8	Plan and manage pavement construction processes; treatment of pavement distresses, and quality issues; maintain safety measures and assess environmental impacts of highway projects
10	Select appropriate and sustainable technologies for pavement construction, infrastructures; using experiment measurements, and testing by applying a full range of civil engineering fields such as pavement evaluation, 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 pavement material, as well as their use in sustainable technologies for highway construction, infrastructures.

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 safety regulations and environmental concerns. **a3** Define contemporary engineering technologies and their applications in relation to highway construction.
C11 Select appropriate and sustainable technologies for construction road works and rehabilitation of roads.	**a1.** Recognize the fundamentals of analysis and mechanics, properties and strength of materials, surveying, and soil mechanics. **a2** Summarize, appropriate and sustainable technologies for roads construction and rehabilitation, bituminous materials and concrete mixtures

4. Course Contents:

No.	Topics	Lecture	Lab.	Exercise	Contact	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	24
2	pavement evaluation and rehabilitation, highway construction	16	-	16	32	32
Total		**28**	**-**	**28**	**56**	**56**

5. Teaching and learning methods:

Topics	Face-to-Face Lecture	Online Lecture	Flipped Classroom	Presentation and mov	Discussion	Problem solving	Brainstorming	Projects	Site visits	Self-learning and Rese	Cooperative	Discovering	Modeling	Lab

				ies						arch				
Application of soil classification methods, material characterization, sub-grade and sub-base stabilization, material variability and quality control	✔			✔	✔	✔				✔				
pavement evaluation and rehabilitation, highway construction	✔			✔	✔	✔				✔				

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 C4 C11	a2 a1, a2 a1, a2
2	Practical /Oral	-	-
3	Final term examination	C2 C4 C11	a2 a1, a2 a1, a2

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	**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, 2020

9. Facilities required for teaching and learning:

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

10. Matrix of knowledge and skills of the course:

No.	Topic	Aims	Competencies	LO's
1	Application of soil classification methods, material characterization, sub-grade and sub-base stabilization, material variability and quality control	8, 10	C2 C4 C11	a2 a1, a2 a1, a2
2	pavement evaluation and rehabilitation, highway construction	8, 10	C2 C11	a2 a1, a2

Course Coordinator: Assoc. Prof. Dr. 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 1
Authorization Date of Course Specification	-

Teaching hours	**Lectures**	**laboratory**	**Exercise**	**Contact**	**Student's load**
	2	-	2	2	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	**a2** Define the principles, basic properties, and features of construction material, as well as their use in sustainable technologies for construction of buildings
C4 Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements,	**a1** Describe codes of practice, and standards, as well as health and safety regulations

environmental issues and risk management principles	**a3** Define contemporary engineering technologies and their applications in relation to disciplines.
C11 Select appropriate and sustainable technologies for construction of buildings, infrastructures and water structures; using either numerical techniques or physical measurements and/or testing by applying a full range of civil engineering concepts and techniques of: properties and strength of materials	**a1** Recognize the fundamentals of properties and strength of materials. **a2** Summarize, appropriate and sustainable technologies for construction of buildings,

4- Course Contents:

No.	Topics	Lectures	Exercise	laboratory	contact	Student's load
1	General introduction for the technological development of material science, ultra and high strength concrete, ultra and high-performance concrete	8	8	-	16	16
2	general classification of the modern materials in the structure field – compound materials and their applications, light weight concrete	10	10	-	20	20
3	Supplementary cementing materials. Compound materials and their applications. Insulating materials. carbon fibers and its use in structures – insulating materials – ant fire materials	10	10	-	20	20

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	Brainstorming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab
General introduction for the technological development of material science	✔	✔			✔	✔	✔							
general classification of the modern materials in the structure field – compound materials and their applications	✔	✔			✔	✔	✔			✔				
carbon fibers and its use in structures – insulating materials – ant fire materials	✔	✔			✔	✔	✔			✔				

6- Teaching and learning methods for 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	a2 a 1 a1
2	Practical /Oral	-	-
3	Final term examination	C4 C11	a1, a3 a2

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	8th
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 203-2018. • 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	General introduction for the technological development of material science, ultra and high strength concrete, ultra and high-performance concrete	8,10	C2	a2, a1	Face-to-Face Lecture Brain storming
2	general classification of the modern materials in the structure field – compound materials and their applications, light weight concrete	8,10	C4 C11	a 2 a1	Face-to-Face Lecture Brain storming Discussion sessions
3	Supplementary cementing materials. Compound materials and their applications. Insulating materials. carbon fibers and its use in structures – insulating materials – ant fire materials	8,10	C11	a1, a3	Face-to-Face Lecture Brain storming Discussion sessions

Course Coordinator: Dr. Nasreen El-awadly.

Head of Department: Assoc. Prof. Mohamed Gabr.

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	-

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

2- Course Aims

No.	Aims
8	Select appropriate and sustainable technologies for construction of buildings, infrastructures and water structures; using numerical techniques, experiment measurements, and testing by applying a full range of civil engineering fields such as properties and strength of materials
10	Achieve an optimum design of Reinforced Concrete and Steel Structures, Foundations and Earth Retaining Structures; and at least three of the following civil engineering topics: Transportation and Traffic, Roadways and Airports, Railways, Sanitary Works, Irrigation, Water Resources and Harbors; or any other emerging field relevant to the discipline.

3- Competencies:

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

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	Contact	Student's load
1	Review on of deterioration of building materials	4	4	-	8	8
2	Concept of life cycle cost- Protection methods against deterioration and corrosion of building materials	8	8	-	16	16
3	Types of defects and damages. Non-destructive tests	6	6	-	12	12
4	Partially destructive tests. Load tests. Materials for repair and selection. Methods and techniques of repair. Rehabilitation and retrofitting	10	10	-	20	20
Total		**28**	**28**	**-**	56	**56**

5- Teaching and learning methods:

No	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
Review on of deterioration of building materials	✔			✔	✔	✔							
Concept of life cycle cost- Protection methods against deterioration and corrosion of building materials	✔			✔	✔	✔							
Types of defects and damages. Non-destructive tests	✔			✔	✔	✔							
Partially destructive tests. Load tests. Materials for repair and selection. Methods and techniques of repair. Rehabilitation and retrofitting.	✔			✔	✔	✔							

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	ILO's
1	Periodic exam	C2	a1, a 2
2	Practical /Oral	-	-

3	Final term examination	C4, C11	a 2, a 3

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	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	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	8,10	C4	a1, a2	Face-to-Face Lecture Brain storming Discussion sessions
2	Concept of life cycle cost- Protection methods against deterioration and corrosion of building materials	8	C2, C11	a 1, a 3	Face-to-Face Lecture Brain storming Discussion sessions

3	Types of defects and damages. Non-destructive tests	10	C11	a 2, a1	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.	10	C2, C11	a1, a3	Face-to-Face Lecture Brain storming Discussion sessions

Course Coordinator: Dr. Ayman Helal

Head of Department: Assoc. Prof. Mohamed Gabr.

Date of Approval: 10/2022

Reliability of Structures
CIE415I

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	-

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

2- Course Aims:

No.	Aims
8	Plan and manage construction processes of projects.
10	Select appropriate and sustainable technologies for construction of buildings.

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 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 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 safety.
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, properties and strength of materials. **a2:** Summarize, appropriate and sustainable technologies for construction of buildings.

4- Course Contents:

No.	Topics	Lectures	laboratory	Exercise	Contact	Student's load
1	Fundamental concepts related to structural reliability	4	-	4	8	8
2	Fundamental concepts related to safety measures	4	-	4	8	8
3	Fundamental concepts related to load models	4	-	4	8	8
4	Fundamental concepts related to resistance models	4	-	4	8	8
5	Fundamental concepts related to system reliability	4	-	4	8	8
6	Optimum safety levels	4	-	4	8	8
7	Optimization of design codes	4	-	4	8	8
Total		**28**	**-**	**28**	**56**	**56**

5- Teaching and learning methods:

Topic	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
Fundamental concepts related to structural reliability	✔				✔	✔							
Fundamental concepts related to safety measures	✔				✔	✔							✔
Fundamental concepts related to load models	✔				✔	✔							✔
Fundamental concepts related to resistance models	✔				✔	✔							✔
Fundamental concepts related to system reliability	✔				✔	✔							
Optimum safety levels	✔				✔	✔							
Optimization of design codes	✔				✔	✔							

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.	Assessment Method	Competencies	LOs
1	Periodic exam	C2 C4 C11	a2 a1, a3 a1, a1
2	Practical\Oral	-	-
3	Final Term Examination	C2 C4 C11	a2 a1, a3 a1, a1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	$2nd$,$7th$, $9th$
2	Practical\Oral	-
3	Final 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:

Essential Books (Textbooks)	• 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:

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

10- Matrix of knowledge and skills of the course:

No.	Topic	Aims	Competencies	LO's
1	Fundamental concepts related to structural reliability	8	C2 C11	a2 a1
2	Fundamental concepts related to safety measures	8	C2	a2
3	Fundamental concepts related to load models	8	C2 C11	a2 a2
4	Fundamental concepts related to resistance models	8	C2 C11	a2 a1
5	Fundamental concepts related to system reliability	8	C2 C11	a2 a2
6	Optimum safety levels	10	C4	a3

7	Optimization of design codes	10	C4	a1

Course coordinator: Prof. Dr. Osami Rageh

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	CIE 415J
Level	Level 4 - Semester 1
Specialization	Elective 1
Authorization Date of Course Specification	-

Teaching hours	**Lectures**	**laboratory**	**Exercise**	**Contact**	**Student's load**
	2	-	2	4	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- 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 movies	Discussion	Problem solving	Brainstorming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Case study
Quality factors for environmenta control. Population and resource use.	✔			✔	✔								
Air pollution, water pollution, land pollution. Solid waste management.	✔			✔	✔								
Thermal pollution, noise pollution. Radiation.	✔			✔	✔	✔							
Energy and the environment. Prediction and assessment of environmental impact.	✔			✔	✔								
Problems of developing nations. Case studies	✔			✔	✔								✔

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. Mohamed ElKiki**.**

Date of Approval: 10/2022.

Design of Earthquake Structures
CIE416A

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	Elective2
Authorization Date of Course Specification	-

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.
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)
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 earthquake 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.

	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: 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. **a2.** Summarize, appropriate and sustainable technologies for construction of structures under seismic loads.

4- Course Contents:

No.	Topics	Lectures	Lab.	Exercise	Contact	Student's load
1	Causes of earthquakes	2	-	2	4	4
2	Seismic waves, scales of earthquakes	4	-	4	8	8
3	Equation of motion for single degree of freedom and multi-degree of freedom systems	4	-	4	8	8
4	Structural behavior under random forces	4	-	4	8	8
5	Spectral analysis depending on soil conditions	4	-	4	8	8
6	Modal analysis for multi strong buildings	4	-	4	8	8
7	Design principles for earthquake structures according to the Egyptian code	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	Brainstorming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab
Causes of earthquakes	✔			✔	✔	✔	✔			✔				
Seismic waves, scales of earthquakes	✔			✔	✔	✔	✔			✔				
Equation of motion for single degree of freedom and multi-degree of freedom systems	✔			✔	✔	✔	✔			✔				
Structural behavior under random forces	✔			✔	✔	✔	✔			✔				
Spectral analysis depending on soil conditions	✔			✔	✔	✔	✔			✔				
Modal analysis for multi strong buildings	✔			✔	✔	✔	✔			✔				
Design principles for earthquake structures according to the Egyptian code	✔			✔	✔	✔	✔			✔				

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 C4 C11	a2 a1,a3,b 1 a1,a2
2	Practical/ Oral	-	-
3	Final Term Examination	C2 C4 C11	a2 a1,a3,b 1 a1,a2

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	$3rd, 7th, 10th$
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	**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
1	Causes of earthquakes	8	C2	a2
2	Seismic waves, scales of earthquakes	10	C2 C4	a2 a1,a3
3	Equation of motion for single degree of freedom and multi-degree of freedom systems	10	C2 C4	a2 a1,a3,b1
4	Structural behavior under random forces	10	C2 C4 C11	a2 a1,a3,b1 a1,a2
5	Spectral analysis depending on soil conditions	10	C2 C4 C11	a2 a1,a3,b1 a1,a2

6	Modal analysis for multi strong buildings	10	C2 C4	a2 a1,a3,b1
7	Design principles for earthquake structures according to the Egyptian code	10	C2 C4	a2 a1,a3,b1

Course Coordinator: Dr. Rafik Wadia

Head of Department: Prof. Dr / Mohamed Elkiki

Date of Approval: 10/2022

Design of Marine Platforms
CIE416B

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	-

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

2- Course Aims:

No.	Aims
8	Plan and manage construction processes and assess environmental impacts of marine platforms.
10	Select appropriate and sustainable technologies for the construction of marine platforms by using numerical techniques within applying a full range of civil engineering fields.

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 for marine platforms.
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, and environmental concerns. **a3:** Define contemporary engineering technologies and their applications in relation to marine platforms.

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 marine platforms. **a2:** Summarize, appropriate and sustainable technologies for construction of marine platforms.

4- Course Contents:

No.	Topics	Lectures	laboratory	Exercise	Contact	Student's load
1	Marine platform (definition – types)	6	-	6	12	12
2	Loads affecting the marine platforms	6	-	6	12	12
3	Tide and wind forces	8	-	8	16	16
4	Design of fixed marine platforms	8	-	8	16	16
Total		**28**	**-**	**28**	**-**	**56**

5- Teaching and learning methods:

Topic	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

Marine platform (definition – types)	✔			✔	✔	✔							
Loads affecting the marine platforms	✔			✔	✔	✔							✔
Tide and wind forces	✔			✔	✔	✔							✔
Design of fixed marine platforms	✔			✔	✔	✔							

6- Teaching and learning methods for disable students:

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

7- Student assessment:

7.1 Student Assessment Methods:

No.	Assessment Method	Competencies	LOs
1	Periodic exam	C2 C4 C11	a2 a1, a3 a1, a1
2	Practical\Oral	-	-
3	Final Term Examination	C2 C4 C11	a2 a1, a3 a1, a1

7.2 Assessment Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	$2nd$,$7th$, $9th$
2	Practical\Oral	-
3	Final examination	15th

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:

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	White Board
3	Data Show System
4	Presenter

10- Matrix of knowledge and skills of the course:

No.	Topic	Aims	Competencies	LO's
1	Marine platform (definition – types)	10	C2 C11	a2 a1
2	Loads affecting the marine platforms	8	C11	a1
3	Tide and wind forces	8	C4	a1
4	Design of fixed marine platforms	10	C4 C11	a3 a2

Course coordinator: Prof. Dr. Osami Rageh

Head of Department: Assoc. Prof. Mohamed Gabr

Date of Approval: 10/2022

Design of shell structures
CIE416C

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 2
Authorization Date of Course Specification	-

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.
10	For shell 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)
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 forces and stresses affecting the shell structures.
C4 Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues and risk management principles	**a1** Codes of practice of shell structures. **a3** Define contemporary engineering technologies and their applications in relation to analysis and design of shell structures. **b1**create methodical approaches when dealing with new and advancing technology.

C11 Select appropriate and sustainable technologies for construction of buildings, infrastructures and water structures; using either numerical techniques or physical measurements and/or testing by applying a full range of civil engineering concepts and techniques of: properties and strength of materials	**a1** Recognize the fundamentals of forces and stresses affecting the shell structures **a2** Summarize, appropriate and sustainable technologies for construction of buildings.

4- Course Contents:

No.	Topics	Lectures	Lab.	Exercise	Contact	Student's load
1	forces and stresses affecting the shell structures	8	-	8	16	16
2	analysis of shell structures	10	-	10	20	20
3	design of shell structures	10	-	10	20	20
Total		**28**	**-**	**28**	**56**	**56**

5- Teaching and learning methods:

Topics	Face-to-FaceLecture	OnlineLecture	FlippedClassroom	Presentationandmovies	Discussion	Problemsolving	Brainstorming	Projects	Sitevisits	Self-learningandResearch	Cooperative	Discovering	Modeling	Lab
forces and stresses affecting the shell structures	✔				✔	✔	✔			✔				
analysis of shell structures	✔				✔	✔	✔			✔				
design of shell structures	✔				✔	✔	✔			✔				

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 C4 C11	a2 a1,a3,b1 a1,a2
2	Practical/oral	-	-
3	Final Exam	C2 C4 C11	a2 a1,a3,b1 a1,a 2

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	$3rd, 7th, 10th$
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
	• 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
1	forces and stresses affecting the shell structures	8,10	C2	a2
2	analysis of shell structures	8,10	C2 C4 C11	a2 a1,a3,b1 a1,a2
3	design of shell structures	8,10	C2 C4 C11	a2 a1,a3,b1 a1,a2

Course Coordinator: Dr. Hamdi Abd Alaty

Head of Department: Prof. Dr. Mohamed ElKiki

Date of Approval: 10/2022

Engineering Project Evaluation
CIE416D

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	-

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 environmental impacts of projects.
9	Deal with biddings, contracts, and financial issues including project insurance and guarantees.
10	Select appropriate and sustainable technologies for construction of buildings, infrastructures, and water structures; using numerical techniques, experiment measurements.

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 concepts and techniques of construction contracting. **c3** Applying 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.	**b1** Judge engineering decisions considering balanced costs, benefits, safety, quality, reliability, and environmental impact. **c2** Applying engineering design procedures to generate cost-effective solutions while adhering to sustainable design and development principles and contexts.
C4 Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues, and risk management principles.	**a1** Describe quality assurance systems, codes of practice, and standards, as well as safety regulations and environmental concerns. **a2** List the engineering-related business and management principles. **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.
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.
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 construction contracting. **a2** Summarize appropriate and sustainable technologies for construction of buildings, infrastructures, and water structures.
C13 Plan and manage construction processes; address construction defects, instability, and quality issues; maintain safety measures in construction and	**a1** Define the plan and manage the construction process.

materials; and assess the 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 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	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	✔	✔			✔	✔		✔					
2	Planning of Civil Engineering Projects	✔	✔			✔	✔		✔					
3	Economic Analysis of Civil Engineering Projects	✔	✔			✔	✔		✔					
4	Introduction to Environmental Impact Assessment and Social Impact Assessment; Case Studies on Civil Engineering Project Appraisal	✔	✔			✔	✔		✔					

6. Teaching and Learning Methods for Disabled Students:

No.	Teaching Method	Reason
1	Presentation of The Course in Digital Material	Better Access at Any Time

2	Wed Communication with Students	Better Communication with Certain Cases
3	Asking Small Groups to Do Assignments; Each Composed of Low, Medium, and High-Performance Students	Knowledge and Skills Transfer Among Different Levels of Students
4	An Electronic Model System for The Institution	E. Learning

7. Student Evaluation:

7.1 Student Evaluation Method:

No.	Evaluation Method	Competencies	LO's
1	Periodic Exams	C2 C3 C4 C9 C11 C13 C14	a1, c3 b1, c2 a1, a2, c1, c2, c3, c4 d2 a1, a2 a1 a1, b1, c1
2	Practical /Oral	-	-
3	Final Term Examination	C2 C3 C4 C9 C11 C13 C14	a1, c3 b1, c2 a1, a2, c1, c2, c3, c4 d2 a1, a2 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	Fundamentals of Project Appraisal and Feasibility Study	6, 8, 9, 10	C2 C3 C4 C9 C11 C13 C14	a1, c3 b1, c2 a1, a2, c1, c2, c3, c4 d2 a1, a2 a1 a1, b1, c1
2	Planning of Civil Engineering Projects	6, 8, 9, 10	C2 C3 C4 C9 C11 C13 C14	a1, c3 b1, c2 a1, a2, c1, c2, c3, c4 d2 a1, a2 a1 a1, b1, c1

3	Economic Analysis of Civil Engineering Projects	6, 8, 9, 10	C2 C3 C4 C9 C11 C13 C14	a1, c3 b1, c2 a1, a2, c1, c2, c3, c4 d2 a1, a2 a1 a1, b1, c1
4	Introduction to Environmental Impact Assessment and Social Impact Assessment; Case Studies on Civil Engineering Project Appraisal	6, 8, 9, 10	C2 C3 C4 C9 C11 C13 C14	a1, c3 b1, c2 a1, a2, c1, c2, c3, c4 d2 a1, a2 a1 a1, b1, c1

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

Fiber Reinforced Cement Composites
CIE416E

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 2
Authorization Date of Course Specification	-

Teaching hours	**Lectures**	**laboratory**	**Exercise**	**contact**	**Student's load**
	2	-	2	2	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	**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. **b1** Create methodical approaches when dealing with new and advancing technology.

C11 Select appropriate and sustainable technologies for construction of buildings, infrastructures and water structures; using either numerical techniques or physical measurements and/or testing by applying a full range of civil engineering concepts and techniques of: properties and strength of materials	**a1** Recognize the fundamentals of properties and strength of materials. **a2** Summarize, appropriate and sustainable technologies for construction of buildings,

4- Course Contents:

No.	Topics	Lectures	Exercise	laboratory	contact	Student's load
1	Fiber-reinforcement of cement-based matrices, continuous and discontinuous fibers, and meshes.	4	4	-	8	8
2	Fiber-reinforced concrete and Ferro-cement	4	4	-	8	8
3	Laminated cementations composites	2	2	-	4	4
4	Behavior and mechanical properties. Mechanics of fiber reinforcement	6	6	-	12	12
5	Constitutive models. High-strength, high-performance fiber composites.	4	4	-	8	8
6	Hybrid and smart composites	4	4	-	8	8
7	projects and laboratory	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	Brainstorming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling
Fiber-reinforcement of cement-based matrices, continuous and discontinuous fibers, and meshes.	✔			✔	✔		✔			✔			
Fiber-reinforced concrete and Ferro-cement	✔						✔			✔			
Laminated cementations composites	✔				✔		✔			✔			
Behavior and mechanical properties. Mechanics of fiber reinforcement	✔				✔	✔	✔						✔
Constitutive models. High-strength, high-performance fiber composites.	✔			✔		✔	✔						
Hybrid and smart composites	✔						✔						
projects and laboratory	✔					✔	✔	✔					

6- Teaching and learning methods for disable students:

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

7- Student Evaluation:

4.1 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

4.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	$3^{th} – 8^{th}- 12^{th}$
2	Practical/ Oral	-
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 2	High performance fiber reinforced cement composite / 2012 / gustavoj. puraa The Egyptian code for the design principles and requirements for the implementation of the use of fiber reinforced polymers in construction projects/ 2006

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	4,10	C4	a3, a1	Face-to-Face Lecture Brain storming

	discontinuous fibers, and meshes.				
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,b1 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: Assoc. Prof. Mohamed Gabr.

Date of Approval: 10/2022.

Project Decision Analysis
CIE416F

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	-

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 environmental impacts of projects.
9	Deal with biddings, contracts, and financial issues including project insurance and guarantees.
10	Select appropriate and sustainable technologies for construction of buildings, infrastructures, and water structures; using numerical techniques, experiment measurements.

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 concepts and techniques of construction contracting. **c3** Applying 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.	**b1** Judge engineering decisions considering balanced costs, benefits, safety, quality, reliability, and environmental impact. **c2** Applying engineering design procedures to generate cost-effective solutions while adhering to sustainable design and development principles and contexts.
C4 Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues, and risk management principles.	**a1** Describe quality assurance systems, codes of practice, and standards, as well as safety regulations and environmental concerns. **a2** List the engineering-related business and management principles. **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.
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.
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 construction contracting. **a2** Summarize appropriate and sustainable technologies for construction of buildings, infrastructures, and water structures.
C13 Plan and manage construction processes; address construction defects, instability, and quality issues; maintain safety measures in construction and	**a1** Define the plan and manage the construction process.

materials; and assess the 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 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	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:

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
Quantitative Methods of Decision-Making	✔	✔			✔	✔		✔					
Important Mathematical Models Useful in Decision Processes	✔	✔			✔	✔		✔					
Model-Structure Assumptions, Limitations and Methods for Use	✔	✔			✔	✔		✔					
Concepts and Models of Support Systems for Management Decision Problems	✔	✔			✔	✔		✔					

6. Teaching and Learning Methods for Disabled Students:

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

4	An Electronic Model System for The Institution	E. Learning

7. Student Evaluation:

7.1 Student Evaluation Method:

No.	Evaluation Method	Competencies	LO's
1	Periodic Exams	C2 C3 C4 C9 C11 C13 C14	a1, c3 b1, c2 a1, a2, c1, c2, c3, c4 d2 a1, a2 a1 a1, b1, c1
2	Practical /Oral	-	-
3	Final Term Examination	C2 C3 C4 C9 C11 C13 C14	a1, c3 b1, c2 a1, a2, c1, c2, c3, c4 d2 a1, a2 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	Quantitative Methods of Decision-Making	6, 8, 9, 10	C2 C3 C4 C9 C11 C13 C14	a1, c3 b1, c2 a1, a2, c1, c2, c3, c4 d2 a1, a2 a1 a1, b1, c1
2	Important Mathematical Models Useful in Decision Processes	6, 8, 9, 10	C2 C3 C4 C9 C11 C13 C14	a1, c3 b1, c2 a1, a2, c1, c2, c3, c4 d2 a1, a2 a1 a1, b1, c1
3	Model-Structure Assumptions, Limitations and Methods for Use	6, 8, 9, 10	C2 C3 C4 C9 C11 C13	a1, c3 b1, c2 a1, a2, c1, c2, c3, c4 d2 a1, a2 a1

			C14	a1, b1, c1
4	Concepts and Models of Support Systems for Management Decision Problems	6, 8, 9, 10	C2 C3 C4 C9 C11 C13 C14	a1, c3 b1, c2 a1, a2, c1, c2, c3, c4 d2 a1, a2 a1 a1, b1, c1

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

Project financial Management
CIE416G

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	-

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 environmental impacts of projects.
9	Deal with biddings, contracts, and financial issues including project insurance and guarantees.
10	Select appropriate and sustainable technologies for construction of buildings, infrastructures, and water structures; using numerical techniques, experiment measurements.

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 concepts and techniques of construction contracting. **c3** Applying 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.	**b1** Judge engineering decisions considering balanced costs, benefits, safety, quality, reliability, and environmental impact. **c2** Applying engineering design procedures to generate cost-effective solutions while adhering to sustainable design and development principles and contexts.
C4 Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues, and risk management principles.	**a1** Describe quality assurance systems, codes of practice, and standards, as well as safety regulations and environmental concerns. **a2** List the engineering-related business and management principles. **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.
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.
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 construction contracting. **a2** Summarize appropriate and sustainable technologies for construction of buildings, infrastructures, and water structures.
C13 Plan and manage construction processes; address construction defects, instability, and quality issues; maintain safety measures in construction and	**a1** Define the plan and manage the construction process.

materials; and assess the 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 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	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:

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
Cash Flow and its Analysis	✔	✔			✔	✔		✔					
Project Budget	✔	✔			✔	✔		✔					
Project Financial Methods	✔	✔			✔	✔		✔					
Risk and Cost Control	✔	✔			✔	✔		✔					
Financial Path for Project	✔	✔			✔	✔		✔					
Time Value	✔	✔			✔	✔		✔					
Profit Rate	✔	✔			✔	✔		✔					
Inflation Effects	✔	✔			✔	✔		✔					

6. Teaching and Learning Methods for Disabled Students:

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

7. Student Evaluation:

7.1 Student Evaluation Method:

No.	Evaluation Method	Competencies	LO's
1	Periodic Exams	C2 C3 C4 C9 C11 C13 C14	a1, c3 b1, c2 a1, a2, c1, c2, c3, c4 d2 a1, a2 a1 a1, b1, c1
2	Practical /Oral	-	-
3	Final Term Examination	C2 C3 C4 C9 C11 C13 C14	a1, c3 b1, c2 a1, a2, c1, c2, c3, c4 d2 a1, a2 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	Cash Flow and its Analysis	6, 8, 9, 10	C2 C3 C4 C9 C11 C13 C14	a1, c3 b1, c2 a1, a2, c1, c2, c3, c4 d2 a1, a2 a1 a1, b1, c1
2	Project Budget	6, 8, 9, 10	C2 C3 C4 C9 C11 C13 C14	a1, c3 b1, c2 a1, a2, c1, c2, c3, c4 d2 a1, a2 a1 a1, b1, c1
3	Project Financial Methods	6, 8, 9, 10	C2 C3 C4 C9 C11 C13 C14	a1, c3 b1, c2 a1, a2, c1, c2, c3, c4 d2 a1, a2 a1 a1, b1, c1

4	Risk and Cost Control	6, 8, 9, 10	C2 C3 C4 C9 C11 C13 C14	a1, c3 b1, c2 a1, a2, c1, c2, c3, c4 d2 a1, a2 a1 a1, b1, c1
5	Financial Path for Project	6, 8, 9, 10	C2 C3 C4 C9 C11 C13 C14	a1, c3 b1, c2 a1, a2, c1, c2, c3, c4 d2 a1, a2 a1 a1, b1, c1
6	Time Value	6, 8, 9, 10	C2 C3 C4 C9 C11 C13 C14	a1, c3 b1, c2 a1, a2, c1, c2, c3, c4 d2 a1, a2 a1 a1, b1, c1
7	Profit Rate	6, 8, 9, 10	C2 C3 C4 C9 C11 C13 C14	a1, c3 b1, c2 a1, a2, c1, c2, c3, c4 d2 a1, a2 a1 a1, b1, c1
8	Inflation Effects	6, 8, 9, 10	C2 C3 C4 C9 C11 C13 C14	a1, c3 b1, c2 a1, a2, c1, c2, c3, c4 d2 a1, a2 a1 a1, b1, c1

Course Coordinator: Dr. Abdo El-Naquib
Head of Department: Assoc. Prof. Dr. Mohamed Gabr

Date of Approval: 10/2022

Risk Management and Constructions Safety
CIE416H

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	-

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 environmental impacts of projects.
9	Deal with biddings, contracts, and financial issues including project insurance and guarantees.
10	Select appropriate and sustainable technologies for construction of buildings, infrastructures, and water structures; using numerical techniques, experiment measurements.

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 concepts and techniques of construction contracting. **c3** Applying 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.	**b1** Judge engineering decisions considering balanced costs, benefits, safety, quality, reliability, and environmental impact. **c2** Applying engineering design procedures to generate cost-effective solutions while adhering to sustainable design and development principles and contexts.
C4 Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues, and risk management principles.	**a1** Describe quality assurance systems, codes of practice, and standards, as well as safety regulations and environmental concerns. **a2** List the engineering-related business and management principles. **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.
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.
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 construction contracting. **a2** Summarize appropriate and sustainable technologies for construction of buildings, infrastructures, and water structures.
C13 Plan and manage construction processes; address construction defects, instability, and quality issues; maintain safety measures in construction and	**a1** Define the plan and manage the construction process.

materials; and assess the 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 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	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:

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
Principles and Practice Regarding Safety in Building	✔	✔			✔	✔		✔						
Accidental Prevention and Safety Control	✔	✔			✔	✔		✔						
Fire Control	✔	✔			✔	✔		✔						
Fire Resistance of Building Materials, Safety Provisions for Fire and Other Hazards in Building	✔	✔			✔	✔		✔						
Safety Standards and Codes	✔	✔			✔	✔		✔						
Governmental Regulations and Inspection Procedures	✔	✔			✔	✔		✔						

6. Teaching and Learning Methods for Disabled Students:

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

7. Student Evaluation:

7.1 Student Evaluation Method:

No.	Evaluation Method	Competencies	LO's
1	Periodic Exams	C2 C3 C4 C9 C11 C13 C14	a1, c3 b1, c2 a1, a2, c1, c2, c3, c4 d2 a1, a2 a1 a1, b1, c1
2	Practical /Oral	-	-
3	Final Term Examination	C2 C3 C4 C9 C11 C13 C14	a1, c3 b1, c2 a1, a2, c1, c2, c3, c4 d2 a1, a2 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	Principles and Practice Regarding Safety in Building	6, 8, 9, 10	C2 C3 C4 C9 C11 C13 C14	a1, c3 b1, c2 a1, a2, c1, c2, c3, c4 d2 a1, a2 a1 a1, b1, c1
2	Accidental Prevention and Safety Control	6, 8, 9, 10	C2 C3 C4 C9 C11	a1, c3 b1, c2 a1, a2, c1, c2, c3, c4 d2 a1, a2

			C13 C14	a1 a1, b1, c1
3	Fire Control	6, 8, 9, 10	C2 C3 C4 C9 C11 C13 C14	a1, c3 b1, c2 a1, a2, c1, c2, c3, c4 d2 a1, a2 a1 a1, b1, c1
4	Fire Resistance of Building Materials, Safety Provisions for Fire and Other Hazards in Building	6, 8, 9, 10	C2 C3 C4 C9 C11 C13 C14	a1, c3 b1, c2 a1, a2, c1, c2, c3, c4 d2 a1, a2 a1 a1, b1, c1
5	Safety Standards and Codes	6, 8, 9, 10	C2 C3 C4 C9 C11 C13 C14	a1, c3 b1, c2 a1, a2, c1, c2, c3, c4 d2 a1, a2 a1 a1, b1, c1
6	Governmental Regulations and Inspection Procedures	6, 8, 9, 10	C2 C3 C4 C9 C11 C13 C14	a1, c3 b1, c2 a1, a2, c1, c2, c3, c4 d2 a1, a2 a1 a1, b1, c1

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

Air conditioning Systems for Building
CIE416I

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	-
Prerequisite	Complete 100 h

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	**a3** Describe the different analyzing procedures to handle problems related to heating systems via hot water and air.

the discipline and within the principles and contexts of sustainable design and development.	
C4. Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues and risk management principles.	**a1** Utilize contemporary technologies, codes of practice and standards, quality guidelines, health 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
CIE416J

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	-

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 environmental impacts of projects.
9	Deal with biddings, contracts, and financial issues including project insurance and guarantees.
10	Select appropriate and sustainable technologies for construction of buildings, infrastructures, and water structures; using numerical techniques, experiment measurements.

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 concepts and techniques of construction contracting. **c3** Applying 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.	**b1** Judge engineering decisions considering balanced costs, benefits, safety, quality, reliability, and environmental impact. **c2** Applying engineering design procedures to generate cost-effective solutions while adhering to sustainable design and development principles and contexts.
C4 Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues, and risk management principles.	**a1** Describe quality assurance systems, codes of practice, and standards, as well as safety regulations and environmental concerns. **a2** List the engineering-related business and management principles. **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.
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.
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 construction contracting. **a2** Summarize appropriate and sustainable technologies for construction of buildings, infrastructures, and water structures.
C13 Plan and manage construction processes; address construction defects, instability, and quality issues; maintain safety measures in construction and	**a1** Define the plan and manage the construction process.

materials; and assess the 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 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	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:

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
Principles of Construction Cost Estimating	✔	✔			✔	✔		✔					
Quantity Take Off	✔	✔			✔	✔		✔					
Methods of Detailed Cost Estimating	✔	✔			✔	✔		✔					
Analysis of Labor and Equipment Costs	✔	✔			✔	✔		✔					
Construction Tendering Process;	✔	✔			✔	✔		✔					
Bidding and Contracting Systems for Construction Projects	✔	✔			✔	✔		✔					
Laws and Regulations Related to The Construction Industry	✔	✔			✔	✔		✔					

6. Teaching and Learning Methods for Disabled Students:

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

7. Student Evaluation:

7.1 Student Evaluation Method:

No.	Evaluation Method	Competencies	LO's
1	Periodic Exams	C2 C3 C4 C9 C11 C13 C14	a1, c3 b1, c2 a1, a2, c1, c2, c3, c4 d2 a1, a2 a1 a1, b1, c1
2	Practical /Oral	-	-
3	Final Term Examination	C2 C3 C4 C9 C11 C13 C14	a1, c3 b1, c2 a1, a2, c1, c2, c3, c4 d2 a1, a2 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	Principles of Construction Cost Estimating	6, 8, 9, 10	C2 C3 C4 C9 C11 C13 C14	a1, c3 b1, c2 a1, a2, c1, c2, c3, c4 d2 a1, a2 a1 a1, b1, c1
2	Quantity Take Off	6, 8, 9, 10	C2 C3 C4 C9 C11 C13 C14	a1, c3 b1, c2 a1, a2, c1, c2, c3, c4 d2 a1, a2 a1 a1, b1, c1
3	Methods of Detailed Cost Estimating	6, 8, 9, 10	C2 C3 C4 C9 C11 C13 C14	a1, c3 b1, c2 a1, a2, c1, c2, c3, c4 d2 a1, a2 a1 a1, b1, c1

4	Analysis of Labor and Equipment Costs	6, 8, 9, 10	C2 C3 C4 C9 C11 C13 C14	a1, c3 b1, c2 a1, a2, c1, c2, c3, c4 d2 a1, a2 a1 a1, b1, c1
5	Construction Tendering Process;	6, 8, 9, 10	C2 C3 C4 C9 C11 C13 C14	a1, c3 b1, c2 a1, a2, c1, c2, c3, c4 d2 a1, a2 a1 a1, b1, c1
6	Bidding and Contracting Systems for Construction Projects	6, 8, 9, 10	C2 C3 C4 C9 C11 C13 C14	a1, c3 b1, c2 a1, a2, c1, c2, c3, c4 d2 a1, a2 a1 a1, b1, c1
7	Laws and Regulations Related to The Construction Industry	6, 8, 9, 10	C2 C3 C4 C9 C11 C13 C14	a1, c3 b1, c2 a1, a2, c1, c2, c3, c4 d2 a1, a2 a1 a1, b1, c1

Course Coordinator: Dr. Abdo El-Naquib
Head of Department: Assoc. Prof. Dr. Mohamed Gabr
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	-

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

2- 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.

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 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 and safety requirements,	**a1:** Describe contemporary technologies for groundwater wells. Define the Ghyben-Herzberg equation – formulation of saltwater intrusion.

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)

4- Course Contents:

No.	Topics	Lectures	laboratory	Exercise	Contact	Student's load
1	Fundamentals of Groundwater properties of soil (types of aquif –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**

5- Teaching and learning methods:

No	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
Fundamentals of Groundwater and properties of Soil (types of aquifers –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).	✔			✔	✔	✔	✔						

Well design and construction (well design – 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).	✔			✔		✔							✔

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 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%**

8- 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.

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	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	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	a1 a1
3	Well design and construction (well design – well construction and maintenance)	7, 10	C12	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	Minor – Elective Course
Authorization Date of Course Specification	-

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

2. Course Aims

No.	Aims
7	Achieve an optimum design of pavement, transportation and Traffic, Roadways and Airports, Railways, or any other emerging field relevant to the discipline.
10	Select appropriate and sustainable technologies for construction of pavement using numerical techniques.

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 pavement 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 safety regulations and environmental concerns for pavement materials and highways construction.

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 pavement
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 pavement projects.

4. Course Contents:

No.	Topics	Lectures	Lab.	Exercise	Contact	Student's load
1	Characteristics of pavement loads.	4	-	4	8	8
2	Stress analysis in pavements.	4	-	4	8	8
3	Design practices, construction, rehabilitation and maintenance.	4	-	4	8	8
4	Optimization of the design of rigid and flexible pavements systems.	4	-	4	8	8
5	Empirical and mechanistic stochastic structural subsystems.	4	-	4	8	8
6	Utility theory, serviceability concept, cost studies, traffic delay, environmental deterioration, rehabilitation	8	-	8	8	8

	and maintenance optimization systems.					
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	Brainstorming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab
Characteristics of pavement loads.	✔			✔	✔	✔				✔				
Stress analysis in pavements.	✔			✔	✔	✔				✔				
Design practices, construction, rehabilitation and maintenance.	✔			✔	✔	✔				✔				
Optimization of the design of rigid and flexible pavements systems.	✔			✔	✔	✔				✔				
Empirical and mechanistic stochastic structural subsystems.	✔			✔	✔	✔				✔				

Utility theory, serviceability concept, cost studies, traffic delay, environmental deterioration, rehabilitation and maintenance optimization 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 levels of students.

7. Student Evaluation:

7.1 Student Evaluation method:

No.	Evaluation Method	Competencies	LO's
1	Periodic exam	C3 C4 C12 C13	a1 a1 b2 c1
2	Practical /Oral	-	-
3	Final term examination	C3 C4 C12 C13	a1 a1 b2 c1

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	Khurmi, R.S. (2018). '' A text book of hydraulics, fluid mechanics and hydraulic machines'' S. Chanel and company Ltd. P.990
2	Subramanya, K. (2018) ''Flow in open channels'' McGra- Hill Education (India). P.602
3	Glenn E. Moglen. 2020.Fundamentals of Open Channel Flow. CRC Press. Available on Taylor & Francis eBooks.

9. Facilities required for teaching and learning:

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

10. Matrix of knowledge and skills of the course:

No	Topic	Aims	Competencies	LO's
1	Characteristics of pavement loads	7, 10	C4	a1
2	Stress analysis in pavements	7, 10	C12 C13	b2 c1
3	Design practices, construction, rehabilitation and maintenance	7, 10	C12	b2
4	Optimization of the design of rigid and flexible pavements systems	7, 10	C12	b2
5	Empirical and mechanistic stochastic structural subsystems	7, 10	C4 C12	a1 b2
6	Utility theory, serviceability concept, cost studies, traffic delay, environmental deterioration, rehabilitation and maintenance optimization systems.	7, 10	C3 C12 C13	a1 b2 c1

Course Coordinator: Assoc. Prof. Dr. Alaa Gabr
Head of Department: Prof. 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 3
Authorization Date of Course Specification	-

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

2. Course Aims

No.	Aims
7	Achieve an optimum design of Concrete 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

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 prefabricated concrete design.
C4: Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues and risk management principles.	**a1:** codes of practice for prefabricated concrete structure.

C12: Achieve an optimum design of Reinforced Concrete Structures.	**b1:** Achieve an optimum design of prefabricated concrete Structures.
C13: Plan and manage construction processes; address construction defects, instability and quality issues; maintain safety measures in construction and materials; and assess environmental impacts of projects.	**c1:** Assess environmental impacts of prefabricated concrete projects.

4. Course Contents:

No.	Topics	Lectures	Lab.	Exercise	Contact	Student's load
1	Performance of prefabricated concrete	4	-	4	8	8
2	Design of concrete supported to shear stress	4	-	4	8	8
3	Design of columns	4	-	4	8	8
4	Design of roofs	4	-	4	8	8
5	Design of building frames	4	-	4	8	8
6	Design projects using the computer	4	-	4	8	8
7	Detailed reports	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 movi	Discussion	Problem solving	Brainstorming	Projects	Site visits	Self-learning and Rese	Cooperative	Discovering	Modeling	Lab

				es						arch				
Performance of prefabricated concrete	✔			✔	✔	✔	✔			✔				
Design of concrete supported to shear stress	✔			✔	✔	✔	✔			✔				
Design of columns	✔			✔	✔	✔	✔			✔				
Design of roofs	✔			✔	✔	✔	✔			✔				
Design of building frames	✔			✔	✔	✔	✔			✔				
Design projects using the computer	✔			✔	✔	✔	✔			✔				
Detailed reports	✔			✔	✔	✔	✔			✔				

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 C13	a1 a1 b1 c1
2	Practical /Oral	-	-
3	Final term examination	C3 C4 C12	a1 a1 b1

		C13	c1

7.2 Evaluation Schedule: -

No.	Evaluation Method	Weeks
1	Periodic exam	7^{th} ,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	**Essential books (text books / design codes):** • Egyptian Code for Design and Construction of Reinforced Concrete Structures 2020. • 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.

9. Facilities required for teaching and learning:

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

10. Matrix of knowledge and skills of the course:

No	Topic	Aims	Competencies	LO's
1	Performance of prefabricated concrete	7,10	C3 C4 C13	a1 a1 c1
2	Design of concrete supported to shear stress	7,10	C3	a1

			C4 C12 C13	a1 b1 c1
3	Design of columns	7,10	C3 C4 C12 C13	a1 a1 b1 c1
4	Design of roofs	7,10	C3 C4 C12 C13	a1 a1 b1 c1
5	Design of building frames	7,10	C3 C4 C12 C13	a1 a1 b1 c1
6	Design projects using the computer	7,10	C3 C4 C12 C13	a1 a1 b1 c1
7	Detailed reports	7,10	C12	b1

Course Coordinator: Dr. Hamdi Abd Alaty

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	-

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.
7	Achieve an optimum design of construction.
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.
10	Select appropriate and sustainable technologies for construction of buildings, infrastructures, and water structures; using numerical techniques, experiment measurements.

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	**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

appropriate to the discipline, and within the principles and contexts of sustainable design and development.	sustainable design and development principles and contexts.
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 safety regulations and environmental concerns. **a2** List the engineering-related business and management principles. **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.
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.
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 construction.
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	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:

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
Construction Projects Work Breakdown Structure (WBS)	✔	✔			✔	✔		✔					
Time Planning and Scheduling Techniques: “Networks –Line of Balance Method for Repetitive Units Projects”	✔	✔			✔	✔		✔					
Cash Flow	✔	✔			✔	✔		✔					
Cost Planning: “Cost Estimation – Cost Control”	✔	✔			✔	✔		✔					
Using Computer Programs in Construction Project Management	✔	✔			✔	✔		✔					
Construction Projects Work Breakdown Structure (WBS)	✔	✔			✔	✔		✔					

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 C9 C12 C13 C14	b1, c2 a1, a2, c1, c2, c3, c4 d2 b1 a1 a1, b1, c1
2	Practical /Oral	-	-
3	Final Term Examination	C3 C4 C9 C12 C13 C14	b1, c2 a1, a2, c1, c2, c3, c4 d2 b1 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	Construction Projects Work Breakdown Structure (WBS)	6, 7, 8, 9, 10	C3 C4 C9 C12 C13 C14	b1, c2 a1, a2, c1, c2, c3, c4 d2 b1 a1 a1, b1, c1
2	Time Planning and Scheduling Techniques: "Networks –Line of Balance Method for Repetitive Units Projects"	6, 7, 8, 9, 10	C3 C4 C9 C12 C13 C14	b1, c2 a1, a2, c1, c2, c3, c4 d2 b1 a1 a1, b1, c1
3	Cash Flow	6, 7, 8, 9, 10	C3 C4 C9 C12 C13	b1, c2 a1, a2, c1, c2, c3, c4 d2 b1 a1

			C14	a1, b1, c1
4	Cost Planning: “Cost Estimation – Cost Control”	6, 7, 8, 9, 10	C3 C4 C9 C12 C13 C14	b1, c2 a1, a2, c1, c2, c3, c4 d2 b1 a1 a1, b1, c1
5	Using Computer Programs in Construction Project Management	6, 7, 8, 9, 10	C3 C4 C9 C12 C13 C14	b1, c2 a1, a2, c1, c2, c3, c4 d2 b1 a1 a1, b1, c1

Course Coordinator: Dr. Hamdy Abd Elaty
Head of Department: Assoc. Prof. Dr. Mohamed Gabr
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	-

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.
7	Achieve an optimum design of construction.
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.
10	Select appropriate and sustainable technologies for construction of buildings, infrastructures, and water structures; using numerical techniques, experiment measurements.

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,	**b1** Judge engineering decisions considering balanced costs, benefits, safety, quality, reliability, and environmental impact.

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 sustainable design and development principles and contexts.
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 safety regulations and environmental concerns. **a2** List the engineering-related business and management principles. **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.
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.
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 construction.
C13 Plan and manage construction processes; address construction defects, instability, and quality issues; maintain safety measures in construction and materials; and	**a1** Define the plan and manage the construction process.

assess the 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 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	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	2	-	2	4	4

	Projects					
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:

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
The Importance of Visibility Study for The Projects	✔	✔			✔	✔		✔					
The Definition of The Visibility Study and The Historical Development for It	✔	✔			✔	✔		✔					
The Project Essence and Its Principles and Forms	✔	✔			✔	✔		✔					
Initial Visibility Studies and Its Elements	✔	✔			✔	✔		✔					

Environmental Visibility Studies	✔	✔			✔	✔		✔					
Important Financial Sides in Visibility Study	✔	✔			✔	✔		✔					
The Important Monetary Sides in Visibility Study	✔	✔			✔	✔		✔					
The Important Marketing Sides	✔	✔			✔	✔		✔					
The Exhibition of The Products and The Effective Parameters in It	✔	✔			✔	✔		✔					
The Pricing Policies	✔	✔			✔	✔		✔					
The Situation of The Government The Consumer and The Competitive Projects	✔	✔			✔	✔		✔					
The Engineering and Technical Visibility for The Project	✔	✔			✔	✔		✔					
Study of The Social Visibility	✔	✔			✔	✔		✔					
Evaluation Methods of The Visibility Study	✔	✔			✔	✔		✔					

6. Teaching and Learning Methods for Disabled Students:

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

7. Student Evaluation:

7.1 Student Evaluation Method:

No.	Evaluation Method	Competencies	LO's

1	Periodic Exams	C3 C4 C9 C12 C13 C14	b1, c2 a1, a2, c1, c2, c3, c4 d2 b1 a1 a1, b1, c1
2	Practical /Oral	-	-
3	Final Term Examination	C3 C4 C9 C12 C13 C14	b1, c2 a1, a2, c1, c2, c3, c4 d2 b1 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	The Importance of Visibility Study for The Projects	6, 7, 8, 9, 10	C3 C4 C9 C12 C13 C14	b1, c2 a1, a2, c1, c2, c3, c4 d2 b1 a1 a1, b1, c1
2	The Definition of The Visibility Study and The Historical Development for It	6, 7, 8, 9, 10	C3 C4 C9 C12 C13 C14	b1, c2 a1, a2, c1, c2, c3, c4 d2 b1 a1 a1, b1, c1
3	The Project Essence and Its Principles and Forms	6, 7, 8, 9, 10	C3 C4 C9 C12 C13 C14	b1, c2 a1, a2, c1, c2, c3, c4 d2 b1 a1 a1, b1, c1
4	Initial Visibility Studies and Its Elements	6, 7, 8, 9, 10	C3 C4 C9 C12 C13 C14	b1, c2 a1, a2, c1, c2, c3, c4 d2 b1 a1 a1, b1, c1

5	Environmental Visibility Studies	6, 7, 8, 9, 10	C3 C4 C9 C12 C13 C14	b1, c2 a1, a2, c1, c2, c3, c4 d2 b1 a1 a1, b1, c1
6	Important Financial Sides in Visibility Study	6, 7, 8, 9, 10	C3 C4 C9 C12 C13 C14	b1, c2 a1, a2, c1, c2, c3, c4 d2 b1 a1 a1, b1, c1
7	The Important Monetary Sides in Visibility Study	6, 7, 8, 9, 10	C3 C4 C9 C12 C13 C14	b1, c2 a1, a2, c1, c2, c3, c4 d2 b1 a1 a1, b1, c1
8	The Important Marketing Sides	6, 7, 8, 9, 10	C3 C4 C9 C12 C13 C14	b1, c2 a1, a2, c1, c2, c3, c4 d2 b1 a1 a1, b1, c1
9	The Exhibition of The Products and The Effective Parameters in It	6, 7, 8, 9, 10	C3 C4 C9 C12 C13 C14	b1, c2 a1, a2, c1, c2, c3, c4 d2 b1 a1 a1, b1, c1
10	The Pricing Policies	6, 7, 8, 9, 10	C3 C4 C9 C12 C13 C14	b1, c2 a1, a2, c1, c2, c3, c4 d2 b1 a1 a1, b1, c1
11	The Situation of The Government	6, 7, 8, 9, 10	C3 C4	b1, c2 a1, a2, c1, c2, c3, c4

	The Consumer and The Competitive Projects		C9 C12 C13 C14	d2 b1 a1 a1, b1, c1
12	The Engineering and Technical Visibility for The Project	6, 7, 8, 9, 10	C3 C4 C9 C12 C13 C14	b1, c2 a1, a2, c1, c2, c3, c4 d2 b1 a1 a1, b1, c1
13	Study of The Social Visibility	6, 7, 8, 9, 10	C3 C4 C9 C12 C13 C14	b1, c2 a1, a2, c1, c2, c3, c4 d2 b1 a1 a1, b1, c1
14	Evaluation Methods of The Visibility Study	6, 7, 8, 9, 10	C3 C4 C9 C12 C13 C14	b1, c2 a1, a2, c1, c2, c3, c4 d2 b1 a1 a1, b1, c1

Course Coordinator: Dr. Abdo El-Naquib
Head of Department: Assoc. Prof. Dr. Mohamed Gabr
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	Minor – Elective Course
Authorization Date of Course Specification	-

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

2. Course Aims:

No.	**Aims**
7	Achieve an optimum design of transportation systems, Traffic, trip generation, distribution, Roads and Airports, trip generation, distribution, or any other emerging field relevant to the discipline.
10	Select appropriate and sustainable technologies for highway construction and traffic planning using numerical techniques.

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	**a1** Learn the general principles of urban transportation planning.

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 safety regulations for urban transportation planning.
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 urban transport systems.

4. Contents:

No.	Topics	Lectures	Lab.	Exercise	Contact	Student's load
1	Land use-transportation interaction	2	-	2	4	4
2	The process of urban transportation planning, urban transport problems, goals, and objectives, data and information, survey design, travel demand forecasting: 1) trip generation, 2) trip distribution, 3) modal choice, 4) route assignment	16	-	16	32	32
3	The evaluation of urban transport systems, transport system management, demand management, and control	10	-	10	20	20
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	Brainstorming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab
Land use-transportation interaction	✔			✔	✔	✔				✔				
The process of urban transportation planning, urban transport problems, goals, and objectives, data and information, survey design, travel demand forecasting: 1) trip generation, 2) trip distribution, 3) modal choice, 4) route assignment	✔			✔	✔	✔				✔				
The evaluation of urban transport systems, transport system management, demand management, and control	✔			✔	✔	✔				✔				

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	C3 C4 C12	a1 a1 b1
2	Practical /Oral	-	-
3	Final term examination	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 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	Ott, Introduction to Statistical Methods and Data Analysis, PWS-Kent, 2019
2	Simulation of urban transport system, slim hammed and mekkiksouri , fib 2021
3	Urban dynamics and simulation models, densipumai, romainreuillon , 2020

9. Facilities required for teaching and learning:

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

10. Matrix of knowledge and skills of the course:

No.	Topic	Aims	Competencies	LO's
1	Land use-transportation interaction	7, 10	C3	a1
2	The process of urban transportation planning, urban transport problems, goals, and objectives, data and information, survey design, travel demand forecasting: 1) trip generation, 2) trip distribution, 3) modal choice, 4) route assignment	7, 10	C4 C12	a1 b1
3	The evaluation of urban transport systems, transport system management, demand management, and control	7, 10	C4 C12	a1 b1

Course Coordinator: Assoc. Prof. Dr. 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 3
Authorization Date of Course Specification	-

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

2. Course Aims

No.	Aims
7	Achieve an optimum design of Concrete 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

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 Special Concrete Structures design.
C4: Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements,	**a1:** Codes of practice, and standards for Special reinforced concrete structure.

environmental issues and risk management principles.	
C12: Achieve an optimum design of Reinforced Concrete Structures.	**b1:** Achieve an optimum design of special reinforced concrete Structures.
C13: Plan and manage construction processes; address construction defects, instability and quality issues; maintain safety measures in construction and materials; and assess environmental impacts of projects.	**c1:** Assess environmental impacts of special reinforced concrete structure.

4. Course Contents:

No.	Topics	Lectures	Lab.	Exercise	Contact	Student's load
1	Introduction to tall building structures.	2	-	2	4	4
2	Design criteria for tall building structures	4	-	4	8	8
3	Loading. Structural formation	4	-	4	8	8
4	Modeling for analysis	6	-	6	12	12
5	Braced frames	4	-	4	8	8
6	Rigid frames	4	-	4	8	8
7	Shear walls	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	Brainstorming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab
Introduction to tall building structures.	✔			✔	✔	✔	✔			✔				
Design criteria for tall building structures	✔			✔	✔	✔	✔			✔				
Loading. Structural formation	✔			✔	✔	✔	✔			✔				
Modeling for analysis	✔			✔	✔	✔	✔			✔				
Braced frames	✔			✔	✔	✔	✔			✔				
Rigid frames	✔			✔	✔	✔	✔			✔				
Shear walls	✔			✔	✔	✔	✔			✔				

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 C13	a1 a1 b1 c1
2	Practical /Oral	-	-
3	Final term examination	C3 C4 C12 C13	a1 a1 b1 c1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	$3rd, 8th, 10th$
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
1	Introduction to tall building structures.	7,10	C3	a1
2	Design criteria for tall building structures	7,10	C3 C4 C12 C13	a1 a1 b1 c1
3	Loading. Structural formation	7,10	C3 C4 C12	a1 a1 b1
4	Modeling for analysis	7,10	C3 C4 C12	a1 a1 b1
5	Braced frames	7,10	C3 C4 C12 C13	a1 a1 b1 c1
6	Rigid frames	7,10	C3 C4 C12 C13	a1 a1 b1 c1
7	Shear walls	7,10	C3 C4 C12 C13	a1 a1 b1 c1

Course Coordinator: Dr. Hamdi Abd Alaty

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 Engineering 2
Course Code	CIE 424H
Year/Level	level 4
Specialization	Elective 3
Authorization Date of Course Specification	-

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

2. Course Aims

No.	Aims
7	Achieve an optimum design of Deep Foundations, Earth Retaining Structures and soil hydraulics.
10	Select appropriate and sustainable technologies for design and construction of Deep 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 deep foundations and retaining structures
C4. Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues and risk management principles.	**a1.** Describe codes of practice, and standards concerns for deep foundations and retaining structures works.

C12. Achieve an optimum design of foundations.	**b1.** Achieve an optimum design of deep foundations and retaining structures
C13. Plan and manage construction processes; address construction defects, instability and quality issues; maintain safety measures in construction and materials; and assess environmental impacts of projects.	**c1.** Plan and manage construction processes, and assess environmental impacts of projects on deep foundations.

Course Contents:

No.	Topics	Lectures	laboratory	Exercise	Contact	Student's load
1	Introduction to Deep foundations	4	-	4	8	8
2	Pile types, piles classifications, Design of pile foundation,	4	-	4	8	8
3	pile loading and pile capacity, Geotechnical pile capacity	6	-	6	12	12
4	pile settlement, pile loading tests,	2	-	2	4	4
5	Design of pile cap	4	-	4	8	8
6	One dimensional flow two dimensional flows	2	-	2	4	4
7	Retaining walls.	2	-	2	4	4
8	Sheet piles design	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	Brainstorming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab.
Introduction to Deep foundations	✔	✔		✔	✔	✔	✔			✔				
Pile types, piles classifications, Design of pile foundation,	✔	✔		✔	✔	✔	✔			✔				
pile loading and pile capacity, Geotechnical pile capacity	✔	✔		✔	✔	✔	✔			✔				
pile settlement, pile loading tests,	✔	✔		✔	✔	✔	✔			✔				
Design of pile cap	✔	✔		✔	✔	✔	✔			✔				

One dimensional flow two dimensional flows	✔	✔		✔	✔	✔	✔			✔				
Retaining walls.	✔	✔		✔	✔	✔	✔			✔				
Sheet piles design	✔	✔		✔	✔	✔	✔			✔				

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 C13	a1 a1 b1 c1
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
5	Course notes: Lecture notes prepared by the course coordinator +Solved examples.
6	Das, B., M. (2017), "Principles of Foundation Engineering ", CENGAGE Learning,
7	Gulhati, S.K. and Datta, M. (2015), “Geotechnical Engineering “, Tata McGraw-Hill, New Delhi.
8	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	Introduction to Deep foundations	7,10	C3 C4 C12 C13	a1 a1 b1 c1
2	Pile types, piles classifications, Design of pile foundation,	7,10	C3 C4 C12	a1 a1 b1
3	pile loading and pile capacity, Geotechnical pile capacity	7,10	C3 C4 C12	a1 a1 b1

4	pile settlement, pile loading tests,	7,10	C3 C4 C12	a1 a1 b1
5	Design of pile cap	7,10	C3 C4 C12	a1 a1 b1
6	One dimensional flow two dimensional flows	7,10	C4 C12	a1 b1
7	Retaining walls.	7,10	C4 C12	a1 b1
8	Sheet piles design	7,10	C4 C12	a1 b1

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	-

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.
7	Achieve an optimum design of construction.
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.
10	Select appropriate and sustainable technologies for construction of buildings, infrastructures, and water structures; using numerical techniques, experiment measurements.

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	**b1** Judge engineering decisions considering balanced costs, benefits, safety, quality, reliability, and environmental impact.

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 sustainable design and development principles and contexts.
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 safety regulations and environmental concerns. **a2** List the engineering-related business and management principles. **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.
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.
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 construction.
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	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	✔	✔			✔	✔		✔					

2	Impact of Human Performance on Productivity	✔	✔			✔	✔		✔					
3	Effect of The Interaction Between Technological Advances and Human Capabilities on Performance and Productivity	✔	✔			✔	✔		✔					
4	Cost Reduction and Productivity Improvement Programs	✔	✔			✔	✔		✔					

6. Teaching and Learning Methods for Disabled Students:

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

7. Student Evaluation:

7.1 Student Evaluation Method:

No.	Evaluation Method	Competencies	LO's
1	Periodic Exams	C3 C4 C9 C12 C13 C14	b1, c2 a1, a2, c1, c2, c3, c4 d2 b1 a1 a1, b1, c1
2	Practical /Oral	-	-
3	Final Term Examination	C3 C4 C9	b1, c2 a1, a2, c1, c2, c3, c4 d2

		C12 C13 C14	b1 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	Identification of Bottlenecks	6, 7, 8, 9, 10	C3 C4 C9 C12 C13 C14	b1, c2 a1, a2, c1, c2, c3, c4 d2 b1 a1 a1, b1, c1
2	Impact of Human Performance on Productivity	6, 7, 8, 9, 10	C3 C4 C9 C12 C13 C14	b1, c2 a1, a2, c1, c2, c3, c4 d2 b1 a1 a1, b1, c1
3	Effect of The Interaction Between Technological Advances and Human Capabilities on Performance and Productivity	6, 7, 8, 9, 10	C3 C4 C9 C12 C13 C14	b1, c2 a1, a2, c1, c2, c3, c4 d2 b1 a1 a1, b1, c1
4	Cost Reduction and Productivity Improvement Programs	6, 7, 8, 9, 10	C3 C4 C9 C12 C13 C14	b1, c2 a1, a2, c1, c2, c3, c4 d2 b1 a1 a1, b1, c1

Course Coordinator: Dr. Abdo El-Naquib
Head of Department: Assoc. Prof. Dr. Mohamed Gabr
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

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

2- Course Aims

No.	Aims
8	Select appropriate and sustainable technologies for construction of buildings, infrastructures and water structures; using numerical techniques, experiment measurements, and testing by applying a full range of civil engineering fields such as properties and strength of materials
9	Deal with biddings, contracts and financial issues including project insurance and guarantees.
10	Achieve an optimum design of Reinforced Concrete and Steel Structures, Foundations and Earth Retaining Structures; and at least three of the following civil engineering topics: Transportation and Traffic, Roadways and Airports, Railways, Sanitary Works, Irrigation, Water Resources and Harbors; or any other emerging field relevant to the discipline.

3- Competencies:

Competencies	Learning Outcomes (LO'S)
C2 Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions	**a2** Define the principles, basic properties, and features of construction material, as well as their use in sustainable technologies for construction of buildings **b 1** 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** Recognizes the various construction defects, instability and quality issues and assess environmental impacts of projects. **b1**Create methodical approaches when dealing with new and advancing technology
C11 Select appropriate and sustainable technologies for construction of buildings, infrastructures and water structures; using either numerical techniques or physical measurements and/or testing by applying a full range of civil engineering concepts and techniques of: properties and strength of materials	**a1** Recognize the fundamentals of properties and strength of materials, **c 1** Apply safe systems at work by taking the necessary precautions to manage hazards

4. Course Contents:

No.	Topics	Lectures	Exercise	laboratory	Contact	Student's load
1	Reliability of parallel and serial engineering systems	**8**	**8**	**-**	**16**	**16**
2	Life testing. Impact of reliability on the design process in engineering fields such as mechanical, electrical and structural engineering.	**10**	**10**	**-**	**20**	**20**
3	Studies the effect of equipment reliability on product quality.	**10**	**10**	**-**	**40**	**40**
	Total	**28**	**28**	**-**	**56**	**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
Reliability of parallel and serial engineering systems	✔			✔	✔								✔
Life testing. Impact of reliability on the design process in engineering fields such as mechanical, electrical and structural engineering.	✔			✔	✔								✔
Studies the effect of equipment reliability on product quality.	✔			✔	✔								✔

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	a1, a3 a1, c1
2	Practical /Oral	-	-
3	Final term examination	C2 C4 C11	b1, a2 a1, c1 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	8,10	C2	a1, a3	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.	8,10	C4 C11	a1 b1	Face-to-Face Lecture Brain storming Discussion sessions
3	Studies the effect of equipment reliability on product quality.	8,10	C4 C11	a1 b1 c1	Face-to-Face Lecture Brain storming Discussion sessions

Course Coordinator: Dr. Abdo EL Naquib

Head of Department: Assoc. Prof. Dr. Mohamed Gabr

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	-

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- Competencies:

Competencies	Learning outcomes (LO'S)
C3: Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global,	**a1:** Learn the general principles of Classifications of rivers, data collection method; velocity and flow rate

economic, environmental, ethical and other aspects as appropriate the principles and contexts of sustainable design and development.	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	Brainstorming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling
Classifications of rivers, data collection method; velocity and flow rate measurements.	✔			✔	✔	✔							
Design of hydraulic structures: dike, spillway, dam	✔			✔	✔	✔	✔						
Countermeasure on sediment control; corrosion deposition scour, bill of quantity and cost estimation, operation and maintenance.	✔			✔	✔	✔							

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- Semester 2
Specialization	Elective 4
Authorization Date of Course Specification	-

Teaching hours	**Lectures**	**laboratory**	**Exercise**	**Contact**	**Student's load**
	2	-	2	4	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- 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	**a1:** Learn the general principles of Basic governing equations of fluid flow (Bernoulli – continuity – application)

aspects as appropriate 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 contemporary technologies and codes of practice for flow through orifices (types of orifices – vena contract – 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	Brainstorming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling
Basic governing equations (Bernoulli and Continuity) – Applications	✔			✔	✔	✔							
Flow through orifices (types – equations – time of filling and emptying tanks)	✔			✔	✔	✔							
Flow over weirs (types – equations)	✔			✔	✔	✔							
Application of Momentum equation	✔			✔	✔	✔							
Steady flow in pipe lines (Basics) – Hydraulic analysis of pipe line networks	✔			✔	✔	✔							
Unsteady flow in pipeline networks. Hydraulic machinery (design of pump station)	✔			✔	✔	✔							

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	Fluid mechanics through problems R.J GARDE, New AGE publishers- 2006
2	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 C13	b2 c1
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	Traffic Control Systems
Course Code	CIE425C
Year/Level	Level 4
Specialization	Minor – Elective Course
Authorization Date of Course Specification	-

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

2. Course Aims

No.	Aims
7	Achieve an optimum design of traffic control systems strategies for intersections and arterials or any other emerging field relevant to the discipline.
8	Plan and manage traffic systems and quality issues; maintain safety measures and assess environmental impacts of traffic projects.
10	Select appropriate and technologies for traffic planning, infrastructures; using experiment measurements by applying a full range of civil engineering fields such as traffic control system analysis.

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 traffic, signals, intersections, arterial systems and area traffic networks

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 safety regulations and environmental concerns.
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 for transportation and traffic, roadways and airports, arterial systems and area traffic networks; 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.	**c1** Assess environmental impacts of traffic projects.

4. Course Contents:

No.	Topics	Lecture	Lab.	Exercise	Contact	Student's load
1	Introduction to existing and new traffic control systems strategies including both off-line signal optimization techniques and real-time computer traffic-responsive control concepts	8	-	8	16	16
2	Control concepts and methods for signal intersections, arterial systems and area traffic networks.	10	-	10	20	20
3	Traffic control system evaluation techniques using measures of effectiveness (M.O.E) for signal intersections, arterial, and networks.	10	-	10	20	20
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	Brainstorming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab
Introduction to existing and new traffic control systems strategies including both off-line signal optimization techniques and real-time computer traffic-responsive control concepts	✔			✔	✔	✔				✔				
Control concepts and methods for 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.	✔			✔	✔	✔				✔				

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 C12 C13	a1 a1 b2 c1
2	Practical /Oral	-	-
3	Final term examination	C3 C4 C12 C13	a1 a1 b2 c1

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	**Essential books (text books):** Transportation Engineering, an Introduction, C. Jotin Khisty, Prentice Hall, Englewood Cliffs, New Jersey, 1990. Traffic Engineering, William R. McShane, Prentice Hall, Englewood Cliffs, New Jersey, 1990.
2	**Recommended books:** Ott, Introduction to Statistical Methods and Data Analysis, PWS-Kent, 1990. Control of traffic systems in buildings, 2006 Sandro marken

9. Facilities required for teaching and learning:

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

10. Matrix of knowledge and skills of the course:

No.	Topic	Aims	Competencies	LO's
1	Introduction to existing and new traffic control systems strategies including both offline signal optimization techniques and real-time computer traffic-responsive control concepts	7, 10	C3 C12 C13	a1 b2 c1
2	Control concepts and methods for signal intersections, arterial systems and area traffic networks.	7, 8	C3 C4 C12 C13	a1 a1 b2 c1
3	Traffic control system evaluation techniques using measures of effectiveness (M.O.E) for signal intersections, arterial, and networks.	8, 10	C4 C12 C13	a1 b2 c1

Course Coordinator: Assoc. Prof. Dr. 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	CIE 425D
Year/Level	level 4
Specialization	Elective 4
Authorization Date of Course Specification	-

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

2- Course Aims

No.	Aims
7	Achieve an optimum design of Foundations, tunneling and earth retaining structures.
8	Plan and manage construction processes; instability constructions and quality issues; maintain safety measures in construction.
10	Select appropriate and sustainable technologies for infrastructures, tunneling and underground excavation

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 deep foundations, tunneling and underground excavations.
C4. Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements,	**a1.** Describe codes of practice, and standards concerns for deep foundations, tunneling and underground excavations works.

environmental issues and risk management principles.	
C12. Achieve an optimum design of foundations tunneling and underground excavations.	**b1.** Achieve an optimum design of foundations tunneling, underground excavations and retaining structures.
C13. Plan and manage construction processes; address construction defects, instability and quality issues; maintain safety measures in construction and materials; and assess environmental impacts of projects.	**c1.** Plan and manage construction processes, and assess environmental impacts of projects on foundations tunneling and underground excavations.

4- Course Contents:

No.	Topics	Lectures	Exercise	laboratory	Contact	Student's load
1	Introduction to tunnels	2	2	-	4	4
2	numerical methods in tunnel constructions	4	4	-	8	8
3	Computer software packages and its applications in tunnels.	4	4	-	8	8
4	Tunneling and excavations in hard rock	4	4	-	8	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	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	8
7	Selection of methods of attack for excavation of tunnels and deep vertical sided openings.	6	6	-	12	12

	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.					
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	Brainstorming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab
Introduction to tunnels	✔	✔		✔	✔	✔	✔			✔				
numerical methods in tunnel constructions	✔	✔		✔	✔	✔	✔			✔				
Computer software packages and its applications in tunnels.	✔	✔		✔	✔	✔	✔			✔				
Tunneling and excavations in hard rock	✔	✔		✔	✔	✔	✔			✔				

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	✔	✔		✔	✔	✔	✔			✔				
problems of urban tunneling, deformation and surface settlement, load on liners, face stability, methods of soft ground tunneling including EPB and slurry shield methods	✔	✔		✔	✔	✔	✔			✔				
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- 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 C13	a1 a1 b1 c1
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	Design and construction of tunnels, pietrolanaridi, 2018
2	Tunneling and tunnel mechanio, Dimitrioskolymbas 2020
3	Course notes: Lecture notes prepared by the course coordinator +Solved examples.

4	Das, B., M. (2017), "Principles of Foundation Engineering ", CENGAGE Learning,
5	Gulhati, S.K. and Datta, M. (2015), “Geotechnical Engineering “, Tata McGraw-Hill, New Delhi.
6	Essential books (textbooks): Egyptian Code of Practice for Soil Mechanics and Foundations (2002)

9- Facilities required for teaching and learning:

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 tunnels	7,8,10	C3 C4 C12 C13	a1 a1 b1 c1
2	numerical methods in tunnel constructions	7,10	C3 C4 C12	a1 a1 b1
3	Computer software packages and its applications in tunnels.	7,10	C3 C4 C12	a1 a1 b1
4	Tunneling and excavations in hard rock	7,10	C3 C4 C12	a1 a1 b1
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	7,10	C3 C4 C12	a1 a1 b1
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	7,10	C3 C4 C12	a1 a1 b1

7	Selection of methods of attack for excavation of tunnels and deep vertical sided openings. Tunneling procedures based on behavioral characteristics of soil and rock, study of tunnel boring machines, shielded and drill-and-blast operations, linings, soil linear interaction. Deep excavation procedures related to support of excavation systems, methods of installation and dewatering.	7,10	C3 C4 C12	a1 a1 b1

Course Coordinator: Dr. Hany Hashish

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 4
Authorization Date of Course Specification	-

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

2- Course Aims

No.	Aims
7	Achieve an optimum design of Concrete structures.
8	Plan and manage construction processes; address construction defects, instability and quality issues; maintain safety measures in construction and materials.

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.

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 composite construction.
C4: Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues and risk management principles.	**a1:** Codes of practice for special reinforced concrete structure.
C12: Achieve an optimum design of Reinforced Concrete Structures.	**b1:** Achieve an optimum design of Composite construction.
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 special reinforced concrete structure projects.

4- Course Contents:

No.	Topics	Lectures	Lab.	Exercise	Contact	Student's load
1	Introduction to Composite construction	2	-	2	4	4
2	materials of composite constructions	4	-	4	8	8
3	simply supported composite beams	4	-	4	8	8
4	continuous beams	6	-	6	12	12
5	The shear connections	4	-	4	8	8

6	composite columns	4	-	4	8	8
7	composite slabs	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	Brainstorming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab
Introduction to Composite construction	✔			✔	✔	✔	✔			✔				
materials of composite constructions	✔			✔	✔	✔	✔			✔				
simply supported composite beams	✔			✔	✔	✔	✔			✔				
continuous beams	✔			✔	✔	✔	✔			✔				
The shear connections	✔			✔	✔	✔	✔			✔				
composite columns	✔			✔	✔	✔	✔			✔				
composite slabs	✔			✔	✔	✔	✔			✔				

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 C13	a1 a1 b1 c1
2	Practical /Oral	-	-
3	Final term examination	C3 C4 C12 C13	a1 a1 b1 c1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	$3^{th}, 7^{th}, 10^{th}$
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	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
1	Introduction to Composite construction	7,8,10	C3 C4 C12 C13	a1 a1 b1 c1
2	materials of composite constructions	7,8,10	C3 C4 C12 C13	a1 a1 b1 c1
3	simply supported composite beams	7,8,10	C3 C4 C12 C13	a1 a1 b1 c1
4	continuous beams	7,8,10	C4 C12 C13	a1 b1 c1
5	The shear connections	7,8,10	C4 C12 C13	a1 b1 c1
6	composite columns	7,8,10	C3 C4 C12	a1 a1 b1

			C13	c1
7	composite slabs	7,8,10	C3 C4 C12 C13	a1 a1 b1 c1

Course Coordinator: Dr. Hamdi Abd Alaty

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 5
Specialization	Major
Authorization Date of Course Specification	-

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

2. Course Aims

No.	Aims
7	Achieve an optimum design of railways, stations, signals or any other emerging field relevant to the discipline.
8	Plan and manage railways construction processes; address defects, instability and quality issues; maintain safety measures in construction and materials; and assess environmental impacts of railways projects.
10	Select appropriate and sustainable technologies for railways construction, infrastructures by applying a full range of civil engineering fields such as analysis mechanism, properties and strength of materials.

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 railways.

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 safety regulations and environmental concerns
C12 Achieve an optimum design of Reinforced Concrete and Steel Structures, Foundations and Earth Retaining Structures; and at least three of the following civil engineering topics: Transportation and Traffic, Roadways and Airports, Railways, Sanitary Works, Irrigation, Water Resources and Harbors; or any other emerging field relevant to the discipline.	**b2** Achieve an optimum design of works for of different parts of railways; 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.	**c1** Assess environmental impacts of railway projects

4. Course Contents:

No.	Topics	Lecture	Lab.	Exercise	Contact	Student's load
1	Engineering principals for railways planning	2	-	2	4	4
2	Railways components and specifications	4	-	4	8	8
3	Design of different parts of railways	6	-	6	12	12
4	Types of stations	2	-	2	4	4
5	Types of signals	2	-	2	4	4
6	Maintenance	4	-	4	8	8
7	Planning of railways lines	4	-	4	8	8
8	Transportation economy	2	-	2	4	4
9	Management and insurance.	2	-	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	Brainstorming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling	Lab
Engineering principals for railways planning	✔			✔	✔	✔				✔				
Railways components and specifications	✔			✔	✔	✔				✔				
Design of different parts of railways	✔			✔	✔	✔				✔				
Types of stations	✔			✔	✔	✔				✔				
Types of signals	✔			✔	✔	✔				✔				
Maintenance	✔			✔	✔	✔				✔				
Planning of railways lines	✔			✔	✔	✔				✔				
Transportation economy	✔			✔	✔	✔				✔				
Management and insurance.	✔			✔	✔	✔				✔				

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 C12 C13	a1 a1 b2 c1
2	Practical /Oral	-	-
3	Final term examination	C3 C4 C12 C13	a1 a1 b2 c1

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	E. B. Machaly, “Behavior, analysis and design of steel work connections “, vol. 3, 2020
2	Railway development 2018, Dr frank pruinsma and DR Irik pills.

9. Facilities required for teaching and learning:

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

10. Matrix of knowledge and skills of the course:

No	Topic	Aims	Competencies	LO’s
1	Engineering principles for railways planning	7, 8	C3 C4	a1 a1
2	Railways components and specifications	10	C3 C4	a1 a1
3	Design of different parts of railways	7	C4 C12 C13	a1 b2 c1
4	Types of stations	7, 10	C3 C4 C12	a1 a1 b2
5	Types of signals	7, 10	C3 C4 C12	a1 a1 b2
6	maintenance	8,10	C12 C13	b2 b2
7	Planning of railways lines	7	C4 C12 C13	a1 b2 c1
8	Transportation economy	8,10	C3 C13	a1 c1
9	Management and insurance.	8,10	C4 C13	a1 c1

Course Coordinator: Assoc. Prof. Dr. 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 4
Authorization Date of Course Specification	-

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

2- Course Aims

No.	**Aims**
7	Achieve an optimum design of Concrete structures.
8	Plan and manage construction processes; address construction defects, instability and quality issues; maintain safety measures in construction and materials.
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.

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 shell structure and pre-stressed reinforced concrete design.

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 for shell structure and pre-stressed reinforced concrete.
C12: Achieve an optimum design of Reinforced Concrete Structures.	**b1:** Achieve an optimum design of reinforced concrete Structures.
C13: Plan and manage construction processes; address construction defects, instability and quality issues; maintain safety measures in construction and materials; and assess environmental impacts of projects.	**c1:** Assess environmental impacts of reinforced concrete structure projects.

4- Course Contents:

No.	Topics	Lectures	Lab.	Exercise	Contact	Student's load
1	Design shell structure	14	-	14	28	28
2	design of pre-stressed reinforced concrete	14	-	14	28	28
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

										rch				
Design shell structure	✔			✔	✔	✔	✔			✔				
design of pre-stressed reinforced concrete	✔			✔	✔	✔	✔			✔				

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 C13	a1 a1 b1 c1
2	Practical /Oral	-	-
3	Final term examination	C3 C4 C12 C13	a1 a1 b1 c1

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Periodic exam	$7^{th}, 8^{th}, 12^{th}$
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	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
1	Design shell structure	7,8,10	C3 C4 C12 C13	a1 a1 b1 c1
2	Design of pre-stressed reinforced concrete	7,8,10	C3 C4 C12 C13	a1 a1 b1 c1

Course Coordinator: Hamdi Abd Alaty
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	CIE413
Year/Level	Level 4
Specialization	Minor – Elective Course
Authorization Date of Course Specification	-
Pre-request	Complete 100 h

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

2- Course Aims

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

3- Competencies:

Competencies	Learning Outcomes (LO'S)

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

4- 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**	**-**

5- Teaching and learning methods:

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

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	Midterm examination	C2 C13	c1 a1
2	Semester work (quizzes, sheets, report)	C6 C13	c2 a1
3	Final term examination	C3 C13	c2 a1

7.2 Evaluation Schedule:

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

7.3 weighting of Evaluation:

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

8- List of References:

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

3	نظم الحماية الكهربية علم وفن, 2007 محمود الجيلانى
4	الكود المصري للمنشات الكهربائية 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	Principles of lighting	4	C2	c1
2	lighting design for buildings which includes artificial lighting, point, line and area light sources, types and properties of luminaries, polar curves	4	C3	c2
3	design methods and calculations, glare index	4	C13	a1
4	lighting design standard	4	C6	c2
5	luminaire heat recovery system and lighting energy management	4	C6	c2
6	hybrid lighting	4	C13	a1
7	daylighting of buildings,	4	C13	a1
8	effect of climate on lighting	4	C13	a1

Course Coordinator: Dr. Rabab Reda
Head of Department: Prof. Dr. Mohamed Elkiki
Date of Approval: 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	Soil Dynamics
Course Code	CIE 425I
Year/Level	Level 4
Specialization	Elective 4
Authorization Date of Course Specification	-

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

2- Course Aims

No.	Aims
7	Achieve an optimum design of Foundations, tunneling and earth retaining structures.
8	Plan and manage construction processes; instability constructions and quality issues; maintain safety measures in construction.
10	Select appropriate and sustainable technologies for infrastructures, tunneling and underground excavation

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 dynamics.
C4. Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements,	**a1.** Describe codes of practice, and standards concerns for soil dynamics works.

environmental issues and risk management principles.	
C12. Achieve an optimum design of foundations tunneling and underground excavations.	**b1.** Achieve an optimum design of foundations and soil dynamics.
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, and assess environmental impacts of projects on foundations and soil dynamics.

4- Course Contents:

No.	Topics	Lectures	laboratory	Exercise	Contact	Student's load
1	Introduction to Soil Dynamics:	2	-	2	4	4
2	Fundamentals of vibrations	4	-	4	8	8
3	Soil dynamic properties	4	-	4	8	8
4	Soil liquefaction	4	-	4	8	8
5	Propagation of waves	4	-	4	8	8
6	Analysis of seismic response	4	-	4	8	8
7	Soil –structure dynamic interaction	6	-	6	12	12
Total		**28**	**-**	**28**	**28**	**56**

5- Teaching and learning methods:

Topics	Face-to-FaceLecture	OnlineLecture	FlippedClassroom	Presentationandmovies	Discussion	Problemsolving	Brainstorming	Projects	Sitevisits	Self-learningandResearch	Cooperative	Discovering	Modeling	Lab
Introduction to Soil Dynamics:	✔			✔	✔	✔	✔							
Fundamentals of vibrations	✔			✔	✔	✔	✔							
Soil dynamic properties	✔			✔	✔	✔	✔			✔				
Soil liquefaction	✔			✔	✔	✔	✔							
Propagation of waves	✔			✔	✔	✔	✔							
Analysis of seismic response	✔			✔	✔	✔	✔			✔				
Soil –structure dynamic interaction	✔			✔	✔	✔	✔							

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 C13	a1 a1 b1 c1
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	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	Das, B., M. (2017), "Principles of Foundation Engineering ", CENGAGE Learning,
5	Gulhati, S.K. and Datta, M. (2015), “Geotechnical Engineering “, Tata McGraw-Hill, New Delhi.
6	Essential books (textbooks): Egyptian Code of Practice for Soil Mechanics and Foundations (2002)

9- Facilities required for teaching and learning:

	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 Soil Dynamics:	7,8,10	C3 C4 C12 C13	a1 a1 b1 c1
2	Fundamentals of vibrations	7,10	C3 C4 C12	a1 a1 b1
3	Soil dynamic properties	7,10	C3 C4 C12	a1 a1 b1
4	Soil liquefaction	7,10	C3 C4 C12	a1 a1 b1
5	Propagation of waves	7,10	C3 C4 C12	a1 a1 b1
6	Analysis of seismic response	7,10	C3 C4 C12	a1 a1 b1
7	Soil –structure dynamic interaction	7,10	C3 C4	a1 a1

			C12	b1

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 4
Authorization Date of Course Specification	-

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.
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- Learning Outcomes (LO'S):

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	**a1:** Learn the general principles of seismic design.

aspects as appropriate 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 environmental concerns for seismic behavior.
C12: 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 structures under earthquake excitation.
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, assess environmental impacts and restoring force characteristics of projects under earthquake excitation.

4- Course Contents:

No.	Topics	Lectures	Lab.	Exercise	Contact	Student's load
1	Introduction to Earthquake Engineering	2	-	2	4	4
2	Properties of earth motion – Tectonic Plates –	4	-	4	8	8
3	Seismic waves – Faults – Magnitude scale Intensity scale Tectonic Plates – Seismic waves – Faults – Magnitude scale Intensity scale	4	-	4	8	8
4	Measuring earthquake	4	-	4	8	8
5	Earthquake risks	4	-	4	8	8
6	seismic maps	4	-	4	8	8
7	International codes provisions for seismic design of structures included Egyptian code of practice	6	-	6	12	12

	for Soil Mechanics and Foundation Design.					
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	Brainstorming	Projects	Site visits	Self-learning and Research	Cooperative	Discovering	Modeling
Introduction to Earthquake Engineering	✔	✔	✔		✔	✔							
Properties of earth motion – Tectonic Plates –	✔	✔			✔	✔	✔						
Seismic waves – Faults – Magnitude scale Intensity scale Tectonic Plates – Seismic waves – Faults – Magnitude scale Intensity scale	✔	✔			✔	✔				✔			
Measuring earthquake	✔	✔	✔		✔	✔							
Earthquake risks	✔	✔			✔	✔							

seismic maps	✔	✔	✔		✔	✔				✔			
International codes provisions for seismic design of structures included Egyptian code of practice for Soil Mechanics and Foundation Design.	✔	✔			✔	✔							

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 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	$3^{rd}, 7^{th}, 10^{th}$
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	**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
1	Introduction to Earthquake Engineering	7,8	C3	a1
2	Properties of earth motion – Tectonic Plates –	8,10	C4	a1

3	Seismic waves – Faults – Magnitude scale Intensity scale Tectonic Plates – Seismic waves – Faults – Magnitude scale Intensity scale	8,10	C12 C13	b1 c1
4	Measuring earthquake	8,10	C12	b1
5	Earthquake risks	10	C12	b1
6	seismic maps	10	C12	b1
7	International codes provisions for seismic design of structures included Egyptian code of practice for Soil Mechanics and Foundation Design.	10	C13	c1

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