2022- 2023

Civil Engineering Program Specification
فصول دراسية

Contents

وزارة التعليم العالي
المعهد العالي للهندسة والتكنولوجيا
بدمياط الجديدة

Civil Engineering

B.Sc. Program Specification

1.	Basic Information			
	1.1	Program title	Civil Engineering	
	1.2	Program type	Single	
	1.3	Department (s)	Civil Engineering	
	1.4	Coordinator	Prof. Dr./ Mohamed Elkiki	
	1.5	External evaluator(s)		
	1.6	Last date of program specifications approval		9/10/2021

2.	Professional Information	
	2.1	**Program Vision**
		Civil Engineering Department will provide a program of the highest quality to produce leader engineers who can address the challenges of the new century and excel at an international level.
	2.2	**Program Mission**
		With this vision, the mission of the Civil Engineering Department is to provide its graduates with the knowledge and skills needed for high quality engineering work as well as advanced engineering research and to equip its graduates with a broad intellectual spectrum in order to prepare them for diverse and competitive career paths.

3.	Program aims
The graduates of the Civil engineering program should be able to:	
1	Master a broad range of engineering knowledge and specialized skills, as well as the ability to apply acquired knowledge in real-world situations by applying theories and abstract thinking in analytic critical and systemic thinking to identify, diagnose, and solve engineering problems of varying complexity and variation.

2	Work in and manage a diverse team of professionals from various engineering disciplines, taking responsibility for own and team performance; and behave professionally and adhere to engineering ethics and standards.
3	Recognize his or her role in promoting engineering and contributing to the profession's and community's development; by appreciating the importance of the environment, both physical and natural, and working to promote sustainability concepts.
4	Use the techniques, skills, and current engineering tools required for engineering practice by taking full responsibility for one's own learning and development, participating in lifelong learning, and demonstrating the ability to pursue postgraduate and research studies.
5	Communicate effectively with a variety of audiences using a variety of forms, methods, and languages; cope with academic and professional issues in a critical and creative manner; and display leadership, business administration, and entrepreneurial abilities.
6	Analyze data from the intended tests to manage resources creatively.
7	Achieve an optimum design of Reinforced Concrete and Steel Structures, Foundations and Earth Retaining Structures; and at least three of the following civil engineering topics: Transportation and Traffic, Roadways and Airports, Railways, Sanitary Works, Irrigation, Water Resources and Harbors; or any other emerging field relevant to the discipline.
8	Plan and manage construction processes; address construction defects, instability and quality issues; maintain safety measures in construction and materials; and assess environmental impacts of projects.
9	Deal with biddings, contracts and financial issues including project insurance and guarantees.
10	Select appropriate and sustainable technologies for construction of buildings, infrastructures and water structures; using numerical techniques, experiment measurements, and testing by applying a full range of civil engineering fields such as structural analysis and mechanics, properties and strength of materials, surveying, soil mechanics, hydrology and fluid mechanics.

4	COMPETENCY
Achievement of the following Program Outcomes would indicate that the graduates are equipped with the necessary knowledge and skills to achieve the Educational Objectives.	
C1	Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.
C2	Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.
C3	Apply engineering design processes to produce cost effective solutions that meet specified needs with consideration for global, cultural, social, economic, environmental, ethical and other aspects as appropriate to the discipline and within the principles and contexts of sustainable design and development.
C4	Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues and risk management principles.
C5	Practice research techniques and methods of investigation as an inherent part of learning.
C6	Plan, supervise and monitor implementation of engineering projects, taking into consideration other trades requirements.
C7	Function efficiently as an individual and as a member of multi-disciplinary and multicultural teams.
C8	Communicate effectively – graphically, verbally and in writing – with a range of audiences using contemporary tools.
C9	Use creative, innovative and flexible thinking and acquire entrepreneurial and leadership skills to anticipate and respond to new situations.
C10	Acquire and apply new knowledge; and practice self, lifelong and other learning strategies.
C11	Select appropriate and sustainable technologies for construction of buildings, infrastructures and water structures; using either numerical techniques or physical measurements and/or testing by applying a full range of civil engineering concepts and techniques of: structural analysis and mechanics, properties and strength of materials, surveying, soil mechanics, hydrology and fluid mechanics.
C12	Achieve an optimum design of Reinforced Concrete and Steel Structures, Foundations and Earth Retaining Structures; and at least three of the following civil engineering topics: Transportation and Traffic, Roadways and Airports, Railways, Sanitary Works, Irrigation, Water Resources and Harbors; or any other emerging field relevant to the discipline.

C13	Plan and manage construction processes; address construction defects, instability and quality issues; maintain safety measures in construction and materials; and assess environmental impacts of projects.
C14	Deal with biddings, contracts and financial issues including project insurance and guarantees.

5. Academic standards

The program adopts the National Academic reference standards of Civil engineering program (NARS 2018) which is approved by the national authority for quality assurance and accreditation of education NAQAAE.

6. Reference standards

a. External references for standards (Benchmarks)
- ABET Engineering Criteria 2000
-University of Texas at Austin, College of Engineering, Dept. of CIVIL Engineering
- Iowa State University, CIVIL Engineering Dept.
-Kuwait University, College of Engineering and Petroleum, Civil Engineering Department.

7. Program Curriculum Structure and Contents

7.1 Program duration:

The program duration is five years

7.2 Program structure:

- **Total hours of the program:** 264 contact hours
- **Theoretical:**139 contact hours
- **Practical/Exercises**: 125 contact hours
- **Compulsory**:248 contact hours
- **Elective**: 16 contact hours

8. THE REFERENCE FRAMES DETERMINANTS FOR BACHELOR STAGE

A. Humanities and Social Sciences

Code	Course Name	Contact hour
BAS025	Int. to Engineering and Environment	2
BAS026	Technical English Language 1	4
BAS027	Human Rights	2
BAS114	Technical English Language 2	4
BAS122	Technical Report Writing	4
BAS421	Research and Analytic Skills	2
BAS422	Environmental Management	3
CIE421	Legislation and contracts	3
Total		24

B. Business Administration

Code	Course Name	Contact hour
BAS213	Engineering Economy	3
BAS321	Project Management and Control	4
Total		7

C. Mathematics and Basic Sciences

Code	Course Name	Contact hour
BAS011	Mathematics 1	4
BAS012	Mechanics 1	4
BAS013	Physics 1	6
BAS014	Engineering Chemistry	4
BAS016	Int. to Computer Systems	4
BAS021	Mathematics 2	4
BAS022	Mechanics 2	4
BAS023	Physics 2	6
BAS111	Mathematics 3	4
BAS121	Mathematics 4	4
BAS211	Engineering Probability and Statistics	4
BAS214	Computer Programming	4

BAS221	Numerical Methods in Engineering	4
Total		56

D. Engineering Culture

Code	Course Name	Contact hour
BAS024	Production Engineering	5
BAS112	Electrical Engineering Fundamentals	5
BAS123	Int. to Information Technology	4
Total		14

E. Basic Engineering Sciences

Code	Course Name	Contact hour
BAS015	Engineering Drawing and Projection	5
BAS113	Engineering Thermodynamics	5
BAS124	Strengthen of Materials	4
BAS212	Fluid Mechanics	4
CIE111	Structures Analysis 1	5
CIE112	Civil Engineering Drawing 1	4
CIE121	Structures Analysis 2	5
CIE122	Civil Engineering Drawing 2	4
CIE211	Structure Analysis 3	4
CIE212	Properties and Strength of concrete Materials	4
CIE213	Surveying 1	4
CIE221	Hydrology and Irrigation Engineering	4
CIE222	Reinforced Concrete 1	6
CIE224	Traffic and Transportation Engineering	4
CIE225	Principles of Building Construction	4
CIE312	Geology and Soil Mechanics 1	4
CIE313	Open Channels Hydraulics	4
Total		74

F. Applied Engineering and Design

Code	Course Name	Contact hour
CIE223	Surveying 2	4
CIE311	Reinforced Concrete 2	6
CIE314	Steel Structures Design 1	6
CIE315	Highways and Airport Engineering	4
CIE316	Water Supply Engineering	4
CIE321	Reinforced Concrete 3	5
CIE322	Soil Mechanics and Foundation	4
CIE323	Computer Application in Civil Engineering	4
CIE324	Steel Structures Design 2	5
CIE326	Water and wastewater treatment	4
CIE411	Foundation Engineering 1	4
CIE412	Inland Navigation and Harbor Engineering	4
CIE413	Design of Irrigation Works	4
CIE415	Elective 1	4
CIE416	Elective 2	4
CIE422	Reinforced Concrete 4	4
CIE424	Elective 3	4
CIE425	Elective 4	4
Total		78

G. Projects and Practice

Code	Course Name	Contact hour
CIE226	Training 1	-
CIE325	Training 2	-
CIE414	Project 1	5
CIE423	Project 2	6
Total		11

From the previous tables, the reference frames determinations can be summarized as follows:

No.	Department	Contact Hours	The program percentage%	Reference Frames' percentage %
A	Humanities and Social sciences	24	9.09	8-12
B	Business Administration	7	2.65	2-4
C	Mathematics and Basic Sciences	56	21.21	18-22
D	Engineering Culture	14	5.30	4-6
E	Basic Engineering Sciences	74	28.03	25-30
F	Applied Engineering and Design	78	29.54	25-30
G	Projects and Practice	11	4.17	4-6
Total		264		

8. Contact Hours According to the Requirements

A. University Requirements

Code	Course Name	Contact hour
BAS016	Int. to Computer Systems	4
BAS025	Int. to Engineering and Environment	2
BAS026	Technical English Language 1	4
BAS027	Human Rights	2
BAS114	Technical English Language 2	4
BAS421	Research and Analytical Skills	2
CIE421	Legislation and contracts	3
Total		21

B. Institute Requirements

Code	Course Name	Contact hour
BAS011	Mathematics 1	4
BAS012	Mechanics 1	4
BAS013	Physics 1	6
BAS014	Engineering Chemistry	4
BAS015	Engineering Drawing and Projection	5
BAS021	Mathematics 2	4
BAS022	Mechanics 2	4

BAS023	Physics 2	6
BAS024	Production Engineering	5
BAS111	Mathematics 3	4
BAS112	Electrical Engineering Fundamentals	5
BAS113	Engineering Thermodynamics	5
BAS121	Mathematics 4	4
BAS122	Technical Report Writing	4
BAS123	Int.to Information Technology	4
BAS211	Engineering Probability and Statistics	4
BAS221	Numerical Methods in Engineering	4
Total		76

C. General Department Requirements

Code	Course Name	Contact hour
BAS124	Strength of Materials	4
BAS212	Fluid Mechanics	4
BAS213	Engineering Economy	3
BAS214	Computer Programming	4
BAS321	Project Management and Control	4
BAS422	Environmental Management	3
CIE111	Structures Analysis 1	5
CIE112	Civil Engineering Drawing 1	4
CIE121	Structures Analysis 2	5
CIE122	Civil Engineering Drawing 2	4
CIE211	Structure Analysis 3	4
CIE212	Properties and strength of concrete Materials	4
CIE213	Surveying 1	4
CIE221	Hydrology and Irrigation Engineering	4
CIE222	Reinforced Concrete 1	6
CIE223	Surveying 2	4
CIE224	Traffic and Transportation Engineering	4
CIE225	Principles of Building Construction	4
CIE312	Geology and Soil Mechanics 1	4
CIE313	Open Channel Hydraulics	4
CIE322	Soil Mechanics and Foundation	4
CIE323	Computer Application in Civil	4

	Engineering	
Total		90

D. Specific Department Requirement

Code	Course Name	Contact hour
CIE226	Training 1	-
CIE311	Reinforced Concrete 2	6
CIE314	Steel Structure Design 1	6
CIE315	High ways and Airport Engineering	4
CIE316	Water Supply Engineering	4
CIE321	Reinforced Concrete 3	5
CIE324	Steel Structure Design 2	5
CIE325	Training 2	-
CIE326	Water and wastewater treatment	4
CIE411	Foundation Engineering 1	4
CIE412	Inland Navigation and Harbor Engineering	4
CIE413	Design of Irrigation Works	4
CIE414	Project 1	5
CIE415	Elective 1	4
CIE416	Elective 2	4
CIE422	Reinforced Concrete 4	4
CIE423	Project 2*	6
CIE424	Elective 3	4
CIE425	Elective 4	4
Total		77

From the previous tables, the contact hours can be summarized as follow:

No.	Department	Contact Hours	The program percentage%	Reference Frames' percentage %
1	University Requirements	21	7.95	6-10
2	Institute Requirements	76	28.79	22-30
3	General Department Requirements	90	34.09	30-35
4	Specific Department Requirements	77	29.17	20-30
Total		264	(250-280)	

9. Curriculum Structure distribution

Level 0, Semester 1

Code	Course Name	Hours per week						Degrees			
		Lecture	Lab.	Exercise	Contact	Student's load	Total	Periodic Exam	Practical\Oral	Final Exam	Total
BAS011	Mathematics 1	2	-	2	4	4	8	60	-	90	150
BAS012	Mechanics 1	2	-	2	4	4	8	40	-	60	100
BAS013	Physics 1	2	2	2	6	4	10	60	15	75	150
BAS014	Engineering Chemistry	2	2	-	4	4	8	50	15	60	125
BAS015	Engineering Drawing and Projection	1	2	2	5	4	9	50	-	75	125
BAS016	Int. to Computer Systems	2	2	-	4	3	7	40	10	50	100
Total		**11**	**8**	**8**	**27**	**23**	**50**				**750**

Level 0, Semester 2

		Hours per week	Degrees

Code	Course Name	Lecture	Lab.	Exercise	Contact	Student's load	Total	Periodic Exam	Practical\Oral	Final Exam	Total
BAS021	Mathematics 2	2	-	2	4	4	8	60	-	90	150
BAS022	Mechanics 2	2	-	2	4	4	8	40	-	60	100
BAS023	Physics 2	2	2	2	6	4	10	60	15	75	125
BAS024	Production Engineering	3	2	-	5	4	9	50	15	60	125
BAS025	Int. to Engineering and Environment	2	-	-	2	2	4	25	-	50	75
BAS026	Technical English Language 1	2	2	-	4	3	7	40	10	50	100
BAS027	Human Rights	2	-	-	2	2	4	20	-	30	50
Total		**15**	**6**	**6**	**27**	**23**	**50**				**750**

Level 1, Semester 1

Code	Course Name	Hours per week						Degrees			
		Lecture	Lab.	Exercise	Contact	Student's load	Total	Periodic Exam	**Practical\Oral**	Final Exam	Total

BAS111	Mathematics 3	2	-	2	4	4	8	60	-	90	150
BAS112	Electrical Engineering Fundamentals	3	-	2	5	4	9	60	-	90	150
BAS113	Engineering Thermodynamics	3	-	2	5	4	9	50	15	60	125
BAS114	Technical English Language 2	2	2	-	4	3	7	40	10	50	100
CIE111	Structures Analysis 1	3	-	2	5	4	9	50	-	75	125
CIE112	Civil Engineering Drawing 1	2	-	2	4	3	7	40	-	60	100
Total		**15**	**2**	**10**	**27**	**22**	**49**				**750**

Level 1, Semester 2

Code	Course Name	Hours per week						**Degrees**			
		Lecture	Lab.	Exercise	Contact	Student's load	Total	Periodic Exam	Practical\Oral	Final Exam	Total
BAS121	Mathematics 4	2	-	2	4	4	8	60	-	90	150
BAS122	Technical Report Writing	2	2	-	4	4	8	40	10	50	100
BAS123	Int.to Information Technology	2	2	-	4	4	8	40	10	50	100
BAS124	Strength of Materials	2	-	2	4	4	8	40	-	60	100
CIE121	Structures Analysis 2	3	-	2	5	5	10	60	-	90	150

CIE122	Civil Engineering Drawing 2	2	1	1	4	3	7	60	-	75	150
Total		**13**	**5**	**7**	**25**	**24**	**49**				**750**

Level 2, Semester 1

Code	Course Name	Hours per week						**Degrees**			
		Lecture	Lab.	Exercise	Contact	Student's load	Total	Periodic Exam	**Practical\Oral**	Final Exam	Total
BAS211	Engineering Probability and Statistics	2	-	2	4	4	8	40	-	60	100
BAS212	Fluid Mechanics	2	1	1	4	4	8	60	15	75	150
BAS213	Engineering Economy	2	-	1	3	4	8	40	-	60	100
BAS214	Computer Programming	2	2	-	4	4	7	40	10	50	100
CIE211	Structures Analysis 3	2	-	2	4	4	8	40	-	60	100
CIE212	Properties and Strength of concrete Materials	2	1	1	4	4	8	40	10	50	100
CIE213	Surveying 1	2	1	1	4	4	8	40	10	50	100
Total		**14**	**5**	**8**	**27**	**28**	**55**				**750**

Level 2, Semester 2

		Hours per week	**Degrees**

Code	Course Name	Lecture	Lab.	Exercise	Contact	Student's load	Total	Periodic Exam	Practical \ Oral	Final Exam	Total
BAS221	Numerical Methods in Engineering	2	-	2	4	5	9	40	-	60	100
CIE221	Hydrology and Irrigation Engineering	2	-	2	4	4	8	40	-	60	100
CIE222	Reinforced Concrete 1	4	-	2	6	5	11	60	-	90	150
CIE223	Surveying 2	2	1	1	4	4	8	50	15	60	125
CIE224	Traffic and Transportation Engineering	2	-	2	4	4	8	50	-	75	125
CIE225	Principles of Building Constructions	2	-	2	4	4	8	40	-	60	100
CIE226	Training 1*	-	-	-	-	-	-	30	-	20	50
Total		14	1	11	26	26	52				

* The student should make training in the summer following the 2nd semester for 4 weeks.

Level 3, Semester 1

		Hours per week	Degrees

Code	Course Name	Lecture	Lab.	Exercise	Contact	Student's load	Total	Periodic Exam	Practical\Oral	Final Exam	Total
CIE311	Reinforced Concrete 2	4	-	2	6	4	10	60	-	90	150
CIE312	Geology and Soil Mechanics1	2	1	1	4	4	8	40	10	75	125
CIE313	Open Channel Hydraulics	2	1	1	4	4	8	30	10	60	100
CIE314	Steel Structure Design1	4	-	2	6	4	10	60	-	90	150
CIE315	High ways and Airport Engineering	2	-	2	4	4	8	40	-	60	100
CIE316	Water supply Engineering	2	-	2	4	4	8	50	-	75	125
Total		**16**	**2**	**10**	**28**	**24**	**52**				**750**

Level 3, Semester 2

Code	Course Name	Hours per week						Degrees			
		Lecture	**Lab.**	**Exercise**	**Contact**	**Student's load**	**Total**	**Periodic Exam**	**Practical\Oral**	**Final Exam**	**Total**

BAS321	Project Management and Control	2	-	2	4	4	8	40	-	60	100
CIE321	Reinforced Concrete 3	3	-	2	5	4	9	50	-	75	125
CIE322	Soil Mechanics and Foundation	2	-	2	4	4	8	50	-	75	125
CIE323	Computer Applications in Civil Engineering	2	2	-	4	4	8	40	10	50	100
CIE324	Steel Structure Design 2	3	-	2	5	4	9	50	-	75	125
CIE325	Training 2*	-	-	-	-	-	-	30	-	20	50
CIE3216	Water and wastewater treatment	2	-	2	4	3	7	50	-	75	125
Total		**14**	**2**	**10**	**26**	**23**	**49**				**750**

* The student should make training in the summer following the 2nd semester for 4 weeks.

Level 4, Semester 1

Code	Course Name	Hours per week						Degrees			
		Lecture	**Lab.**	**Exercise**	**Contact**	**Student's load**	**Total**	**Periodic Exam**	**Practical\Oral**	**Final Exam**	**Total**
CIE411	Foundation Engineering 1	2	-	2	4	5	9	60	-	90	150
CIE412	Inland Navigation and Harbor Engineering	2	-	2	4	4	8	50	-	75	125
CIE413	Design of Irrigation Works	2	-	2	4	4	8	50	-	75	125
CIE414	Project 1*	3	2	-	5	4	9	60	-	90	150
CIE415	Elective 1	2	-	2	4	4	8	40	-	60	100

CIE416	Elective 2	2	-	2	4	4	8	40	-	60	100
Total		**13**	**2**	**10**	**25**	**25**	**50**				**750**

Level 4, Semester 2

Code	Course Name	Hours per week						Degrees			
		Lecture	Lab.	Exercise	Contact	Student's load	Total	Periodic Exam	Practical\Oral	Final Exam	Total
BAS421	Research and Analytical Skills	2	-	-	2	2	4	10	-	40	50
BAS422	Environmental Management	2	-	1	3	3	6	40	-	60	100
CIE421	Legislation and contracts	2	-	1	3	4	7	40	-	60	100
CIE422	Reinforced concrete 4	2	-	2	4	4	8	40	-	60	100
CIE423	Project 2*	2	-	4	6	5	11	60	-	90	150
CIE424	Elective 3	2	-	2	4	4	8	40	-	60	100
CIE425	Elective 4	2	-	2	4	4	8	40	-	60	100
Total		**14**		**12**	**26**	**26**	**52**				**750**

Continuous course; one oral examination for both CIE414 and CIE423 at the end of the second term.

10. Curriculum Structure and Contents

A. Compulsory								
Level	Semester	Code	Course Name	Hours per week			Competencies	Program LO'S
				Lec.	Lab.	Exer.		
LEVEL 0	SEMESTER 1	BAS011	Mathematics 1	2	-	2	C1	a1, b1, a3
		BAS012	Mechanics 1	2	-	2	C1	a1, a2, b1
		BAS013	Physics 1	2	2	2	C1	a1, a2, b1
		BAS014	General Chemistry	2	2	-	C1	a1, c2, c3
							C10	d2
		BAS015	Engineering drawing and projection	1	-	2	C1	a1, a2, b1, b2
		BAS016	Int. to computer systems	2	2	-	C1	c2, c3
							C5	b1
		Total		**11**	**8**	**8**		
	SEMESTE	BAS021	Mathematics 2	2	-	2	C1	a1, a3, b1, b3
		BAS022	Mechanics 2	2	-	2	C1	a1, a2, b1, c1
		BAS023	Physics 2	2	2	2	C1	a1, a2, a3, b2
		BAS024	Production engineering	3	2	-	C1	a1, a3, b3
							C3	c1, c2
							C6	a1, c2
		BAS025	Int. to Engineering and environment	2	-	-	C1	a2, a3, b2, c3

A. Compulsory								
Level	Semester	Code	Course Name	Hours per week			Competencies	Program LO'S
				Lec.	Lab.	Exer.		
	R 2						C3	a2, a3, b1, c1
		BAS026	Technical English Language 1	1	-	2	C8	d1
		BAS027	Human Rights	2	-	-		
		Total		**15**	**6**	**6**		
LEVEL 1	SEMESTER 1	BAS111	Mathematics 3	2	-	2	C1	a1, a2, a3, b1
		BAS112	Electrical Engineering Fundamental	3	-	2	C1	a1, a2, b1, b2, c1, c2
							C2	a1, b3, b4, c1
		BAS113	Engineering Thermodynamics	3	-	2	C1	a1, a2, a3, b1, b2, c1, c2
		BAS114	Technical English Language 2	2	2	-	C8	d1, d2
							C10	d1, d2
		CIE111	Structure Analysis 1	3	-	2	C1	a3, b3, c3
							C2	a1, c3
							C11	a1, c1
		CIE112	Civil engineering drawing 1	2	-	2	C1	a1, a2
							C3	c1
							C13	b1
		Total		**15**	**2**	**10**		

A. Compulsory								
Level	Semester	Code	Course Name	Hours per week			Competencies	Program LO'S
				Lec.	Lab.	Exer.		
	SEMESTER 2	BAS121	Mathematics 4	2	-	2	C1	a1, a2, a3, b1,c1
		BAS122	Technical Report Writing	2	2	-	C5	a1, a2, b1, b2,c1,d1
							C8	d1,d2
		BAS123	Int. to Information Technology	2	2	-	C4	a2,a3,c3
							C8	d1,d2
		BAS124	Strengthen of materials	2	-	2	C1	a1, b1, c2, c3
		CIE121	Structure analysis2	3	-	2	C1	a1,b3
							C2	a1
							C11	a1
		CIE122	Civil engineering drawing 2	2	1	1	C1	a2,a3
							C3	C1
							C11	C1
							C12	b1
		Total		13	5	7		

A. Compulsory								
Level	Semester	Code	Course Name	Hours per week			Competencies	Program LO'S
				Lec.	Lab.	Exer.		
LEVEL 2	SEMESTER 1	BAS211	Engineering Probability and Statistics	2	-	2	C1	a1, a2, b1, b3, c2
		BAS212	Fluid Mechanics	2	1	1	C2	a1,a2,b1,b2,b3
							C2	a1,a2,b1
							C10	d1
		BAS213	Engineering Economy	2	-	1	C3	a1,a2,b1,c1
							C4	a2,b1,c2
		BAS214	computer programming	2	2	-	C1	b3,c1,c2
							C2	a1,b3,c1
		CIE211	Structure analysis 3	2	-	2	C1	a3,b3,c2,c3
							C2	a1,c3
							C11	a1,c1
		CIE212	Properties and strengthen of concrete materials	2	1	1	C4	a1,a3
							C11	a1,a2
		CIE213	surveying 1	2	1	1	C1	a2, b1
							C11	a1,C1
		Total		14	5	8		

A. Compulsory								
Level	Semester	Code	Course Name	Hours per week			Competencies	Program LO'S
				Lec.	Lab.	Exer.		
	SEMESTER 2	BAS221	Numerical Methods in Engineering	2	-	2	C1	a1, a2, b1, b2, c1, c2
		CIE 221	Hydrology and Irrigation Engineering	2	-	2	C1	a2, a3, b1, b2
							C2	a1, b1, b2
							C11	a1, c1
							C12	b1, b2
		CIE 222	Reinforced concrete 1	4	-	2	C1	a3,c2
							C2	A2,c3
							C4	a1
							C11	C1
							C12	b1
		CIE 223	Surveying 2	2	1	1	C1	a3,c2
							C11	a1,c1
		CIE 224	Traffic and transportation Engineering	2	-	2	C1	a1,c2
							C2	a2,b2,b3,c3
							C11	a2
							C12	b2
		CIE 225	principles of Building constructions	2	-	2	C2	a2
							C4	a1,a2,a3
							C11	a2
		CIE 226	Training 1 *	-	-	-	C3	a1,a2,a3, b1,c2
							C5	a1, b1, c1, d1
							C6	a1, c2
							C7	d1, d2, d3
							C9	d1, d2
		Total		**14**	**1**	**11**		
		CIE311	Reinforced concrete 2	4	-	2	C1	a2 ,c3
							C9	d1,d3
							C12	b1

A. Compulsory								
Level	Semester	Code	Course Name	Hours per week			Competencies	Program LO'S
				Lec.	Lab.	Exer.		
LEVEL 3	SEMESTER 1	CIE312	Geology and Soil Mechanics1	2	1	1	C1	a3, b3, c3
							C2	a1, c3
							C11	a1, c1
		CIE313	Open Channel Hydraulics	2	1	1	C2	a1, b1
							C12	b1,b2
		CIE314	Steel Structure Design 1	4	-	2	C1	a3, b3, c3
							C2	a1, c3
							C9	d3
							C11	a1, c1
							C12	b1
		CIE315	High ways and Airport Engineering	2	-	2	C2	a2,b2,b3
							C3	a1,a3,b1
							C11	a2
							C12	b2
		CIE316	Water supply engineering	2	-	2	C1	a3,b2
							C11	a2
							C12	b2
		Total		16	2	10		

A. Compulsory								
Level	Semester	Code	Course Name	Hours per week			Competencies	Program LO'S
				Lec.	Lab.	Exer.		
	SEMESTER 2	BAS321	Project Management and Control	2	-	2	C3	b1,c2
							C9	d2
							C13	a1, c1
							C14	a1,b1,c1
		CIE321	Reinforced concrete 3	3	-	2	C2	a2,b1,c3
							C11	a1,a2
							C12	b1
		CIE322	Soil Mechanics and Foundation	2	-	2	C1	a3,b2
							C2	a2,b2,c3
							C10	d1,d2
							C11	a1,a2
							C12	b2
		CIE323	Computer Application in Civil Engineering	2	2	-	C2	a1, c1
							C11	c1
		CIE324	Steel Structure Design 2	3	-	2	C1	a1,b3
							C2	a1
							C5	d1
							C11	a1,c1
							C12	b1
		CIE325	Training 2*	-	-	-	C3	a1,a2,a3, b1,c2
							C5	a1, b1, c1, d1
							C6	a1, c2
							C7	d1, d2, d3
							C9	d1, d2
		CIE326	water and wastewater treatment	2	-	2	C3	a2, c1
							C12	b2
							C13	c1
		Total		**14**	**2**	**10**		

A. Compulsory								
Level	Semester	Code	Course Name	Hours per week			Competencies	Program LO'S
				Lec.	Lab.	Exer.		
LEVEL 4	SEMESTER 1	CIE411	Foundation Engineering 1	2	-	2	C1	a3,b3,c3
							C4	a1
							C12	b1
		CIE412	Inland Navigation and Harbor Engineering	2	-	2	C3	a1
							C4	a1
							C11	a1,a2,c1
							C12	b1,b2
							C13	c1
		CIE413	Design of Irrigation Works	2	-	2	C1	a1, a3
							C11	a2
							C12	b1, b2
		CIE414	Project 1*	3	2	-	C2	a2, b1, b2, b3, b4, c1, c2, c3,
							C3	a1, a2, a3, b1
							C4	a1, a3, c2, c3
							C5	b1, c1, d1
							C7	d1, d2, d3
							C8	d1, d2
							C11	a1, a2, c1
							C12	b1, b2
							C13	a1, b1, c1
							C14	a1, b1, c1
		CIE415	Elective 1	2	-	2	C2	a1
							C4	a1,a3
							C11	a1,a2
		CIE416	Elective 2	2	-	2	C2	a2
							C4	a1,a3,b1
							C11	a1,a2
		Total		**13**	**2**	**10**		

A. Compulsory								
Level	Semester	Code	Course Name	Hours per week			Competencies	Program LO'S
				Lec.	Lab.	Exer.		
	SEMESTER 2	BAS421	Research and Analytical skills	2	-	-	C2	b3,c3
		BAS422	Environmental management	2	-	1	C3	a2,a3,b1,c1
							C4	a1,c1,c3
							C10	d1
		CIE421	Legislation and contract	2	-	1	C3	b1,c2
							C9	d2
							C13	a1
							C14	a1, b1, c1
		CEE422	Reinforced concrete 4	2	-	2	C6	a1
							C11	a1,a2
							C12	b1
		CIE423	Project 2*	2	-	4	C2	a2, b1, b2, b3, b4, c1, c2, c3,
							C3	a1, a2, a3, b1
							C4	a1, a3, c2, c3
							C5	b1, c1, d1
							C7	d1, d2, d3
							C8	d1, d2
							C11	a1, a2, c1
							C12	b1, b2
							C13	a1, b1, c1
							C14	a1, b1, c1
		CIE424	Elective 3	2	-	2	C3	a1
							C4	a1
							C12	b1
							C13	c1
		CIE425	Elective 4	2	-	2	C3	a1
							C4	a1
							C12	b1
							C13	c1
		Total		14	-	12		

11. Elective Courses

The students should choose one course from each of the following tables:

	Code	Course name	Competencies	Lo's
Elective 1	CIE415A	Bridge Engineering	C2 C4 C11	a2 a1, a3 a1, a2
	CIE415B	Coastal Engineering Fundamentals		
	CIE415C	Concrete Structures Technology		
	CIE415D	Construction Contraction		
	CIE415E	Coast Analysis for Structure Projects		
	CIE415F	Highway Materials and Construction		
	CIE415G	Modern Structure Materials		
	CIE415H	planning of buildings Maintenance and Protection		
	CIE415I	Reliability of Structures		
	CIE415J	Environmental Pollution Control		

	Code	Course name	Competencies	Lo's
Elective 2	CIE416A	Design of Earthquake Structures	C2 C4 C11	a2 a1, a3 a1, a2
	CIE416B	Design of Marine Platforms		
	CIE416C	Design of Shell Structures		
	CIE416D	Engineering Project Evaluation		
	CIE416E	Fiber Reinforced Cement Composites		
	CIE416F	Project Decision Analysis		
	CIE416G	Project Financial Management		
	CIE416H	Risk Management and Constructions Safety		
	CIE416I	Air conditioning Systems for Building		
	CIE416J	Construction Estimating and Tendering		

	Code	Course name	Competencies	Lo's
Elective 3	CIE424A	Groundwater Hydraulics	C3 C4 C12 C13	a1 a1 b1 c1
	CIE424B	Pavement Design		
	CIE424C	Pre- Fabricated Concrete Frames		
	CIE424D	Project Management2		
	CIE424E	Project Visibility Study		
	CIE424F	Urban Transportation Planning		
	CIE424G	Special Concrete Structures 1		
	CIE424H	Foundation Engineering 2		
	CIE424I	Productivity Enhancement Methods		
	CIE424J	Quality Assurance		

	Code	Course name	Competencies	Lo's
Elective 4	CIE425A	River Engineering	C3 C4 C12 C13	a1 a1 b1 c1
	CIE425B	Hydraulics Engineering		
	CIE425C	Traffic Control Systems		
	CIE425D	Tunneling and Underground Excavation		
	CIE425E	Special Concrete Structures 2		
	CIE425F	Railway Engineering		
	CIE425G	Reinforced Concrete 5		
	CIE425H	Design of lighting Systems for buildings		
	CIE425I	Soil Dynamics		
	CIE425J	Introduction to Earthquake Engineering		

12. Methods and rules for student evaluation

Method (tool)	Lo's
Periodic Exams	To assess knowledge, understanding, professional and general and transferable skill.
Practical / Oral	To assess knowledge, understanding, professional and general and transferable skill.
Final Examination	To assess knowledge, understanding, professional and general and transferable skill.

Project applied on a practical field problem	To assess knowledge, understanding, professional and general and transferable skill.

13. Program Evaluation

Evaluator	Tools	Sample evidence
1-Senior students	Questionnaires	15% of the students
2- Alumni	Questionnaires	
3- Stakeholders	Questionnaires	Samples representative from all sectors
4-external evaluator	Review reports	

14. Civil Engineering Courses CONTENTS

Level: 0 Semester: 1

BAS011	Mathematics 1				4 Contact Hours
Content	Algebra: vectors algebra - partial fractions - equations theory - vectors -mathematical deduction - numerical solutions methods (simple repetitive method - Newton and modified Newton's method - intersection method – False position method - arrays - linear equations systems - Gauss Jordan method for deletion. Derivation: function (definition - theories) - basic trigonometric functions and its inverse - exponential and logarithmic functions - hyperbolic functions and its inverse - connection (definition - theories) - limits (definition - theories)- derivatives (definition - theories - higher order types) - curves drawing -mathematical and engineering derivative applications - undefined formulas - Taylor expansion - MacLean expansion - approximation - introduction in partial derivation.				
Lecture	2 hours/week	Laboratory	-	Tutorial	2hours /week

BAS012	Mechanics 1				4 Contact Hours
Content	Applications of space vectors – results of group of Forces - momentums - equivalent couples – equivalent groups - equations of equilibrium for rigid bodies - Supports and pivots types - equilibrium under the effect of forces and the space couples - center of mass (groups of particles - flat surfaces) – moment of inertia (mean axes- equal surfaces).				
Lecture	2 hours / week	Laboratory	-	Tutorial	2hours / week.

BAS013	Physics 1				Contact 6 Hours
Content	Material properties – Physical quantities – Standard units and dimensions –frequency motion, mechanical properties for materials –fluid properties – viscosity – surface tension–sound waves – waves in elastic media - Heat and thermodynamics: heat transfer – Gas motion theory – First law of thermodynamics – entropy and second law of thermodynamics – temperature measurements and thermometers.				
Lecture	2 hours /week	Laboratory	2 hours / week	Tutorial	2hours /week

BAS014	Engineering Chemistry				4 Contact Hours
Content	Gaseous status - substantial and heat balance in fuel burning operations and chemical operations - properties of solutions - dynamic balance in physical and chemical operations - kinetic chemical interactions - electric chemistry -introduction to chemical corrosion - water processing - building materials -pollution and its treatment Selected chemical industries: chemical manures - dyes - polymers - sugar -petrochemicals semiconductors - oil, greases and industrial detergents.				
Lecture	2 hours / week	Laboratory	2 hours / week	Tutorial	- Hours / week.

BAS015	Engineering drawing and projection				5 Contact Hours
Content	Techniques and skills of engineering drawing – engineering operations – orthogonal projection – secondary orthogonal – solid bodies – intersections (cutters for solid bodies – intersections of surfaces) - personals – projections of simple bodies – rules of writing dimensions – drawing of perspectives – deduction of missing projections – drawing of engineering sections. **Drawing of the steel frames** - binding and fixing devices - the assembled drawing for some mechanical steel components Introduction to AutoCAD Fundamentals of engineering drafting by way of computer aided drawing (CAD) software. Basic features and capabilities of CAD software and drafting fundamentals including orthographic projection, and isometric pictorials, part dimensioning in 2 dimensional drawings.				
Lecture	1 hours / week	Laboratory	4 hours / week	Tutorial	-

BAS016	Introductions to Computer Systems	4 Contact Hours
Content	Computer architecture – computer systems – files systems – computer networks – internet networks – Database systems and information technology – Computer graphics – multimedia systems – methods of solving problems – logical design for the programs and matrices –	

	applications in programming using one structured or visual languages – using this language in solving the engineering problems.				
Lecture	**2 hours / week**	**Laboratory**	**2 hours / week**	**Tutorial**	**-**

Level 0, Semester 2

BAS021	**Mathematics 2**				**4 Contact Hours**
Content	**Analytical geometry:** equations of second degree and double equation for two straight lines – movement and rotation of axes – groups of unified axes circles – conical sectors (properties of conical sectors - parabola – ellipse – hyperbola) – analytical geometry in space – Cartesian coordinates – cylindrical – spherical – plane in space – equations of surfaces in second order – rotation and movement of axes in space **Integration:** indefinite integration (basic functions – theories) – method of integration (direct – indirect) - definite integration (definition – properties -theories) – applications of definite integration (plain areas – circular volumes – plain technical length) – areas – circular surfaces – numerical integration.				
Lecture	**2 hours / week**	**Laboratory**	**-**	**Tutorial**	**2hours /week.**

BAS022	**Mechanics 2**				**4 Contact Hours**
Content	Position, displacement, velocity, and acceleration of particle – plane motion path of particle – description of plane motion using Cartesian axes – projectiles - tied motion for particle in straight path – motion in fixed axes -motion in polar axes – relative motion between particles - tied motion for particle in circular path – principle of work and energy of motion– principle of conservation of mechanical energy – principle of impulse and momentum of rigid body.				
Lecture	**2 hours / week**	**Laboratory**	**-**	**Tutorial**	**2hours /week.**

BAS023	**Physics 2**	**6 Contact Hours**
Content	Electricity and magnetism: charge and substance- electric field- column's law- electric flux- Gauss law- electric volt- condenser and insulation materials-current, resistance and electric force – ohm's law and simple circuits- magnetic field- Babot and Savart laws – magnetic flux and gauss law- Faraday law - Magnetic impedance Topics: engineering light – light properties for spherical surfaces – lenses and mirrors – wave properties for light and Hygen's principle - interference - polarization- and diffraction - Nuclear physics:	

	nuclear construction – Bohar theorem – principle of quantum theory- laser – optical – electric phenomenon.				
Lecture	**2 hours / week**	**Laboratory**	**2 hours / week**	**Tutorial**	**2hours / week.**

BAS024	**Production Engineering**			**5 Contact Hours**	
Content	The engineering substances and its properties - heating and cooling diagrams – heating equilibrium diagrams - alloys - casting operation (sand casting and the preparation of the mold) – forming processes (cold and hot forming: forging -rolling – wire drawing – blanking and piercing - deep drawing - the extrusion) – processes of metal connections (the riveting – welding with its types sticking) – cutting processes (cutting elements – processes – hand machining – automatic cutting machining: lathing - shaping – drilling –milling - grinding – work piece fixation - cutting tools fixation - specifications of the operating machine) – measuring tools (venire caliper – micrometers and its types) – engineering specifications – production cycle – production efficiency - industrial safety – practical training in the different workshops.				
Lecture	**3 hours / week**	**Laboratory**	**2 hours / week**	**Tutorial**	**-**

BAS025	**Introductions to Engineering and Environment**				**6 Contact Hours**
Content	**Engineering concepts**: What is engineering – international classification for the engineering jobs – relation between engineering development and environment economic and social development – engineering branches – ethics of the engineering jobs. **Introduction to environmental science**: the importance of studying environmental science – modern technology and its effect on the environment – quality of the environment and development elements – sources of environmental pollution and method of control (air pollution – water pollution – solid wastes pollution –noise) – economics of environmental pollution control – legislations for the environment protection.				
Lecture	**2 hours / week**	**Laboratory**	**-**	**Tutorial**	**-**

BAS026	**Technical English Language 1**			**6 Contact Hours**	
Content	Intensive guided practice in reading and analyzing expository and argumentative prose and in writing and revising essays that demonstrate coherent logical development, an ability to employ effective strategies of argument and persuasion, and a command of written English appropriate for college-level work				
Lecture	**2 hours / week**	**Laboratory**	**-**	**Tutorial**	**1 hour / week**
BAS027	**Human rights**				**2 Contact Hours**

Content	الإلمام بأهمية حقوق الإنسان والنشأة التاريخية لتلك الحقوق والمدارس الفقهية لتأصيل تلك الحقوق وأحكام الاتفاقيات الدولية الخاصة بحقوق الإنسان، والمنظمات الدولية العالمية والإقليمية القائمة على حماية تلك الحقوق، وموقف الدستور المصري من حقوق الإنسان، والحماية القانونية لها على الصعيد الوطني والصعيد الدولي، بالإضافة إلى حقوق الإنسان في الشريعة الإسلامية .الأصول التاريخية الفلسفية لحقوق الإنسان المصادر الدولية لحقوق الإنسان العالمية والإقليمية- المصادر الوطنية – لحقوق الإنسان الأجهزة العالمية القائمة على حماية حقوق لإنسان (أجهزة الأمم المتحدة) الحماية - الوطنية. لحقوق الإنسان حقوق الإنسان في الشريعة الإسلامية عرض لبعض طوائف حقوق الإنسان.				
Lecture	**2 hours / week**	**Laboratory**	**-**	**Tutorial**	**-**

Level: 1 Semester: 1

BAS111	**Mathematics 3**				**4 Contact Hours**
Content	**Partial differentiation applications**: maximum and minimum values in more than one variable – directional analysis - the directional differential effects - the multi integrations and its applications (the curved and the orthogonal axis) – Gauss- Stokes theory - the endless series and function expansion – basic concepts for the convergence and divergence. **Ordinary differential equations:** The first order (the equations which can be separated, homogeneous, exact and linear) - the ordinary differential equations from the second order and higher orders (with constant and variable coefficients), systems from the ordinary differential equations– Laplace transfer and its applications in the solution of differential equations.				
Lecture	**2 hours / week**	**Laboratory**	**-**	**Tutorial**	**2hours / week.**

BAS112	**Electrical Engineering Fundamentals**	**5 Contact Hours**
Content	Direct Current - Theory of electric circuits- Delta and Star connections - Sine A.C and D.C circuits - Time vectors diagram- Electric power and power factor in A.C circuits - 3-Phase current - Electric machines - D.C machines – Transformers - Induction and synchronous machines - Fractional power machines. Basic concepts of programming: problem analysis and developing the programs charts – structured programming with one programming language - form of the program - repetition - branching - matrix – processes and functions – registers - pointers - connected lists - self repetition - the return. Concepts of object-Oriented programming: Classes, inheritance and message passing, fundamentals of Java programming language and its syntax - major class libraries in	

	Java - Java applets - Graphic User Interface programming – practice on Java programming language.				
Lecture	**3 hours / week**	**Laboratory**	**-**	**Tutorial**	**2 hours / week**

BAS113	**Engineering Thermodynamics**				**5 Contacts Hours**
Content	Fundamental concepts - Properties of a pure substance – Equation of state - thermodynamic systems - Work and heat - First law of thermodynamics; Applications to Systems and Control Volumes - Second Law of Thermodynamics; Principle of Carnot cycles; Heat engines, Refrigerators and heat pumps - Principle of the increase of entropy - Applications to systems and control volumes - Irreversibility and availability - Power and refrigeration cycles.				
Lecture	**3 hours / week**	**Laboratory**	**-**	**Tutorial**	**2 hours/ week.**

BAS114	**Technical English Language 2**				**4 Contact Hours**
Content	Fundamental concepts - Properties of a pure substance – Equation of state - thermodynamic systems - Work and heat - First law of thermodynamics; Applications to Systems and Control Volumes - Second Law of Thermodynamics; Principle of Carnot cycles; Heat engines, Refrigerators and heat pumps - Principle of the increase of entropy - Applications to systems and control volumes - Irreversibility and availability - Power and refrigeration cycles.				
Lecture	**2 hours / week**	**Laboratory**	**-**	**Tutorial**	**2 hours/ week.**

CIE111	**Structures Analysis 1**				**5 Contacts Hours**
Content	Basic concepts in structural analysis - Loads and reactions - Statically determinate beams - Statically determinate rigid frames - Statically determinate arches -Statically determinate trusses - Influence lines for statically determinate structures.				
Lecture	**3 hours / week**	**Laboratory**	**-**	**Tutorial**	**2 hours / week.**

CIE112	**Civil Engineering Drawing 1**				**4 Contact Hours**
Content	Introduction to civil engineering drawings: Irrigation works (earth works, crossing of roads, Retaining walls; Brick – plain concrete – Reinforced concrete – Bridges – Culverts – Syphons – Aqueducts – Weirs – Regulators –Escapes)				
Lecture	**1 hours / week**	**Laboratory**	**-**	**Tutorial**	**4 hours / week.**

Level: 1 Semester: 2

BAS121	Mathematics 4				4 Contact Hours
Content	Special functions – Fourier series - periodic functions and Euler's laws – Fourier's integrations – solutions of the differential equations by series - solving the partial differential equations using variables separation. Functions with complex variables – complex quantities algebra– multiple values functions - the analytical functions and Koshi's theorem - the complex series – Taylor and Lorant series - the zeros, unique points and the rest - the infinite series.				
Lecture	2 hours / week	Laboratory	-	Tutorial	2hours /week.

BAS122	Technical Report Writing				4 Contact Hours
Content	Writing the scientific reports by English language: The principles of report preparation - types of reports – formatting the reports – skills of figures and shapes – importing text – chart drawings – optical scanning for the pictures and documents – the border and notes operations in the reports. Saving and indexing the reports – searching for text – coping and safety of information – using the different computer programs packages for writing and demonstrating the reports.				
Lecture	2 hours / week	Laboratory	2	Tutorial	-

BAS123	Introductions to Information Technology				4 Contact Hours
Content	Introduction to the design and use of computer-based information systems - Software and hardware used in information systems - information requirements - Communication systems – Networking - The internet; the foundations, resources and uses of the internet, emphasizing practical skills for finding, reading and authorizing materials - Fundamentals of computer communication networks – Introduction to computer networking elements; communications architectures and protocols, HTML principles and applications - Case studies.				
Lecture	2 hours / week	Laboratory	-	Tutorial	2 hours / week

BAS124	Strength of Materials				4 Contact Hours
Content	Simple states of stress and strain -Torsion stresses - Bending and shearing stresses in beams - Compound stresses - Analysis of plane stress - Combined stresses - Analysis of thin-walled pressure vessels - Deflection of beams.				
Lecture	2 hours / week	Laboratory	1 hours /week.	Tutorial	1 hours /week.

CIE121	Structures Analysis 2				5 Contacts Hours
Content	Basic concepts in structure mechanics - Normal Stresses - Shear Stresses - Combined and Principal Stresses - Elastic deformations of statically determined structures - Statically indeterminate structures using the three moments equation.				
Lecture	3 hours / week	Laboratory	-	Tutorial	2 hours / week.

CIE122	Civil Engineering Drawing 2				4 Contact Hours
Content	Reinforced concrete works (Slabs – Beams – Columns – Foundations). Steel works (Beams and columns sections – compound sections – Beam connections– Beams and columns connections – column bases – trusses). AutoCAD Fundamentals of civil engineering drafting by way of computer aided drawing (CAD) software. Basic features and capabilities of CAD software and drafting fundamentals including orthographic projection, and, part dimensioning in 2dimensional drawings.				
Lecture	2 hours / week	Laboratory	-	Tutorial	2 hours / week.

Level: 2 Semester: 1

BAS211	Engineering Probability and Statistics				4 Contacts Hours
Content	Probability theory. Discrete and continuous probability distributions. Statistics in engineering. Descriptive Statistics Sampling distributions. Estimation and confidence intervals. Hypothesis testing. Simple regression.				
Lecture	2 hours / week	Laboratory	-	Tutorial	2hours / week.

BAS212	Fluid Mechanics				4 Contacts Hours
Content	Fluid properties, fluid statics, kinematics, fluid dynamics including energy and momentum equations, dimensional analysis, laminar flow, turbulent flow and its applications, forces on immersed bodies, introduction to compressible flow, applications to filtration and fluidization. Laboratory course in Fluid Mechanics includes experiments on venture-meter, friction losses in pipes, center of pressure, flow measuring apparatus, multi-pump test (Pump characteristics) and losses in piping systems.				
Lecture	2 hours / week	Laboratory	1hours / week	Tutorial	1hours /week

BAS213	Engineering Economy	3 Contacts Hours

Content	This course covers the basic concepts of engineering economics as applied to the evaluation of capital investment alternatives in both the private and public sectors of our economy. Attention is given to the time value of money by showing the concepts and techniques for evaluating the worth of products, systems, structures, and services in relation to their cost. Economic and cost concepts: calculating economic equivalence, comparison of alternatives and replacement economy. Economic optimization in design and operations. Cost estimation of products and systems.				
Lecture	**2 hours / week**	**Laboratory**	**-**	**Tutorial**	**1hours / week**

BAS214	**Computer Programming**		**4 Contacts Hours**		
Content	Basic concepts of programming: problem analysis and developing the programs charts – structured programming with one programming language -form of the program - repetition - branching - matrix – processes and functions - registers - pointers - connected lists - self repetition - the return. Concepts of object-Oriented programming: Classes, inheritance and message passing, fundamentals of Java programming language and its syntax – major class libraries in Java - Java applets - Graphic User Interface programming -practice on Java programming language.				
Lecture	**2 hours /week**	**Laboratory**	**2 hours / week.**	**Tutorial**	**-**

CIE211	**Structures Analysis 3**			**4 Contacts Hours**	
Content	Statically Indeterminate Structures using force method - Slope Deflection Method - Moment Distribution Method - Introduction to Stiffness Method.				
Lecture	**2 hours / week**	**Laboratory**	**-**	**Tutorial**	**2hours / week**

CIE212	**Properties and Strength of Concrete Materials**				**4 Contact Hours**
Content	Manufacture and types of cements, properties and grading of aggregates, concrete workability tests and factors affecting the workability, factors affecting concrete strength in tension, compression and flexure, durability of concrete, mix design. Manufacture of bituminous binders, properties of bituminous binders and mixtures, design and uses of bituminous mixtures. Manufacture of steel, composition and structure of steel, heat treatment of steel, alloy steels.				
Lecture	**2 hours / week**	**Laboratory**	**1 hours / week**	**Tutorial**	**1 hours / week.**

CIE213	Surveying 1				4 Contacts Hours
Content	Introduction to surveying, Mapping Using Linear Measurements, Different Types of Scales, Compass Surveying and Traverse Computations Area and volume Determination. Leveling: Type of levels, method of calculation, Vertical section: Profile and Cross sections, Contouring earth work. Theodolite: temporary and permanent adjustment of theodolite, measuring of horizontal and vertical angles, errors in measuring horizontal and vertical angles. Tachometric surveying: Stadia and Tangential method, Substance bar. Traversing: Omitted observations, link traverse.				
Lecture	2 hours / week	Laboratory	1 hours / week	Tutorial	1 hours / week

Level: 2 Semester: 2

BAS221	Numerical Methods in Engineering				4 Contacts Hours
Content	Numerical solution of linear and nonlinear systems - Numerical differentiation and integration - Curve fitting and interpolation - Numerical solution of initial value problems - Boundary and Eigen value problems.				
Lecture	2 hours / week	Laboratory	-	Tutorial	2 hours /week.

CIE221	Hydrology and Irrigation Engineering				4 Contacts Hours
Content	Hydrology: Hydrologic cycle; Precipitation (types of precipitation –measurements of precipitation – estimates of missing data – double mass curve– mean areal depth of precipitation). Hydrologic losses (evaporation -evapotranspiration – interception –infiltration). Hydrograph (rainfall-runoff relationship – hydrograph – unit hydrograph – S-curve). Irrigation Engineering; water requirements – control and management for distribution of irrigation water – planning and design of irrigation and drainage networks – sprinkler irrigation – drip irrigation – covered drainage.				
Lecture	2 hours / week	Laboratory	-	Tutorial	2 hours / week

CIE222	Reinforced Concrete 1	6 Contacts Hours
Content	Introduction to reinforced concrete - Design criteria - Design of sections subjected to moments - Bond length between concrete and steel bars -	

	Shear in beams - Design of one way and two-way slabs- Load calculation in slabs and beams.				
Lecture	**4 hours / week**	**Laboratory**	**-**	**Tutorial**	**2 hours / week.**

CIE223	**Surveying 2**			**4 Contacts Hours**	
Content	Setting out of horizontal and vertical curves. Introduction to theory of errors and error analysis of surveying measurements. Coordinate transformations. Coordinate computations: Intersection, and resection. Modern methods for distance measurements: Electromagnetic Distance Measurement (EDM) and Total Station. Introduction to Geodesy. Introduction to Global Positioning System (GPS)				
Lecture	**2 hours / week**	**Laboratory**	**1 hours / week.**	**Tutorial**	**1 hours / week.**

CIE224	**Traffic and Transportation Engineering**			**4 Contacts Hours**	
Content	Principles of traffic engineering. Road-user and vehicle characteristics. Travel time, speed and volume studies. Highway capacity. Pedestrian, parking and accident studies. Traffic control devices. Intersections and Grade-separations. Cross-section elements, sight distances, and horizontal and vertical alignments. Principles of transportation planning. Transportation systems planning and demand analysis. The 3-steps model of urban transportation planning.				
Lecture	**2 hours / week**	**Laboratory**	**-**	**Tutorial**	**2 hours / week.**

CIE225	**Principles of Building Construction**			**4 Contacts Hours**	
Content	Building construction techniques; conventional methods, construction automation, Prefabricated methods. Architecture drawings and details, steps of the construction of a building, foundations, staircases, roofs, walls, paint, floorings, electrical and plumbing services, principles of architecture – theories – architecture panels details – basic architecture principles (utility – service – ventilation – properties).				
Lecture	**2 hours / week**	**Laboratory**	**-**	**Tutorial**	**2 hours / week.**

CIE226	**Training 1**

Content	Students should spend 4 weeks in field training, after completing the Second level, in any Engineering Institution or Engineering Firms. Students should demonstrate the professional and practical skills they acquired during discussion with their assigned tutors.				
Lecture	**-**	**Field**	**35 hours / week**	**Tutorial**	**-**

Level: 3 Semester: 1

CIE311	**Reinforced Concrete 2**				**4 Contacts Hours**
Content	Design of hollow block slabs - Design of sections subjected to torsion - Design of flat slabs - Design of paneled beam slabs - Design of stairs.				
Lecture	**4 hours / week**	**Laboratory**	**-**	**Tutorial**	**2 hours / week.**

CIE312	**Geology and Soil Mechanics 1**				**4 Contacts Hours**
Content	Geology; Sources and Processes for geological component needed for construction, minerals and rocks types. Structure geology and influence of geological features on engineering works. Soil Physical properties; Soil Formation, Weight–Volume Relationships, Plasticity and Structure of Soil, Classification of Soil, Soil Compaction. Soil Mechanical properties; permeability, seepage, Stress Distribution, Consolidation, Shear strength, Various laboratory experiments are performed to illustrate the basic principles of soil mechanics.				
Lecture	**2 hours / week**	**Laboratory**	**1 hours / week**	**Tutorial**	**1 hours / week**

CIE313	**Open Channel Hydraulics**	**4 Contacts Hours**
Content	Basic concepts (section properties – classification of flow – parallel and curvilinear flow – Saint Venant equations – velocity distribution – velocity coefficients – boundary layer). The energy principles (specific energy and specific discharge – the transition problem – choking phenomena – control section – discharge measuring). The momentum principles (hydraulic jump –momentum function – jump classification – surge in open channel). Flow resistance (shear stress on wetted perimeter – resistance equations – channels with composite roughness). Gradually varied flow (types of slopes – dynamic equation of G.V.F – classification of flow profile – methods of computations).Design of channel for uniform flow (erodible and non-erodible channels – best	

	hydraulic sections – maximum permissible velocity method – tractive force method).				
Lecture	**2 hours / week**	**Laboratory**	**1 hours / week.**	**Tutorial**	**1 hours / week.**

CIE314	**Steel Structures Design 1**				**6 Contacts Hours**
Content	Design of steel structures; Tension and compression members; Beams; Beam-columns; Built-up members; Plate girders; Connection; Design practice; Tutorial design workshops.				
Lecture	**4 hours / week**	**Laboratory**	**-**	**Tutorial**	**2 hours / week.**

CIE315	**Highways and Airport Engineering**				**4 Contacts Hours**
Content	Strength & stabilization of subgrade soils. Unbound materials characterization. Sources of asphalt, characteristics of asphalt binder and asphalt mixtures. Design of asphalt mixtures. Design of Flexible and Rigid pavements. Pavement drainage. Introduction to Airport Engineering. Aircraft characteristics. Air traffic control. Airport configuration, components, and capacity. Design of airport components.				
Lecture	**2 hours / week**	**Laboratory**	**-**	**Tutorial**	**2 hours / week.**

CIE316	**Water Supply Engineering**				**4 Contacts Hours**
Content	Sources of water supply - drinking water standards, quality requirement, groundwater collecting; Design of Collection, purification and distribution Works; screening coagulation and flocculation, sedimentation, filtration, disinfection, softening removal, taste and odor removal, underground and elevated tanks. Design of distribution networks. Cold water systems.				
Lecture	2 hours / week	**Laboratory**	**-**	**Tutorial**	2 hours / week.

Level: 3 Semester: 2

BAS321	**Project Management and Control**				**4 Contacts Hours**
Content	Introduction to Project Management – Project Planning and Scheduling –Network based Scheduling – Critical Path Method (CPM) – Program Evaluation & Review Technique (PERT) – Probability Aspects of Project Completion Time – Project Cost Control - Resource Allocation – For casting Funds Requirements.				
Lecture	**2 hours / week**	**Laboratory**	**-**	**Tutorial**	**2 hours / week.**

CIE321	Reinforced Concrete 3				5 Contacts Hours
Content	Design of halls with beam girders - Design of frames - Design of arches - Design of trusses and Vierendeel girder - Design of saw tooth roofs.				
Lecture	3 hours / week	Laboratory	-	Tutorial	2 hours / week.

CIE322	Soil Mechanics and Foundation				4 Contacts Hours
Content	Stresses in soil and compressibility; Settlement and Contact Pressure -Consolidation of soil - Ground Improvement -Lateral Earth Pressure and Stability of Slopes - Bearing Capacity - Subsoil Investigation. Foundation Design; Introduction to Foundation Engineering, Design of Strip, Isolated, Combined footing, Strap beam and Raft foundations.				
Lecture	2 hours / week	Laboratory	-	Tutorial	2 hours / week.

CIE323	Computer Applications in civil Engineering				4 Contacts Hours
Content	Use the computer in the analysis of structural problems; concrete beams, columns and slabs; steel beams, columns and beam-columns – and in the analysis of water resources and environmental engineering problems. Computation of uniform and gradually varied flows in open channels. Pipe network design. Sewer system modeling. Design of water and wastewater treatment facilities for each area, the necessary theoretical background reviewed and discrete modeling methods as implemented in computer programs discussed and applied to selected problems. Extensive use of microcomputers.				
Lecture	2 hours / week	Laboratory	-	Tutorial	2 hours / week.

CIE324	Steel Structures Design 2				5 Contacts Hours
Content	Steel frames design – riveted and bolted connections – high strength bolted connections – welded constructions – base connections – roof trusses – rigid frames design.				
Lecture	3 hours / week	Laboratory	-	Tutorial	2 hours / week.

CIE325	Training 2
Content	Students should spend 6 weeks in field training, after completing the Third level, in any Engineering Institution or Engineering Firms. They should prepare a technical report implying a full description of the

	processes they joined for training. Students should demonstrate the professional and practical skills they acquired during discussion of report with their assigned tutors.				
Lecture	**-**	**Field**	**35 hours / week**	**Tutorial**	**-**

CIE326	**Water and wastewater treatment**				**4 Contacts Hours**
Content	Introduction to sewerage works. Characteristics and sources of wastewater; domestic, industrial, rain and infiltration. Calculation of discharges. Design of sewer pipes and manholes. Pump stations. Collection works of sewerage system. Primary and secondary treatment. Sludge treatment and disposal.				
Lecture	**2 hours / week**	**Laboratory**	**-**	**Tutorial**	**2 hours / week.**

Level: 4 Semester: 1

CIE411	**Foundation Engineering 1**				**4 Contacts Hours**
Content	Introduction to Deep foundations; Pile types, piles classifications, Design of pile foundation, pile loading and pile capacity, Geotechnical pile capacity, Lateral load capacity of piles, pile settlement, pile loading tests, Design of pile cap.				
Lecture	**2 hours / week**	**Laboratory**	**-**	**Tutorial**	**2 hours / week.**

CIE412	**Inland Navigation and Harbor Engineering**				**4 Contacts Hours**
Content	Kinds of Harbors, Studies of the Natural Phenomena, Quays, Hydraulic Model Studies, Planning of Harbors, Light Houses and Guiding Signals, Breakwaters, Spillways, Dry Docks, Inland Navigation.				
Lecture	**2 hours / week**	**Laboratory**	**-**	**Tutorial**	**2 hours / week.**

CIE413	**Design of Irrigation Works**				**4 Contacts Hours**
Content	Introduction to irrigation works, design of crossing structures (Culverts, bridges, syphon, aqueducts). Retaining walls (Gravity, cantilever, and counterfort). Design of floor for heading up works and stilling basic brief idea on navigation structures (locks).				
Lecture	**2 hours / week**	**Laboratory**	**-**	**Tutorial**	**2 hours / week.**

CIE414	Project 1 *				5 Contacts Hours
Content	The graduation project aims to explore students' ability and skills to comprehensively address and manage architectural and technical issues associated with a large-scale design project. The project examines and measures students' knowledge, skills, and collective outputs gained throughout their study in the faculty and department in a combined manner, that reflects identity and creativity in all its preliminary and analytical phases. A complete set of appropriately presented drawings, accompanied by a detailed report of the project's attributable studies and potential considerations should be implemented by each student.				
Lecture	3 hours / week	Laboratory	2 hours / week.	Tutorial	-

CIE415A	Bridge Engineering				4 Contacts Hours
Content	Different types of bridges – different methods in bridges construction –load calculations and its different effects – methods of bridges design using the standard specifications codes – using commercial computer packages for bridge design. Planning of bridge projects; Design, analysis and construction of various types of bridges including reinforced and pre stressed concrete bridges, steel bridges, composite bridges, and cable-supported bridges.				
Lecture	2 hours / week	Laboratory	-	Tutorial	2 hours / week.

CIE415B	Coastal Engineering Fundamentals				4 Contacts Hours
Content	Effect of waves on coastal structures, design of seawalls and breakwaters, jetties, harbors, ship channels and pipelines, intentional and accidental discharge of pollutants, diffusion and spreading, oil spill containment and collection, wave theory and applications to engineering problems, analysis of wave data.				
Lecture	2 hours / week	Laboratory	-	Tutorial	2 hours / week.

CIE415C	Concrete Structures Technology				4 Contacts Hours
Content	Concrete mixing method, mixing time, delivery, pumping and casting. Concrete casting method and precautions. Concrete compaction method. Concrete surface finishing. Concrete curing method, curing time and precautions. Casting concrete in hot weather and its precautions. Self-compact concrete manufacturing, pumping, casting and testing. Hot weather concrete. Special type of concrete. Quality control.				
Lecture	2 hours / week	Laboratory	-	Tutorial	2 hours / week.

CIE415D	Construction Contraction				4 Contacts Hours
Content	Construction contracting for contractors, architects, owners. Organization and administration; industry structure, construction contracts, bonds, insurance. Planning, estimating, and control, quantity takeoff and pricing, labor and equipment estimates, estimating excavation and concrete, proposal preparation, scheduling, accounting and cost control. Students use contract documents to prepare detailed estimate.				
Lecture	2 hours / week	Laboratory	-	Tutorial	2 hours / week.

CIE415E	Cost Analysis for Structure projects				4 Contacts Hours
Content	Direct costs – indirect costs – collective systems - comparisons between projects – fundamentals of cost analysis for wood, steel and concrete buildings– preparing project and report writing – case study.				
Lecture	2 hours / week	Laboratory	-	Tutorial	2 hours / week.

CIE415F	Highway and Airport Engineering				4 Contacts Hours
Content	Application of soil classification methods, material characterization, sub-grade and sub-base stabilization, material variability and quality control, pavement evaluation and rehabilitation, highway construction.				
Lecture	2 hours / week	Laboratory	-	Tutorial	2 hours / week.

CIE415G	Modern Structure Materials				4 Contacts Hours
Content	High strength concrete. High performance concrete. Ultra-high strength concrete. Ultra-high-performance concrete. Light weight concrete. Supplementary cementing materials. Compound materials and their applications. Insulating materials				
Lecture	2 hours / week	Laboratory	-	Tutorial	2 hours / week.

CIE415H	Planning of Buildings Maintenance and Protection	4 Contacts Hours
Content	Building maintenance important, objective, type, planning, cost and problem. Types of cracks and damages. Non-destructive test. Repairs	

	and protection materials. Method and techniques of repair. Isolation of buildings and structural elements against moisture. Technical reports				
Lecture	**2 hours / week**	**Laboratory**	**-**	**Tutorial**	**2 hours / week.**

CIE415I	**Reliability of Structures**			**4 Contacts Hours**
Content	Fundamental concepts related to structural reliability, safety measures, load models, resistance models, and system reliability. Optimum safety levels and optimization of design codes.			
Lecture	**2 hours / week**	**Laboratory**	**-**	**Tutorial**	**2 hours / week.**

CIE415J	**Environmental Pollution Control**			**4 Contacts Hours**
Content	Quality factors for environmental control. Population and resource use. Air pollution, water pollution, land pollution. Solid waste management. Thermal pollution, noise pollution. Radiation. Energy and the environment. Prediction and assessment of environmental impact. Problems of developing nations. Case studies			
Lecture	**2 hours / week**	**Laboratory**	**-**	**Tutorial**	**2 hours / week.**

CIE416A	**Design of Earthquake Structures**			**4 Contacts Hours**
Content	Earthquakes: causes, seismic waves, scales, equation of motion for single degree of freedom and multi-degree of freedom systems – Structures behavior under random forces – Spectral analysis depending on soil conditions – Modal analysis for multi-strong buildings – design principles for earthquake structures according to the Egyptian code.			
Lecture	**2 hours / week**	**Laboratory**	**-**	**Tutorial**	**2 hours / week.**
CIE416B	**Design of Marine Platforms**			**4 Contacts Hours**
Content	Marine platform (definition – types), loads affecting the marine platforms – tide and wind forces – design of fixed marine platforms.			
Lecture	**2 hours / week**	**Laboratory**	**-**	**Tutorial**	**2 hours / week.**

CIE416D	**Engineering Project Evaluation**	**4 Contacts Hours**
Content	Fundamentals of project appraisal and feasibility study; Planning of civil engineering projects; Economic analysis of civil engineering	

	projects; Introduction to environmental impact assessment and social impact assessment; Case studies on civil engineering project appraisal.				
Lecture	**2 hours / week**	**Laboratory**	**-**	**Tutorial**	**2 hours / week.**

CIE416E	**Fiber Reinforced Cement Composites**				**4 Contacts Hours**
Content	Fiber-reinforcement of cement-based matrices, continuous and discontinuous fibers, and meshes. Fiber-reinforced concrete and Ferro-cement. Laminated cementations composites. Behavior and mechanical properties. Mechanics of fiber reinforcement. Constitutive models. High-strength, high-performance fiber composites. Hybrid and smart composites. Lectures, projects and laboratory.				
Lecture	2 hours / week	Laboratory	-	Tutorial	2 hours / week.

CIE416F	**Project Decision Analysis**				**4 Contacts Hours**
Content	Quantitative methods of decision-making. Important mathematical models useful in decision processes. Model-structure assumptions, limitations and methods for use. Concepts and models of support systems for management decision problems.				
Lecture	**2 hours / week**	**Laboratory**	**-**	**Tutorial**	**2 hours / week.**

CIE416G	**Project Financial Management**				**4 Contacts Hours**
Content	Cash flow and its analysis -project budget - project financial methods - risk and cost control - financial path for project - time value - profit rate - inflation effects.				
Lecture	**2 hours / week**	**Laboratory**	**-**	**Tutorial**	**2 hours / week.**

CIE416H	**Risk Management and Constructions Safety**				**4 Contacts Hours**
Content	Principles and practice regarding safety in building. Accidental prevention and safety control. Fire control. Fire resistance of building materials, safety provisions for fire and other hazards in building. Safety standards and codes. Governmental regulations and inspection procedures.				
Lecture	**2 hours / week**	**Laboratory**	**-**	**Tutorial**	**2 hours / week.**

CIE416I	Air Conditioning Systems for Building				4 Contacts Hours
Content	Psychometric and process of air. Cooling load estimation. Refrigeration cycles. Water chiller systems. Air handling system. Cooling towers. Equipment selection. Installation, operation and maintenance of air conditioning systems.				
Lecture	2 hours / week	Laboratory	-	Tutorial	2 hours / week.

CIE416J	Construction Estimating and Trending				4 Contacts Hours
Content	Principles of construction cost estimating; Quantity takeoff; Methods of detailed cost estimating; Analysis of labor and equipment costs; Construction tendering process; Bidding and contracting systems for construction projects; Laws and regulations related to the construction industry.				
Lecture	2 hours / week	Laboratory	-	Tutorial	2 hours / week.

Level: 4 Semester: 2

BAS421	research and analytical skills				2 Contacts Hours
Content	Analysis Skills: Framework for analyzing engineering problems taking into account technical, economic, environmental, and ethical issues. Phases of problem solving (Understanding the problem and formulating it, Solution plan, Implementation plan, Evaluation, and Revision). Role of creativity in the analysis. SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis for different alternatives. Detailed Cost - Benefit analysis and Risk analysis. Role of cooperation and team - work in analyzing large engineering problems. Importance of finding the relevant data, information, and knowledge. Search Skills: Basic Web search methods and how to formulate search engine queries using logical connectives (e.g. AND, OR, NOT). Phrase, title, domain, URL, and link search. Evaluating search results, choosing the appropriate search engine. Importance of evaluating the credibility of the different Web sites.				
Lecture	2 hours / week	Laboratory	-	Tutorial	-
BAS422	Environmental Management				3 Contacts Hours
Content	The importance of studying environmental science – modern technology and its effect on the environment – quality of the environment and development elements – sources of environmental pollution and method of control (air pollution – water pollution – solid				

	wastes pollution – noise) – economics of environmental pollution control – legislations for the environment protection.				
Lecture	**1 hours / week**	**Laboratory**	**-**	**Tutorial**	**2 hours / week**

CIE421	**Legislation and contracts**			**3 Contacts Hours**	
Content	التشريعات والقوانين في صناعة البناء – تعريفات (الجوانب التشريعية والقانونية في صناعة التشييد –المفاهيم القانونية في مجال عقود التشييد – عقود التشييد وأنواعها – الأنواع المختلفة لعقود المقاولة –أنواع الالتزام في عقد المقاولة) تبصر المهندس بمسئولياته وحقوقه التي ينظمها القانون وتحدد علاقته بأطراف مثلث التشييد (المالك – المقاول – المهندس). استعراض بنود القانون المدني الخاصة بعقد المقاولة من ماده (646) وحتى ماده (667). استعراض بعض القوانين والتشريعات التي تتعرض للعمل الهندسي ولوائحها وشرحها نظريا واعطاء بعض الأمثلة التطبيقية على سبيل المثال قانون البناء الموحد وقانون المناقصات والمزايدات.				
Lecture	**2 hours / week**	**Laboratory**	**-**	**Tutorial**	**1 hours / week.**

CIE422	**Reinforced Concrete 4**			**4 Contacts Hours**	
Content	Design of water structures - Design of concrete sections subjected to moments without cracking - Design of rectangular tanks - Design of circular tanks - Design of elevated tanks				
Lecture	**2 hours / week**	**Laboratory**	**-**	**Tutorial**	**2 hours / week.**

CIE423	**Project 2 ***			**6 Contacts Hours**	
Content	Continuation and conclusion of the investigations on the civil problems of Project 1; written reports and team presentations are required.				
Lecture	**2 hours / week**	**Laboratory**	**-**	**Tutorial**	**4 hours / week.**

CIE424A	**Groundwater Hydraulics**	**4 Contacts Hours**
Content	Fundamentals of Groundwater and Properties of Soil (types of aquifers –porosity – rock and water – degree of saturation – hydraulic conductivity and intrinsic permeability). Groundwater movement and well hydraulics (Darcy law– direction of the hydraulic gradient – groundwater recharge – seepage through porous media – homogeneity and isotropy – flow in stratified media – steady and unsteady flow toward a well in various types of aquifers) . Well design and construction (well design – well construction and maintenance). Saltwater intrusion in coastal aquifers (introduction – Ghyben-Herzberg equation –formulation of saltwater intrusion – modeling of saltwater intrusion – theory of images – controlling of saltwater intrusion).	

Lecture	**2 hours / week**	**Laboratory**	**-**	**Tutorial**	**2 hours / week.**

CIE424B	**Pavement Design**			**4 Contacts Hours**	
Content	Characteristics of pavement loads, stress analysis in pavements, design practices, construction, rehabilitation and maintenance, optimization of the design of rigid and Flexible pavements systems, empirical and mechanistic stochastic structural subsystems, utility theory, serviceability concept, cost studies, traffic delay, environmental deterioration, and rehabilitation and maintenance optimization systems.				
Lecture	**2 hours / week**	**Laboratory**	**-**	**Tutorial**	**2 hours / week.**

CIE424C	**Pre-fabricated Concrete Frames**			**4 Contacts Hours**	
Content	Prefabricated concrete performance – design of concrete supported to shear stress – design of Columbus – roofs and building frame – design project using the computer – detailed report.				
Lecture	**2 hours / week**	**Laboratory**	**-**	**Tutorial**	**2 hours / week.**

CIE424D	**Project Management 2**			**4 Contacts Hours**	
Content	Construction Projects Work Breakdown Structure (WBS) – Time Planning and Scheduling Techniques: "Networks – Line of Balance Method for Repetitive Units Projects" – Cash Flow – Cost Planning: "Cost Estimation – Cost Control" – Using Computer Programs in Construction Project Management				
Lecture	**2 hours / week**	**Laboratory**	**-**	**Tutorial**	**2 hours / week.**

CIE424E	**Project Visibility Study**			**4 Contacts Hours**	
Content	The importance of visibility study for the projects - the definition of the visibility study and the historical development for it - the project essence and its principles and forms – initial visibility studies and its elements - environmental visibility studies - important financial sides in visibility study - the important monetary sides in visibility study - the important marketing sides - the exhibition of the products and the effective parameters in it - the pricing policies - the situation of the government, the consumer and the competitive projects - the engineering and technical visibility for the project - study of the social visibility – evaluation methods of the visibility study.				
Lecture	**2 hours / week**	**Laboratory**	**-**	**Tutorial**	**2 hours / week.**

CIE424F	Urban Transportation Planning				4 Contacts Hours
Content	Land use-transportation interaction. The process of urban transportation planning, urban transport problems, goals, and objectives, data and information, survey design, travel demand forecasting: 1) trip generation, 2) trip distribution, 3) modal choice, 4) route assignment. The evaluation of urban transport systems, transport system management, demand management, and control.				
Lecture	2 hours / week	Laboratory	-	Tutorial	2 hours / week.

CIE424G	Special Concrete Structures 1				4 Contacts Hours
Content	Introduction to tall building structures. Design criteria for tall building structures. Loading. Structural formation. Modeling for analysis. Braced frames. Rigid frames. Shear walls.				
Lecture	2 hours / week	Laboratory	-	Tutorial	2 hours / week.

CIE424H	Foundation Engineering 2				4 Contacts Hours
Content	Soil Hydraulics; Introduction to soil hydraulics - hydraulic Conductivity determination - Flow through porous media - One dimensional flow two dimensional flows. Deep foundation; Sheet pile design - Determination of pile capacity - Design of pile cap - Retaining walls.				
Lecture	2 hours / week	Laboratory	-	Tutorial	2 hours / week.

CIE424I	Productivity Enhancement Methods				4 Contacts Hours
Content	Identification of bottlenecks; impact of human performance on productivity. Effect of the interaction between technological advances and human capabilities on performance and productivity. Cost reduction and productivity improvement programs.				
Lecture	2 hours / week	Laboratory	-	Tutorial	2 hours / week.

CHE424j	Quality Assurance				4 Contacts Hours
Content	Reliability of parallel and serial engineering systems. Life testing. Impact of reliability on the design process in engineering fields such as mechanical, electrical and structural engineering. Studies the effect of equipment reliability on product quality				
Lecture	2 hours / week	Laboratory	-	Tutorial	2 hours / week.

CIE425A	River Engineering				4 Contacts Hours
Content	Classifications of rivers, data collection method; Velocity and flow rate measurement, design of hydraulic structures: dike, spillway, dam, gate, pumping station, sheet pile, Countermeasure on sediment control: corrosion, deposition, scour, bill of quantity and cost estimation, operation and maintenance.				
Lecture	2 hours / week	Laboratory	-	Tutorial	2 hours / week.

CIE425B	Hydraulics Engineering				4 Contacts Hours
Content	Basic governing equations of fluid flow (Bernoulli – continuity – application) Flow through orifices (types of orifices – venacontracta – hydraulic coefficients – flow through different types of orifices – time for filling and emptying tanks). Flow over weirs (types of weirs – flow over different types of weirs). Momentum equation (application of momentum equation). Steady flow in pipelines (basics of flow in pipelines – hydraulic analysis of pipe network). Unsteady flow in pipelines (water hammer – Euler equation – continuity equation – application). Hydraulic machinery (design of pump station)				
Lecture	2 hours / week	Laboratory	-	Tutorial	2 hours / week.

CIE425C	Traffic Control System				4 Contacts Hours
Content	Introduction to existing and new traffic control systems strategies including both off-line signal optimization techniques and real-time computer traffic-responsive control concepts. Control concepts and methods for signal intersections, arterial systems and area traffic networks. Traffic control system evaluation techniques using Measures of Effectiveness (M.O.E.) for single intersections, arterial, and networks.				
Lecture	2 hours / week	Laboratory	-	Tutorial	2 hours / week.

CIE425D	Tunneling and Underground Excavation	4 Contacts Hours
Content	Introduction to tunnels –numerical methods in tunnel constructions– computer software packages and its applications in tunnels. Tunneling and excavations in hard rock - basic rock mechanics, shape, size and orientation of an opening, elastic deformation and the Kirsch solution, rock mass classification, support design and ground reaction curve, drill and blast method, NATM tunneling method. Tunneling in soft ground -	

	problems of urban tunneling, deformation and surface settlement, load on liners, face stability, methods of soft ground tunneling including EPB and slurry shield methods. Selection of methods of attack for excavation of tunnels and deep vertical sided openings. Tunneling procedures based on behavioral characteristics of soil and rock, study of tunnel boring machines, shielded and drill-and-blast operations, linings, soil linear interaction. Deep excavation procedures related to support of excavation systems, methods of installation and dewatering.				
Lecture	**2 hours / week**	**Laboratory**	**-**	**Tutorial**	**2 hours / week.**

CIE425E	**Special Concrete Structures 2**			**4 Contacts Hours**	
Content	Introduction to Composite construction – materials of composite constructions – simply supported composite beams – continuous beams – The shear connections – composite columns – composite slabs.				
Lecture	**2 hours / week**	**Laboratory**	**-**	**Tutorial**	**2 hours / week.**

CIE425F	**Railway Engineering**			**4 Contacts Hours**	
Content	Engineering principles for railways planning – railways components and specifications – design of different parts of railways – types of stations – types of signals – maintenance – planning of the railway's lines – transportation economy –management and insurance.				
Lecture	**2 hours / week**	**Laboratory**	**-**	**Tutorial**	**2 hours / week.**

CIE425G	**Reinforced Concrete 5**			**4 Contacts Hours**	
Content	Design of shell structures - Design of Pre-stressed reinforced concrete				
Lecture	**2 hours / week**	**Laboratory**	**-**	**Tutorial**	**2 hours / week.**

CIE425H	**Design of Lighting Systems for Buildings**			**4 Contacts Hours**	
Content	Principles of lighting, lighting design for buildings which includes artificial lighting, point, line and area light sources, types and properties of luminaries, polar curves, design methods and calculations, glare index, lighting design standard, luminaries heat recovery system and lighting energy management, hybrid lighting, day lighting of buildings, effect of climate on lighting.				
Lecture	**2 hours / week**	**Laboratory**	**-**	**Tutorial**	**2 hours / week**

CIE425I	**Soil Dynamics**	**4 Contacts Hours**

Content	Introduction to Soil Dynamics: Fundamentals of vibrations – Soil dynamic properties – Soil liquefaction – Propagation of waves – Analysis of seismic response– Soil –structure dynamic interaction						
Lecture	**2 hours / week**	**Laboratory**	**-**	**Tutorial**	**2 hours / week**		
CIE425J	**Introduction to Earthquake Engineering**						**4 Contacts Hours**
Content	Introduction to Earthquake Engineering: Properties of earth motion – Tectonic Plates – Seismic waves – Faults – Magnitude scale Intensity scale – Measuring earthquake – Earthquake risk – seismic maps – International codes provisions for seismic design of structures included Egyptian code of practice for Soil Mechanics and Foundation Design.						
Lecture	**2 hours / week**	**Laboratory**	**-**	**Tutorial**	**2 hours / week**		