Level 0

Course Specification

1. Basic Information:

Program Title	Construction Engineering and Management			
Department Offering the course	**Basic Engineering Sciences Department**			
Date of Specification Approval	**2/1/2024**			
Course Title	Analytical geometry & Linear Algebra	**Code**	FRB001	
Type	**Compulsory** ☒	**Elective** ☐		
Semester	Fall Semester (Level 0-1)			
Teaching Hours	**Lec.**	**Tut.**	**Lab.**	**Credit hours**
	2	**2**	**0**	**3**

2. Professional Information:

2.1. Course description:

Pr.Req.: Non

Analytical geometry: Functions (Lines, Circles, Parabolas, Piecewise-Functions, Power Functions, Polynomials, Rational Functions, Algebraic Functions, Trigonometric Functions, Hyperbolic Functions, Exponential Functions and Logarithmic Functions) and their properties, their graphs and their inverses. Limits and continuity. Differentiation rules of real functions of one variable. Applications of derivatives (maxima, minima and inflection points, curve tracing, optimization problems). Taylor's and Maclaurin's series of functions of one variable.

Linear Algebra: Matrices and their properties, types, ranks and their inverses (Adjoint of matrix, Eigen equation and Gauss elimination). Existence and uniqueness of solutions. Solving system of linear equations by Matrices (Gauss elimination, Gauss – Jordan elimination, LU factorization). Eigenvalues and eigenvectors. Complex numbers. Elements of mathematical logic with applications.

2.2. Course Objectives (CO):

Program objective		Course objective	
PO1	Apply a wide spectrum of engineering knowledge, science, and specialized skills with analytic, critical, and systemic thinking to identify and solve engineering problems in real-life situations.	**CO1**	Apply and identify some functions, their properties, and applications which arising from engineering problems in real-life situations.
		CO2	Apply wide sets of mathematical methods to

			identify and solve any system of linear equations by matrices which arising from engineering problems in real-life situations.

2.3. Course Learning Outcomes (CLO's):

Student Competences	Program Learning Outcomes		Course Learning Outcomes	
A1	PLO1	Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.	CLO1	Identify functions, their properties, graphs, inverses, limits, continuity, differentiation, and applications of derivatives.
			CLO2	Apply Taylor's and Maclaurin's series of functions of one variable.
A2	PLO2	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.	CLO3	Explain matrices and their properties, types, ranks and their inverses, existence and uniqueness of solutions.
			CLO4	Solve any system of linear equations by matrices, eigenvalues and eigenvectors, complex roots of equations and elements of mathematical logic with applications.

2.4. Course Topics:

Course Topics	Week	Course LO's Covered			
		CLO1	CLO2	CLO3	CLO4
Functions and their properties and their graphs.	1	√			
Inverse function, Limits and continuity.	2	√			
Differentiation rules of real functions of one variable	3	√			
Applications of derivatives (maxima, minima and inflection points)	4	√	√		
Applications of derivatives (curve tracing and optimization problems)	5	√	√		

Taylor's and Maclaurin's series of functions of one variable.	6		√		
First Exam	**7**	√	√		
Matrices, their properties and types.	8			√	
Rank of matrices and their inverses (Adjoint of matrix, Eigen equation)	9			√	
Inverse matrix (Gauss elimination). Existence and uniqueness of solutions	10			√	
Solving system of linear equations by Matrices (Gauss elimination, Gauss – Jordan elimination)	11				√
Second Exam	**12**			√	√
Solving system of linear equations by Matrices (LU factorization)	13				√
Eigenvalues and eigenvectors.	14				√
Complex numbers. Elements of mathematical logic with applications.	15				√
Final Exam	**16**	√	√	√	√
Total	**16**	**5**	**3**	**3**	**4**

2.5. Lab Topics:

NA

2.6 Teaching and Learning Methods

Teaching and Learning Methods:	**Course LO's Covered**			
	CLO1	**CLO2**	**CLO3**	**CLO4**
1. Lecture	√	√		
2. Tutorials	√	√		
3. Problem-based Learning		√		
4.Discussion			√	√
Teaching and Learning Methods for Students with Special Needs:				
Methods				
1. Discussion Session				
2. Extra Lectures				
3. Provide different levels of books and materials				

2.7 Assessment Methods

Assessment Methods:		Course LOs Covered			
		CLO1	CLO2	CLO3	CLO4
Formative Assessment Method					
Tests	First Exam	√	√		
	Second Exam			√	√
Assignments		√	√		
Quizzes			√		√
Summative Assessment Method					
Final Exam		√	√	√	√

2.7.1. Assessment Schedule & Grades Distribution

Assessment Method		Week	The weighting of Assessment %
Formative Assessment Method			
Tests	**First exam**	7	30
	Second exam	12	20
Assignments		2, …, 15	5
Quizzes		6, 11, 14	5
Summative Assessment Method			
Final Exam		16	40 %
Total			100 %

2.9. List of Reference:

Course Notes:	https://www.math.hkust.edu.hk/~machas/
Essential Books (Textbooks):	1. Introductory Mathematics for Engineering Applications by Kuldip S. Rattan , Nathan W. Klingbeil , Wiley; 1 edition, 2014. 2. Applied Engineering Analysis, Tai-Ran Hsu, published by John Wiley & Sons, 2018 (ISBN 97811119071204)
Periodicals, Web Sites, … etc:	1. **https://byjus.com/maths/** 2. **https://ncert.nic.in/ebooks.php?ln=**

2.10. Facilities required for Teaching and Learning

Different Facilities
Lecture Hall
White Board
Data Show

3. Matrix:

3.1. Program Objectives VS Course Objectives

Program Objectives	Course Objective	
	CO1	CO2
PO1	√	√

3.2. Course Objectives VS Course Learning Outcomes

Course Objectives	Course Learning Outcomes			
	CLO1	CLO2	CLO3	CLO4
CO1	√	√		
CO2			√	√

1.3. Program Learning Outcomes VS Course Learning Outcomes

Student Competences	Program Learning Outcomes	Course Learning Outcomes			
		CLO1	CLO2	CLO3	CLO4
A1	PLO1	√	√		
A2	PLO2			√	√

3.4. Assessment Alignment Matrix

SC	PLO	PO	CLO	Teaching M.	Assessment M.
A1	PLO1	PO1	CLO1	Lecture Tutorials	First and Final Exam Assignments
			CLO2	Lecture Tutorials Problem-based Learning	First and Final Exam Quizzes Assignments
A2	PLO2		CLO3	Discussion	Second and Final Exam
			CLO4	Discussion	Second and Final Exam Quizzes

Course Coordinator: **Ass. Prof. Doaa Ahmed Abd-Elwahab Hammad**

Head of Department: **Dr. Ahmed Youssef Kamal El-Deen**

Date: 2/1/2024

Course Specification

1. Basic Information:

Program Title	Construction Engineering and Management			
Department Offering the course	Construction Engineering and Management			
Date of Specification Approval	**2/1/2024**			
Course Title	Integration & Multivariable functions	**Code**	**FRB002**	
Type	**Compulsory** ☒	**Elective** ☐		
Semester	**Spring Semester (Level 0-2)**			
Teaching Hours	**Lec.**	**Tut.**	**Lab.**	**Credit hours**
	2	**2**	**0**	**3**

2. Professional Information:

2.1. Course Description:

Pr.Req.: FRB 001

Integration: Techniques of integration (Basic Integration Formulas, Integration by Parts, Integration of Rational Functions by Partial Fractions, Trigonometric Integrals and Substitutions). Applications of indefinite integrals. Applications of definite integrals (areas, volumes of revolution, lengths of curves and surface areas of revolution).
Multivariable functions: Curves and surfaces in three dimensions. Limits, continuity and partial derivatives of functions of several variables. Chain Rule. Directional and total derivatives. Applications (tangent planes and normal lines, Taylor series of functions of two variables, Extreme values and conditional extreme values of functions of two variables).

2.2. Course Objectives (CO):

Program objective		Course objective	
PO1	Apply a wide spectrum of engineering knowledge, science, and specialized skills with analytic, critical, and systemic thinking to identify and solve engineering problems in real-life situations.	**CO1**	Explain elements of mathematical logic, relations, mappings, real functions and their graphs applications of differentiation, and its applications.
PO2	Behave professionally and adhere to engineering ethics and standards and work to develop the profession and the community and promote sustainability principles.	**CO2**	Select a suitable item to evaluate applied engineering problems.

2.3. Course Learning Outcomes (CLO's):

Student Competences	Program Learning Outcomes		Course Learning Outcomes	
A1	PLO1	Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.	CLO1	Identify the basic items of the course.
			CLO2	Explain how to use all items of the course in applied engineering problems
A3	PLO3	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.	CLO3	Solve the suitable solution methods for various mathematics elements
			CLO4	Analyze the different problems and verifications

2.4. Course Topics:

Course Topics	Week	Course LO's Covered			
		CLO1	CLO2	CLO3	CLO4
Indefinite integrals with applications	1,2	√	√		
Methods of integration	3,4		√		√
Definite integrals with applications	5	√			
Areas and volumes of revolution, lengths of curves and surface area	6	√	√		√
First exam	7	√	√		√
Surfaces and curves in three dimensions	9	√		√	√
Vector functions of one variable	10	√		√	√
Scalar functions of several variables, partial derivatives	11		√	√	
Second exam	12	√		√	√
Directional derivatives, total derivatives	13		√	√	
Tangent planes and normal lines	14		√	√	
Taylor expansions, maxima and minima, Lagrange's multipliers	15	√			√
Final exam	16	√		√	
Total					

2.5. Lab Topics:

Not applicable.

2.6 Teaching and Learning Methods

Teaching and Learning Methods:	Course LO's Covered			
	CLO1	CLO2	CLO3	CLO4
1. Lecture	√	√	√	
2. Tutorials			√	√
3. Problem-based Learning	√	√		√
Teaching and Learning Methods for Students with Special Needs:				
Methods				
1. Discussion Session				
2. Extra Lectures				
3. Provide different levels of books and materials				

2.7 Assessment Methods

Assessment Methods:		Course LOs Covered			
		CLO1	CLO2	CLO3	CLO4
Formative Assessment Method					
Tests	**First Exam**	√	√		√
	Second Exam	√		√	√
	Quizzes		√	√	√
Discussion			√		√
Summative Assessment Method					
Final Exam		√		√	

2.7.1. Assessment Schedule & Grades Distribution

Assessment Method		Week	The weighting of Assessment %
Formative Assessment Method			
Tests	First exam	7	30 %
	Second exam	12	20 %
	Quizzes	3,5,8	6%
Discussion		6,10	4%
Summative Assessment Method			
Final Exam		16	40 %
Total			100 %

2.8. List of Reference:

Essential Books (Textbooks):	Howard Anton, "Calculus with analytical geometry", John Wiley & Sons, Last Edition. George B. Thomas, Jr., Maurice D. Weir, Joel Hass, THOMAS' CALCULUS Multivariable (Twelfth Edition), 2010.
Periodicals, Web Sites, … etc:	1. **https://byjus.com** 2. **https://ncert.nic.in**

2.9. Facilities required for Teaching and Learning

Different Facilities
Lecture Hall
Data Show
White Board

3. Matrix:

3.1. Program Objectives VS Course Objectives

Program Objectives	Course Objective	
	CO 1	**CO2**
PO1	√	
PO2		√

3.2. Course Objectives VS Course Learning Outcomes

Course Objectives	Course Learning Outcomes			
	CLO1	CLO2	CLO3	CLO4
CO1	√	√		
CO2			√	√

3.3. Program Learning Outcomes VS Course Learning Outcomes

Student Competences	Program Learning Outcomes	Course Learning Outcomes			
		CLO1	CLO2	CLO3	CLO4
A1	**PLO1**	√	√		
A3	PLO3			√	√

3.4. Assessment Alignment Matrix

SC	PLO	PO	CLO	Teaching M.	Assessment M.
A1	PLO1	PO1	CLO1	Lecture Problem-based Learning	First , Second and Final Exam
			CLO2	Lecture Problem-based Learning	First , and Final Exam Discussion Quizzes
A3	PLO3	PO2	CLO 3	Lecture Tutorials	Second and Final Exam Quizzes
			CLO4	Tutorials Problem-based Learning	First , Second and Final Exam Quizzes Discussion

Course Coordinator: **Ass. Prof. Doaa Ahmed Abd-Elwahab Hammad**

Head of Department: **Dr. Ahmed Youssef Kamal El-Deen**

Date: 2/1/2024

Course Specification

1. Basic Information:

Program Title	**Construction Engineering and Management Program**			
Program Offering the course	**Construction Engineering and Management Program**			
Date of Specification Approval	**2/1/2024**			
Course Title	Statics		**Code**	FRB003
Type	**Compulsory** ☒		**Elective** ☐	
Semester	**Fall Semester** (Level 0-1)			
Teaching Hours	**Lec.**	**Tut.**	**Lab.**	**Credit hours**
	2	**2**	**0**	**3**

2. Professional Information:

2.1. Course Description:

Pr.Req.: Non

Vector algebra and applications to mechanics, Statics of particles in three dimensions, Moment of a forces about a point and a line and moment of couples, Equivalent systems of forces, Equilibrium of rigid bodies, Centroids and centers of gravity, Analysis of structures, Friction and its application, Moment of inertia of Areas and masses.

2.2. Course Objectives (CO):

Program objective		**Course objective**	
PO1	Apply a wide spectrum of engineering knowledge, science, and specialized skills with analytic, critical, and systemic thinking to identify and solve engineering problems in real life situation.	**CO1**	Analyze the mathematics equilibrium conditions of rest for rigid bodies under the action of various loads.
		CO2	Evaluate the principles of statics as a science for solving the practical problems of engineering applications.

2.3. Course Learning Outcomes (CLO's):

Student Competences	**Program Learning Outcomes**		**Course Learning Outcomes**	
A1	**PLO1**	Identify, formulate, and solve complex engineering problems by applying engineering fundamentals,	**CLO1**	predict the statically equilibrium conditions of a particle under the action of forces

		basic science, and mathematics	**CLO2**	Apply the statically equilibrium conditions of a rigid body under the action of various loads.
A2	**PLO2**	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.	**CLO3**	Analyze the forces acting on the members of structures composed of pin-connected members.
			CLO4	Determine the location of the centroid and the moment of inertia for a body of a regular or irregular shape.

2.4 Course Topics:

Course Topics	Week	Course LO's Covered			
		CLO1	CLO2	CLO3	CLO4
Vector algebra and applications to mechanics	1	√			
Analysis of Structures: Trusses (method of joints)	2,3			√	
Analysis of Structures: Trusses (method of sections)	4			√	
Statics of particles in three dimensions	5,6	√			
First Exam	**7**	√		√	
Moment of a forces about a point and a line and moment of couples	8,9		√		
Equivalent systems of forces	10		√		
Equilibrium of Rigid bodies	11		√		
Second Exam	**12**		√		
Centroids and centers of gravity	13				√
Moment of inertia of Areas and masses	14				√
Friction and its application	15	√			
Final Exam	**16**	√	√	√	√
Total	**16**	**4**	**4**	**3**	**2**

2.5. Lab Topics:

NA

2.6 Teaching and Learning Methods

Teaching and Learning Methods:	Course LO's Covered			
	CLO1	CLO2	CLO3	CLO4
1. Lecture	√			
2. Tutorials		√		
3. Discussion			√	√
Teaching and Learning Methods for Students with Special Needs:				
Methods				
Discussion Session				

2.7. Assessment Methods

Assessment Methods		Course LOs Covered			
		CLO1	CLO2	CLO3	CLO4
Formative Assessment Method					
Tests	First Exam	√		√	
	Second Exam		√		
	Quizzes	√			
Assignments		√	√	√	√
Summative Assessment Method					
Final Exam		√	√	√	√

2.7.1. Assessment Schedule & Grades Distribution

Assessment Methods		Week	Weighting of Asses.
Formative Assessment Method			
Tests	First Exam	7^{th}	30%
	Second Exam	12^{th}	20%
	Quizzes	10^{th}, 15^{th},	5%
Assignments		8^{th}, 11^{th}, 14^{th},	5%
Summative Assessment Method			
Final exam		16^{th}	40%
Total			**100%**

2.8. List of Reference:

Course Notes:	Lecture notes (PDF)
Essential Books (Textbooks):	Vector Mechanics for Engineers: Statics, 12th Edition Ferdinand P. Beer, E. Russell Johnston, 2019
Recommended Books:	Engineering Mechanics, Statics, 14th Edition- Hibbeler, 2019

2.9. Facilities required for Teaching and Learning

Different Facilities
Lecture Hall
Data Show
White Board

3. Matrix:

3.1. Program Objectives VS Course Objectives

Program Objectives	Course Objective	
	CO1	CO2
PO1	√	√

3.2. Course Objectives VS Course Learning Outcomes

Course Objectives	Course Learning Outcomes			
	CLO1	CLO2	CLO3	CLO4
CO1	√	√		
CO2			√	√

3.3. Program Learning Outcomes VS Course Learning Outcomes

Student Competences	Program Learning Outcomes	Course Learning Outcomes			
		CLO1	CLO2	CLO3	CLO4
A1	PLO1	√	√		
A2	PLO2			√	√

3.4. Assessment Alignment Matrix

Student Competences	PLO	PO	CLO	Teaching M.	Assessment M.
A1	PLO1	PO1	CLO1	• Lectures	• First Exam • Assignments • Quizzes
			CLO2	• Tutorials	• Second and Final Exam • Assignments
A2	PLO2		CLO3	• Discussion	• First and Final Exam • Assignments
			CLO4	• Discussion	• Final Exam • Assignments

Course Coordinator: Dr. Ehab Magdy

Program Coordinator: Dr. Ahmed Youssef

Date: 2/1 /2024

Course Specification

1. Basic Information:

Program Title	**Construction Engineering and Management Program**			
Program Offering the course	**Construction Engineering and Management Program**			
Date of Specification Approval	**2/1/2024**			
Course Title	Dynamics		**Code**	FRB004
Type	**Compulsory** ☒		**Elective** ☐	
Semester	**Spring Semester** (Level 0-2)			
Teaching Hours	**Lec.**	**Tut.**	**Lab.**	**Credit hours**
	2	**2**	**0**	**3**

2. Professional Information:

2.1. Course Description:

Pr.Req.: FRB 003

Kinematics of particles (rectilinear and curvilinear motion), Kinetics of particles (Newton's second law – principle of work and energy – principle of impulse and momentum - impact), Kinematics of rigid bodies (translation, rotation about a fixed axis and general plane motion), Kinetics of rigid bodies (force and acceleration method).

2.2. Course Objectives (CO):

Program objective		**Course objective**	
PO1	Apply a wide spectrum of engineering knowledge, science, and specialized skills with analytic, critical, and systemic thinking to identify and solve engineering problems in real life situation.	**CO1**	Analyze the mathematics equilibrium conditions of motion for rigid bodies under the action of various loads.
		CO2	Evaluate the principals of dynamics as a science for solving the practical problems of engineering applications.

2.3. Course Learning Outcomes (CLO's):

Student Competences	Program Learning Outcomes	Course Learning Outcomes		
A1	PLO1	Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science, and mathematics	CLO1	Describe the particle motion along different trajectory using different coordinate systems.
			CLO2	Apply the equilibrium conditions of motion for a particle using Newton's second law, the principle of conservation of energy and the principle of conservation of linear momentum.
A2	PLO2	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.	CLO3	Analyze the various types of a rigid-body planar motion.
			CLO4	Apply the equilibrium conditions of motion for a rigid body using Newton's second law.

2.4 Course Topics:

Course Topics	Week	Course LO's Covered			
		CLO1	CLO2	CLO3	CLO4
Kinematics of particles (Rectilinear motion)	1, 2	√			
Kinematics of particles (curvilinear motion)	3, 4	√			
Kinetics of particles (force and acceleration method)	5, 6		√		
First Exam	7	√	√		
Kinetics of particles (work and energy method)	8, 9		√		
Kinetics of particles (impulse and momentum method)	10		√		
Kinetics of particles (impact)	11		√		
Second Exam	12		√		

Kinematics of Rigid bodies:(Translation, Rotation, and General plane motion)	13, 14			√	√
Kinetics of Rigid bodies (Force and acceleration method)	15			√	√
Final Exam	16	√	√	√	√
Total	**16**	**4**	**6**	**3**	**3**

2.5. Lab Topics:

NA

2.6 Teaching and Learning Methods

Teaching and Learning Methods:	**Course LO's Covered**			
	CLO1	**CLO2**	**CLO3**	**CLO4**
1. Lecture	√	√		
2. Tutorials	√	√		
3. Discussion			√	√
Teaching and Learning Methods for Students with Special Needs:				
Methods				
Discussion Session				

2.7. Assessment Methods

Assessment Methods		**Course LOs Covered**			
		CLO1	**CLO2**	**CLO3**	**CLO4**
Formative Assessment Method					
Tests	First Exam	√	√		
	Second Exam			√	√
	Quizzes	√	√	√	√
Assignments		√	√		
Summative Assessment Method					
Final Exam		√	√	√	√

2.7.1. Assessment Schedule & Grades Distribution

Assessment Methods		**Week**	**Weighting of Asses.**
Formative Assessment Method			
Tests	First Exam	7^{th}	30%
	Second Exam	12^{th}	20%
	Quizzes	10^{th}, 14^{th},	5 %
Assignments		6^{th}, 11^{th}, 15^{th}	5 %
Summative Assessment Method			
Final exam		16^{th}	40%
Total			**100%**

2.8. List of Reference:

Course Notes:	Lecture notes (PDF)
Essential Books (Textbooks):	Vector Mechanics for Engineers: Dynamics, 12th Edition Ferdinand P. Beer, E. Russell Johnston, 2019
Recommended Books:	Engineering Mechanics, Dynamics, 14th Edition- Hibbeler, 2018

2.9. Facilities required for Teaching and Learning

Different Facilities
Lecture Hall
Data Show
White Board

3. Matrix:

3.1. Program Objectives VS Course Objectives

Program Objectives	Course Objective	
	CO1	CO2.
PO1	√	√

3.2. Course Objectives VS Course Learning Outcomes

Course Objectives	Course Learning Outcomes			
	CLO1	CLO2	CLO3	CLO4
CO1	√	√		
CO2			√	√

3.3. Program Learning Outcomes VS Course Learning Outcomes

Student Competences	Program Learning Outcomes	Course Learning Outcomes			
		CLO1	CLO2	CLO3	CLO4
A1	PLO1	√	√		
A2	PLO2			√	√

3.4. Assessment Alignment Matrix

Student Competences	PLO	PO	CLO	Teaching M.	Assessment M.
A1	PLO1	PO1	CLO1	Lectures Tutorials	First, and Final Exam Assignments Quizzes
			CLO2	Lectures Tutorials	First, and Final Exam Assignments Quizzes
A2	PLO2		CLO3	Discussion	Second , and Final Exam Quizzes
			CLO4	Discussion	Second , and Final Exam Quizzes

Course Coordinator: Dr. Ehab Magdy

Program Coordinator: Dr. Ahmed Youssef

Date: 2/1/2024

Course Specification

1. Basic Information:

Program Title	Construction Engineering and Management			
Department Offering the course	Construction Engineering and Management			
Date of Specification Approval	**2/1/2024**			
Course Title	Waves and Heat		**Code**	FRB 005
Type	**Compulsory** ☒		**Elective** ☐	
Semester	Fall Semester (Level 0-1)			
Teaching Hours	**Lec.**	**Tut.**	**Lab.**	**Credit hours**
	2	**1**	**2**	**3**

2. Professional Information:

2.1. Course description

Pr.Req.: Non

Simple harmonic motion, Wave motion, Sound waves, Superposition of waves, Interference of light waves, Diffraction of light, First law of thermodynamics, Kinetic theory of gases, specific heats of gases, thermodynamic processes: isochoric, isobaric, isothermal, and adiabatic, Heat transfer: conduction, convection and radiation, Elasticity, Hooke's law, Hydrostatics and surface tension, Hydrodynamics and Viscosity.

2.2. Course Objectives (CO):

Program objective		Course objective	
PO 1	Apply a wide spectrum of engineering knowledge, science, and specialized skills with analytic, critical, and systemic thinking to identify and solve engineering problems in real-life situations.	**CO 1**	**Apply** wide sets of surveying knowledge in engineering physics to identify and solve engineering problems with innovative solutions. And perform simple lab experiments on different concepts of physics and extract information from the collected data.

2.3. Course Learning Outcomes (CLO's):

Student Competences	Program Learning Outcomes		Course Learning Outcomes	
A1	**PLO 1**	Identify, formulate, analyze, and solve complex engineering problems by applying	**CLO1**	**Explain** the concept of waves, their types and mathematical description, some of their physical phenomena with a few simple applications on

		principles of engineering, science, and mathematics.		mechanical waves and superposition of waves.
			CLO2	**Discuss** Young's interference of light, Thin Film, Single Slit Diffraction and Diffraction Grating.
			CLO3	**Explain** the meaning and concept of thermodynamics, its main and principle physical quantities, thermodynamic processes, first law of thermodynamics, ideal gas and its properties, and heat transfer.
			CLO4	**Discuss** some of the basic topics on the properties of matter explaining stress and strain and Hooke's law in elasticity and equation of continuity, Bernoulli's equation and its applications, viscosity, and surface tension in fluid mechanics.
A2	**PLO 2**	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.	**CLO5**	Practically **examine** different physical concepts using basic instruments in the lab.

2.4. Course Topics:

Course Topics	Week	Course LO's Covered				
		CLO1	CLO2	CLO3	CLO4	CLO5
Wave motion	1, 2	√				
Sound waves	3	√				
Superposition of waves	4	√				
Interference of light	5		√			
Diffraction of light	6		√			
First exam	7	√	√			
Heat and 1st law of thermodynamics	8			√		
Ideal gas and its properties	9, 10			√		
Heat transfer	11			√		
Practical/Oral Exam	12					√
Properties of matter	13- 15				√	
Final Exam	16	√	√	√	√	
Total	**16**	**4**	**2**	**4**	**3**	

2.5. Lab Topics:

Lab Topics	Week	Course LO's Covered				
		CLO1	CLO2	CLO3	CLO4	CLO5
Hooke's Law	2					√
Surface Tension	3					√
Viscosity	4					√
Malus' Law	5					√
Specific Heat	6					√
Resonance in Air column	8					√
Single Slit Diffraction	9					√
Diffraction Grating	10					√
Oral & Experimental Test	12					√
Total						8

2.6 Teaching and Learning Methods

Teaching and Learning Methods:	Course LO's Covered				
	CLO1	CLO2	CLO3	CLO4	CLO5
1. Lectures	√	√	√	√	
2. Practical-based Learning					√
3. Tutorials	√	√	√	√	
Teaching and Learning Methods for Students with Special Needs:					
Methods					
1. Extra Lectures					
2. Provide different levels of books and materials					

2.7 Assessment Methods

Assessment Methods:		Course LOs Covered				
		CLO1	CLO2	CLO3	CLO4	CLO5
Formative Assessment Method						
Tests	**First Exam**	√	√			
	Oral Test					√
	Experimental Test					√
Assignment		√	√	√	√	
Summative Assessment Method						
Final Exam		√	√	√	√	

2.7.1. Assessment Schedule & Grades Distribution

Assessment Method		Week	The weighting of Assessment %
Formative Assessment Method			
Tests	First exam	7	30
	Oral	12	20
	Experimental		
Assignment		2-14	10
Summative Assessment Method			
Final Exam		16	40 %
Total			100 %

2.9. List of Reference:

Essential Books (Textbooks):	• Tarek M. Abdolkader, Mohamed Elfaham, Mina Asham, Ibrahim Maged, Walid Selmy, "Engineering Physics, Part I, Waves, Heat and Optics", 1st edition, 2022.
Recommended Books:	• R. A. Serway and J. W. Jewett, Physics for scientists and engineers: Cengage learning, 2018. • D. Halliday, et al., Fundamentals of physics: John Wiley & Sons, 2013. • D. Giancoli, Physics for Scientists & Engineers with Modern Physics, 4th Edition ed. Pearson, 2008.

2.10. Facilities required for Teaching and Learning

Different Facilities	
Lecture Hall	√
Data Show	√
White Board	√
Laboratory	√

3. Matrix:

3.1. Program Objectives VS Course Objectives

Program Objectives	Course Objective
	CO1
PO 1	√

3.2. Course Objectives VS Course Learning Outcomes

Course Objectives	Course Learning Outcomes				
	CLO1	**CLO2**	**CLO3**	**CLO4**	**CLO5**
CO1	√	√	√	√	√

3.3. Program Learning Outcomes VS Course Learning Outcomes

Student Competences	Program Learning Outcomes	Course Learning Outcomes				
		CLO1	CLO2	CLO3	CLO4	CLO5
A1	**PLO1**	√	√	√	√	
A2	**PLO2**					√

3.4. Assessment Alignment Matrix

SC	PLO	PO	CLO	Teaching M.	Assessment M.
A1	**PLO1**	**PO1**	**CLO1**	• Lecture • Tutorial	First and Final exams Assignment
			CLO2	• Lecture • Tutorial	First and Final exams Assignment
			CLO3	• Lecture • Tutorial	Final exams Assignment
			CLO4	• Lecture • Tutorial	Final exams Assignment
A2	**PLO2**		**CLO5**	• Practical-based Learning	Experimental Oral Test

Course Coordinator: **Dr. Ibrahim Sayed Ahmed Ibrahim Maged**

Head of Department: **Dr. Ahmed Youssef Kamal El-Deen**

Date: 2/1/2024

Course Specification

1. Basic Information:

Program Title	Construction Engineering and Management			
Department Offering the course	Construction Engineering and Management			
Date of Specification Approval	**2/1/2024**			
Course Title	Electricity and Magnetism		**Code**	FRB 006
Type	**Compulsory** ☒		**Elective** ☐	
Semester	Fall Semester (Level 0)			
Teaching Hours	**Lec.**	**Tut.**	**Lab.**	**Credit hours**
	2	**1**	**2**	**3**

2. Professional Information:

2.1. Course description

Pr.Req.: Non

Electric field, Gauss law and applications, Electric potential, Capacitors and dielectrics, Current and resistance, Magnetic field and magnetic force, Sources of magnetic field, Ampere's law, Faraday's law, Self-induction and magnetic energy.

2.2. Course Objectives (CO):

Program objective		Course objective	
PO 1	Apply a wide spectrum of engineering knowledge, science, and specialized skills with analytic, critical, and systemic thinking to identify and solve engineering problems in real-life situations.	**CO 1**	**Apply** wide sets of surveying knowledge in engineering physics to identify and solve engineering problems with innovative solutions. And perform simple lab experiments on different concepts of physics and extract information from the collected data.

2.3. Course Learning Outcomes (CLO's):

Student Competences	Program Learning Outcomes		Course Learning Outcomes	
A1	**PLO 1**	Identify, formulate, analyze, and solve complex engineering	**CLO1**	**Study** the electric force, electric field, and Gauss's law in electricity with some of its applications

		problems by applying principles of engineering, science, and mathematics.	**CLO2**	**Discuss** the electric potential, capacitors and electric current and resistance.
			CLO3	**Explain** the magnetic field and magnetic force, and Ampere's law and its applications (sources of magnetic field).
			CLO4	**Study** Faraday's law, self-induction and magnetic energy.
A2	**PLO 2**	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.	**CLO5**	Practically **examine** different physical concepts using basic instruments in the lab.

2.4. Course Topics:

Course Topics	Week	Course LO's Covered				
		CLO1	CLO2	CLO3	CLO4	CLO5
Electric field	1, 2	√				
Gauss's law	3	√				
Electric potential	4		√			
Capacitance	5, 6		√			
First Exam	7	√	√			
Electrical current and resistance	8, 9		√			
Magnetic field	10			√		
Sources of magnetic field	11			√		
Experimental/Oral Exam	**12**					√
Faraday's law	13				√	
Induction	14,15				√	
Final Exam	16	√	√	√	√	
Total	16	4	5	3	3	

2.5. Lab Topics:

Lab Topics	Week	Course LO's Covered				
		CLO1	CLO2	CLO3	CLO4	CLO5
Resistors Combinations and Ohm's Law	2					√
Kirchhoff's Laws	3					√
Wheatstone bridge & Metric bridge	5					√

Electric Field Mapping	6					√
Capacitor Charging	8					√
Capacitor Discharging	9					√
Electric Transformer	11					√
Faraday's Law	12					√
Experimental/Oral Exam	12					√
Total						9

2.6 Teaching and Learning Methods

Teaching and Learning Methods:	**Course LO's Covered**				
	CLO1	**CLO2**	**CLO3**	**CLO4**	**CLO5**
1. Lectures	√	√	√	√	
2. Practical-based Learning					√
3. Tutorials	√	√	√	√	
Teaching and Learning Methods for Students with Special Needs:					
Methods					
1. Extra Lectures					
2. Provide different levels of books and materials					

2.7 Assessment Methods

Assessment Methods:		**Course LOs Covered**				
		CLO1	**CLO2**	**CLO3**	**CLO4**	**CLO5**
Formative Assessment Method						
Tests	First Exam	√	√			
	Oral					√
	Experimental					√
Assignments		√	√	√	√	
Summative Assessment Method						
Final Exam		√	√	√	√	

2.7.1. Assessment Schedule & Grades Distribution

Assessment Method		**Week**	**The weighting of Assessment %**
	Formative Assessment Method		
Tests	First exam	7	30
	Oral	12	10
	Experimental	12	10
Assignment		2-14	10
	Summative Assessment Method		
Final Exam		16	40 %
Total			100 %

2.8. List of Reference:

Essential Books (Textbooks):	• Tarek M. Abdolkader, Mohamed Elfaham, Mina Asham, Ibrahim Maged, Walid Selmy, "Engineering Physics, Part II, Electricity and Magnetism", 1st edition, 2022.
Recommended Books:	• R. A. Serway and J. W. Jewett, Physics for scientists and engineers: Cengage learning, 2018. • D. Halliday, et al., Fundamentals of physics: John Wiley & Sons, 2013. • D. Giancoli, Physics for Scientists & Engineers with Modern Physics, 4th Edition ed. Pearson, 2008.

2.9. Facilities required for Teaching and Learning

Different Facilities	
Lecture Hall	√
Data Show	√
White Board	√
Laboratory	√

3. Matrix:

3.1. Program Objectives VS Course Objectives

Program Objectives	**Course Objective**
	CO1
PO 1	√

3.2. Course Objectives VS Course Learning Outcomes

Course Objectives	**Course Learning Outcomes**				
	CLO1	**CLO2**	**CLO3**	**CLO4**	**CLO5**
CO1	√	√	√	√	√

3.3. Program Learning Outcomes VS Course Learning Outcomes

Student Competences	**Program Learning Outcomes**	**Course Learning Outcomes**				
		CLO1	**CLO2**	**CLO3**	**CLO4**	**CLO5**
A1	**PLO1**	√	√	√	√	
A2	**PLO2**					√

3.4. Assessment Alignment Matrix

SC	PLO	PO	CLO	Teaching M.	Assessment M.
A1	PLO1	PO1	CLO1	Lecture Tutorial	First and Final exams Assignments
			CLO2	Lecture Tutorial	First and Final exams Assignments
			CLO3	Lecture Tutorial	Final exams Assignments
			CLO4	Lecture Tutorial	Final exams Assignments
A2	PLO2		CLO5	Practical-based Learning	Experimental / Oral Test

Course Coordinator: **Dr. Ibrahim Sayed Ahmed Ibrahim Maged**

Head of Department: **Dr. Ahmed Youssef Kamal El-Deen**

Date: 2/1/2024

Course Specification

1. Basic Information:

Department Offering the program	Construction Engineering and Management				
Department Offering the course	Construction Engineering and Management				
Date of Specification Approval	**2/1/2024**				
Course Title	Chemistry for Engineers			**Code**	FRB 007
Type	**Compulsory** ☒		**Elective** ☐		
Semester	**Fall Semester (Level 0-1)**				
Teaching Hours	**Lec.**	**Tut.**	**Lab.**	**Credit hours**	
	3	2	1	**4**	

2. Professional Information:

2.1. Course description:

Pr.Req.: Non

Gases: ideal & real gas laws, kinetic molecular theory - Liquids and solutions - Solids: arrangement of atoms, metallic solids, alloys - Chemical kinetics: reaction rates & order, catalysis – Electrochemistry: electrochemical cells, corrosion– Cements – Polymers – lubricants.

2.2. Course Objectives (CO):

Program objective		Course objective	
PO1	Apply a wide spectrum of engineering knowledge, science, and specialized skills with analytic, critical, and systemic thinking to identify and solve engineering problems in real-life situations.	**CO1**	Demonstrate knowledge of laboratory safety and to generalize the analytical and quantitative skills gained and apply them in more advanced courses.
		CO2	Recognize the basic fundamentals in engineering chemistry to provide a broad foundation in chemistry that stresses on the concepts of reaction kinetics, redox reaction and understanding polymers, cements, and lubricants,
		CO3	Classify matter and explain the qualitative and quantitative relationships between state of matter and energy involved in chemical or physical processes.

2.3. Course Learning Outcomes (CLO's):

Student Competences	Program Learning Outcomes		Course Learning Outcomes	
A1	PLO1	Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics	CLO1	Explain gas laws and differentiate between ideal and real gas behavior.
			CLO2	Recognize the intermolecular forces and solutions colligative properties. Familiarizing with basic principal of lubrication and selection of lubricant.
			CLO3	Describe bonding that can be applied to affect the properties of solids. Identify properties of polymers and their characteristics. Specify requirements of clinker, and chemical admixtures used in concrete technology
			CLO4	Identify reaction order to determine rate law. Recognize different factors affecting on it.
A2	PLO2	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.	CLO5	Recognize redox reactions and different types of electrochemical cells. Make stoichiometric calculations for electrolytic processes Recognize corrosion and basic principles to control.
			CLO6	Perform laboratory experiments correctly using appropriate techniques and safety procedures and communicate the results of their experiments via written laboratory reports

2.4. Course Topics:

Course Topics	Week	Course LO's Covered					
		CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
Gas laws & molecular theory, Deviation from ideal gas to real behavior	1-2	√					
Intermolecular forces& properties of liquids, phase diagrams, Solution process, Colligative properties	3-4		√				
Structure and bonding in solids, Types of crystalline solids	5			√			
Reaction rates and the dependence of rate on concentration	6				√		
First Exam	7	√	√	√	√		
Dependence of reaction rate on concentration, Temperature and catalysis	8				√		
Oxidation reduction reactions, types of electrochemical cells. corrosion and basic principles to corrosion control	9- 10					√	
Polymerization reactions, Members of the polymer family	11			√			
Oral & Experimental Test	12					√	√
Lubricants	13		√				
Cement	14			√			
	15						
Final Exam	16	√	√	√	√		
Total	16	2	2	3	2	2	

2.5. Lab Topics:

Lab Topics	Week	Course LO's Covered			
		CLO6	CLO5		
Introduction to lab. safety rules	1	√	√		
Introduction to lab. glassware	2	√	√		
Experiment 1: Volumetric determination of NaOH using a standard HCl	3	√	√		
Experiment 2: Determination of a mixture of carbonate and bicarbonate content of a soda ash sample	4	√	√		
Experiment 3: Determination of	5	√	√		

chloride ion concentration					
Experiment 4: Indirect determination of A mixture of halides.	**6**	√	√		
Experiment 5: Determination of ferrous ions in ferrous sulphate using potassium permanganate solution	**7**	√	√		
Experiment 6: Titration of ferrous sulphate using potassium dichromate solution	**8**	√	√		
Experiment 7: Determination of copper ions in copper sulphate using sodium thiosulphate solution	**9**	√	√		
Experiment 8: Determine the consistency of cement using the Vicat apparatus	**10**	√	√		
Oral & Experimental Test	**12**	√	√		
Total	**10**	**10**	**10**		

2.6 Teaching and Learning Methods

Teaching and Learning Methods:	**Course LO's Covered**					
	CLO1	**CLO2**	**CLO3**	**CLO4**	**CLO5**	**CLO6**
1. Lecture	√	√	√	√		
2. Tutorials	√	√	√	√		
3. Practical-based Learning					√	√
4. Problem-based Learning	√	√	√	√		
5. Interactive learning					√	√
Teaching and Learning Methods for Students with Special Needs:						
Methods						
1. Discussion Session						
2. Extra Lectures	√	√	√	√	√	√
3. Provide different levels of books and materials						

2.7 Assessment Methods

Assessment Methods:		Course LOs Covered					
		CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
Formative Assessment Method							
Tests	**First Exam**	√	√	√	√		
	Oral & Experimental Test					√	√
Observation						√	√
Summative Assessment Method							
Final Exam		√	√	√	√		

2.7.1. Assessment Schedule & Grades Distribution

Assessment Method		Week	The weighting of Assessment %
Formative Assessment Method			
Tests	First exam	7	30 %
	Oral & Experimental Test	12	20 %
Observation		1-11	10%
Summative Assessment Method			
Final Exam		16	40 %
	Total		100 %

2.8. List of Reference:

Course Notes:	Elsayed Fouad, Textbook of Engineering Chemistry, 2023.
Essential Books (Textbooks)	- P. Barnes, J. Bensted, Structure and Performance of Cements, CRC Press, 2nd Edition, 2019. - Jeffrey Gaffney, Nancy Marley, General Chemistry for Engineers (Enhanced Edition), Elsevier; 2018.
Recommended Books	- Brown, Lawrence S. and Holme, Thomas, "Chemistry for Engineering Students, 4th Edition" (2018). Chemistry Books.
Periodicals, Web Sites, … etc:	1.https://lib.dr.iastate.edu/chem_books/1

2.9. Facilities required for Teaching and Learning

Different Facilities	
Lecture Hall	√
Library Usage	√
laboratory Usage	√
Data Show	√
White Board	√

3. Matrix:

3.1. Program Objectives VS Course Objectives

Program Objectives	Course Objective		
	CO1	CO2	CO3
PO1	√	√	√

3.2. Course Objectives VS Course Learning Outcomes

Course Objectives	Course Learning Outcomes					
	CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
CO1					√	√
CO2	√	√	√			
CO3					√	√

3.3. Program Learning Outcomes VS Course Learning Outcomes

Program Learning Outcomes	Course Learning Outcomes					
	CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
PLO1	√	√	√	√		
PLO2					√	√

3.4. Assessment Alignment Matrix

PLO	PO	CLO	Teaching M.	Assessment M.
PLO1	PO1	1	• Lecture • Tutorials • Problem-based Learning	First , and Final Exam Observation
		2	• Lecture • Tutorials • Problem-based Learning	First , and Final Exam Observation
		3	• Lecture • Tutorials • Problem-based Learning	First , and Final Exam Observation
		4	• Lecture • Tutorials • Problem-based Learning	First , and Final Exam Observation
PLO2		5	• Practical-based Learning • Interactive learning	Experimental Test Observation
		6	• Practical -based Learning • Interactive learning	Experimental Test Observation

Course Coordinator: **Prof. Elsayed Fouad**

Program Coordinator: **Dr. Ahmed Youssef Kamal El-Deen**

Date: 2/1/2024

Course Specification

1. Basic Information:

Program Title	Construction Engineering and Management			
Department Offering the course	Construction Engineering and Management			
Date of Specification Approval	**2/1/2024**			
Course Title	Computer Programming		**Code**	FRE012
Type	**Compulsory** ☐		**Elective** ☒	
Semester	Spring Semester (Level 0-2)			
Teaching Hours	**Lec.**	**Tut.**	**Lab.**	**Credit hours**
	0	**2**	**2**	**2**

2. Professional Information:

2.1. Course Description:

Pr.Req. : …….

Introduction to Computer Programming, Basics of C++ language, Problem Solving and Algorithm Design, Pseudo-codes and Flow charts, Arithmetic Operators and Variables, Exploring input and output statements, Control Structure (Selection and iterative), Functions, Primary data structure of Arrays and its multi – dimensional behavior, Concepts of Pointers, Introductory knowledge of Structures.

2.2. Course Objectives (CO):

Program objective		**Course objective**	
PO1	Apply a wide spectrum of engineering knowledge, science, and specialized skills with analytic, critical, and systemic thinking to identify and solve engineering problems in real- life situations.	**CO1**	**Apply** fundamental programming skills and general programming concepts.

2.3. Course Learning Outcomes (CLO's):

Student Competences	**Program Learning Outcomes**		**Course Learning Outcomes**	
A1	**PLO1**	Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.	**CLO1**	**Identify** the digital world, networks, and the developments in computer hardware and software from the first generation to the present.
			CLO2	**Explain the** data representation and work with different number systems.

A3	**PLO3**	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.	**CLO3**	**Use** algorithms, flowcharts, and pseudo code to solve engineering problems.
			CLO4	**Apply** a computer software to solve problems using flowcharts and a specific programming language.

2.4. Course Topics:

Course Topics	Week	Course LO's Covered			
		CLO1	CLO2	CLO3	CLO4
Historical introduction, computer classification, Computer Networks and the Internet, computer and society	1,2	√			
Data representation, and number systems	3	√	√		
Computer components	4,5	√	√		
Present the computer software basics and operating systems.	6	√	√		
First exam	7	√	√		
Algorithms, and flowcharts	8,9			√	√
Introduction to computer programming languages	10			√	√
High-level languages	11			√	√
Experimental Test	12			√	√
High-level languages	13-15			√	√
Final exam	16	√	√	√	√
Total	**16**	**6**	**4**	**7**	**7**

2.5 Lab Topics

Lap Topics	Week	Course LO's Covered			
		CLO1	CLO2	CLO3	CLO4
Introduction to computer programming languages.	8:14			√	√
Experimental Test	12			√	√
Total				**6**	**6**

2.6 Teaching and Learning Methods

Teaching and Learning Methods:	Course LO's Covered			
	CLO1	CLO2	CLO3	CLO4
1. Tutorials	√	√		
2. Project-based Learning			√	√
3. Case Study			√	√
Teaching and Learning Methods for Students with Special Needs:				
Methods				
1. Discussion Session				
2. Extra Lectures				
3. Provide different levels of books and materials				

2.7 Assessment Methods

Assessment Methods:		Course Los Covered			
		CLO1	CLO2	CLO3	CLO4
Formative Assessment Method					
Tests	First Exam	√	√		
	Experimental Test			√	√
	Oral Test			√	√
Assignment		√	√		
Mini-Project				√	√
Summative Assessment Method					
Final Exam		√	√		

2.7.1. Assessment Schedule & Grades Distribution

Assessment Method		Week	The weighting of Assessment %
Formative Assessment Method			
Tests	**First Exam**	7	30%
	Experimental	12	20%
	Oral	15	4%
Assignment		3,6	2%
Mini-Project		15	4%
Summative Assessment Method			
Practical Exam		16	20 %
Final Exam		16	20%
Total			100 %

2.8. List of Reference:

Essential Books (Textbooks):	• Deborah Morley and Charles S. Parker, "Understanding Computers: Today and Tomorrow", Comprehensive Cengage Learning; 16th Edition 2017. • David I. Schneider, "Introduction to Programming Using Python", Pearson Education Limited, 1st Edition 2016.
Recommended Books:	• Joseph Connor, "computer programming for beginners-Learn the Basic of Java, SQL & C++", 4th Edition (17Aug. 2015)

2.9. Facilities required for Teaching and Learning

Different Facilities
Lecture Hall
Data Show
White Board

3. Matrix:

3.1. Program Objectives VS Course Objectives

Program Objectives	Course Objectives
	CO1
PO1	√

3.2. Course Objectives VS Course Learning Outcomes

Course Objectives	Course Learning Outcomes			
	CLO1	CLO2	CLO3	CLO4
CO1	√	√	√	√

3.3. Program Learning Outcomes VS Course Learning Outcomes

S.C	Program Learning Outcomes	Course Learning Outcomes			
		CLO1	CLO2	CLO3	CLO4
A1	PLO1	√	√		
A3	PLO3			√	√

3.4. Assessment Alignment Matrix

S.C	PLO	PO	CLO	Teaching M.	Assessment M.
A1	PLO1	PO1	CLO1	• Tutorials	• First, and Final Exams • Assignment
			CLO2	• Tutorials	• First, and Final Exams • Assignment
A2	PLO2		CLO3	• Project-based Learning • Case Study	• Experimental Test • Oral Test • Mini-Project
			CLO4	• Project-based Learning • Case Study	• Experimental Test • Oral Test • Mini-Project

Course Coordinator: Dr. Hossam Labib Zayed Hossam

Head of Department: Dr. Ahmed Youssef Kamal El-Deen

Date: 2/1/2024

Course Specification

1. Basic Information:

Program Title	Construction Engineering and Management			
Department Offering the course	Construction Engineering and Management			
Date of Specification Approval	**2/1/2024**			
Course Title	**Production Systems Engineering**		**Code**	**FRM008**
Type	**Compulsory ☐**		**Elective ☒**	
Semester	**Spring Semester (Level 0-2)**			
Teaching Hours	**Lec.**	**Tut.**	**Lab.**	**Credit hours**
	1	**0**	**3**	**2**

2. Professional Information:

2.1. Course Description:

Pr.Req.: Non

Introduction, Casting processes: Main steps of sand casting, Pattern design, melting of metals, Metal forming techniques: Forging, Rolling, Extrusion, Drawing, Bending Processes: Temporary and permanent joints, welding techniques, cutting techniques: Principles and elements of cutting processes, Basic cutting, and machining (Turning, Drilling, Milling, etc.,). Production planning and control principles, Fundamentals of quality control.

2.2. Course Objectives (CO):

Program objective		Course objective	
PO3	Work in and lead a heterogeneous team and display leadership qualities, business administration, and entrepreneurial skills	**CO1**	Evaluate the equipment and methods for deformation and cutting processes of material , to help in production engineering skills
PO5	Apply analytical, experimental, design, construction engineering techniques and project management skills with proficiency aided by modern tools	**CO2**	Select the equipment and methods for production of products.

2.3. Course Learning Outcomes (CLO's):

Student Competences	Program Learning Outcomes		Course Learning Outcomes	
A4	PLO4	Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues and risk management principles.	CLO1	Apply knowledge of mathematics, science, and engineering to evaluation of equipment and methods for production of products.
			CLO2	Identify the selection of equipment and methods for production of products.
A6	PLO6	Plan, supervise and monitor implementation of engineering projects, taking into consideration other trades requirements.	CLO3	Apply engineering fundamentals and analyses to the planning, selection, and utilization of production equipment. Through understanding of: The total production process, from inspection of the idea through construction and start up.
			CLO4	elect the most cost-effective manner to produce the intended quality

2.4. Course Topics:

Course Topics	Week	Course LO's Covered			
		CLO1	CLO2	CLO3	CLO4
Introduction, Casting processes	1			√	√
Forging	2			√	√
Rolling,	3			√	√
Extrusion	4			√	√
Drawing	5			√	
Bending Processes	6			√	√
First exam	7			√	√
Temporary and permanent joints	8	√	√		
welding techniques	9			√	√
cutting techniques (traditional methods)	10			√	√
cutting techniques (Non-traditional methods)	11			√	√
Experimental Test	12	√	√	√	√
Production planning and control principles	13	√	√		

Fundamentals of quality control	14,15	√	√		
Final exam	16			√	√
Total	16	**3**	**3**	**9**	**8**

2.5. Lab Topics:

Lab Topics	Week	Course LO's Covered			
		CLO1	CLO2	CLO3	CLO4
Casting processes	1	√	√		
Forging	2	√	√		
Rolling,	3	√	√		
Extrusion	4	√	√		
Drawing	5	√			
Bending Processes	6	√	√		
welding techniques	8				
cutting techniques	9,10				
Quality control lab .	11				
Oral and Experimental Test	12	√	√		
Total	**12**	**6**	**5**		

2.6 Teaching and Learning Methods

Teaching and Learning Methods:	Course LO's Covered			
	CLO1	CLO2	CLO3	CLO4
1. Lecture			√	√
2. Practical-based Learning	√	√		
3. Discussion	√	√	√	√
Teaching and Learning Methods for Students with Special Needs:				
Methods				
1. Discussion Session				
2. Extra Lectures				
3. Provide different levels of books and materials				

2.7 Assessment Methods

Assessment Methods:		Course LOs Covered			
		CLO1	CLO2	CLO3	CLO4
Tests	**First Exam**			√	√
	Experimental Test	√	√		
	Oral Test	√	√		
Reports		√	√		
Discussions				√	√
Summative Assessment Method					
Final Exam				√	√

2-7-1 Assessment Schedule & Grades Distribution

Assessment Method		Week	The weighting of Assessment %
Formative Assessment Method			
Tests	First Exam	7	30%
	Oral and Experimental Test	12	20%
Discussion		2-6,9-11	5 %
Reports		15	5%
Summative Assessment Method			
Final Exam		16	40 %
Total			100 %

2.8. List of Reference:

Essential Books (Textbooks):	1- Jiangshan Li, Semyon M. Meerkov, 2008, "Production Systems Engineering", Springer; 1st ed. 2009 edition, 2008 2- M. P. Groover, 2011, "Principles of Modern Manufacturing", 4th Ed., john Wiley & Sons, Inc.

2.9. Facilities required for Teaching and Learning

Different Facilities
Lecture Hall
Data Show
White Board

3. Matrix:

3.1. Program Objectives VS Course Objectives

Program Objectives	Course Objective	
	CO1	CO2
PO3	√	
PO5		√

3.2. Course Objectives VS Course Learning Outcomes

Course Objectives	Course Learning Outcomes			
	CLO1	CLO2	CLO3	CLO4
CO1			√	√
CO2	√	√		

3.3. Program Learning Outcomes VS Course Learning Outcomes

Course Objectives	Course Learning Outcomes			
	CLO1	CLO2	CLO3	CLO4
PLO5	√	√		
PLO13			√	√

3.4. Assessment Alignment Matrix

PLOs	POs	CLOs	Teaching M.	Assessment M.
PLO5	PO5	CLO1	Practical-based Learning. Discussion.	Oral, and Experimental Test. Report
		CLO2	Practical-based Learning. Discussion.	Oral, and Experimental Test. Report
PLO13	PO3	CLO3	Lectures Discussions	First , and Final exams. Discussions.
		CLO4	Lectures. Discussions	First , and Final exams. Discussions.

Course Coordinator: DR. Ahmed Saied Faheim El-Saaey

Head of Department: Dr. Ahmed Youssef Kamal El-Deen

Date: 2/1/2024

Course Specification

1. Basic Information:

Program Title	**Construction Engineering and Management**			
Department Offering the course	**Construction Engineering and Management**			
Date of Specification Approval	**2/1/2024**			
Course Title	**Engineering Drawing**		**Code**	**FRM 009**
Type	**Compulsory ☒**		**Elective ☐**	
Semester	**Fall Semester (Level 0-1)**			
Teaching Hours	**Lec.**	**Tut.**	**Lab.**	**Credit hours**
	…..	**4**	**…**	**2**

2. Professional Information:

2.1. Course description:

Pr.Req. : Non

Principles and skills of Engineering drawing. Conventional lettering and dimensioning. Geometric constructions. Orthographic projection of engineering bodies. Theories of view derivation. Derivation of views from isometric drawings and deducing of missing views. Sectioning views: (full, half, offset, partial, revolved, removed, and partial sectioning). Steel construction, Symbols of electrical circuits.

2.2. Course Objectives (CO):

Program objective		Course objective	
PO1	Apply a wide spectrum of engineering knowledge, science and specialized skills with analytic, critical and systemic thinking to identify and solve engineering problems in real life situation.	**CO1**	Understanding the importance of drawing as a language for engineers and developing student's skills in engineering drawing.
PO4	Master self-learning and life-long learning strategies to communicate effectively in academic/professional fields.	**CO2**	Creating freehand sketching to aid in the visualization process and to efficiently communicate ideas graphically.

2.3. Course Learning Outcomes (CLO's):

Student Competences	Program Learning Outcomes		Course Learning Outcomes	
A06	PLO06	Plan, supervise and monitor implementation of engineering projects, taking into consideration other trades requirements.	CLO1	Illustrate the engineering drawing (drawing tools, tangency, projections, isometrics, missing views, …)
			CLO2	Define the geometry of engineering objects and steel structure.
A08	PLO08	Communicate effectively – graphically, verbally and in writing – with a range of audiences using contemporary tools.	CLO3	Evaluate the drawing rules in engineering drawing
			CLO4	Solve problems in the sectioning of engineering objects.

2.4. Course Topics:

Course Topics	Week	Course LO's Covered			
		CLO1	CLO2	CLO3	CLO4
Introduction to engineering graphics	1	√			
Geometric construction	2-3	√	√		
Isometric graphics	4-5		√	√	
Orthograph projection from isometric	6	√		√	
First Exam	7	√	√		
Orthograph projection –missing view	8-9	√			√
Section view	10-11	√		√	
Second Exam	12			√	√
Steel constructions	13-14		√		√
Symbols of electric circuit +Revision	15			√	√
Final Exam	16	√	√	√	
Total	16				

2.5. Lab Topics:

NA

2.6 Teaching and Learning Methods

Teaching and Learning Methods:	Course LO's Covered			
	CLO1	CLO2	CLO3	CLO4
1. Lectures.	√	√	√	
2. Tutorials.		√	√	√
3. Discussions.	√		√	√
Teaching and Learning Methods for Students with Special Needs:				
Methods				
1. Discussion Session				
2. Extra Lectures				
3. Provide different levels of books and materials				

2.7 Assessment Methods

Assessment Methods:		Course LOs Covered			
		CLO1	CLO2	CLO3	CLO4
Formative Assessment Method					
Tests	First Exam	√	√		
	Second Exam			√	√
Assignment		√			√
Summative Assessment Method					
Final Exam		√	√	√	

2.7.1. Assessment Schedule & Grades Distribution

Assessment Method		Week	The weighting of Assessment %
Formative Assessment Method			
Tests	**First exam**	7	30
	Second exam	12	20
Assignments		2-14	10
Summative Assessment Method			
Final Exam		16	40 %
Total			100 %

2.8. List of Reference:

Essential Books (Textbooks):	William Chalk, Goetsch, "Technical Drawing", Delmar technical graphics series, 6th edition, 2010.
Recommended Books:	Allbert W. Boundy, "Engineering Drawing", McGraw-Hill Australia, 2012

2.9. Facilities required for Teaching and Learning

Different Facilities	
Lecture Hall	
Data Show	
White Board	

3. Matrix:
3.1. Program Objectives VS Course Objectives

Program Objectives	Course Objective	
	CO1	CO2
PO1	√	
PO4		√

3.2. Course Objectives VS Course Learning Outcomes

Course Objectives	Course Learning Outcomes			
	CLO1	CLO2	CLO3	CLO4
CO1	√	√		
CO2			√	√

3.3. Program Learning Outcomes VS Course Learning Outcomes

Student Competences	Program Learning Outcomes	Course Learning Outcomes			
		CLO1	CLO2	CLO3	CLO4
A06	PLO6	√		√	
A08	PLO8		√		√

3.4. Assessment Alignment Matrix

SC	PLO	PO	CLO	Teaching M.	Assessment M.
A6	PLO6	PO2	CLO1	• Lectures • Tutorials • Discussion	• First , and Final Exam • Assignments
			CLO2	• Lectures • Tutorials	• First , and Final Exam
A8	PLO8	PO3	CLO3	• Lectures • Discussion • Tutorials	• Final Exam • Assignments
			CLO4	• Discussion • Tutorials	• Second and Final Exam • Assignments

Course Coordinator: **Dr. Mohamed Shehata** Mhamed Sh.

Head of Department: **Dr. Ahmed Youssef Kamal El-Deen**

Date: 2/1/2024

Course Specification

1. Basic Information:

Program Title	Construction Engineering and Management			
Program Offering the course	Construction Engineering and Management			
Date of Specification Approval	**2/1/2024**			
Course Title	**Engineering Drawing by Computer**		**Code**	**FRM010**
Type	**Compulsory ☒**	**Elective ☐**		
Semester	**Spring Semester(Level0-2)**			
Teaching Hours	**Lec.**	**Tut.**	**Lab.**	**Credit hours**
	1	**0**	**2**	**3**

2. Professional Information:

2.1. Course Description:

Introduction to Computer Aided Drawing, Benefits of computer-aided drawing. Graphics/CAD involves the visualization, sketching, and geometric construction of mechanical components. Industry standard for drawing. Layout and creation of 2D working industrial drawings. Illustrate CAD drawing construction techniques, implementation of graphical communication using the alphabet of lines, orthographic projection, section views, auxiliary views and the creation of assembly and detail mechanical components. 3D drawing of Mechanical Components.

2.2. Course Objectives (CO):

Program objective		**Course objective**	
PO 4	Master self-learning and life -long learning strategies to communicate effectively in academic/professional fields.	**CO 1**	Create accurate and detailed engineering drawings using software
PO 5	Solve problems in the areas of integrated mechanics, electronics, computers, and software systems.	**CO 2**	Draw clear and well-organized technical drawings using AutoCAD features such as layers, dimensioning, and text to

2.3. Course Learning Outcomes (CLO's):

Student Competences	Program Learning Outcomes		Course Learning Outcomes	
A4	PLO 4	Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues, and risk management principles.	CLO 1	Apply industry-standard drafting conventions for engineering drawing.
			CLO 2	Discuss fundamental CAD commands, tools, and techniques for creating 2D drawings.
A8	PLO 8	Communicate effectively – graphically, verbally and in writing – with a range of audiences using contemporary tools.	CLO 3	Use engineering standards and specifications for drawing.
			CLO 4	Utilize AutoCAD features for clear and well-organized technical drawings.

2.4. Course Topics (LT):

Course Topics	Week	Course LO's Covered			
		CLO 1	CLO 2	CLO 3	CLO4
Introduction to Computer Aided Drawing .	1	√			
Industry standard for drawing	2		√		
The visualization, sketching, and geometric construction of mechanical components	3-6	√	√		
First Experimental Exam	7	√	√		
Illustrate CAD drawing construction techniques	8	√			
Graphical communication	9-11			√	√
Second Experimental Exam	12	√		√	
Creation of assembly and detail mechanical components.	13,14		√		
3D drawing of Mechanical Component	15			√	
Practical Exam	16	√	√	√	√
Total	16	6	7	5	4

2.5. Lab Topics: (C.T)

2.6. Teaching and Learning Methods

Teaching and Learning Methods:	Course LO's Covered			
	CLO 1	CLO 2	CLO 3	CLO 4
Lecture	√	√	√	√
Interactive Learning			√	√
Computer-based Instruction	√	√		
Teaching and Learning Methods for Students with Special Needs:				
Methods				
1. Discussion Session				
2. Extra Lectures				
3. Provide different levels of books and materials				

2.7. Assessment Methods

Assessment Methods		Course LOs Covered			
		CLO 1	CLO 2	CLO 3	CLO 4
Formative Assessment Method					
Tests	First Experimental Exam	√	√		
	Second Experimental Exam	√		√	
Assignments		√	√		
Mini-Project				√	√
Summative Assessment Method					
Practical Exam		√		√	√

2.7.1. Assessment Schedule & Grades Distribution

Assessment Methods		Week	Weighting of Asses.
Formative Assessment Method			
Tests	First Exam	7	30
	Experimental Exam	12	20
Assignments		3,6	2
Mini-Project		15	8
Summative Assessment Method			
Practical Exam		16^{th}	40%
Total			**100%**

2.8. List of Reference:

Essential Books (Textbooks):	1. William Chalk, Goetsch, "Technical Drawing", Delmar technical graphics series, 6th edition, 2010.
Recommended Books:	1. • Allbert W. Boundy, "Engineering Drawing", McGraw-Hill Australia, 2012

2.9. Facilities required for Teaching and Learning

Different Facilities
Lecture Hall
Data Show
White Board

3. Matrix:

3.1. Program Objectives VS Course Objectives

Program Objectives	Course Objective	
	CO 1	CO 2
PO 4	√	
PO 5		√

3.2. Course Objectives VS Course Learning Outcomes

Course Objectives	Course Learning Outcomes			
	CLO 1	CLO 2	CLO 3	CLO4
CO 1	√		√	
CO 2		√		√

3.3. Program Learning Outcomes VS Course Learning Outcomes

Student Competences	Program Learning Outcomes	Course Learning Outcomes			
		CLO 1	CLO 2	CLO 3	CLO4
A4	PLO 4	√	√		
A8	PLO 8			√	√

3.4. Assessment Alignment Matrix

S.A	PLO	PO	CLO	Teaching M.	Assessment M.
A4	PLO 4	PO 4	CLO1	• Lecture • Computer-based Instruction	• First and Second Experimental Exam • Practical Exam • Assignments
			CLO2	• Lecture • Computer-based Instruction	• First Experimental Exam • Assignments
A8	PLO 8	PO 5	CLO3	• Lecture • Interactive Learning	• Second Experimental Exam Assignments • Practical Exam • Mini-Project
			CLO4	• Lecture • Interactive Learning	• Practical Exam • Mini-Project

Course Coordinator: Dr.Ahmed Majed Ahmed M.

Program Coordinator: Dr. Ahmed Youssef Kamal El-Deen

Date:2/1/2024

Course Specification

1. Basic Information:

Program Title	Construction Engineering and Management			
Department Offering the course	Construction Engineering and Management			
Date of Specification Approval	2/1/2024			
Course Title	Foreign Language		**Code**	UHS101
Type	**Compulsory** ☒		**Elective** ☐	
Semester	Fall Semester (Level 0-1)			
Teaching Hours	**Lec.**	**Tut.**	**Lab.**	**Credit hours**
	2	-	-	2

2. Professional Information:

2.1. Course description:

Pr.Req.: Non

The characteristics of the foreign language (English, Deutsch, French, or any foreign language approved by the academic department council and both the faculty and university councils) - Revision of the language grammar – grammar style and effective sentences and their characteristics – Identification of common errors in writing technical sentences – Building basic paragraphs: types of paragraphs, reading and analyzing of excerpts from books in varies disciplines to develop communication skills.

2.2. Course Objectives (CO):

The students will be able to:

Program objective		Course objective	
PO4	Master self-learning and life - long learning strategies to communicate effectively in academic/professional fields.	**CO1**	**Use** written and oral communication in a range of situation with an emphasis on academic communication.
		CO2	**Illustrate** the academic terminologies related to their field of specialization

2.3. Course Learning Outcomes (CLO's):

Student Competences	Program Learning Outcomes		Course Learning Outcomes	
A5	PLO5	Practice research techniques and methods of investigation as an inherent part of learning.	CLO1	**Apply** basic research skills through constructing a project related to an engineering or science related situation.
A8	PLO8	Communicate effectively – graphically, verbally and in writing – with a range of audiences using contemporary tools.	CLO2	**Identify** the appropriate written and oral communication in different situations in English.
			CLO3	**Communicate** efficiently to convey ideas verbally.
			CLO4	**Discuss** the abstract ideas and arguments from a range of texts.
			CLO5	**Use** vocabulary as a key ingredient in developing advanced written skills.
A10	PLO10	Acquire and apply new knowledge; and practice self, lifelong and other learning strategies.	CLO6	**Practice** a range of grammatical structures and vocabulary accurately and effectively.

2.4. Course Topics:

Course Topics	Week	Course LO's Covered					
		CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
Introduction to course content	1-2		√		√	√	
Revision of the language grammar	3-4					√	
grammar style	5					√	
effective sentences and their characteristics	6		√	√	√	√	
First Exam	7		√		√	√	
Identification of common errors in writing technical sentences	8-9						√
types of paragraphs	10-11	√				√	√
Second Exam	12		√		√	√	
reading and analyzing of excerpts from books in varies disciplines to develop communication skills	13-15	√	√	√			
Final Exam	16		√		√	√	
Total	**16**	**5**	**6**	**4**	**3**	**8**	**4**

2.5. Lab Topics:

(Not Applicable**)**

2.6 Teaching and Learning Methods

Teaching and Learning Methods:	Course LO's Covered					
	CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
1. Lecture		√		√	√	
2. Discussion			√	√	√	
3. Interactive Learning	√	√	√			√
4. Self- learning	√					√
Teaching and Learning Methods for Students with Special Needs:						
Methods						
1. Discussion Session						
2. Extra Lectures						
3. Provide different levels of books and materials						

2.7 Assessment Methods

Assessment Methods:		Course LOs Covered					
		CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
Formative Assessment Method							
1. Tests	First Exam		√		√	√	
	Second Exam		√		√	√	
2. Discussions				√		√	
3.Reports		√					√
4.Observation		√		√	√		√
Summative Assessment Method							
Final Exam			√		√	√	

2.7.1. Assessment Schedule & Grades Distribution

Assessment Method		Week	The weighting of Assessment %
Formative Assessment Method			
Tests	First Exam	7	30 %
	Second Exam	12	20 %
Discussion		6,10,11,13	4%
Report		11, 15	2%
Observation		6,13-15	4%
Summative Assessment Method			
Final Exam		16	40 %
Total			100 %

2.8. List of References:

Essential Books (Textbooks):	Folse, Keith, April Muchmore-Vokoun and Elena Vestri Solomon. Great Essays. 3rd ed. U.K.: Heinle Cengage Learning, 2010.
Recommended Books:	Murphy, R. and Smalzer, W., 2000. Grammar in use. Cambridge: Cambridge University Press
	EManuel Alvarez-Sandoval, "The Importance of Learning a Foreign Language in a Changing Society", 2005, Universe
Periodicals, Web Sites, … etc:	http:// www.duolingo.com https://elt.oup.com

2.10. Facilities required for Teaching and Learning

Different Facilities
Lecture Hall
Data show
White board

3. Matrix:

3.1. Program Objectives VS Course Objectives

Program Objectives	Course Objective	
	CO1	CO2
PO4	√	√

3.2. Course Objectives VS Course Learning Outcomes

Course Objectives	Course Learning Outcomes					
	CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
CO1	√	√	√			
CO2				√	√	√

3.3. Program Learning Outcomes VS Course Learning Outcomes

Student Competences	Program Learning Outcomes	Course Learning Outcomes					
		CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
A5	PLO5	√					
A8	PLO8		√	√	√	√	
A10	PLO10						√

3.4. Assessment Alignment Matrix

SC	PLO	PO	CLO	Teaching M.	Assessment M.
A5	PLO5	PO4	CLO1	Self- learning	Reports
				Interactive Learning	Observation
A8	PLO8		CLO2	Lecture	First , and Second Exams
				Interactive Learning	Observation
			CLO3	Interactive Learning	Observation
				Discussion	Discussions
			CLO4	Lecture	First , and Second Exams
				Discussion	Discussions
			CLO5	Lecture	First , and Second Exams
				Discussion	Discussions
A10	PLO10		CLO6	Self- learning	Reports
				Interactive Learning	Observation

Course Coordinator: **Mohamed Abd El-Ghany**

Head of Department: **Dr. Ahmed Youssef Kamal El-Deen**

Date: 2/1/2024

Course Specification

1. Basic Information:

Program Title	Construction Engineering and Management			
Department Offering the course	Construction Engineering and Management			
Date of Specification Approval	2/1/2024			
Course Title	Information and Communication Technology	**Code**	UHS102	
Type	**Compulsory** ☒	**Elective** ☐		
Semester	Spring Semester (Level 0-2)			
Teaching Hours	**Lec.**	**Tut.**	**Lab.**	**Credit hours**
	2	-	-	2

2. Professional Information:

2.1. Course description:

Pr.Req. : …….

Concepts and terminologies of information technology – Communication styles in teaching and learning – The internet and learning – multimedia systems – databases – Virtual Reality – Augmented reality – Internet of Things – Robotics and its classification – Artificial Intelligence – Big data – Cloud Computing.

2.2. Course Objectives (CO):

The students will be able to:

Program objective		Course objective	
PO4	Master self-learning and life-long learning strategies to communicate effectively in academic/professional fields.	**CO1**	Use ICT to expand their range and effectiveness of communication;
PO5	Apply analytical, experimental, design, construction engineering techniques and project management skills with proficiency aided by modern tools.	**CO2**	Apply knowledge, understanding and skills to produce ICT-based solutions

2.3. Course Learning Outcomes (CLO's):

Student Competences	Program Learning Outcomes		Course Learning Outcomes	
A4	PLO4	Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues and risk management principles.	CLO1	Utilize the basic concepts and requirements learnt for internet connectivity.
			CLO2	Use the techniques, skills and modern ICT tools necessary for engineering practice
A10	PLO10	Acquire and apply new knowledge; and practice self, lifelong and other learning strategies.	CLO3	Acquire different learning techniques and applications in ICT-enabled learning environment
			CLO4	Apply intelligent techniques in learning and scientific research

2.4. Course Topics:

Course Topics	Week	Course LO's Covered			
		CLO1	CLO2	CLO3	CLO4
Introduction to Information Communication Technology and Its Applications	1, 2	√	√	√	
Types and components of computer systems	3	√	√		
Data Communication and Networking	4, 5	√			
Internet	6	√	√		
First Exam	7	√	√		
Introduction to Data analysis and management	8	√			
Introduction to Virtual Environment Technology	9		√	√	
Concepts and Definitions of The Internet of Things	10	√			
An introduction to Robot Technology	11		√		
Second Exam	12	√	√		
AI and its Applications	13, 14	√			√
Cloud Computing	15	√		√	√
Final Exam	16	√	√		
Total	**16**	**11**	**6**	**3**	**3**

2.5. Lab Topics:

(Not Applicable**)**

2.6 Teaching and Learning Methods

Teaching and Learning Methods:	Course LO's Covered			
	CLO1	CLO2	CLO3	CLO4
1. Lecture	√	√		
2. Report			√	√
Teaching and Learning Methods for Students with Special Needs:				
Methods				
1. Discussion Session				
2. Extra Lectures				
3. Provide different levels of books and materials				

2.7 Assessment Methods

Assessment Methods:		Course LOs Covered			
		CLO1	CLO2	CLO3	CLO4
Formative Assessment Method					
1. Tests	First Exam	√	√		
	Second Exam	√	√		
2. Reports				√	√
Summative Assessment Method					
Final Exam		√	√		

2.7.1. Assessment Schedule & Grades Distribution

Assessment Method		Week	The weighting of Assessment %
Formative Assessment Method			
Tests	First Exam	7	30 %
	Second Exam	12	20 %
Reports		15	10%
Summative Assessment Method			
Final Exam		16	40 %
Total			100 %

2.8. List of References:

Essential Books (Textbooks):	TL Limited ITL Education Solutions Limited, "Introduction to Information Technology", 2nd edition, 2012, Pearson Education, ISBN: 9789332525146
Recommended Books:	Floyd Fuller, Brain Larson, Lisa Bucki, Faithe Wempen, "Computers: Understanding Technology Comprehensive ", 6th edition, 2016, Kendall Hunt Publishing, ISBN-13: 978-0763870089
Periodicals, Web Sites, … etc:	

2.9. Facilities required for Teaching and Learning

Different Facilities
Lecture Hall
Data show
White board

3. Matrix:

3.1. Program Objectives VS Course Objectives

Program Objectives	Course Objective	
	CO1	CO2
PO4	√	
PO5		√

3.2. Course Objectives VS Course Learning Outcomes

Course Objectives	Course Learning Outcomes			
	CLO1	CLO2	CLO3	CLO4
CO1	√	√		
CO2			√	√

3.3. Program Learning Outcomes VS Course Learning Outcomes

Student Competences	Program Learning Outcomes	Course Learning Outcomes			
		CLO1	CLO2	CLO3	CLO3
A4	PLO4	√	√		
A10	PLO10			√	√

3.4. Assessment Alignment Matrix

SC	PLO	PO	CLO	Teaching M.	Assessment M.
A4	PLO4	PO4	CLO1	● Lecture	● First, Second and Final Exam
			CLO2	● Lecture	● First, Second and Final Exam
A10	PLO10	PO5	CLO3	● Report	● Report
			CLO4	● Report	● Report

Course Coordinator: **Dr. Tamer Omar Mohamed Diab** Tamer Omar

Head of Department: **Dr. Ahmed Youssef Kamal El-Deen**

Date: 2/1/2024

Course Specification

1. Basic Information:

Program Title	Construction Engineering and Management			
Department Offering the course	Construction Engineering and Management			
Date of Specification Approval	**2/1/2024**			
Course Title	Social Issues		**Code**	UHS103
Type	**Compulsory** ☒	**Elective** ☐		
Semester	Fall Semester (Level0-1)			
Teaching Hours	**Lec.**	**Tut.**	**Lab.**	**Credit hours**
	2	0	0	2

2. Professional Information:

2.1. Course description:

Pr.Req.: Non

In this course, the social problems facing societies in the modern era are studied. Topics include problems related to the population issue, citizenship, a culture of tolerance and acceptance of the other, globalization, and violence against women. Social problems will be analyzed from different social perspectives to better understand their possible causes and consequences. Strategies for addressing social problems will be discussed and evaluated.

2.2. Course Objectives (CO):

Program objective		Course objective	
PO3	Work in and lead a heterogeneous team and display leadership qualities, business administration, and entrepreneurial skills.	**CO1**	**Analyze** different social issues and illustrate how to deal with heterogeneous team
PO4	Master self-learning and life-long learning strategies to communicate effectively in academic/professional fields	**CO2**	**Evaluate** the origins of social problems in the structure of existing social institutions to communicate effectively in professional fields

2.3. Course Learning Outcomes (CLO's):

Student Competences	Program Learning Outcomes		Course Learning Outcomes	
A5	PLO5	Practice research techniques and methods of investigation as an inherent part of learning	CLO1	**Examine** scientific research, various types of research, appropriate methods, technologies and data that sociologists use to investigate the human condition;
A7	PLO7	Function efficiently as an individual and as a member of multi-disciplinary and multi-cultural teams.	CLO2	**Analyze** different social issues that related with the individual as a member of multi-cultural teams.
A10	PLO10	Acquire and apply new knowledge; and practice self, lifelong and other learning strategies.	CLO3	**Practice** self, learning strategies in different social issues
			CLO4	**Evaluate** competing social scientific theories regarding the origins of social problems using lifelong and other learning strategies.

2.4. Course Topics:

Course Topics	Week	Course LO's Covered			
		CLO1	CLO2	CLO3	CLO4
1.Introduction in social issues.	1		√		
2.Recognize the structural, systemic factors which affect the quality of life of persons of different ages, gender, social class, sexual orientation, disability, and racial/ethnic backgrounds;	2,3				√
3.Problems related to the population issue.	4,5		√		
4.Problems related to citizenship.	6	√		√	
5.First Exam	7	√	√	√	
6.Problems related to citizenship.	8		√		
7.Problems related to a culture of tolerance and acceptance of the other.	9,10		√		
8.Problems related to globalization.	11		√		
9.Second Exam	12	√	√	√	
10. Problems related to violence against women	13	√		√	
11. Present alternative explanations or theories	14				√

of social phenomena					
12. Review	15	√	√		√
13. Final Exam	16	√	√	√	
Total	16	**3**	**8**	**2**	**4**

2.5. Lab Topics:

(Not Applicable**)**

2.6 Teaching and Learning Methods

Teaching and Learning Methods:	**Course LO's Covered**			
	CLO1	**CLO2**	**CLO3**	**CLO4**
1. Lecture	√	√	√	
2. Report		√		√
3.Self Learning				√
4. Hybrid Learning	√	√	√	
Teaching and Learning Methods for Students with Special Needs:				
Methods				
1. Discussion Session				
2. Extra Lectures				
3. Provide different levels of books and materials				

2.7Assessment Methods

Assessment Methods:		**Course LOs Covered**			
		CLO1	**CLO2**	**CLO3**	**CLO4**
Formative Assessment Method					
Test	**First Exam**	√	√	√	
	Second Exam	√	√	√	
Report			√		
Presentations					√
Summative Assessment Method					
Final Exam		√	√	√	

2.7.1. Assessment Schedule & Grades Distribution

Assessment Method		Week	The weighting of Assessment %
Formative Assessment Method			
Tests	(First, Second)Exams	7,12	50
Report		6,13	5
Presentations		13	5
Summative Assessment Method			
Final exam		16	40
Total		16	100

2.8. List of References:

Course Notes:	Lecturer Notes
Essential Books (Textbooks):	Lauer, Robert and Jeanette Lauer. 2016. Social Problems and the Quality of Life, 13th Edition. New York: NY. McGraw Hill w/Connect.
Web Sites	https://beng.bu.edu.eg/item/1739-2022-05-29-11-57-14

2.10. Facilities required for Teaching and Learning

Different Facilities	
Lecture Hall	√
Data Show	√
White Board	√

3. Matrix:

3.1. Program Objectives VS Course Objectives

Program Objectives	Course Objective	
	CO1	CO2
PO3	√	
PO4		√

3.2. Course Objectives VS Course Learning Outcomes

Course Objectives	Course Learning Outcomes			
	CLO1	CLO2	CLO3	CLO4
CO1	√	√		
CO2			√	√

3.3. Program Learning Outcomes VS Course Learning Outcomes

Student Competences	Program Learning Outcomes	Course Learning Outcomes			
		CLO1	CLO2	CLO3	CLO4
A5	PLO5	√			
A7	PLO7		√		
A10	PLO10			√	√

3.4. Assessment Alignment Matrix

SC	PLO	PO	CLO	Teaching M.	Assessment M.
A5	PLO5	PO3	CLO1	Lecture Hybrid Learning	First, Second, and Final Exams
A7	PLO7		CLO2	Hybrid Learning Report	First, Second, and Final Exams Report
A10	PLO10	PO4	CLO3	Lecture Hybrid Learning	First, Second, and Final Exams
			CLO4	Self – Learning Report	Presentations

Course Coordinator: Dr. Dr. Mohamed R. Ali mohamed

Head of Department: Dr. Ahmed Youssef Kamal El-Deen

Date: 2/1/2024

Level 1

Course Specification

1. Basic Information:

Program Title	Construction Engineering and Management			
Department Offering the course	Construction Engineering and Management			
Date of Specification Approval	**2/1/2024**			
Course Title	Basic Architectural Engineering	**Code**	CMA107	
Type	**Compulsory** ☒	**Elective** ☐		
Semester	Spring **Semester**. (Level 1-1)			
Teaching Hours	**Lec.**	**Tut.**	**Lab.**	**Credit hours**
	1	2	-	2

2. Professional Information:

2.1. Course description:

Pr.Req. : Engineering Graphics (FRM 009)

Architectural engineering drawings is the language that is used to describe the size and shape of buildings. The course will enable the student to understand and use the architectural drawings language. It is designed to introduce the students the concepts, practices, standards, and drafting techniques needed for architectural design

2.2. Course Objectives (CO):

Program objective		Course objective	
PO1	Apply a wide spectrum of engineering knowledge, science, and specialized skills with analytic, critical, and systemic thinking to identify and solve engineering problems in real-life situations.	**CO1**	Apply critical analytical thinking to solve engineering problems in a variety of scientific ways
		CO2	lead the work team for effective presentation at the individual and group levels & Take responsibility, and the use of modern technology to communicate information

2.3. Course Learning Outcomes (CLO's):

Student Competences	Program Learning Outcomes		Course Learning Outcomes	
A8	**PLO8**	Communicate effectively – graphically, verbally and in writing – with a range of audiences using contemporary	**CLO1**	Identify the basics of structural engineering drawing and implement them into projects.

		tools.	**CLO2**	Analysis the structural systems of buildings in a simple context, scales and types that meet engineering requirements.
D1	**PLO15**	Create architectural, urban, and planning designs that satisfy both aesthetic and technical requirements, using adequate knowledge of history and theory, related fine arts, local culture and heritage, technologies and human sciences	**CLO3**	Discuss engineering technologies related to systems of building construction.
			CLO4	Apply construction technologies and materials into different projects.

2.4. Course Topics:

Course Topics	Week	Course LO's Covered			
		CLO1	CLO2	CLO3	CLO4
Introduction to course content	1	√		√	
Preliminary operations lecture for construction operations + The start of the guard room project Plan	2	√	√		
A lecture on primary building materials + project completion and drawing of Elevations + Sections	3		√	√	
Completion of the pre-construction works lecture + project submission	4		√		√
Discussion of research group No. (1) Construction systems and construction methods (load-bearing and structural walls)	5	√	√		√
Discussion of research group No. (2) Types of surface foundations and insulation in installations, Types of deep foundations and insulation in structures	6	√			√
First Exam	7	√	√		
Discussion of the research group No. (3) Brick stacks and bonding methods	8			√	√
Discussion of the research group No. (4) stone stacks and bonding methods	9	√		√	√
Discussion of research group No. (5) heritage coverage and construction (dome, vault, vault and wood)	10	√	√		
Large project presentation and drawing (Plan + Elevations + Sections)	11			√	√
Second Exam	12			√	√

project Semi Final submission	13		√	√	
project Final submission	14		√		√
Portfolio submission and general discussion	15	√		√	√
Final Exam	16		√		√
Total	**16**	**8**	**9**	**8**	**10**

2.5 Lab Topics

N.A

2.6 Teaching and Learning Methods

Teaching and Learning Methods:	**Course LO's Covered**			
	CLO1	**CLO2**	**CLO3**	**CLO4**
Lecture	√		√	√
Tutorial		√	√	√
Presentations			√	√
Brain Storming	√	√		
Projects	√	√	√	
Discussion		√	√	
Teaching and Learning Methods for Students with Special Needs:				
Methods				
1. Discussion Session				
2. Extra Lectures				
3. Provide different levels of books and materials				

2.7 Assessment Methods

Assessment Methods:		**Course LOs Covered**			
		CLO1	**CLO2**	**CLO3**	**CLO4**
Formative Assessment Method					
Tests	First Exam	√	√		
	Second Exam			√	√
	Quizzes		√	√	
Discussions		√	√		
Projects		√	√		
Assignments				√	√
Presentations		√		√	√
Summative Assessment Method					
Final Exam			√		√

2.7.1. Assessment Schedule & Grades Distribution

Assessment Method	**Week**	**The weighting of**

			Assessment %
Formative Assessment Method			
Tests	First Exam	7	30 %
	Second Exam	12	20 %
	Quizzes	3 , 8	1%
Discussions		5 ,11	1%
Projects		15	4%
Assignments		2 - 4 , 10	2%
Presentations		5 , 6 , 9 , 10	2%
Summative Assessment Method			
Final Exam		16	40 %
Total			100 %

2.8. List of References:

Course Notes:	▪ Lecture Notes
Essential Books (Textbooks):	▪ SEELY, I.H. - Building Technology- Mac Millan - London - 1995.
	• BARRY, R.,The Construction of Buildings, (Vol. I, IV) Ed., Granada Technical Books, London, 1980. • CHING, F., Building Construction Illustration, John Wiley, New York, 1991. • CHUDLEY, R., Construction Technology, 2nd Ed., Essex, England: Longman, 1987. • GREENO, Roger, Principles of Construction.- 2nd Ed., Essex: Longman, 1986. • LYONS, Arthur, Materials for architects and Builders, Oxford: Elsevier, 2020. • MCKAY, W.B., Building Construction, (Vol. 1) last Ed., Longman, London. • MC ROVEN, Ch., Building with Stone, Lippincott & Crowell Publishers, New York1980. • NASHED, Fred, Time – Saver Details for Exterior wall Design, N.Y.:McgrawHill,1996. • NIKOLAS, Davies & JOKINIEMI, Erkki, Dictionary of Architecture and Building construction, 2st Edition. 2020.
Periodicals, Web Sites, … etc:	http:// www.archnet.org http:// www.greatbuilding.com http:// www.architecture.com

2.9 Facilities required for Teaching and Learning

Different Facilities
Lecture Hall
Library Usage
Data Show
White Board

3. Matrix:

3.1. Program Objectives VS Course Objectives

Program Objectives	Course Objective	
	CO1	CO2
PO1	√	√

3.2. Course Objectives VS Course Learning Outcomes

Course Objectives	Course Learning Outcomes			
	CLO1	CLO2	CLO3	CLO4
CO1	√		√	√
CO2		√	√	√

3.3. Program Learning Outcomes VS Course Learning Outcomes

Student Competences	Program Learning Outcomes	Course Learning Outcomes			
		CLO1	CLO2	CLO3	CLO4
A8	PLO8	√	√		
D1	PLO15			√	√

3.4. Assessment Alignment Matrix

SC	PLO	PO	CLO	Teaching M.	Assessment M.
A8	PLO8	PO1	CLO1	Lecture Brain Storming Project	First Exam Presentations Discussion Projects
D1	PLO15		CLO2	Tutorial Discussion Project Brain Storming	First and Final Exam Quizzes Discussion Projects
			CLO3	Lecture Tutorial Discussion Presentations Projects	Second Exam Quizzes Assignments Presentations
			CLO4	Lecture Tutorial Presentations	Second and Final Exam Assignments Presentations

Course Coordinator: **Ass.Pro.Dr. Mona Yehia Shedid**

Head of Department: **Dr. Ahmed Youssef Kamal El-Deen**

Date: 2/1/2024

Course Specification

1. Basic Information:

Program Title	Construction Engineering and Management			
Department Offering the course	Construction Engineering and Management			
Date of Specification Approval	**2/1/2024**			
Course Title	Building Construction		**Code**	CMA110
Type	**Compulsory** ☒	**Elective** ☐		
Semester	Spring Semester (Level 1-2)			
Teaching Hours	**Lec.**	**Tut.**	**Lab.**	**Credit hours**
	2	**1**	**0**	**3**

2. Professional Information:

2.1. Course Description:

Pr.Req. : Basic Architectural Engineering (CMA 107)

The course aims to introduce students the relation between architectural designs and building components. It provides a fundamental understanding how to create the different basic elements of the building construction and provides the students with the basic knowledge of: Building Construction Stages, Wall bearing and Skeleton Structures, Stone construction, Masonry- raw bricks & brick masonry, Stairs detailing internal and external finishing materials

2.2. Course Objectives (CO):

Program objective		Course objective	
PO1	Apply a wide spectrum of engineering knowledge, science, and specialized skills with analytic, critical, and systemic thinking to identify and solve engineering problems in real-life situations.	**CO1**	The students will be able to **apply** the engineering ethics , standards and work in the project
		CO2	Evaluate the decisions in the architectural and urban issues.
PO5	Apply analytical, experimental, design, construction engineering techniques and project management skills with proficiency aided by modern tools.	**CO3**	Create the architectural vocabulary and drawings

2.3. Course Learning Outcomes (CLO's):

Student Competences	Program Learning Outcomes		Course Learning Outcomes	
A5	PLO5	Practice research techniques and methods of investigation as an inherent part of learning	CLO1	Discuss the different types of both expansion and settlement joints in buildings by scientific research.
			CLO2	Present information about different finishing materials in buildings.
A8	PLO8	Communicate effectively – graphically, verbally and in writing – with a range of audiences using contemporary tools.	CLO3	Identify the main elements of concrete, steel, and wood structural systems.
			CLO4	Produce neat drawings for the principal elements and components of concrete, steel, and wood structural systems.
D2	PLO16	Generate ecologically responsible, environmental conservation and rehabilitation designs; through an understanding of structural design, construction, technology, and engineering problems	CLO5	Describe the different stairs types and its various elements.
			CLO6	Design the suitable stair type for a specific use.

2.4. Course Topics:

Course Topics	Week	Course LO's Covered					
		CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
Introduction & Course Review	1	√					
Brick& stone stacks and bonding methods	2	√	√				
Pre-Cast Conc. Construction	3		√		√		
Timber Floors & Roofs Construction	4	√	√		√		
Timber Walls & Columns Construction	5	√	√		√	√	
Steel Floors & Roofs Construction	6	√			√	√	
First Exam	7				√	√	
Discussion of 1st research:	8		√	√	√		√

Different types of both expansion and settlement joints							
Introduction To RC Stairs	9	√		√		√	√
Introduction to Cantilevered Staircase design	10		√		√	√	√
Introduction to Precast Concrete Stairs	11	√		√	√		√
Second Exam	12				√	√	√
Introduction to Steel Stair System	13				√	√	
Discussion of 2nd research: Different finishing materials in buildings.	14		√	√		√	
Physical Model: RC Stair System	15		√	√	√		√
Final exam	16			√	√	√	√
Total	16	**9**	**10**	**8**	**11**	**9**	**9**

2.5 Lab Topics

Not Applicable

2.6 Teaching and Learning Methods

Teaching and Learning Methods:	**Course LO's Covered**					
	CLO1	**CLO2**	**CLO3**	**CLO4**	**CLO5**	**CLO6**
Lectures			√	√	√	
Tutorials			√	√		√
Project-based Learning					√	√
Presentations	√	√			√	
Discussion			√	√	√	
Self-Learning	√	√				
Teaching and Learning Methods for Students with Special Needs:						
Methods						
1. Discussion Session						
2. Extra Lectures						
3. Provide different levels of books and materials						

2.7 Assessment Methods

Assessment Methods:		Course LOs Covered					
		CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
Formative Assessment Method							
Tests	First Exam				√	√	
	Second Exam				√	√	√
Discussions		√	√				√
Mini-Projects		√	√			√	
Assignments				√	√		√
Presentations		√	√	√	√		√
Summative Assessment Method							
Final Exam				√	√	√	√

2.7.1. Assessment Schedule & Grades Distribution

Assessment Method		Week	The weighting of Assessment %
Formative Assessment Method			
Tests	First Exam	7	30
	Second Exam	12	20
Discussions		6 ,9	2%
Mini-Projects		15	4%
Assignments		5 , 10	2%
Presentations		15	2%
Summative Assessment Method			
Final exam		16	40
Total			100

2.8. List of Reference:

Essential Books (Textbooks):	The Architect's Handbook of Professional Practice, American Institute of Architects, Wiley, 16th Edition, 2019
Recommended Books:	• McKay, W. B. (2005). Building Construction Metric Vol. I–IV. 4th Ed. Mumbai: Orient Longman. • Ching, Francis D. K. (2019). Architectural Graphics (6th Edition). New Jersey: John Wiley & Sons Inc.
Periodicals, Web Sites, … etc:	http:// www.archnet.org http:// www.greatbuilding.com http:// www.architecture.com

2.9. Facilities required for Teaching and Learning

Different Facilities
Lecture Hall
Library Usage
Data Show

White Board

3. Matrix:

3.1. Program Objectives VS Course Objectives

Program Objectives	Course Objective		
	CO1	CO2	CO3
PO1	√	√	√
PO5			√

3.2. Course Objectives VS Course Learning Outcomes

Course Objectives	Course Learning Outcomes					
	CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
CO1	√	√		√		
CO2			√			√
CO3	√				√	

3.3. Program Learning Outcomes VS Course Learning Outcomes

Student Competences	Program Learning Outcomes	Course Learning Outcomes					
		CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
A5	PLO5	√	√				
A8	PLO8			√	√		
D2	PLO16					√	√

3.4. Assessment Alignment Matrix

SC	PLO	PO	CLO	Teaching M.	Assessment M.
A5	PLO5	PO1	CLO1	Presentations Self-Learning	Discussions Mini-Projects Presentations
			CLO2	Presentations Self-Learning	Discussions Mini-Projects Presentations
A8	PLO8		CLO3	Lectures Tutorials Discussion	Final Exam Assignments Presentations
			CLO4	Lectures Tutorials Discussion	First, Second, and Final Exam Assignments Presentations
D2	PLO16	PO5	CLO5	Lectures Project-based Learning Presentations Discussion	First, Second, and Final Exam Mini-Project
			CLO6	Tutorials Project-based Learning	Second, and Final Exam Discussion Assignments Presentations

Course Coordinator: : Dr. Mona Yehia Shedid

Head of Department: Dr. Ahmed Youssef Kamal El-Deen

Date: 2/1/2024

Course Specification

1. Basic Information:

Program Title	Construction Engineering and Management			
Department Offering the course	Construction Engineering and Management			
Date of Specification Approval	**2/1/2024**			
Course Title	Structural Analysis-1		**Code**	CMC101
Type	**Compulsory** ☒		**Elective** ☐	
Semester	Fall Semester (Level 1-1)			
Teaching Hours	**Lec.**	**Tut.**	**Lab.**	**Credit hours**
	2	2	----	3

2. Professional Information:

2.1. Course Description:

Pr.Req. : Statics (FRB003)

Loads and reactions – Stability of structures (external and internal) – Straining actions in Statically determinate structures- Normal stresses – Shear stresses (pure shear, torsional) – Combined stresses. Elastic deflection of determinate structures (double Integration method and virtual work method).

2.2. Course Objectives (CO):

Program objective		Course objective	
PO1	Apply a wide spectrum of engineering knowledge, science, and specialized skills with analytic, critical, and systemic thinking to identify and solve engineering problems in real-life situations.	**CO1**	**Use** engineering knowledge to identify structural problems.
		CO2	**Analyze** a wide spectrum of engineering, with analytic, critical, and systemic thinking to solve structural problems.

2.3. Course Learning Outcomes (CLO's):

Student Competences	Program Learning Outcomes		Course Learning Outcomes	
A1	PLO1	Identity, formulate and solve complex engineering problems by applying engineering fundamentals, basic science, and mathematics.	CLO1	**Identify** the structures and different types of structural elements, the determinacy and stability of structures
			CLO2	**Calculate** the structure support reactions.
B1	PLO11	Select appropriate and sustainable technologies for the 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.	CLO3	**Determine** the internal forces in determinate structural elements using classical methods
			CLO4	**Study** the stresses on the structure (normal, shear, and combined).
			CLO5	**Analyze** the elastic deflection of determinate structures

2.4. Course Topics:

Course Topics	Week	Course LO's Covered				
		CLO1	CLO2	CLO3	CLO4	CLO5
Review of Statics Stability of structures	1	√				
Loads and Reactions.	2-3	√	√			
Analysis of Determinate Beam.	4-5			√		
Analysis of Determinate Frame.	6			√		
First Exam	7	√	√	√		
Introduction to stresses (Properties of areas)	8				√	
Normal stresses	9				√	
Shear stresses	10				√	
Principal stresses	11				√	
Second Exam	12	√		√	√	

Elastic deflection of beams	13					√
double Integration method	14					√
virtual work method	15					√
Final Exam	16	√	√	√	√	√
Total	**16**	**1**	**2**	**3**	**4**	**3**

2.5. Lab Topics:

(Not applicable**)**

2.6 Teaching and Learning Methods

Teaching and Learning Methods:	**Course LO's Covered**				
	CLO1	**CLO2**	**CLO3**	**CLO4**	**CLO5**
1. Lecture	√	√	√	√	√
2. Tutorials	√	√	√	√	√
3. Hybrid Learning			√	√	
Teaching and Learning Methods for Students with Special Needs:					
Methods					
1. Discussion Session					
2. Extra Lectures					
3. Provide different levels of books and materials					

2.7 Assessment Methods:

Assessment Methods:		**Course LOs Covered**				
		CLO1	**CLO2**	**CLO3**	**CLO4**	**CLO5**
Formative Assessment Method						
Test	First Exams	√	√	√		
	Second Exams	√		√	√	
Assignments		√	√	√	√	√
Summative Assessment Method						
Final Exam		√	√	√	√	√

2.7.1. Assessment Schedule & Grades Distribution

Assessment Method		Week	The weighting of Assessment %
Formative Assessment Method			
Tests	First Exams	7	30
	Second Exams	12	20
Assignments		4-6,8-11,14	10
Summative Assessment Method			
Final Exam		16	40
Total			100

2.8. List of References:

Essential Books (Textbooks):	• "Solved Examples in Determinate Structures", Dar-Elmaarefa, Egypt, Dr. Ahmed Youssef Kamal El-Deen, ISBN 21638/**2016**
Recommended Books:	• Structural Analysis by Russell C. Hibbeler, Pearson, 9th Edition, 2014, ISBN-13:978-0-13-394284-2. • George, N. Frantziskonis. "Essentials of the Mechanics of Materials, Second Edition". USA: Destech Publications, Inc. 2013. ISBN 13: 9781605950983 • Pytel, A. and Kiusalaas, J. "Mechanics of Materials Second Edition". Cengage Learning2012. ISBN-13: 978-0-495-66775-9
Periodicals, Web Sites, … etc	• https://byjusexamprep.com/determinate-and-indeterminate-structures-i

2.9. Facilities required for Teaching and Learning

Different Facilities	
Lecture Hall	√
Data Show	√
White Board	√

3. Matrix:

3.1. Program Objectives VS Course Objectives

Program Objectives	Course Objectives	
	CO1	CO2
PO1	√	√

3.2. Course Objectives VS Course Learning Outcomes

Course Objectives	Course Learning Outcomes				
	CLO1	CLO2	CLO3	CLO4	CLO5
CO1	√	√			
CO2			√	√	√

3.3. Program Learning Outcomes VS Course Learning Outcomes

Student Competences	Program Learning Outcomes	Course Learning Outcomes				
		CLO1	CLO2	CLO3	CLO4	CLO5
A1	PLO1	√	√			
B1	PLO11			√	√	√

3.4. Assessment Alignment Matrix

SC	PLO	PO	CLO	Teaching M.	Assessment
A1	PLO1	PO1	CLO1	Lecture Tutorials	First , Second and Final Exams Assignments
			CLO2	Lecture Tutorials	First and Final Exams Assignments
B1	PLO11		CLO3	Lecture	First , Second and Final Exams
				Hybrid Learning	
				Tutorials	Assignments
			CLO4	Lecture	Second , and Final Exams
				Hybrid Learning	
				Tutorials	Assignments
			CLO5	Lecture	Final Exams
				Tutorials	Assignments

Course Coordinator: Dr. Ahmed Youssef Kamal El-Deen

Head of Department: Dr. Ahmed Youssef Kamal El-Deen

Date: 2/1/2024

Course Specification

1. Basic Information:

Program Title	Construction Engineering and Management			
Department Offering the course	Construction Engineering and Management			
Date of Specification Approval	**2/1/2024**			
Course Title	Structural Analysis-2		**Code**	CMC102
Type	**Compulsory** ☒		**Elective** ☐	
Semester	Spring Semester (Level 1-2)			
Teaching Hours	**Lec.**	**Tut.**	**Lab.**	**Credit hours**
	2	2	----	3

2. Professional Information:

2.1. Course Description:

Pr.Req. : Structural Analysis-1 (CMC101)

Analysis of statically indeterminate structures (Three moment equations). Analysis of statically indeterminate structures: Force approach (Consistent deformation method). Displacement approach (Slope deflection Method, Moment distribution method). Introduction to Matrix Structural Analysis for 1-D element using Stiffness method (Truss, Beam, and frame elements).

2.2. Course Objectives (CO):

Program objective		Course objective	
PO1	Apply a wide spectrum of engineering knowledge, science, and specialized skills with analytic, critical, and systemic thinking to identify and solve engineering problems in real-life situations.	**CO1**	**Study** the stiffness method for the structural elements
		CO2	**Analyze** a wide spectrum of engineering, with analytic, critical, and systemic thinking to solve indeterminate structural problems**.**

2.3. Course Learning Outcomes (CLO's):

Student Competences	Program Learning Outcomes		Course Learning Outcomes	
A1	PLO1	Identity, formulate and solve complex engineering problems by applying engineering fundamentals, basic science, and mathematics.	CLO1	**Identify** the indeterminate structures
			CLO2	**Describe** the Displacement approach
			CLO3	**Explain** the Matrix Structural Analysis for 1-D element
B1	PLO11	Select appropriate and sustainable technologies for the 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.	CLO4	**Analysis** of statically indeterminate structures using three-moment equations
			CLO5	**Evaluate** the Displacement for the structure
			CLO6	**Estimate** Stiffness for Truss, Beam, and frame elements

2.4. Course Topics:

Course Topics	Week	Course LO's Covered					
		CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
Introduction to the indeterminate structures	1	√					
Three-moment equations	2	√			√		
Consistent deformation method	3	√			√		
Displacement approach	4		√				
Slope deflection Method	5		√			√	
Moment distribution method	6		√			√	
First Exam	7	√	√		√	√	
Introduction to Matrix Structural Analysis for 1-D	8			√			
Stiffness method for Truss elements	9-10			√			√
Stiffness method for Beam elements	11			√			√
Second Exam	12			√			√

Stiffness method for Beam elements	13			√			√
Stiffness method for frame elements	14-15			√			√
Final Exam	16	√	√	√	√	√	√
Total	**16**	**3**	**3**	**5**	**2**	**2**	**4**

2.5. Lab Topics:

(Not applicable**)**

2.6 Teaching and Learning Methods

Teaching and Learning Methods:	**Course LO's Covered**					
	CLO1	**CLO2**	**CLO3**	**CLO4**	**CLO5**	**CLO6**
1. Lecture	√	√	√	√	√	√
2. Tutorials				√	√	√
3. Hybrid Learning		√	√			
Teaching and Learning Methods for Students with Special Needs:						
Methods						
1. Discussion Session						
2. Extra Lectures						
3. Provide different levels of books and materials						

2.7 Assessment Methods:

Assessment Methods:		**Course LOs Covered**					
		CLO1	**CLO2**	**CLO3**	**CLO4**	**CLO5**	**CLO6**
Formative Assessment Method							
Test	First Exams	√	√		√	√	
	Second Exams			√			√
	Quizzes	√	√	√			
Assignments					√	√	√
Summative Assessment Method							
Final Exam		√	√	√	√	√	√

2.7.1. Assessment Schedule & Grades Distribution

Assessment Method		Week	The weighting of Assessment %
Formative Assessment Method			
Tests	First Exams	7	30
	Second Exams	12	20
	Quizzes	1,5,9,10,13	5
Assignments		4,6,8,11,13	5
Summative Assessment Method			
Final Exam		16	40
Total			100

2.8. List of References:

Essential Books (Textbooks):	• "Solved Examples in Determinate Structures", Dar-Elmaarefa, Egypt, Dr. Ahmed Youssef Kamal El-Deen, ISBN 21638/**2016**
Recommended Books:	• Structural Analysis by Russell C. Hibbeler, Pearson, 9th Edition, 2014, ISBN-13:978-0-13-394284-2. • George, N. Frantziskonis. "Essentials of the Mechanics of Materials, Second Edition". USA: Destech Publications, Inc. 2013. ISBN 13: 9781605950983 • Pytel, A. and Kiusalaas, J. "Mechanics of Materials Second Edition". Cengage Learning2012. ISBN-13: 978-0-495-66775-9
Periodicals, Web Sites, … etc	• https://byjusexamprep.com/determinate-and-indeterminate-structures-i

2.9. Facilities required for Teaching and Learning

Different Facilities	
Lecture Hall	√
Data Show	√
White Board	√

3. Matrix:

3.1. Program Objectives VS Course Objectives

Program Objectives	Course Objectives	
	CO1	CO2
PO1	√	√

3.2. Course Objectives VS Course Learning Outcomes

Course Objectives	Course Learning Outcomes					
	CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
CO1			√			√
CO2	√	√		√	√	

3.3. Program Learning Outcomes VS Course Learning Outcomes

Student Competences	Program Learning Outcomes	Course Learning Outcomes					
		CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
A1	PLO1	√	√				
B1	PLO11			√	√	√	√

3.4. Assessment Alignment Matrix

SC	PLO	PO	CLO	Teaching M.	Assessment
A1	PLO1	PO1	CLO1	Lecture	First and Final Exams Quiz
			CLO2	Lecture	Quiz
				Hybrid Learning	First and Final Exams
			CLO3	Lecture	Quiz
				Hybrid Learning	Second and Final Exams
B1	PLO11		CLO4	Lecture	First and Final Exams
				Tutorials	Assignments
			CLO5	Lecture	First and Final Exams
				Tutorials	Assignments
			CLO6	Lecture	Second and Final Exam
				Tutorials	Assignments

Course Coordinator: **Dr. Ahmed Youssef Kamal El-Deen**

Head of Department: **Dr. Ahmed Youssef Kamal El-Deen**

Date: **2/1/2024**

Course Specification

1. Basic Information:

Program Title	Construction Engineering and Management			
Department Offering the course	Construction Engineering and Management			
Date of Specification Approval	**2/1/2024**			
Course Title	Properties and Testing of Construction Materials		**Code**	CMC103
Type	**Compulsory** ☒	**Elective** ☐		
Semester	Fall Semester (Level 1-1)			
Teaching Hours	**Lec.**	**Tut.**	**Lab.**	**Credit hours**
	2	**0**	**1**	**2**

2. Professional Information:

2.1. Course description:

Pr.Req. : Statics (FRB003)

Stress and strain - Types of tests - Testing machines - Strain gauge devices - Static tension test - Static compression test - Bending test - Shear test - Torsion test - Hardness test - Fatigue test - Impact test - Metals creep test.

2.2. Course Objectives (CO):

Program objective		Course objective	
PO1	Apply a wide spectrum of engineering knowledge, science, and specialized skills with analytic, critical, and systemic thinking to identify and solve engineering problems in real-life situations.	**CO1**	**Apply** wide sets of engineering knowledge to identify and solve different problems related to mechanical properties of engineering materials
		CO2	**Illustrate** different tests for engineering materials such as tension, compression, bending, shear, torsion, impact, fatigue and hardness tests

2.3. Course Learning Outcomes (CLO's):

Student Competences	Program Learning Outcomes		Course Learning Outcomes	
A2	**PLO2**	Develop and conduct appropriate experimentation	**CLO1**	Identify mechanical, physical and chemical properties of

		and/or simulation, analyze and interpret data, assess and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions		engineering materials
			CLO2	Explain stress-strain behavior, strength, ductility, toughness, and resilience lines
B1	**PLO11**	Select appropriate and sustainable technologies for the 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.	**CLO3**	Determine the mechanical properties of engineering materials under tension, compression, bending, shear and torsion tests
			CLO4	Discuss the mechanical properties of engineering materials under impact, fatigue and hardness tests

2.4. Course Topics:

Course Topics	Week	Course LO's Covered			
		CLO1	CLO2	CLO3	CLO4
Stress and strain	**1,2**	√		√	
Types of tests	**3**		√	√	
Testing machines	**4**		√	√	
Strain gauge devices	**5**	√	√	√	
Static tension test	**6**	√	√	√	
First exam	**7**	√	√	√	
Static compression test	**8**	√		√	
Bending test	**9,10**	√		√	
Shear test	**11**	√		√	
Experimental Test	**12**	√	√		
Torsion test	**13**				√
Hardness test, Fatigue test	**14**				√
Impact test, Metals creep test	**15**				√
Final exam	**16**	√	√	√	√
Total	**16**	**11**	**4**	**8**	**3**

2.5. Lab Topics:

Lab Topics	Week	Course LO's Covered			
		CLO1	CLO2	CLO3	CLO4
Static test.	**1-6**	√	√		
Static test.	**8**	√			
Bending test.	**9**	√			
Hardness test.	**10**	√			
Impact test.	**11**	√			
Oral and Experimental Test	**12**	√	√		
Total		**7**	**4**		

2.6 Teaching and Learning Methods

Teaching and Learning Methods:	Course LO's Covered			
	CLO1	CLO2	CLO3	CLO4
1. Lecture			√	√
2. Tutorials			√	√
3. Practical-based Learning	√	√		
4. Discussion	√	√		
Teaching and Learning Methods for Students with Special Needs:				
Methods				
1. Discussion Session				
2. Extra Lectures				
3. Provide different levels of books and materials				

2.7 Assessment Methods

Assessment Methods:		Course LOs Covered			
		CLO1	CLO2	CLO3	CLO4
Formative Assessment Method					
Tests	First Exam	√	√	√	
	Experimental Test	√	√		
	Oral Test	√	√		
Assignment				√	√
Summative Assessment Method					
Final Exam		√	√	√	√

2.7.1. Assessment Schedule & Grades Distribution

Assessment Method		Week	The weighting of Assessment %
Formative Assessment Method			
Tests	**First Exam**	7	30
	Oral and Experimental Test	12	20
	Assignment	3,4,6,9,13	10
Summative Assessment Method			
Final exam		16	40
Total		16	100

2.8. List of Reference:

Essential Books (Textbooks):	Engineering Materials: Properties and Selection by Kenneth G. Budinski, Pearson, 9th Edition, 2017
Periodicals, Web Sites, … etc:	https://byjusexamprep.com/mechanical-properties-of-engineering-materials-i https://mffeci.ekb.eg/linkresolver/openurl/v0.1 Egyptian Knowledge Bank

2.9. Facilities required for Teaching and Learning

Different Facilities
Lecture Hall
Library Usage
Laboratory Usage
Data Show
White Board

3. Matrix:

3.1. Program Objectives VS Course Objectives

Program Objectives	Course Objective	
	CO1	CO2
PO1	√	√

3.2. Course Objectives VS Course Learning Outcomes

Course Objectives	Course Learning Outcomes			
	CLO1	CLO2	CLO3	CLO4
CO1	√	√		
CO2			√	√

3.3. Program Learning Outcomes VS Course Learning Outcomes

Student Competences	Program Learning Outcomes	Course Learning Outcomes			
		CLO1	CLO2	CLO3	CLO4
A2	PLO2	√	√		
B1	PLO11			√	√

3.4. Assessment Alignment Matrix

SC	PLO	PO	CLO	Teaching M.	Assessment M.
A2	PLO2	PO1	CLO1	• Practical-based Learning • Discussion	• Oral & Experimental • First , and Final Exam
			CLO2	• Practical-based Learning • Discussion	• Oral & Experimental • First , and Final Exam
B1	PLO11		CLO3	• Lecture • Tutorial	• First and Final Exam
			CLO4	• Lecture	• Final Exam
				• Tutorial	• Assignment

Course Coordinator: Dr Ahmed Abouelfetouh Abdelaziz

Head of Department: Dr. Ahmad Youssef Kamal El Din Mohamed

Date:2/1/2024

Course Specification

1. Basic Information:

Program Title	Construction Engineering and Management			
Department Offering the course	Construction Engineering and Management			
Date of Specification Approval	**2/1/2024**			
Course Title	Construction Materials and Concrete Technology		**Code**	**CMC104**
Type	**Compulsory** ☒		**Elective** ☐	
Semester	**Fall Semester (Level 1-2)**			
Teaching Hours	**Lec.**	**Tut.**	**Lab.**	**Credit hours**
	2	**1**	**2**	**3**

2. Professional Information:

2.1. Course description:

Pr. Req.: Properties and Testing of Construction Materials (CMC103)

Types and properties of construction materials. Aggregate types, sources and quality, cements. Introduction to fiber reinforced polymers. Steel in construction, insulation materials and coatings. Concrete mix design, admixtures. Asphalt cement, asphalt concrete mix design. Concrete manufacture. Properties of fresh concrete. Properties of hardened concrete. Durability of concrete. Non-destructive testing. Special concretes.

2.2. Course Objectives (CO):

Program objective		Course objective	
PO1	Apply a wide spectrum of engineering knowledge, science, and specialized skills with analytic, critical, and systemic thinking to identify and solve engineering problems in real-life situations.	**CO1**	**Apply** wide sets of construction materials knowledge, science, and specialized skills with analytic, critical, and systemic thinking to identify and solve surveying problems in real-life situations.
		CO2	**Solve** engineering problems in the process of the properties of construction materials

2.3. Course Learning Outcomes (CLO's):

Student Competences	Program Learning Outcomes		Course Learning Outcomes	
A2	**PLO2**	Develop and conduct appropriate experimentation	**CLO1**	**Identify** types and properties of construction

		and/or simulation, analyze and interpret data, assess and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions		materials and how to test them.
			CLO2	**Conduct** appropriate experimentation for aggregate types, cement, concrete
B1	**PLO11**	Select appropriate and sustainable technologies for the 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: Structural4 Analysis and Mechanics, Properties and Strength of Materials, Surveying, Soil Mechanics, Hydrology and Fluid Mechanics	**CLO3**	**Determine** concrete mix components and asphalt concrete mix components.
			CLO4	**Solve** engineering problems in the process of the properties of construction materials and account for concrete mix and asphalt concrete components.
			CLO5	**Discuss** properties of fresh concrete, hardened .and special concrete and durability of concrete.
			CLO6	**Explain** fiber reinforced polymers, steel in construction, insulation materials, coatings, Non-destructive testing, and asphalt cement

2.4. Course Topics:

Course Topics	Week	Course LO's Covered					
		CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
Introduction to types and properties of construction materials	1	√	√	√			
Aggregate types, admixtures	2	√	√	√			
cements	3	√	√	√	√		
fiber reinforced polymers	4	√	√	√	√		
Steel in construction	5	√	√	√	√		
Insulation materials and coatings.	6	√	√	√	√		
First Exam	7			√	√		
Concrete mix design	8	√	√		√	√	
Asphalt cement, Asphalt concrete mix design	9	√	√		√	√	
Concrete manufacture	10	√	√		√	√	

Properties of fresh concrete	11						√
Experimental Test	12	√	√				
Properties of hardened concrete	13		√				√
Durability of concrete	14						√
Non-destructive testing. Special concretes	15	√	√				√
Final Exam	**16**			√	√	√	√
Total	**16**	**10**	**11**	**6**	**9**	**3**	**4**

2.5 Lab Topics

Lab Topics	Week	Course LO's Covered					
		CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
• Sieve analysis of course and fine aggregate, bulk density of aggregate – specific weight of aggregate.	1,2	√	√				
•. Coarse aggregate crushing value.	**3,4**	√	√				
• Specific surface area of cement, Setting time of cement, compressive strength of cement.	**5,6**	√	√				
• Compression test.	**7,8**	√	√				
• Compacting factor test, Slump test.	**9,10**		√				
• Compressive strength test - Splitting tensile strength test – Modulus of rupture test.	**11**	√	√				
• Rebound hammer test - Ultrasonic Pulse velocity test	**12**	√	√				
Experimental Test	**12**	√	√				
Total	**12**						

2.6 Teaching and Learning Methods

Teaching and Learning Methods:	Course LO's Covered					
	CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
1. Lectures			√	√	√	√
2. Tutorials			√	√	√	√
3. Practical-based Learning	√	√				
4. Discussion			√	√	√	√
Teaching and Learning Methods for Students with Special Needs:						
Methods						

1. Repeat the explanation of some of the material and tutorials.
2. Give them specific tasks and assign a teaching assistance to follow up the performance of this group of students.
3. Provide different levels of books and materials

2.7 Assessment Methods

Assessment Methods:		Course LOs Covered					
		CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
Formative Assessment Method							
Tests	**First Exam**			√	√		
	Experimental Test	√	√				
Assignment				√	√	√	√
Summative Assessment Method							
Final Exam				√	√	√	√

2.7.1. Assessment Schedule & Grades Distribution

Assessment Method		Week	The weighting of Assessment %
Formative Assessment Method			
Tests	**First Exams**	7	30
	Experimental Test	12	20
Assignment		2,4,6,8.10,14	10
Summative Assessment Method			
Final Exam		16	40
Total			100

2.8. List of Reference

Essential Books (Textbooks):	Construction Materials, Methods and Techniques by William P. Spence, Delmar Cengage Learning, 4th Edition, 2016
Periodicals, Web Sites, … etc:	• https://structuralengineeringbasics.com/what-types-of-construction-building-materials/ • https://08122ce4x-1103-y-https-iopscience-iop-org.mplbci.ekb.eg/article/10.1088/1742-6596/1378/2/022058 (Egyptian Knowledge Bank)

2.9. Facilities required for Teaching and Learning

Different Facilities
Lecture Hall
Data Show
White Board
Laboratory Usage

3. Matrix:

3.1. Program Objectives VS Course Objectives

Program Objectives	Course Objective	
	CO1	CO2
PO1	√	√

3.2. Course Objectives VS Course Learning Outcomes

Course Objectives	Course Learning Outcomes					
	CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
CO1	√	√				
CO2			√	√	√	√

3.3. Program Learning Outcomes VS Course Learning Outcomes

Student Competences	Program Learning Outcomes	Course Learning Outcomes					
		CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
A2	PLO2	√	√				
B1	PLO11			√	√	√	√

3.4. Assessment Alignment Matrix

SC	PLO	PO	CLO	Teaching M.	Assessment M.
A2	PLO2	PO1	CLO1	• Practical-based Learning	• Experimental Test
			CLO2	• Practical-based Learning	• Experimental Test
B1	PLO11		CLO3	• Lecture • Discussion • Tutorial	• First and Final Exam • Assignment
			CLO4	• Lecture • Discussion • Tutorial	• First and Final Exam • Assignment
			CLO5	• Lecture • Discussion • Tutorial	• Final Exam • Assignment
			CLO6	• Lecture • Discussion • Tutorial	• Final Exam • Assignment

Course Coordinator: Dr. Marwa Hany مروة هاني

Head of Department: Dr. Ahmed Youssef Kamaldeen El

Date: 2/1/2024

Course Specification

1. Basic Information:

Program Title	Construction Engineering and Management			
Department Offering the course	Construction Engineering and Management			
Date of Specification Approval	**2/1/2024**			
Course Title	Surveying for Engineers-1		**Code**	CMC 105
Type	**Compulsory** ☒		**Elective** ☐	
Semester	Fall Semester (Level 1-1)			
Teaching Hours	**Lec.**	**Tut.**	**Lab.**	**Credit hours**
	2	1	2	3

2. Professional Information:

2.1. Course Description:

Pr.Req. : Integration & Multivariable functions (FRB002)

Principles of plane surveying; distances measurements (Optical, Electronic), angle and direction measurements; traverse computations; Coordinate systems for engineering works, setting out horizontal and vertical curves; earthwork computation; setting out engineering structures and construction projects, Levelling (theory, methods, and equipment).

2.2. Course Objectives (CO):

Program objective		Course objective	
PO1	**Apply** a wide spectrum of engineering knowledge, science, and specialized skills with analytic, critical, and systemic thinking to identify and **solve** engineering problems in real-life situations.	**CO1**	**Apply** wide sets of surveying knowledge, science, and specialized skills with analytic, critical, and systemic thinking to identify and **solve** surveying problems in real-life situations.
PO5	Apply analytical, **experimental**, design, construction engineering techniques and project management skills with proficiency aided by modern tools.	**CO2**	**Practice** the **experimental**, and surveying techniques and skills with proficiency using modern surveying instruments in a work team.

2.3. Course Learning Outcomes (CLOs):

Student Competences	Program Learning Outcomes		Course Learning Outcomes	
A2	**PLO2**	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.	**CLO1**	**Apply** the fundamental concepts of using surveying instruments in survey and setting out.
A7	**PLO7**	Function efficiently as an individual and as **a member** of multi-disciplinary and multi-cultural teams.	**CLO2**	**Use** different survey instruments, (tap, theodolite, and level) efficiently as **a member in a working group** in engineering projects.
B1	**PLO11**	Select appropriate and sustainable technologies for the 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.	**CLO3**	**Identify** the basic principles of a plane and topographic survey.
			CLO4	**Determine** horizontal and vertical angles, horizontal distance, and reduced level of points.
			CLO5	**Calculate** the coordinate of the traverse, adjust it, and solve the intersection and resection problems.
			CLO6	**Predict** the area and volume of the project.
			CLO7	**Apply** the techniques of survey and setting out for curves

2.4. Course Topics:

Course Topics	Week	Course LO's Covered						
		CLO1	CLO2	CLO3	CLO4	CLO5	CLO6	CLO7
1.Introduction to Surveying	1,2	√	√	√				
2.Angular Measurement and Theodolite	3	√	√	√	√			
3.Distance measurements	4			√	√			
4.Traversing computation and adjustment	5,6	√	√			√		
5.First Exam	7			√	√	√		
6.Levelling method	8	√	√	√	√			
7.Earthwork computation	9	√	√		√			
8.Areas and Volumes Computation	10,11						√	
9.Second Exam (Experimental Test)	12	√	√					
10. Horizontal curve	13							√
11. Vertical curve	14							√
12. Setting out engineering structures and construction projects	15	√	√					√
13. Final Exam	16			√	√	√	√	√
Total	**16**	**8**	**8**	**5**	**4**	**2**	**2**	**3**

2.5. Lab Topics:

Lab Topics	Week	Course LO's Covered						
		CLO1	CLO2	CLO3	CLO4	CLO5	CLO6	CLO7
Distance measurements	1,4	√						
Theodolite parts and calibration	3	√						
Total station parts & software	5	√						
Coordinates by Total Station	6	√						
Survey levelling instruments and height determination	8,9	√						
Lay out and setting out by Total Station	10	√						
Experimental Test	12	√						
Total	**12**	**8**						

2.6 Teaching and Learning Methods

Teaching and Learning Methods:	Course LO's Covered						
	CLO1	CLO2	CLO3	CLO4	CLO5	CLO6	CLO7
1. Lecture			√	√	√	√	√
2. Tutorials				√	√	√	√
3. Practical-based Learning	√						
4. Problem-based Learning				√	√	√	√
5. Co-operative Learning		√					
Teaching and Learning Methods for Students with Special Needs:							
Methods							
1. Discussion Session							√
2. Extra Lectures							√
3. Provide different levels of books and materials							√

2.7 Assessment Methods

Assessment Methods:		Course LOs Covered						
		CLO1	CLO2	CLO3	CLO4	CLO5	CLO6	CLO7
Formative Assessment Method								
Test	**First Exam**			√	√	√		
	Experimental Test	√						
Discussion					√	√	√	√
Observation			√					
Mini-Project		√	√					
Summative Assessment Method								
Final Exam				√	√	√	√	√

2.7.1. Assessment Schedule & Grades Distribution

Assessment Method		Week	The weighting of Assessment %
Formative Assessment Method			
Tests	**First Exam**	7	30%
	Experimental Test	12	20%
Discussion		3,5,8,10,13	5 %
Observation		1,3,4,10,11,15	3 %
Mini-Project		2,15	2 %
Summative Assessment Method			
Final Exam		16	40 %
Total			100 %

2.8. List of References:

Course Notes:	• Lecturer Notes
Essential Books (Textbooks):	• Surveying for Civil and Mine Engineers Theory, Workshops, and Practicals-John Walker Joseph L. Awange- **2018**-ISBN 978-3-319-53128-1- ISBN 978-3-319-53129-8 (eBook)
Recommended Books:	• Elementary Surveying - An Introduction to Geomatics -Thirteenth Edition-2012-CHARLES D. GHILANI-ISBN-13: 978-0-13-255434-3-ISBN-10: 0-13-255434-8 • Surveying Engineering & Instruments- Valeria Shank- First Edition-2012- ISBN 978-81-323-4403-2
Periodicals, Web Sites, … etc:	• https://www.lawinsider.com/dictionary/survey-plan#:~:text=Survey%20Plan%20means%20the%20plan,Sample%201 Sample%202 • https://0810ole6z-1105-y-https-www-webofscience-com.mplbci.ekb.eg/wos/woscc/full-record/WOS:000931961700049?SID=EUW1ED0D57dNJ5kJCin9AAaFD1YUc Egyptian Knowledge Bank

2.9. Facilities required for Teaching and Learning

Different Facilities	
Lecture Hall	√
Laboratory Usage	√
Data Show	√
White Board	√

3. Matrix:

3.1. Program Objectives VS Course Objectives

Program Objectives	Course Objectives	
	CO1	CO2
PO1	√	
PO5		√

3.2. Course Objectives VS Course Learning Outcomes

Course Objectives	Course Learning Outcomes						
	CLO1	CLO2	CLO3	CLO4	CLO5	CLO6	CLO7
CO1			√	√	√	√	√
CO2	√	√					

3.3. Program Learning Outcomes VS Course Learning Outcomes

Student Competences	Program Learning Outcomes	Course Learning Outcomes						
		CLO1	CLO2	CLO3	CLO4	CLO5	CLO6	CLO7
A2	PLO2	√						
A7	PLO7		√					
B1	PLO11			√	√	√	√	√

3.4. Assessment Alignment Matrix

SC	PLO	PO	CLOs	Teaching M.	Assessment
A2	PLO2	PO5	CLO1	Practical-based Learning	Experimental Test
					Mini-Project
A7	PLO7		CLO2	Co-operative Learning	Observation
					Mini-Project
B1	PLO11	PO1	CLO3	Lecture	First , and Final Exams.
			CLO4	Lecture	First , and Final Exams.
				Tutorials	
				Problem-based Learning	Discussion
			CLO5	Lecture	First, and Final Exams.
				Tutorials	
				Problem-based Learning	Discussion
			CLO6	Lecture	Final Exams
				Tutorials	
				Problem-based Learning	Discussion
			CLO7	Lecture	Final Exam.
				Tutorials	
				Problem-based Learning	Discussion

Course Coordinator: **Dr. Rasha Mohey Al-Deen**

Head of Department: **Dr. Ahmed Youssef Kamal El-Deen**

Date: 2/1/ 2024

Course Specification

1. Basic Information:

Program Title	Construction Engineering and Management			
Department Offering the course	Construction Engineering and Management			
Date of Specification Approval	**2/1/2024**			
Course Title	Construction Engineers Drawing		**Code**	CMC 106
Type	**Compulsory** ☒		**Elective** ☐	
Semester	Spring Semester (Level 1-2)			
Teaching Hours	**Lec.**	**Tut.**	**Lab.**	**Credit hours**
	1	**-**	**3**	**2**

2. Professional Information:

2.1. Course Description:

Pr.Req. : Computer Aided Drafting (FRM010)

Introduction to BIM in Autodesk Revit. Model creation, view creation, in Revit. Geometrical Constructions; two- dimensional drawing, sketching for creating solid models. Introduction to solid Modeling in Autodesk Inventor, creating solid model of structures in Autodesk Inventor environment. Creating orthographic views from a solid model in AutoCAD.

2.2. Course Objectives (CO):

Program objective		**Course objective**	
PO1	Apply a wide spectrum of engineering knowledge, science, and specialized skills with analytic, critical, and systemic thinking to identify and solve engineering problems in real-life situations.	**CO1**	Illustrate the basics of general drawing and civil engineering drawing using Autodesk Revit.
PO2	Behave professionally, adhere to engineering ethics and standards, and work to develop the profession and community and promote sustainability principles	**CO2**	Formulate the fundamentals of architectural, structural, plumbing, electrical and HVAC drawings.

2.3. Course Learning Outcomes (CLO's):

Student Competences	Program Learning Outcomes		Course Learning Outcomes	
A8	PLO8	Communicate effectively – graphically, verbally and in writing – with a range of audiences using contemporary tools.	CLO1	Use the skills and have the knowledge to take a project from start to finish using the tools and library provided.
B2	PLO12	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.	CLO2	Illustrate the interface to help them navigating in Autodesk Revit.
			CLO3	Discuss the fundamentals of 2-D and 3-D dimensional drawing, and sketching for creating solid models.
			CLO4	Create 2D and 3D representations, renderings and basic documentation by using Autodesk Revit projects

2.4. Lab (Course) Topics:

Course Topics	Week	Course LO's Covered			
		CLO1	CLO2	CLO3	CLO4
Introduction of BIM and Construction Management.	1,2	√			
Conceptual Drawings and Projection system	3,4		√		
Discuss the fundamentals of Architectural Plan, Elevation and Section of a Simple Building	5,6		√	√	
First Experimental exam	7		√	√	
Structural Details of a Simple Building	8,9		√	√	
Draw plan and elevation views of a building .	10,11			√	√
Second Experimental exam	12			√	√
Skills to produce solid models of objects.	13,14	√		√	√
Create solid models of objects.	15	√			√
Practical exam	16	√	√	√	√
Total	**16**	**6**	**8**	**11**	**7**

2.5. Lab Topics (C.T)

2.6 Teaching and Learning Methods

Teaching and Learning Methods:	Course LO's Covered			
	CLO1	CLO2	CLO3	CLO4
Lecture	√	√	√	
Interactive Learning	√			√
Computer-based Instruction		√	√	√
Teaching and Learning Methods for Students with Special Needs:				
Methods				
1. Discussion Session				
2. Extra Lectures				
3. Provide different levels of books and materials				

2.7 Assessment Methods

Assessment Methods:		Course LOs Covered			
		CLO1	CLO2	CLO3	CLO4
Formative Assessment Method					
Test	First Experimental Exam		√	√	
	Second Experimental Exam			√	√
Quizzes		√	√	√	
Mini-Project		√			√
Summative Assessment Method					
Practical Exam			√	√	√

2.7.1. Assessment Schedule & Grades Distribution

Assessment Method		Week	Weighting of Asses.
Formative Assessment Method			
Test	First Experimental Exam	7	30
	Second Experimental Exam	12	20
Quizzes		3,6,13	3
Mini-Project		15	7
Summative Assessment Method			
Practical Exam		**16**	**40**
Total			**100**

2.8. List of Reference:

Course Notes:	Lecture Notes
Essential Books (Textbooks):	A Textbook of Engineering Drawing: Along with an Introduction to AutoCAD, International Publishing House, 2015. ISBN 9789384588687.
Recommended Books:	BIM and Construction Management: Proven Tools, Methods, and Workflows. Hardin and McCool, 2nd edition, Wiley 2015.

2.9. Facilities required for Teaching and Learning

Different Facilities
Laboratory Usage
Data Show
White Board

3. Matrix:

3.1. Program Objectives VS Course Objectives

Program Objectives	Course Objective	
	CO 1	CO 2
PO1	√	
PO2		√

3.2. Course Objectives VS Course Learning Outcomes

Course Objectives	Course Learning Outcomes			
	CLO1	CLO2	CLO3	CLO4
CO1	√	√		
CO2			√	√

3.3. Program Learning Outcomes VS Course Learning Outcomes

Student Competences	Program Learning Outcomes	Course Learning Outcomes			
		CLO1	CLO2	CLO3	CLO4
A8	PLO8	√	√		
B2	PLO12			√	√

3.4. Assessment Alignment Matrix

SC	PLO	PO	CLO	Teaching M.	Assessment M.
A8	PLO 8	PO1	CLO1	Lectures Interactive Learning	Quizzes Mini-Project
			CLO2	Lectures	Quizzes
				Computer-based Instruction	First Experimental Exam Practical exam
B2	PLO 12	PO2	CLO3	Lectures	Quizzes
				Computer-based Instruction	First and Second Experimental Exam Practical exam
			CLO4	Interactive Learning	Mini-Project
				Computer-based Instruction	Second Experimental Exam Practical exam

Course Coordinator: **Dr. Omia Said El Hadidi**

Head of Department: **Dr. Ahmed Youssef Kamal El-Deen**

Date: 2/1/2024

Course Specification

1. Basic Information:

Program Title	Construction Engineering and Management			
Department Offering the course	Construction Engineering and Management			
Date of Specification Approval	**2/1/2024**			
Course Title	Surveying for Engineers-2		**Code**	CMC 108
Type	**Compulsory** ☒		**Elective** ☐	
Semester	Spring Semester (Level 1-2)			
Teaching Hours	**Lec.**	**Tut.**	**Lab.**	**Credit hours**
	2	2	0	3

2. Professional Information:

2.1. Course description:

Pr.Req. : Surveying for Engineers-1 (CMC 105)

Introduction to geodesy; Coordinate systems, Map projections, GNSS system concepts and characteristics, signal structure, receivers and antennae; GNSS measurements, GNSS time, error sources and measurement accuracy; position determination techniques – Errors Reduction Techniques, single point and differential positioning, static and kinematic GNSS, postprocessing and Real-time processing, DGNSS concepts.

2.2. Course Objectives (CO):

Program objective		Course objective	
PO1	Apply a wide spectrum of engineering knowledge, science, and specialized skills with analytic, critical, and systemic thinking to identify and solve engineering problems in real-life situations.	**CO1**	**Solve** the problems and discuss all that related to geodetic datum and coordinate systems of the objects on the earth by applying a wide spectrum of surveying knowledge.
		CO2	**Evaluate** the techniques of the point position determination using analytic thinking.
PO4	Master self-learning and life-long learning strategies to communicate effectively in academic/professional fields.	**CO3**	**Apply** a self-learning strategies to communicate effectively in professional (surveying) fields

2.3. Course Learning Outcomes (CLO's):

Student Competences	Program Learning Outcomes		Course Learning Outcomes	
A5	PLO5	Practice research techniques and methods of investigation as an inherent part of learning.	CLO1	**Practice** research techniques on the map-projection
			CLO2	**Apply** the methods of investigation in DGNSS concepts.
B1	PLO11	Select appropriate and sustainable technologies for the 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.	CLO3	**Identify** the concepts and theories of Geodesy and Global Navigation Satellite System.
			CLO4	**Discuss** the basic principle of different coordinate systems on the ellipsoid.
			CLO5	**Analyze** the results of geodetic observations using numerical models and calculate their accuracy.
			CLO6	**Evaluate** the different Position determination techniques by Global Navigation Satellite System.
			CLO7	**Use** suitable software to solve the problems of determining 3-D position on and near the surface of the earth

2.4. Course Topics:

Course Topics	Week	Course LO's Covered						
		CLO1	CLO2	CLO3	CLO4	CLO5	CLO6	CLO7
Introduction to geodesy	1			√	√			
Coordinate systems	2				√			√
Map projections	3,4	√						√
GNSS system concepts and characteristics, signal	5			√			√	

structure, receivers and antennae								
GNSS measurements	6			√			√	
First Exam	7			√	√		√	
GNSS time, error sources and measurement accuracy	8			√			√	
position determination techniques	9,10				√		√	
Errors Reduction Techniques	11				√	√		
Second Exam	12			√	√	√	√	
single point and differential positioning, static and kinematic GNSS	13			√	√	√	√	
postprocessing and Real-time processing, DGNSS concepts	14,15		√	√				
Final Exam	16			√	√	√	√	
Total	16	**2**	**2**	**7**	**6**	**2**	**6**	**2**

2.5. Lab Topics:

(Not Applicable**)**

2.6Teaching and Learning Methods

Teaching and Learning Methods:	**Course LO's Covered**						
	CLO1	**CLO2**	**CLO3**	**CLO4**	**CLO5**	**CLO6**	**CLO7**
1. Lecture			√	√	√	√	
2. Tutorials			√	√	√		√
3. Report	√	√					
4.Computer-based Instruction							√
Teaching and Learning Methods for Students with Special Needs:							
Methods							
1. Discussion Session							√
2. Extra Lectures							√
3. Provide different levels of books and materials							√

2.7 Assessment Methods

Assessment Methods:		Course LOs Covered						
		CLO1	CLO2	CLO3	CLO4	CLO5	CLO6	CLO7
Formative Assessment Method								
Test	**First Exam**			√	√		√	
	Second Exam			√	√	√	√	
Report		√	√					
Presentation		√	√					
Assignments								√
Discussion								√
Summative Assessment Method								
Final Exam				√	√	√	√	

2.7.1. Assessment Schedule & Grades Distribution

Assessment Method		Week	The weighting of Assessment %
Formative Assessment Method			
Tests	**First Exam**	**7**	**30**
	Second Exam	**12**	**20**
Report		**1,15**	**2**
Presentation		**1,15**	**3**
Assignments		**4**	**3**
Discussion		**3**	**2**
Summative Assessment Method			
Final exam		**16**	**40**
Total			**100**

2.8. List of Reference:

Essential Books (Textbooks):	Surveying and geomatics engineering, principles, technologies and applications. Surveying committee. 2022-ISBN 978-0-7844-1603-7 ISBN 978-0-7844-8422-7 (epub)
Recommended Books:	• Elementary surveying. An introduction to geomatics by Ghilani C.D., Wolf P.R., PH 2011, ISBN: 0132554348. • PRECISION SURVEYING The Principles and Geomatics Practice-JOHN OLUSEGUN OGUNDARE-2015-ISBN 978-1-119-10251-9 • Geodesy- Introduction to Geodetic Datum and Geodetic Systems-Zhiping Lu - Yunying Qu - Shubo Qiao-2014-ISBN 978-3-642-41244-8- ISBN 978-3-642-41245-5 (eBook) • ENGINEERING SATELLITE-BASED NAVIGATION AND TIMING-Global Navigation Satellite Systems, Signals, and Receivers-

	John W. Betz-2016-ISBN: 978-1-118-61597-3
Web Sites	https://desktop.arcgis.com/en/arcmap/latest/map/projections/transverse-mercator.htm

2.9. Facilities required for Teaching and Learning

Different Facilities	
Lecture Hall	√
Library	√
Data Show	√
White Board	√

3. Matrix:

3.1. Program Objectives VS Course Objectives

Program Objectives	Course Objective		
	CO1	CO2	CO3
PO1	√	√	
PO4			√

3.2. Course Objectives VS Course Learning Outcomes

Course Objectives	Course Learning Outcomes						
	CLO1	CLO2	CLO3	CLO4	CLO5	CLO6	CLO7
CO1			√	√			
CO2					√	√	√
CO3	√	√					

3.3. Program Learning Outcomes VS Course Learning Outcomes

Student Competences	Program Learning Outcomes	Course Learning Outcomes						
		CLO1	CLO2	CLO3	CLO4	CLO5	CLO6	CLO7
A5	PLO5	√	√					
B1	PLO11			√	√	√	√	√

3.4. Assessment Alignment Matrix

SC	PLO	PO	CLO	Teaching M.	Assessment M.
A5	PLO5	PO4	CLO1	Report	Report Presentation
			CLO2	Report	Report Presentation
B1	PLO11	PO1	CLO3	Lecture Tutorials	First, Second and Final Exam
			CLO4	Lecture Tutorials	First, Second and Final Exam
			CLO5	Lecture Tutorials	Second, and Final Exam
			CLO6	Lecture	First, Second and Final Exam
			CLO7	Computer-based Instruction	Assignments
				Tutorials	Discussion

Course Coordinator: **Dr. Rasha Mohey Al-Deen**

Head of Department: **Dr. Ahmed Youssef Kamal El-Deen**

Date: 2/1/2024

Course Specification

1. Basic Information:

Program Title	Construction Engineering and Management			
Department Offering the course	Construction Engineering and Management			
Date of Specification Approval	**2/1/2024**			
Course Title	Fluid Mechanics	**Code**	CMC109	
Type	**Compulsory** ☒	**Elective** ☐		
Semester	Fall Semester (Level 1-1)			
Teaching Hours	**Lec.**	**Tut.**	**Lab.**	**Credit hours**
	2	**---**	**1**	**2**

2. Professional Information:

2.1. Course Description:

Pr. Req.: Waves and Heat (FRB005)

Dimensions and Units - Fluid Properties - Fluid Statics (Pressure distribution - Pressure measurements - Forces on submerged surfaces) - Buoyancy and Floatation - Fluids in Relative Equilibrium - Fluid Kinematics (Description of Fluids motion - Continuity Equation -Velocity and Acceleration) - Fluid Dynamics (Energy Equation - Applications of Bernoulli's Equation) - Impulse-Momentum Equation - Application of the Momentum Equation - Flow in Pipes – Pipes Systems.

2.2. Course Objectives (CO):

Program objective		Course objective	
PO1	Apply a wide spectrum of engineering knowledge, science, and specialized skills with analytic, critical, and systemic thinking to identify and solve engineering problems in real-life situations.	**CO1**	**Apply** the fundamental principles of fluid mechanics for the solution of real-life civil Engineering problems.
PO5	Apply analytical, experimental, design, construction engineering techniques and project management skills with proficiency aided by modern tools.	**CO2**	**Practice** the laboratory experiments with proficiency using fluid mechanics laboratory devices.

2.3. Course Learning Outcomes (CLO's):

Student Competences	Program Learning Outcomes		Course Learning Outcomes	
A1	PLO1	Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics	CLO1	**Identify** the basic principles of fluid mechanics and flow in pipes
			CLO2	**Apply** civil Engineering processes for flow in open channels and pipeline systems
A2	PLO2	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.	CLO3	**Conduct** laboratory tests on hydraulic laboratory.
			CLO4	**Work** efficiently in groups to assess the experimental data tests by comparing them with the available fluid mechanics equations.
B1	PLO11	Select appropriate and sustainable technologies for the 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	CLO5	**Use** different techniques of fluid mechanics, for solving civil engineering problems.
			CLO6	**Solve** fluid flow problems using Mass, Energy and Momentum equations

2.4. Course Topics:

Course Topics	Week	Course LO's Covered					
		CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
Introduction & Dimensions and Units	1	√					
Properties of liquids	2	√	√	√			
Fluid statics and pressure measurements	3		√			√	
Forces on Submerged Surface	4		√			√	

Buoyancy and Floatation	5	√	√			√	
Fluids in Relative Equilibrium	6		√			√	
First Exam	7	√	√			√	
Type of Flow, Continuity equation	8	√		√		√	√
Bernoulli's equation	9	√		√	√	√	√
Flow over weirs & Flow through orifices	10		√	√	√	√	√
Momentum equation	11	√				√	√
Experimental Exam	12	√	√			√	√
Momentum equation's Application	13		√			√	√
Flow in pipes and losses	14	√	√	√	√	√	√
Practical and oral exam	15			√	√		
Final exam	16	√	√			√	√
Total	16	**10**	**11**	**6**	**4**	**13**	**8**

2.5 Lab Topics

Lab Topics	**Week**	**Course LO's Covered**					
		CLO1	**CLO2**	**CLO3**	**CLO4**	**CLO5**	**CLO6**
Determine Densities, Specific Gravities, Weights and Viscosity	**2**			√	√		
Bernoulli's Theorem Demonstration	**8**			√	√		
Flow through sharp edged Orifice.	**9**			√	√		
Flow over Rectangular and Triangular Weirs.	**10**			√	√		
Friction in a smooth bore pipe, Minor loss Experiment.	**11**			√	√		
Oral Test and experimental	**12**						
Total	**5**	**-**	**-**	**5**	**5**	**-**	**-**

2.6 Teaching and Learning Methods

Teaching and Learning Methods:	**Course LO's Covered**					
	CLO1	**CLO2**	**CLO3**	**CLO4**	**CLO5**	**CLO6**
1. Lecture	√	√			√	√
2. Practical-based Learning			√	√		
Teaching and Learning Methods for Students with Special Needs:						
Methods						
1. Discussion Session						
2. Extra Lectures						
3. Provide different levels of books and materials						

2.7 Assessment Methods

Assessment Methods:		Course LOs Covered					
		CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
Formative Assessment Method							
Tests	First Exam	√	√			√	
	Experimental			√	√		
	Oral			√	√		
	Quizzes	√	√			√	√
Summative Assessment Method							
Final Exam		√	√			√	√

2.7.1. Assessment Schedule & Grades Distribution

Assessment Method		Week	The weighting of Assessment %
Formative Assessment Method			
Tests	First Exam	7	30
	Experimental	12	10
	Oral	12	10
	Quizzes	Each 2-3 weeks	10
Summative Assessment Method			
Final exam		16	40
Total			100

2.8. List of Reference:

Course Notes:	Lecture notes
	A Brief Introduction to Fluid Mechanics by Hochstein, John I., and Andrew L. Gerhart. Young, Munson and Okiishi's. John Wiley & Sons, 2021. ISBN: 978-1-119-61117-2 A Brief Introduction to Fluid Mechanics, sixth Edition by Donald F. Young, Bruce R. Munson, Theodore H. Okiishi, Wade W. Huebsch, Wiley 2010, ISBN: 0470596791, 9780470596791 E. Shashi Menon, "Liquid Pipeline Hydraulics", Marcel Dekker, 2004.
Periodicals, Web Sites, … etc:	**Journal -Experiments in Fluids** https://www.youtube.com/watch?v=96XaYmaHg6A&ab_channel=GetAClass-Physics https://www.youtube.com/watch?v=eKEorBipbO8&ab_channel=GetAClass-Physics

2.9. Facilities required for Teaching and Learning

Different Facilities
Lecture Hall
Laboratory Usage
Library Usage
Data Show
White Board

3. Matrix:

3.1. Program Objectives VS Course Objectives

Program Objectives	Course Objective	
	CO1	CO2
PO1	√	
PO5		√

3.2. Course Objectives VS Course Learning Outcomes

Course Objectives	Course Learning Outcomes					
	CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
CO1	√	√			√	√
CO2			√	√		

3.3. Program Learning Outcomes VS Course Learning Outcomes

Student Competences	Program Learning Outcomes	Course Learning Outcomes					
		CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
A1	PLO1	√	√				
A2	PLO2			√	√		
B1	PLO11					√	√

3.4. Assessment Alignment Matrix

SC	PLO	PO	CLO	Teaching M.	Assessment M.
A1	PLO1	PO1	CLO1	• Lecture	• Quizzes • First, and Final exam
			CLO2	• Lecture	• Quizzes • First, and Final exam
A2	PLO2		CLO3	• Practical-based Learning	• Experimental Test • Oral Test
			CLO4	• Practical-based Learning	• Experimental Test • Oral Test
B1	PLO11	PO5	CLO5	• Lecture	• Quizzes • First, and Final exam
			CLO6	• Lecture	• Quizzes • Final exam

Course Coordinator: Dr. Fahmy Salah Abdelhaleem

Head of Department: Dr. Ahmed Youssef Kamal El-Deen

Date: 2/1/2024

Course Specification

1. Basic Information:

Program Title	Construction Engineering and Management			
Department Offering the course	Construction Engineering and Management			
Date of Specification Approval	**2/1/2024**			
Course Title	Hydraulics for Construction Engineers		**Code**	CMC112
Type	**Compulsory** ☒		**Elective** ☐	
Semester	Spring Semester (Level 1-2)			
Teaching Hours	**Lec.**	**Tut.**	**Lab.**	**Credit hours**
	2	**---**	**1**	**2**

2. Professional Information:

2.1. Course Description:

Pr.Req.: Fluid Mechanics (CMC109)

Basic Principles (open channel flow) - Uniform Flow (Basic equations for steady uniform flow - Velocity and shear stress distributions in open channels) – Non-Uniform Flow (Specific energy - Hydraulics of channel bed transition) - Hydraulic Jumps - Gradually Varied Flow - Open Channel Design (Rigid boundary and erodible channel) - Dimensional analysis and Similarity (Methods of dimensional analysis - Model analysis and similarity) – Hydraulics Machinery (Pumps and Turbines).

2.2. Course Objectives (CO):

Program objective		Course objective	
PO1	Apply a wide spectrum of engineering knowledge, science, and specialized skills with analytic, critical, and systemic thinking to identify and solve engineering problems in real-life situations.	**CO1**	**Apply** the fundamental principles of Fluid dynamics for the solution of real-life hydraulic engineering problems
PO5	Apply analytical, experimental, design, construction engineering techniques and project management skills with proficiency aided by modern tools.	**CO2**	**Apply** the skills for analyzing experimental data and working in teams

2.3. Course Learning Outcomes (CLO's):

Student Competences	Program Learning Outcomes		Course Learning Outcomes	
A2	PLO2	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.	CLO1	**Investigate** the fundamental principles of hydraulics through experimentation
			CLO2	**Discuss** experimental readings through working in teams.
A3	PLO3	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.	CLO3	**Solve** complex problems in hydraulics
			CLO4	**Design** of canal and drain cross section
B1	PLO11	Select appropriate and sustainable technologies for the 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	CLO5	**Acquire** the skills for dimensional analysis and similitude.
			CLO6	**Predict** the operating characteristics of pumps and the factors affecting their operation, performance, and efficiency.

2.4. Course Topics:

Course Topics	Week	Course LO's Covered					
		CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
Open channel flow	1	√	√				
Uniform Flow	2			√			
Velocity distributions in open channels	3			√			
shear stress distributions in open channels	4			√			
Specific energy- Hydraulics transition	5			√			
Hydraulic Jumps	6	√	√	√			
First Exam	7			√			
Gradually Varied Flow	8			√			
Open Channel Design	9			√	√		
Open Channel Design	10			√	√		
Dimensional analysis	11			√		√	
Experimental Exam	12	√	√				
Model analysis and similarity	13			√		√	
Hydraulics Machinery	14	√	√	√			√
Hydraulics Machinery	15	√	√				√
Final exam	16			√	√	√	√
Total	16	**4**	**4**	**12**	**3**	**4**	**3**

2.5 Lab Topics

Lab Topics	Week	Course LO's Covered					
		CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
Open Channel Flow	**1-6**	√	√				
Hydraulic Jump	**1-6**	√	√				
Pump Characteristics	**1-6**	√	√				
Oral Test and experimental	**12**	√	√				
Total	**12**	**6**	**6**				

2.6 Teaching and Learning Methods

Teaching and Learning Methods:	Course LO's Covered					
	CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
1. Lecture			√	√	√	√
2. Practical-based Learning	√	√				
3. Reports					√	√
Teaching and Learning Methods for Students with Special Needs:						
Methods						
1. Discussion Session						
2. Extra Lectures						
3. Provide different levels of books and materials						

2.7 Assessment Methods

Assessment Methods:		Course LOs Covered					
		CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
Formative Assessment Method							
Tests	First Exam			√			
	Experimental	√	√				
	Quizzes			√	√	√	√
Reports						√	√
Mini-Project		√	√				
Summative Assessment Method							
Final Exam				√	√	√	√

2.7.1. Assessment Schedule & Grades Distribution

Assessment Method		Week	The weighting of Assessment %
Formative Assessment Method			
Tests	First Exam	7	30
	Experimental	12	20
	Quizzes	Each 3 weeks	4
Reports		15	3
Mini-Project		15	3
Summative Assessment Method			
Final exam		16	40
Total			100

2.8. List of Reference:

Course Notes:	Lecture notes
Essential Books (Textbooks):	• Chadwick, A., Morfett, J. and Borthwick, M. (2021), Hydraulics in Civil and Environmental Engineering, 6th Edn., Published June 8, 2021, by CRC Press. ISBN 9780367460891. • Wynn P. (2014), Hydraulics for Civil Engineers by, ICE Publishing. First Edition. ISBN-13: 978-0727758453.
Periodicals, Web Sites, … etc:	Journal of hydraulic Engineering, ASCE https://www.youtube.com/watch?v=bY0PJgnITTI&ab_channel=GerardaMaryShields

2.9. Facilities required for Teaching and Learning

Different Facilities
Lecture Hall
Laboratory Usage
Library Usage
Data Show
White Board

3. Matrix:

3.1. Program Objectives VS Course Objectives

Program Objectives	Course Objective	
	CO1	CO2
PO1	√	
PO5		√

3.2. Course Objectives VS Course Learning Outcomes

Course Objectives	Course Learning Outcomes					
	CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
CO1			√	√	√	√
CO2	√	√				

3.3. Program Learning Outcomes VS Course Learning Outcomes

Student Competences	Program Learning Outcomes	Course Learning Outcomes					
		CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
A2	PLO2	√	√				
A3	PLO3			√	√		
B1	PLO11					√	√

3.4. Assessment Alignment Matrix

SC	PLO	PO	CLO	Teaching M.	Assessment M.
A2	PLO2	PO1	CLO1	• Practical-based Learning	• Experimental • Mini-Project
			CLO2	• Practical-based Learning	• Experimental • Mini-Project
A3	PLO3	PO5	CLO3	• Lecture	• Quizzes • First, and Final Exam
			CLO4	• Lecture	• Quizzes • Final Exam
B1	PLO11		CLO5	• Lecture • Reports	• Quizzes • Final Exam • Reports
			CLO6	• Lecture • Reports	• Quizzes • Reports • Final Exam

Course Coordinator: Prof. Fahmy Salah Abdelhaleem

Head of Department: Dr. Ahmed Youssef Kamal El-Deen

Date: 2/1/2024

Course Specification

1. Basic Information:

Program Title	Construction Engineering and Management			
Program Offering the course	Construction Engineering and Management			
Date of Specification Approval	**2/1/2024**			
Course Title	**Engineering Differential Equations**		**Code**	**FRB 101**
Type	**Compulsory ☒**		**Elective ☐**	
Semester	**Fall Semester (Level 1-1)**			
Teaching Hours	**Lec.**	**Tut.**	**Lab.**	**Credit hours**
	2	**2**	**0**	**3**

2. Professional Information:

2.1. Course Description:

Pr.Req. : Integration & Multivariable functions (FRB002)

Basic Concepts of Ordinary and Partial differential equations (ODEs & PDEs):
Oder, Degree, Linearity, Formation, Geometric and physical applications (Newtons law of cooling, electric circuits), Types of solutions, Existence and uniqueness of solutions.
ODEs: Solution of first order ODEs (Separable, Homogeneous, Exact, Integrating factor, Linear and Bernoulli equations). Orthogonal trajectories. Solution of nth order ODEs (homogeneous and non-homogeneous). System of first order linear differential equations. Laplace transforms and inverse Laplace transforms with applications. Fourier series with applications. Gamma and Beta functions
PDEs: Solution of linear PDEs with constant coefficients, solution of some initial boundary value problems. Solution of PDEs by Laplace Transforms.

2.2. Course Objectives (CO):

Program objective		**Course objective**	
PO1	Apply a wide spectrum of engineering knowledge, science, and specialized skills with analytic, critical, and systemic thinking to identify and solve engineering problems in real-life situations.	**CO1**	**List and Explain** basic Theorems of Probability, and their applications in engineering life.
		CO2	**Select** a suitable item to evaluate applied probability problems in **real-life situations**

2.3. Course Learning Outcomes (CLO's):

Student Competences	Program Learning Outcomes		Course Learning Outcomes	
A1	PLO1	Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science, and applied mathematics.	CLO1	**Identify** the basic items of the course.
			CLO2	**Explain** how to use all items of the course in applied engineering problems
A2	PLO2	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	CLO3	**Solve** different problems for various mathematics elements
			CLO4	**Analyze** the different problems and verifications.

2.4. Course Topics:

Course Topics	Week	Course LO's Covered			
		CLO1	CLO2	CLO3	CLO4
Oder, Degree, Linearity, Formation, Geometric and physical applications .	1&2	√	√		
Solution of first order ODEs .	3&4	√	√		
Orthogonal trajectories. Solution of nth order ODEs (homogeneous and non-homogeneous).	5&6	√	√	√	
First Mid-Term	7	√	√	√	
System of first order linear differential equations.	8&9	√	√		
Fourier series with applications	10	√	√		
Gamma and Beta functions	11	√	√		
Second Mid-Term	12	√	√		
Solution of linear PDEs with constant coefficients.	13	√	√	√	√
Solution of PDEs by Laplace Transforms	14	√	√	√	√
Revision	15	√	√	√	√
Final Exam	**16**	√	√	√	√
Total	**16**	**13**	**13**	**5**	**3**

2.5. Lab Topics:

NA

2.6. Teaching and Learning Methods

Teaching and Learning Methods:	Course LO's Covered			
	CLO1	CLO2	CLO3	CLO4
1. Lecture	√	√		
2. Tutorials	√	√		
3. Discussions			√	√
Teaching and Learning Methods for Students with Special Needs:				
Methods				
1. Discussion Session				
2. Extra Lectures				
3. Provide different levels of books and materials				

2.7. Assessment Methods

Assessment Methods		Course LOs Covered			
		CLO1	CLO2	CLO3	CLO4
Formative Assessment Method					
Tests	First Exam	√	√	√	
	Second Exam	√	√		√
	Quizzes	√	√		
Discussions				√	√
Summative Assessment Method					
Final Exam		√		√	

2.7.1. Assessment Schedule & Grades Distribution

Assessment Methods		Week	Weighting of Asses.
Formative Assessment Method			
Tests	**First exam**	7^{th}	30%
	Second exam	12^{th}	20%
	Quizzes	6^{th},9^{th}	5%
Discussion		5^{th},8^{th},11^{th},14^{Th}	5%
Summative Assessment Method			
Final exam		16^{th}	40%
Total			**100%**

2.8. List of Reference:

Essential Books (Textbooks):	Tenenbaum, Morris, and Harry Pollard. Ordinary differential equations: an elementary textbook for students of mathematics, engineering, and the sciences. Courier Corporation, 1985. Hsu, Sze-Bi, and Kuo-Chang Chen. Ordinary differential equations with applications. Vol. 23. World scientific, 2022.
Periodicals, Web Sites, … etc:	https://mathinsight.org/ordinary_differential_equation_introduction

2.9. Facilities required for Teaching and Learning

Different Facilities
Lecture Hall
Data Show
White Board
Lecture notes (Power Point)

3. Matrix:

3.1. Program Objectives VS Course Objectives

Program Objectives	Course Objective	
	CO1	CO2
PO1	√	√

3.2. Course Objectives VS Course Learning Outcomes

Course Objectives	Course Learning Outcomes			
	CLO1	CLO2	CLO3	CLO4
CO1	√	√		
CO2			√	√

3.3. Program Learning Outcomes VS Course Learning Outcomes

Student Competences	Program Learning Outcomes	Course Learning Outcomes			
		CLO1	CLO2	CLO3	CLO4
A1	PLO1	√	√		
A2	PLO2			√	√

3.4. Assessment Alignment Matrix

Student Competences	PLO	PO	CLO	Teaching M.	Assessment M.
A1	PLO1	PO1	CLO1	Lecture Tutorials	First, Second, Final Exams. Quizzes
			CLO2	Lecture Tutorials	First and Second Exams. Quizzes
A2	PLO2		CLO3	Discussions	First, and Final Exam Discussions.
			CLO4	Discussions	Second Exam, Discussions.

Course Coordinator: Assoc. Prof. Mohamed.A.Elsiy

Program Coordinator: Dr. Ahmed Youssef Kamal El-Deen

Date: 2/1/2024

Course Specification

1. Basic Information:

Department Offering the program	Construction Engineering and Management			
Department Offering the course	Construction Engineering and Management			
Date of Specification Approval	2/1/2024			
Course Title	**Water Chemistry**		**Code**	**FRB 201**
Type	**Compulsory ☒**	**Elective ☐**		
Semester	**Spring Semester (Level 1-2)**			
Teaching Hours	**Lec.**	**Tut.**	**Lab.**	**Credit hours**
	2	-	2	**3**

2. Professional Information:

2.1. Course description:

Pr.Req. : Chemistry for Engineers (FRB007)

This course aims to provide an introduction of equilibrium chemistry principles in aquatic systems. This course is designed for engineering students who are often required to understand the composition of solutions and direction of changes during treatment or in environmental systems. By completion of the course, the student will be able to interpret and communicate results related to water quality. Therefore, the course syllabus includes the following topics: equilibrium principles of acids-bases, dissolution-precipitation, titration, gas-liquid equilibrium, oxidation-reduction, complexation and water quality analysis and quality control.

2.2. Course Objectives (CO):

Program objective		Course objective	
PO1	Apply a wide spectrum of engineering knowledge, science, and specialized skills with analytic, critical, and systemic thinking to identify and solve engineering problems in real-life situations.	**CO1**	Predict acid and base behavior in aquatic systems.
PO2	Behave professionally, adhere to engineering ethics and standards, and work to develop the profession and community and promote sustainability principles.	**CO2**	Perform water quality analyses and interpret the results.

2.3. Course Learning Outcomes (CLO's):

Student Competences	Program Learning Outcomes		Course Learning Outcomes	
A1	PLO1	Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science, and applied mathematics.	CLO1	Discuss acid and base reactions, precipitation /dissolution and complexing
			CLO2	Illustrate the carbonate buffer system, and the impact for aquatic chemistry in general
A2	PLO2	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	CLO3	Use the basic analytical methods in water chemistry.
A4	PLO4	Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues and risk management principles.	CLO4	Explain the effects of speciation on availability and toxicity of selected ions

2.4. Course Topics:

Course Topics	Week	Course LO's Covered			
		CLO1	CLO2	CLO3	CLO4
Introduction to water properties, solutes properties and natural water compositions	1	√			
Acids and Bases: carbonate system, log C vs pH diagrams	2	√			
Chemical kinetics and reaction rates	3-4	√			
Principles and applications for chemical equilibrium in aquatic systems	5		√		
Chemical reaction and chemical equilibrium, and conservation of mass	6		√		
First exam	7	√	√		
Titration, alkalinity and acidity	8			√	
Gas-liquid equilibrium and effect on alkalinity	9		√		
Precipitation/dissolution and water softening	10		√		

Oxidation reduction reactions	**11**				√
Experimental Exam	**12**			√	
Complexation and water quality analysis and quality control	**13**				√
Practical exam	**14,15**			√	
Final	**16**	√	√		√
Total	**15**	**5**	**6**	**2**	**4**

2.5. Lab Topics:

Lab Topics	**Week**	**Course LO's Covered**			
		CLO6	**CLO2**	**CLO3**	**CLO4**
Introduction to lab. safety rules	**1**			√	
Experiment 1: Water pH	**2**			√	
Experiment 2: Total Dissolved Solids (TDS)	**3**			√	
Experiment 3: Electrical Conductivity (EC)	**4**			√	
Experiment 4: Water Hardness	**5**			√	
Experiment 5: Water Alkalinity	**6**			√	
Experiment 6: Total Suspended Solids (TSS)	**7**			√	
Oral & Experimental Test	**12**			√	
Total	**8**			**8**	

2.6 Teaching and Learning Methods

Teaching and Learning Methods:	**Course LO's Covered**			
	CLO1	**CLO2**	**CLO3**	**CLO4**
Lecture	√	√		√
Practical-based Learning			√	
Interactive learning			√	
Teaching and Learning Methods for Students with Special Needs:				
Methods				
1. Discussion Session	√	√	√	√
2. Extra Lectures	√	√	√	√

2.7 Assessment Methods

Assessment Methods		**Course LOs Covered**			
		CLO1	**CLO2**	**CLO3**	**CLO4**
Formative Assessment Method					
Tests	First Exam	√	√		
	Experimental			√	
	Oral			√	
	Quizzes	√	√		√
Observation				√	
Summative Assessment Method					
Final Exam		√	√		√

2.7.1. Assessment Schedule & Grades Distribution

Assessment Methods		Week	Weighting of Asses.
Formative Assessment Method			
Tests	**First exam**	7th	30%
	Oral and Experimental Test	12th	20%
	Quizzes	3,9,10	3%
Observations		1-7	7%
Summative Assessment Method			
Final exam		16th	40%
Total			**100%**

2.8. List of Reference:

Essential Books (Textbooks)	- Patrick L. Brezonik (Author), William A. Arnold, Water Chemistry: The Chemical Processes and Composition of Natural and Engineered Aquatic Systems 2nd Edition, 2022 - Sawyer, McCarty & Parkin, Chemistry for Environmental Engineering, McGraw Hill, 2003
Recommended Books	Stumm & Morgan, aquatic Chemistry. Third edition, John Wiley & Sons. 1995.

2.9. Facilities required for Teaching and Learning

Different Facilities	
Lecture Hall	√
laboratory Usage	√
Data Show	√
White Board	√

3. Matrix:

3.1. Program Objectives VS Course Objectives

Program Objectives	Course Objective	
	CO1	CO2
PO1	√	
PO2		√

3.2. Course Objectives VS Course Learning Outcomes

Course Objectives	Course Learning Outcomes			
	CLO1	CLO2	CLO3	CLO4
CO1	√	√		
CO2			√	√

3.3. Program Learning Outcomes VS Course Learning Outcomes

Student Competences	Program Learning Outcomes	Course Learning Outcomes			
		CLO1	CLO2	CLO3	CLO4
A1	PLO1	√	√		
A2	PLO2			√	
A4	PLO4				√

3.4. Assessment Alignment Matrix

Student Competences	PLO	PO	CLO	Teaching M.	Assessment M.
A1	PLO1	PO1	CLO1	Lecture	First and Final Exam Quizzes
			CLO2	Lecture	First and Final Exam Quizzes
A2	PLO2	PO2	CLO3	Practical-based Learning Interactive learning	Experimental Exam Observation
A4	PLO4		CLO4	Lecture	Final Exam Quizzes

Course Coordinator: Prof. Elsayed Fouad

Program Coordinator: Dr. Ahmed Youssef Kamal El-Deen

Date: 2/1/2024

Course Specification

1. Basic Information:

Program Title	**Construction Engineering and Management**			
Program Offering the course	**Construction Engineering and Management**			
Date of Specification Approval	**2/1/2024**			
Course Title	Environmental Pollution and Industrial Safety		**Code**	FRB103
Type	**Compulsory** ☒		**Elective** ☐	
Semester	Fall Semester (Level 1-1)			
Teaching Hours	Lec.	Tut.	Lab.	Credit hours
	2	0	1	3

2. Professional Information:

2.1. Course description:

Pr.Req. : Non

Air pollution-Adverse effects -ozone depletion – green house effects- Acid rain and global warming -measurement and control methods.
- Water pollution- constituents of wastewater- primary treatment: various pre-treatment methods
- Advanced Treatment: chemical oxidation, precipitation, air stripping

Construction Engineering and Managment students: Plan and manage construction health and safety, maintain safety issues for construction to introduce the foundations on which appropriate health and safety systems may be built. Occupation and health and safety affect all aspects of work. Legal framework for health and safety.

2.2. Course Objectives (CO):

Program objective		Course objective	
PO4	Master self-learning and life-long learning strategies to communicate effectively in academic/professional fields.	**CO1**	Illustrate Adverse effects -ozone and global warming measurement and control methods.
PO5	Apply analytical, experimental, design, construction engineering techniques and project management skills with proficiency aided by modern tools.	**CO2**	Maintain safety measures in construction and materials and assess environmental impacts of projects.

2.3. Course Learning Outcomes (CLO's):

Student Competences	Program Learning Outcomes		Course Learning Outcomes	
A1	PLO1	Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.	CLO1	Describe the primary treatment: various pre-treatment methods, Advanced Treatment: chemical oxidation, precipitation, air stripping for water pollutants
A2	PLO2	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.	CLO2	Discuss sources of air pollution and ways for control and adverse effects.
A4	PLO4	Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues, and risk management principles.	CLO3	Demonstrate nature and sources of water pollution and advanced treatment.
			CLO4	Demonstrate the general safety issues for construction introduce the foundations on which appropriate health and safety to systems may be built

2.4. Course Topics:

Course Topics	Week	Course LOs Covered			
		CLO1	CLO2	CLO3	CLO4
Introduction to environmental engineering , Environmental Impact Assessment, different types of environmental pollution, characteristics of wastewater	1	√			
	2	√			
Primary treatment: various pre-treatment methods,	3	√			
Advanced wast water Treatment: chemical oxidation, precipitation, air stripping	4		√		
	5		√		

Occupation health and safety affect all aspects of work. Legal framework for health and safety.	**6**			√	
First Exam	**7**	√		√	
Nature and sources of air pollution	**8**			√	
Ozone depletion - green house effects- Acid rain and global warming measurement and control method, Plan and manage construction health and safety.	**9-11**				√
Experimental Exam	**12**		√		
Maintain safety issues for construction introduce the foundations on which appropriate health and safety to systems may be built	**13**				√
	14				√
	15				√
Final Exam	**16**	√		√	√
Total	**16**	**4**	**3**	**3**	**6**

2.5. Lab Topics:

Lab Topics	Week	Course LO's Covered			
		CLO1	CLO2	CLO3	CLO4
Air sampling, Water sampling	**3-4**		√		
Adsorption, Precipitation	**5-6**		√		
Experimental Exam	**12**		√		
Total	**4**		**4**		

2.6 Teaching and Learning Methods

Teaching and Learning Methods:	Course LO's Covered			
	CLO1	CLO2	CLO3	CLO4
1. Lecture	√		√	√
2. Practical-based Learning		√		
Teaching and Learning Methods for Students with Special Needs:				
Methods				
1. Discussion Session				
2. Extra Lectures				
3. Provide different levels of books and materials				

2.7 Assessment Methods

Assessment Methods:		Course LOs Covered			
		CLO1	CLO2	CLO3	CLO4
Formative Assessment Method					
Tests	First Exam	√		√	
	Experimental Exam		√		
Assignments		√		√	√
Quizzes		√		√	√
Summative Assessment Method					
Final Exam		√		√	√

2.7.1. Assessment Schedule & Grades Distribution

Assessment Method		Week	The weighting of Assessment %
Formative Assessment Method			
Tests	First Exams	7	30
	Experimental Exam	12	20
Assignments		**2 - 6 , 9 - 13**	5
Quizzes		**2- 6 , 9 - 13**	5
Summative Assessment Method			
Final Exam		16	40
Total			100

2.8. List of Reference:

Course Notes:	Not used
Essential Books (Textbooks):	• Peavy, Rowe and Tchobangolous " Environmental Engineering" McGraw Hill • Jeremy Colls, “Air Pollution”, second edition, by Spon Press 2012 • Handbook of "Industrial Safety and Health, Trade and Technical Press Ltd. Morden, U.K.1980. S.P. Mahajan, "Pollution Control in Process Industries" Tata McGraw Hill, NewDelhi1985.

2.9. Facilities required for Teaching and Learning

Different Facilities
Lecture Hall
Laboratory Usage
Data Show
White Board

3. Matrix:

3.1. Program Objectives VS Course Objectives

Program Objectives	Course Objective	
	CO1	CO2
PO4	√	
PO5		√

3.2. Course Objectives VS Course Learning Outcomes

Course Objectives	Course Learning Outcomes			
	CLO1	CLO2	CLO3	CLO4
CO1	√	√		
CO2			√	√

3.3. Program Learning Outcomes VS Course Learning Outcomes

Student Competences	Program Learning Outcomes	Course Learning Outcomes			
		CLO1	CLO2	CLO3	CLO4
A1	PLO1	√			
A2	PLO2		√		
A4	PLO4			√	√

3.4. Assessment Alignment Matrix

Student Competences	PLO	PO	CLO	Teaching M.	Assessment M.
A1	PLO1	PO4	CLO1	• Lecture	• First and Final Exam Quiz • Assignments
A2	PLO2	PO5	CLO2	• Practical-based Learning	• Experimental Exam
A4	PLO4	PO4	CLO3	• Lecture	• First and Final Exam Quiz • Assignments
			CLO4	• Lecture	• Final Exam • Assignments • Quiz

Course Coordinator: Dr. Boosy Samy Aly Boosy Samy

Head of Department: Dr. Ahmed Youssef Kamal El-Deen

Date: 2/1/2024

Level 2

Course Specification

1. Basic Information:

Program Title	Construction Engineering and Management			
Department Offering the course	Construction Engineering and Management			
Date of Specification Approval	**2/1/2024**			
Course Title	Introduction to City Planning	**Code**	CMA210	
Type	**Compulsory** ☒	**Elective** ☐		
Semester	Spring Semester (Level 2-2)			
Teaching Hours	**Lec.**	**Tut.**	**Lab.**	**Credit hours**
	2	**1**	**0**	**3**

2. Professional Information:

2.1. Course Description:

Pr.Req. : …….

The course aims to provide an introduction to understand the theoretical and practical skills of planning, its components, and problems by providing a historical and critical look. The course aims also to raise students' awareness on urban issues and problems. Throughout the course students will also become familiar with land use and spatial/physical components of the built environment

2.2. Course Objectives (CO):

Program objective		Course objective	
PO1	Apply a wide spectrum of engineering knowledge, science, and specialized skills with analytic, critical, and systemic thinking to identify and solve engineering problems in real-life situations.	**CO1**	Determine the city planning theories, concepts, the various elements of urban form and the principles that shape the cities.
		CO2	Classify the various analytic tools of city planning.
		CO3	Apply the theoretical knowledge to real world cases in class assignments and project.

2.3. Course Learning Outcomes (CLO's):

Student Competences	Program Learning Outcomes		Course Learning Outcomes	
A6	PLO6	Plan, supervise and monitor implementation of engineering projects, taking into consideration other trades requirements.	CLO1	Identify the different theories and concepts that shape the cities.
			CLO2	Analyze different elements of urban form to obtain design criteria.
			CLO3	Apply the urban planning concepts on a selected area.
D1	PLO15	Create architectural, urban, and planning designs that satisfy both aesthetic and technical requirements, using adequate knowledge of history and theory, related fine arts, local culture and heritage, technologies and human sciences	CLO4	Analyze site & different factors affecting planning problems solutions
			CLO5	Choose appropriate solutions for planning problems based on analytical thinking
D2	PLO16	Generate ecologically responsible, environmental conservation and rehabilitation designs; through an understanding of structural design, construction, technology, and engineering problems	CLO6	Analyze city planning theories into urban spaces while having adequate knowledge of environmental conservation.

2.4. Course Topics:

Course Topics	Week	Course LO's Covered					
		CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
Course Introduction	1	√					
Introduction to City Planning	2	√	√				
History of City Planning	3	√	√				
City Planning Theory	4	√	√				√
Urban Tissue	5		√	√			
Urban Form	6		√	√			
First Exam	7	√	√				
City Structure	8	√				√	√
The Neighborhood: A Residential Environment	9	√	√			√	√

SWOT Analysis	10					√	√
Urban Planning Process	11				√		
Second Exam	12			√	√		
Introduction to project	13				√	√	√
Similar project analysis	14				√	√	√
Final sketch & presentation	15				√	√	√
Final exam	16	√	√			√	√
Total	16	**8**	**8**	**3**	**5**	**7**	**8**

2.5 Lab Topics

Not Applicable

2.6 Teaching and Learning Methods

Teaching and Learning Methods:	**Course LO's Covered**					
	CLO1	**CLO2**	**CLO3**	**CLO4**	**CLO5**	**CLO6**
1. Lecture	√	√		√	√	√
2. Tutorial		√	√		√	√
3. Project- based learning			√	√	√	√
4. Report	√	√	√			
Teaching and Learning Methods for Students with Special Needs:						
Methods						
1. Discussion Session						
2. Extra Lectures						
3. Provide different levels of books and materials						

2.7 Assessment Methods

Assessment Methods:		**Course LOs Covered**					
		CLO1	**CLO2**	**CLO3**	**CLO4**	**CLO5**	**CLO6**
Formative Assessment Method							
Tests	First Exam	√	√				
	Second Exam			√	√		
Reports		√	√	√			
Mini-Project				√	√	√	√
Summative Assessment Method							
Final Exam		√	√			√	√

2.7.1. Assessment Schedule & Grades Distribution

Assessment Method		Week	The weighting of Assessment %
Formative Assessment Method			
Tests	First Exam	7	30
	Second Exam	12	20
Reports		4	3
Project		14	7
Summative Assessment Method			
Final exam		16	40
Total			100

2.8. List of Reference:

Essential Books (Textbooks):	Time Saver Standards for Housing and Residential Development by Joseph De Chiara, Julius Panero, Martin Zelnik, 2017. How to Study Public Life, Jan Gehl, Birgitte Svarre, 2013.
Recommended Books:	إشكالية النسيج والطابع، نسمات عبد القادر، سيد التوني، 1997 Urban Planning by Jordan Yin, W. Paul Farmer, Dummies, 1 Edition, 2012

2.9. Facilities required for Teaching and Learning

Different Facilities
Lecture Hall
Library Usage
Data Show
White Board

3. Matrix:

3.1. Program Objectives VS Course Objectives

Program Objectives	Course Objective		
	CO1	CO2	CO3
PO1	√	√	√

3.2. Course Objectives VS Course Learning Outcomes

Course Objectives	Course Learning Outcomes					
	CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
CO1	√		√			
CO2		√				√
CO3				√	√	

3.3. Program Learning Outcomes VS Course Learning Outcomes

Student Competences	Program Learning Outcomes	Course Learning Outcomes					
		CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
A6	PLO6	√	√	√			
D1	PLO15				√	√	
D2	PLO16						√

3.4. Assessment Alignment Matrix

SC	PLO	PO	CLO	Teaching M.	Assessment M.
A6	PLO6	PO1	CLO1	• Lecture • Report	• First and Final Exam
			CLO2	• Lecture • Tutorial • Report	• First and Final Exam
			CLO3	• Tutorial • Project- based learning • Report	• Second Exam • Mini-Project • Report
D1	PLO15		CLO4	• Project- based learning • Lecture	• Mini-Project • Second Exam
			CLO5	• Lecture • Tutorial • Project- based learning	• Final Exam • Mini-Project
D2	PLO16		CLO6	• Lecture • Tutorial • Project- based learning	• Final Exam • Mini-Project

Course Coordinator: Dr. Mona Yehia Shedid

Head of Department: Dr. Ahmed Youssef Kamal El-Deen

Date: 2/1/2024

Course Specification

1. Basic Information:

Program Title	Construction Engineering and Management			
Department Offering the course	Construction Engineering and Management			
Date of Specification Approval	**2/1/2024**			
Course Title	Hydrology and Water Resources	**Code**	CMC201	
Type	**Compulsory** ☒	**Elective** ☐		
Semester	Fall Semester (Level 2-1)			
Teaching Hours	**Lec.**	**Tut.**	**Lab.**	**Credit hours**
	2	**2**	**--**	**3**

2. Professional Information:

2.1. Course Description:

Pr.Req.: Hydraulics for Construction (CMC112)

Introduction to water balance and hydrological cycle, Precipitation, Evaporation, Transpiration, Infiltration, Runoff, Hydrograph. Steam flow measurements, Hydrograph analysis, flood routing, storage operations. Hydrology of the Nile basin, Nile water resources. Major projects constructed on the river Nile and suggested storage projects. Water problems in Egypt, water scarcity, water resources in Egypt, Renewable Water Resources conventional resources, and non-conventional water resources. Principles of water resources assessment. Economics and assessment principles of water projects.

2.2. Course Objectives (CO):

Program objective		Course objective	
PO1	Apply a wide spectrum of engineering knowledge, science, and specialized skills with analytic, critical, and systemic thinking to identify and solve engineering problems in real-life situations.	**CO1**	**Solve** real engineering problems in water resources and hydrology.
		CO2	**Apply** the skills for analysing the Egyptian water resources, the cause of water shortage, challenges, and initiatives to counter the shortage for sustainability.

2.3. Course Learning Outcomes (CLO's):

Student Competences	Program Learning Outcomes		Course Learning Outcomes	
A1	PLO1	Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.	CLO1	**Identify** hydrological components like precipitation, evaporation, infiltration, and runoff.
			CLO2	**Solve** practical problems in surface hydrology and groundwater hydrology
B1	PLO11	Select appropriate and sustainable technologies for the 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	CLO3	**Use** computer programs related to hydrology science and applications
			CLO4	**Analyze** in quantitative terms the processes of the water resources and hydrology for solving civil engineering problems
B2	PLO12	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.	CLO5	**Apply** suitable solutions to the water Resources problem through teamwork.
			CLO6	**Write** reports on water resources projects in Egypt.

2.4. Course Topics:

Course Topics	Week	Course LO's Covered					
		CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
hydrological cycle	1	√	√				
Precipitation	2	√	√	√			
Evaporation	3	√	√	√			
Infiltration	4	√	√	√			
Runoff	5	√	√	√			
Hydrograph	6		√	√			
First Exam	7	√	√				
Hydrology of the Nile basin	8				√		√
Nile water resources	9				√		√
Major projects on the Nile River	10				√		√
Water scarcity	11			√	√	√	√
Second Exam	12	√	√		√		
water resources in Egypt	13					√	√
conventional and non-conventional water resources	14					√	√
Economics and assessment principles of water projects	15			√		√	√
Final exam	16	√	√		√		
Total	16	**8**	**9**	**7**	**6**	**4**	**7**

2.5 Lab Topics

NA

2.6 Teaching and Learning Methods

Teaching and Learning Methods:	Course LO's Covered					
	CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
1.Lecture	√	√		√	√	
2. Tutorials		√		√		
3. Project-based Learning	√		√			
4. Reports			√			√
Teaching and Learning Methods for Students with Special Needs:						
Methods						
1. Discussion Session						
2. Extra Lectures						
3. Provide different levels of books and materials						

2.7 Assessment Methods

Assessment Methods:		Course LOs Covered					
		CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
Formative Assessment Method							
Tests	First Exam	√	√				
	Second Exam	√	√		√		
	Quizzes	√	√		√	√	
Reports				√			√
Mini Projects		√		√			
Summative Assessment Method							
Final Exam		√	√		√		

2.7.1. Assessment Schedule & Grades Distribution

Assessment Method		Week	The weighting of Assessment %
Formative Assessment Method			
Tests	First Exam	7	30
	Second Exam	12	20
	Quizzes	3,5,8,11	4
Reports		15	3
Mini Projects		15	3
Summative Assessment Method			
Final exam		16	40
Total			100

2.8. List of Reference:

Course Notes:	Lecturer's notes
Essential Books (Textbooks):	• Mays, L.W., Ground and surface water hydrology. John Wiley & Sons, Inc., 2012. ISBN: 978-0-470-16987-2 • Subramanya, K., Engineering Hydrology. 4th Edition 2017.
Periodicals, Web Sites, … etc:	Journal of Hydrology. Elsevier B.V. www.wcc.ncrs.usda.gov https://www.sciencedirect.com/journal/journal-of-hydrology

2.9. Facilities required for Teaching and Learning

Different Facilities
Lecture Hall
Library Usage

Data Show
White Board

3. Matrix:

3.1. Program Objectives VS Course Objectives

Program Objectives	Course Objective	
	CO1	CO2
PO1	√	√

3.2. Course Objectives VS Course Learning Outcomes

Course Objectives	Course Learning Outcomes					
	CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
CO1	√	√	√			
CO2				√	√	√

3.3. Program Learning Outcomes VS Course Learning Outcomes

Student Competences	Program Learning Outcomes	Course Learning Outcomes					
		CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
A1	PLO1	√	√				
B1	PLO11			√	√		
B2	PLO12					√	√

3.4. Assessment Alignment Matrix

SC	PLO	PO	CLO	Teaching M.	Assessment M.
A1	PLO1	PO1	CLO1	• Lecture • Project -based Learning	Quizzes First, Second and, Final Exam Mini-Project
			CLO2	• Lecture • Tutorials	Quizzes First, Second and, Final Exam
B1	PLO11		CLO3	• Project-based Learning • Reports	Reports Mini-Project
			CLO4	• Lecture • Tutorials	Quizzes Second and, Final Exam
B2	PLO12		CLO5	• Lecture	Quizzes
			CLO6	• Reports	Reports

Course Coordinator: Prof. Fahmy Salah Abdelhaleem

Head of Department: Dr. Ahmed Youssef Kamal El-Deen

Date: 2/1/2024

Course Specification

1. Basic Information:

Program Title	Construction Engineering and Management			
Department Offering the course	Construction Engineering and Management			
Date of Specification Approval	**2/1/2024**			
Course Title	Transportation and Traffic Engineering	**Code**	CMC202	
Type	**Compulsory** ☒	**Elective** ☐		
Semester	Spring Semester (Level 2 -2)			
Teaching Hours	**Lec.**	**Tut.**	**Lab.**	**Credit hours**
	2	**1**	**2**	**3**

2. Professional Information:

2.1. Course Description:

Pr.Req. : Applied Engineering Probability and Mathematical Statistics (FRB201)

Transportation Planning: Introduction to transportation planning - Study area - Transportation planning surveys - Travel demand forecasting (Trip generation - Trip distribution - Modal split (Mode Choice) - Traffic assignment) - Transportation evaluation

Traffic Engineering: Introduction (Road user characteristics - Vehicle characteristics) - Traffic volume - Traffic speed - Traffic density - Travel time and delay studies - Traffic Flow characteristics - Parking studies - Traffic control devices - Intersection control - Traffic signals design

2.2. Course Objectives (CO):

Program objective		Course objective	
PO4	Master self-learning and life-long learning strategies to communicate effectively in academic/professional fields	**CO1**	Evaluate transportation planning process with respect to design, financing, regulations and policies, environmental related issues, land use and contemporary issues.
PO5	Apply analytical, experimental, design, construction engineering techniques and project management skills with proficiency aided by modern tools.	**CO2**	Design traffic signal, plan parking area, and evaluate traffic operation

2.3. Course Learning Outcomes (CLO's):

Student Competences	Program Learning Outcomes		Course Learning Outcomes	
A1	**PLO1**	Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.	**CLO1**	Solve transportation problem
A2	**PLO2**	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.	**CLO2**	Collect data required for planning
A5	**PLO5**	Practice research techniques and methods of investigation as an inherent part of learning	**CLO3**	Evaluate transportation project
B2	**PLO12**	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.	**CLO4**	Design of traffic signal
B3	**PLO13**	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.	**CLO5**	Analyze traffic flow characteristics

2.4. Course Topics:

Course Topics	Week	Course LO's Covered				
		CLO1	CLO2	CLO3	CLO4	CLO5
Volume studies	1		√			√
Speed studies	2		√			√
Density, travel time and delay studies	3		√			√
Traffic flow characteristics	4					√
Parking studies	5		√			√
Human characteristics and vehicle characteristics	6					√
First Exam	7					√
Traffic control devices and intersection control	8				√	
Traffic signals design	9				√	
Introduction to transportation planning- Transportation problem	10	√		√		
Define study area - Data collection (Origin and destination studies)	11	√	√			
Second Exam (oral)	12		√			
Travel forecast (Trip generation - Trip distribution)	13	√				
Travel forecast (Modal split - Traffic Assignment)	14	√				
Transportation evaluation	15			√		
Final exam	16	√		√	√	√
Total	16	**4**	**5**	**2**	**2**	**6**

2.5 Lab Topics

Lab Topics	Week	Course LO's Covered				
		CLO1	CLO2	CLO3	CLO4	CLO5
Traffic surveys (traffic volume count)	**2**		√			
Speed & delay study	**4**		√			
Parking study	**6**		√			
Roadside and household interviews.	**11**		√			
Experimental Test (Second Exam (oral))	**12**		√			
Total			**4**			

2.6 Teaching and Learning Methods

Teaching and Learning Methods:	Course LO's Covered				
	CLO1	CLO2	CLO3	CLO4	CLO5
1.Lecture	√			√	√
2.Tutorials	√			√	√
3.Practical Based Learning		√			
4.Report			√		
5.Hybired Learning			√		
6.Presentations		√			
Teaching and Learning Methods for Students with Special Needs:					
Methods					
1. Extra Lectures					
2. Provide different levels of books and materials					

2.7 Assessment Methods

Assessment Methods:		Course LOs Covered				
		CLO1	CLO2	CLO3	CLO4	CLO5
Formative Assessment Method						
Tests	First Exam					√
	Oral Test		√			
Assignment		√			√	√
Reports			√	√		
Summative Assessment Method						
Final Exam		√		√	√	√

2.7.1. Assessment Schedule & Grades Distribution

Assessment Method		Week	The weighting of Assessment %
Formative Assessment Method			
Tests	First Exam	7	30
	Second Exam (oral)	12	20
Assignment		2-6,8,10,15	8
Reports		12	2
Summative Assessment Method			
Final exam		16	40
Total			100

2.8. List of Reference:

Essential Books (Textbooks):	Traffic and Highway Engineering, Nicholas Garber and Lester Hoel, Fifth Enhanced SI Edition, CENGAG Learning, 2020, ISBN-13: 978-1-337-63104-4.
Periodicals, Web Sites, … etc:	https://transportation.org/traffic/

2.9. Facilities required for Teaching and Learning

Different Facilities
Lecture Hall
Library Usage
Data Show
White Board

3. Matrix:

3.1. Program Objectives VS Course Objectives

Program Objectives	Course Objective	
	CO1	CO2
PO4	√	
PO5		√

3.2. Course Objectives VS Course Learning Outcomes

Course Objectives	Course Learning Outcomes				
	CLO1	CLO2	CLO3	CLO4	CLO5
CO1	√	√			
CO2			√	√	√

3.3. Program Learning Outcomes VS Course Learning Outcomes

Student Competences	Program Learning Outcomes	Course Learning Outcomes				
		CLO1	CLO2	CLO3	CLO4	CLO5
A1	PLO1	√				
A2	PLO2		√			
A5	PLO5			√		
B2	PLO12				√	
B3	PLO13					√

3.4. Assessment Alignment Matrix

SC	PLO	PO	CLO	Teaching M.	Assessment M.
A1	PLO1	PO4	CLO1	• Lecture • Tutorials	• Final Exam • Assignment
A2	PLO2		CLO2	• Practical Based Learning • Presentations	• Oral Test • Report
A5	PLO5	PO5	CLO3	• Hybired Learning • Report	• Final Exam • Report
B2	PLO12		CLO4	• Lecture • Tutorials	• Final Exam • Assignment
B3	PLO13		CLO5	• Lecture • Tutorials	• First and Final Exam • Assignment

Course Coordinator: **Dr Ahmed Gamal M. Morsi** 

Head of Department: **Dr. Ahmed Youssef Kamal El-Deen** 

Date:2/1/2024

Course Specification

1. Basic Information:

Program Title	Construction Engineering and Management			
Department Offering the course	Construction Engineering and Management			
Date of Specification Approval	**2/1/2024**			
Course Title	Soil Mechanics		**Code**	CMC 203
Type	**Compulsory ☒**		**Elective ☐**	
Semester	Fall Semester (Level 2-1)			
Teaching Hours	**Lec.**	**Tut.**	**Lab.**	**Credit hours**
	2	**1**	**2**	**3**

2. Professional Information:

2.1. Course description:

Pr.Req. : Properties and Testing of Construction Materials (CMC 103)

Introduction to soil Mechanics - Definitions and Relationships - Index Properties of Soil - Soil Classification Systems (Unified – British) - Permeability and Seepage of Soil (Darcy's Law) - Capillarity in Soils - Flow Net Analysis) - Stress Distribution in Soil (Point load – Uniform Load (New-mark – Fadum - Approximation)) - Shear Strength of Soil (Direct Shear Box - Triaxial– Unconfined Compression) - Lateral Earth Pressure (Active and Passive) - Soil Compaction (Standard Proctor - Modified Proctor).

2.2. Course Objectives (CO):

Program objective		Course objective	
PO1	Apply a wide spectrum of engineering knowledge, science, and specialized skills with analytic, critical, and systemic thinking to identify and solve engineering problems in real-life situations.	**CO1**	Explain a fundamental understanding of the nature and properties of soil and its different types and study the effect of water on its behavior in different situations.
		CO2	Apply the laws and engineering sciences learned through understanding the soil behavior and the use of analytical and critical thinking to solve the surrounding realistic engineering problems.

2.3. Course Learning Outcomes (CLO's):

Student Competences	Program Learning Outcomes		Course Learning Outcomes	
A2	PLO2	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	CLO1	Analyze the index properties of soils and soil classification of the different types of soils
			CLO2	Determine the soil permeability coefficient due to variable permeability tests.
			CLO3	Calculate the soil shear parameters due to variable shear tests.
A5	PLO5	Practice research techniques and methods of investigation as an inherent part of learning.	CLO4	Use research techniques, for staking out for engineering work as the Soil Classification
B1	PLO11	Select appropriate and sustainable technologies for the 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.	CLO5	Evaluate the variable soil parameters according to the knowledge of soil properties and classifications.
			CLO6	Evaluate the stresses on soil due to different loads and the shear strength of a soil mass..

2.5. Course Topics:

Course Topics	Week	Course LO's Covered					
		CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
Introduction to soil Mechanics.	1					√	
Index Properties of Soil	2	√				√	
Soil Classification Systems	3-4	√			√	√	
Permeability and Seepage of Soil layer.	5-6		√	√			
First Exam	7					√	
Stress Distribution in Soil layer	8-9						√
Shear Strength of Soil	10-11			√			√

Experimental Test	12						
Lateral Earth Pressure	13-14						√
Soil Compaction	15			√			
Final Exam	16					√	√
Total	16	3	2	5	2	4	6

2.6. Lab Topics:

Lab Topics	Week	Course LO's Covered					
		CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
Unit weight and water content of soil	2	√					
Atterberg's Limits (LL– PL– SL).	3	√					
Specific Gravity	4	√					
Grain Size Distribution - (Sieve Analysis).	5	√					
Particle Size Distribution - (Hydrometer Analysis)	6	√					
Determination of Natural Unit Weight of Soil (Sand Bottle Test - Core Cutter Test).	7		√				
Constant Head Permeability Test	8		√				
Falling Head Permeability Test.	9		√				
Direct Shear Box Test.	10						
Tri-axial Shear Test.				√			
Unconfined Shear Test.							
Standard Proctor Test.	11						
Modified Proctor Test			√				
Experimental Test	12	√	√	√			
Total		**5**	**4**	**1**			

2.7 Teaching and Learning Methods

Teaching and Learning Methods:	Course LO's Covered					
	CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
Lecture					√	√
Tutorials					√	√
Practical-based Learning	√	√	√			
Report				√		
Teaching and Learning Methods for Students with Special Needs:						
Methods						
1. Discussion Session						
2. Extra Lectures						
3. Provide different levels of books and materials						

2.8 Assessment Methods

Assessment Methods:		Course LOs Covered					
		CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
Formative Assessment Method							
Tests	First Exam					√	
	Experimental Test	√	√	√			
Assignments						√	√
Report					√		
Summative Assessment Method							
Final Exam						√	√

2.8.1. Assessment Schedule & Grades Distribution

Assessment Method		Week	The weighting of Assessment %
Formative Assessment Method			
Tests	First Exam	7	30
	Experimental Test	12	20
Assignments		3,6,8,11,13	5
Report		4	5
Summative Assessment Method			
Final Exam		16	40
Total			**100**

2.9. List of Reference:

Essential Books (Textbooks):	• Das, B.M., "Principles of Geotechnical Engineering", 25th Ed., SI Edition Co., 2020, ISBN-10:0-495-41132-9, ISBN-13: 978-0-495-41132-1.
Recommended Books:	- Das, B.M., "Principles of Foundation Engineering", 10th Ed., PWS Publishing Co., 2019, ISBN: 81-7008-081-9. - "Egyptian Code of Practice for Soil Mechanics, Design and Construction of foundations", Parts 1, 2 and 3, Housing and Building Research Center, Cairo, 2020. - El-Kasaby, E. A., Soil Mechanics, Dar Al-Kutub Al-Almia, Cairo, 5th Ed., (21371/2013), ISBN 978 – 977 – 726 – 041 – 1, 2014. - Das, B. M, Soil Mechanics Laboratory Manual, Oxford University Press, 9th. Ed., ISBN 978 – 019 – 020 – 966 – 7, 2016 .
Periodicals, Web Sites, … etc:	• https://www.kau.edu.sa/Files/0001553/files/SoilMechBook.pdf • https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/soil-structure • https://byjus.com/biology/soil-profile/

2.10. Facilities required for Teaching and Learning

Different Facilities	
Lecture Hall	√
Library Usage	√
Laboratory	√
Data Show	√
White Board	√

3. Matrix:
3.1. Program Objectives VS Course Objectives

Program Objectives	Course Objective	
	CO1	CO2
PO1	√	√

3.2. Course Objectives VS Course Learning Outcomes

Course Objectives	Course Learning Outcomes					
	CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
CO1	√	√	√	√	√	
CO2						√

3.3. Program Learning Outcomes VS Course Learning Outcomes

Student Competences	Program Learning Outcomes	Course Learning Outcomes					
		CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
A2	PLO2	√	√	√			
A5	PLO5	√					
B1	PLO11				√	√	√

3.4. Assessment Alignment Matrix

SC	PLO	PO	CLO	Teaching M.	Assessment M.
A2	PLO2	PO1	CLO1	• Practical-based Learning	• Experimental Test
			CLO2	• Practical-based Learning	• Experimental Test
			CLO3	• Practical-based Learning	• Experimental Test
A5	PLO5	PO5	CLO4	• Report	• Report
B1	PLO11	PO11	CLO5	• Lecture • Tutorials	• First and Final Exam • Assignments
			CLO6	• Lecture • Tutorials	• Final Exam • Assignments

Course Coordinator: **Asso.Pro.Dr. Alnos Aly Ea**

Head of Department: **Dr. Ahmed Youssef Kamal El-Deen**

Date: 2/1/2024

Course Specification

1. Basic Information:

Program Title	Construction Engineering and Management			
Department Offering the course	Construction Engineering and Management			
Date of Specification Approval	**2/1/2024**			
Course Title	Geotechnical Engineering & Foundations		**Code**	CMC 204
Type	**Compulsory ☒**		**Elective ☐**	
Semester	Spring Semester (Level 2-2)			
Teaching Hours	**Lec.**	**Tut.**	**Lab.**	**Credit hours**
	2	**1**	**2**	**3**

2. Professional Information:

2.1. Course description:

Pr.Req. : Soil Mechanics (CMC 203)

Soil Consolidation and Settlement (Soil Consolidation Theory - Primary and Secondary Settlement - Oedometer Test) - Bearing Capacity of Soil (Terzaghi Eq. - Mayerhof Eq. – Egyptian Code Eq.) - Shallow Foundations (Construction Considerations - Design Considerations) - Design of Isolated Footings (Square and Rectangular Footings – Footing with Moment) - Design of Strip Footings - Design of Combined Footings - Design of Strap Beam Footings – Design of Rafts (Conventional Method – Ribbed Raft).

2.2. Course Objectives (CO):

Program objective		Course objective	
PO2	Behave professionally, adhere to engineering ethics and standards, and work to develop the profession and community and promote sustainability principles.	**CO1**	Apply standards to calculate Soil Consolidation, Settlement, Bearing Capacity of Soil and work to develop the profession and community and promote sustainability principles.
PO5	Apply analytical, experimental, design, construction engineering techniques and project management skills with proficiency aided by modern tools.	**CO2**	Design foundations, construction engineering techniques and project management skills with proficiency aided by modern tools.

2.3. Course Learning Outcomes (CLO's):

Student Competences	Program Learning Outcomes		Course Learning Outcomes	
A2	PLO2	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	CLO1	Compute Soil Consolidation, Settlement and evaluate findings using statistical analyses
			CLO2	Determine Bearing Capacity of Soil and conduct appropriate experimentation and/or simulation, analyze and interpret data.
A3	PLO3	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.	CLO3	Apply construction and design considerations to produce cost-effective solutions that meet specified needs.
			CLO4	Design Shallow Foundations that meet specified needs with consideration for global, cultural, social, economic, environmental, ethical and other aspects.
B1	PLO11	Select appropriate and sustainable technologies for the 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.	CLO5	Specify appropriate and sustainable technologies for the construction of Isolated Footings (Square and Rectangular Footings – Footing with Moment)
			CLO6	Design of Strip and Combined Footings by applying a full range of civil engineering concepts and techniques.
B2	PLO12	Achieve an optimum design of Reinforced Concrete and Steel Structures, Foundations	CLO7	Design an optimum design of Strap Beam Footings.

		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	**CLO8**	Design an optimum design of Rafts (Conventional Method – Ribbed Raft)

2.4. Course Topics:

Course Topics	Week	Course LO's Covered							
		CLO1	CLO2	CLO3	CLO4	CLO5	CLO6	CLO7	CLO8
Soil Consolidation and Settlement (Soil Consolidation Theory Raft- Primary and Secondary Settlement - Oedometer Test).	**1,2**	√	√						
Bearing Capacity of Soil (Terzaghi Eq. - Mayerhof Eq. – Egyptian Code Eq.).	**3,4**	√	√						
Shallow Foundations (Construction Considerations - Design Considerations).	**5,6**	√	√	√	√				
First Exam	**7**	√	√	√	√				
Design of Isolated Footings (Square and Rectangular Footings – Footing with Moment).	**8**					√			
	9					√			
Design of Strip Footings.	**10**						√		
Design of Combined Footings.	**11**						√		
Experimental Test	**12**	√	√						
Design of Strap Beam Footings.	**13**							√	
Design of Rafts (Conventional Method – Ribbed).	**14,15**							√	√
Final Exam	**16**			√	√	√	√	√	√
Total	**16**			**2**	**2**	**2**	**2**	**2**	**2**

2.5. Lab Topics:

Lab Topics	Week	Course LO's Covered							
		CLO1	CLO2	CLO3	CLO4	CLO5	CLO6	CLO7	CLO8
One Dimensional Consolidation Test (Oedometer Test).	1,2	√							
SPT: Standard Penetration Test..	3,4		√						
CPT: Cone Penetration Test.	5-6		√						
Plate Loading Test.	8-10	√	√						
Experimental Test	12	√	√						
Total									

2.6 Teaching and Learning Methods

Teaching and Learning Methods:	Course LO's Covered							
	CLO1	CLO2	CLO3	CLO4	CLO5	CLO6	CLO7	CLO8
Lecture			√	√	√	√	√	√
Tutorials			√	√			√	√
Problem-based learning			√	√	√	√	√	√
Discussion.	√	√						
Practical-based Learning	√	√						
Teaching and Learning Methods for Students with Special Needs:								
Methods								
1. Discussion Session								
2. Extra Lectures								
3. Provide different levels of books and materials								

2.7 Assessment Methods

Assessment Methods:		Course LOs Covered							
		CLO1	CLO2	CLO3	CLO4	CLO5	CLO6	CLO7	CLO8
Formative Assessment Method									
Tests	First Exam	√	√	√	√				
	Experimental Test	√	√						
	Oral Test	√	√						
Assignments				√	√	√	√	√	√
Summative Assessment Method									
Final Exam				√	√	√	√	√	√

2.7.1. Assessment Schedule & Grades Distribution

Assessment Method		Week	The weighting of Assessment %
Formative Assessment Method			
Tests	First Exam	7	30
	Experimental Test	12	10
	Oral Test	12	10
Assignments		6,8,10,11,13	10
Summative Assessment Method			
Final Exam		16	40
Total			**100**

2.8. List of Reference:

Essential Books (Textbooks):	- Das, B.M., "Principles of Geotechnical Engineering", 25th Ed., SI Edition Co., 2020, ISBN-10:0-495-41132-9, ISBN-13: 978-0-495-41132-1. - "Egyptian Code of Practice for Soil Mechanics, Design and Construction of foundations", Parts 1, 2 and 3, Housing and Building Research Center, Cairo, 2020. - Das, B.M., "Principles of Foundation Engineering", 10th Ed., PWS Publishing Co., 2019, ISBN: 81-7008-081-9.
Recommended Books:	- El-Kasaby, E. A., Soil Mechanics, Dar Al-Kutub Al-Almia, Cairo, 5th Ed., (21371/2013), ISBN 978 – 977 – 726 – 041 – 1, 2014. - Das, B. M, Soil Mechanics Laboratory Manual, Oxford University Press, 9th. Ed., ISBN 978 – 019 – 020 – 966 – 7, 2016 . - El-Kasaby, E. A., Soil Mechanics, Dar Al-Kutub Al-Almia, Cairo, 5th Ed., (21371/2013), ISBN 978 – 977 – 726 – 041 – 1, 2014. - El-Kasaby, E. A., Engineering of Surface Foundations, Dar Al-Kutub Al-Almia, Cairo, 5th Ed., (19440/2015), ISBN 978 – 977 – 726 – 139 – 5, 2015. - Das, B. M, Principles of Foundation Engineering, Brooks - Cole, 9th. Ed., ISBN 978 – 133 – 770 – 502 – 8, 2017
Periodicals, Web Sites, … etc:	• https://www.kau.edu.sa/Files/0001553/files/SoilMechBook.pdf • https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/soil-structure • https://byjus.com/biology/soil-profile/

2.9. Facilities required for Teaching and Learning

Different Facilities	
Lecture Hall	√
Data Show	√
White Board	√
Laboratory	√

3. Matrix:

3.1. Program Objectives VS Course Objectives

Program Objectives	Course Objective	
	CO1	CO2
PO2	√	
PO5		√

3.2. Course Objectives VS Course Learning Outcomes

Course Objectives	Course Learning Outcomes							
	CLO1	CLO2	CLO3	CLO4	CLO5	CLO6	CLO7	CLO8
CO1	√	√	√	√				
CO2					√	√	√	√

3.3. Program Learning Outcomes VS Course Learning Outcomes

Student Competences	Program Learning Outcomes	Course Learning Outcomes							
		CLO1	CLO2	CLO3	CLO4	CLO5	CLO6	CLO7	CLO8
A2	PLO2	√	√						
A3	PLO3			√	√				
B1	PLO11					√	√		
B2	PLO12							√	√

3.4. Assessment Alignment Matrix

SC	PLO	PO	CLO	Teaching M.	Assessment M.
A2	PLO2	PO2	CLO1	• Practical-based Learning • Discussion	• First Exam • Experimental Test. • Oral Test
			CLO2	• Practical-based Learning • Discussion	• First Exam • Experimental Test. • Oral Test
A3	PLO3		CLO3	• Lecture • Tutorials • Problem-based learning.	• First, and Final Exams. • Assignments.
			CLO4	• Lecture • Tutorials • Discussion.	• First, and Final Exams. • Assignments.
B1	PLO11	PO5	CLO5	• Lecture • Problem-based learning	• Final Exams. • Assignments.
			CLO6	• Lecture • Problem-based learning	• Final Exams. • Assignments.
B2	PLO12		CLO7	• Lecture • Tutorials • Problem-based learning.	• Final Exam. • Assignments.
			CLO8	• Lecture • Tutorials • Problem-based learning.	• Final Exam. • Assignments.

Course Coordinator: Dr. Marwa Ibrahim Marwa I

Head of Department: Dr. Ahmed Youssef Kamal El-Deen

Date: 2/1/2024

Course Specification

1. Basic Information:

Program Title	Construction Engineering and Management			
Department Offering the course	Construction Engineering and Management			
Date of Specification Approval	**2/1/2024**			
Course Title	Design of Metallic Structures-1	**Code**	CMC 205	
Type	**Compulsory** ☒	**Elective** ☐		
Semester	Fall Semester (Level 2-1)			
Teaching Hours	**Lec.**	**Tut.**	**Lab.**	**Credit hours**
	2	**2**	**--**	**3**

2. Professional Information:

2.1. Course description:

Pr.Req. : Structure Analysis -2 (CMC 102)

Steel as a construction material - Material properties and steel sections - Allowable Stress Design method - Design of tension members - Design of compression members - Columns in braced and unbraced frames - Design of flexural members - Types and classification of beam cross sections - Design of laterally supported and unsupported beams - Design of beam-columns (axial and flexural forces) - Design of bolted connections - Design of welded connections.

2.2. Course Objectives (CO):

Program objective		Course objective	
PO1	Apply a wide spectrum of engineering knowledge, science, and specialized skills with analytic, critical, and systemic thinking to identify and solve engineering problems in real-life situations.	**CO1**	Apply a structural analysis methods to get a critical cases for design steel element.
PO5	Apply analytical, experimental, design, construction engineering techniques and project management skills with proficiency aided by modern tools.	**CO2**	Design of steel elements according to standard codes.

2.3. Course Learning Outcomes (CLO's):

Student Competences	Program Learning Outcomes		Course Learning Outcomes	
A3	PLO3	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.	CLO1	Apply specified consideration to planning the steel structure.
			CLO2	Apply of different loads, structural analysis of steel structure.
A4	PLO4	Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues and risk management principles.	CLO5	Derive safety of actual stresses by compare it by allowable stresses of codes and standards of steel structures.
			CLO6	Derive safety requirements (serviceability &deflection) by compare it by limits of codes and standards of steel structures.
B2	PLO12	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	CLO3	Determine the critical straining action for elements.
			CLO4	Design of Steel Structure elements achieving an optimum design. By end this lesson, the student will be able to design the Structure steel elements.

2.4. Course Topics:

Course Topics	Week	Course LO's Covered					
		CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
Steel as a construction material – Material properties and steel sections	1	√	√				
Allowable Stress Design method - Design of tension members	2	√	√	√			
Design of compression members - Columns in braced and unbraced frames	3,4	√			√		
Types and classification of beam cross sections - Design of flexural members	5		√	√	√	√	
Design of laterally supported beams	6				√		
First Exam	7	√	√		√		
Design of laterally unsupported beams	8,9			√	√	√	√
Design of beam-columns (axial and flexural forces)	10				√	√	√
Design of bolted connections (bearing type)	11				√	√	
Second Exam	12			√	√	√	√
Design of bolted connections (friction type)	13,14				√	√	
Design of welded connections	15				√	√	√
Final Exam	16	√			√	√	√
Total	16	**4**	**3**	**4**	**11**	**8**	**4**

2.5. Lab Topics:

NA

2.6 Teaching and Learning Methods

Teaching and Learning Methods:	Course LO's Covered					
	CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
1. Lecture	√	√	√	√		
2. Tutorials				√	√	√
Teaching and Learning Methods for Students with Special Needs:						
Methods						
1. Discussion Session						
2. Extra Lectures						
3. Provide different levels of books and materials						

2.7 Assessment Methods

Assessment Methods:		Course LOs Covered					
		CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
Formative Assessment Method							
Tests	Quiz	√			√	√	√
	First Exam	√	√		√		
	Second Exam			√	√	√	√
Assignment		√	√	√	√	√	√
Summative Assessment Method							
Final Exam		√			√	√	√

2.7.1. Assessment Schedule & Grades Distribution

Assessment Method		Week	The weighting of Assessment %
Formative Assessment Method			
Tests	**First exam**	7	30
	Second exam	12	20
Quiz		5,9,11	6
Assignments		4,6,11,13	4
Summative Assessment Method			
Final Exam		16	40 %
Total			100 %

2.8. List of Reference:

Essential Books (Textbooks):	- Steel structures design by Prof Dr. Abdelrahim Khalil Dessouki, ISBN: 977-5423-65-1, (2018).
Recommended Books:	- Egyptian code for design of steel structure. - Advanced Steel Design of Structures, by Prof. Srinivasan Chandrasekaran, Indian Institute of Technology, India. ISBN-13 9780367232900 - Steel Designers' Manual, by (Steel Construction Institute), Edited by Buick Davison and Graham W. Owens, ISBN-13 9781119249863 - Steel design hand book by. Prof Dr. Bahaa M. Mashaly Part 1. Seventh Edition, ISBN: 977-223-549-8. - Design of Metallic Structures, EHAB ELLOBODY, RAN FENG, BEN YOUNG, 2014, ISBN: 978-0-12-416561-8
Periodicals, Web Sites, … etc:	•

2.9. Facilities required for Teaching and Learning

Different Facilities	
Lecture Hall	√
Data Show	√
White Board	√

3. Matrix:

3.1. Program Objectives VS Course Objectives

Program Objectives	Course Objective	
	CO1	CO2
PO1	√	
PO5		√

3.2. Course Objectives VS Course Learning Outcomes

Course Objectives	Course Learning Outcomes					
	CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
CO1	√	√	√	√		
CO2					√	√

3.3. Program Learning Outcomes VS Course Learning Outcomes

Student Competences	Program Learning Outcomes	Course Learning Outcomes					
		CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
A3	PLO3	√	√				
A4	PLO4					√	√
B2	PLO12			√	√		

3.4. Assessment Alignment Matrix

SC	PLO	PO	CLO	Teaching M.	Assessment M.
A3	PLO3	PO1	CLO1	Lecture.	First and Final Exams. Assignments Quiz.
			CLO2	Lecture.	First Exam. Assignments
B2	PLO12		CLO3	Lecture.	Second Exam. Assignments
			CLO4	Lecture. Tutorials.	First, second, and Final Exams. Assignments Quiz.
A4	PLO4	PO5	CLO5	Tutorials.	Second, and Final Exams. Assignments Quiz.
			CLO6	Tutorials.	Second, and Final Exams. Assignments Quiz.

Course Coordinator: **Dr. Ayman Abd-allah Zaky El-sayed Soliman**

Head of Department: **Dr. Ahmed Youssef Kamal El-Deen**

Date: 2/1/2024

Course Specification

1. Basic Information:

Program Title	Construction Engineering and Management			
Department Offering the course	Construction Engineering and Management			
Date of Specification Approval	**2/1/2024**			
Course Title	Construction Project Management		**Code**	**CMC 206**
Type	**Compulsory ☒**	**Elective ☐**		
Semester	Spring Semester (Level 2-2)			
Teaching Hours	**Lec.**	**Tut.**	**Lab.**	**Credit hours**
	2	**2**	**---**	**3**

2. Professional Information:

2.1. Course description:

Pr.Req. : ------

Introduction to construction project management, need for project management, project definition, project life cycle, project success factors, key roles and tasks of construction project participants, construction project organizational structure, the project team, project site management, preparation of construction method, safety and health roles in construction projects.

2.2. Course Objectives (CO):

Program objective		Course objective	
PO 1	Apply a wide spectrum of engineering knowledge, science, and specialized skills with analytic, critical, and systemic thinking to identify and solve engineering problems in real-life situations.	**CO 1**	**Apply** wide sets of project management knowledge, science, and specialized skills with analytic, critical, and systemic thinking to identify and manage construction project problems in real-life situations.
PO 2	Behave professionally, adhere to engineering ethics and standards, and work to develop the profession and community and promote sustainability principles.	**CO 2**	**Organize** how to behave professionally towards construction project management processing

2.3. Course Learning Outcomes (CLO's):

Student Competences	Program Learning Outcomes		Course Learning Outcomes	
A6	PLO6	Plan, supervise and monitor implementation of engineering projects, taking into consideration other trades requirements.	CLO1	Use the theory and application of the time, cost, and quality triangle.
			CLO2	Identify key elements of the project management lifecycle and its practical application.
A7	PLO 7	Function efficiently as an individual and as a member of multi-disciplinary and multi-cultural teams.	CLO3	Recognize the importance of people management in construction project management in a member of multi-disciplinary and multi-cultural teams.
A9	PLO 9	Use creative, innovative and flexible thinking and acquire entrepreneurial and leadership skills to anticipate and respond to new situations.	CLO4	Analyze, evaluate and produce project documentation.
			CLO5	Describe key elements of the planning and development framework.
B3	PLO13	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.	CLO6	Plan for project risks using defined risk assessment processes.
			CLO7	Discuss a project management plan articulating how a given project is to be executed, including breaking down the project into manageable tasks.
B4	PLO 14	Deal with biddings, contracts and financial issues including project insurance and guarantees	CLO8	Communicate professionally and effectively through written and graphical means.

2.4. Course Topics:

Course Topics	Week	Course LO's Covered							
		CLO1	CLO2	CLO3	CLO4	CLO5	CLO6	CLO7	CLO8
Introduction of construction management	1,2	√	√						
Method Statements Project stakeholders	3	√	√			√	√		
construction method: Site works and below ground structures	4					√			
Analysis of Construction productivity	5,6					√	√		
First Exam	**7**	√	√				√		
Contract strategy of Construction project.	8				√				√
Key elements of the planning	9,10	√			√	√	√	√	
Construction Quality and safety management	11	√	√	√		√		√	√
Second Exam	12	√	√				√	√	
Closing and commissioning	13,14				√			√	√
Revision	15	√	√	√		√		√	
Final Exam	16	√	√				√	√	
Total	**16**	**7**	**5**	**2**	**5**	**11**	**7**	**10**	**5**

2.5. Lab Topics:

(Not applicable**)**

2.6 Teaching and Learning Methods

Teaching and Learning Methods:	Course LO's Covered							
	CLO1	CLO2	CLO3	CLO4	CLO5	CLO6	CLO7	CLO8
Lecture	√	√				√	√	
Tutorials	√	√				√	√	√
Project-based Learning			√	√	√			√
Interactive Learning			√	√	√			
Teaching and Learning Methods for Students with Special Needs:								
Methods								
1. Discussion Session								
2. Extra Lectures								
3. Provide different levels of books and materials								

2.7 Assessment Methods

Assessment Methods:		Course LOs Covered							
		CLO1	CLO2	CLO3	CLO4	CLO5	CLO6	CLO7	CLO8
Formative Assessment Method									
Tests	**First Exam**	√	√				√		
	Second Exam	√	√				√	√	
Assignments							√	√	
Discussion		√		√	√	√			√
Mini-Project				√	√	√			√
Summative Assessment Method									
Final Exam		√	√				√	√	

2.7.1. Assessment Schedule & Grades Distribution

Assessment Method		Week	The weighting of Assessment %
Formative Assessment Method			
Tests	First Exam	7	30
	Second Exam	12	20
Assignments		6,10	2
Discussion		10,13	2
Mini-Project		15	6
Summative Assessment Method			
Final exam		16	40
Total			100

2.8. List of References:

Recommended Books:	Paul Netscher "Construction Management: From Project Concept to Completion" CreateSpace Independent Publishing Platform (October 2017), ISBN-10: 1975934342, ISBN13: 978-1975934347
Periodicals, Web Sites, … etc:	https://www.projectmanager.com/guides/construction-project-management

2.9. Facilities required for Teaching and Learning

Different Facilities	
Lecture Hall	√
Data Show	√
White Board	√

3. Matrix:

3.1. Program Objectives VS Course Objectives

Program Objectives	Course Objective	
	CO 1	CO 2
PO 1	√	
PO 2		√

3.2. Course Objectives VS Course Learning Outcomes

Course Objectives	Course Learning Outcomes							
	CLO 1	CLO 2	CLO 3	CLO 4	CLO 5	CLO 6	CLO 7	CLO 8
CO 1	√	√	√					√
CO 2				√	√	√	√	

3.3. Program Learning Outcomes VS Course Learning Outcomes

Student Competences	Program Learning Outcomes	Course Learning Outcomes							
		CLO 1	CLO 2	CLO 3	CLO 4	CLO5	CLO 6	CLO 7	CLO 8
A6	PLO 6	√	√						
A7	PLO 7			√					
A9	PLO 9				√	√			
B3	PLO13						√	√	
B4	PLO 14								√

3.4. Assessment Alignment Matrix

SC	PLO	PO	CLO	Teaching M.	Assessment M.
A6	PLO 6	PO1	CLO1	Lecture Tutorials	First , Second and Final Exam Discussion
			CLO2	Lecture Tutorials	First , Second and Final Exam
A7	PLO 7		CLO3	Project-based Learning Interactive Learning	Discussion Mini-Project
A9	PLO 9	PO2	CLO4	Project-based Learning Interactive Learning	Discussion Mini-Project
			CLO5	Project-based Learning Interactive Learning	Discussion Mini-Project
B3	PLO13		CLO6	Lecture Tutorials	First, Second, and Final Exam Assignments
			CLO7	Lecture Tutorials	Second, and Final Exam Assignments
B4	PLO14	PO1	CLO8	Tutorials Project-based Learning	Discussion Mini-Project

Course Coordinator: **Dr. Omia Said El Hadidi**

Head of Department: **Dr. Ahmed Youssef Kamal El-Deen**

Date: **2/1/2024**

Course Specification

1. Basic Information:

Program Title	Construction Engineering and Management			
Department Offering the course	Construction Engineering and Management			
Date of Specification Approval	**2/1/2024**			
Course Title	Design of R.C. Structures-1	**Code**	CMC 207	
Type	**Compulsory** ☒	**Elective** ☐		
Semester	Fall Semester (Level 2-1)			
Teaching Hours	**Lec.**	**Tut.**	**Lab.**	**Credit hours**
	2	2	0	3

2. Professional Information:

2.1. Course Description:

Pr. Req.: (Structural Analysis-2) (CMC 102) +

(Construction Materials and Concrete Technology) (CMC 104)

Properties of concrete materials - Ultimate limit states design method - Design of sections under pure bending moment (Rectangular, L & T - sections) - Load distribution – Design of section under shear – Design simple and continuous beams - Design of one-way and two-way solid slabs - Design of hollow block slabs - Design of panelled beams.

2.2. Course Objectives (CO):

Program objective		Course objective	
PO1	**Apply** a wide spectrum of engineering knowledge, science, and specialized skills with analytic, critical, and systemic thinking to identify and **solve** engineering problems in real-life situations.	**CO1**	**Apply** the different types of RC design methods.
PO2	Behave professionally, adhere to engineering ethics and standards, and work to develop the profession and community and promote sustainability principles.	**CO2**	**Analyze** the different RC slabs system.
PO5	Apply analytical, **experimental**, design, construction engineering techniques and project management skills with proficiency aided by modern tools.	**CO3**	**Design** the different concrete elements.

2.3. Course Learning Outcomes (CLOs):

Student Competences	Program Learning Outcomes		Course Learning Outcomes	
A3	**PLO3**	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.	**CLO1**	**Apply** the methods of design according to the standard code.
A4	**PLO4**	Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues and risk management principles.	**CLO2**	**Use** the code to design of sections subjected to flexure and shear.
B2	**PLO12**	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.	**CLO3**	**Verify** the conditions of serviceability Limit states.
			CLO4	**Design** the different reinforcement concrete structural elements according to ECP.
D2	**PLO16**	Generate ecologically responsible, environmental conservation and rehabilitation designs; through an understanding of structural design, construction, technology, and engineering problems	**CLO5**	**Apply** the principals of designing the slabs, and beams**.**
			CLO6	**Make** the reinforcement details and draw the full structure details.

2.4. Course Topics:

Course Topics	Week	Course LO's Covered					
		CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
1.Introduction to Reinforced Concrete.	1	√					
2.Properties of concrete materials.	2	√					
3.Ultimate limit states design method	3		√	√			
4.Design of sections under pure bending moment (Rectangular)	4	√		√			
5.Design of sections under pure bending moment (L &T - sections)	5	√		√			
6.Load distribution	6			√			
7.First Exam	7	√	√	√			
8.Design of section under shear	8	√	√				
9.Design simple beams	9	√		√	√	√	√
10. Design continuous beams	10,11	√	√	√	√	√	√
11. Second Exam	12	√	√	√	√	√	√
12. Design of one-way and two-way solid slabs	13	√		√	√	√	√
13. Design of hollow block slabs	14	√		√	√	√	√
14. Design of paneled beams	15	√		√	√	√	√
15. Final Exam	16	√	√	√	√	√	√
Total	**16**	**11**	**4**	**10**	**6**	**6**	**6**

2.5 Lab Topics

N.A.

2.6 Teaching and Learning Methods

Teaching and Learning Methods:	Course LO's Covered					
	CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
1. Lecture	√	√	√	√		
2. Tutorials	√	√	√	√	√	√
3. Discussion			√	√	√	
4. Presentation		√			√	
Teaching and Learning Methods for Students with Special Needs:						
Methods						
1. Discussion Session						
2. Extra Lectures						
3. Provide different levels of books and materials						

2.7.Assessment Methods

Assessment Methods:		Course LOs Covered					
		CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
Formative Assessment Method							
	First Exam	√	√	√			
	Second Exam	√	√	√	√	√	√
Assignments		√	√				√
Mini-Project			√	√	√	√	
Summative Assessment Method							
Final Exam		√	√	√	√	√	√

2.7.1. Assessment Schedule & Grades Distribution

Assessment Method		Week	The weighting of Assessment %
Formative Assessment Method			
Tests	**First Exam**	7	30%
	Second Exam	12	20%
Assignments		2,9,13,14	8 %
Mini-Project		15	2%
Summative Assessment Method			
Final Exam		16	40 %
Total			100 %

2.8. List of References:

Course Note	• Lectures Notes
Essential Books (Textbooks):	• Shaker Elbehary handbook. • Egyptian Code for Design & Construction of Reinforced Concrete Structures – ECOP 203-2018
Recommended Books:	• Design of Reinforced Concrete by Jack C. McCormac, Russell H. Brown, Wiley, Fifth Edition, 2014 • Design of Concrete Structures, Arthur H Nilson, D.Darwin, Charles W. Fifteenth Edition,2016. • Design of reinforced concrete structures, Mashhour Ghoneim, Mahmoud Elmihilmy, Volume I, second edition, 2012. • Design of reinforced concrete structures, Mashhour Ghoneim, Mahmoud Elmihilmy, Volume 2, Third edition, 2012. • Fundamentals of Reinforcement Concrete and Prestressed concrete, M.Hilal, 1987.

2.9. Facilities required for Teaching and Learning

Different Facilities	
Lecture Hall	√
Data Show	√
White Board	√

3. Matrix:

3.1. Program Objectives VS Course Objectives

Program Objectives	Course Objectives		
	CO1	CO2	CO3
PO1	√		
PO2		√	
PO5			√

3.2. Course Objectives VS Course Learning Outcomes

Course Objectives	Course Learning Outcomes					
	CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
CO1	√	√				
CO2			√	√		
CO3					√	√

3.3. Program Learning Outcomes VS Course Learning Outcomes

Student Competences	Program Learning Outcomes	Course Learning Outcomes					
		CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
A3	PLO3	√					
A4	PLO4		√				
B2	PLO12			√	√		
D2	PLO16					√	√

3.4. Assessment Alignment Matrix

SC	PLO	PO	CLOs	Teaching M.	Assessment
A3	PLO3	PO2	CLO1	Lecture	First, Second, and Final Exams
				Tutorials	Assignments
A4	PLO4	PO5	CLO2	Lecture	First ,Second, and Final Exams
				Tutorials	Assignments
				Presentation	Mini-Project
B2	PLO12	PO1	CLO3	Lecture	First ,Second, and Final Exams
				Tutorials	
				Discussion	Mini-Project
			CLO4	Lecture	Second, and Final Exams
				Tutorials	
				Discussion	Mini-Project
D2	PLO16	PO5	CLO5	Tutorials	Final Exams
				Discussion	Mini-Project
				Presentation	
			CLO6	Tutorials	Second, and Final Exams
					Assignments

Course Coordinator: Dr. Marwa Hany مروة صابى

Head of Department: Dr. Ahmed Youssef Kamal El-Deen

Date:2/1/2024

Course Specification

1. Basic Information:

Program Title	Construction Engineering and Management			
Department Offering the course	Construction Engineering and Management			
Date of Specification Approval	**2/1/2024**			
Course Title	Design of R.C. Structures-2		**Code**	CMC 208
Type	**Compulsory** ☒		**Elective** ☐	
Semester	Spring Semester (Level 2-2)			
Teaching Hours	**Lec.**	**Tut.**	**Lab.**	**Credit hours**
	2	2	0	3

2. Professional Information:

2.1. Course Description:

Pr.Req.: Design of R.C. structures-1 (CMC 207)

Design of flat slabs - Design of sections subjected to bending moment and axial force - Analysis and design of columns – Design of RC frames -Design of Sections under Torsion- Serviceability limit states (deflection - crack width).

2.2. Course Objectives (CO):

Program objective		Course objective	
PO1	**Apply** a wide spectrum of engineering knowledge, science, and specialized skills with analytic, critical, and systemic thinking to identify and **solve** engineering problems in real-life situations.	**CO1**	**Classify** the types of RC structure systems.
PO2	Behave professionally, adhere to engineering ethics and standards, and work to develop the profession and community and promote sustainability principles.	**CO2**	**Design** the different Concrete elements geometrically & structure
PO5	Apply analytical, **experimental**, design, construction engineering techniques and project management skills with proficiency aided by modern tools.	**CO3**	**Analyze** the water RC structure elements and design waterside sections.

2.3. Course Learning Outcomes (CLOs):

Student Competences	Program Learning Outcomes		Course Learning Outcomes	
A3	**PLO3**	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.	**CLO1**	**Apply** knowledge to choose the better type of structural system.
A4	**PLO4**	Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues and risk management principles.	**CLO2**	**Use** different structural systems for planning the RC buildings.
B2	**PLO12**	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.	**CLO3**	**Analyze** the different RC structure elements.
			CLO4	**Design** the different reinforcement concrete structural elements according to ECP.
D2	**PLO16**	Generate ecologically responsible, environmental conservation and rehabilitation designs; through an understanding of: structural design, construction, technology, and engineering problems	**CLO5**	**Apply** the Principals of designing to the water-structural elements**.**
			CLO6	**Make** the reinforcement details and draw the full structure details.

2.4 Course Topics:

Course Topics	Week	Course LO's Covered					
		CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
1.Design of flat slabs	1-2	√	√	√			√
2.Design of sections subjected to bending moment and axial force	3-4	√	√	√			
3.Analysis and design of columns	5-6			√			√
4.First Exam	7	√	√				√
5.Design of RC frames	8-9	√	√	√			√
6.Design of Sections under Torsion	10,11			√	√		
7.Second Exam	12	√	√	√			√
8.Serviceability limit states (deflection - crack width).	13-15	√	√	√	√	√	√
9.Final Exam	16	√	√	√		√	√
Total	**16**	**9**	**9**	**13**	**5**	**3**	**9**

2.5. Lab Topics

Not Applicable

2.6 Teaching and Learning Methods

Teaching and Learning Methods:	Course LO's Covered					
	CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
1. Lecture	√	√	√	√	√	√
2. Tutorials	√	√	√			
3. Discussion				√	√	√
4. Presentation		√		√	√	√
Teaching and Learning Methods for Students with Special Needs:						
Methods						
1. Discussion Session						
2. Extra Lectures						
3. Provide different levels of books and materials						

2.7 Assessment Methods

Assessment Methods:		Course LOs Covered					
		CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
Formative Assessment Method							
Test	**First Exam**	√	√				√
	Second Exam	√	√	√			√
Assignments		√	√	√			
Discussion					√	√	√
Presentation			√		√	√	√
Summative Assessment Method							
Final Exam		√	√	√		√	√

2.7.1. Assessment Schedule & Grades Distribution

Assessment Method		Week	The weighting of Assessment %
Formative Assessment Method			
Tests	**First Exam**	7	30%
	Second Exam	12	20%
Assignments		2, 6,9,11	4 %
Discussion		10,13	2%
Presentation		14,15	2%
Summative Assessment Method			
Final Exam		16	40 %
Total			100 %

2.8. List of References:

Essential Books (Textbooks):	• Shaker Elbehary handbook. • Egyptian Code for Design & Construction of Reinforced Concrete Structures – ECOP 203-2018. • Design of RC Structure halls – DR.M. Hilal
Recommended Books:	• Design of Concrete Structures, Arthur H Nilson, D.Darwin, Charles W. Fifteenth Edition,2016. • Fundamentals of Reinforcement Concrete and Prestressed concrete, M.Hilal, 1987. • Design of reinforced concrete structures, Mashhour Ghoneim, Mahmoud Elmihilmy, Volume 2, Third edition, 2012. • Design of reinforced concrete structures, Mashhour Ghoneim, Mahmoud Elmihilmy, Volume 3, First edition, 2011

2.9. Facilities required for Teaching and Learning

Different Facilities	
Lecture Hall	√
Data Show	√
White Board	√

3. Matrix:

3.1. Program Objectives VS Course Objectives

Program Objectives	Course Objectives		
	CO1	CO2	CO3
PO1	√		
PO2		√	
PO5			√

3.2. Course Objectives VS Course Learning Outcomes

Course Objectives	Course Learning Outcomes					
	CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
CO1	√	√				
CO2			√	√		
CO3					√	√

3.3. Program Learning Outcomes VS Course Learning Outcomes

Student Competences	Program Learning Outcomes	Course Learning Outcomes					
		CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
A3	PLO3	√					
A4	PLO4		√				
B2	PLO12			√	√		
D2	PLO16					√	√

3.4. Assessment Alignment Matrix

SC	PLO	PO	CLOs	Teaching M.	Assessment
A3	PLO3	PO1	CLO1	Lecture Tutorials	First, Second, and Final Exams Assignments
A4	PLO4		CLO2	Lecture	First ,Second, and Final Exams
				Tutorials	Assignments
				Presentation	Discussion
B2	PLO12	PO2	CLO3	Lecture	Second, and Final Exams
				Tutorials	Assignments
			CLO4	Lecture	Presentation
				Presentation	
				Discussion	Discussion
D2	PLO16	PO5	CLO5	Lecture	Final Exam
				Presentation	Presentation
				Discussion	Discussion
			CLO6	Lecture	First, Second and Final Exam
				Presentation	Presentation
				Discussion	Discussion

Course Coordinator: **Dr. Marwa Hany** مروة هاني

Head of Department: **Dr. Ahmed Youssef Kamal El-Deen**

Date:2/1/2024

Course Specification

1. Basic Information:

Program Title	Construction Engineering and Management			
Program Offering the course	Construction Engineering and Management			
Date of Specification Approval	**2/1/2024**			
Course Title	**Engineering Numerical Analysis**		**Code**	**FRB 104**
Type	**Compulsory** ☒	**Elective** ☐		
Semester	**Spring Semester (Level2-1)**			
Teaching Hours	**Lec.**	**Tut.**	**Lab.**	**Credit hours**
	2	**0**	**2**	**3**

2. Professional Information:

2.1. Course Description:

Numeric in General: Solution of linear systems by iterative methods (Jacobi Iteration, Gauss–Seidel Iteration Method, Convergence and Matrix Norms). Solution of nonlinear equations (Fixed-Point Iteration, Newton–Raphson's method, Sufficient Convergence Condition). Curve fitting (Least square method). Interpolations (Lagrange Interpolation, Newton's Forward and Backward Interpolations). Numerical differentiation. Numerical integration (Rectangular Rule, Trapezoidal Rule, Simpson's Rule).
Numeric for ODEs and PDEs: Solution of first-order ODEs (Euler's method, Runge– Kutta Methods). Solution of higher order ODEs. Boundary and initial-boundary value problems for ODEs, Elliptic and parabolic PDEs (Finite difference methods, Explicit method, Crank–Nicolson Method). Lab simulations of engineering applications.

2.2. Course Objectives (CO):

Program objective		**Course objective**	
PO1	Apply a wide spectrum of engineering knowledge, science, and specialized skills with analytic, critical, and systemic thinking to identify and solve engineering problems in real-life situations.	**CO1**	**Explain** basic Theorems of Probability, and their applications in engineering life.
		CO2	**Select** a suitable item to evaluate applied probability problems in **real-life situations**

2.3. Course Learning Outcomes (CLO's):

Student Competences	Program Learning Outcomes		Course Learning Outcomes	
A1	PLO1	Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science, and applied mathematics.	CLO1	**Identify** the basic items of the course.
			CLO2	**Explain** how to use all items of the course in applied engineering problems
A2	PLO2	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	CLO3	**Solve** different problems for various mathematics elements
			CLO4	**Analyze** the different problems and verifications.

2.4. Course Topics:

Course Topics	Week	Course LO's Covered			
		CLO1	CLO2	CLO3	CLO4
Solution of linear systems by iterative methods	**1&2**	√			
Solution of nonlinear equations	**3**	√			
Curve fitting (Least square method).	**4**	√			
Interpolations (Lagrange Interpolation,	**5&6**	√			
First Exam	**7**				
Numerical differentiation.	**8&9**	√			
Numerical integration	**10**				
Solution of first-order ODEs (Euler's method, Runge–Kutta Methods).	**11**		√		
Experimental Test	**12**				
Solution of higher order ODEs.	**13**	√	√		
Lab simulations of engineering applications.	**14**	√	√		
Revision	**15**	√	√		
Final Exam	**16**				
Total	**16**	**11**	**4**		

2.5. Lab Topics:

Lab Topics	Week	Course LO's Covered			
		CLO1	CLO2	CLO3	CLO4
Lab simulations by software's as (C++, Matlab, Python…)-	1,2			√	√
Simulating practical technical problems-	3			√	√
linear equations	5			√	√
Nonlinear structural problems	6			√	√
equations due to the fluid continuum problems	8,9			√	√
fluid flow rate calculations- Distributed wind force problems.	10			√	√
Experimental Test	12			√	√
Total	**12**			**8**	**8**

2.6. Teaching and Learning Methods

Teaching and Learning Methods:	Course LO's Covered			
	CLO1	CLO2	CLO3	CLO4
1. Lecture	√	√		
2. Discussion	√	√		
3. Computer-based Instruction			√	√
Teaching and Learning Methods for Students with Special Needs:				
Methods				
1. Discussion Session				
2. Extra Lectures				
3. Provide different levels of books and materials				

2.7. Assessment Methods

Assessment Methods		Course LOs Covered			
		CLO1	CLO2	CLO3	CLO4
Formative Assessment Method					
Tests	First Exam	√	√		
	Experimental Test			√	√
	Quizzes	√	√		
Assignment				√	√
Summative Assessment Method					
Final Exam		√	√		

2.7.1. Assessment Schedule & Grades Distribution

Assessment Methods		Week	Weighting of Asses.
Formative Assessment Method			
Tests	**First exam**	7^{th}	30%
	Experimental Test	12^{th}	20%
	Quizzes	6^{th},14^{th}	4%
Assignments		3,5,6,8,10,11	6%
Summative Assessment Method			
Final exam		16^{th}	40%
Total			**100%**

2.8. List of Reference:

Essential Books (Textbooks):	1. van Kan, J. J. I. M., August Segal, and Fredericus Johannes Vermolen. "Numerical methods in scientific computing." (2023). 2. Yang, Won Y., et al. *Applied numerical methods using MATLAB*. John Wiley & Sons, 2020.
Recommended Books:	1. Epperson, James F. *An introduction to numerical methods and analysis*. John Wiley & Sons, 2021. 2. Corriou, Jean-Pierre, and Jean-Pierre Corriou. *Numerical Methods of Optimization*. Springer International Publishing, 2021.
Periodicals, Web Sites, … etc:	1. https://archive.org/details/numerical-methodas-for-engineers-and-scientists 2. https://www.youtube.com/watch?v=IOR31yN43Kg&list=PLDea8VeK4MUTOBXLpvx_WKtVrMkojEh52

2.9. Facilities required for Teaching and Learning

Different Facilities
Lecture Hall
Data Show
White Board
Laboratory

3. Matrix:

3.1. Program Objectives VS Course Objectives

Program Objectives	Course Objective	
	CO1	CO2
PO1	√	√

3.2. Course Objectives VS Course Learning Outcomes

Course Objectives	Course Learning Outcomes			
	CLO1	CLO2	CLO3	CLO4
CO1	√	√		
CO2			√	√

3.3. Program Learning Outcomes VS Course Learning Outcomes

Student Competences	Program Learning Outcomes	Course Learning Outcomes			
		CLO1	CLO2	CLO3	CLO4
A1	PLO1	√	√		
A2	PLO2			√	√

3.4. Assessment Alignment Matrix

S.A	PLO	PO	CLO	Teaching M.	Assessment M.
A1	PLO1	PO1	CLO1	Lecture Discussion	• First, and Final Exams. • Quizzes
			CLO2	Lecture Discussion	• First and Final Exams. • Quizzes
A2	PLO2		CLO3	Computer-based Instruction	• Experimental Test • Assignment
			CLO4	Computer-based Instruction	• Experimental Test • Assignment

Course Coordinator: Assoc. Prof. Mohamed.A.Elsiy

Program Coordinator: Dr. Ahmed Youssef Kamal El-Deen

Date: 2/1/2024

Course Specification

1. Basic Information:

Program Title	**Construction Engineering and Management**			
Program Offering the course	**Construction Engineering and Management**			
Date of Specification Approval	**2/1/2024**			
Course Title	**Applied Engineering Probability and Mathematical Statistics**		**Code**	**FRB 201**
Type	**Compulsory ☒**	**Elective ☐**		
Semester	Fall Semester (Level 2-1)			
Teaching Hours	**Lec.**	**Tut.**	**Lab.**	**Credit hours**
	2	**2**	**0**	**3**

2. Professional Information:

2.1. Course Description:

Pr.Req. : Non

Probability: Basic Theorems of Probability. Conditional Probability. Independent Events. Discrete and Continuous Random Variables. Mean and Variance of Distributions. Discrete Distributions (Binomial, Poisson and Hypergeometric Distribution). Continuous Distributions (Normal and Exponential Distribution). Distributions of Several Random Variables (Discrete and Continuous Two-Dimensional Distributions).

Mathematical Statistics: Random Sampling. Sample mean and variance. Point Estimation of Parameters. Confidence Intervals. Simple and multiple Linear Regression and Correlation. Testing of Hypotheses. Markov chains. Quality Control. Engineering Applications. Lab simulations of engineering applications.

2.2. Course Objectives (CO):

Program objective		**Course objective**	
PO1	Apply a wide spectrum of engineering knowledge, science, and specialized skills with analytic, critical, and systemic thinking to identify and solve engineering problems in real-life situations.	**CO1**	**List and Explain** basic Theorems of Probability, and their applications in engineering life.
		CO2	**Select** a suitable item to evaluate applied probability problems in **real-life situations**

2.3. Course Learning Outcomes (CLO's):

Student Competences	Program Learning Outcomes		Course Learning Outcomes	
A1	PLO1	Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science, and applied mathematics.	CLO1	**Identify** the basic items of the course.
			CLO2	**Explain** how to use all items of the course in applied engineering problems
A2	PLO2	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	CLO3	**Solve** different problems for various mathematics elements
			CLO4	**Analyze** the different problems and verifications.

2.4. Course Topics:

Course Topics	Week	Course LO's Covered			
		CLO1	CLO2	CLO3	CLO4
Basic Theorems of Probability.	1-2	√	√		
Conditional Probability. Independent Events.	3	√	√		
Discrete and Continuous Random Variables. Mean and Variance of Distributions.	4	√	√	√	√
Discrete Distributions (Binomial, Poisson and Hypergeometric Distribution)	5-6	√	√	√	√
First Mid-Term	**7**	√	√	√	
Continuous Distributions (Normal and Exponential Distribution).	8-9	√	√		
Distributions of Several Random Variables (Discrete and Continuous Two-Dimensional Distributions).	10	√	√		
Random Sampling. Sample mean and variance.	11	√	√		
Second Mid-Term	**12**	√	√		√
Point Estimation of Parameters. Confidence Intervals.	13	√	√	√	√
Testing of Hypotheses	14	√	√	√	√
Engineering Applications	15	√	√	√	√
Final Exam	**16**	√	√	√	√
Total	**16**	**13**	**13**	**6**	**6**

2.5. Lab Topics:

NA

2.6. Teaching and Learning Methods

Teaching and Learning Methods:	Course LO's Covered			
	CLO1	CLO2	CLO3	CLO4
1. Lecture	√	√		
2. Tutorials	√	√		
3. Discussions			√	√
Teaching and Learning Methods for Students with Special Needs:				
Methods				
1. Discussion Session				
2. Extra Lectures				
3. Provide different levels of books and materials				

2.7. Assessment Methods

Assessment Methods		Course LOs Covered			
		CLO1	CLO2	CLO3	CLO4
Formative Assessment Method					
Tests	First Exam	√	√	√	
	Second Exam	√	√		√
	Quizzes	√	√		
Discussions		√	√		
Summative Assessment Method					
Final Exam		√	√	√	√

2.7.1. Assessment Schedule & Grades Distribution

Assessment Methods		Week	Weighting of Asses.
Formative Assessment Method			
Tests	**First exam**	7^{th}	30%
	Second exam	12^{th}	20%
	Quizzes	6^{th}&9^{th}	5%
Discussion		5^{th}&8^{th}&11^{th}&14^{Th}	5%
Summative Assessment Method			
Final exam		16^{th}	40%
Total			**100%**

2.8. List of Reference:

Essential Books (Textbooks):	1. R. E Walpole, R. H. Myers, "Probability and Statistics for Engineers and Scientists", Macmillan Publishing, Last Edition.
Recommended Books:	1. David Levine, Patricia Ramsey , Robert Smidt, "Applied Statistics for Engineers and Scientists: Using Microsoft Excel & Minitab", First Edition, 2000.
Periodicals, Web Sites, … etc:	1. https://archive.org/details/introductiontopr4th00mend_d6h2

2.9. Facilities required for Teaching and Learning

Different Facilities
Lecture Hall
Data Show
White Board
Lecture notes (Power Point)

3. Matrix:

3.1. Program Objectives VS Course Objectives

Program Objectives	Course Objective	
	CO1	CO2
PO1	√	√

3.2. Course Objectives VS Course Learning Outcomes

Course Objectives	Course Learning Outcomes			
	CLO1	CLO2	CLO3	CLO4
CO1	√	√		
CO2			√	√

3.3. Program Learning Outcomes VS Course Learning Outcomes

Student Competences	Program Learning Outcomes	Course Learning Outcomes			
		CLO1	CLO2	CLO3	CLO4
A1	PLO1	√	√		
A2	PLO2			√	√

3.4. Assessment Alignment Matrix

Student Competences	PLO	PO	CLO	Teaching M.	Assessment M.
A1	PLO1	PO1	CLO1	• Lecture • Tutorials	• First, Second, Final Exams. • Quizzes • Discussions.
			CLO2	• Lecture • Tutorials	• First, Second, Final Exam. • Quizzes • Discussions.
A2	PLO2		CLO3	• Discussions	• First Exam, and Final Exam
			CLO4	• Discussions	• Second, and Final Exam

Course Coordinator: **Assoc. Prof. Mohamed Medhat Mousa**

Head of Department: **Assoc. Prof. Ahmed Youssef Kamal El-Deen**

Date: 2/1/2024

Level 2

Elective

Humanities

Course Specification

1. Basic Information:

Program Title	Construction Engineering and Management			
Department Offering the course	Construction Engineering and Management			
Date of Specification Approval	**2/1/2024**			
Course Title	Principles of Entrepreneurship and Project Management	**Code**	UHS201	
Type	**Compulsory** ☐	**Elective** ☒		
Semester	Fall Semester (Level 2-1)			
Teaching Hours	**Lec.**	**Tut.**	**Lab.**	**Credit hours**
	2	-	-	2

2. Professional Information:

2.1. Course description:

Concepts in entrepreneurship – entrepreneurship and small enterprises – Idea generation of entrepreneurial projects – The university and entrepreneurship opportunities and challenges – Marketing plan – operational plan – financial plan – Writing the business plan – The technological environment for entrepreneurship projects – External business environment for pioneering projects – Egyptian economy programs to support leading projects – entrepreneurial project presentation skills – Introduction to project management – The organizational structure – Success assessment – Planning – data reading – network planning – critical path analysis of networks – resource allocation and constraints – cost management – risk management – measurement and control of project performance.

2.2. Course Objectives (CO):

Program objective		**Course objective**	
PO4	Master self-learning and life-long learning strategies to communicate effectively in academic / professional fields	**CO1**	Apply the professional integrity and sustainability awareness, incorporating ethics into project development, collaboration, and ecosystem building.
		CO2	Use the analytical tools, design principles, and project management methodologies, applying modern technologies for effective and efficient execution of entrepreneurial projects.

2.3. Course Learning Outcomes (CLO's):

Student Competences	Program Learning Outcomes		Course Learning Outcomes	
A3	PLO3	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.	CLO1	Perform the market needs for innovative entrepreneurial projects that incorporate sustainable design principles.
			CLO2	Implement cost effective solutions for entrepreneurial projects.
A4	PLO4	Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues and risk management principles.	CLO3	Use cutting-edge technologies and industry standards in executing entrepreneurial projects.
			CLO4	Identify risk management principles into entrepreneurial planning to project success and environmental sustainability.

2.4. Course Topics:

Course Topics	Week	Course LO's Covered			
		CLO1	CLO2	CLO3	CLO4
Market Analysis and Opportunity Identification	1	√	√		
Idea Generation and Validation Techniques	2	√	√		
Sustainable Design Principles for Entrepreneurship	3	√			
Financial Planning and Cost Management for Startups	4	√			
Ethical Considerations in Business Development	5	√	√		
Market Analysis and Opportunity Identification	6		√		
First Exam	7	√	√		
Operational Planning and Project Management	8, 9		√		√
Technology Adoption and Risk Management for Entrepreneurs	10, 11			√	√
Second Exam	12		√	√	√
Entrepreneurial Business Plan Development	13, 14	√	√		
Pitching and Presentation Skills for Entrepreneurs	15		√	√	
Final Exam	16	√	√	√	√
Total	**16**	**7**	**9**	**3**	**4**

2.5. Lab Topics:

(Not Applicable**)**

2.6 Teaching and Learning Methods

Teaching and Learning Methods:	Course LO's Covered			
	CLO1	CLO2	CLO3	CLO4
Lecture	√	√	√	√
Discussion	√	√		
Brain Storming			√	
Problem-based Learning			√	√
Teaching and Learning Methods for Students with Special Needs:				
Methods				
1. Discussion Session				
2. Extra Lectures				
3. Provide different levels of books and materials				

2.7 Assessment Methods

Assessment Methods:		Course LOs Covered			
		CLO1	CLO2	CLO3	CLO4
Formative Assessment Method					
1. Tests	First Exam	√	√		
	Second Exam		√	√	√
2. Mini-Project				√	√
3. Discussion				√	√
Summative Assessment Method					
Final Exam		√	√	√	√

2.7.1. Assessment Schedule & Grades Distribution

Assessment Method		Week	The weighting of Assessment %
Formative Assessment Method			
Tests	First Exam	7	30 %
	Second Exam	12	20 %
Mini--Project		15	7 %
Discussion		8,10,14	3%
Summative Assessment Method			
Final Exam		16	40 %
Total			100 %

2.8. List of References:

Essential Books (Textbooks):	Alexander Osterwalder, Yves Pigneur, "Business model generation: A handbook for visionaries, game changers, and challengers", 1st edition, 2010, ISBN-13 : 978-0470876411
Recommended Books:	Eric Ries, "The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses", 1st edition, 2011, ISBN-13 : 978-0307887894
Periodicals, Web Sites, … etc:	https://designthinking.ideo.com/

2.9. Facilities required for Teaching and Learning

Different Facilities
Lecture Hall
Data show
White board

3. Matrix:

3.1. Program Objectives VS Course Objectives

Program Objectives	Course Objective	
	CO1	CO2
PO4	√	√

3.2. Course Objectives VS Course Learning Outcomes

Course Objectives	Course Learning Outcomes			
	CLO1	CLO2	CLO3	CLO4
CO1	√	√		
CO2			√	√

3.3. Program Learning Outcomes VS Course Learning Outcomes

Student Competences	Program Learning Outcomes	Course Learning Outcomes			
		CLO1	CLO2	CLO3	CLO4
A3	PLO3	√	√		
A4	PLO4			√	√

3.4. Assessment Alignment Matrix

SC	PLO	PO	CLO	Teaching M.	Assessment M.
A3	PLO3	PO4	CLO1	• Lecture • Discussion	• First , and Final exam • Project
			CLO2	• Lecture • Discussion	• First ,Second and Final exam
A4	PLO4		CLO3	• Lecture • Brain Storming • Problem-based Learning	• Second and Final Exam • Discussion • Mini- Project
			CLO4	• Lecture • Problem-based Learning	• Second and Final Exam • Discussion • Mini- Project

Course Coordinator: Assoc.Prof. Amr Abdelhamid Ali Attia Al-Awamry Al-Awamry

Head of Department: Dr. Ahmed Youssef Kamal El-Deen

Date: 2/1/2024

Course Specification

1. Basic Information:

Program Title	Construction Engineering and Management			
Department Offering the course	Construction Engineering and Management			
Date of Specification Approval	**2/1/2024**			
Course Title	**Human Resources Management**		**Code**	**UHS203**
Type	**Compulsory** ☐		**Elective** ☒	
Semester	**Fall Semester (Level 2-1)**			
Teaching Hours	**Lec.**	**Tut.**	**Lab.**	**Credit hours**
	2	**….**	**….**	**2**

2. Professional Information:

2.1. Course Description:

The concept of human resources management – The historical development of human resource management – the main jobs of human resource management – planning for human resources – obtaining human resources – training and developing human resources – compensation for human resources – maintaining and sustaining human resources.

2.2. Course Objectives (CO):

Program objective		Course objective	
PO4	Master self-learning and life-long learning strategies to communicate effectively in academic / professional fields	**CO 1**	Perform the tasks and practices of human resource management, whether on a strategic, tactical or operational level
		CO 2	Apply the career path of employment and understand performance appraisal systems and wage and incentive policies

2.3. Course Learning Outcomes (CLO's):

Student Competences	Program Learning Outcomes		Course Learning Outcomes	
A3	**PLO3**	Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global, cultural, social, economic,	**CLO 1**	Solve issues for human resource issues through case studies and brainstorming

		environmental, ethical and other aspects as appropriate to the discipline and within the principles and contexts of sustainable design and development.	**CLO 2**	Use career paths for employment for the quality life work, Through effective evaluation of employee performance
A4	**PLO4**	.Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues and risk management principles.	**CLO 3**	Model the basics of human resource management as strategies, policies, and executive.
			CLO 4	Identify the nature of human resource Outsourcing services.

2.4. Course Topics:

Course Topics	Week	Course LO's Covered			
		CLO1	CLO2	CLO3	CLO4
Strategic Human Resource Management.	1				√
Human Resource Practices.	2	√			√
Career Path Planning and Development.	3		√		
Employee Performance Appraisal.	4		√		
Strategic Human Resource Management.	5	√			√
Human Resource Practices.	6	√			√
First Exam	**7**	√	√		√
Outsourcing Human Resource Services.	8-9	√		√	√
Electronic Human Resource Management.	10-11	√		√	√
Second Exam	**12**	√	√		√
Talent Management.	13	√		√	√
Quality of Work Life	14-15		√		
Final Exam	**16**	√	√	√	√
Total	**16**	**7**	**4**	**4**	**9**

2.6. Teaching and Learning Methods

Teaching and Learning Methods:	Course LO's Covered			
	CLO1	CLO2	CLO3	CLO4
Lecture	√	√	√	√
Discussion	√	√		
Brain Storming			√	
Problem-based Learning			√	
Teaching and Learning Methods for Students with Special Needs:				
Methods				
1. Discussion Session				
2. Extra Lectures				
3. Provide different levels of books and materials				

2.7. Assessment Methods

Assessment Methods		Course LOs Covered			
		CLO1	CLO2	CLO3	CLO4
Formative Assessment Method					
Tests	First Exam	√	√		√
	Second Exam	√	√		√
Observation				√	
Discussion		√	√	√	√
Summative Assessment Method					
Final Exam		√	√	√	√

2.8.1. Assessment Schedule & Grades Distribution

Assessment Methods		Week	Weighting of Asses.
Formative Assessment Method			
Tests	First Exam	7th	30%
	Second Exam	12th	20%
Observation		1-2,5-6	5%
Discussion		3-4,15	5%
Summative Assessment Method			
Final exam		16th	40%
Total			**100%**

2.9. List of Reference:

Essential Books (Textbooks):	د. مروة محمد عبد الحميد ، **إدارة الموارد البشرية الاستراتيجية : مدخل لادارة المواهب وجودة الحياة الوظيفية** ، المؤلف، القاهرة، 2022م
Recommended Books:	أ.د. أحمد سيد مصطفى ، **إدارة الموارد البشرية: الإدارة العصرية لرأس المال الفكرى**، المؤلف، القاهرة، 2005م
Periodicals, Web Sites, … etc:	**Human Resource Management Magazine**

2.10. Facilities required for Teaching and Learning

Different Facilities	
Lecture Hall	√
Data Show	√

3. Matrix:

3.1. Program Objectives VS Course Objectives

Program Objectives	Course Objective	
	CO1	CO2
PO4	√	√

3.2. Course Objectives VS Course Learning Outcomes

Course Objectives	Course Learning Outcomes			
	CLO1	CLO2	CLO3	CLO4
CO1	√	√		
CO2			√	√

3.3. Program Learning Outcomes VS Course Learning Outcomes

Student Competences	Program Learning Outcomes	Course Learning Outcomes			
		CLO1	CLO2	CLO3	CLO4
A3	PLO3	√	√		
A4	PLO4			√	√

3.4. Assessment Alignment Matrix

SC	PLO	PO	CLO	Teaching M.	Assessment M.
A3	PLO3	PO4	CLO1	• Discussion • Lecture	• Discussion • First ,Second and Final Exam
			CLO2	• Discussion • Lecture	• Discussion • First ,Second and Final Exam
A4	PLO4		CLO3	• Lecture • Brain Storming • Problem-based Learning	• Final Exam • Observation • Discussion
			CLO4	• Lecture	• First,Second and Final Exam • Discussion

Course Coordinator: Marwa Abd-El Hameid

Program Coordinator: Dr. Ahmed Youssef Kamal El-Deen

Date: 2/1/2024

Level 3

Course Specification

1. Basic Information:

Program Title	Construction Engineering and Management			
Department Offering the course	Construction Engineering and Management			
Date of Specification Approval	**2/1/2024**			
Course Title	Technical Installations in Buildings	**Code**	CMM301	
Type	**Compulsory** ☒	**Elective** ☐		
Semester	Fall Semester (Level 3-1)			
Teaching Hours	**Lec.**	**Tut.**	**Lab.**	**Credit hours**
	1	**---**	**3**	**2**

2. Professional Information:

2.1. Course Description:

Pr.Req.: Non

Thermal Comfort Heating. Ventilation & Air Conditioning. (HVAC), Central heating and cooling Systems, Distribution Media, and Delivery Devices. Heat and Moisture Transfer in Buildings, Lighting On-site power generation, and Normal electrical systems. Special systems. Water supply and drainage systems, types of fixtures, private sewerage systems, Fire protection systems, Architectural acoustics

2.2. Course Objectives (CO):

Program objective		Course objective	
PO1	Apply a broad spectrum of engineering knowledge, science, and specialized skills with analytic, critical, and systemic thinking to identify and solve engineering problems in real-life situations.	**CO1**	**Illustrate** the concept of Ventilation and Air Conditioning. (HVAC), lighting and electrical generation, Fire protection, and Plumbing works.
		CO2	**Demonstrate** a wide spectrum of Electrical and mechanical installation systems components with analytics and solve engineering problems in distribution power systems
PO5	Apply analytical, experimental, design, construction engineering techniques and project management skills with proficiency aided by modern tools.	**CO3**	**Design** of Electrical and mechanical System Requirements for installations in buildings

2.3. Course Learning Outcomes (CLO's):

Student Competences	Program Learning Outcomes		Course Learning Outcomes	
A2	PLO2	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.	CLO1	**Present** the elementary subsystems included in different air conditioning systems such as air distribution systems, chilled water circuits for central air conditioning systems, and refrigerant piping systems for refrigeration plants.
A3	PLO3	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.	CLO2	**Demonstrate** the parameters affecting the performance of the installation building to propose improvements.
A5	PLO5	Practice research techniques and methods of investigation as an inherent part of learning.	CLO3	**Present** the basic principles and concepts of electrical and mechanical installations in buildings as an inherent part of learning.
B1	PLO11	Select appropriate and sustainable technologies for the construction of buildings, infrastructures, and water structures; using either numerical techniques or physical measurements and testing by applying a full range of civil engineering concepts and techniques of Structural Analysis and Mechanics, Properties	CLO4	**Perform** appropriate for the construction of electrical and mechanical installation; using either numerical techniques or physical measurements.

		and Strength of Materials, Surveying, Soil Mechanics, Hydrology and Fluid Mechanics		
D2	**PLO16**	Generate ecologically responsible, environmental conservation and rehabilitation designs; through an understanding of structural design, construction, technology, and engineering problems	**CLO5**	**Classify** different air conditioning systems and equipment to be designed and selected during the AC system design stages.
			CLO6	**Design** construction of electrical and mechanical installations in buildings engineering techniques and project management skills with proficiency aided by modern tools.

2.4. Course Topics:

Course Topics	Week	Course LO's Covered					
		CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
Introduction to the Power Distribution System	1		√	√			
Electrical load estimation	2				√		√
Circuit breaker, Generator, and transformer	3, 4		√		√		
Cables, Lighting	5, 6			√			√
First Exam	7		√				√
Introduction to Air Conditioning Systems	8	√				√	
Classification of Air Conditioning Systems	9	√				√	
All Air Systems and Air side equipment	10	√				√	
Air Conditioning Systems load estimation.	11	√				√	√
Experimental Test	12	√			√	√	
Basic parts of the fire-fighting systems and Waterside Equipment.	13			√	√		
Fire-fighting systems and Equipment.	14, 15		√		√		
Final exam	16		√		√		√
Total	**16**	**4**	**5**	**4**	**6**	**4**	**4**

2.5 Lab Topics

Lab Topics	Week	Course LO's Covered					
		CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
Introduction to power distribution Software	2,3,4	√					
Cable distributions	5, 6	√					
Lighting System	9				√	√	
Lighting distributions	10,11				√	√	
Experimental	**12**	√			√	√	
Total	**9**	**5**			**4**	**4**	

2.6 Teaching and Learning Methods

Teaching and Learning Methods:	Course LO's Covered					
	CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
1. Lecture		√		√		√
2. Computer-based Learning	√			√	√	
3. Report			√			
4. Discussion	√	√			√	√
Teaching and Learning Methods for Students with Special Needs:						
Methods						
1. Discussion Session						
2. Extra Lectures						
3. Provide different levels of books and materials						

2.7 Assessment Methods

Assessment Methods:		Course LOs Covered					
		CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
Formative Assessment Method							
Tests	First Exam		√				√
	Experimental Test	√			√	√	
	Oral Test	√	√	√			
Reports				√		√	
Summative Assessment Method							
Final Exam			√		√		√

2.7.1. Assessment Schedule & Grades Distribution

Assessment Method		Week	The weighting of Assessment %
Formative Assessment Method			
Tests	First Exam	7	30
	Experimental	12	20
	Oral Test	15	5
Reports		2,6,10	5
Summative Assessment Method			
Final exam		16	40
Total			100

2.8. List of Reference:

Course Notes:	Available lecture notes are shared with the students
Essential Books (Textbooks):	• Refrigeration Systems and Applications, I. Dincer, Wiley, 3rd Edition, 2018. • Brian Scaddan: "Electrical Installation Work" tenth Edition,2022 • ASHARE, HVAC Systems and Equipment Handbook, 2020. • ASHARE, HVAC Application Handbook, 2019.
	• Building Technology: Mechanical and Electrical Systems- Architecture by Benjamin Stein, John Wiley & Sons, 2010 • Basic Refrigeration and Air Conditioning by Ananthanarayanan McGraw Hill, 2013.
Periodicals, Web Sites, … etc:	

2.9. Facilities required for Teaching and Learning

Different Facilities
Lecture Hall
Library Usage
Laboratory
Data Show
White Board

3. Matrix:

3.1. Program Objectives VS Course Objectives

Program Objectives	Course Objective		
	CO1	CO2	CO3
PO1	√	√	
PO5			√

3.2. Course Objectives VS Course Learning Outcomes

Course Objectives	Course Learning Outcomes					
	CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
CO1	√	√				
CO2			√	√		
CO3					√	√

3.3. Program Learning Outcomes VS Course Learning Outcomes

Student Competences	Program Learning Outcomes	Course Learning Outcomes					
		CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
A2	PLO2	√					
A3	PLO3		√				
A5	PLO5			√			
B1	PLO11				√		
D2	PLO16					√	√

3.4. Assessment Alignment Matrix

SC	PLO	PO	CLO	Teaching M.	Assessment M.
A2	PLO2	PO1	CLO1	• Computer-based Learning	• Experimental Test
				• Discussion	• Oral Test
A3	PLO3		CLO2	• Lecture	• First and Final Exam
				• Discussion	• Oral Test
A5	PLO5		CLO3	• Report	• Report • Oral Test
B1	PLO11		CLO4	• Lecture	• Final Exam
				• Computer-based Learning	• Experimental Test
D2	PLO16	PO2	CLO5	• Computer-based Learning	• Experimental Test
				• Discussion	• Report
			CLO6	• Lecture	• First, and Final Exam
				• Discussion	

Course Coordinator: Ass. Prof. Fawzy Ahmed Mohamed

Head of Department: Dr. Ahmed Youssef Kamal El-Deen

Date: 2/1/2024

Course Specification

1. Basic Information:

Program Title	Construction Engineering and Management			
Department Offering the course	Construction Engineering and Management			
Date of Specification Approval	**2/1/2024**			
Course Title	Sanitary Engineering		**Code**	CMC302
Type	**Compulsory** ☒	**Elective** ☐		
Semester	Spring Semester (Level 3-2)			
Teaching Hours	**Lec.**	**Tut.**	**Lab.**	**Credit hours**
	2	**1**	**2**	**3**

2. Professional Information:

2.1. Course Description:

Pr.Req. : Hydraulics for Construction (CMC112)

Sources of pollution, Water resources and characteristics, Water quality, Water collection works, Water purification works, Water distribution works, Sewer systems, Wastewater characteristics, Wastewater treatment works, Wastewater disposal works, Treated wastewater reuse, Industrial wastes

.2.2. Course Objectives (CO):

Program objective		Course objective	
PO1	**Apply** a wide spectrum of engineering knowledge, science, and specialized skills with analytic, critical, and systemic thinking to identify and **solve** engineering problems in real-life situations.	**CO1**	Illustrate Sources of pollution, Water resources and characteristics which used as concept for water treatment.
PO5	Apply analytical, **experimental**, design, construction engineering techniques and project management skills with proficiency aided by modern tools.	**CO2**	Design the different units of WTP, WWTP the water distribution system and Wastewater gravity system.

2.3. Course Learning Outcomes (CLOs):

Student Competences		Program Learning Outcomes	Course Learning Outcomes	
A2	PLO2	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.	CLO1	Discuss the concepts of environmental pollution, Water resources and water characteristics
B2	PLO12	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.	CLO2	Apply knowledge of environmental impact assessment and sustainability and water consumption.
			CLO3	**Design of** Water collection works, Water purification works and Wastewater treatment works.
			CLO4	**Use** different methods for planning Water distribution works and Sewer systems.

2.4. Course Topics:

Course Topics	Week	Course LO's Covered			
		CLO1	CLO2	CLO3	CLO4
Introduction to Environmental engineering	1	√	√		
Water Quality	2	√	√		
Water supply (Population & Water Consumption)	3		√		
Collection Works for Surface Water	4			√	
Sedimentation	5,6			√	
First Exam	7	√	√	√	
Disinfection	8			√	
storage	9			√	
Design of Water Distribution System	10,11				√
Experimental Test	12	√			
Sewer System	13				√
Wastewater Treatment and disposal	14			√	√
Final Exam	16	√	√	√	√
Total	**16**	**5**	**2**	**9**	**4**

2.5 Lab Topics

Lab Topics	Week	Course LO's Covered			
		CLO1	CLO2	CLO3	CLO4
Turbidity, Total Dissolved Solids (TDS), Total Suspended Solids (TSS) Volatile Solids (VS)	**3-5**	√			
Chloride Iron and Manganese, Arsenic, Fluorides Total bacteria account	**9,10**	√			
Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Dissolved Oxygen (DO)	**11**	√			
Experimental Test	**12**	√			

2.6 Teaching and Learning Methods

Teaching and Learning Methods:	Course LO's Covered			
	CLO1	CLO2	CLO3	CLO4
1. Lecture		√	√	√
2. Tutorials		√	√	√
3. Discussion	√		√	√
4. Practical-based Learning	√			
Teaching and Learning Methods for Students with Special Needs:				
Methods				
1. Discussion Session				
2. Extra Lectures				
3. Provide different levels of books and materials				

2.7 Assessment Methods

Assessment Methods:		Course LOs Covered			
		CLO1	CLO2	CLO3	CLO4
Formative Assessment Method					
Tests	**Quizzes**			√	√
	First Exam	√	√	√	
	Experimental Test	√			
Discussion		√			
Assignments			√	√	√
Summative Assessment Method					
Final Exam		√	√	√	√

2.7.1. Assessment Schedule & Grades Distribution

Assessment Method		Week	The weighting of Assessment %
Formative Assessment Method			
Tests	**First Exam**	7	30%
	Experimental Test	12	20%
	Quizzes	8,9,10,13	4 %
Discussion		4,6,10,11	4%
Assignments		9,10	2%
Summative Assessment Method			
Final Exam		16	40 %
Total			100 %

2.8. List of References:

Course Notes:	• Sanitary Engineering Prof. Mohamed Basiouny (2019) • Pollution & society Prof. Mohamed Basiouny (2019)
Essential Books (Textbooks):	• Water and Wastewater Technology: Pearson New International Edition ISBN-13: 9781292021041 • Introduction to Environmental Engineering by Mackenzie Davis, David Cornwell, McGrawHill, Fifth Edition, 2012. • شبكات المياه - الكود المصرى (2019) • محطات تنقية مياه الشرب - الكود المصرى- (2019) • محطات الرفع - الصرف الصحى- الكود المصرى - (2019) • أعمال المعالجة- الصرف الصحى - الكود المصرى-(2019)

2.9. Facilities required for Teaching and Learning

Different Facilities	
Lecture Hall	√
Data Show	√
Laboratory	√
White Board	√

3. Matrix:

3.1. Program Objectives VS Course Objectives

Program Objectives	Course Objectives	
	CO1	**CO2**
PO1	√	
PO5		√

3.2. Course Objectives VS Course Learning Outcomes

Course Objectives	Course Learning Outcomes			
	CLO1	CLO2	CLO3	CLO4
CO1			√	√
CO2	√	√		

3.3. Program Learning Outcomes VS Course Learning Outcomes

Student Competences	Program Learning Outcomes	Course Learning Outcomes			
		CLO1	CLO2	CLO3	CLO4
A2	PLO2	√	√		
B2	PLO12			√	√

3.4. Assessment Alignment Matrix

SC	PLO	PO	CLOs	Teaching M.	Assessment
A2	PLO2	PO1	CLO1	Practical-based Learning	Experimental Test
				Discussion	First , and Final Exams Discussion
			CLO2	Lecture	First , and Final Exams
				Tutorials	Assignments
B2	PLO12	PO5	CLO3	Lecture	Quizzes
				Tutorials	Assignments
				Discussion	First , and Final Exams
			CLO4	Lecture	Quizzes
				Tutorials	Assignments
				Discussion	Final Exams

Course Coordinator: **Dr. Osama Abdelaziz Abosiada**

Head of Department: **Dr. Ahmed Youssef Kamal El-Deen**

Date:2/1/2024

Course Specification

1. Basic Information:

Program Title	Construction Engineering and Management			
Department Offering the course	Construction Engineering and Management			
Date of Specification Approval	**2/1/2024**			
Course Title	Methods and Equipment for Construction	**Code**	CMC 303	
Type	**Compulsory** ☒	**Elective** ☐		
Semester	Fall Semester (Level 3-1)			
Teaching Hours	**Lec.**	**Tut.**	**Lab.**	**Credit hours**
	2	**2**	**--**	**3**

2. Professional Information:

2.1. Course description:

Pr.Req. : Design of R.C. Structures-1 (CMC 207)

Techniques of building construction. Methods, materials, tools and equipment of construction. Traditional, mechanized and prefabrication construction systems. Selection of construction equipment. Applications on influence of construction methods on design and details. Evaluation and selection of appropriate construction technology. Sizing, operation and maintenance of construction equipment, design of temporary construction elements such as: concrete formwork, scaffolding systems, cofferdams. Type of cranes.

2.2. Course Objectives (CO):

Program objective		Course objective	
PO3	Work in and lead a heterogeneous team and display leadership qualities, business administration, and entrepreneurial skills	**CO1**	**Evaluate** the equipment and methods for construction of projects, to help in business administration and entrepreneurial skills
PO5	Apply analytical, experimental, design, construction engineering techniques and project management skills with proficiency aided by modern tools	**CO2**	**Select** the equipment and methods for construction of projects, including design of formwork, trench supports, and cofferdams.

2.3. Course Learning Outcomes (CLO's):

Student Competences	Program Learning Outcomes		Course Learning Outcomes	
A5	**PLO5**	Practice research techniques and methods of investigation as an inherent part of learning.	**CLO1**	**Apply** knowledge of mathematics, science, and engineering to evaluation of equipment and methods for construction of projects.
A6	**PLO6**	Plan, supervise and monitor implementation of engineering projects, taking into consideration other trades requirements.	**CLO2**	**Identify the** selection of equipment and methods for construction of projects
B1	**PLO11**	Select appropriate and sustainable technologies for the 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.	**CLO3**	**Apply** engineering fundamentals and analyses to the planning, selection, and utilization of construction equipment. Through understanding of: The total construction process, from inspection of the idea through construction and start up.
			CLO4	**Select** the most cost-effective manner to produce the intended quality

2.4. Course Topics:

Course Topics	Week	Course LO's Covered			
		CLO1	**CLO2**	**CLO3**	**CLO4**
Engineering fundamentals of moving earth.	1			√	√
Earth-moving equipment–Backhoe, …	2			√	√
Earth-compacting equipment–Rollers, ..	3			√	√
Hauling equipment–dumpers, trucks, tippers	4			√	√
Cost of owning and operating construction equipment	5			√	
Conveying equipment–Belts, cables, conveyors	6			√	√
First Exam	**7**			√	√
Internal combustion engine and	8	√	√		

fundamentals of hydraulic circuits					
Hoisting equipment–Crane (; derrick cranes, mobile cranes, and tower cranes), forklift	9			√	√
Aggregate production equipment-Jaw crusher, Gyratory crusher, Cone crusher	10			√	√
Equipment's concrete works –Agitation trucks, RMC plant or batching plants.	11			√	√
Second Exam	**12**			√	√
Pile-driving equipment–Single & double acting hammer, drop hammer, diesel hammer	13	√	√		
Construction equipment maintenance & Equipment life and replacement procedures	14	√	√		
A Case Study from any national project	15			√	√
Final Exam	**16**			√	√
Total	**16**	**3**	**3**	**13**	**13**

2.5. Lab Topics:

NA

2.6. Teaching and Learning Methods

Teaching and Learning Methods:	**Course LO's Covered**			
	CLO1	**CLO2**	**CLO3**	**CLO4**
Lectures		√	√	√
Tutorials		√	√	√
Discussions			√	√
Presentation	√			
Report	√			
Teaching and Learning Methods for Students with Special Needs:				
Methods				
1. Discussion Session				
2. Extra Lectures				
3. Provide different levels of books and materials				

2.7 Assessment Methods

Assessment Methods:		Course LOs Covered			
Methods		CLO1	CLO2	CLO3	CLO4
Tests	First Exam			√	√
	Second Exam			√	√
	Quizzes		√	√	√
Reports		√			
Discussions				√	√
Presentations		√	√		
Summative Assessment Method					
Final Exam				√	√

2.7.1. Assessment Schedule & Grades Distribution

Assessment Method		Week	The weighting of Assessment %
Formative Assessment Method			
Tests	First Exam	7	30%
	Second Exam	12	20%
	Quizzes	4,6,11	3%
Discussion		9,10	2 %
Presentations		15	2 %
Reports		15	3%
Summative Assessment Method			
Final Exam		16	40 %
Total			100 %

2.8. List of Reference:

Course Notes:	Lectures and presentations
Essential Books (Textbooks):	R. Peurifoy, Construction planning, equipment and methods, ninth edition, 2018
Recommended Books:	Leonhard E. Bernold, Construction equipment and methods: planning, innovation, safety, 2013. Construction Technology Paperback English by Mr Roy Chudley, Roger Greeno, ISBN-13 9780131286429

2.9. Facilities required for Teaching and Learning

Different Facilities	
Lecture Hall	√
Library Usage	√
Data Show	√
White Board	√

3. Matrix:

3.1. Program Objectives VS Course Objectives

Program Objectives	Course Objective	
	CO1	CO2
PO3	√	
PO5		√

3.2. Course Objectives VS Course Learning Outcomes

Course Objectives	Course Learning Outcomes			
	CLO1	CLO2	CLO3	CLO4
CO1			√	√
CO2	√	√		

3.3. Program Learning Outcomes VS Course Learning Outcomes

Student Competences	Program Learning Outcomes	Course Learning Outcomes			
		CLO1	CLO2	CLO3	CLO4
A5	PLO5	√	√		
A6	PLO6			√	
B1	PLO11				√

3.4. Assessment Alignment Matrix

SC	PLO	PO	CLO	Teaching M.	Assessment M.
A5	PLO5	PO5	CLO1	Presentation. Report.	Report. Presentation.
A6	PLO6		CLO2	Lectures Tutorials	Presentation. Quizzes
B1	PLO11	PO3	CLO3	Lectures Tutorials. Discussions	First , Second and Final Exams. Quizzes. Discussions.
			CLO4	Lectures Tutorials. Discussions	First , Second and Final Exams. Quizzes. Discussions.

Course Coordinator: Dr. Ahmed Saied Faheim El-Saaey

Head of Department: Dr. Ahmed Youssef Kamal El-Deen

Date: 2/1/2024

Course Specification

1. Basic Information:

Program Title	Construction Engineering and Management			
Department Offering the course	Construction Engineering and Management			
Date of Specification Approval	**2/1/2024**			
Course Title	Construction and Site Safety		**Code**	CMC 304
Type	**Compulsory** ☒		**Elective** ☐	
Semester	Spring Semester (Level 3-2)			
Teaching Hours	**Lec.**	**Tut.**	**Lab.**	**Credit hours**
	2	1	0	2

2. Professional Information:

2.1. Course Description:

Pr. Req.: Methods and Equipment for Construction (CMC303)

Students acquire working knowledge of the construction hazards, safety precautions, and effective integration of safety regulations into the design and construction phases. Different types of construction related hazards including crane, equipment, and machinery, universal, access, construction, operation, and maintenance hazards together with methods to prevent them from happening are discussed.

2.2. Course Objectives (CO):

Program objective		Course objective	
PO1	**Apply** a wide spectrum of engineering knowledge, science, and specialized skills with analytic, critical, and systemic thinking to identify and **solve** engineering problems in real-life situations.	**CO1**	**Illustrate** different types of construction related hazards to prevent them from happening.
PO2	**Behave** professionally, adhere to engineering ethics and standards, and work to develop the profession and community and promote sustainability principles.	**CO2**	**Classify** the knowledge of the construction hazards.

2.3. Course Learning Outcomes (CLOs):

Student Competences	Program Learning Outcomes		Course Learning Outcomes	
A4	**PLO4**	Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues and risk management principles.	**CLO1**	**Apply** knowledge to choose the better type of the construction hazards.
A6	**PLO6**	Plan, supervise and monitor implementation of engineering projects, taking into consideration other trades requirements.	**CLO2**	**Use** safety precautions, and effective integration of safety regulations.
B3	**PLO13**	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.	**CLO3**	**Manage** safety regulations into the design and construction phases.
			CLO4	**Assess** different types of construction related hazards.
			CLO5	**Discuss** crane, equipment, and machinery, universal, access, construction, operation, and maintenance hazards together.
D1	**PLO15**	Create architectural, urban, and planning designs that satisfy both aesthetic and technical requirements, using adequate knowledge of history and theory, related fine arts, local culture and heritage, technologies, and human sciences.	**CLO6**	**Prevent** construction related hazards from happening without affecting on satisfying both aesthetic and technical requirements

2.4. Course Topics:

Course Topics	Week	Course LO's Covered					
		CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
1.acquire Students acquire working knowledge of the construction hazards	1-2	√					
2.safety precautions, and effective	3-4	√	√				

integration of safety regulations into the design and construction phases.							
3.Different types of construction related hazards.	5-6	√	√	√	√		
4.First Exam	7	√	√	√			
5.Crane, equipment, and machinery, universal, access.	8-9	√	√	√	√		
6.construction, operation, and maintenance hazards.	10,11	√	√	√	√	√	
7.Second Exam	12			√	√	√	
8.Methods to prevent construction hazards from happening.	13-15	√	√	√	√	√	√
9.Final Exam	16	√	√	√	√	√	√
Total	**16**	**13**	**11**	**9**	**7**	**5**	**3**

2.5. Lab Topics

Not Applicable

2.6 Teaching and Learning Methods

Teaching and Learning Methods:	**Course LO's Covered**					
	CLO1	**CLO2**	**CLO3**	**CLO4**	**CLO5**	**CLO6**
1. Lecture	√	√	√	√	√	√
2. Tutorials		√	√	√		√
3. Presentations	√					
4. Case Study			√	√	√	√
Teaching and Learning Methods for Students with Special Needs:						
Methods						
1. Discussion Session						
2. Extra Lectures						
3. Provide different levels of books and materials						

2.7 Assessment Methods

Assessment Methods:		Course LOs Covered					
		CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
Formative Assessment Method							
Test	**First Exam**	√	√	√			
	Second Exam			√	√	√	
Assignments			√	√	√		√
Oral Test		√		√	√	√	√
Summative Assessment Method							
Final Exam		√	√	√	√	√	√

2.7.1. Assessment Schedule & Grades Distribution

Assessment Method		Week	The weighting of Assessment %
Formative Assessment Method			
Tests	**First Exam**	7	30%
	Second Exam	12	20%
Assignments		4,6,9,11	4%
Oral Test		15	6%
Summative Assessment Method			
Final Exam		16	40 %
Total			100 %

2.8. List of References:

Essential Books (Textbooks):	• Handbook of OSHA Construction Safety and Health Second Edition ISBN10: 0849365465 2019
Recommended Books:	• Construction Safety Engineering Principles (McGraw-Hill Construction Series): Designing and Managing Safer Job Sites, ISBN13: 9780071482448.

2.9. Facilities required for Teaching and Learning

Different Facilities	
Lecture Hall	√
Data Show	√
White Board	√

3. Matrix:

3.1. Program Objectives VS Course Objectives

Program Objectives	Course Objectives	
	CO1	CO2
PO1	√	
PO2		√

3.2. Course Objectives VS Course Learning Outcomes

Course Objectives	Course Learning Outcomes					
	CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
CO1	√	√				
CO2			√	√	√	√

3.3. Program Learning Outcomes VS Course Learning Outcomes

Student Competences	Program Learning Outcomes	Course Learning Outcomes					
		CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
A4	PLO4	√					
A6	PLO6		√				
B3	PLO13			√	√	√	
D1	PLO15						√

3.4. Assessment Alignment Matrix

SC	PLO	PO	CLOs	Teaching M.	Assessment
A4	PLO4	PO1	CLO1	Lecture Presentation	First ,and Final Exam Oral Test
A6	PLO6		CLO2	Lecture Tutorials	First and Final Exam Assignments
B3	PLO13	PO2	CLO3	Lecture Tutorials Case Study	First ,Second ,and Final Exam Assignments Oral Test
			CLO4	Lecture Tutorials Case Study	Second ,and Final Exam Assignments Oral Test
			CLO5	Lecture Case Study	Second ,and Final Exam Oral Test
D1	PLO15		CLO6	Lecture Tutorials Case Study	Final Exam Assignments Oral Test

Course Coordinator: **Dr. Marwa Hany Bondok.** مروة هاني

Head of Department: **Dr. Ahmed Youssef Kamal El-Deen**

Date:2/1/2024

Course Specification

1. Basic Information:

Program Title	Construction Engineering and Management			
Department Offering the course	Construction Engineering and Management			
Date of Specification Approval	**2/1/2024**			
Course Title	Design and Construction of Foundations & Earth Retaining Structures	**Code**	**CMC305**	
Type	**Compulsory** ☒	**Elective** ☐		
Semester	**Fall Semester (Level 3-1)**			
Teaching Hours	**Lec.**	**Tut.**	**Lab.**	**Credit hours**
	2	**2**	**0**	**3**

2. Professional Information:

2.1. Course Description:

Pr.Req. : Geotechnical Engineering & Foundations (CMC204)

Pile Foundations (Types of Piles - Load Transfer Mechanisms - Static Capacity for Piles - Field Load Tests – Pile Group – Elastic Centre Method - Design of Pile Caps) - Introduction to Earth Retaining Structures - Pile wall (Secant piles - Tangent Piles - Bored Pile Wall) - Construction Techniques and Design of Retaining Walls (Cantilever RW – Counterfort RW) – Introduction to Reinforced Soil RW - SPW.

2.2. Course Objectives (CO):

Program objective		Course objective	
PO1	Apply a wide spectrum of engineering knowledge, science, and specialized skills with analytic, critical, and systemic thinking to identify and solve engineering problems in real-life situations.	**CO1**	Formulate a basic understanding of soil mechanics and structural mechanics to design of structural
		CO2	Perform different types of structural foundations and when each might be used.

2.3. Course Learning Outcomes (CLO's):

Student Competences	Program Learning Outcomes		Course Learning Outcomes	
A3	PLO3	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.	CLO1	Use limit analysis concepts to the calculation of limit load in Earth Retaining Structures
			CLO2	Apply the knowledge on soil mechanics to design, foundations
B2	PLO12	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.	CLO3	Formulate the processes that govern ground response, to interpret field information and to predict soil response
D2	PLO16	Generate ecologically responsible, environmental conservation and rehabilitation designs; through an understanding of structural design, construction, technology, and engineering problems	CLO4	Analyze cases of failure in Earth Retaining Structures

2.4. Course Topics:

Course Topics	Week	Course LO's Covered			
		CLO1	CLO2	CLO3	CLO4
Pile Foundations	1,2		√		
Introduction to Earth Retaining Structures	3,4	√			

Pile wall	5,6		√		
First exam	7	√	√		
Construction Techniques and Design of Retaining Walls	8	√			√
Cantilever RW	9,10	√			√
Counterfort RW	11	√			√
Second exam	12	√			√
Introduction to Reinforced Soil RW -	13			√	
Introduction to Reinforced Soil SPW.	14,15			√	
Final exam	16	√	√	√	√
Total		**6**	**4**	**3**	**3**

2.5. Lab Topics:

Not applicable.

2.6 Teaching and Learning Methods

Teaching and Learning Methods:	**Course LO's Covered**			
	CLO1	**CLO2**	**CLO3**	**CLO4**
1. Lecture	√	√	√	√
2. Tutorials	√		√	
3. Project-based Learning		√		√
Teaching and Learning Methods for Students with Special Needs:				
Methods				
1. Discussion Session				
2. Extra Lectures				
3. Provide different levels of books and materials				

2.7 Assessment Methods

Assessment Methods:		**Course LOs Covered**			
		CLO1	**CLO2**	**CLO3**	**CLO4**
Formative Assessment Method					
Tests	**First Exam**	√	√		
	Second Exam	√			√
Mini-Project			√		√
Assignments		√		√	
Summative Assessment Method					
Final Exam		√	√	√	√

2.7.1. Assessment Schedule & Grades Distribution

Assessment Method		Week	The weighting of Assessment %
Formative Assessment Method			
Tests	First exam	7	30 %
	Second exam	12	20 %
Mini-Project		14	6%
Assignments		4,9,11,13	4%
Summative Assessment Method			
Final Exam		16	40 %
Total			100 %

2.8. List of Reference:

Essential Books (Textbooks):	El-Kasaby, E. A., Design and Construction of Deep and Special Foundations, Dar Al-Kutub Al-Almia, Cairo, 4th Ed., (10651/2016), ISBN 978 – 977 – 726 – 168 – 5, 2016.
	Das, B. M, Principles of Foundation Engineering, Brooks - Cole, 9th. Ed., ISBN 978 – 133 – 770 – 502 – 8, 2017.
	Bowles, J., Foundation Analysis and Design, McGraw - Hill, 5th. Ed., ISBN 978 – 007 - 912 – 247 – 7, 2009.
Web Sites	https://apps.dtic.mil/sti/citations/ADA123637

2.9. Facilities required for Teaching and Learning

Different Facilities
Lecture Hall
Data Show
White Board

3. Matrix:

3.1. Program Objectives VS Course Objectives

Program Objectives	Course Objective	
	CO 1	**CO2**
PO1	√	√

3.2. Course Objectives VS Course Learning Outcomes

Course Objectives	Course Learning Outcomes			
	CLO1	**CLO2**	CLO3	CLO4
CO1	√		√	
CO2		√		√

3.3. Program Learning Outcomes VS Course Learning Outcomes

Student Competences	Program Learning Outcomes	Course Learning Outcomes			
		CLO1	CLO2	CLO3	CLO4
A3	**PLO3**	√	√		
B2	PLO12			√	
D2	PLO16				√

3.4. Assessment Alignment Matrix

SC	PLO	PO	CLO	Teaching M.	Assessment M.
A3	**PLO3**	**PO1**	**CLO1**	Lecture Tutorials	First, Second and Final Exam Assignments
			CLO2	Lecture Project-based Learning	First, and Final Exam Mini-Project
B2	**PLO12**		**CLO3**	Lecture Tutorials	Final Exam Assignments
D2	**PLO16**		**CLO4**	Lecture Project-based Learning	Second and Final Exam Mini-Project

Course Coordinator: Dr. Marwa Ibrahim Marwa I

Head of Department: Dr. Ahmed Youssef Kamal El-Deen

Date: 2/1/2024

Course Specification

1. Basic Information:

Program Title	Construction Engineering and Management			
Department Offering the course	Construction Engineering and Management			
Date of Specification Approval	**2/1/2024**			
Course Title	Project Planning, Scheduling, and Control	**Code**	CMC 306	
Type	**Compulsory** ☒	**Elective** ☐		
Semester	Spring Semester (Level 3-2)			
Teaching Hours	**Lec.**	**Tut.**	**Lab.**	**Credit hours**
	2	**2**	**1**	**3**

2. Professional Information:

2.1. Course Description:

Pr.Req. : Construction Project Management (CMC 206)

Concept of project planning, definition of planning techniques [Bar chart, arrow network, program evaluation and review technique (PERT), critical path method (CPM), line of balance technique (LOB)], Work Breakdown Structure (WBS), logic, networking by using CPM technique, scheduling and control models. Resource allocation and leveling, optimal schedules, documentation and reporting, time and cost control, progress monitoring and evaluation. Computer applications by primavera software package.

2.2. Course Objectives (CO):

Program objective		Course objective	
PO2	Behave professionally, adhere to engineering ethics and standards, and work to develop the profession and community and promote sustainability principles.	**CO1**	**Apply** wide sets of project time management knowledge, science, and specialized skills with analytic, critical, and systemic thinking to identify engineering time management in real-life situations.
PO5	Apply analytical, experimental, design, construction engineering techniques and project management skills with proficiency aided by modern tools.	**CO2**	**Apply** analytical, and project management skills with proficiency aided by solving management problems

2.3. Course Learning Outcomes (CLO's):

Student Competences	Program Learning Outcomes		Course Learning Outcomes	
A2	PLO2	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.	CLO1	Evaluate the basics of Project Planning, the role project participants and the construction work break down to plan the project
A6	PLO6	Plan, supervise and monitor implementation of engineering projects, taking into consideration other trades requirements.	CLO2	Explain the networks of Project Planning and its techniques and how deal in the project
B3	PLO13	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.	CLO3	Present time scheduling of Project and its Resources.
			CLO4	Use suitable software to schedule the Project
B4	PLO14	Deal with biddings, contracts and financial issues including project insurance and guarantees.	CLO5	Illustrate the critical notice of biddings and contracts that dealing with scheduling Resource and Project Economy.

2.4. Course Topics:

Course Topics	Week	Course LO's Covered				
		CLO1	CLO2	CLO3	CLO4	CLO5
Concepts of Project Planning	1,2	√				√
Techniques of planning	3,4		√			
Project Scheduling	5,6			√		
First exam	7		√	√		
Resource management	8,9			√		√

Computer applications by primavera software package on Time management	10,11	√		√	√	
Experimental Test	12	√		√	√	
Applications in construction projects and case studies	13,14	√	√	√	√	
Revision	15		√	√		
Final exam	16		√	√	√	√
Total	**16**	**7**	**7**	**12**	**6**	**5**

2.5. Lab Topics:

Lab Topics	Week	Course LO's Covered				
		CLO1	CLO2	CLO3	CLO4	CLO5
1.Computer applications by primavera software package.	**6-14**	√		√	√	
2.Second Experimental Test	12	√		√	√	

2.6 Teaching and Learning Methods

Teaching and Learning Methods:	Course LO's Covered				
	CLO1	CLO2	CLO3	CLO4	CLO5
Lecture		√	√	√	√
Computer-based Instruction	√		√	√	
Tutorials				√	√
Project-based Learning			√		
Teaching and Learning Methods for Students with Special Needs:					
Methods					
1. Discussion Session					
2. Extra Lectures					
3. Provide different levels of books and materials					

2.7 Assessment Methods

Assessment Methods:		Course LOs Covered				
		CLO1	CLO2	CLO3	CLO4	CLO5
Formative Assessment Method						
Test	**First Exam**		√	√		
	Experimental Test	√		√	√	
Assignments		√			√	√
Mini Projects				√		
Summative Assessment Method						
Final Exam			√	√	√	√

2.7.1. Assessment Schedule & Grades Distribution

Assessment Method		Week	Weighting of Asses%
Formative Assessment Method			
Test	**First Exam**	7	30
	Experimental Exam	12	20
Assignments		2-14	10
Summative Assessment Method			
Final Exam		**16**	**40**
Total			**100**

2.8. List of Reference:

Course Notes:	Lecture Notes
Essential Books (Textbooks):	
Recommended Books:	• Textbook: Authors: Jimmie-Hinze " Construction Planning and Scheduling" Publisher: Prentice Hall; (International Ed.) 4th edition (January 2013), ISBN-13: 978-9332505735 • Reference: Daniel W. Halpin, Bolivar A. Senior, Gunnar Lucko "Construction Management" John Wiley & Sons, Inc., 5th Edition (August 2017), ISBN: 978-1-119-25680-9

2.9. Facilities required for Teaching and Learning

Different Facilities
Laboratory Usage
Data Show
White Board

3. Matrix:

3.1. Program Objectives VS Course Objectives

Program Objectives	Course Objective	
	CO1	**CO2**
PO2	√	
PO5		√

3.2. Course Objectives VS Course Learning Outcomes

Course Objectives	Course Learning Outcomes				
	CLO1	CLO2	CLO3	CLO4	CLO5
CO1	√	√			

CO2			√	√	√

3.3. Program Learning Outcomes VS Course Learning Outcomes

Student Competences	Program Learning Outcomes	Course Learning Outcomes				
		CLO1	CLO2	CLO3	CLO4	CLO5
A2	PLO2	√				
A6	PLO6		√			
B3	PLO13			√	√	
B4	PLO14					√

3.4. Assessment Alignment Matrix

SC	PLO	PO	CLO	Teaching M.	Assessment M.
A2	**PLO2**	**PO2**	**CLO1**	Computer-based Instruction	Experimental Test Assignments
A6	**PLO6**		**CLO2**	Lecture	First, and Final Exam
B3	**PLO13**	**PO5**	**CLO3**	Lecture Project-based Learning Computer-based Instruction	First, and Final Exam Mini-Project Experimental Test
			CLO4	Lecture Tutorials Computer-based Instruction	Final Exam Assignments Experimental Test
B4	**PLO14**		**CLO5**	Lecture Tutorials	Final Exam Assignments

Course Coordinator: **Dr. Omia El-Hadidi**

Head of Department: **Dr. Ahmed Youssef Kamal El-Deen**

Date: 2/1/2024

Course Specification

1. Basic Information:

Program Title	Construction Engineering and Management			
Department Offering the course	Construction Engineering and Management			
Date of Specification Approval	**2/1/2024**			
Course Title	Cost Engineering & Quantity Surveying		**Code**	**CMC 307**
Type	**Compulsory ☒**		**Elective ☐**	
Semester	Fall Semester (Level 3-1)			
Teaching Hours	**Lec.**	**Tut.**	**Lab.**	**Credit hours**
	2	**2**	**---**	**3**

2. Professional Information:

2.1. Course description:

Pr.Req. : Construction Project Management (CMC 206)

Introduction to project cost estimate, Conceptual estimating, cost indices, Quantity take-off methods, estimating costs for construction material, labour, equipment, project overhead, mark-up and profit, unit costs, production rates, and pricing methods, balanced bid and budget form preparation for projects., and bid unbalancing.

2.2. Course Objectives (CO):

Program objective		Course objective	
PO1	Apply a wide spectrum of engineering knowledge, science, and specialized skills with analytic, critical, and systemic thinking to identify and solve engineering problems in real-life situations.	**CO1**	**Apply** wide sets of cost estimate knowledge, science, and specialized skills with analytic, critical, and systemic thinking to identify and solve engineering management problems in real-life situations
PO2	Behave professionally, adhere to engineering ethics and standards, and work to develop the profession and community and promote sustainability principles	**CO2**	**Perform** professional behave, adhere to financial issues and project assurance engineering ethics and standards

2.3. Course Learning Outcomes (CLO's):

Student Competences	Program Learning Outcomes		Course Learning Outcomes	
A6	PLO6	Plan, supervise and monitor implementation of engineering projects, taking into consideration other trades requirements.	CLO1	Identify the basics of Principle of cost estimate and indices
B3	PLO13	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.	CLO 2	Explain the basics of Quantity Take-off
			CLO 3	Illustrate efficiently types and steps of cost estimate
B4	PLO 14	Deal with biddings, contracts and financial issues including project insurance and guarantees	CLO 4	Evaluate the project's direct cost and indirect cost
			CLO 5	Perform the bidding, contracts and financial issues for the project

2.4. Course Topics:

Course Topics	Week	Course LO's Covered				
		CLO1	CLO2	CLO3	CLO4	CLO5
Introduction & Principals to Cost Estimate	1,2	√		√		
Construction quantity take-off Methods	3,4,5	√	√			
Types of Cost Estimate Methods	6	√	√	√		
First Exam	**7**	√	√	√		
Types of Cost Estimate Methods	8	√	√	√		
Project Resources Cost	9,10		√		√	
Direct &indirect costs	11		√		√	
Second Exam	12		√	√	√	
Balanced Bid	13		√		√	
Unbalanced Bid	14				√	√
Final Revision	15	√	√		√	√
Final Exam	16	√	√	√	√	√
Total		**10**	**13**	**7**	**8**	**3**

2.5. Lab Topics:

(Not Applicable**)**

2.6 Teaching and Learning Methods

Teaching and Learning Methods:	Course LO's Covered				
	CLO1	CLO2	CLO3	CLO4	CLO5
Lecture	√	√	√	√	√
Tutorials		√			√
Problem-based Learning	√		√		
Case Study				√	√
Teaching and Learning Methods for Students with Special Needs:					
Methods					
1. Discussion Session					
2. Extra Lectures					

2.7 Assessment Methods

Assessment Methods:		Course LOs Covered				
		CLO1	CLO2	CLO3	CLO4	CLO5
Formative Assessment Method						
Tests	**First Exam**	√	√	√		
	Second Exam		√	√	√	
Discussion				√		
Assignments		√	√			√
Mini-Project					√	√
Summative Assessment Method						
Final Exam		√	√	√	√	√

2.7.1. Assessment Schedule & Grades Distribution

Assessment Method		Week	The weighting of Assessment %
Formative Assessment Method			
Tests	First Exam	7	30
	Second Exam	12	20
Discussion		6,11	2
Assignments		4,8,10,13	4
Mini-Project		15	4
Summative Assessment Method			
Final exam		16	40
Total			100

2.8. List of References:

Course Notes:	
Essential Books (Textbooks):	David Bratt, Fundamentals of Construction Estimating, Cengage Learning; 4th edition (Jan., 2018): ISBN-13: 978-1337399395
Recommended Books:	Martin Brook "Estimating and Tendering for Construction Work", Taylor & Francis Ltd, 5th edition, (26 Jul 2016), ISBN13: 9781138838062
Periodicals, Web Sites, … etc:	**https://www.icoste.org/index.htm#icec**

2.9. Facilities required for Teaching and Learning

Different Facilities	
Lecture Hall	√
Data Show	√
White Board	√

3. Matrix:

3.1. Program Objectives VS Course Objectives

Program Objectives	Course Objective	
	CO1	CO2
PO1	√	
PO2		√

3.2. Course Objectives VS Course Learning Outcomes

Course Objectives	Course Learning Outcomes				
	CLO1	CLO2	CLO3	CLO4	CLO5
PO1	√	√	√		
PO2				√	√

3.3. Program Learning Outcomes VS Course Learning Outcomes

Student Competences	Program Learning Outcomes	Course Learning Outcomes				
		CLO1	CLO2	CLO3	CLO4	CLO5
A6	PLO6	√				
B3	PLO13		√	√		
B4	PLO 14				√	√

3.4. Assessment Alignment Matrix

SC	PLO	PO	CLO	Teaching M.	Assessment M.
A6	PLO 6	PO1	CLO1	Lecture Problem-based Learning	First , and Final Exam Assignments
B3	PLO13	PO2	CLO2	Lecture Tutorials	First ,Second and Final Exam Assignments
			CLO3	Lecture Problem-based Learning	First ,Second and Final Exam Discussion Assignments
B4	PLO14		CLO4	Lecture Case Study	Second and Final Exam Mini-Project
			CLO5	Lecture Tutorials Case Study	Final Exam Assignments Mini-Project

Course Coordinator: Dr. Omia El-Hadidi أمية الهادي

Head of Department: Dr. Ahmed Youssef Kamal El-Deen

Date: 2/1/2024

Course Specification

1. Basic Information:

Program Title	Construction Engineering and Management			
Department Offering the course	Construction Engineering and Management			
Date of Specification Approval	**2/1/2024**			
Course Title	Senior Design Project I	**Code**	CMC 308	
Type	**Compulsory** ☒	**Elective** ☐		
Semester	**Spring Semester (Level 3-2)**			
Teaching Hours	**Lec.**	**Tut.**	**Lab.**	**Credit hours**
	0	**0**	**4**	**2**

2. Professional Information:

2.1. Course Description:

Pr.Req.: According to the selected project.

Topics are selected by groups of students according to their area of interest upon advisor approval. Projects address solution to open ended applications using an integrated engineering approach. Actual construction projects are selected by groups of students upon advisor approval for analysis. The management and technology aspects of construction are simulated and investigated.

2.2. Course Objectives (CO):

Program objective		Course objective	
PO1	Apply a wide spectrum of engineering knowledge, science, and specialized skills with analytic, critical, and systemic thinking to identify and solve engineering problems in real-life situations.	**CO1**	Choose engineering Work Break down Structure (WBS) of the building work to produce effective steps of project.
PO2	Behave professionally, adhere to engineering ethics and standards, and work to develop the profession and community and promote sustainability principles.	**CO2**	Study all elements geometrically & structure of the building according to project management.
PO4	Master self-learning and life-long learning strategies to communicate effectively in academic/professional fields.	**CO3**	Evaluate the construction engineering management project.
PO5	Apply analytical, experimental, design, construction engineering techniques and project management skills with proficiency aided by modern tools.	**CO4**	Derive project scope, and Analyzed contract of the project management items.

2.3. Course Learning Outcomes (CLO's):

Student Competences	Program Learning Outcomes		Course Learning Outcomes	
A3	**PLO3**	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.	**CLO1**	Discuss the laws and codes of practice, and standards
A4	**PLO4**	Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues and risk management principles.	**CLO2**	Use planning and drawing software programs.
A6	**PLO6**	Plan, supervise and monitor implementation of engineering projects, taking into consideration other trades requirements.	**CLO3**	Design the project, taking into consideration the management principles.
A7	**PLO7**	Function efficiently as an individual and as a member of multi-disciplinary and multi-cultural teams.	**CLO4**	Work efficiently as a member of the team.
A8	**PLO8**	Communicate effectively – graphically, verbally and in writing – with a range of audiences using contemporary tools.	**CLO5**	Illustrate how to communicate effectively with a range of audiences using contemporary tools in a project.
A9	**PLO9**	Use creative, innovative and flexible thinking and acquire entrepreneurial and leadership skills to anticipate and respond to new situations.	**CLO6**	Use creative, innovative and flexible thinking in the project management
A10	**PLO10**	Acquire and apply new knowledge; and practice self, lifelong and other learning strategies.	**CLO7**	Study novel systems to solve technical issues and practice self-learning.

B1	**PLO11**	Select appropriate and sustainable technologies for the 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.	**CLO8**	Analyze structural elements and properties of materials according to project management.
B2	**PLO12**	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.	**CLO9**	Explain all reinforcement concrete structural elements and properties of materials according to building construction method.
B3	**PLO13**	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.	**CLO10**	Illustrate the building structure, elements and materials according to construction method.
B4	**PLO14**	Deal with biddings, contracts and financial issues including project insurance and guarantees.	**CLO11**	Select the suitable tender, contracts, and financial issues.
D2	**PLO16**	Generate ecologically responsible, environmental conservation and rehabilitation designs; through an understanding of structural design, construction, technology, and engineering problems	**CLO12**	Drive the project presentation including WBS, and activity list.

2.4. Course Topics:

NA

2.5. Lab Topics:

Course Topics	Week	Course LO's Covered											
		CLO1	CLO2	CLO3	CLO4	CLO5	CLO6	CLO7	CLO8	CLO9	CLO10	CLO11	CLO12
Introduction of the project steps	1	√			√	√		√		√			
Project scope	2,3	√			√	√	√	√	√	√	√		
Studding project document	4	√	√		√	√	√	√	√	√	√		
Contracts and Tendering	5,6		√	√								√	√
Creating WBS and activity list	7,8		√	√			√				√	√	√
Learning primavera	9-11		√						√			√	√
Construction method	12-15				√	√	√		√	√	√		√
Final Oral Exam	16	√		√	√	√	√	√		√	√		√
Total	16	**4**	**8**	**4**	**7**	**7**	**8**	**4**	**8**	**7**	**8**	**7**	**10**

2.6 Teaching and Learning Methods

Teaching and Learning Methods:	Course LO's Covered											
	CLO1	CLO2	CLO3	CLO4	CLO5	CLO6	CLO7	CLO8	CLO9	CLO10	CLO11	CLO12
1. Computer-based Instruction		√						√			√	√
2. Discussion	√				√		√	√	√	√	√	√
3. Project	√		√	√	√	√						√
4. Problem-based Learning		√				√		√			√	
5. Co-operative Learning				√				√				√
Teaching and Learning Methods for Students with Special Needs:												
Methods												
1. Discussion Session												
2. Extra Lectures												
3. Provide different levels of books and materials												

2.7 Assessment Methods

Assessment Methods:	Course LOs Covered											
	CLO1	CLO2	CLO3	CLO4	CLO5	CLO6	CLO7	CLO8	CLO9	CLO10	CLO11	CLO12
Formative Assessment Method												
Discussion	√	√			√		√	√	√	√	√	√
Assignments		√						√			√	
Presentations	√		√	√	√	√						√
Summative Assessment Method												
Project	√		√	√	√	√	√	√		√		√
Final Oral Exam	√		√	√	√	√	√		√	√		√

2.7.1. Assessment Schedule & Grades Distribution

Assessment Method	Week	The weighting of Assessment %
Formative Assessment Method		
Discussion	Every week	25 %
Presentations		22%
Assignments	3, 6	3 %
Summative Assessment Method		
Project	16	30 %
Final Oral Exam	16	20%
Total		100 %

2.8. List of Reference:

Essential Books (Textbooks):	• Shaker elbehary Handbook 2018. • Egyptian code for designing concrete structures ECP203-2020. • Egyptian code for calculating loads ECP202-2012.
Recommended Books:	• Design of RC Structure - DR. Mashhour A. Ghoneim. (vols.1, 2, 3) • Design of Reinforced Concrete by Jack C. McCormac, Russell H. Brown, Wiley, Fifth Edition, 2014. • Reinforced Concrete: Mechanics and Design by James K. Wight, James G. MacGregor, Prentice Hall, Fifth Edition 2008. • Computer Applications in Civil Engineering by Paul D. Spindel, Van Nostrand Reinhold Company. • Concrete and Steel Construction: Quality Control and Assurance by Mohamed A. El-Reedy, CRC press, 2013 • Building Construction: Principles, Materials, & Systems by Madan L Mehta Ph.D., Walter Scarborough, Diane Armpriest, Pearson, 2

	Edition, 2012

2.9. Facilities required for Teaching and Learning

Different Facilities
Laboratory
Data Show
White Board

3. Matrix:

3.1. Program Objectives VS Course Objectives

Program Objectives	Course Objectives			
	CO1	CO2	CO3	CO4
PO1	√			
PO2		√		
PO4			√	
PO5				√

3.2. Course Objectives VS Course Learning Outcomes

Course Objectives	Course Learning Outcomes											
	CLO1	CLO2	CLO3	CLO4	CLO5	CLO6	CLO7	CLO8	CLO9	CLO10	CLO11	CLO12
CO1	√	√								√		
CO2				√	√	√						
CO3							√	√	√			
CO4			√								√	√

3.3. Program Learning Outcomes VS Course Learning Outcomes

Program Learning Outcomes	Course Learning Outcomes											
	CLO1	CLO2	CLO3	CLO4	CLO5	CLO6	CLO7	CLO8	CLO9	CLO10	CLO11	CLO12
PLO3	√											
PLO4		√										
PLO6			√									
PLO7				√								

PLO8					√							
PLO9						√						
PLO10							√					
PLO11								√				
PLO12									√			
PLO13										√		
PLO14											√	
PLO16												√

3.4. Assessment Alignment Matrix

SC	PLO	PO	CLOs	Teaching M.	Assessment
A3	**PLO3**	**PO1**	**CLO1**	Discussion Project	Discussion Presentations Project Final Oral Exam
A4	**PLO4**		**CLO2**	Computer-based Instruction Problem-based Learning	Assignments Discussion
A6	**PLO6**	**PO5**	**CLO3**	Project	Presentation Project Final Oral Exam
A7	**PLO7**	**PO2**	**CLO4**	Project Co-operative Learning	Presentation Project Final Oral Exam
AB	**PLO8**		**CLO5**	Discussion Project	Discussion Presentation Project Final Oral Exam
A9	**PLO9**		**CLO6**	Problem-based Learning Project	Presentation Project Final Oral Exam
A10	**PLO10**	**PO4**	**CLO7**	Discussion	Discussion Project Final Oral Exam
B1	**PLO11**		**CLO8**	Computer-based Instruction Discussion Problem-based Learning Co-operative Learning	Assignments Discussion Project
B2	**PLO12**		**CLO9**	Discussion	Discussion Final Oral Exam
B3	**PLO13**	**PO1**	**CLO10**	Discussion	Discussion Project

					Final Oral Exam
B4	**PLO14**	**PO5**	**CLO11**	Computer-based Instruction Discussion Problem-based Learning	Assignments Discussion
D2	**PLO16**		**CLO12**	Computer-based Instruction Discussion Project Co-operative Learning	Discussion Presentation Project Final Oral Exam

Course Coordinator: **Dr. Omia Said El Hadidi**

Head of Department: **Dr. Ahmed Youssef Kamal El-Deen**

Date: 2/1/2024

Course Specification

1. Basic Information:

Program Title	Construction Engineering and Management			
Department Offering the course	Construction Engineering and Management			
Date of Specification Approval	**2/1/2024**			
Course Title	Quality Control & Inspection of Structures		**Code**	**CMC309**
Type	**Compulsory ☒**	**Elective ☐**		
Semester	**Fall Semester (Level 3-1)**			
Teaching Hours	**Lec.**	**Tut.**	**Lab.**	**Credit hours**
	2	**1**	**-**	**2**

2. Professional Information:

2.1. Course description:

Pr.Req. : Design of R.C. Structures-1 (CMC 207)

Introduction to quality improvement techniques. Control charts for variables and attributes. Quality systems; 1SO 9000, 1SO 14000. Total quality management. Maintenance of structures. Inspection and its related subjects. Deterioration of structures, causes and investigation. Structural behavior and different repair techniques for different structural materials.

2.2. Course Objectives (CO):

Program objective		Course objective	
PO1	Apply a wide spectrum of engineering knowledge, science, and specialized skills with analytic, critical, and systemic thinking to identify and solve engineering problems in real-life situations.	**CO1**	Apply a quality improvement technique, engineering knowledge, science, and specialized skills with analytic, critical, and systemic thinking to identify and solve engineering problems in real-life situations.
		CO2	Solve engineering problems on the maintenance and repairing different structures.

2.3. Course Learning Outcomes (CLO's):

Student Competences	Program Learning Outcomes		Course Learning Outcomes	
A6	**PLO6**	Plan, supervise and monitor implementation of engineering projects, taking into consideration other trades requirements.	**CLO1**	Determine quality improvement techniques for engineering projects, taking into consideration other trades requirements.
			CLO2	Apply control charts for variables and attributes quality systems; 1SO 9000, 1SO 14000.
A9	**PLO9**	Use creative, innovative and flexible thinking and acquire entrepreneurial and leadership skills to anticipate and respond to new situations	**CLO3**	Use creative, innovative and flexible thinking and acquire entrepreneurial and leadership skills to anticipate and respond to quality management systems implementation.
			CLO4	Assign creative, innovative and flexible manner for the maintenance of structures.
B3	**PLO13**	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.	**CLO5**	Manage the inspection and maintain safety measures in construction and materials; and assess environmental impacts of projects.
			CLO6	Examine the deterioration of structures and its causes.
D1	**PLO15**	Create architectural, urban, and planning designs that satisfy both aesthetic and technical requirements, using adequate knowledge of history and theory, related fine arts, local culture and heritage, technologies, and human sciences	**CLO7**	Produce an investigation of structural behavior that satisfy both aesthetic and technical requirements, using adequate knowledge of history and theory.
			CLO8	Design a repair technique with different structural materials that satisfy both aesthetic and technical requirements, using adequate knowledge of history and theory.

2.4. Course Topics:

Course Topics	Week	Course LO's Covered							
		CLO1	CLO2	CLO3	CLO4	CLO5	CLO6	CLO7	CLO8
Introduction to quality improvement techniques	**1**	√							
	2	√							
Control charts for variables and attributes. Quality systems; 1SO 9000, 1SO 14000.	**3,4**		√						
Total quality management	**5**			√					
	6			√					
First Exam	**7**	√	√	√					
Maintenance of structures	**8**				√				
	9					√			
Deterioration of structures, causes and investigation	**10**						√		
	11						√		
Second Exam	**12**	√	√	√	√	√	√		
Structural behavior and different repair techniques for different structural materials	**13**							√	
	14								√
	15								√
Final exam	**16**	√	√	√	√	√	√	√	√
Total	**16**	**4**	**4**	**5**	**3**	**3**	**4**	**2**	**3**

2.5. Lab Topics:

Not Applicable

2.6 Teaching and Learning Methods

Teaching and Learning Methods:	Course LO's Covered							
	CLO1	CLO2	CLO3	CLO4	CLO5	CLO6	CLO7	CLO8
1. Lecture	√	√			√	√	√	√
2. Tutorials					√	√	√	√
3. Discussion			√	√				
4.Interactive Learning			√	√				
Teaching and Learning Methods for Students with Special Needs:								
Methods								
1. Discussion Session								
2. Extra Lectures								
3. Provide different levels of books and materials								

2.7 Assessment Methods

Assessment Methods:		Course LOs Covered							
		CLO1	CLO2	CLO3	CLO4	CLO5	CLO6	CLO7	CLO8
Formative Assessment Method									
Tests	First Exam	√	√	√					
	Second Exam	√	√	√	√	√	√		
Assignments						√	√	√	√
Mini Projects				√	√				
Summative Assessment Method									
Final Exam		√	√	√	√	√	√	√	√

2.7.1. Assessment Schedule & Grades Distribution

Assessment Method		Week	The weighting of Assessment %
Formative Assessment Method			
Tests	First Exam	7	30
	Second Exam	12	20
Assignments		5,9,11,14	7
Discussion		4, 8,10,13	3
Summative Assessment Method			
Final exam		16	40
Total		16	100

2.8. List of References:

Course Notes:	Lecture Notes
Essential Books (Textbooks):	Repair of building (2016) By Prof Elsayed Elkasby ISBN: 9789777261401
Recommended Books	Concrete and Steel Construction: Quality Control and Assurance by Mohamed A. El-Reedy, CRC press, 2013

2.9. Facilities required for Teaching and Learning

Different Facilities
Lecture Hall
Library Usage

Data Show
White Board

3. Matrix:

3.1. Program Objectives VS Course Objectives

Program Objectives	Course Objective			
	CO1	CO2	CO3	CO4
PO1	√	√		
PO6			√	√

3.2. Course Objectives VS Course Learning Outcomes

Course Objectives	Course Learning Outcomes							
	CLO1	CLO2	CLO3	CLO4	CLO5	CLO6	CLO7	CLO8
CO1	√	√						
CO2			√	√				
CO3					√	√		
CO4							√	√

3.3. Program Learning Outcomes VS Course Learning Outcomes

Student Competences	Program Learning Outcomes	Course Learning Outcomes							
		CLO1	CLO2	CLO3	CLO4	CLO5	CLO6	CLO7	CLO8
A6	PLO6	√	√						
A9	PLO9			√	√				
B3	PLO13					√	√		
D1	PLO15							√	√

3.4. Assessment Alignment Matrix

SC	PLO	PO	CLO	Teaching M.	Assessment M.
A6	PLO6	PO1	CLO1	• Lecture	• First, Second and Final Exams.
			CLO2	• Lecture	• First, Second and Final Exams.
A9	PLO9		CLO3	• Discussion • Interactive Learning	• First, Second and Final Exams. • Mini Projects
			CLO4	• Discussion • Interactive Learning	• Second and Final Exams. • Mini Projects.
B3	PLO13	PO6	CLO5	• Lecture • Tutorials	• Second and Final Exams. • Assignments.
			CLO6	• Lecture • Tutorials	• Second and Final Exams. • Assignments.
D1	PLO15		CLO7	• Lecture • Tutorials	• Final Exam. • Assignments.
			CLO8	• Lecture • Tutorials	• Final Exam. • Assignments

Course Coordinator: Dr. Marwa Ibrahem Ali Badawy Marwa I

Head of Department: Dr. Ahmad Youssef Kamal El Din Mohamed

Date:2/1/2024

Level 3

Elective

Course Specification

1. Basic Information:

Program Title	Construction Engineering and Management			
Department Offering the course	Construction Engineering and Management			
Date of Specification Approval	**2/1/2024**			
Course Title	Value Engineering in the Construction Industry	**Code**	CMC 310	
Type	**Compulsory** ☐	**Elective** ☒		
Semester	**Spring Semester (Level 3-2)**			
Teaching Hours	**Lec.**	**Tut.**	**Lab.**	**Credit hours**
	2	**2**	**-**	**3**

2. Professional Information:

2.1. Course Description:

The value concept: history, definitions, application to the construction industry, incentive provisions in construction contracts, factors to be considered, application to design. Value engineering methodology: information phase, speculative phase, analytical phase, proposal phase, and final report phase. Value engineering study procedures: objective, selecting the input required, required documentation, life cycle cost methodology.

2.2. Course Objectives (CO):

Program objective		Course objective	
PO1	Apply a wide spectrum of engineering knowledge, science, and specialized skills with analytic, critical, and systemic thinking to identify and solve engineering problems in real-life situations.	**CO1**	**Apply** wide sets of civil engineering knowledge, science, and specialized skills with analytic, critical, and systemic thinking to identify and solve problems in real-life situations.
PO3	Work in and lead a heterogeneous team and display leadership qualities, business administration, and entrepreneurial skills.	**CO2**	**Estimate** the best job plan for the project with the heterogeneous team and display leadership qualities, and entrepreneurial skills.

2.3. Course Learning Outcomes (CLO's):

Student Competences	Program Learning Outcomes		Course Learning Outcomes	
B3	**PLO13**	Plan and manage construction processes; address construction defects, instability and quality issues;	**CLO1**	**Explain** The value concept: history, definitions, and application to the construction industry.

		maintain safety measures in construction and materials; and assess environmental impacts of projects.	**CLO2**	**Study** Value engineering methodology: information phase, speculative phase, analytical phase, proposal phase, and final report phase.
B4	**PLO14**	Deal with biddings, contracts and financial issues including project insurance and guarantees.	**CLO3**	A**pply** Value engineering study procedures: objective, selecting the input required, required documentation, and life cycle cost methodology.
A6	**PLO6**	Plan, supervise and monitor implementation of engineering projects, taking into consideration other trades requirements..	**CLO4**	**Estimate** the function cost and choose the best alternative.

2.4. Course Topics:

Course Topics	**Week**	**Course LO's Covered**			
		CLO1	**CLO2**	**CLO3**	**CLO4**
Value history and concepts.	1,2	√			
Application to the construction industry	3,4	√			
Incentive provisions in construction contracts	5,6		√		
First exam	7	√	√		
Value engineering methodology	8		√		
Analytical phase, proposal phase, and final report phase	9			√	√
Value engineering study procedures: objective	10		√		
Selecting the input required, required documentation	11			√	√
Second exam	12		√	√	√
Selecting the input required, required documentation	13			√	√
Life cycle cost methodology	14,15			√	
Final exam	16	√	√	√	√
Total		**4**	**4**	**5**	**3**

2.5. Lab Topics:

Not applicable.

2.6 Teaching and Learning Methods

Teaching and Learning Methods:	Course LO's Covered			
	CLO1	CLO2	CLO3	CLO4
1. Lecture	√	√	√	√
2. Tutorials		√	√	√
Teaching and Learning Methods for Students with Special Needs:				
Methods				
1. Discussion Session				
2. Extra Lectures				
3. Provide different levels of books and materials				

2.7 Assessment Methods

Assessment Methods:		Course LOs Covered			
		CLO1	CLO2	CLO3	CLO4
Formative Assessment Method					
Tests	**First Exam**	√	√		
	Second Exam		√	√	√
Assignments			√	√	√
Summative Assessment Method					
Final Exam		√	√	√	√

2.7.1. Assessment Schedule & Grades Distribution

Assessment Method		Week	The weighting of Assessment %
Formative Assessment Method			
Tests	First exam	7	30 %
	Second exam	12	20 %
Assignments		6,8,11,13,14	10%
Summative Assessment Method			
Final Exam		16	40 %
Total			100 %

2.8. List of Reference:

Essential Books (Textbooks):	1- Value Engineering: Concepts, Techniques and Applications First Edition by Anil Kumar Mukhopadhyaya, 2012. 2- Value Analysis and Engineering Reengineered: The Blueprint for Achieving Operational Excellence and Developing Problem Solvers and Innovators 1st Edition by Abate O. Kassa, **2015.**
Web Sites	https://projectcostsolutions.com/how-value-engineering-is-used-in-construction-projects/

2.9. Facilities required for Teaching and Learning

Different Facilities
Lecture Hall
Library Usage
Data Show
White Board

3. Matrix:

3.1. Program Objectives VS Course Objectives

Program Objectives	Course Objective	
	CO 1	CO 2
PO1	√	
PO3		√

3.2. Course Objectives VS Course Learning Outcomes

Course Objectives	Course Learning Outcomes			
	CLO1	CLO2	CLO3	CLO4
CO1	√	√		
CO2			√	√

3.3. Program Learning Outcomes VS Course Learning Outcomes

Student Competences	Program Learning Outcomes	Course Learning Outcomes			
		CLO1	CLO2	CLO3	CLO4
A6	PLO6				√
B3	PLO13	√	√		
B4	PLO14			√	

3.4. Assessment Alignment Matrix

SC	PLO	PO	CLO	Teaching M.	Assessment M.
B3	PLO13	PO1	CLO1	• Lecture	• First and Final Exams
			CLO2	• Lecture • Tutorials	• First , Second and Final Exams • Assignments
B4	PLO14	PO3	CLO3	• Lecture • Tutorials	•Second and Final Exam • Assignments
A6	PLO6		CLO4	• Lecture •Tutorials	• Second and Final Exam • Assignments

Course Coordinator: **Dr. Mostafa Abd Elsalam**

Head of Department: **Dr. Ahmed Youssef Kamal El-Deen**

Date: 2/1/2024

Course Specification

1. Basic Information:

Program Title	Construction Engineering and Management				
Department Offering the course	Construction Engineering and Management				
Date of Specification Approval	**2/1/2024**				
Course Title	Engineering Economy			**Code**	CMC 312
Type	**Compulsory** ☐		**Elective** ☒		
Semester	Spring Semester (Level 3-2)				
Teaching Hours	**Lec.**	**Tut.**	**Lab.**	**Credit hours**	
	2	2	0	3	

2. Professional Information:

2.1. Course Description:

Pr. Req.: …….

Foundations of Engineering Economy, Interest Factors, Nominal and Effective Interest Rates, Present Worth Analysis, Annual Worth Analysis, Rate of Return Analysis, Benefit/Cost Analysis, Breakeven and Payback Analysis, Replacement and Retention Decisions, Effects of Inflation, Estimating Costs, Depreciation Methods, After-Tax Economic Analysis, Multiple Attributes and Risk.

2.2. Course Objectives (CO):

Program objective		Course objective	
PO1	**Apply** a wide spectrum of engineering knowledge, science, and specialized skills with analytic, critical, and systemic thinking to identify and **solve** engineering problems in real-life situations.	**CO1**	**Solve** engineering economy problems in real-life situations.
PO2	**Behave** professionally, adhere to engineering ethics and standards, and work to develop the profession and community and promote sustainability principles.	**CO2**	**Apply** the professional techniques for Benefit/Cost Analysis.

2.3. Course Learning Outcomes (CLOs):

Student Competences	Program Learning Outcomes		Course Learning Outcomes	
A6	PLO6	Plan, supervise and monitor implementation of engineering projects, taking into consideration other trades requirements.	CLO1	**Discuss** the Foundations of Engineering Economy, Interest Factors, Nominal and Effective Interest Rates.
B3	PLO13	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.	CLO2	**Calculate** the Rate of Return, Present Worth, Annual Worth, Rate of Return, Benefit/Cost.
			CLO3	**Apply** Breakeven and Payback Analysis, Replacement and Retention Decisions.
B4	PLO14	Deal with biddings, contracts and financial issues including project insurance and guarantees.	CLO4	**Discuss** Effects of Inflation.
			CLO5	**Estimate** Costs, Depreciation Methods, After-Tax Economic Analysis, Multiple Attributes and Risk.

2.4. Course Topics:

Course Topics	Week	Course LO's Covered				
		CLO1	CLO2	CLO3	CLO4	CLO5
1.Foundations of Engineering Economy, Interest Factors.	1-2	√				
2.Nominal and Effective Interest Rates, Present Worth Analysis.	3-4	√	√			
3.Annual Worth Analysis, Rate of Return Analysis.	5	√	√	√		
4.Benefit/Cost Analysis, Breakeven and Payback Analysis.	6	√	√	√		
5.First Exam	7	√	√	√		
6.Replacement and Retention Decisions, Effects of Inflation.	8-9	√			√	
7.Estimating Costs, Depreciation Methods.	10,11	√	√		√	

8.Second Exam	12	√			√	
9.After-Tax Economic Analysis, Multiple Attributes and Risk.	13-15	√	√	√		√
10. Final Exam	16	√	√	√	√	
Total	**16**					

2.5. Lab Topics

Not Applicable

2.6 Teaching and Learning Methods

Teaching and Learning Methods:	**Course LO's Covered**				
	CLO1	**CLO2**	**CLO3**	**CLO4**	**CLO5**
1. Lecture	√			√	
2. Tutorials	√	√	√	√	√
3. Problem-based Learning		√	√		√
Teaching and Learning Methods for Students with Special Needs:					
Methods					
1. Discussion Session					
2. Extra Lectures					
3. Provide different levels of books and materials					

2.7 Assessment Methods

Assessment Methods:		**Course LOs Covered**				
		CLO1	**CLO2**	**CLO3**	**CLO4**	**CLO5**
Formative Assessment Method						
	First Exam	√	√	√		
	Second Exam	√			√	
Assignments		√		√	√	√
Mini-Project			√			√
Summative Assessment Method						
Final Exam		√	√	√	√	

2.7.1. Assessment Schedule & Grades Distribution

Assessment Method		Week	The weighting of Assessment %
Formative Assessment Method			
Tests	**First Exam**	7	30%
	Second Exam	12	20%
Assignments		4,6,9,11	4 %
Mini-Project		15	6%
Summative Assessment Method			
Final Exam		16	40 %
Total			100 %

2.8. List of References:

Essential Books (Textbooks):	• Basics of Engineering Economy, Leland Blank & Anthony Tarquim, McGraw HILL, Third Edition, 2020, ISBN-13: 978-1260571141 • Engineering Economy, William G. Sullivan, Elin M. Wicks, & C. Patrick Koelling, Seventeenth Global Edition, Pearson, 2020, ISBN 13: 978-1-292-26490-5. • Engineering Economy, Leland Blank & Anthony Tarquim, McGraw HILL, Eighth Edition, 2018, ISBN: 978-0-07-352343-9

2.9. Facilities required for Teaching and Learning

Different Facilities	
Lecture Hall	√
Data Show	√
White Board	√

3. Matrix:

3.1. Program Objectives VS Course Objectives

Program Objectives	Course Objectives	
	CO1	CO2
PO1	√	
PO2		√

3.2. Course Objectives VS Course Learning Outcomes

Course Objectives	Course Learning Outcomes				
	CLO1	CLO2	CLO3	CLO4	CLO5
CO1	√	√	√		
CO2				√	√

3.3. Program Learning Outcomes VS Course Learning Outcomes

Student Competences	Program Learning Outcomes	Course Learning Outcomes				
		CLO1	CLO2	CLO3	CLO4	CLO5
A6	PLO6	√				
B3	PLO13		√	√		
B4	PLO14				√	√

3.4. Assessment Alignment Matrix

SC	PLO	PO	CLOs	Teaching M.	Assessment
A6	PLO6	PO1	CLO1	Lecture Tutorials	First , Second , and Final Exam Assignments
B3	PLO13		CLO2	Tutorials Problem-based Learning	First Final Exam Mini-Project
			CLO3	Tutorials Problem-based Learning	First Final Exam Assignments
B4	PLO14	PO2	CLO4	Lecture Tutorials	Second , and Final Exam Assignments
			CLO5	Tutorials Problem-based Learning	Assignments Mini-Project

Course Coordinator: Dr. Dr. Marwa Hany Bondok. مروة صابن

Head of Department: Dr. Ahmed Youssef Kamal El-Deen

Date:2/1/2024

Course Specification

1. Basic Information:

Program Title	Construction Engineering and Management			
Department Offering the course	Construction Engineering and Management			
Date of Specification Approval	**2/1/2024**			
Course Title	Construction Quality Management	**Code**	**CMC 314**	
Type	**Compulsory** ☐	**Elective** ☒		
Semester	Spring Semester (Level 3-2)			
Teaching Hours	**Lec.**	**Tut.**	**Lab.**	**Credit hours**
	2	**2**	**---**	**3**

2. Professional Information:

2.1. Course description:

Pr.Req. : Construction Project Management (CMC 206)

Overview of quality, quality in construction projects, quality management system. Quality improvement techniques, control charts for variables and attributes. Lot-by-lot acceptance sampling by attributes, acceptance sampling systems, cost of quality, assessment of quality, total quality management. Computers and quality control.

2.2. Course Objectives (CO):

Program objective		Course objective	
PO1	Apply a wide spectrum of engineering knowledge, science, and specialized skills with analytic, critical, and systemic thinking to identify and solve engineering problems in real-life situations.	**CO1**	Apply wide sets of cost estimate knowledge, science, and specialized skills with analytic, critical, and systemic thinking to identify and solve engineering management problems in real-life situations.
PO2	Behave professionally, adhere to engineering ethics and standards, and work to develop the profession and community and promote sustainability principles	**CO2**	Perform professional behave, adhere to financial issues and project assurance engineering ethics and standards

2.3. Course Learning Outcomes (CLO's):

Student Competences	Program Learning Outcomes		Course Learning Outcomes	
A6	PLO6	Plan, supervise and monitor implementation of engineering projects, taking into consideration other trades requirements.	CLO1	Identify the basics of Principle of quality in construction projects
B3	PLO13	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.	CLO 2	Explain quality management system, and Quality improvement techniques.
			CLO 3	Illustrate efficiently how to lot-by-lot acceptance sampling by attributes, acceptance sampling systems of quality
B4	PLO 14	Deal with biddings, contracts and financial issues including project insurance and guarantees	CLO 4	Calculate the project's cost of quality & total quality management
			CLO 5	Recognize the importance of Computers in quality control.

2.4. Course Topics:

Course Topics	Week	Course LO's Covered				
		CLO1	CLO2	CLO3	CLO4	CLO5
Basics of Principle of quality in construction projects	1,2	√		√		
Quality management system	3,4,5	√	√			
Quality improvement and control techniques	6	√	√	√		
First Exam	**7**	√	√	√		
Lot-by-lot acceptance sampling by attributes, acceptance sampling systems of quality	8	√	√	√		
Project's cost of quality	9,10		√		√	
Total quality management	11		√		√	
Second Exam	12		√	√	√	
construction projects quality control using Computers	13		√		√	
Successful applications	14				√	√

Final Revision	15	√	√		√	√
Final Exam	16	√	√	√	√	√
Total		**10**	**13**	**7**	**8**	**3**

2.5. Lab Topics:

(Not Applicable**)**

2.6 Teaching and Learning Methods

Teaching and Learning Methods:	**Course LO's Covered**				
	CLO1	**CLO2**	**CLO3**	**CLO4**	**CLO5**
1. Lecture	√	√	√	√	√
2. Tutorials		√			√
3. Problem-based Learning			√	√	
Teaching and Learning Methods for Students with Special Needs:					
Methods					
1. Discussion Session					
2. Extra Lectures					

2.7 Assessment Methods

Assessment Methods:		**Course LOs Covered**				
		CLO1	**CLO2**	**CLO3**	**CLO4**	**CLO5**
Formative Assessment Method						
Tests	**First Exam**	√	√	√		
	Second Exam		√	√	√	
Mini-Project				√	√	
Assignments			√	√	√	√
Summative Assessment Method						
Final Exam		√	√	√	√	√

2.7.1. Assessment Schedule & Grades Distribution

Assessment Method		**Week**	**The weighting of Assessment %**
Formative Assessment Method			
Tests	First Exam	7	30
	Second Exam	12	20
Mini-Project		4,6,9,11,14	5
Assignments		3,5,8,10,13	5
Summative Assessment Method			
Final exam		16	40
Total			100

2.8. List of References:

Course Notes:	
Essential Books (Textbooks):	Abdul Razzak Rumane, "Quality Management in Construction Projects" book, Published by CRC Press of Taylor & Francis Group, 2nd edition, December 10, 2019, ISBN 9780367890032
Recommended Books:	
Periodicals, Web Sites, … etc:	

2.9. Facilities required for Teaching and Learning

Different Facilities	
Lecture Hall	√
Data Show	√
White Board	√

3. Matrix:

3.1. Program Objectives VS Course Objectives

Program Objectives	Course Objective	
	CO1	CO2
PO1	√	
PO2		√

3.2. Course Objectives VS Course Learning Outcomes

Course Objectives	Course Learning Outcomes				
	CLO1	CLO2	CLO3	CLO4	CLO5
PO1	√	√	√		
PO2				√	√

3.3. Program Learning Outcomes VS Course Learning Outcomes

Student Competences	Program Learning Outcomes	Course Learning Outcomes				
		CLO1	CLO2	CLO3	CLO4	CLO5
A6	PLO6	√				
B3	PLO13		√	√		
B4	PLO 14				√	√

3.4. Assessment Alignment Matrix

SC	PLO	PO	CLO	Teaching M.	Assessment M.
A6	PLO 6	PO1	CLO1	Lecture	First & Final Exam
B3	PLO13	PO2	CLO2	Lecture Tutorials	First ,Second and Final Exam Assignments
			CLO3	Lecture Problem-based Learning	First ,Second and Final Exam Assignments Mini-Project
B4	PLO14		CLO4	Lecture Problem-based Learning	Second and Final Exam Assignments Mini-Project
			CLO5	Lecture Tutorials	Assignments Final Exam

Course Coordinator: **Dr. Omia El-Hadidi**

Head of Department: **Dr. Ahmed Youssef Kamal El-Deen**

Date: 2/1/2024

Course Specification

1. Basic Information:

Program Title	Construction Engineering and Management			
Department Offering the course	Construction Engineering and Management			
Date of Specification Approval	**2/1/2024**			
Course Title	Building Technology		**Code**	CMA311
Type	**Compulsory** ☐	**Elective** ☒		
Semester	Fall Semester (Level 3-1)			
Teaching Hours	**Lec.**	**Tut.**	**Lab.**	**Credit hours**
	2	**2**	**0**	**3**

2. Professional Information:

2.1. Course Description:

Pr.Req. : …….

Building technology of the main elements of building structural systems. Different structural systems will be addressed through describing and explaining their varied functions, types, materials, design considerations and execution techniques. (Reinforced Concrete structures, Precast reinforced concrete construction, Steel structures)

2.2. Course Objectives (CO):

Program objective		Course objective	
PO1	Apply a wide spectrum of engineering knowledge, science, and specialized skills with analytic, critical, and systemic thinking to identify and solve engineering problems in real-life situations.	**CO1**	Analyze, describe, and document site conditions spatially and visually and identify site opportunities and constraints.
PO5	Apply analytical, experimental, design, construction engineering techniques and project management skills with proficiency aided by modern tools.	**CO2**	Observe, analyze, describe and document site conditions spatially and visually, and identify site opportunities and constraints.

2.3. Course Learning Outcomes (CLO's):

Student Competences	Program Learning Outcomes		Course Learning Outcomes	
A4	**PLO4**	Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety	**CLO1**	Discuss the symbols and codes of different building materials.

		requirements, environmental issues and risk management principles.		
A5	**PLO5**	. Practice research techniques and methods of investigation as an inherent part of learning.	**CLO2**	Search basic structural systems and their components.
B1	**PLO11**	Select appropriate and sustainable technologies for the 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.	**CLO3**	Carry out field work in team group to design suitable working and execution drawings for structural and foundation
			CLO4	Compare between construction systems & their materials.
B3	**PLO13**	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.	**CLO5**	Prepare technical and professional drawings using engineering tools.
			CLO6	Coordinate construction elements as one integrated whole system.
D2	**PLO16**	Generate ecologically responsible, environmental conservation and rehabilitation designs; through an understanding of structural design, construction, technology, and engineering problems	**CLO7**	Discuss construction problems and items in an appropriate professional manner.
			CLO8	Transfer techniques and solutions from one field of architecture to another.

2.4. Course Topics:

Course Topics	Week	Course LO's Covered							
		CLO1	CLO2	CLO3	CLO4	CLO5	CLO6	CLO7	CLO8
Introduction to building construction:	1	√			√				
Building construction & structural systems:	2			√	√				
Skeleton structure system	3	√	√	√					
Large span structure.	4	√		√	√	√		√	
Foundation types	5	√	√			√		√	
Isolated and combined footings' components	6	√		√	√	√		√	
First Exam	7			√	√	√		√	
Continuation of the previous lecture and evaluation.	8				√				
Site visit	9	√	√	√					
Raft & Pile foundation systems components.	10	√			√	√		√	
Presentation of research	11		√						
Second Exam	12					√	√	√	
Masonry Work: Brick and block types	13				√		√	√	√
Lintel and parapet in wall construction.	14				√	√	√		√
Building insulation types	15	√			√	√	√	√	√
Final exam	16			√	√	√	√		
Total	16	**7**	**8**	**9**	**8**	**9**	**4**	**4**	**4**

2.5 Lab Topics

Not Applicable

2.6 Teaching and Learning Methods

Teaching and Learning Methods:	Course LO's Covered							
	CLO1	CLO2	CLO3	CLO4	CLO5	CLO6	CLO7	CLO8
Lecture				√	√		√	√
Tutorials			√	√	√	√	√	√
Presentations	√	√						
Case Study						√	√	
Projects- based Learning						√	√	√
Discussion	√		√			√		√
Teaching and Learning Methods for Students with Special Needs:								
Methods								
1. Discussion Session								
2. Extra Lectures								
3. Provide different levels of books and materials								

2.7 Assessment Methods

Assessment Methods:		Course LOs Covered							
		CLO1	CLO2	CLO3	CLO4	CLO5	CLO6	CLO7	CLO8
Formative Assessment Method									
Tests	First Exam			√	√	√		√	
	Second Exam					√	√	√	
Report		√	√						
Mini-Projects				√			√	√	√
Assignments				√	√	√			√
Presentations		√	√						
Summative Assessment Method									
Final Exam				√	√	√	√		

2.7.1. Assessment Schedule & Grades Distribution

Assessment Method		Week	The weighting of Assessment %
Formative Assessment Method			
Tests	First Exam	7	30
	Second Exam	12	20
Report		11	2
Mini- Projects		14 - 15	4
Assignments		5,10	2
Presentations		11	2
Summative Assessment Method			
Final exam		16	40
Total			100

2.8. List of Reference:

Essential Books (Textbooks):	SEELY, I.H. - Building Technology- Mac Millan - London - 1995.
Recommended Books:	• BARRY, R.,The Construction of Buildings, (Vol. I, IV) Ed., Granada Technical Books, London, 1980. • CHING, F., Building Construction Illustration, John Wiley, New York, 1991. • CHUDLEY, R., Construction Technology, 2nd Ed., Essex, England: Longman, 1987. • GREENO, Roger, Principles of Construction.- 2nd Ed., Essex: Longman, 1986. • LYONS, Arthur, Materials for architects and Builders, Oxford: Elsevier, 2020. • MCKAY, W.B., Building Construction, (Vol. 1) last Ed., Longman, London. • MC ROVEN, Ch., Building with Stone, Lippincott & Crowell Publishers, New York1980. • NASHED, Fred, Time – Saver Details for Exterior wall Design, N.Y.:McgrawHill,1996. • NIKOLAS, Davies & JOKINIEMI, Erkki, Dictionary of

	Architecture and Building construction, 2st Edition. 2020. • OSBOURN, D., Introduction to Building, England: Wesley,1997. • ROSEN, Harold J, Architectural Materials for Construction, N.Y.: Mcgraw – Hill, 1996. • ROY, Chudley & GREENO, Roger.BA, Advanced construction Technology,3rd Edition, 2005
Periodicals, Web Sites, … etc:	http:// www.archnet.org http:// www.greatbuilding.com http:// www.architecture.com

2.9. Facilities required for Teaching and Learning

Different Facilities
Lecture Hall
Library Usage
Data Show
White Board

3. Matrix:

3.1. Program Objectives VS Course Objectives

Program Objectives	Course Objective	
	CO1	CO2
PO1	√	
PO5		√

3.2. Course Objectives VS Course Learning Outcomes

Course Objectives	Course Learning Outcomes							
	CLO1	CLO2	CLO3	CLO4	CLO5	CLO6	CLO7	CLO8
CO1			√	√	√	√		
CO2	√	√					√	√

3.3. Program Learning Outcomes VS Course Learning Outcomes

Student Competences	Program Learning Outcomes	Course Learning Outcomes							
		CLO1	CLO1	CLO3	CLO4	CLO5	CLO6	CLO7	CLO8
A4	PLO4	√							
A5	PLO5		√						
B1	PLO11			√	√				
B3	PLO13					√	√		
D2	PLO16							√	√

3.4. Assessment Alignment Matrix

SC	PLO	PO	CLO	Teaching M.	Assessment M.
A4	PLO4	PO5	CLO1	Presentations Discussion	Presentations Report
A5	PLO5		CLO2	Presentations	Report Presentations
B1	PLO11	PO1	CLO3	Tutorials Discussion	First ,and Final Exam Assignments Mini-Projects
			CLO4	Lectures Tutorials	First ,and Final Exam Assignments
B3	PLO13		CLO5	Lectures Tutorials	First, Second , and Final Exam Assignments
			CLO6	Tutorials Case Study Project-based Learning Discussion	Second , and Final Exam Mini-Projects
D2	PLO16	PO5	CLO7	Tutorials Lectures Project-based Learning Case Study	First and Second Exam Mini-Projects
			CLO8	Tutorials Project-based Learning Discussion Presentations	Assignments Mini-Projects

Course Coordinator: **Dr. Mona Yehia Shedi**

Head of Department: **Dr. Ahmed Youssef Kamal El-Deen**

Date: 2/1/2024

Course Specification

1. Basic Information:

Program Title	Construction Engineering and Management			
Department Offering the course	Construction Engineering and Management			
Date of Specification Approval	**2/1/2024**			
Course Title	Highway Facilities		**Code**	CMC313
Type	**Compulsory** ☐	**Elective** ☒		
Semester	Fall Semester (Level 3-1)			
Teaching Hours	**Lec.**	**Tut.**	**Lab.**	**Credit hours**
	2	**2**	**---**	**3**

2. Professional Information:

2.1. Course Description:

Pr.Req. : Transportation and Traffic Engineering (CMC202)

Analysis of factors in developing highway transportation facilities, problems of highway geometric and design standards, planning and location principles, intersection design factors, structural design of pavement and highway maintenance.

2.2. Course Objectives (CO):

Program objective		Course objective	
PO1	Apply a wide spectrum of engineering knowledge, science, and specialized skills with analytic, critical, and systemic thinking to identify and solve engineering problems in real-life situations.	**CO1**	**Design** the main elements of highway.
PO5	Apply analytical, experimental, design, construction engineering techniques and project management skills with proficiency aided by modern tools.	**CO2**	**Perform** the suitable methods of stabilization and compaction according to soil type with proficiency aided by modern tools..

2.3. Course Learning Outcomes (CLO's):

Student Competences	Program Learning Outcomes		Course Learning Outcomes	
A4	**PLO4**	Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues and risk management principles.	**CLO1**	Assess environmental issues of highway projects .
A5	**PLO5**	Practice research techniques and methods of investigation as an inherent part of learning	**CLO2**	Apply research techniques in highway maintenance.
B1	**PLO11**	Select appropriate and sustainable technologies for the 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.	**CLO3**	Design highway intersections and Horizontal alignment
B3	**PLO13**	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.	**CLO4**	Manage the highway maintenance system.
D2	**PLO16**	Generate ecologically responsible, environmental conservation and rehabilitation designs; through an understanding of structural design, construction, technology, and engineering problems	**CLO5**	Design flexible pavement according to Egyptian code.

2.4 Course Topics:

Course Topics	Week	Course LO's Covered				
		CLO1	CLO2	CLO3	CLO4	CLO5
Introduction to geometric design & cross section elements	1					√
Sight distance	2					√
Vertical Alignment	3				√	√
Horizontal Alignment	4				√	
Horizontal Alignment cont.	5				√	
Intersection design	6				√	
First Exam	7				√	√
Soil Classification	8	√				
Soil Strength	9	√				
Stress and deflection	10		√	√		
Flexible Pavement design	11		√	√		
Second Exam	12	√		√		
Soil compaction & stabilization for highways	13			√	√	
Rigid Pavement design	14	√				
Highway maintenance & the environmental issues	15			√		√
Final exam	16	√		√	√	√
Total	16	**3**	**2**	**4**	**5**	**4**

2.5Lab Topics

NA

2.6 Teaching and Learning Methods

Teaching and Learning Methods:	Course LO's Covered				
	CLO1	CLO2	CLO3	CLO4	CLO5
Lecture	√		√	√	√
Tutorials	√		√		√
Presentations		√			
Case Study				√	√
Projects- based Learning				√	√
Discussion	√				
Teaching and Learning Methods for Students with Special Needs:					
Methods					
1. Discussion Session					
2. Extra Lectures					

3. Provide different levels of books and materials

2.7 Assessment Methods

Assessment Methods:		Course LOs Covered				
		CLO1	**CLO2**	**CLO3**	**CLO4**	**CLO5**
Formative Assessment Method						
Tests	First Exam				√	√
	Second Exam	√		√		
Report			√			
Mini-Projects					√	√
Assignments		√		√		
Presentations			√			
Summative Assessment Method						
Final Exam		√		√	√	√

2.7.1. Assessment Schedule & Grades Distribution

Assessment Method		Week	The weighting of Assessment %
Formative Assessment Method			
Tests	First Exam	7	30
	Second Exam	12	20
Report		13	2
Mini-Projects		15	4
Assignments		8,11	2
Presentations		13	2
Summative Assessment Method			
Final exam		16	40
Total			100

2.8. List of Reference:

Course Notes:	According to the lecturer
Essential Books (Textbooks):	• Traffic and Highway Engineering, Nicholas Garber and Lester Hoel, Fifth Enhanced SI Edition, CENGAG Learning, 2020, ISBN-13: 978-1-337-63104-4. • Egyptian Code – 2016
Periodicals, Web Sites, … etc:	The students themselves can search the internet network for pages which help themselves in preparing reports.

2.9. Facilities required for Teaching and Learning

Different Facilities
Lecture Hall
Library Usage
Data Show
White Board

3. Matrix:

3.1. Program Objectives VS Course Objectives

Program Objectives	Course Objective	
	CO1	CO2
PO4	√	
PO5		√

3.2. Course Objectives VS Course Learning Outcomes

Course Objectives	Course Learning Outcomes				
	CLO1	CLO2	CLO3	CLO4	CLO5
CO1			√	√	
CO2	√	√			√

3.3. Program Learning Outcomes VS Course Learning Outcomes

Student Competences	Program Learning Outcomes	Course Learning Outcomes				
		CLO1	CLO2	CLO3	CLO4	CLO5
A4	PLO4	√				
A5	PLO5		√			
B1	PLO11			√		
B3	PLO13				√	
D2	PLO16					√

3.4. Assessment Alignment Matrix

SC	PLO	PO	CLO	Teaching M.	Assessment M.
A4	PLO4	PO5	CLO1	• Lecture • Discussion • Tutorials	• Second and Final Exam • Assignments
A5	PLO5		CLO2	• Presentations • Report	• Presentations • Reports
B1	PLO11	PO4	CLO3	• Lecture • Tutorials	• Second and Final Exam • Assignments
B3	PLO13		CLO4	• Lecture • Case Study • Projects- based Learning	• First and Final Exam • Mini-Projects
D2	PLO16	PO5	CLO5	• Lecture • Tutorials • Case Study • Projects- based Learning	• First and Final Exam • Mini-Projects

Course Coordinator: **Dr. Mostafa Abd Elsalam**

Head of Department: **Dr. Ahmed Youssef Kamal El-Deen**

Date: 2/1/2024

Course Specification

1. Basic Information:

Program Title	Construction Engineering and Management			
Department Offering the course	Construction Engineering and Management			
Date of Specification Approval	**2/1/2024**			
Course Title	Bridge Building Technology		**Code**	CMC 315
Type	**Compulsory** ☐		**Elective** ☒	
Semester	Fall Semester (Level 3-1)			
Teaching Hours	**Lec.**	**Tut.**	**Lab.**	**Credit hours**
	2	**2**	**--**	**3**

2. Professional Information:

2.1. Course description:

Pr.Req.: Design of R.C. Structures-2 (CMC 208)

A study of the unique design considerations, construction challenges, and load paths for a range of bridge types. Topics include fixed and moveable bridges, stringer/girder, steel truss, concrete slab, box girder, arch, suspension, and cable stayed bridges. Emphasis is placed on AASHTO loading and design requirements, load testing, and verification of unconventional materials. Covers case studies of bridges around the world

2.2. Course Objectives (CO):

Program objective		Course objective	
PO1	Apply a wide spectrum of engineering knowledge, science, and specialized skills with analytic, critical, and systemic thinking to identify and solve engineering problems in real-life situations.	**CO1**	Design of the elements of the bridges.
		CO2	Design of girders as a built-up steel section.
PO5	Apply analytical, experimental, design, construction engineering techniques and project management skills with proficiency aided by modern tools.	**CO3**	Study of load paths for a range of bridge types.

2.3. Course Learning Outcomes (CLO's):

Student Competences	Program Learning Outcomes		Course Learning Outcomes	
A4	**PLO4**	Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues and risk management principles.	**CLO1**	Utilize codes of practice and standards of steel structures to check the allowable stresses.
A5	**PLO5**	Practice research techniques and methods of investigation as an inherent part of learning	**CLO2**	Use research techniques and standards of steel structures for safety requirements (serviceability deflection)
B1	**PLO11**	Select appropriate and sustainable technologies for the 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.	**CLO3**	Apply of different loads, and structural analysis of bridges
B3	**PLO13**	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.	**CLO4**	Select specified consideration to planning a range of bridge types.
D2	**PLO16**	Generate ecologically responsible, environmental conservation and rehabilitation designs; through an understanding of structural design, construction, technology, and engineering problems	**CLO5**	Calculate the critical straining actions for bridge elements.
			CLO6	Design of bridge elements.

2.4. Course Topics:

Course Topics	Week	Course LO's Covered					
		CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
A study of the unique design considerations.	1,2			√	√		
Design of stringer	3	√		√		√	
Design of Plate girder	4	√				√	
Concrete slab, Steel bridge with truss system	5,6	√		√	√	√	
First Exam	7	√		√	√	√	
Design of box girder	8	√	√			√	√
Design of arch bridge	9	√	√			√	√
Suspension, and cable stayed bridges	10,11	√	√				√
Second Exam	12	√				√	√
Emphasis is placed on AASHTO loading and design requirements, load testing, and verification of unconventional materials.	13,14	√					√
Covers case studies of bridges around the world	15						√
Final Exam	16	√		√		√	√
Total	**16**	**10**	**4**	**5**	**4**	**6**	**7**

2.5. Lab Topics:

NA

2.6 Teaching and Learning Methods

Teaching and Learning Methods:	Course LO's Covered					
	CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
Lecture	√		√	√		
Tutorials			√	√	√	√
Presentations		√				
Case Study					√	√
Projects- based Learning					√	√
Discussion	√					
Teaching and Learning Methods for Students with Special Needs:						
Methods						
1. Discussion Session						
2. Extra Lectures						
3. Provide different levels of books and materials						

2.7 Assessment Methods

Assessment Methods:		Course LOs Covered					
		CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
Formative Assessment Method							
Tests	First Exam	√		√	√	√	
	Second Exam	√				√	√
Report			√				
Mini-Projects						√	√
Assignments		√		√	√		
Presentations			√				
Summative Assessment Method							
Final Exam		√		√	√	√	√

2.7.1. Assessment Schedule & Grades Distribution

Assessment Method		Week	The weighting of Assessment %
Formative Assessment Method			
Tests	First Exam	7	30
	Second Exam	12	20
Report		10	2
Mini-Projects		15	4
Assignments			2
Presentations		12	2
Summative Assessment Method			
Final Exam		16	40
Total			**100**

2.8. List of Reference:

Recommended Books:	- Steel-concrete Composite Bridges by Nicholas J. Garber, Lester A. Hoel, ICE Publishing, 2013 - AISC Steel Design manual from CMCE 2315
Periodicals, Web Sites, … etc:	https://www.conexpoconagg.com/news/emerging-tech-trends-in-bridge-construction https://www.britannica.com/technology/bridge-engineering

2.9. Facilities required for Teaching and Learning

Different Facilities	
Lecture Hall	√
Library Usage	√
Data Show	√
White Board	√

3. Matrix:

3.1. Program Objectives VS Course Objectives

Program Objectives	Course Objective		
	CO1	CO2	CO3
PO1	√	√	
PO5			√

3.2. Course Objectives VS Course Learning Outcomes

Course Objectives	Course Learning Outcomes					
	CLO1	**CLO2**	**CLO3**	**CLO4**	**CLO5**	**CLO6**
CO1					√	√
CO2			√	√		
CO3	√	√				

3.3. Program Learning Outcomes VS Course Learning Outcomes

Student Competences	Program Learning Outcomes	Course Learning Outcomes					
		CLO1	**CLO2**	**CLO3**	**CLO4**	**CLO5**	**CLO6**
A4	PLO4	√					
A5	PLO5		√				
B1	PLO11			√			
B3	PLO13				√		
D2	PLO16					√	√

3.4. Assessment Alignment Matrix

SC	PLO	PO	CLO	Teaching M.	Assessment M.
A4	**PLO4**	**PO1**	**CLO1**	• Lecture. • Discussion	• First, Second and Final Exams. • Assignments.
			CLO2	• Presentations	• Report • Presentations
B1	**PLO11**	**PO2**	**CLO3**	• Lecture • Tutorials	• First and Final Exams. • Assignments.
			CLO4	• Lecture. • Tutorials	• First and Final Exams. • Assignments.
D2	**PLO16**	**PO5**	**CLO5**	• Tutorials. • Case Study • Projects- based Learning	• First, Second and Final Exams • Mini-Project.
			CLO6	• Tutorials. • Case Study • Projects- based Learning	• Second and final Exams • Mini-Project.

Course Coordinator: **Dr. Ayman Abd-allah Zaky El-sayed Soliman**

Head of Department: **Dr. Ahmed Youssef Kamal El-Deen**

Date: 2/1/2024

Course Specification

1. Basic Information:

Program Title	Construction Engineering and Management			
Department Offering the course	Construction Engineering and Management			
Date of Specification Approval	**2/1/2024**			
Course Title	Dynamics of Structures		**Code**	CMC 316
Type	**Compulsory** ☐		**Elective** ☒	
Semester	**Spring Semester (Level 3-2)**			
Teaching Hours	**Lec.**	**Tut.**	**Lab.**	**Credit hours**
	2	**2**	**0**	**3**

2. Professional Information:

2.1. Course description:

Pr.Req. : Structural Analysis-2 (CMC 202)

Types of dynamic loads and the formulation of the equation of motion. Single degree of freedom systems, free and forced vibrations of multi degree of freedom systems. Response of structures to earthquakes. Design response spectra for structures, Design criteria for seismic resistant structures, Seismic response of tall buildings.

2.2. Course Objectives (CO):

Program objective		Course objective	
PO1	Apply a wide spectrum of engineering knowledge, science, and specialized skills with analytic, critical, and systemic thinking to identify and solve engineering problems in real-life situations.	**CO1**	Formulate the Equation of motion for single-degree and multi degrees systems under different vibration systems.
PO2	Behave professionally, adhere to engineering ethics and standards, and work to develop the profession and community and promote sustainability principles.	**CO2**	Analyze spectrum and different mode shapes for single and multi-degree of freedom systems

2.3. Course Learning Outcomes (CLO's):

Student Competences	Program Learning Outcomes		Course Learning Outcomes	
A3	PLO3	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.	CLO1	Illustrate the main components of dynamic structure.
			CLO2	Form the Equation of motion for single and multi-degree of freedom systems
			CLO3	Examine single and multi-degree of freedom systems
B2	PLO12	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.	CLO4	Present an overview of Seismological background, Lateral load resisting systems and an introduction to earthquake analysis methods.
			CLO5	Discuss the dynamic analysis and environmental loads
B4	PLO16	Generate ecologically responsible, environmental conservation and rehabilitation designs; through an understanding of structural design, construction, technology, and engineering problems	CLO6	Investigate free and forced vibration

2.4. Course Topics:

Course Topics	Week	Course LO's Covered					
		CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
Introduction to dynamic analysis	1	√					
Types of dynamic loads	2	√					
Formulation of the Equation of motion	3		√				
Single degree of freedom systems (Free vibration)	4		√	√			
Single degree of freedom systems (Forced vibration)	5,6		√	√			
First Exam	7	√	√	√			
Two and Multi degree of freedom systems	8,9		√	√			
Model analysis (Eigen value problem)	10,11		√	√			√
Second Exam	12		√	√			√
Introduction to Earthquake analysis using equivalent static method and response spectrum method	13				√	√	
Design criteria for seismic resistant structures.	14				√	√	
Seismic response of tall buildings.	15				√	√	
Final Exam	16	√	√	√	√	√	√
Total	**16**	**2**	**8**	**8**	**3**	**3**	**2**

2.5. Lab Topics:

Not Applicable

2.6 Teaching and Learning Methods

Teaching and Learning Methods:	Course LO's Covered					
	CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
1. Lectures	√	√	√	√	√	√
2. Tutorials		√	√		√	√
3. Problem-based Learning		√	√			
4. Case Study				√		
Teaching and Learning Methods for Students with Special Needs:						
Methods						
1. Discussion Session						
2. Extra Lectures						
3. Provide different levels of books and materials						

2.7.Assessment Methods

Assessment Methods:		Course LOs Covered					
		CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
Formative Assessment Method							
Tests	**First Exam**	√	√	√			
	Second Exam		√	√			√
Assignments			√	√		√	√
Discussion			√	√	√		
Summative Assessment Method							
Final Exam		√	√	√	√	√	√

2.7.1. Assessment Schedule & Grades Distribution

Assessment Method		Week	Weighting of Asses %
Formative Assessment Method			
Tests	First exam	7	30
	Second exam	12	20
Assignments		3,5,6,8,9,13,14	6
Discussion		6,8,14	3
Summative Assessment Method			
Final Exam		**16**	40
Total			**100**

2.8. List of Reference:

Essential Books (Textbooks):	William T. Thomson (auth.)-Theory of Vibration with Applications-Springer US (1st edition 1993)
Recommended Books:	Dynamics of Structures: Theory and Applications to Earthquake Engineering by Anil K. Chopra (1st edition 1995)
Web Sites, … etc:	https://engineering.purdue.edu/UCIST/TeachingModules/UG%20Exercises/Introduction%20to%20Dynamics%20of%20Structures/student.pdf

2.9. Facilities required for Teaching and Learning

Different Facilities	
Lecture Hall	√
Data Show	√
White Board	√

3. Matrix:

3.1. Program Objectives VS Course Objectives

Program Objectives	Course Objective	
	CO1	CO2
PO1	√	
PO2		√

3.2. Course Objectives VS Course Learning Outcomes

Course Objectives	Course Learning Outcomes					
	CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
CO1		√				√
CO2	√		√	√	√	

3.3. Program Learning Outcomes VS Course Learning Outcomes

Student Competences	Program Learning Outcomes	Course Learning Outcomes					
		CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
A3	**PLO3**	√	√	√			
B2	**PLO12**				√	√	
B16	**PLO16**						√

3.4. Assessment Alignment Matrix

SC	PLO	PO	CLO	Teaching M.	Assessment M.
A3	PLO3	PO1	CLO1	• Lectures	• First and Final Exam
B2	PLO12	PO1	CLO2	• Lectures	• First, Second and Final Exam
				• Tutorials	• Assignment
				• Problem-based Learning	• Discussion
		PO2	CLO3	• Lectures	• First, Second and Final Exam
				• Tutorials	• Assignment
				• Problem-based Learning	• Discussion
			CLO4	• Lectures	• Final Exam
				• Case Study	• Discussion
B4	PLO16		CLO5	• Lectures	• Final Exam
				• Tutorials	• Assignment
		PO1	CLO6	• Lectures	• Second and Final Exam
				• Tutorials	• Assignment

Course Coordinator: **Dr. Ibrahim Ali El-Azab**

Head of Department: **Dr. Ahmed Youssef Kamal El-Deen**

Date:2/1/2024

Course Specification

1. Basic Information:

Program Title	Construction Engineering and Management			
Department Offering the course	Construction Engineering and Management			
Date of Specification Approval	**2/1/2024**			
Course Title	Design of Metallic Structures-2	**Code**	CMC 318	
Type	**Compulsory** ☐	**Elective** ☒		
Semester	Spring Semester (Level 3-2)			
Teaching Hours	**Lec.**	**Tut.**	**Lab.**	**Credit hours**
	2	**2**	**--**	**3**

2. Professional Information:

2.1. Course description:

Pr.Req. : Design of Metallic Structures-1 (CMC 205)

Composite construction - composite floor beams (Strength requirement - shear connectors - formed metal deck) - Design of composite columns - Flexural design of slender sections - Connection classification and design (Flexible - Rigid – Semi rigid) - Design of base plates and anchor bolts – Introduction of Load and Resistance Factor Design (LRFD) - Identification of Limit states (Strength limit state and Serviceability limit state) - Design of tension, compression and flexure members using LRFD approach

2.2. Course Objectives (CO):

Program objective		Course objective	
PO1	**Apply** a wide spectrum of engineering knowledge, science, and specialized skills with analytic, critical, and systemic thinking to identify and **solve** engineering problems in real-life situations.	**CO1**	Design of the steel elements and composite structures according to Egyptian code.
PO2	Behave professionally, adhere to engineering ethics and standards, and work to develop the profession and community and promote sustainability principles.	**CO2**	Solve steel and composite structures problem according to engineering ethics and standard.

2.3. Course Learning Outcomes (CLO's):

Student Competences	Program Learning Outcomes		Course Learning Outcomes	
A3	PLO3	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.	CLO1	Discuss the specified consideration for composite sections and its properties.
			CLO2	Apply specified consideration for properties of slender sections.
B2	PLO12	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	CLO3	Calculate the critical straining action for elements.
			CLO4	Design of Steel Structure elements.
D2	PLO16	Generate ecologically responsible, environmental conservation and rehabilitation designs; through an understanding of structural design, construction, technology, and engineering problems	CLO5	Use codes of practice and standards of steel structural to check the allowable stresses.
			CLO6	Utilize codes of practice and standards of steel structural to check serviceability

2.4. Course Topics:

Course Topics	Week	Course LO's Covered					
		CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
Composite construction	1	√					
Composite floor beams (Strength requirement - shear connectors -	2	√		√	√	√	

formed metal deck)							
Design of composite columns	3	√			√	√	
Flexural design of slender sections	4,5		√	√	√	√	
Connection classification and design (Flexible - Rigid – Semi rigid)	6		√		√	√	
First Exam	7	√		√	√	√	
Design of base plates and anchor bolts	8				√	√	√
Introduction of Load and Resistance Factor Design (LRFD)	9				√		
Identification of Limit states (Strength limit state and Serviceability limit state)	10				√		√
Design of tension members using LRFD approach	11					√	√
Second Exam	12		√		√	√	√
Design of tension members using LRFD approach	13					√	√
Design of compression members using LRFD approach	14					√	√
Design of flexure members using LRFD approach	15			√	√	√	√
Final Exam	16		√	√	√	√	√
Total	16	**3**	**3**	**4**	**9**	**10**	**8**

2.5. Lab Topics:

NA

2.6 Teaching and Learning Methods

Teaching and Learning Methods:	**Course LO's Covered**					
	CLO1	**CLO2**	**CLO3**	**CLO4**	**CLO5**	**CLO6**
1. Lecture	√	√	√	√		
2. Tutorials					√	√
3. Problem-based Learning			√	√		
4. Case Study				√		
Teaching and Learning Methods for Students with Special Needs:						
Methods						
1. Discussion Session						
2. Extra Lectures						
3. Provide different levels of books and materials						

2.7 Assessment Methods

Assessment Methods:		Course LOs Covered					
		CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
Formative Assessment Method							
Tests	Quiz	√	√			√	
	First Exam	√		√	√	√	
	Second Exam		√		√	√	√
Assignments						√	√
Discussion				√	√		
Summative Assessment Method							
Final Exam			√	√	√	√	√

2.7.1. Assessment Schedule & Grades Distribution

Assessment Method		Week	The weighting of Assessment %
Formative Assessment Method			
Tests	First Exam	7	30
	Second Exam	12	20
	Quiz	4, 9,14	4
Assignments		4,6,10,11,13	4
Discussion			2
Summative Assessment Method			
Final Exam		16	40
Total			**100**

2.8. List of Reference:

Essential Books (Textbooks):	- Egyptian Code of Practice for Steel Construction and Bridges (LRFD).
Recommended Books:	- Steel Design for Engineers and Architects, by David A. Fanella, Rene Amon, Bruce Knobloch, Atanu Mazumder, United States of America ISBN-13: 978-1-4615-9731-5
Periodicals, Web Sites, … etc:	•

2.9. Facilities required for Teaching and Learning

Different Facilities	
Lecture Hall	√
Data Show	√
White Board	√

3. Matrix:

3.1. Program Objectives VS Course Objectives

Program Objectives	Course Objective	
	CO1	CO2
PO2	√	
PO5		√

3.2. Course Objectives VS Course Learning Outcomes

Course Objectives	Course Learning Outcomes					
	CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
CO1	√	√	√			
CO2				√	√	√

3.3. Program Learning Outcomes VS Course Learning Outcomes

Student Competences	Program Learning Outcomes	Course Learning Outcomes					
		CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
A3	PLO3	√	√				
B2	PLO12			√	√		
D2	PLO16					√	√

3.4. Assessment Alignment Matrix

SC	PLO	PO	CLO	Teaching M.	Assessment M.
A3	PLO3	PO2	CLO1	• Lecture.	• First Exam. • Quiz.
			CLO2	• Lecture.	• Second and Final exams. • Quiz
B2	PLO12	PO5	CLO3	• Lecture. • Problem-based Learning	• First and Final Exams. • Discussion
			CLO4	• Lecture. • Problem-based Learning • Case Study	• First, Second, and Final Exams. • Discussion
D2	PLO16	PO5	CLO5	• Tutorials	• First, Second, and Final Exams. • Assignments • Quiz.
			CLO6	• Tutorials	• Second, and Final Exams. • Assignments

Course Coordinator: **Dr. Ayman Abd-allah Zaky El-sayed Soliman**

Head of Department: **Dr. Ahmed Youssef Kamal El-Deen**

Date: 2/1/2024

Course Specification

1. Basic Information:

Program Title	Construction Engineering and Management			
Department Offering the course	Construction Engineering and Management			
Date of Specification Approval	**2/1/2024**			
Course Title	Prefabricated Water and Prestressed Concrete Structures	**Code**	CMC 320	
Type	**Compulsory** ☐	**Elective** ☒		
Semester	Spring Semester (Level 3-2)			
Teaching Hours	**Lec.**	**Tut.**	**Lab.**	**Credit hours**
	2	2	0	3

2. Professional Information:

2.1. Course Description:

Pr. Req.: Design of R.C. Structures-2 (CMC 208)

Prefabricated concrete: design methods, floor and roof systems, wall panels and construction joints. Concrete water structures: design considerations, water tightness. Construction of circular and rectangular tanks. Prestressed concrete: basic principles, methods and systems of prestressing, partial loss of prestressing, analysis and design for flexural, shear and bearing.

2.2. Course Objectives (CO):

Program objective		Course objective	
PO1	**Apply** a wide spectrum of engineering knowledge, science, and specialized skills with analytic, critical, and systemic thinking to identify and **solve** engineering problems in real-life situations.	**CO1**	**Perform** the types of the prefabricated structure
PO2	**Behave** professionally, adhere to engineering ethics and standards, and work to develop the profession and community and promote sustainability principles.	**CO2**	**Design** the different Concrete elements geometrically & structure according to engineering ethics and standards.

2.3. Course Learning Outcomes (CLOs):

Student Competences	Program Learning Outcomes		Course Learning Outcomes	
A3	PLO3	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.	CLO1	**Apply** knowledge to choose the better type of structural system
			CLO2	**Use** different structural systems for planning the RC buildings.
B2	PLO12	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.	CLO3	**Analyze** the different RC structure elements.
			CLO4	**Design** the different reinforcement concrete structural elements according to ECP.
D2	PLO16	Generate ecologically responsible, environmental conservation and rehabilitation designs; through an understanding of: structural design, construction, technology, and engineering problems	CLO5	**Apply** the Principals of designing to the water-structural elements**.**
			CLO6	**Make** the reinforcement details and draw the full structure details.

2.4. Course Topics:

Course Topics	Week	Course LO's Covered					
		CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
1.Prefabricated concrete: design methods, floor, and roof systems.	1-2	√	√	√			
2.Wall panels and construction joints.	3-4	√	√	√			
3.Concrete water structures: design considerations, water tightness.	5-6	√	√	√			
4.First exam	7	√	√	√			

5.Construction of circular and rectangular tanks.	8-9		√	√			√
6.Prestressed concrete: basic principles, methods, and systems of prestressing.	10,11			√		√	
7.Second exam	12	√	√	√		√	√
8.Partial loss of prestressing.	13		√		√	√	
9.Analysis and design for flexural, shear and bearing.	14-15		√	√	√		√
10. Final Exam	16	√	√	√	√	√	√
Total	**16**	**6**	**11**	**12**	**3**	**3**	**4**

2.5. Lab Topics

Not Applicable

2.6 Teaching and Learning Methods

Teaching and Learning Methods:	**Course LO's Covered**					
	CLO1	**CLO2**	**CLO3**	**CLO4**	**CLO5**	**CLO6**
1. Lecture	√		√		√	
2. Tutorials	√	√	√	√	√	√
3. Problem-based Learning			√		√	
4. Case Study				√		
Teaching and Learning Methods for Students with Special Needs:						
Methods						
1. Discussion Session						
2. Extra Lectures						
3. Provide different levels of books and materials						

2.7 Assessment Methods

Assessment Methods:		**Course LOs Covered**					
		CLO1	**CLO2**	**CLO3**	**CLO4**	**CLO5**	**CLO6**
Formative Assessment Method							
Test	**First Exam**	√	√	√			
	Second Exam	√	√	√		√	√
	Quizzes	√		√		√	
Assignments		√	√		√		√
Discussion				√	√	√	
Summative Assessment Method							
Final Exam		√	√	√	√	√	√

2.7.1. Assessment Schedule & Grades Distribution

Assessment Method		Week	The weighting of Assessment %
Formative Assessment Method			
Tests	**First Exam**	7	30%
	Second Exam	12	20%
	Quizzes	11,13	2%
Assignments		4,6,9,11,15	5 %
Discussion		10,13,14	3%
Summative Assessment Method			
Final Exam		16	40 %
Total			100 %

2.8. List of References:

Essential Books (Textbooks):	• Shaker Elbehary handbook. • Egyptian Code for Design & Construction of Reinforced Concrete Structures – ECOP 203-2018. • Design of RC Structure halls – DR.M. Hilal
Recommended Books:	• Reinforced Concrete: Mechanics and Design by James K. Wight, James G. MacGregor, Prentice Hall, 5 Edition 2008

2.9. Facilities required for Teaching and Learning

Different Facilities	
Lecture Hall	√
Data Show	√
White Board	√

3. Matrix:

3.1. Program Objectives VS Course Objectives

Program Objectives	Course Objectives	
	CO1	CO2
PO1	√	
PO2		√

3.2. Course Objectives VS Course Learning Outcomes

Course Objectives	Course Learning Outcomes					
	CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
CO1	√	√			√	
CO2			√	√		√

3.3. Program Learning Outcomes VS Course Learning Outcomes

Student Competences	Program Learning Outcomes	Course Learning Outcomes					
		CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
A3	PLO3	√	√				
B2	PLO12			√	√		
D2	PLO16					√	√

3.4. Assessment Alignment Matrix

SC	PLO	PO	CLOs	Teaching M.	Assessment
A3	PLO3	PO1	CLO1	Lecture Tutorials	First, Second, and Final Exam Assignments Quiz
			CLO2	Tutorials	First, Second, and Final Exam Assignments
B2	PLO12	PO2	CLO3	Lecture Tutorials Problem-based Learning	First, Second, and Final Exam Quiz Assignments
			CLO4	Tutorials Case Study	Final Exam Assignments Discussion
D2	PLO16	PO1	CLO5	Lecture Tutorials Problem-based Learning	Second, and Final Exam Quiz Assignments
		PO2	CLO6	Tutorials	Second, and Final Exam Assignments

Course Coordinator: Dr. Marwa Hany Bondok. مروة صابن

Head of Department: Dr. Ahmed Youssef Kamal El-Deen

Date:2/1/2024

Course Specification

1. Basic Information:

Program Title	Construction Engineering and Management			
Department Offering the course	Construction Engineering and Management			
Date of Specification Approval	**2/1/2024**			
Course Title	Professional Ethics		**Code**	UHS104
Type	**Compulsory** ☒		**Elective** ☐	
Semester	**Spring Semester (Level 3-2)**			
Teaching Hours	**Lec.**	**Tut.**	**Lab.**	**Credit hours**
	2	0	0	**2**

2. Professional Information:

2.1. Course description:

Pr.Req. : ……

Definition of law and its duties. Highlights on the civil and criminal laws on the engineer, Highlights on the laws of syndicates and enterprises. Highlight on the laws of taxes and environment protection. Scope and objectives of the ethics of the engineering profession. Nature of the engineering professions (experimentation, safety, risk and carelessness), Professional behavior, Responsibilities towards customers and supervisors, Rules, Rights of Engineers, Codes of Ethics, Engineers as Managers, Consultants and Leaders.

2.2. Course Objectives (CO):

Program objective		Course objective	
PO2	Behave professionally and adhere to engineering ethics and standards and work to develop the profession and the community and promote sustainability principles.	**CO1**	Create mindfulness on engineering ethics to instill moral and social values and faithfulness faithfulness in real-life situations.
PO4	Master self-learning and life-long learning strategies to communicate effectively in academic/professional fields.	**CO2**	Explain knowledge on intellectual property rights and design practices for providing safety in all professional fields

2.3. Course Learning Outcomes (CLO's):

Student Competences	Program Learning Outcomes		Course Learning Outcomes	
A4	PLO4	Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues, and risk management principles.	CLO1	Demonstrate and analyze an ethical issues in the subject matter under investigation or in a relevant field
			CLO2	Identify the multiple ethical interests at stake in a real-world situation or practice
A10	PLO10	Acquire and apply new knowledge; and practice self, lifelong and other learning strategies.	CLO3	Create awareness to provide safety, risk reduction and risk benefit analysis
			CLO4	Demonstrate knowledge of ethical values and codesto in synthesize, and apply knowledge of ethical dilemmas and solutions

2.4. Course Topics:

Course Topics	Week	Course LO's Covered			
		CLO1	CLO2	CLO3	CLO4
Introduction to Engineering Ethics	1	√			
Ethical Issues Faced by Engineers	2	√			
Engineering Codes of Ethics	3	√			
Professionalism and Codes of Ethics	3		√		
Ethical Theories	4		√		
Plagiarism & Cheating	4		√		
Risk, Safety, and Accidents	5		√		
Designing for Safety	5		√		
Professional Rights	6			√	
Ethics in Research and Experimentation	6			√	
First Exam	7	√	√		
Egyptian code, The ethics of practicing the engineering profession	8				
The first: General responsibilities of the engineer towards the community	9			√	
The second: The engineer's relationship with the engineering community towards fellow engineers	10			√	
Third: Intellectual property	11			√	√
Second Exam	12			√	√

Fourth : Responsibility of the engineer towards customers	**13**				√
Fifth : Professional Practice: Business Preparation	**14**				√
Sixth: Continuing education and training	**15**				√
Final Exam	**16**	√	√	√	√
Total	**16**	**5**	**5**	**6**	**6**

2.5. Lab Topics:

NA

2.6 Teaching and Learning Methods

Teaching and Learning Methods:	**Course LO's Covered**			
	CLO1	**CLO2**	**CLO3**	**CLO4**
1. Lecture	√	√		
2. Hybrid Learning			√	√
3. Interactive Learning			√	√
Teaching and Learning Methods for Students with Special Needs:				
Methods				
1. Discussion Session				
2. Extra Lectures				
3. Provide different levels of books and materials				

2.7 Assessment Methods

Assessment Methods:		**Course LOs Covered**			
		CLO1	**CLO2**	**CLO3**	**CLO4**
Formative Assessment Method					
Tests	**First Exam**	√	√		
	Second Exam			√	√
Observation				√	√
Summative Assessment Method					
Final Exam		√	√	√	√

2.7.1. Assessment Schedule & Grades Distribution

Assessment Method		**Week**	**The weighting of Assessment %**
Formative Assessment Method			
Tests	**First exam**	7	30
	Second exam	12	20
Observation			10
Summative Assessment Method			
Final Exam		16	40 %
Total			100 %

2.8. List of Reference:

Course Notes:	Egyptian code, The ethics of practicing the engineering profession
Essential Books (Textbooks):	Engineering ethics: Concepts and cases, 6th ed. by Charles E. Harris; Michael S. Pritchard; Michael J. Rabins; Ray James; Elaine Englehardt, 2019
Recommended Books:	Engineering ethics: Real world case studies by Steve Starrett; Amy L. Lara; Carlos, 2017
Periodicals, Web Sites, … etc:	

2.9. Facilities required for Teaching and Learning

Different Facilities	
Lecture Hall	√
Library Usage	√
Data Show	√
White Board	√

3. Matrix:

3.1. Program Objectives VS Course Objectives

Program Objectives	Course Objective	
	CO1	CO2
PO2	√	
PO4		√

3.2. Course Objectives VS Course Learning Outcomes

Course Objectives	Course Learning Outcomes			
	CLO1	CLO2	CLO3	CLO4
CO1	√	√		
CO2			√	√

3.3. Program Learning Outcomes VS Course Learning Outcomes

Program Learning Outcomes	Course Learning Outcomes			
	CLO1	CLO2	CLO3	CLO4
PLO4	√	√		
PLO10			√	√

3.4. Assessment Alignment Matrix

SA	PLO	PO	CLO	Teaching M.	Assessment M.
A4	PLO4	PO2	CLO1	• Lecture	• First and Final Exams
			CLO2		
A10	PLO10	PO4	CLO3	• Hybrid Learning	• First, Second and Final Exams • Observation
			CLO4	• Hybrid Learning	• Second and Final Exams • Observation

Course Coordinator: Prof. Elsayed Fouad

Program Coordinator: Dr. Ahmed Youssef Kamal El-Deen

Date: 2/1/2024

Level 3

Elective

Humanities

Course Specification

1. Basic Information:

Program Title	Construction Engineering and Management			
Department Offering the course	Construction Engineering and Management			
Date of Specification Approval	**2/1/2024**			
Course Title	Communication and Presentation Skills	**Code**	UHS301	
Type	**Compulsory** ☐	**Elective** ☒		
Semester	Fall Semester (Level 3-1)			
Teaching Hours	**Lec.**	**Tut.**	**Lab.**	**Credit hours**
	2	-	-	2

2. Professional Information:

2.1. Course description:

Pr.Req. : N.A

A general introduction to communication, the importance of communication, types of communication, communication obstacles, communication skills, features and methods of effective presentation, verbal communication: speaking skills – non-verbal communication – dialogue skills and persuasion strategies – communication in the work environment – writing resume – writing formal reports and letters.

2.2. Course Objectives (CO):

The students will be able to:

Program objective		Course objective	
PO4	Master self-learning and life-long learning strategies to communicate effectively in academic/professional fields.	**CO1**	Communicate and deliver presentations effectively and professionally.

2.3. Course Learning Outcomes (CLO's):

Student Competences	Program Learning Outcomes		Course Learning Outcomes	
A8	**PLO8**	Communicate effectively – graphically, verbally and in writing – with a range of audiences using contemporary tools.	**CLO1**	Apply the communication skills with a range of audiences using contemporary tools.
			CLO2	Use self-confident and strong

				determination graphically, verbally and in writing in the project
A9	**PLO9**	Use creative, innovative and flexible thinking and acquire entrepreneurial and leadership skills to anticipate and respond to new situations.	**CLO3**	Use creative templates and techniques to construct and deliver presentations suitable for expressing ideas.
			CLO4	Discuss the dialogue skills and persuasion strategies in the work environment

2.4. Course Topics:

Course Topics	Week	Course LO's Covered			
		CLO1	CLO2	CLO3	CLO4
What is Communication?	1	√			
Communication Styles	2		√		
Perceptual preferences	3, 4	√	√		
Verbal and nonverbal and paraverbal	5, 6	√	√		
First Exam	7	√	√		
Presentation structure	8, 9			√	
Developing a Persuasive Delivery Style	10, 11	√		√	
Second Exam	12	√		√	
Rehearsing process	13				√
Active listening	14	√			√
Negotiation skills	15	√			√
Final Exam	16	√	√	√	√
Total	16	**9**	**5**	**4**	**3**

2.5. Lab Topics:

(Not Applicable**)**

2.6 Teaching and Learning Methods

Teaching and Learning Methods:	Course LO's Covered			
	CLO1	CLO2	CLO3	CLO4
1. Lectures	√	√		
2. Presentations			√	√
3.Interactive Learning	√	√	√	√
4.Hybird Learning			√	√
Teaching and Learning Methods for Students with Special Needs:				
Methods				
1. Discussion Session				
2. Extra Lectures				
3. Provide different levels of books and materials				

2.7 Assessment Methods

Assessment Methods:		Course LOs Covered			
		CLO1	CLO2	CLO3	CLO4
Formative Assessment Method					
Tests	First Exam	√	√		
	Second Exam	√		√	
Presentations				√	√
Observation		√	√	√	√
Summative Assessment Method					
Final Exam		√	√	√	√

2.7.1. Assessment Schedule & Grades Distribution

Assessment Method		Week	The weighting of Assessment %
Formative Assessment Method			
Tests	First Exam	7	30 %
	Second Exam	12	20 %
Presentations		15	6%
Observation		3,6,8,13	4%
Summative Assessment Method			
Final Exam		16	40 %
Total			100 %

2.8. List of References:

Essential Books (Textbooks):	Mike Markel; Stuart A. Selber, "Practical Strategies for Technical Communication", Macmillan Learning, 3rd edition, 2019
Recommended Books:	Mike Markel; Stuart Selber, "Technical Communication", Macmillan Learning, 13th edition, 2021

2.9. Facilities required for Teaching and Learning

Different Facilities
Lecture Hall
Data show
White board

3. Matrix:

3.1. Program Objectives VS Course Objectives

Program Objectives	Course Objective
	CO1
PO4	√

3.2. Course Objectives VS Course Learning Outcomes

Course Objectives	Course Learning Outcomes			
	CLO1	CLO2	CLO3	CLO4
CO1	√	√	√	√

3.3. Program Learning Outcomes VS Course Learning Outcomes

Student Competences	Program Learning Outcomes	Course Learning Outcomes			
		CLO1	CLO2	CLO3	CLO4
A8	PLO8	√	√		
A9	PLO9			√	√

3.4. Assessment Alignment Matrix

SC	PLO	PO	CLO	Teaching M.	Assessment M.
A8	PLO8	PO4	CLO1	• Lectures • Interactive Learning	• First ,Second and Final Exam • Observation
			CLO2	• Lectures • Interactive Learning	• First , and Final Exam • Observation
A9	PLO9		CLO3	• Presentations • Interactive Learning • Hybrid Learning	• Presentations • Observation • Second and Final Exam
			CLO	• Presentations • Interactive Learning • Hybrid Learning	• Presentations • Observation • Final Exam

Course Coordinator: **Assoc. Prof. Amr Abdelhamid Ali Attia Al-Awamry** Al-Awamry

Head of Department: **Dr. Ahmed Youssef Kamal El-Deen**

Date: **2/1/2024**

Course Specification

1. Basic Information:

Program Title	Construction Engineering and Management			
Department Offering the course	Construction Engineering and Management			
Date of Specification Approval	**2/1/2024**			
Course Title	Leadership Skills		**Code**	UHS302
Type	**Compulsory** ☐		**Elective** ☒	
Semester	Fall Semester (Level 3-1)			
Teaching Hours	**Lec.**	**Tut.**	**Lab.**	**Credit hours**
	2	-	-	2

2. Professional Information:

2.1. Course description:

Pr.Req. : …..

The course aims to develop the students' leadership and management skills – Develop their opportunities for excellence, by introducing the leadership and administrative personality traits – The most important ways of transformation from mobility to leadership – The most important strategies of excellence and leadership interaction – developing some skills and ethics of leadership and management related to planning self and other management – Effective decision-making methods and techniques – motivational methods – the skill of change leadership – management and leadership ethics.

2.2. Course Objectives (CO):

The students will be able to:

Program objective		Course objective	
PO4	Master self-learning and life-long learning strategies to communicate effectively in academic/professional fields.	**CO1**	Apply business administration skills like budgeting, resource allocation, and risk management to achieve project goals.
		CO2	Use the entrepreneurial principles like innovation, risk assessment, and market analysis to deliver a successful and sustainable project outcome.

2.3. Course Learning Outcomes (CLO's):

Student Competences	Program Learning Outcomes		Course Learning Outcomes	
A8	PLO8	Communicate effectively – graphically, verbally and in writing – with a range of audiences using contemporary tools.	CLO1	Use a variety of visual and multimedia tools, tailoring communication to diverse audiences within leadership and management contexts.
			CLO2	Discuss the reports and proposals summarizing complex leadership and management data and clear visuals for effective communication.
A9	PLO9	Use creative, innovative and flexible thinking and acquire entrepreneurial and leadership skills to anticipate and respond to new situations.	CLO3	Identify emerging trends and challenges in leadership and management
			CLO4	Illustrate the complex leadership and management issues, encouraging divergent perspectives

2.4. Course Topics:

Course Topics	Week	Course LO's Covered			
		CLO1	CLO2	CLO3	CLO4
Leadership Theories & Styles	1,2		√		√
Team Dynamics & Communication	3			√	
Decision-Making & Problem-Solving	4		√	√	
Motivation & Delegation	5, 6		√		
First Exam	7		√	√	
Project Management & Execution	8, 9			√	√
Entrepreneurial Principles & Innovation	10, 11	√		√	√
Second Exam	12	√		√	√
Ethics & Sustainability	13, 14, 15	√	√	√	√
Final Exam	16	√	√	√	√
Total	**16**	**5**	**12**	**9**	**10**

2.5. Lab Topics:

(Not Applicable**)**

2.6 Teaching and Learning Methods

Teaching and Learning Methods:	Course LO's Covered			
	CLO1	CLO2	CLO3	CLO4
1. Lectures	√	√		
2. Presentations			√	√
3.Interactive Learning	√	√	√	√
4. Hybrid Learning			√	√
Teaching and Learning Methods for Students with Special Needs:				
Methods				
1. Discussion Session				
2. Extra Lectures				
3. Provide different levels of books and materials				

2.7 Assessment Methods

Assessment Methods:		Course LOs Covered			
		CLO1	CLO2	CLO3	CLO4
Formative Assessment Method					
Tests	First Exam		√	√	
	Second Exam	√		√	√
Presentations				√	√
Observation		√	√	√	√
Summative Assessment Method					
Final Exam		√	√	√	√

2.7.1. Assessment Schedule & Grades Distribution

Assessment Method		Week	The weighting of Assessment %
Formative Assessment Method			
Tests	First Exam	7	30 %
	Second Exam	12	20 %
Presentations		4,6,9,11,14	5%
Observation		4,6,9,11,14	5%
Summative Assessment Method			
Final Exam		16	40 %
Total			100 %

2.8. List of References:

Essential Books (Textbooks):	Primal Leadership, "Unleashing the power of Emotional Intelligence", Daniel Goleman, Harvard Business Review Press
Periodicals, Web Sites, … etc:	https://info.email.online.hbs.edu/leadership-ebook

2.9. Facilities required for Teaching and Learning

Different Facilities
Lecture Hall
Data show
White board

3. Matrix:

3.1. Program Objectives VS Course Objectives

Program Objectives	Course Objective	
	CO1	CO2
PO4	√	√

3.2. Course Objectives VS Course Learning Outcomes

Course Objectives	Course Learning Outcomes			
	CLO1	CLO2	CLO3	CLO4
CO1	√	√		
CO2			√	√

3.3. Program Learning Outcomes VS Course Learning Outcomes

Student Competences	Program Learning Outcomes	Course Learning Outcomes			
		CLO1	CLO2	CLO3	CLO4
A8	PLO8	√	√		
A9	PLO9			√	√

3.4. Assessment Alignment Matrix

SC	PLO	PO	CLO	Teaching M.	Assessment M.
A8	PLO8	PO4	CLO1	• Lecture • Interactive Learning	• First , and Final Exam • Observation
			CLO2	• Lecture • Interactive Learning	• First and Final Exam • Observation
A9	PLO9		CLO3	• Presentations • Interactive Learning • Hybrid Learning	• Presentations • Observation • First , Second and Final Exam
			CLO4	• Presentations • Interactive Learning • Hybrid Learning	• Presentations • Observation • Second and Final Exam

Course Coordinator: **Assoc. Prof. Amr Abdelhamid Ali Attia Al-Awamry** Al-Awamry

Head of Department: **Dr. Ahmed Youssef Kamal El-Deen**

Date: **2/1/2024**

Level 4

Course Specification

1. Basic Information:

Program Title	Construction Engineering and Management			
Department Offering the course	Construction Engineering and Management			
Date of Specification Approval	**2/1/2024**			
Course Title	Project Finance & Management		**Code**	CMC 401
Type	**Compulsory ☒**		**Elective ☐**	
Semester	Fall Semester (Level 4-1)			
Teaching Hours	**Lec.**	**Tut.**	**Lab.**	**Credit hours**
	2	**2**	**1**	**3**

2. Professional Information:

2.1. Course Description:

Pr.Req. : Cost Engineering & Quantity Surveying (CMC 307)

Preparation of budgets. Type of budget. Classification of costs. Project cost accounting, time cost envelope (S-Curve), income and expenses cash flow forecasting, and cost of capital lock-up. The factors that affect capital lock-up. Economic assessments. Profitability measures. Inflation. Accuracy of future estimates. Financial modeling. Cost-benefit analysis. The financing of plant. Systematic plant selection

2.2. Course Objectives (CO):

Program objective		Course objective	
PO2	Behave professionally, adhere to engineering ethics and standards, and work to develop the profession and community and promote sustainability principles.	**CO1**	**Apply** wide sets of project time management knowledge, science, and specialized skills with analytic, critical, and systemic thinking to identify engineering time management in real-life situations.
PO5	Apply analytical, experimental, design, construction engineering techniques and project management skills with proficiency aided by modern tools.	**CO2**	**Formulate** analytical, and project management skills with proficiency aided by solving management problems

2.3. Course Learning Outcomes (CLO's):

Student Competences	Program Learning Outcomes		Course Learning Outcomes	
A2	**PLO2**	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.	**CLO1**	Perform the basics of project and the basics of project budgets
A6	**PLO6**	Plan, supervise and monitor implementation of engineering projects, taking into consideration other trades requirements.	**CLO2**	Describe project cost accounting, time cost envelope (S-Curve), income and expenses cash flow forecasting and factors that affect capital lock-up
B3	**PLO13**	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.	**CLO3**	Plan economic assessments profitability measures.
			CLO4	Analyze cost benefit, Inflation and accuracy of future estimates
B4	**PLO14**	Deal with biddings, contracts and financial issues including project insurance and guarantees.	**CLO5**	Formulate the critical notice of bidding and contracts that dealing with preparation of budgets.

2.4. Course Topics:

Course Topics	Week	Course LO's Covered				
		CLO1	CLO2	CLO3	CLO4	CLO5
Concepts of Preparation of budgets	1,2	√				√
Type of budget& Classification of costs	3,4		√	√		
Project cost accounting	5,6		√	√		
First exam	7		√	√		
Time cost envelope (S-Curve)	8,9			√		√
Income and expenses cash flow forecasting	10,11	√		√	√	
Experimental Test	12	√		√	√	√
Cost of capital lock-up	13,14	√	√	√	√	
Economic assessments	15		√	√		
Final exam	16		√	√	√	√
Total	**16**	**6**	**7**	**11**	**4**	**4**

2.5. Lab Topics:

Lab Topics	Week	Course LO's Covered				
		CLO1	CLO2	CLO3	CLO4	CLO5
1.Computer applications by primavera software package.	**1-11**	√		√	√	√
Experimental Test	12	√		√	√	√

2.6 Teaching and Learning Methods

Teaching and Learning Methods:	Course LO's Covered				
	CLO1	CLO2	CLO3	CLO4	CLO5
Lecture		√	√	√	√
Computer-based Instruction	√		√	√	√
Project-based Learning		√	√	√	
Tutorials			√	√	
Teaching and Learning Methods for Students with Special Needs:					
Methods					
1. Discussion Session					
2. Extra Lectures					
3. Provide different levels of books and materials					

2.7 Assessment Methods

Assessment Methods:		Course LOs Covered				
		CLO1	CLO2	CLO3	CLO4	CLO5
Formative Assessment Method						
Test	**First Exam**		√	√		
	Experimental Test	√		√	√	√
Assignments		√				√
Mini-Project			√	√	√	
Summative Assessment Method						
Final Exam			√	√	√	√

2.7.1. Assessment Schedule & Grades Distribution

Assessment Method		Week	Weighting of Asses.
Formative Assessment Method			
Test	**First Exam**	7	30
	Experimental Test	12	20
Assignments		2,10,11,13,14	5
Mini-Project		15	5
Summative Assessment Method			
Final Exam		**16**	**40**
Total			**100**

2.8. List of Reference:

Course Notes:	Lecture Notes
Recommended Books:	Daniel W. Halpin "Construction Management" textbook, John Wiley & Sons; 5th edition (August 7, 2017), ISBN-13: 978-1119256809.
Website	https://www.projectmanager.com/blog/project-financial-management

2.9. Facilities required for Teaching and Learning

Different Facilities
Laboratory Usage
Data Show
White Board

3. Matrix:

3.1. Program Objectives VS Course Objectives

Program Objectives	Course Objective	
	CO1	CO2
PO2	√	
PO5		√

3.2. Course Objectives VS Course Learning Outcomes

Course Objectives	Course Learning Outcomes				
	CLO1	CLO2	CLO3	CLO4	CLO5
CO1	√	√			
CO2			√	√	√

3.3. Program Learning Outcomes VS Course Learning Outcomes

Student Competences	Program Learning Outcomes	Course Learning Outcomes				
		CLO1	CLO2	CLO3	CLO4	CLO5
A2	PLO2	√				
A6	PLO6		√			
B3	PLO13			√	√	
B4	PLO14					√

3.4. Assessment Alignment Matrix

SC	PLO	PO	CLO	Teaching M.	Assessment M.
A2	PLO2	PO2	CLO1	Computer-based Instruction	Experimental Test Assignments
A6	PLO6		CLO2	Lecture Project-based Learning	First and Final Exam Mini-Project
B3	PLO13	PO5	CLO3	Lecture Tutorials Computer-based Instruction Project-based Learning	First and Final Exam Experimental Test Mini-Project
			CLO4	Lecture Tutorials Computer-based Instruction Project-based Learning	Final Exam Experimental Test Mini-Project
B4	PLO14		CLO5	Lecture Computer-based Instruction	Final Exam Experimental Test, Assignments

Course Coordinator: **Dr. Omia El-Hadidi**

Head of Department: **Dr. Ahmed Youssef Kamal El-Deen**

Date: 2/1/2024

Course Specification

1. Basic Information:

Program Title	Construction Engineering and Management			
Department Offering the course	Construction Engineering and Management			
Date of Specification Approval	**2/1/2024**			
Course Title	Construction Project Specifications, Bids, and Contracts	**Code**	CMC 403	
Type	**Compulsory ☒**	**Elective ☐**		
Semester	Fall Semester (Level 4-1)			
Teaching Hours	**Lec.**	**Tut.**	**Lab.**	**Credit hours**
	2	**1**	**-**	**2**

2. Professional Information:

2.1. Course Description:

Pr.Req. : Cost Engineering & Quantity Surveying (CMC 307)

Participants in a construction contract. Contract definition. Types of contracts; formation principles of a contract, performance or breach of contractual obligations. Analysis and comparison of the different kinds of construction contracts. Bidding logistics. Legal organizational structures. Different types and uses of specifications. Different forms of contracts utilized in construction.

2.2. Course Objectives (CO):

Program objective		Course objective	
PO1	Apply a wide spectrum of engineering knowledge, science, and specialized skills with analytic, critical, and systemic thinking to identify and solve engineering problems in real-life situations.	**CO1**	**Perform** construction contract. Contract definition. Types of contracts; formation principles of a contract, performance or breach of contractual obligations.
PO2	Behave professionally, adhere to engineering ethics and standards, and work to develop the profession and community and promote sustainability principles	**CO2**	**Analyze** different kinds of construction contracts. Bidding logistics. Legal organizational structures. Different types and uses of specifications. Different forms of contracts utilized in construction.

2.3. Course Learning Outcomes (CLO's):

Student Competences	Program Learning Outcomes		Course Learning Outcomes	
A6	PLO6	Plan, supervise and monitor implementation of engineering projects, taking into consideration other trades requirements.	CLO1	Identify the basics of Principle in a construction contract.
B3	PLO13	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.	CLO 2	Explain Types of contracts, formation principles of a contract, performance or breach of contractual obligations.
			CLO 3	Illustrate and compare of the different kinds of construction contracts
B4	PLO 14	Deal with biddings, contracts and financial issues including project insurance and guarantees	CLO 4	Organize the construction projects with Bidding logistics and Legal organizational structures.
			CLO 5	Write different types and uses of specifications and different forms of contracts in construction.

2.4. Course Topics:

Course Topics	Week	Course LO's Covered				
		CLO1	CLO2	CLO3	CLO4	CLO5
Introduction & Principals of construction contract	1,2	√		√		
Introduction & Principals of Tendering	3,4,5	√	√			
Types of Tendering	6	√	√	√		
First Exam	**7**	√	√	√		
Types of construction contract	8	√	√	√		
construction contract Egypt law	9,10		√		√	
Different types and uses of specifications	11		√		√	
Second Exam	12		√	√	√	
Different types and uses of	13		√		√	

specifications						
Different forms of contracts utilized in construction.	14				√	√
Final Revision	15	√	√		√	√
Final Exam	16	√	√	√	√	√
Total		**10**	**13**	**7**	**8**	**3**

2.5. Lab Topics:

Not applicable

2.6 Teaching and Learning Methods

Teaching and Learning Methods:	**Course LO's Covered**				
	CLO1	**CLO2**	**CLO3**	**CLO4**	**CLO5**
Lecture	√	√		√	√
Tutorials		√	√	√	√
Case Study		√	√		
Project-based Learning		√	√		
Teaching and Learning Methods for Students with Special Needs:					
Methods					
1. Discussion Session					
2. Extra Lectures					

2.7 Assessment Methods

Assessment Methods:		**Course LOs Covered**				
		CLO1	**CLO2**	**CLO3**	**CLO4**	**CLO5**
Formative Assessment Method						
Tests	**First Exam**	√	√	√		
	Second Exam		√	√	√	
Mini Projects			√	√		
Assignments			√		√	√
Summative Assessment Method						
Final Exam		√	√	√	√	√

2.7.1. Assessment Schedule & Grades Distribution

Assessment Method		Week	The weighting of Assessment %
Formative Assessment Method			
Tests	First Exam	7	30
	Second Exam	12	20
Mini Projects		14	7
Assignments		4,6,10	3
Summative Assessment Method			
Final exam		16	40
Total			100

2.8. List of Reference:

Course Notes:	Lecture Notes
Recommended Books:	Daniel W. Halpin, Bolivar A. Senior, Gunnar Lucko "Construction Management" John Wiley & Sons, Inc., 5th Edition (August 2017), ISBN: 978-1-119-25680-9 Will Hughes, Ronan Champion, John Murdoch "Construction Contracts Law and Management" Published by Routledge (Taylor & Francis), April, 2015 ISBN 9780415657044.
Website	https://www.procore.com/library/construction-bidding-process

2.9. Facilities required for Teaching and Learning

Different Facilities
Laboratory Usage
Data Show
White Board

3. Matrix:

3.1. Program Objectives VS Course Objectives

Program Objectives	Course Objective	
	CO1	CO2
PO1	√	
PO2		√

3.2. Course Objectives VS Course Learning Outcomes

Course Objectives	Course Learning Outcomes				
	CLO1	CLO2	CLO3	CLO4	CLO5
PO1	√	√	√		
PO2				√	√

3.3. Program Learning Outcomes VS Course Learning Outcomes

Student Competences	Program Learning Outcomes	Course Learning Outcomes				
		CLO1	CLO2	CLO3	CLO4	CLO5
A6	PLO6	√				
B3	PLO13		√	√		
B4	PLO 14				√	√

3.4. Assessment Alignment Matrix

SC	PLO	PO	CLO	Teaching M.	Assessment M.
A6	PLO 6	PO1	CLO1	Lecture	First and Final Exam
B3	PLO13	PO2	CLO2	Lecture Tutorials Case Study Project-based Learning	First , Second and Final Exam Assignments Mini-Project
			CLO3	Tutorials Case Study Project-based Learning	First , Second and Final Exam Mini Projects
B4	PLO14		CLO4	Lecture Tutorials	Second and Final Exam Assignments s
			CLO5	Lecture Tutorials	Final Exam Assignments

Course Coordinator: **Dr. Omia El-Hadidi**

Head of Department: **Dr. Ahmed Youssef Kamal El-Deen**

Date: 2/1/2024

Course Specification

1. Basic Information:

Program Title	Construction Engineering and Management			
Department Offering the course	Construction Engineering and Management			
Date of Specification Approval	**2/1/2024**			
Course Title	Senior Design Project II	**Code**	CMC405	
Type	**Compulsory** ☒	**Elective** ☐		
Semester	**Fall Semester (Level 4-1)**			
Teaching Hours	**Lec.**	**Tut.**	**Lab.**	**Credit hours**
	1	**0**	**4**	**3**

2. Professional Information:

2.1. Course Description:

Pr.Req.: Senior Design Project I (CMC 308)

Topics are selected by groups of students according to their area of interest upon advisor approval. Projects address solution to open ended applications using an integrated engineering approach. Actual construction projects are selected by groups of students upon advisor approval for analysis. The management and technology aspects of construction are simulated and investigated.

2.2. Course Objectives (CO):

Program objective		Course objective	
PO1	Apply a wide spectrum of engineering knowledge, science, and specialized skills with analytic, critical, and systemic thinking to identify and solve engineering problems in real-life situations.	**CO1**	**Apply** the suitable engineering Work Break down Structure (WBS) of the building work to produce effective steps of project.
PO2	Behave professionally, adhere to engineering ethics and standards, and work to develop the profession and community and promote sustainability principles.	**CO2**	**Design** the different concrete elements geometrically & structure at Value Engineering.
PO4	Master self-learning and life-long learning strategies to communicate effectively in academic/professional fields.	**CO3**	**Present** the final construction engineering management project

PO5	Apply analytical, experimental, design, construction engineering techniques and project management skills with proficiency aided by modern tools.	**CO4**	**Create** the final project scope and the final Analyzed contract of the project management items.

2.3. Course Learning Outcomes (CLO's):

Student Competences	Program Learning Outcomes		Course Learning Outcomes	
A3	**PLO3**	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.	**CLO1**	**Apply** engineering design processes to produce cost-effective solutions in planning and illustrating the project.
A4	**PLO4**	Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues and risk management principles.	**CLO2**	**Use** the laws and codes of practice, and standards effectively in the final project
A6	**PLO6**	Plan, supervise and monitor implementation of engineering projects, taking into consideration other trades requirements.	**CLO3**	**Supervise** the project, taking into consideration the management principles and other trades requirements
A7	**PLO7**	Function efficiently as an individual and as a member of multi-disciplinary and multi-cultural teams.	**CLO4**	**Work** efficiently with multi-disciplinary and multi-cultural teams.
A8	**PLO8**	Communicate effectively – graphically, verbally and in writing – with a range of	**CLO5**	**Model** the time planning, cost, and survey software

		audiences using contemporary tools.		programs with a project team using contemporary tools.
A9	**PLO9**	Use creative, innovative and flexible thinking and acquire entrepreneurial and leadership skills to anticipate and respond to new situations.	**CLO6**	**Solve** technical management problems using creative, innovative and flexible thinking.
A10	**PLO10**	Acquire and apply new knowledge; and practice self, lifelong and other learning strategies.	**CLO7**	**Study** a new systems with acquire knowledge and other learning strategies to solve technical issues
B1	**PLO11**	Select appropriate and sustainable technologies for the 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.	**CLO8**	**Design** the structural project according to cost and time
B2	**PLO12**	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	**CLO9**	**Modify** the final project according to time and cost.

		field relevant to the discipline.		
B3	**PLO13**	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.	**CLO10**	**Prepare** the project management and quality control items.
B4	**PLO14**	Deal with biddings, contracts and financial issues including project insurance and guarantees.	**CLO11**	**Formulate** the safety and financial issues for the project
D2	**PLO16**	Generate ecologically responsible, environmental conservation and rehabilitation designs; through an understanding of structural design, construction, technology, and engineering problems	**CLO12**	**Create** the final project presentation including all steps of project.

2.4. Course Topics:

Course Topics	**Week**	**Course LO's Covered**											
		CLO1	**CLO2**	**CLO3**	**CLO4**	**CLO5**	**CLO6**	**CLO7**	**CLO8**	**CLO9**	**CLO10**	**CLO11**	**CLO12**
Introduction of the Project Time Planning	1	√		√	√	√						√	
Time Planning in Primavera	5,6		√	√							√	√	√
Cost Analysis	9,10		√			√	√		√			√	√
Resource Management	11,12	√	√	√		√			√	√	√		√
Quality and Safety	13,14			√	√		√	√	√	√	√	√	
Value Engineering	15	√	√	√	√	√	√	√	√	√	√		√
Final Oral Exam	16	√		√	√	√	√	√			√		√
Total	14	4	7	8	4	6	5	3	7	5	9	7	7

2.5. Lab Topics:

Course Topics	Week	Course LO's Covered											
		CLO1	CLO2	CLO3	CLO4	CLO5	CLO6	CLO7	CLO8	CLO9	CLO10	CLO11	CLO12
Project Survey	2		√						√				√
Survey Project with Rivet	3,4		√						√	√	√	√	
Time Planning in Primavera	5,6		√								√	√	√
Contentious Time Planning in Primavera	7,8		√								√	√	√
Cost Analysis	9,10		√						√			√	√
Resource Management	11,12		√						√	√	√		√
Quality and Safety	13,14								√	√	√	√	
Value Engineering	15		√						√	√	√		√
Total	14		12						10	7	11	10	10

2.6 Teaching and Learning Methods

Teaching and Learning Methods:	Course LO's Covered											
	CLO1	CLO2	CLO3	CLO4	CLO5	CLO6	CLO7	CLO8	CLO9	CLO10	CLO11	CLO12
1. Lecture	√	√							√			
2. Computer-based Instruction		√						√	√	√	√	√
3. Discussion	√				√		√	√	√	√	√	√
4. Project	√		√	√	√	√						√
5. Problem-based Learning		√				√		√			√	
6. Co-operative Learning				√				√				√
Teaching and Learning Methods for Students with Special Needs:												
Methods												
1. Discussion Session												
2. Extra Lectures												
3. Provide different levels of books and materials												

2.7 Assessment Methods

Assessment Methods:	Course LOs Covered											
	CLO1	CLO2	CLO3	CLO4	CLO5	CLO6	CLO7	CLO8	CLO9	CLO10	CLO11	CLO12
Formative Assessment Method												
Discussion	√	√			√		√	√	√	√	√	√
Assignments		√						√	√		√	
Presentations	√		√	√	√	√						√
Summative Assessment Method												
Project	√		√	√	√	√	√	√		√		√
Final Oral Exam	√		√	√	√	√	√			√		√

2.7.1. Assessment Schedule & Grades Distribution

Assessment Method	Week	The weighting of Assessment %
Formative Assessment Method		
Discussion	Every week	25 %
Presentations	Every week	20%
Assignments	3, 6	5 %
Summative Assessment Method		
Project	14	30 %
Final Oral Exam	14	20%
Total		100 %

2.8. List of Reference:

Course Notes:	• Lectures
Essential Books (Textbooks):	• Shaker elbehary Handbook 2018. • Egyptian code for designing concrete structures ECP203-2020. • Egyptian code for calculating loads ECP202-2012.
Recommended Books:	• Design of RC Structure - DR. Mashhour A. Ghoneim. (vols.1, 2, 3) • Design of Reinforced Concrete by Jack C. McCormac, Russell H. Brown, Wiley, Fifth Edition, 2014. • Reinforced Concrete: Mechanics and Design by James K. Wight, James G. MacGregor, Prentice Hall, Fifth Edition 2008. • Computer Applications in Civil Engineering by Paul D. Spindel, Van Nostrand Reinhold Company. • Concrete and Steel Construction: Quality Control and Assurance by Mohamed A. El-Reedy, CRC press, 2013

	• Building Construction: Principles, Materials, & Systems by Madan L Mehta Ph.D., Walter Scarborough, Diane Armpriest, Pearson, 2 Edition, 2012

2.9. Facilities required for Teaching and Learning

Different Facilities
Laboratory
Data Show
White Board

3. Matrix:

3.1. Program Objectives VS Course Objectives

Program Objectives	Course Objectives			
	CO1	CO2	CO3	CO4
PO1	√			
PO2		√		
PO4			√	
PO5				√

3.2. Course Objectives VS Course Learning Outcomes

Course Objectives	Course Learning Outcomes											
	CLO1	CLO2	CLO3	CLO4	CLO5	CLO6	CLO7	CLO8	CLO9	CLO10	CLO11	CLO12
CO1	√	√								√		
CO2				√	√	√						
CO3							√	√	√			
CO4			√								√	√

3.3. Program Learning Outcomes VS Course Learning Outcomes

Program Learning Outcomes	Course Learning Outcomes											
	CLO1	CLO2	CLO3	CLO4	CLO5	CLO6	CLO7	CLO8	CLO9	CLO10	CLO11	CLO12

PLO3	√											
PLO4		√										
PLO6			√									
PLO7				√								
PLO8					√							
PLO9						√						
PLO10							√					
PLO11								√				
PLO12									√			
PLO13										√		
PLO14											√	
PLO16												√

3.4. Assessment Alignment Matrix

SC	PLO	PO	CLOs	Teaching M.	Assessment
A3	**PLO3**	**PO1**	**CLO1**	Lecture Discussion Project	Discussion Presentations Project Final Oral Exam
A4	**PLO4**		**CLO2**	Lecture Problem-based L earning Computer-based Instruction	Discussion Assignments
A6	**PLO6**	**PO5**	**CLO3**	Project	Presentation Project Final Oral Exam
A7	**PLO7**	**PO2**	**CLO4**	Project Co-operative Learning	Presentation Project Final Oral Exam
AB	**PLO8**		**CLO5**	Discussion Project	Discussion Presentation Project Final Oral Exam
A9	**PLO9**		**CLO6**	Problem-based Learning Project	Presentation Project Final Oral Exam
A10	**PLO10**	**PO4**	**CLO7**	Discussion	Discussion Project Final Oral Exam
B1	**PLO11**		**CLO8**	Computer-based Instruction Discussion	Assignments Discussion

				Problem-based Learning Co-operative Learning	
B2	**PLO12**		**CLO9**	Lecture Discussion	Discussion Final Oral Exam
B3	**PLO13**	**PO1**	**CLO10**	Discussion	Discussion Project Final Oral Exam
B4	**PLO14**		**CLO11**	Computer-based Instruction Discussion Problem-based Learning	Assignments Discussion
D2	**PLO16**	**PO5**	**CLO12**	Computer-based Instruction Discussion Project Co-operative Learning	Discussion Presentation Project Final Oral Exam

Course Coordinator: **Dr. Omia Said El Hadidi**

Head of Department: **Dr. Ahmed Youssef Kamal El-Deen**

Date: 2/1/2024

Level 4

Elective

Course Specification

1. Basic Information:

Program Title	Construction Engineering and Management			
Department Offering the course	Construction Engineering and Management			
Date of Specification Approval	**2/1/2024**			
Course Title	Engineering for a Sustainable Environment	**Code**	CMC407	
Type	**Compulsory** ☐	**Elective** ☒		
Semester	Fall Semester (Level 4-1)			
Teaching Hours	**Lec.**	**Tut.**	**Lab.**	**Credit hours**
	2	**2**	**-**	**3**

2. Professional Information:

2.1. Course Description:

Pr.Req. : …..

Solid, industrial and hazardous waste generation and control, with an emphasis on sustainable engineering practices such as environmental impact assessment and performance, waste management, pollution prevention, waste minimization, cleaner production, energy recovery, recycling and reuse.

2.2. Course Objectives (CO):

Program objective		Course objective	
PO2	Behave professionally, adhere to engineering ethics and standards, and work to develop the profession and community and promote sustainability principles.	**CO1**	Formulate the Philosophy of Solid, industrial and hazardous waste generation, recycling and reuse.
PO5	Apply analytical, experimental, design, construction engineering techniques and project management skills with proficiency aided by modern tools.	**CO2**	Illustrate different environmental impact assessment and performance, waste management

2.3. Course Learning Outcomes (CLO's):

Student Competences	Program Learning Outcomes		Course Learning Outcomes	
A3	PLO3	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.	CLO1	Use the national and international regulatory related to Engineering for a Sustainable Environment
			CLO2	Discuss the Environmental impact assessment and performance, waste management
A4	PLO4	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.	CLO3	Demonstrate nature and sources of solid, industrial
B3	PLO13	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.	CLO4	Create the suitable method for waste management, recycling and reuse.

2.4. Course Topics:

Course Topics	Week	Course LO's Covered			
		CLO1	CLO2	CLO3	CLO4
1.Solid, industrial and hazardous waste generation	1	√	√		
2.Solid, industrial and hazardous waste control	2	√	√	√	
3.Sustainable engineering practices	**3**		√	√	
4.environmental impact assessment	4,5		√		
5.environmental impact performance	6		√		
6.First Exam	7	√	√	√	
7.waste management	8				√
8.pollution prevention	9			√	√
9.waste minimization	10,11				√
10. Second Exam	12		√	√	√
11. cleaner production energy recovery, recycling and reuse	13-15				√
12. **Final Exam**	16	√	√	√	√
Total	**16**	**2**	**6**	**3**	**7**

2.5 Lab Topics

NA

2.6 Teaching and Learning Methods

Teaching and Learning Methods:	Course LO's Covered			
	CLO1	CLO2	CLO3	CLO4
1. Lecture	√		√	√
2. Tutorials		√	√	√
3. Discussion	√		√	√
4. presentation		√		√
Teaching and Learning Methods for Students with Special Needs:				
Methods				
1. Discussion Session				
2. Extra Lectures				
3. Provide different levels of books and materials				

2.7 Assessment Methods

Assessment Methods:		Course LOs Covered			
		CLO1	CLO2	CLO3	CLO4
Formative Assessment Method					
Tests	**Quizzes**			√	√
	First Exam	√	√	√	
	Second Exam		√	√	√
Report		√	√	√	√
Assignments				√	√
Summative Assessment Method					
Final Exam		√	√	√	√

2.7.1. Assessment Schedule & Grades Distribution

Assessment Method		Week	The weighting of Assessment %
Formative Assessment Method			
Tests	**First Exam**	7	30%
	Second Exam	12	20%
	Quizzes	4,6,11,12	5 %
Report		15	2%
Assignments		3,9,13	3 %
Summative Assessment Method			
Final Exam		16	40 %
Total			100 %

2.8. List of Reference:

Course Notes:	Lecture Notes
Essential Books (Textbooks):	Energy, the Environment, and Sustainability- Efstathios E. Michaelides - International Standard Book Number-13: 978-1-138-03844-8
Periodicals, Web Sites, …	https://openknowledge.worldbank.org/handle/10986/2159

2.10. Facilities required for Teaching and Learning

Different Facilities
Lecture Hall
Library Usage
Data Show
White Board

3.1. Program Objectives VS Course Objectives

Program Objectives	Course Objectives	
	CO1	CO2
PO2	√	
PO5		√

3.2. Course Objectives VS Course Learning Outcomes

Course Objectives	Course Learning Outcomes			
	CLO1	CLO2	CLO3	CLO4
CO1	√	√		
CO2			√	√

3.3. Program Learning Outcomes VS Course Learning Outcomes

Program Learning Outcomes	Course Learning Outcomes			
	CLO1	CLO2	CLO3	CLO4
PLO3	√	√		
PLO4			√	
PLO13				√

3.4. Assessment Alignment Matrix

SA	PLO	PO	CLOs	Teaching M.	Assessment
A3	PLO3	PO2	CLO1	Lecture	First and Final Exam
				Discussion	Report
			CLO2	Tutorials	First, Second and Final Exam
				presentation	Report
A4	PLO4	PO5	CLO3	Lecture	Quizzes
					First, Second and Final Exam
				Tutorials	Assignments
				Discussion	Report
				presentation	
B3	PLO3	PO5	CLO4	Lecture	Second and Final Exam
				Tutorials	Quizzes
					Assignments
				Discussion	Report
				presentation	

Course Coordinator: **Dr. Osama Abdelaziz Abosiada**

Head of Department: **Dr. Ahmed Youssef Kamal El-Deen**

Date: 2/1/2024

Course Specification

1. Basic Information:

Program Title	Construction Engineering and Management			
Department Offering the course	Construction Engineering and Management			
Date of Specification Approval	**2/1/2024**			
Course Title	Environmental Engineering		**Code**	CMC409
Type	**Compulsory** ☐	**Elective** ☒		
Semester	Fall Semester (Level 4-1)			
Teaching Hours	**Lec.**	**Tut.**	**Lab.**	**Credit hours**
	2	**2**	**-**	**3**

2. Professional Information:

2.1. Course Description:

Pr.Req. : Water Chemistry (FRB102)

Introduction to environmental engineering, pollution problems, types of pollution, degrees of Pollution, sources of pollution, surface water pollution, groundwater Pollution, rainwater Pollution, sea & ocean water pollution, air pollution. Soil pollution, pollution control, pollution prevention. Samples conditions, chemical pollutions measuring in water, microbiological & biological pollution measuring in water, field pollution monitoring, environmental protection laboratory. Water supply, wastewater systems, solid waste management, air pollution. Solid waste management: collection, handling, separation and treatment, disposal, recycling, and reuse. Monitoring and control, noise, air pollution, environmental laws and its applications.

.2.2. Course Objectives (CO):

Program objective		Course objective	
PO2	Behave professionally, adhere to engineering ethics and standards, and work to develop the profession and community and promote sustainability principles.	**CO1**	Explain Philosophy of environmental engineering, pollution problems, types of pollution, degrees of Pollution, sources of pollution and sustainability principles.
PO5	Apply analytical, experimental, design, construction engineering techniques and project management skills with proficiency aided by modern tools.	**CO2**	**Illustrate** different pollutants for environmental (Air Pollution, water pollution, noise pollution and solid waste management).

2.3. Course Learning Outcomes (CLOs):

Student Competences	Program Learning Outcomes		Course Learning Outcomes	
A3	PLO3	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.	CLO1	Use the national and international regulatory related to environment and pollution
			CLO2	Discuss different Emissions which cause climate change and its Control - Environmental Impact Assessment - Ecological Sanitation.
A4	PLO4	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.	CLO3	Demonstrate nature and sources of air pollution and ways for control and reduction.
B3	PLO13	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.	CLO4	Describe nature and sources of water pollution, Soil pollution, noise pollution, solid waste management and ways for control and reduction.

2.4. Course Topics:

Course Topics	Week	Course LO's Covered			
		CLO1	CLO2	CLO3	CLO4
1.Introduction to Philosophy of environmental controls and introduction to national and international regulatory structures noise pollution	1	√	√		
2.Emissions control and environmental impact assessment	2,3	√	√		
3.Nature and sources of air pollution and air pollution control and reduction	4,5		√	√	
4.water pollution and ecological sanitation	6			√	
5.First Exam	7	√	√	√	
6.water pollution and ecological sanitation	8			√	√
7.noise pollution	9			√	√
8.Soil pollution	10,11			√	√
9.Second Exam	12			√	√
10. Solid wastes management	13,14				√
11. environmental laws and its applications	15	√			√
12. Final Exam	16	√	√	√	√
Total	**16**	**5**	**5**	**4**	**8**

2.5. Lab Topics:

Not applicable.

2.6 Teaching and Learning Methods

Teaching and Learning Methods:	Course LO's Covered			
	CLO1	CLO2	CLO3	CLO4
1. Lecture	√		√	√
2. Tutorials		√	√	√
3. Discussion	√		√	√
4. presentation		√		√
Teaching and Learning Methods for Students with Special Needs:				
Methods				
1. Discussion Session				
2. Extra Lectures				
3. Provide different levels of books and materials				

2.7 Assessment Methods

Assessment Methods:		Course LOs Covered			
		CLO1	CLO2	CLO3	CLO4
Formative Assessment Method					
Tests	**Quizzes**			√	√
	First Exam	√	√	√	
	Second Exam		√	√	√
Report		√	√		√
Assignments				√	√
Summative Assessment Method					
Final Exam		√	√	√	√

2.7.1. Assessment Schedule & Grades Distribution

Assessment Method		Week	The weighting of Assessment %
Formative Assessment Method			
Tests	**First Exam**	7	30%
	Second Exam	12	20%
	Quizzes	4,6,11,12	5 %
Report		3,5,8,10,13	2.5 %
Assignments		Every week	2.5 %
Summative Assessment Method			
Final Exam		16	40 %
Total			100 %

2.8. List of References:

Course Notes:	• Prof. M. Bassuieny, “Pollution and Environment “ (2019)
Essential Books (Textbooks):	• Peavy, Rowe and Tchobangolous " Environmental Engineering" McGraw Hill • Jeremy Colls, “Air Pollution”, second edition, by Spon Press 2002.

2.9. Facilities required for Teaching and Learning

Different Facilities	
Lecture Hall	√
Data Show	√
White Board	√

3. Matrix:

3.1. Program Objectives VS Course Objectives

Program Objectives	Course Objectives	
	CO1	CO2
PO2	√	
PO5		√

3.2. Course Objectives VS Course Learning Outcomes

Course Objectives	Course Learning Outcomes			
	CLO1	CLO2	CLO3	CLO4
CO1	√	√		
CO2			√	√

3.3. Program Learning Outcomes VS Course Learning Outcomes

Program Learning Outcomes	Course Learning Outcomes			
	CLO1	CLO2	CLO3	CLO4
PLO3	√	√		
PLO4			√	
PLO13				√

3.4. Assessment Alignment Matrix

PLO	PO	CLOs	Teaching M.	Assessment
PLO3	PO2	CLO1	Lecture	First and Final Exam
			Discussion	Report
		CLO2	Tutorials	First, Second and Final Exam
			presentation	Report
PLO4	PO5	CLO3	Lecture	Quizzes
				First, Second and Final Exam
			Tutorials	Assignments
			Discussion	Report
PLO3	PO5	CLO4	Lecture	Second and Final Exam
			Tutorials	Quizzes
				Assignments
			Discussion	Report
			presentation	

Course Coordinator: Dr. Osama Abdelaziz Abosiada

Head of Department: Dr. Ahmed Youssef Kamal El-Deen
Date: 2/1/2024

Course Specification

1. Basic Information:

Program Title	Construction Engineering and Management			
Department Offering the course	Construction Engineering and Management			
Date of Specification Approval	**2/1/2024**			
Course Title	Special Topics in Structural Analysis		**Code**	**CMC 411**
Type	**Compulsory** ☐	**Elective** ☒		
Semester	**Fall Semester (Level 4-1)**			
Teaching Hours	**Lec.**	**Tut.**	**Lab.**	**Credit hours**
	2	**2**	**0**	**3**

2. Professional Information:

2.1. Course Description:

Pr.Req. : Structural Analysis- 2 (CMC 102)

Elements of plate bending theory, circular plates, rectangular plates, large deflections of plates. Membrane stresses in shells, bending stresses in shells. Applications to pipes, tanks and pressure vessels.

2.2. Course Objectives (CO):

Program objective		Course objective	
PO2	Behave professionally, adhere to engineering ethics and standards, and work to develop the profession and community and promote sustainability principles.	**CO1**	Analyze different method for structural elements
PO5	Apply analytical, experimental, design, construction engineering techniques and project management skills with proficiency aided by modern tools.	**CO2**	Generate professional behavior, and standards, to develop the failure mechanisms principles.

2.3. Course Learning Outcomes (CLO's):

Student Competences	Program Learning Outcomes		Course Learning Outcomes	
A3	**PLO3**	Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess and evaluate findings, and use	**CLO1**	Reiterate a comprehensive understanding of plate bending theory, including its fundamental elements

		statistical analyses and objective engineering judgment to draw conclusion.		and principles.
			CLO2	Predict membrane stresses in shells, demonstrating proficiency in assessing structural integrity under various loading conditions.
A4	**PLO4**	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.	**CLO4**	Analyze the concepts of circular plates, rectangular plates, and large deflections for complex engineering problems related to plate structures.
B3	**PLO13**	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.	**CLO3**	Apply the acquired knowledge to real-world scenarios, specifically in the analysis of pipes, tanks, and pressure vessels, considering practical applications and industry standards.

2.4. Course Topics:,

Course Topics	**Week**	**Course LO's Covered**			
		CLO1	**CLO2**	**CLO3**	**CLO4**
Elements of plate bending theory	1,2	√			
Circular and rectangular plates	3,4	√			√
large deflections of plates	5,6				√
First exam	7	√			√
Membrane stresses in shells	8,9		√		√
bending stresses in shells	10,11	√	√		√
Second exam	12	√	√		√
Applications to pipes tanks and pressure vessels.	13,14,15			√	
Final exam	16	√	√	√	√
Total		**6**	**4**	**3**	**8**

2.5. Lab Topics:

Not applicable.

2.6 Teaching and Learning Methods

Teaching and Learning Methods:	Course LO's Covered			
	CLO1	CLO2	CLO3	CLO4
1. Lecture	√	√	√	√
2. Tutorials	√	√		√
3. Discussion			√	
4. presentation			√	
Project-based Learning				
Methods				
1. Discussion Session				
2. Extra Lectures				
3. Provide different levels of books and materials				

2.7 Assessment Methods

Assessment Methods:		Course LOs Covered			
		CLO1	CLO2	CLO3	CLO4
Formative Assessment Method					
Tests	**Quizzes**	√	√		√
	First Exam	√			√
	Second Exam	√	√		√
Report				√	
Assignments		√	√		√
Summative Assessment Method					
Final Exam		√	√	√	√

2.7.1. Assessment Schedule & Grades Distribution

Assessment Method		Week	The weighting of Assessment %
Formative Assessment Method			
Tests	First exam	7	30 %
	Second exam	12	20 %
	Quizzes	3,5,11	3%
Report		15	4 %
Assignments		4,6,10	3%
Summative Assessment Method			
Final Exam		16	40 %
Total			100 %

2.8. List of Reference:

Essential Books (Textbooks):	"Roark's Formulas for Stress and Strain" by Warren C. Young and Richard G. Budynas.
Web Sites	https://jackson.engr.tamu.edu/wp-content/uploads/sites/229/2023/03/Roarks-formulas-for-stress-and-strain.pdf

2.9. Facilities required for Teaching and Learning

Different Facilities
Lecture Hall
Data Show
White Board

3. Matrix:

3.1. Program Objectives VS Course Objectives

Program Objectives	Course Objective
	CO1
PO1	√

3.2. Course Objectives VS Course Learning Outcomes

Course Objectives	Course Learning Outcomes			
	CLO1	CLO2	CLO3	CLO4
CO1	√	√	√	√

3.3. Program Learning Outcomes VS Course Learning Outcomes

Student Competences	Program Learning Outcomes	Course Learning Outcomes			
		CLO1	CLO2	CLO3	CLO4
A3	PLO1	√	√		
A4	PLO4				√
B13	PLO13			√	

3.4. Assessment Alignment Matrix

SC	PLO	PO	CLO	Teaching M.	Assessment M.
A3	PLO3	PO1	CLO1	Lecture Tutorials	First, Second and Final Exam Quiz
			CLO2	Lecture Tutorials	Second and Final Exam Quiz Assignments
A4	PLO4		CLO4	Lecture Tutorials	First, Second and Final Exam Quiz Assignments
B3	PLO13		CLO3	Lecture Discussion Presentation	Final Exam Report

Course Coordinator: **Dr. Ibrahim Elazab**

Head of Department: **Dr. Ahmed Youssef Kamal El-Deen**

Date: 2/1/2024

Course Specification

1. Basic Information:

Program Title	Construction Engineering and Management			
Department Offering the course	Construction Engineering and Management			
Date of Specification Approval				
Course Title	Advanced Engineering Materials	**Code**	CMC413	
Type	**Compulsory** ☐	**Elective** ☒		
Semester	Fall Semester (Level4-1)			
Teaching Hours	**Lec.**	**Tut.**	**Lab.**	**Credit hours**
	2	**2**	**-**	**3**

2. Professional Information:

2.1. Course description:

Pr.Req. : Construction Materials and Concrete Technology (CMC 104)

Polymers and Epoxies, types, properties and applications of polymers concrete, Fibers, different types, of fibers reinforced concrete, properties, production and applications. Theory of failure of fiber reinforced concrete, Introduction of composite materials, Lightweight aggregate, natural and artificial aggregate, lightweight concrete, Insulating concrete, structural lightweight concrete, properties of lightweight concrete, design mixes of lightweight concrete, failure theories of lightweight concrete under different stresses, Massing and heavy concrete. Introduction of Egyptian and International Specifications..

2.2. Course Objectives (CO):

Program objective		**Course objective**	
PO2	Behave professionally, adhere to engineering ethics and standards, and work to develop the profession and community and promote sustainability principles.	**CO1**	Derive different theory to solve problems that related to lightweight and heavy concrete
		CO2	Classify different types of polymers and fibers.

2.3. Course Learning Outcomes (CLO's):

Student Competences	**Program Learning Outcomes**		**Course Learning Outcomes**	
A10	**PLO10**	Acquire and apply new knowledge, and practice self, lifelong and other learning strategies.	**CLO1**	Explain a new knowledge of polymers and fibers that used in engineering projects
D1	**PLO15**	Create architectural, urban, and planning designs that	**CLO2**	Apply new knowledge in advanced engineering

		satisfy both aesthetic and technical requirements, using adequate knowledge of history and theory, related fine arts, local culture and heritage, technologies, and human sciences		materials using adequate knowledge and theory, local culture and heritage, technologies.
D2	**PLO16**	Generate ecologically responsible, environmental conservation and rehabilitation designs; through an understanding of structural design, construction, technology, and engineering problems	**CLO3**	Design the mix of lightweight and heavy concrete
			CLO4	Select material that used in concrete to be suitable for environment designs

2.4. Course Topics:

Course Topics	Week	Course LO's Covered			
		CLO1	CLO2	CLO3	CLO4
Introduction to polymers	1	√	√		
Epoxies	2	√			
Fibers, different types of fibers reinforced concrete	3,4	√	√		√
Properties of fiber reinforced concrete in compression, tension, bending	5	√	√		
Shear- Ferro-cement materials, behavior of Ferro-cement under different stresses	6		√		
First exam	7		√		
Theories of composite materials	8,9		√	√	
Lightweight concrete	10,11			√	√
Second exam	12		√	√	
Massing and heavy concrete	13,14		√	√	√
Introduction of Egyptian and International Specifications	15			√	√
Final exam	16		√	√	√
Total	**16**	**5**	**10**	**7**	**7**

2.5. Lab Topics:

Not Applicable

2.6 Teaching and Learning Methods

Teaching and Learning Methods:	Course LO's Covered			
	CLO1	CLO2	CLO3	CLO4
1.Lecture		√	√	
2. Tutorials				√
3- Presentation		√		
4. Case Study	√			√
5.Self - Learning	√		√	
Teaching and Learning Methods for Students with Special Needs:				
Methods				
1. Discussion Session				
2. Extra Lectures				
3. Provide different levels of books and materials				

2.7 Assessment Methods

Assessment Methods:		Course LOs Covered			
		CLO1	CLO2	CLO3	CLO4
Formative Assessment Method					
Tests	First Exam		√		
	Second Exam		√	√	
Presentation		√	√		√
Report		√		√	
Summative Assessment Method					
Final Exam			√	√	√

2.7.1. Assessment Schedule & Grades Distribution

Assessment Method		Week	The weighting of Assessment %
Formative Assessment Method			
Tests	First Exam	7	30 %
	Second Exam	12	20 %
Presentation		3-6	3%
Report		15	7%
Summative Assessment Method			
Final Exam		16	40 %
Total			100 %

2.8. List of Reference:

Course Notes:	Lecture Notes
Essential Books (Textbooks):	Engineering Materials: Properties and Selection by Kenneth G. Budinski, Pearson, 9th Edition, 2017
Periodicals, Web Sites, … etc:	https://onlinelibrary.wiley.com/journal/15272648

2.10. Facilities required for Teaching and Learning

Different Facilities
Lecture Hall
Library Usage
Data Show
White Board

3. Matrix:

3.1. Program Objectives VS Course Objectives

Program Objectives	Course Objective	
	CO1	CO2
PO2	√	√

3.2. Course Objectives VS Course Learning Outcomes

Course Objectives	Course Learning Outcomes			
	CLO1	CLO2	CLO3	CLO4
CO1			√	√
CO2	√	√		

3.3. Program Learning Outcomes VS Course Learning Outcomes

Student Competences	Program Learning Outcomes	Course Learning Outcomes			
		CLO1	CLO2	CLO3	CLO4
A10	PLO10	√			
D1	PLO15		√		
D2	PLO16			√	√

3.4. Assessment Alignment Matrix

SC	PLO	PO	CLO	Teaching M.	Assessment M.
A10	PLO10	PO2	CLO1	• Case Study	• Presentation
				• Self - Learning	• Reports
D1	PLO15		CLO2	• Lecture	• First, Second and Final Exams
				• Presentation	• Presentation
D2	PLO16		CLO3	• Lecture	• Second and Final Exams
				• Self - Learning	• Report
				• Tutorials	• Final Exam
				• Case Study	• Presentation

Course Coordinator: **Dr Ahmad Youssef Kamal El Din Mohamed**

Head of Department: **Dr. Ahmad Youssef Kamal El Din Mohamed**

Date:4/4/2023

Course Specification

1. Basic Information:

Program Title	Construction Engineering and Management			
Department Offering the course	Construction Engineering and Management			
Date of Specification Approval	**2/1/2024**			
Course Title	Finishing Materials Technology	**Code**	CMA415	
Type	**Compulsory** ☐	**Elective** ☒		
Semester	Fall Semester (Level 4-1)			
Teaching Hours	**Lec.**	**Tut.**	**Lab.**	**Credit hours**
	2	**2**	**0**	**3**

2. Professional Information:

2.1. Course Description:

Pr.Req. : …….

Focus will be placed on various building materials and construction techniques based on performing standards and codes, with each material's application explored in detail. To teach students about different types of floors and flooring materials, as well as partitions and panels, different surface finishes, and different routes of vertical transportation. To provide students with knowledge of the most recent advancements in building construction methods and their applications.

2.2. Course Objectives (CO):

Program objective		Course objective	
PO1	Apply a wide spectrum of engineering knowledge, science, and specialized skills with analytic, critical, and systemic thinking to identify and solve engineering problems in real- life situations.	**CO1**	Formulate students' ability to make engineering decisions .
PO4	Master self-learning and life-long learning strategies to communicate effectively in academic/professional fields.	**CO2**	Classify techniques and modern engineering tools of construction and finishing material.

2.3. Course Learning Outcomes (CLO's):

Student Competences	Program Learning Outcomes		Course Learning Outcomes	
A10	PLO10	Acquire and apply new knowledge, and practice self, lifelong and other learning strategies.	CLO1	Identify all necessary construction, technology and architectural drawings that meet technical requirements.
			CLO2	Acquire construction techniques based on performing standards and codes
D1	PLO15	Create architectural, urban, and planning designs that satisfy both aesthetic and technical requirements, using adequate knowledge of history and theory, related fine arts, local culture and heritage, technologies, and human sciences	CLO3	Discuss the capability of: architecture design.
			CLO4	Perform the knowledge of: finishing material using and its properties .
D2	PLO16	Generate ecologically responsible, environmental conservation and rehabilitation designs; through an understanding of structural design, construction, technology, and engineering problems	CLO5	Identify principles of environmental construction
			CLO6	Illustrate an understanding of structural design, construction, technology

2.4. Course Topics:

Course Topics	Week	Course LO's Covered					
		CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
Construction materials, construction systems and their development	1,2	√	√				
Modern advanced finishes for pattern	3,4	√	√				
Modern advanced finishes for ceilings	5,6			√	√		
First Exam	**7**	√	√	√	√		
Modern advanced wall	7,8			√	√		

finishes							
pattern details	9					√	√
wall details	10					√	√
Ceiling details	11					√	√
Second Exam	**12**					√	√
Shop drawing	13-15					√	√
Final exam	**16**				√	√	√
Total	**16**	**4**	**4**	**4**	**4**	**4**	**4**

2.5 Lab Topics

Not Applicable

2.6 Teaching and Learning Methods

Teaching and Learning Methods:	**Course LO's Covered**					
	CLO1	**CLO2**	**CLO3**	**CLO4**	**CLO5**	**CLO6**
1.Lecture			√	√	√	√
2. Tutorials			√	√	√	√
3. Discussion	√	√				
Teaching and Learning Methods for Students with Special Needs:						
Methods						
1. Discussion Session						
2. Extra Lectures						
3. Provide different levels of books and materials						

2.7 Assessment Methods

Assessment Methods:		**Course LOs Covered**					
		CLO1	**CLO2**	**CLO3**	**CLO4**	**CLO5**	**CLO6**
Formative Assessment Method							
Tests	First Exam	√	√	√	√		
	Second Exam					√	√
Discussion		√	√	√	√		√
Summative Assessment Method							
Final Exam					√	√	√

2.7.1. Assessment Schedule & Grades Distribution

Assessment Method		Week	The weighting of Assessment %
Formative Assessment Method			
Tests	First Exam	7	30
	Second Exam	12	20
Discussion		2-3	10
Summative Assessment Method			
Final exam		16	40
Total			100

2.8. List of Reference:

Essential Books (Textbooks):	• Dean, Y, (2016), Materials Technology, 2nd Edition, Routledge, ISBN: 9781315504278 • Fernandez, J., (2005), Material Architecture: emergent materials for innovative buildings and ecological construction, 1st Edition, Architectural Press, ISBN-13: 978-0750664974
Periodicals, Web Sites, … etc:	

2.9. Facilities required for Teaching and Learning

Different Facilities
Lecture Hall
Library Usage
Data Show
White Board

3. Matrix:

3.1. Program Objectives VS Course Objectives

Program Objectives	Course Objective	
	CO1	CO2
PO1	√	
PO4		√

3.2. Course Objectives VS Course Learning Outcomes

Course Objectives	Course Learning Outcomes					
	CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
CO1	√	√	√			
CO2				√	√	√

3.3. Program Learning Outcomes VS Course Learning Outcomes

Student Competences	Program Learning Outcomes	Course Learning Outcomes					
		CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
A10	PLO10	√	√				
D1	PLO15			√	√		
D2	PLO16					√	√

3.4. Assessment Alignment Matrix

SC	PLO	PO	CLO	Teaching M.	Assessment M.
A10	PLO10	PO1	CLO1	• Discussion	• First Exam • Discussion
			CLO2	• Discussion	• First Exam • Discussion
D1	PLO15		CLO3	• Lecture • Tutorials	• First Exam • Discussion
			CLO4	• Lecture • Tutorials	• First and Final Exam • Discussion
D2	PLO16	PO4	CLO5	• Lecture • Tutorials	• Second and Final Exam
			CLO6	• Lecture • Tutorials	• Second and Final Exam • Discussion

Course Coordinator: Dr. Ahmed Elsaadany

Head of Department: Dr. Ahmed Youssef Kamal El-Deen

Date: 2/1/2024

Course Specification

1. Basic Information:

Program Title	Construction Engineering and Management			
Department Offering the course	Construction Engineering and Management			
Date of Specification Approval	**2/1/2024**			
Course Title	Principles and Approaches of Smart Cities	**Code**	CMA417	
Type	**Compulsory** ☐	**Elective** ☒		
Semester	Fall Semester (Level 4-1)			
Teaching Hours	**Lec.**	**Tut.**	**Lab.**	**Credit hours**
	2	**2**	**0**	**3**

2. Professional Information:

2.1. Course Description:

Pr.Req. : Building Construction (CMA110)

The course will introduce the concept, and technologies of smart cities in (e.g., transportation, buildings), and the concept of smart cities. Students will not only master the core technologies for building and implementing solutions for a smart and sustainable city during the course, but they will also gain an understanding of the problems that these solutions face. Students are urged to use critical thinking skills to accept technological solutions that will help cities become smarter and sustainable.

2.2. Course Objectives (CO):

Program objective		Course objective	
PO2	Behave professionally, adhere to engineering ethics and standards, and work to develop the profession and community and promote sustainability principles.	**CO1**	Realize and understand the different elements that compose sustainable (Green)/ Smart buildings.
		CO2	Determine the different construction techniques matching with environment.

2.3. Course Learning Outcomes (CLO's):

Student Competences	Program Learning Outcomes		Course Learning Outcomes	
A10	PLO10	Acquire and apply new knowledge, and practice self, lifelong and other learning strategies.	CLO1	Identify the environmental design principles
D1	PLO15	Create architectural, urban, and planning designs that satisfy both aesthetic and technical requirements, using adequate knowledge of history and theory, related fine arts, local culture and heritage, technologies, and human sciences	CLO2	Discuss the basics of smart buildings
			CLO3	Define the factors affecting smart buildings developments
			CLO4	Outline the various strategies for smart buildings in advanced countries
D2	PLO16	Generate ecologically responsible, environmental conservation and rehabilitation designs; through an understanding of structural design, construction, technology, and engineering problems	CLO5	Analyze the factors affecting smart building requirements.
			CLO6	Assess the impact of smart systems on behaviors and performance.

2.4. Course Topics:

Course Topics	Week	Course LO's Covered					
		CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
Introduction to course content	1	√	√				
International & regional experience of sustainable & smart buildings	2		√	√			
Importance of smart buildings in 21st Century	3		√	√			
International cases of sustainable & smart buildings.	4	√	√	√			
Green and smart cities:	5	√	√		√		
Elements & components of smart buildings	6		√				
First Exam	7		√	√	√		
Low-tech smart system vs. High-tech smart systems .	8,9		√		√	√	√
Smart system: HTS Smart Envelop and Smart Glass	10			√	√	√	√
Smart System: Solar Water Heating (SWH)	11			√		√	√

Second Exam	12		√	√		√	
Understanding Energy consumption & Occupancy Patterns of a multi-purpose academic building	13,14	√			√	√	√
Selected cases studies: Smart & Sustainable buildings	15						√
Final exam	16		√	√		√	
Total	16	**5**	**8**	**5**	**5**	**6**	**7**

2.5 Lab Topics

Not Applicable

2.6 Teaching and Learning Methods

Teaching and Learning Methods:	**Course LO's Covered**					
	CLO1	**CLO2**	**CLO3**	**CLO4**	**CLO5**	**CLO6**
1.Lecture		√	√			√
2. Tutorials				√	√	
3- Presentation		√				√
4. Case Study	√			√	√	√
5.Self - Learning	√		√			
Teaching and Learning Methods for Students with Special Needs:						
Methods						
1. Discussion Session						
2. Extra Lectures						
3. Provide different levels of books and materials						

2.7 Assessment Methods

Assessment Methods:		**Course LOs Covered**					
		CLO1	**CLO2**	**CLO3**	**CLO4**	**CLO5**	**CLO6**
Formative Assessment Method							
Tests	First Exam		√	√	√		
	Second Exam		√	√		√	
Report		√		√			√
Presentation		√	√		√	√	√
Summative Assessment Method							
Final Exam		√	√	√		√	

2.7.1. Assessment Schedule & Grades Distribution

Assessment Method		**Week**	**The weighting of Assessment %**
Formative Assessment Method			
Tests	First Exam	7	30
	Second Exam	12	20
Report		15	5
Presentation		15	5
Summative Assessment Method			
Final exam		16	40

Total	100

2.8. List of Reference:

Essential Books (Textbooks):	• Dean, Y, (2016), Materials Technology, 2nd Edition, Routledge, ISBN: 9781315504278 • Fernandez, J., (2005), Material Architecture: emergent materials for innovative buildings and ecological construction, 1st Edition, Architectural Press, ISBN-13: 978-0750664974
	Sinopoli, J., Advanced Technology for Smart Buildings, Artech House, 2017
	Governing Smart Cities:Policy Benchmarks for Ethical and Responsible Smart City-Development- JULY 2021
Periodicals, Web Sites, … etc:	**https://education.nationalgeographic.org/resource/smart-cities/**

2.9. Facilities required for Teaching and Learning

Different Facilities
Lecture Hall
Library Usage
Data Show
White Board

3. Matrix:

3.1. Program Objectives VS Course Objectives

Program Objectives	**Course Objective**	
	CO1	CO2
PO2	√	√

3.2. Course Objectives VS Course Learning Outcomes

Course Objectives	**Course Learning Outcomes**					
	CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
CO1	√	√	√			
CO2				√	√	√

3.3. Program Learning Outcomes VS Course Learning Outcomes

Student Competences	**Program Learning Outcomes**	**Course Learning Outcomes**					
		CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
A10	PLO10	√					
D1	PLO15		√	√	√		
D2	PLO16					√	√

3.4. Assessment Alignment Matrix

SC	PLO	PO	CLO	Teaching M.	Assessment M.
A10	PLO10	PO2	CLO1	• Case Study	• Presentation
				• Self - Learning	• Reports
D1	PLO15		CLO2	• Lecture	• First, Second and Final Exam
				• Presentation	• Presentation
			CLO3	• Lecture	• First, Second and Final Exam
				• Self - Learning	• Report
			CLO4	• Tutorials	• First Exam
				• Case Study	• Presentation
D2	PLO16	PO2	CLO5	• Tutorials	• Second and Final Exam
				• Case Study	• Presentation
			CLO6	• Lecture	• Report • Presentation
				• Presentation	
				• Case Study	

Course Coordinator: **Dr. Mona Yehia Shedid**

Head of Department: **Dr. Ahmed Youssef Kamal El-Deen**

Date: 2/1/2024

Course Specification

1. Basic Information:

Program Title	Construction Engineering and Management			
Department Offering the course	Construction Engineering and Management			
Date of Specification Approval	**2/1/2024**			
Course Title	Modeling and Simulation of Construction Systems		**Code**	CMC 419
Type	**Compulsory** ☐		**Elective** ☒	
Semester	Fall Semester (Level 4-1)			
Teaching Hours	**Lec.**	**Tut.**	**Lab.**	**Credit hours**
	2	**--**	**2**	**3**

2. Professional Information:

2.1. Course Description:

Pr.Req. : Project Planning, Scheduling, and Control (CMC 306)

Building Information Modeling, Computer modeling of construction processes, 4-D Simulation of construction operations, Productivity modeling, measuring, and forecasting, Sequencing and coordination of construction systems, Post-Optimality Analysis of Integer and Linear Programming Models in construction, discrete event simulation of construction processes

2.2. Course Objectives (CO):

Program objective		Course objective	
PO2	Behave professionally, adhere to engineering ethics and standards, and work to develop the profession and community and promote sustainability principles.	**CO1**	Enable students to Apply analytic critical and systemic thinking to identify, diagnose and solve engineering problems with a wide range of complexity and variation.
PO3	Work in and lead a heterogeneous team and display leadership qualities, business administration, and entrepreneurial skills.	**CO2**	Use techniques, skills, and modern engineering tools necessary for construction project.

2.3. Course Learning Outcomes (CLO's):

Student Competences	Program Learning Outcomes		Course Learning Outcomes	
A7	**PLO7**	Function efficiently as an individual and as a member of multi-disciplinary and multi-cultural teams	**CLO1**	Use different computer modeling of construction processes software efficiently as a member in a working group in engineering projects.
A9	**PLO9**	Use creative, innovative and flexible thinking and acquire entrepreneurial and leadership skills to anticipate and respond to new situations.	**CLO2**	Use creative, innovative, flexible thinking and post-optimality analysis of integer and linear programming models in construction
A10	**PLO10**	Acquire and apply new knowledge, and practice self, lifelong and other learning strategies.	**CLO3**	apply new knowledge of Building Information Modeling in the field of construction management
B1	**PLO11**	Select appropriate and sustainable technologies for the 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	**CLO4**	Explain the networks of Project Planning and its techniques and how to deal with the all project sides
D2	**PLO16**	Generate ecologically responsible, environmental conservation and rehabilitation designs; through an understanding of structural design,	**CLO5**	Use suitable software Building Information Modeling

		construction, technology, and engineering problems		

2.4. Course Topics:

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2.5. Lab Topics:

Lab Topics	Week	Course LO's Covered				
		CLO1	CLO2	CLO3	CLO4	CLO5
Concepts of BIM	1,2	√				
Techniques of BIM	3,4	√	√		√	√
Computer applications in BIM and software package on management	5,6				√	√
First Experimental Test	7				√	√
Sequencing and coordination of construction systems	8,9			√		√
4-D Simulation of construction operations& Productivity modeling	10,11			√	√	
Second Experimental Test	12				√	√
Post-Optimality Analysis of Integer and Linear Programming Models	13,14	√	√	√	√	
Applications in BIM	15			√	√	√
Practical exam	16				√	√
Total	**16**	**6**	**4**	**7**	**9**	**7**

2.6 Teaching and Learning Methods

Teaching and Learning Methods:	Course LO's Covered				
	CLO1	CLO2	CLO3	CLO4	CLO5
Lecture				√	√
Computer-based Instruction				√	√
Inter active learning	√	√	√		
Project-based Learning	√	√			
Self-Learning			√	√	
Teaching and Learning Methods for Students with Special Needs:					
Methods					
1. Discussion Session					
2. Extra Lectures					
3. Provide different levels of books and materials					

2.7 Assessment Methods

Assessment Methods:		Course LOs Covered				
		CLO1	CLO2	CLO3	CLO4	CLO5
Formative Assessment Method						
Test	**First Experimental Exam**				√	√
	Second Experimental Exam				√	√
Mini Project		√	√	√		
Report				√	√	
Observation		√	√			
Summative Assessment Method						
Practical Exam					√	√

2.7.1. Assessment Schedule & Grades Distribution

Assessment Method		Week	Weighting of Asses.
Formative Assessment Method			
Test	**First Experimental Exam**	7	30
	Second Experimental Exam	12	20
Mini Project		14	4
Report		15	4
Observation		2-4,13	2
Summative Assessment Method			
Practical Exam		**16**	**40**
Total			**100**

2.8. List of Reference:

Course Notes:	Lecture Notes
Essential Books (Textbooks):	Modeling and Simulation of Systems Using MATLAB and Simulink- 2017-ISBN 9781315218335
Website	https://doi.org/10.1201/9781315218335 https://www.cambridgescholars.com/resources/pdfs/978-1-5275-5005-6-sample.pdf

2.9. Facilities required for Teaching and Learning

Different Facilities
Laboratory Usage
Data Show
White Board

3. Matrix:

3.1. Program Objectives VS Course Objectives

Program Objectives	Course Objective	
	CO1	CO2
PO2	√	
PO3		√

3.2. Course Objectives VS Course Learning Outcomes

Course Objectives	Course Learning Outcomes				
	CLO1	CLO2	CLO3	CLO4	CLO5
CO1	√	√	√		
CO2				√	√

3.3. Program Learning Outcomes VS Course Learning Outcomes

Student Competences	Program Learning Outcomes	Course Learning Outcomes				
		CLO1	CLO2	CLO3	CLO4	CLO5
A7	PLO7	√				
A9	PLO9		√			
A10	PLO10			√		
B1	PLO11				√	
D2	PLO16					√

3.4. Assessment Alignment Matrix

SC	PLO	PO	CLO	Teaching M.	Assessment M.
A7	**PLO7**	**PO2**	**CLO1**	Inter active learning Project-based Learning	Observation Mini Project
A9	**PLO9**		**CLO2**	Inter active learning Project-based Learning	Observation Mini Project
A10	**PLO10**		**CLO3**	Inter active learning Self-Learning	Mini Project Report
B1	**PLO11**	**PO3**	**CLO4**	Lecture Computer-based Instruction Self-Learning	First, Second Experimental and Practical Exam Report
D2	**PLO16**		**CLO5**	Lecture Computer-based Instruction	First, Second Experimental and Practical Exam

Course Coordinator: **Dr. Omia El-Hadidi**

Head of Department: **Dr. Ahmed Youssef Kamal El-Deen**

Date: 2/1/2024

Course Specification

1. Basic Information:

Program Title	Construction Engineering and Management			
Department Offering the course	Construction Engineering and Management			
Date of Specification Approval	**2/1/2024**			
Course Title	Geographic Information System GIS		**Code**	**CMC 421**
Type	**Compulsory** ☐	**Elective** ☒		
Semester	**Fall Semester (Level 4-1)**			
Teaching Hours	**Lec.**	**Tut.**	**Lab.**	**Credit hours**
	2	**0**	**2**	**3**

2. Professional Information:

2.1. Course Description:

Pr.Req. : Surveying for Engineers-2 (CMC 108)

Fundamentals of GIS -type, source, and format of data. GIS components, Data models, vector data models, Raster Data models, Data, and file structure. - Spatial Data Modeling- GIS Data Management- Data Input and Editing- Data Quality Issues- Data Analysis and Modeling- Creation of Information System: A Case Study

2.2. Course Objectives (CO):

Program objective		Course objective	
PO2	Behave professionally, adhere to engineering ethics and standards, and work to develop the profession and community and promote sustainability principles.	**CO1**	Analyze, and present geospatial data while emphasizing the value of visual communication.
PO3	Work in and lead a heterogeneous team and display leadership qualities, business administration, and entrepreneurial skills.	**CO2**	Formulate the basic geospatial concepts using standard GIS technology working in a heterogeneous team.

2.3. Course Learning Outcomes (CLO's):

Student Competences	Program Learning Outcomes		Course Learning Outcomes	
A7	**PLO7**	Function efficiently as an individual and as a member of multi-disciplinary and multi-cultural teams	**CLO1**	Use GIS program efficiently as a member in a working group in engineering projects.

A9	**PLO9**	Use creative, innovative and flexible thinking and acquire entrepreneurial and leadership skills to anticipate and respond to new situations.	**CLO2**	Create and access data in the GIS's system using an appropriate software package
A10	**PLO10**	Acquire and apply new knowledge, and practice self, lifelong and other learning strategies.	**CLO3**	Acquire GIS's system information from databases, existing maps, and the Internet
B1	**PLO11**	Select appropriate and sustainable technologies for the 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	**CLO4**	Explain basic concepts of using GIS in mapping the earth in spatial terms and populating the GIS's system to access data
D2	**PLO16**	Generate ecologically responsible, environmental conservation and rehabilitation designs; through an understanding of structural design, construction, technology, and engineering problems	**CLO5**	Classify the geographic information among several coordinate systems

2.4. Course Topics:,

LT

2.5. Lab Topics:

Lab Topics	**Week**	**Course LO's Covered**				
		CLO1	**CLO2**	**CLO3**	**CLO4**	**CLO5**
Fundamentals of GIS -type, source, and format of data	1				√	
GIS components	2,3				√	

Data models, vector data models, Raster Data models	4				√	
Data, and file structure	5				√	
Spatial Data Modeling	6			√		
First Experimental exam	7				√	
GIS Data Management	8,9		√		√	√
Data Input and Editing	10,11		√		√	√
Second Experimental exam	12				√	√
Data Analysis and Modeling	13	√		√		√
Creation of Information System: A Case Study	14,15	√		√		√
Practical exam	16				√	√
Total		**3**	**4**	**4**	**9**	**7**

2.6 Teaching and Learning Methods

Teaching and Learning Methods:	**Course LO's Covered**				
	CLO1	**CLO2**	**CLO3**	**CLO4**	**CLO5**
Lecture				√	√
Computer-based Instruction				√	√
Inter active learning	√	√	√		
Project-based Learning	√	√			
Self-Learning			√	√	
Teaching and Learning Methods for Students with Special Needs:					
Methods					
1. Discussion Session					
2. Extra Lectures					
3. Provide different levels of books and materials					

2.7 Assessment Methods

Assessment Methods:		**Course LOs Covered**				
		CLO1	**CLO2**	**CLO3**	**CLO4**	**CLO5**
Formative Assessment Method						
Test	**First Experimental Exam**				√	
	Second Experimental Exam				√	√
Mini Project		√	√	√		
Report				√	√	
Observation		√	√			
Summative Assessment Method						
Practical Exam					√	√

2.7.1. Assessment Schedule & Grades Distribution

Assessment Method		Week	Weighting of Asses.
Formative Assessment Method			
Test	**First Experimental Exam**	7	30
	Second Experimental Exam	12	20
Mini Project		14	4
Report		15	4
Observation		8,9,10,13	2
Summative Assessment Method			
Practical Exam		**16**	**40**
Total			**100**

2.8. List of Reference:

Essential Books	An Introduction to Geographical Information Systems, by Ian Heywood, Sarah Cornelius, Steve Carver, Prentice Hall 2006, ISBN: 0-13-129317-6, 978-0-13-129317-5, 9781405898447 ELEMENTS OF GEOGRAPHIC INFORMATION SYSTEM-Brad Maguire-Andrew Miller-2008 Principle of Geographical Information Systems-Otto Husiman-2009- ISBN:978-90-6164-5 Switching to ArcGIS Pro from ArcMap Second Edition-ISBN 10 1589487311-**2022**
Web Sites	https://education.nationalgeographic.org/resource/geographic-information-system-gis/

2.9. Facilities required for Teaching and Learning

Different Facilities
Lecture Hall
Data Show
White Board
Laboratory

3. Matrix:

3.1. Program Objectives VS Course Objectives

Program Objectives	Course Objective	
	CO1	**CO2**
PO2	√	
PO3		√

3.2. Course Objectives VS Course Learning Outcomes

Course Objectives	Course Learning Outcomes				
	CLO1	CLO2	CLO3	CLO4	CLO5
CO1	√	√		√	
CO2			√		√

3.3. Program Learning Outcomes VS Course Learning Outcomes

Student Competences	Program Learning Outcomes	Course Learning Outcomes				
		CLO1	CLO2	CLO3	CLO4	CLO5
A7	PLO7	√				
A9	PLO9		√			
A10	PLO10			√		
B1	PLO11				√	
D2	PLO16					√

3.4. Assessment Alignment Matrix

SC	PLO	PO	CLO	Teaching M.	Assessment M.
A7	**PLO7**	**PO2**	**CLO1**	Inter active learning Project-based Learning	Mini Project
A9	**PLO9**		**CLO2**	Inter active learning Project-based Learning	Mini Project
A10	**PLO10**		**CLO3**	Inter active learning Self-Learning	Mini Project Report
B1	**PLO11**	**PO3**	**CLO4**	Lecture Computer-based Instruction Self-Learning	First, Second Experimental and Practical Exam Report
D2	**PLO16**		**CLO5**	Lecture Computer-based Instruction	Second Experimental Exam Practical Exam

Course Coordinator: Dr.Rasha Mohey A-Deen

Head of Department: Dr. Ahmed Youssef Kamal El-Deen

Date: 2/1/2024

Course Specification

1. Basic Information:

Program Title	Construction Engineering and Management			
Department Offering the course	Construction Engineering and Management			
Date of Specification Approval	**2/1/2024**			
Course Title	Modeling of structures		**Code**	**CMC 423**
Type	**Compulsory** ☐	**Elective** ☒		
Semester	**Fall Semester (Level 4-1)**			
Teaching Hours	**Lec.**	**Tut.**	**Lab.**	**Credit hours**
	2	**0**	**2**	**3**

2. Professional Information:

2.1. Course Description:

General derivation of finite element equilibrium equations - General coordinate models for specific problem (one dimensional element - Plane stress/strain elements) - Lumping of structural properties and loads - Calculation of stresses and assessment of error - formulation of bar Element - Formulation of isoperimetric continuous elements: quadrilateral and triangular elements - Formulation of structural elements: beams -axisymmetric and plate bending elements - Numerical integration: Gauss formula (one dimension integration) - Integration in two dimensions- Computer Applications using ANSYS Engineering Simulation Software.

2.2. Course Objectives (CO):

Program objective		Course objective	
PO2	Behave professionally, adhere to engineering ethics and standards, and work to develop the profession and community and promote sustainability principles.	**CO1**	**Generate the** finite element analysis techniques for comprehensive structural understanding and practical application.
PO3	Work in and lead a heterogeneous team and display leadership qualities, business administration, and entrepreneurial skills.	**CO2**	Use techniques, skills, and modern engineering tools necessary for modeling of structures

2.3. Course Learning Outcomes (CLO's):

Student Competences	Program Learning Outcomes		Course Learning Outcomes	
A7	**PLO7**	Function efficiently as an individual and as a member of multi-disciplinary and multi-cultural teams	**CLO1**	Use different computer modeling of Simulation Software efficiently as a member in a working group in engineering projects.
A9	**PLO9**	Use creative, innovative and flexible thinking and acquire entrepreneurial and leadership skills to anticipate and respond to new situations.	**CLO2**	Formulate mathematical representations of complex problems in the context of finite element equilibrium equations with creative, innovative, flexible thinking
A10	**PLO10**	Acquire and apply new knowledge, and practice self, lifelong and other learning strategies.	**CLO3**	Use mathematical methods and basic science principles to analyze the behavior of structural elements
B1	**PLO11**	Select appropriate and sustainable technologies for the 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	**CLO4**	Analyze the concepts of circular plates, rectangular plates, and large deflections for complex engineering problems related to plate structures.
D2	**PLO16**	Generate ecologically responsible, environmental conservation and rehabilitation designs; through an understanding of structural design, construction, technology, and engineering problems	**CLO5**	Use ANSYS Engineering Simulation Software for practical computer-based applications in structural analysis.

2.4. Course Topics:,

LT

2.5. Lab Topics:

Lab Topics	Week	Course LO's Covered				
		CLO1	CLO2	CLO3	CLO4	CLO5
Finite Element Equilibrium Equations	1				√	
General Coordinate Models	2,3				√	
Lump Structural Properties and Loads for analytical purposes.	4		√		√	
Stresses and Assess Error of structures.	5			√	√	
Bar Elements Formulation	6				√	
First Experimental exam	7				√	
Develop Isoperimetric Continuous Elements	8,9		√	√		√
Structural Elements Formulation	10,11		√		√	√
Second Experimental exam	12				√	√
Numerical Integration Techniques	13	√			√	√
Utilizing ANSYS for Computer Applications:	14,15	√				√
Practical exam	16				√	√
Total		**3**	**5**	**3**	**9**	**7**

2.6 Teaching and Learning Methods

Teaching and Learning Methods:	Course LO's Covered				
	CLO1	CLO2	CLO3	CLO4	CLO5
Lecture				√	√
Computer-based Instruction				√	√
Inter active learning	√	√	√		
Project-based Learning	√	√			
Self-Learning			√	√	
Teaching and Learning Methods for Students with Special Needs:					
Methods					
1. Discussion Session					
2. Extra Lectures					
3. Provide different levels of books and materials					

2.7 Assessment Methods

Assessment Methods:		Course LOs Covered				
		CLO1	CLO2	CLO3	CLO4	CLO5
Formative Assessment Method						
Test	**First Experimental Exam**				√	
	Second Experimental Exam				√	√
Mini Project		√	√	√		
Report				√	√	
Observation		√	√			
Summative Assessment Method						
Practical Exam					√	√

2.7.1. Assessment Schedule & Grades Distribution

Assessment Method		Week	Weighting of Asses.
Formative Assessment Method			
Test	**First Experimental Exam**	7	30
	Second Experimental Exam	12	20
Mini Project		14	**10**
Summative Assessment Method			
Practical Exam		**16**	**40**
Total			**100**

2.8. List of Reference:

Essential Books (Textbooks):	G. Ramamurty, " Applied Finite Element Analysis", New Delhi: 2nd Edition, I.K. Inc, 2010, ISBN-13: 978-9380578453 George R. Buchanan ," Schaum's Outline of Finite Element Analysis", 2nd Edition, United State of America, McGraw Hill Inc., 2015 Saeed Moaveni, "Finite Element Analysis: Theory and Application with ANSYS", 4th Edition, Pearson Global Edition, 2015, ISBN 13: 978-0-273-77430-3.
Web Sites	http://ftp.demec.ufpr.br/disciplinas/TM738/Livros/Finite%20Element%20Analysis,%20Theory%20and%20application%20with%20ANSYS,%20.pdf

2.9. Facilities required for Teaching and Learning

Different Facilities
Lecture Hall
Data Show
White Board
Laboratory

3. Matrix:

3.1. Program Objectives VS Course Objectives

Program Objectives	Course Objective	
	CO1	CO2
PO2	√	
PO3		√

3.2. Course Objectives VS Course Learning Outcomes

Course Objectives	Course Learning Outcomes				
	CLO1	CLO2	CLO3	CLO4	CLO5
CO1	√	√		√	
CO2			√		√

3.3. Program Learning Outcomes VS Course Learning Outcomes

Student Competences	Program Learning Outcomes	Course Learning Outcomes				
		CLO1	CLO2	CLO3	CLO4	CLO5
A7	PLO7	√				
A9	PLO9		√			
A10	PLO10			√		
B1	PLO11				√	
D2	PLO16					√

3.4. Assessment Alignment Matrix

SC	PLO	PO	CLO	Teaching M.	Assessment M.
A7	**PLO7**	**PO2**	**CLO1**	Inter active learning Project-based Learning	Observation Mini Project
A9	**PLO9**		**CLO2**	Inter active learning Project-based Learning	Observation Mini Project
A10	**PLO10**		**CLO3**	Inter active learning Self-Learning	Mini Project Report
B1	**PLO11**	**PO3**	**CLO4**	Lecture Computer-based Instruction Self-Learning	First, Second Experimental and Practical Exam Report
D2	**PLO16**		**CLO5**	Lecture Computer-based Instruction	Second Experimental and Practical Exam

Course Coordinator: **Ibrahim Elazab**

Head of Department: **Dr. Ahmed Youssef Kamal El-Deen**
Date: 2/1/2024

Level 4

Elective

Humanities

Course Specification

1. Basic Information:

Program Title	Construction Engineering and Management			
Department Offering the course	Construction Engineering and Management			
Date of Specification Approval				
Course Title	Research Methodologies		**Code**	UHS801
Type	**Compulsory** ☐		**Elective** ☒	
Semester	Fall Semester (Level 4-1)			
Teaching Hours	**Lec.**	**Tut.**	**Lab.**	**Credit hours**
	2	-	-	2

2. Professional Information:

2.1. Course description:

Pr.Req. : ……..

Scientific thinking and its specifications, definition of scientific research and its specifications, steps of scientific research and designing research tools and sample selection (choosing a research subject, defining the research problem and the principles of choice, setting the research frame and methodology and data analysis). Types of scientific studies: Descriptive, survey and experimental studies. Scientific research methods: Descriptive method, social screening, content study, content analysis, types of experimental designs, descriptive methods, analytical methods.

2.2. Course Objectives (CO):

The students will be able to:

Program objective		Course objective	
PO4	Master self-learning and life-long learning strategies to communicate effectively in academic/professional fields.	**CLO1**	Evaluate the Clarification of expressions and ideas, Production of pieces of reasoning appropriate to given task
PO5	Apply analytical, experimental, design, construction engineering techniques and project management skills with proficiency aided by modern tools.	**CLO2**	Evaluate the Identification of reasons and explanations, Ethical concepts,

2.3. Course Learning Outcomes (CLO's):

Student Competences	Program Learning Outcomes		Course Learning Outcomes	
A5	PLO5	Practice research techniques and methods of investigation as an inherent part of learning.	CLO1	Explain the Clarification of expressions and ideas, Production of pieces of reasoning appropriate to given task
			CLO2	Identify the reasons and explanations, Ethical concepts
A10	PLO10	Acquire and apply new knowledge; and practice self, lifelong and other learning strategies.	CLO3	Discuss the ethical dimension in the process of formulating and implementing engineering policies and strategies.
			CLO4	Describe the major quantitative and qualitative research methods in mass communication research.

2.4. Course Topics:

Course Topics	Week	Course LO's Covered			
		CLO1	CLO2	CLO3	CLO4
Scientific thinking and its specifications.	1	√			
Definition of scientific research and its specifications,	2	√			
Steps of scientific research	3	√			√
Designing research tools and sample selection .	4	√			√
Types of scientific studies	5				√
Descriptive, survey and experimental studies. Scientific research methods.	6				√
First Exam	7				√
Descriptive method	8			√	√
Social screening	9			√	√
Content study	10			√	√
Content analysis	11			√	
Second Exam	12			√	√
Types of experimental designs	13		√		
descriptive methods	14		√		
analytical methods.	15		√		

Final Exam	16			√	√
Total	**16**	**4**	**3**	**4**	**7**

2.5. Lab Topics:

(Not Applicable**)**

2.6 Teaching and Learning Methods

Teaching and Learning Methods:	**Course LO's Covered**			
	CLO1	**CLO2**	**CLO3**	**CLO4**
Self-Learning	√	√		
Hybrid Learning			√	√
Report	√	√		
Brain Storming			√	√
Presentations	√	√		
Teaching and Learning Methods for Students with Special Needs:				
Methods				
1. Discussion Session				
2. Extra Lectures				
3. Provide different levels of books and materials				

2.7 Assessment Methods

Assessment Methods:		**Course LOs Covered**			
		CLO1	**CLO2**	**CLO3**	**CLO4**
Formative Assessment Method					
1. Tests	First Exam				√
	Second Exam			√	√
2. Report		√	√		
3. Observation				√	√
4. Presentations		√	√		
Summative Assessment Method					
Final Exam				√	√

2.7.1. Assessment Schedule & Grades Distribution

Assessment Method		**Week**	**The weighting of Assessment %**
Formative Assessment Method			
Tests	First Exam	7	30 %
	Second Exam	12	20 %
Report		15	6%
Observation		8-11	4%
Summative Assessment Method			
Final Exam		16	40 %
Total			100 %

2.8. List of References:

Essential Books (Textbooks):	C.R. Kothari, "Research Methodology: Methods and Techniques", New Age, 2nd Edition, 2004, ISBN (13) : 978-81-224-2488-1
Recommended Books:	Ann Sloan Devlin, "The Research Experience: Planning, Conducting and Reporting Research", SAGE, 2nd Edition, 2020
Periodicals, Web Sites, … etc:	https://www.scribbr.com/category/methodology/

2.9. Facilities required for Teaching and Learning

Different Facilities
Lecture Hall
Data show
White board

3. Matrix:

3.1. Program Objectives VS Course Objectives

Program Objectives	Course Objective	
	CO1	CO2
PO4	√	
PO5		√

3.2. Course Objectives VS Course Learning Outcomes

Course Objectives	Course Learning Outcomes			
	CLO1	CLO2	CLO3	CLO4
CO1			√	√
CO2	√	√		

3.3. Program Learning Outcomes VS Course Learning Outcomes

Student Competences	Program Learning Outcomes	Course Learning Outcomes			
		CLO1	CLO2	CLO3	CLO4
A5	PLO5	√	√		
A10	PLO10			√	√

3.4. Assessment Alignment Matrix

SC	PLO	PO	CLO	Teaching M.	Assessment M.
A5	PLO5	PO5	CLO1	Self-Learning Report Presentations	Report Presentations
			CLO2	Self-Learning Report Presentations	Report Presentations
A10	PLO10	PO4	CLO3	Hybrid Learning Brain Storming	Second and Final Exam Observation
			CLO4	Hybrid Learning Brain Storming	First, Second and Final Exam Observation

Course Coordinator: Dr. Mohamed Reda Mohamed Ali mohamed

Head of Department: Dr. Ahmed Youssef Kamal El-Deen

Date: 2/1/2024

Course Specification

1. Basic Information:

Department Offering the program	**Construction Engineering and Management**			
Department Offering the course	**All Academic programs**			
Date of Specification Approval	**2/1/2024**			
Course Title	Thinking Skills		**Code**	**UHS803**
Type	**Compulsory** ☐	**Elective** ☒		
Semester	**Fall Semester (Level 4-1)**			
Teaching Hours	**Lec.**	**Tut.**	**Lab.**	**Credit hours**
	2	**----**	**---**	**2**

2. Professional Information:

2.1. Course description:

Pr.Req. : …….

Evaluation of reasoning, Recognition and evaluation of assumptions, Clarification of expressions and ideas, Production of pieces of reasoning appropriate to given task, Identification of reasons and explanations, Ethical concepts, Complex issues, Ethical problems facing leaders, Ethical outcomes in the corporate-level decision-making process, Identification of the ethical dimension in the process of formulating and implementing engineering policies and strategies.

2.2. Course Objectives (CO):

Program Learning Outcomes		**Course Objectives**	
PO4	Master self-learning and life-long learning strategies to communicate effectively in academic/professional fields.	**CLO1**	Apply the skills to think critically about developing products and briefings that are accurate, insightful, relevant and timely through exposure to “best practices”.
PO5	Apply analytical, experimental, design, construction engineering techniques and project management skills with proficiency aided by modern tools.	**CLO2**	Use skills that necessary to write and brief senior government officials.

2.3. Course Learning Outcomes (CLO's):

Student Competences	Program Learning Outcomes		Course Learning Outcomes	
A5	PLO5	Practice research techniques and methods of investigation as an inherent part of learning.	CLO1	Practice research techniques and methods in Critical Thinking
A10	PLO10	Acquire and apply new knowledge; and practice self, lifelong and other learning strategies.	CLO2	Apply strategies to overcome cognitive biases inherent to intelligence analysis.
			CLO3	Analyze the causes and impact of an analytical failure.
			CLO4	Classify the different techniques analysts can employ in order to interpret

2.4. Course Topics:

Course Topics	Week	Course LO's Covered			
		CLO1	CLO2	CLO3	CLO4
Analytical Skills	1	√			
Critical Thinking Evaluation of reasoning	2	√			
Recognition and evaluation of assumptions	3	√			
Ethical problems facing leaders,	4				√
Identification of reasons and explanations,	5				√
Production of pieces of reasoning appropriate to given task.	6				√
First Exam	7				√
Ethical outcomes in the corporate-level decision making process	8,9		√	√	√
Identification of the ethical dimension in the process of formulating.	10		√	√	√
Implementing engineering policies and strategies.	11		√	√	
Second Exam	12			√	√
Clarification of expressions and ideas	13	√		√	
Complex issues	14			√	
Ethical concepts,	15		√	√	√
Final Exam	16			√	√
Total		4	5	7	7

2.5. Lab Topics:

N.A

2.6 Teaching and Learning Methods

Teaching and Learning Methods:	Course LO's Covered			
	CLO1	CLO2	CLO3	CLO4
Self-Learning	√	√		
Hybrid Learning			√	√
Report	√	√		
Brain Storming			√	√
Presentations	√	√		
Teaching and Learning Methods for Students with Special Needs:				
Methods				
1. Discussion Session				
2. Extra Lectures				
3. Provide different levels of books and materials				

2.7 Assessment Methods

Assessment Methods:		Course LOs Covered			
		CLO1	CLO2	CLO3	CLO4
Formative Assessment Method					
1. Tests	First Exam				√
	Second Exam			√	√
2. Report		√	√		
3. Observation				√	√
4. Presentations		√	√		
Summative Assessment Method					
Final Exam				√	√

2.7.1. Assessment Schedule & Grades Distribution

Assessment Method		Week	The weighting of Assessment %
Formative Assessment Method			
Tests	First Exam	7	30 %
	Second Exam	12	20 %
Report		15	4%
Observation		8-11	2%
Presentations		15	4%
Summative Assessment Method			
Final Exam		16	40 %
Total			100 %

2.8. List of Reference:

Course Notes:	Lecture notes
Essential Books (Textbooks):	Critical Thinking Skills Developing Effective Analysis and Argument by Stella (z-lib.org),2019.

2.9. Facilities required for Teaching and Learning

Different Facilities
Lecture Hall
Library Usage
Data Show
White Board

3. Matrix:

3.1. Program Objectives VS Course Objectives

Program Objectives	Course Objective	
	CO1	CO2
PO4	√	
PO5		√

3.2. Course Objectives VS Course Learning Outcomes

Course Objectives	Course Learning Outcomes			
	CLO1	CLO2	CLO3	CLO4
CO1			√	√
CO2	√	√		

3.3. Program Learning Outcomes VS Course Learning Outcomes

Student Competences	Program Learning Outcomes	Course Learning Outcomes			
		CLO1	CLO2	CLO3	CLO4
A5	PLO5	√			
A10	PLO10		√	√	√

3.4. Assessment Alignment Matrix

SC	PLO	PO	CLO	Teaching M.	Assessment M.
A5	PLO5	PO5	CLO1	Self-Learning Report Presentations	Report Presentations
			CLO2	Self-Learning Report Presentations	Report Presentations
A10	PLO10	PO4	CLO3	Hybrid Learning Brain Storming	Second and Final Exam Observation
			CLO4	Hybrid Learning Brain Storming	First, Second and Final Exam Observation

Course Coordinator: **Dr. Mohamed Reda Mohamed Ali** 

Head of Department: **Dr. Ahmed Youssef Kamal El-Deen** 

Date: 2/1/2024

Course Specification

1. Basic Information:

Program Title	Construction Engineering and Management			
Department Offering the course	Construction Engineering and Management			
Date of Specification Approval	**2/1/2024**			
Course Title	Field Training I	**Code**	FT103	
Type	**Compulsory** ☒	**Elective** ☐		
Semester	65 Credit Hours			
Teaching Hours	**Lec.**	**Tut.**	**Lab.**	**Credit hours**
	……	……	……	0

2. Professional Information:

2.1. Course description:

**** Completion of 65 CR. HRS.**

For 6 weeks interval as a minimum.
Field training conducted under the supervision of a faculty member and field mentor in the actual field practice. The student must submit a detailed technical report by the end of training period, explain what he learned during this training.
By the end of the training the student will be able to:
.

2.2. Course Objectives (CO):

At the end of course, the student will be able to:

Program objective		Course objective	
PO3	Work in and lead a heterogeneous team and display leadership qualities, business administration, and entrepreneurial skills	**CO1**	Work with multidisciplinary teams during the training period.
PO4	Master self-learning and life-long learning strategies to communicate effectively in academic / professional fields.	**CO2**	Apply the principles knowledge to execute practical engineering field works

2.3. Course Learning Outcomes (CLO's):

Student Competences	Program Learning Outcomes		Course Learning Outcomes	
A7	PLO7	Function efficiently as an individual and as a member of multi-disciplinary and multicultural teams.	CLO1	Work in individual and as a member of multi-disciplinary and multicultural teams within constraints.
			CLO2	Identify the tasks, time, and resources Effectively.
A10	PLO10	Acquire and apply new knowledge; and practice self, lifelong and other learning strategies.	CLO3	Apply new knowledge in construction engineering concepts
			CLO4	Use modern techniques in construction application

2.4 Teaching and Learning Methods

Teaching and Learning Methods:	Course LO's Covered			
	CLO1	CLO2	CLO3	CLO4
1. Discussion				√
2. Case Study			√	√
3. Report	√	√	√	
Teaching and Learning Methods for Students with Special Needs:				
Methods				
1. Discussion Session				
2. Extra Lectures				
3. Provide different levels of books and materials				

2.6 Assessment Methods

Assessment Methods:	Course LOs Covered			
	CLO1	CLO2	CLO3	CLO4
1. Report	√	√		
2. Presentation	√	√		
3. Oral Test			√	√

- The field training is evaluated on pass / fail basis and does not count in the cumulative GPA calculation.

3. Matrix:

3.1. Program Objectives VS Course Objectives

Program Objectives	Course Objective	
	CO1	CO2
PO3	√	
PO4		√

3.2. Course Objectives VS Course Learning Outcomes

Course Objectives	Course Learning Outcomes			
	CLO1	CLO2	CLO3	CLO4
CO1			√	√
CO2	√	√		

3.3. Program Learning Outcomes VS Course Learning Outcomes

Student Competences	Program Learning Outcomes	Course Learning Outcomes			
		CLO1	CLO2	CLO3	CLO4
A7	PLO7	√	√		
A10	PLO10			√	√

3.4. Assessment Alignment Matrix

SC	PLO	PO	CLO	Teaching M.	Assessment M.
A7	**PLO7**	**PO3**	**CLO1**	• Report	• Presentation • Report
			CLO2	• Report	• Presentation • Report
A10	**PLO10**	**PO4**	**CLO3**	• Case Study • Report	• Oral Test
			CLO4	• Case Study • Discussion	• Oral Test

Course Coordinator: Dr. : Dr. Rasha Mohey Al-Deen

Head of Department: Dr. Ahmed Youssef

Date: 2/1/2024

Course Specification

1. Basic Information:

Program Title	Construction Engineering and Management			
Department Offering the course	Construction Engineering and Management			
Date of Specification Approval	**2/1/2024**			
Course Title	Field Training II		**Code**	FT203
Type	**Compulsory** ☒		**Elective** ☐	
Semester	96 Credit Hours			
Teaching Hours	**Lec.**	**Tut.**	**Lab.**	**Credit hours**
	……	……	……	0

2. Professional Information:

2.1. Course description:

**** Completion of 96 CR. HRS**

For 6 weeks interval as a minimum.

Field training conducted under the supervision of a faculty member and field mentor in the actual field practice. The student must submit a detailed technical report by the end of training period, explain what he learned during this training.

By the end of the training the student will be able to:

.

2.2. Course Objectives (CO):

At the end of course, the student will be able to:

Program objective		Course objective	
PO3	Work in and lead a heterogeneous team and display leadership qualities, business administration, and entrepreneurial skills	**CO1**	Work with multidisciplinary teams during the training period.
PO4	Master self-learning and life-long learning strategies to communicate effectively in academic / professional fields.	**CO2**	Apply the principles knowledge to execute practical engineering field works

2.3. Course Learning Outcomes (CLO's):

Student Competences	Program Learning Outcomes		Course Learning Outcomes	
A7	PLO7	Function efficiently as an individual and as a member of multi-disciplinary and multicultural teams.	CLO1	Work in individual and as a member of multi-disciplinary and multicultural teams within constraints.
			CLO2	Identify the tasks, time, and resources Effectively.
A10	PLO10	Acquire and apply new knowledge; and practice self, lifelong and other learning strategies.	CLO3	Apply new knowledge in construction engineering concepts
			CLO4	Use modern techniques in construction application

2.4 Teaching and Learning Methods

Teaching and Learning Methods:	Course LO's Covered			
	CLO1	CLO2	CLO3	CLO4
1. Discussion				√
2. Case Study			√	√
3. Report	√	√	√	
Teaching and Learning Methods for Students with Special Needs:				
Methods				
1. Discussion Session				
2. Extra Lectures				
3. Provide different levels of books and materials				

2.6 Assessment Methods

Assessment Methods:	Course LOs Covered			
	CLO1	CLO2	CLO3	CLO4
1. Report	√	√		
2. Presentation	√	√		
3. Oral Test			√	√

- The field training is evaluated on pass / fail basis and does not count in the cumulative GPA calculation.

3. Matrix:

3.1. Program Objectives VS Course Objectives

Program Objectives	Course Objective	
	CO1	CO2
PO3	√	
PO4		√

3.2. Course Objectives VS Course Learning Outcomes

Course Objectives	Course Learning Outcomes			
	CLO1	CLO2	CLO3	CLO4
CO1			√	√
CO2	√	√		

3.3. Program Learning Outcomes VS Course Learning Outcomes

Student Competences	Program Learning Outcomes	Course Learning Outcomes			
		CLO1	CLO2	CLO3	CLO4
A7	PLO7	√	√		
A10	PLO10			√	√

3.4. Assessment Alignment Matrix

SC	PLO	PO	CLO	Teaching M.	Assessment M.
A7	**PLO7**	**PO3**	**CLO1**	• Report	• Presentation • Report
			CLO2	• Report	• Presentation • Report
A10	**PLO10**	**PO4**	**CLO3**	• Case Study • Report	• Oral Test
			CLO4	• Case Study • Discussion	• Oral Test

Course Coordinator: Dr. : Dr. Rasha Mohey Al-Deen

Head of Department: Dr. Ahmed Youssef

Date: 2/1/2024