Program Specification

For

Doctor of Philosophy Degree

in

Civil Engineering

2019-2020

Program Specification
For
PhD of Science Degree in
Civil Engineering

A- Basic Information

1- Program title: Civil Engineering.

2- Program type: **Single** ☑ **Double** ☐ **Multiple** ☐

3- Department (s): Civil Engineering
4- Assistance Coordinator: Dr. Ahmed Turk
5- Coordinator: Prof. Dr. Hassan M. Hassan
6- External evaluator(s): Prof. Dr. Hassan Ibrahim M.
7- Last date of program specifications approval: Bylaw 2000.

B- Professional Information

1- INTRODUCTION

Civil Engineering is constantly widening its scope in every field of engineering. The prime work of the Civil engineer is to design, fabricate, produce, test and supervise the manufacturing of civil engineering different elements that suits the various industries. The program is devided into three main branches, namely, Structural Engineering branch, Irrigation and Hydraulic Engineering branch, and Public Works branch. This postgraduate master program in Civil Engineering transforms graduate engineers to high-quality technical professionals and research scholars who can meet the requisite requirement of educational institutes, R&D organizations, and business industry. The Structure Engineering program is focused in emerging fields of analysis and design. Also, it was designed to cover the fields of Numerical analysis in structural engineering, Theories of elasticity and plasticity, stress and strain analysis, design of high rise buildings, construction materials, soil mechanics, productivity in the construction engineering, statistics in structural engineeing, and computing knowledge required to acquire this advanced knowledge. For the Irrigation and Hydraulic Engineering program, the program is focused in computer application in hydraulic engineering, water resources, flow and contaminants transportation, water waves and wave theory, sediments motion, and design of breakwater systems. The public work engineering program is focused in transportation engineering, design of roadways, computer application in transportation systems, and advanced domestic waste water treatment. In general, this PhD program

is to produce a well-rounded and well-balanced graduate who can use Civil Engineering tools in different branches to solve real world problems.program.

2- Graduate Attributes :

After completing the program the graduate would be able to

A. Proficiency in the application of the basics and the methodologies of scientific research and the use of its different tools to serve professional practice in the field of Civil Engineering.
B. Apply the analytical approach and using it in the field of Civil engineering, as well as the topics that affect his/her professional practice.
C. Apply the specialized knowledge integrated with and the use of appropriate engineering tools, such as, computational facilities, laboratory equipment, necessary for his / her professional practice and project management.
D. Show awareness of current problems and modern visions in the field of Civil Engineering.
E. Identify professional problems and find solutions for it.
F. Mastery of an appropriate range of specialized professional and intellectual skills and the use of appropriate technology means to carry out a research study, writing a scientific methodology plain. Add new information to the knowledge and write scientific paper.
G. Communicate effectively and lead team works effectively.
H. Take good decisions in different professional contexts
I. Employ available resources to achieve and maintain the highest benefit
J. Show awareness of his / her role in community development and environmental conservation in the light of the global and regional variables
K. Display professional responsibilities and ethical, societal and cultural concerns.
L. Specialized engineering concepts related to his / her professional practice in the field of Civil Engineering.
M. Recognize the need to engage to develop him / her academically and being able to learn continuously in the field of Civil Engineering.
N. Carry out a research study and writing a scientific methodology
O. Orientation to develop of methods, tools and new techniques of professional practice.
P. Use of appropriate technology to serve professional applications.

3- Program Aims:

The graduate of the Master program must be able to:

1. Gain a depth of knowledge, understanding, and methodologies of scientific research including professional skills, pertinent software and appropriate technological means to make decisions, employ available resources efficiently, develop new skills to deal with high level complex problems, and engage in continuous learning practice in the field of Civil engineering.
2. Demonstrate sufficient essential knowledge and a deep understanding of concepts, theories, and practice in the field of Civil engineering, as well as the topics that affect his/her professional practice.
3. Apply the analytical approaches and its technological professional skills to develop techniques for

identifying, formulating, solving, analyzing, and designing Civils engineering problems.

4. Communicate and lead team works effectively through professional system considering the detrimental impact of the engineer role on society, environment, societal and cultural concerns.
5. Demonstrate knowledge of contemporary, current, and advanced engineering issues related to Civils engineering problems.
6. Adopt basics and principles of quality and fundamentals of ethical & legal professional practice of scientific research in the field of Civil engineering.
7. Carry out a research study and writing a scientific methodology plain and add new information to the knowledge and write scientific paper.
8. Develop of methods, tools and new techniques of professional practice and use of appropriate technology to serve professional applications.

4- Graduate Attributes with Program Aims

Program Aims	Graduates Attributes
1. Gain a depth of knowledge, understanding and methodologies of scientific research including professional skills, pertinent software and appropriate technological means to make decisions, employ available resources efficiently, develop new skills to deal with a high level complex problems, and engage in continuous learning practice in the field of Civil engineering.	A, F I, and H
2. Demonstrate sufficient essential knowledge and a deep understanding of concepts, theories, and practice in the field of Civil engineering, as well as the topics that affect his/her professional practice.	C, D, and F
3. Apply the analytical approaches and its technological professional skills to develop techniques for identifying, formulating, solving, analyzing, designing, and analyze risks of the professional practice in Civils engineering.	B, E, and K
4. Communicate and lead team works effectively through professional system considering the detrimental impact of the engineer role on society, environment, societal and cultural concerns.	G,J and K
5. Demonstrate knowledge of contemporary, current, and advanced engineering issues related to Civils engineering problems.	L
6. Adopt basics and principles of quality and fundamentals of ethical & legal professional practice of scientific research in the	M

field of Civil engineering.	
7. Carry out a research study and writing a scientific methodology plain and add new information to the knowledge and write scientific paper.	N
8. Develop of methods, tools and new techniques of professional practice and use of appropriate technology to serve professional applications.	O,P

5- Intended Learning Outcomes (ILOs) for the whole program

Civil Engineering Master Program is designed to achieve the above objectives through the following Intended **Learning Outcomes (ILOs)**:

A. Knowledge and understanding			
NAQAAE Academic Reference Standards (ARS)	**ILOs**	**Graduate Attributes**	**Courses Covering such ILOs (by code)**
A1. Theories and basics related to learning field, as well as other related fields. **النظريات و الأساسيات المتعلقة بمجال التعلم وكذا في المجالات ذات**	a1-1 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in the field of **Structural Engineering**.	A, C, F	CES 601,CES614, CES 615, CES 616, CES 617, CES 618,CES621, CES612 ,CES603,CES608,CES609,CES604, CES605, CES611, CES612, CES613,CES619,CES623, CEI613,CEI614,CEI617,CEI620, CEP604

العلاقة	a1-2 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in the field of **Irrigation and hydraulic Engineering**.		CES 606, CES612,CES603 CES608,CES609, CES604, CES605, CES611,CES612, CES613, CES600,CES602,CEI601,CEI602,CEI603,CEI604,CEI606,CEI607,CEI609,CEI612,CEI615,CEI616,CEI618, CEP604
	a1-3 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in the field of **Public Work Engineering**.		CES607,CES610,CES612, CES604, CES611,CES612,CES613, CEP606

	a1-4 Exhibit ability to indetail, creatively, with a high level of clarity and authority, using scientific scrutiny and adequate tools identify, explain, analyze and assess issues pertinent to a MS.c thesis in the research field, within which the thesis project is placed.	A, B, C, D, E, F, G, H, I, J,K, L	CES604,CES612,CES613
A2- Mutual relation between professional aspects of professional practice and its effects on the Environment. **التأثير المتبادل بين الممارسة المهنية وانعكاسها علي البيئة**	a2-1 Discuss the effects of civil engineering technologies on the surrounding environment.	J	CES612CEI605,CEI614,CEI617,CEP601,CEP603,CEP606

A3- Main scientific advances in the field of specialization. **التطورات العلمية في مجال التخصص**	a3-1 Classify the Potential applications of advanced civil engineering applications.	D, F, L	CES 606, CES 617, CES 618,CES625 , CES611, CEI606,CEI607,CEI613,CEI619,CEI620, CEP604,CEP607
	a3-2 Report new advances in analysis and design methodologies in civil engineering and its application paradigms.		, CES 617, CES 618, CES611 CES623,CEP604
	a3-3 Discuss the recent and update developments in the most important themes related to civil engineering.		CES 606,CES614, CES 616, CES 617, CES 618, CEI606,CEI607,CEI619

A4- Fundamentals of ethical & legal professional practice in the field of specialization. **المبادئ الأخلاقية و القانونية للممارسة المهنية في مجال التخصص**	a4-1 Recognize ethnical and professional responsibility issues arising in the practice of the engineering profession.	K	CES622, CEP607,THESIS
A5- Basics and principles of quality in professional practice in the field of specialization. **مبادئ و أساسيات الجودة في الممارسة المهنية في مجال التخصص**	a5-1 Explain Quality Assurance concepts of different civil engineering disciplins and systems development phases.	F, H, I	CES619,CES624,,CES530,CEI608,CEI610, CEP600,CEP601,CEP602,CEP603,CEP605,CEP608,CEP609, CEP610,CEP611,THESIS

A6- Basics and ethics of scientific research **أساسيات وأخلاقيات البحث العلمي**	a6-1 Recognize Basics and ethics of scientific research.	K,N	,CES607,CES610, CES624,, CEI608,CEI610, CEP600,CEP602,CEP604,CEP609,CEP610,CEP611,THESIS
B. Intellectual skills			
B1- Analyze and evaluate the information in the field of specialization, and solve the problems based on that. **تحليل و تقييم المعلومات في مجال التخصص و القياس عليها لحل المشاكل**	b1-1 Demonstrate an investigatory and analytic thinking approach (Problem solving) to solve problems related to civil engineering.	B, C,O,P	CES 601,CES614,CES620, CES612, CES604,CES612,CES613, CEI601,CEI605,CEI606,CEI607,CEI610,,CEI614, CEP604,CEP605,CEP606,CEP607
	b1-2 Interpret, analyze, and evaluate a given system specific information and relate it to the design of		CES 606,CES614, CES 615, CES 616,CES620, CES604, CES613,CES619,CES624, CEI619,

	the required system.		
B2- Solve specialized problems even with lack of some data and variables, (incomplete data). **حل المشاكل المتخصصة مع عدم توافر بعض المعطيات**	b2-1 Apply broad knowledge of modern computational methods and think critically to solve unstructured problems (with incomplete data) related to civil engineering.	B, C, E,P	CES601,CES622,CES625, CES607,CES610, CES612,CES603,CES608,CES609,, CES604, CES605, CES611,CES612,CES613 CES623,CES600,CES602,CEI601,CEI602,CEI603,CEI604,CEI608,CEI609,CEI610,CEI612,CEI613,CEI614,CEI615,CEI616, CEI617,CEI618, CEP600,CEP601,CEP602,CEP603,CEP604,CEP605,CEP606, CEP608,CEP609,CEP610,CEP611,THESIS
B3- Link and integrate diverse knowledge to solve professional problems. **الربط بين المعارف المختلفة لحل المشاكل المهنية**	b3-1 Analyze, interpret and manipulate data from a variety of sources and relate it to solve professional problems.	B, C, E, H, I	CES 606,CES620, CES619,CES624,, CES600,CEI605,CEI606,CEI607,CEI613,CEI617,CEI619,CEI620, CEP600,CEP601,CEP602,CEP603,CEP604,CEP607,CEP609, CEP610,CEP611
	b3-2 Use integrated approaches to solve problems scientifically.		, CES 615,CES622,CES607,CES610,
B4- Conduct a research study and/or writing systematic	b4-1 Write an research plan to conduct applied research.	A, D, E, F	,CES620, CEI602,CEI603,CEI609,CEI612, CEP604,THESIS

scientific study about Research problem. **إجراء دراسة بحثية و /أو كتابة دراسة علمية منهجية حول مشكلة بحثية**	b4-2 Perform applied research on industrial and societal concerns problems related to civil engineering field (thesis).		,THESIS
B5- Risk assessment in the professional practices related to the field of specialization, **تقييم المخاطر في الممارسات المهنية في مجال التخصص**	b5-1 Evaluate pros and cons of given methodologies for civil engineering systems development.	J, K	CES611,THESIS
B6- Planning for performance development in the field of practice . **التخطيط لتطوير الأداء في مجال التخصص**	b6-1 Plan to guide progress in his / her professional career.	C, L,O,P	CES623,,CEI610,THESIS

B7- Take professional decisions in different professional practical contexts. **اتخاذ القرارات المهنية في سياقات مهنية متنوعة**	b7-1 Acquire decision making capabilities in different situation when facing problems related to analysis, design and development of civil engineering systems.	H	,CES621, CES603,CES608,CES609,, CES605,CES602,CEI608,THESIS
C. Professional and practical skills			
C1- Mastering the basics as well as the latest professional skills in the field of specialization. **إتقان المهارات المهنية الأساسية و الحديثة في مجال التخصص**	c1-1 Express competence skills, such as identifying, formulating, analyzing, and creating engineering solutions, using latest engineering techniques, skills, and tools.	A, B, C, D, E, F	CES 601, CES 606,CES625, CES604,CES612,CES613 , ,CES603,CES608,CES609,, CES605,CES619,CES624, CES623,THESIS CES602,CEI601,CEI606,CEI607,CEI615,CEI616,CEI618,CEI 619, CEP602,CEP604,CEP605,CEP606,CEP607
C2- Write and evaluate technical and professional reports.	c.2-1 Write and evaluate a professional report on specialized systems related	A, L,N	CES621, CES611, CEI608,CEI610, CEP600,CEP603,CEP606,CEP608,CEP609,CEP610,CEP611

كتابة و تقييم التقارير المهنية	to civil engineering technical matters.		
C3- Evaluate means and tools available in the field of practice. **تقييم الطرق و الأدوات القائمة في مجال التخصص**	c3-1 Evaluate methods and tools reported in a specified published articles and researches concerning to civil engineering field.	A, E, F, H, I	CES 615,CES620, CES607,CES610, CES623,, CES600,CEI602,CEI603,CEI604,CEI605,CEI609,CEI612,CEI 613,CEI614,CEI617,CEI620, CEP601,CEP604,CEP605,CEP606,CEP607
D. General and transferrable skills			
D1- Communicate effectively using all methods. التواصل الفعال بأنواعه المختلفة	d1-1 Express professional and communication skills to innovate and to interact with the scientific community, research team and technocrats involved in multinational companies at global level in	G	CES603,CES608,CES609,, CES605,CES602, CEP607,THESIS

	the related fields to civil engineering.		
D2- Use information technology to improve his/her professional practice. **استخدام تكنولوجيا المعلومات بما يخدم الممارسة المهنية**	d2-1 Use state-of-the-art computer design tools and applications for solving civil engineering problems.	A, F, I, L,P	CES 601, CES 606,CES614,CES621, CES607,CES610, CES612, CES604,CES612,CES613,CES619,CES624,, CES 600 ,CEI601,CEI602,CEI603,CEI605,CEI606,CEI607,CEI609,CEI 610,CEI612,CEI614,CEI615,CEI616,CEI618,CEI619, CEP600,CEP601,CEP602,CEP603,CEP604,CEP605,CEP606, CEP608,CEP609,CEP610,CEP611
	d2-2 Employ the information technology skills to serve his / her career development.		CES 601,CES612, CES604,CES612,CES613,,
D3- Apply self evaluation and define personal educational needs. **التقييم الذاتي وتحديد احتياجاتها التعلمية الشخصية**	d3-1 Apply self evaluation and specify his educational needs related to civil engineering aspects.	L	THESIS
D4- Set evaluation criteria and benchmarks to evaluate others performance. **وضع قواعد ومؤشرات تقييم أداء الآخرين**	d4-1 Design standards to evaluate others performance.	G, K	,CES621, CEI601,THESIS
D5- Use different	d5-1 Use different	C, L	CES 601,CES614, CES 615, CES 616, CES612, , CES604,CES612,CES613 CES623,, CEI604, CEP606

resources to obtain knowledge and information. **استخدام المصادر المختلفة للحصول على المعلومات و المعارف**	resources of information like libraries, internet access facilities, etc. to upgrade and enhance their conceptual knowledge.		
D6- Work in a team and lead teams in familiar professional context **العمل في فريق ، وقيادة فرق في سياقات مهنية مختلفة**	d6-1 Practicing team work, and lead teams in specified professional jobs.	G	THESIS
D7- Time management effectively **إدارة الوقت بكفاءة**	d7-1 Manage the time use in a perfec way.	G, I	CEI608,CEI613,CEI617,CEI620,THESIS
D8- Learn independently and seek continuous learning. **التعلم الذاتي و المستمر**	d8-1 Express a strong foundation of continuous learning so they can maintain their technical competency.	L	,CES621, CES611,THESIS

	d8-2 Seek continuous learning through continuous education, organizing and participating in seminars, workshops, national and international conferences.		CES621,THESIS

6- Program Academic Reference Standards (ARS)

The external references for standards considered in the development of this program were the Academic Reference Standards (ARS) for postgraduate programs prepared by the National Authority for Quality Assurance and Accreditation (NAQAAE) on 2009. These standards set out the attributes and academic characteristics that are expected to be achieved by the end of the program.

7- Program Structure and Contents:

5.1 Program Duration: a minimum of 2 years & a maximum of 5 years (including one year of preparatory courses)

5.2 Program Structure:

Awarding a Master Degree in Civil Engineering Sciences required the study of courses amounting to 18 hours weekly for one academic year. 9 hours of them are devoted to department basic requirements. The other 9 hours constitute specialized courses are selected by the supervision team and approved by the department council. These courses are chosen from among the 600 – level and are directly related to the topic of his research. Also, required for awarding the Master Degree in Civil Engineering Sciences is the execution of scientific research that terminated by writing a thesis containing the research results and its complete analysis and defending it successfully.

5.3 Program Contents (Courses):

- **Civil Engineering (Structural Engineering):**

Course Code	Course Title	Course Hrs/Week	Total Marks
CES 600	Numerical analysis in structural engineering	3	100

CES 601	Computer application in civil engineering	3	100
CES 602	Theory of elasticity	3	100
CES 603	Theory of plasticity	3	100
CES 604	Fracture mechanics	3	100
CES 605	Experimental stress analysis and strain measurement	3	100
CES 606	Plates and shells	3	100
CES 607	Structural optimization	3	100
CES 608	Plastic analysis and design of steel structures	3	100
CES 609	Suspension and guyed structures	3	100
CES 610	Wind and earthquakes engineering	3	100
CES 611	High rise buildings	3	100
CES 612	Dynamics of concrete structures	3	100
CES 613	Deformations and fracture mechanics of concrete structures	3	100
CES 614	Structures masonary	3	100
CES 615	Testing of materials, products and structures	3	100
CES 616	Deterioration and durability of concrete	3	100
CES 617	Underground structures	3	100
CES 618	Numerical analysis in geotechnical engineering	3	100
CES 619	Advanced topics in soil mechanics	3	100
CES 620	Methods of soil strengthening	3	100
CES 621	Control of ground water and side exacavation support	3	100
CES 622	Advanced design and study in foundation	3	100
CES 623	System analysis for civil engineering	3	100
CES 624	Productivity in construction engineering	3	100
ECE 625	Statistics in structural engineering	3	100

- **Civil Engineering (Irrigation and Haydraulic Engineering):**

Course Code	Course Title	Course Hrs/Week	Total Marks
CEI 601	Computer application in hydraulic engineering	3	100
CEI 602	Fluid mechanics	3	100
CEI 603	Hydraulic engineering	3	100
CEI 604	Hydralogy	3	100
CEI 605	Risk analysis and managment	3	100
CEI 606	Water resources system (1)	3	100
CEI 607	Water resources system (2)	3	100
CEI 608	Environmental quality systems engineering	3	100

CEI 609	Advanced fluid mechanics	3	100
CEI 610	Flow and contaminant transport modeling in groundwater	3	100
CEI 611	Hydralogy	3	100
CEI 612	Flow in porous media and groundwater	3	100
CEI 613	Small and finite amplitude water waves	3	100
CEI 614	Environmental fluid mechanics	3	100
CEI 615	Natural phenomena	3	100
CEI 616	High order wave theories	3	100
CEI 617	Sediment motion and transport	3	100
CEI 618	Wave dynamics	3	100
CEI 619	Design of breakwaters	3	100
CEI 620	Design of shore protection structures	3	100

- **Civil Engineering (Public Works):**

Course Code	Course Title	Course Hrs/Week	Total Marks
CEP 600	Transportation engineering (2)		
CEP 601	Modern railway track	3	100
CEP 602	Development and applications of railway engineering	3	100
CEP 603	Alignment and design of roadways	3	100
CEP 604	Development of roadways	3	100
CEP 605	Development of traffic and transportation	3	100
CEP 606	Application of traffic	3	100
CEP 607	Computer applications of transportation systems	3	100
CEP 608	Computer applications in railways	3	100
CEP 609	Advanced water treatment	3	100
CEP 610	Advanced domestic waste water treatment	3	100
CEP 611	Master planning for sanitary projects	3	100

8- Evaluation of program intended learning outcomes:

- Written examinations for the preparatory year after 30 weeks.
- An examiners committee is approved by the faculty council (including at least one external examiner). The evaluation of the thesis and the discussion is carried out in an open session.

9- Program Matrix:

The following tables explains the ILO's (of the current program) – Course (main ILOs) matrix.

		ILOs																																						
		a1-1	a1-2	a1-3	a1-4	a2-1	a3-1	a3-2	a3-3	a4-1	a5-1	a6-1	b1-1	b1-2	b2-1	b3-1	b3-2	b4-1	b4-2	b5-1	b6-1	b7-1	c1-1	c2-1	c3-1	d1-1	d2-1	d2-2	d3-1	d4-1	d5-1	d6-1	d7-1	d8-1	d8-2
PhD THESIS										X	X	X			X			X	X	X	X	X	X			X			X	X		X	X	X	X
CES	600		X												X	X									X		X								
	601	X											X		X								X				X	X			X				
	602	X	X												X							X	X			X									
	603	X	X												X							X	X			X									
	604	X	X	X	X								X	X	X								X			X									
	605	X	X												X							X	X			X									
	606		X				X		X					X		X								X				X								
	607			X								X			X		X								X		X									
	608	X	X												X							X	X			X									
	609	X	X												X							X	X			X									
	610			X								X			X		X								X		X								
	611	X	X	X			X	X							X					X				X										X	
	612	X	X	X	X								X		X								X				X	X			X				
	613	X	X	X	X								X	X	X								X				X	X			X				
	614	X							X				X	X													X				X				
	615	X												X			X								X						X				
	616	X							X					X																	X				
	617	X					X	X	X																										
	618	X					X	X	X																										
	619	X									X				X	X							X		X						X				
	620												X	X		X		X							X										
	621	X																				X		X		X			X				X	X
	622									X					X		X																		
	623	X						X							X						X		X		X					X					
	624										X	X			X	X							X				X									
	625						X								X								X													

		ILOs																																							
		a1-1	a1-2	a1-3	a1-4	a2-1	a3-1	a3-2	a3-3	a4-1	a5-1	a6-1	b1-1	b1-2	b2-1	b3-1	b3-2	b4-1	b4-2	b5-1	b6-1	b7-1	c1-1	c2-1	c3-1	d1-1	d2-1	d2-2	d3-1	d4-1	d5-1	d6-1	d7-1	d8-1	d8-2
CEI	601		X										X		X								X				X			X					
	602		X												X			X							X		X								
	603		X												X			X							X		X								
	604		X												X										X						X				
	605					X							X			X									X		X								
	606		X				X		X				X			X							X				X								
	607		X				X		X				X			X							X				X								
	608										X	X			X							X		X									X		
	609		X												X			X							X		X								
	610										X	X	X		X						X			X			X								
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	613	X					X								X	X									X								X		
	614	X				X							X		X										X		X								
	615		X												X								X				X								
	616		X												X								X				X								
	617	X				X									X	X									X								X		
	618		X												X								X				X								
	619						X		X					X		X								X				X								
	620	X					X								X	X									X								X		
CEP	600										X	X			X	X								X			X								
	601					X					X				X	X									X		X								
	602										X	X			X	X							X				X								
	603					X					X				X	X								X			X								
	604	X	X				X	X				X	X		X	X		X					X		X		X								
	605										X		X		X								X		X		X								
	606			X		X							X		X								X	X	X		X				X				
	607						X			X			X			X								X		X	X									
	608										X				X									X			X								
	609										X	X			X	X								X			X								
	610										X	X			X	X								X			X								
	611										X	X			X	X								X			X								

Program Coordination Committee:

Programme coordinator: **Dr. Ahmed Turk**

Head of the Department: **Prof. Dr. Hassan M. Hassan**

Date: August 2019

PhD of Science
Thesis
Specification

Thesis Specification

Program on which the thesis is given	MS.C in Civil engineering(Specialization: Computer and Control Engineering)).
Major or minor element of program	Major
Department offering the program	Civil Engineering
Department offering the course	Civil Engineering
Academic year/Level	PhD 2019-2020
Date of specification approval	***2019***

A- Basic Information

Title: Thesis	**Code Symbol: Without**	
Lecture	Independent but regular contacts with the supervisor is required	
Tutorial / Laboratory	Independent	
Total	At least 2 years	Bylaw 2000

B- Professional Information

1- Thesis Aims:

The PhD's Thesis is an independent project (degree project) to develop and display the skills and abilities of the student to carry out individual, independent scientific work on a specific topic, exploring it in a trans-disciplinary manner, and assessing solutions and conclusions with respect to the different dimensions of sustainability. It does not aim to provide additional substantive material or methodological toolkit, the way typical graduate courses do. Its goal is rather modest as it attempts to apply student cumulative understanding and skills to specific research situation. From the perspective of one's program of study, however, the thesis phase poses a real-world test helping to make a realistic transition from coursework to dissertation. Completing a dissertation successfully is the last and often most challenging part of PhD studies. The goal is to put one's theoretical knowledge and research proficiency to practical test by carrying out an independent, albeit guided, project producing an original piece of research and making a significant contribution to solving a problem and expanding the knowledge base in the specific discipline. While research is an ongoing process, in which one is

expected to stay on top of the relevant developments in the discipline, the assumption is that students are capable of thinking through the important milestones in the dissertation process and developing a dissertation prospectus that spells out the core concepts and questions as well as the designs of research and the structure of intended dissertation. The overall aim of the thesis phase is that the students should further develop and enhance their ability to independently plan, conduct and report on a research project which makes a contribution to the current state-of-the-art in the area. Also, the student should exhibit ability to in detail, creatively, with a high level of clarity and authority, using scientific scrutiny and adequate tools identify, explain, analyze and assess issues pertinent to a MS.c thesis in the research field, within which the thesis project is placed. On balance, a successful completion of the thesis phase is marked by student ability to do the following:

1. Apply his/her theoretical and methodological understanding and skills into devising researchable ideas and specific research questions and hypotheses,
2. Conduct a focused review of the relevant literature and create appropriate conceptual framework,
3. Develop a realistic research design with specific research strategies,
4. Communicate research ideas and their appropriate theoretical and methodological issues effectively and efficiently,
5. Gain understanding of the process of dissertation including stress, time, and project management, committee formation, dissertation proposition and defense, and human subjects reviews.
6. Develop and execute his/her survey to collect the necessary data to prove / support the problem that he has set up.
7. Identify own knowledge needs with respect to the planned project.
8. Write theses and report on research projects in a scientifically sound way.
9. Describe what the contribution of his/her thesis is and relate it to the current state-of-the-art within one or several international knowledge communities within the discipline
10. State the threats against and argue for the validity of her/his research methods, and in doing so, show awareness of that the concept of validity may have different values and be used in different ways within qualitative and quantitative research approaches.
11. Analyze a PhD's thesis in a constructively critical way and identify the major strong and weak points of the thesis.
12. Describe how and where he/she has searched for, and why he/she has probably found the most relevant related work.

2- Intended Learning Outcomes (ILOs) for the whole program

The thesis is designed to achieve the above objectives through the following **Intended Learning Outcomes (ILOs)**:

Field	Programme ILOs	Thesis ILOs

Knowledge& Understanding	**A-4** Fundamentals of ethical & legal professional practice in the field of specialization.	**a4-1** Recognize ethnical and professional responsibility issues arising in the practice of the engineering profession.
	A-5 Methodologies of solving engineering problems, data collection and interpretation.	**a-5-1** Define the Methodologies of solving engineering problems
	A-6 Basics and ethics of scientific research	**a6-1** Recognize Basics and ethics of scientific research.
Intellectual skills	**A-2** Select appropriate solutions for engineering problems based on analytical thinking.	**b-2-1**Use the appropriate solution for engineering problems
	B-4 Conduct a research study and/or writing systematic scientific study about Research problem.	**b4-1** Write an research plan to conduct applied research.
		b4-2 Perform applied research on industrial and societal concerns problems related to civil engineering field (thesis).
	B-5 Risk assessment in the professional practices related to the field of specialization,	**b5-1** Evaluate pros and cons of given methodologies for civil engineering systems development.
	B-6 Planning for performance development in the field of practice .	**b6-1** Plan to guide progress in his / her professional career.
	B-7 Take professional decisions in different professional practical contexts.	**b7-1** Acquire decision making capabilities in different situation when facing problems related to analysis, design and development of civil engineering systems.
Professional skills	**C1-** Mastering the basics as well as the latest professional skills in the field of specialization.	**c1-1** Express competence skills, such as identifying, formulating, analyzing, and creating engineering solutions, using latest engineering techniques, skills, and tools.
General skills	**D1-** Communicate effectively using all methods.	**d1-1** Express professional and communication skills to innovate and to interact with the scientific community, research team and technocrats involved in multinational companies at global level in the related fields to civil

	D3- Apply self evaluation and define personal educational needs.	d3-1 Apply self evaluation and specify his educational needs related to civil engineering aspects.
	D4- Set evaluation criteria and benchmarks to evaluate others performance.	d4-1 Design standards to evaluate others performance.
	D6- Work in a team and lead teams in familiar professional context	d6-1 Practicing team work, and lead teams in specified professional jobs.
	D7- Time management effectively	d7-1 Manage the time use in a perfec way.
	D8- Learn independently and seek continuous learning.	d8-1 Express a strong foundation of continuous learning so they can maintain their technical competency.
		d8-2 Seek continuous learning through continuous education, organizing and participating in seminars, workshops, national and international conferences.

3- Thesis Phases:

The PhD's Thesis is an independent project (degree project) to develop and display the skills and abilities of the student to carry out individual, independent scientific work on a specific topic. The readings for the thesis work are selected by the individual student in collaboration with the supervisor. **The PhD's Thesis phases can be outlined as follow:**

1. Developing a thesis proposal by formulating a realistic research plan with specific research strategies and specifying steps and timelines
2. Identify and construct a problem/thesis statement.
3. Presentation and defending of self-authored materials describing the thesis proposal at a seminar with external discussants (Department Staff).
4. Conduct a focused review of the relevant literature and create appropriate conceptual framework.
5. Analyze and evaluate methods and tools reported in a specified published articles and researches concerning the thesis problem in a constructively critical way and identify the major strong and weak points of them.
6. Carry out research:
   - Use state-of-the-art computer aided design tools.
   - Provide practical and/or laboratory services that can help.
7. Analysis and discussion of the simulated / practical results.
8. Developing defensible conclusions.
9. Writing the final thesis.
10. Presentation and defending of self-authored materials describing the thesis at a seminar with external discussants (Department Staff).
11. Reporting on and presenting the thesis in a final defense. At the examination seminar, the student should be able to respond to criticism given and also act as an opponent.

- The thesis work also includes a number of thesis workshop sessions in advance, where research and writing methods are discussed, and where the individual initial drafting of the thesis scope and outline is discussed.
- Throughout these phases:

  - The academic supervisor helps and guides the students.
  - The student is to write a manuscript in the format of a scientific article to be published.
  - Documentation is carried out.

4- Relationship between the course and the program

Field	National Academic Reference Standard(NARS)			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Program Academic Standards that the course contributes in achieving.	a4-1, a5-1,a6-1	B2-1, b4-2, b4-1, b5-1, , b6-1, b7-1	c1-1,	d1-1, d3-1, d4-1, , d6-1, d7-1, d8-1 d8-2

5- Course Subject Area:

A	B	C	D	E	F	G	
Humanities and Social Science	Mathematics and Basic Sciences	Basic Engineering Science	Applied Engineering And Design	Computer Applications and ICT	Projects and practice	Disccretionry subjects	Total
---	---	-	-	-	100		100%

6- Learning and Teaching Methods:

Besides proposing, planning, conducting and presenting one's own PhD thesis project, the student is required to read, analyze and evaluate methods and tools reported in a specified published articles and researches concerning the thesis problem in a constructively critical way and identify the major strong and weak points of them and write an opponent report about it. The supervisor supports and supervises the student throughout the entire thesis project, but it is the student who must take on the responsibility of requesting support and supervision during the on-going project. The student is expected to report to her/his supervisor at least every four weeks. Besides this, the student is required to hand in a written progress report at least every three months. One or several lectures or seminars held by internal guest researchers, and focusing on research methods and the art of presenting research results, are arranged during the thesis development. In-seminar discussions should be enhanced with additional student-advisor (and committee, if appropriate) meetings. Students are expected to be prepared for all seminar meetings. It is mandatory for the student to have regular contacts with the supervisor so that the supervisor is able to follow the student's work process to secure the progress and the quality of the work. The thesis work also includes a number of thesis workshop sessions in advance, where research and writing methods are discussed, and where the individual initial drafting of the thesis scope and outline is discussed.

7- Assessment Methods:

7.1 Assessment is carried out by evaluating of the student ability to clearly present the thesis orally and

to discuss and defend the conclusions and the knowledge and arguments behind them, in a dialogue with examiner committee.

7.2 For a passing grade the student must (a) make an acceptable oral presentation of the thesis; (b) perform an acceptable defense of the thesis and should be able to respond to criticism given by the examiner committee and also act as an opponent.

8- Facilities required for teaching and learning

Blackboard – Class Room Equipped with Computer and Video Projector - Computer Lab - Library.

A. laboratory Usage:

Students are expected to prepare and conduct some computer simulation and practical works using computer labs.

B. Library Usage:

Students should be encouraged to use library technical resources during the thesis development.

9- List of References:

The readings for the thesis work are selected by the individual student in collaboration with the supervisor.

10- Program Coordination Committee:

Programme coordinator: **Dr. Ahmed Turk**

Head of Department: **Prof. Dr. Hassan M. Hassan**

Date: August 2019

Civil Engineering Ph.D.
Courses Specifications

Course Specification

Program on which the course is given	Civil Engineering
Major or minor element of program	Major
Department offering the program	Civil Engineering
Department offering the course	Civil Engineering
Academic year/Level	M. Sc. & PhD 2019-2020
Date of specification approval	2019

A- Basic Information

Title: Plates and shells	**Code Symbol**: **CES 606**	
Lecture	2	
Tutorial	**1**	
Laboratory	**0**	
Total	3	Bylaw 2000
First term	prerequisite	

B- Professional Information

1- Course Aims:

This course is designed to illustrate the analysis and design principles for plates and shells. For those students who look toward extending their knowledge on design and analysis of such buildings after graduation, this course is designed to widen background in structural engineering and help them to be familiar with methods and techniques for analysis and design for this type of buildings. This course will also provide an excellent opportunity to understand the different types of load resisting structural systems.The main Objectives of this course are to equip the students with:

1. Knowledge and understanding of principles and Special considerations for Plates and Shells.
2. Advanced skills in structural behavior of different systems of plates and shells and their range of applications.
3. Recognize the governing factors controlling the choice of suitable resisting structural system according to the building shape and specifications.
4. Analyze the different systems as used in such buildings.
5. Understand the advanced behavior for plates and shells under different loading conditions.
6. Use of existing structural analysis applications for suitable modeling techniques related to plates and shells.

2- Intended Learning Outcomes (ILOs)

NAQAAE Academic Reference Standards (ARS)	Program ILOs	Course ILOs
A. Knowledge and understanding		
A1- Theories and basics related to learning field, as well as other related fields.	**a1-2** Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledgein the field of**Structural Engineering**.	**a1-2**Describe the different types of structural systems related to plates and shells.
A3- Main scientific advances in the field of specialization.	**a3-1** Classify the Potential applications of advanced civil engineering applications.	**a3-1**Discuss the social and environmental effects of the increasing usage of plates and shells.
	a3-3 Discuss the recent and update developments in the most important themes related to civil engineering.	**a3-3**Discuss the recent and update developments in the most important themes related to the different types of plates and shell buildings.
B. Intellectual skills		
B1- Analyze and evaluate the information in the field of specialization, and solve the problems based on that. .	**b1-2**Interpret, analyze, and evaluate a given system specific information and relate it to the design of the required system.	**b1-2**Interpret, analyze, and evaluate a given structural system specific information and relate it to the design of the required building.
B3- Link and integrate diverse knowledge to solve professional problems.	**b3-1** Analyze, interpret and manipulate data from a variety of sources and relate it to solve professional problems.	**b3-1** Analyze, interpret and manipulate data from a variety of sources and relate it to solve professional problems related building.
C. Professional and practical skills		
C1- Mastering the basics as well as the latest professional skills in the field of specialization.	**c1-1** Express competence skills, such as identifying, formulating, analyzing, and creating engineering solutions, using latest engineering techniques, skills, and tools.	**c1-1** Express competence skills, such as identifying, formulating, analyzing, and creating engineering solutions related to design of plates and shellsusing latest engineering techniques, skills, and tools.
D. General and transferrable skills		
D2- Use information	**d2-1** Use state-of-the-art	**d2-1** Use state-of-the-art computer

technology to improve his/her professional practice	computer design tools and applications for solving civil engineering problems	Internet tools for getting latest information and standards related to design of plates and shells.

3- Course Contents

Topic	*Total Hours*	*Contact hrs*			*Course ILOs Covered (By No.)*
		Lec.	Tut.	Lab.	
1. Introduction tobuildingsconsist of plates and shells and historical background.	6	4	2	--	**a3-1**, **d2-1**
2. Pure bending of plates and symmetrical bending of circular plates.	12	8	4	--	**a3-1**, **b1-2**, **b3-1**, **d2-1**
3. Deflection of plates with different boundary conditions.	12	8	4	--	**a3-1**, **b1-2**, **b3-1**
4. Modeling and analysis techniques of plates under combined actions of loads.	18	12	6	--	**a1-2**, **a3-3**, **b1-2**, **b3-1**, **c1-1, d2-1**
5. General theory of shells.	12	8	4	--	**a1-2**, **a3-3**, **b1-2**, **b3-1**, **c1-1**
6. Surface of revolution and symmetrically loaded shells.	12	8	4	--	**a1-2**, **a3-3**, **b1-2**, **b3-1**, **c1-1**
7. Computer related applications.	12	8	4	--	**a1-2**, **a3-3**, **b1-2**, **b3-1**, **c1-1, d2-1**
Total	84	56	28	--	

4- Relationship between the course and the program

Field	Academic Reference Standard(ARS)			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Program Academic Standards that the course contributes in achieving	**A1(a1-2) A3(a3-1, a3-3)**	**B1(b1-2), B3(b3-1)**	**C1(c1-1)**	**D2(d2-1)**

5- Course Subject Area:

A	B	C	D	E	F	G	
Humanities and Social Science	Mathematics and Basic Sciences	Basic Engineering Science	Applied Engineering And Design	Computer Applications and ICT	Projects and practice	Discretionary subjects	Total
---	5%	30%	50%	15%	---	---	100%

6- Course Topics.

Topic No.	Topic	Weeks
1st	Introduction to buildingsconsist of plates and shells and historical background.	**1-2**
2nd	Pure bending of plates and symmetrical bending of circular plates.	**3-6**
3rd	Deflection of plates with different boundary conditions.	**7-10**
4th	Modeling and analysis techniques of plates under combined actions of loads.	**11-16**
5th	General theory of shells.	**17-20**
6th	Surface of revolution and symmetrically loaded shells.	**21-24**
7th	Computer related applications.	**25-28**

7- ILOs Matrix Topics

Course topics	1st	2nd	3rd	4th	5th	6th	7th
Course ILOs	**Knowledge & Understanding**						
a1-2 Describe the different types of structural systems related to plates and shells.				x	x	x	x
a3-1 Discuss the social and environmental effects of the increasing usage of plates and shells.	x	x	x				
a3-3 Discuss the recent and update developments in the most important themes related to the different types of plates and shells.				x	x	x	x
Course ILOs	**Intellectual skills**						
b1-2 Interpret, analyze, and evaluate a given structural system specific information and		x	x	x	x	x	x

relate it to the design of the required building.							
b3-1 Analyze, interpret and manipulate data from a variety of sources and relate it to solve professional problems related to plate and shell buildings..		x	x	x	x	x	x
Course ILOs	**Professional and practical skills**						
c1-1 Express competence skills, such as identifying, formulating, analyzing, and creating engineering solutions related to design of buildings using latest engineering techniques, skills, and tools.				x	x	x	x
Course ILOs	**General and transferrable skills**						
d2-1 Use state-of-the-art computer Internet tools for getting latest information and standards related to design of plates and shells.	x	x					

8- Teaching and Learning Method:

Course Intended learning outcomes (ILOs)		Teaching and Learning Method												
		Lecture	Presentation and	Discussion	Tutorial	Problem solving	Brain storming	Projects	Report	Self-learning	Cooperative	Discovering	Computer Simulation	Practical Experiments
Knowledge & understanding	**a1-2**	x				x								
	a3-1	x				x								
	a3-3		x	x					x	x				
Intellectual Skills	**b1-2**		x											
	b3-1		x											
Professional Skills	**c1-1**		x											
General Skills	**d2-1**										x		x	

9- Assessment

9.1 Assessment Methods

Final Written Examination : to assess students' knowledge, understanding, analysis, creativity, problem solving, and problem identification.

9.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	week
Final Examination	100	32
Total	100%	

10- Facilities required for teaching and learning

Whiteboard – Class Room Equipped with Computer and Video Projector - Computer Lab - Library.

A. Library Usage:

Students should be encouraged to use library technical resources in the studying the course.

11- List of references:

1. S. Timoshenko " Theory of Plates and Shells “, 1989
2. Kienzler, Reinhold, Altenbach, Holm, Ott, Ingrid (Eds.)" Theories of Plates and Shells “,2004

12- Program Coordination Committee:

Course Coordinator: **Prof. Dr. Hassan Mohamed Hassan**

Program coordinator: **Dr. Ahmed Turk**

Head of the Department: **Prof .Dr. Hassan M. Hassan**

August /2019

Course Specification

Program on which the course is given	MSc and PhD in Civil Engineering (Specialization: Structural Engineering).
Major or minor element of program	Major
Department offering the program	Civil Engineering
Department offering the course	Civil Engineering
Academic year/Level	MSc/PhD 2019-2020
Date of specification approval	2019

A- Basic Information

Title:Plastic Analysis and Design of Steel Structures	**Code Symbol**: **CES608**	
Lecture	2 hours	
Tutorial	1 hours	
Laboratory	-	
Total	3 hours	Bylaw 2000
First term	prerequisite	-

B- Professional Information

1- Course Aims:

This course is designed to extend basic concepts learned in plastic analysis in civil engineering. For those students who look toward advanced analysis and design of steel structures after graduation. This course will also provide an excellent opportunity to provide students with learning about concepts of plastic analysis. The course is meant to create the deep understanding of the basics and theories of plastic design and plastic hinge formation. The main Objectives of this course are to equip the students with:

1. Knowledge and understanding of key and advanced design, theories, concepts, principles and techniques relevant to solve the problems in plastic analysis.
2. Understanding the behavior of the structure that considering plastic analysis.
3. Understanding the plastic hinge formation.
4. Analyze and design of the flexural beams and frames.
   Understanding the beam mechanism and sway mechanism.

2- Course Objectives

By the end of the course the students will be able to:

- Understanding the main concept of collapse Mechanics.
- Understanding main theory plasticity.
- Understanding the behavior equations of structure considering plastic analysis.

3- Intended Learning Outcomes (ILOs):

Field	Programme ILOs that the course contribute in achieving	Course ILOs
Knowledge& Understanding	A-1 Theories and basics related to learning field, as well as other related fields	A1-1 Describe the behavior of structure using plastic analysis.
		A1-2 Recognize the behavior of supports under plastic loadings.
Intellectual skills	**B-2** Select appropriate solutions for engineering problems based on analytical thinking.	b-2-1 Employ the plastic hinge formation.
	B-7 Take professional decisions in different professional practical contexts	B7-1 Sketch combined mechanism under plastic loading.
Professional skills	**C-1** Apply knowledge of mathematics, science, information technology, design, business context and engineering practice integrally to solve engineering problems.	C1.1 Apply knowledge of mathematics to derive and calculate the collapse load using plastic analysis.
General skills	D-1 Communicate effectively using all methods.	d1-1 Collaborate effectively within multidisciplinary team to design structure using plastic analysis.

4- Course Contents

Week No.	*Topic*	*Total Hours*	*Contact hrs*			*Course ILOs Covered (By No.)*
			Lec.	**Tut.**	**Lab.**	
1-2	1. Basic concepts of plastic analysis	12	8	4	--	A1-1, A1-2 & , C1.1
3-6	2. Plastic hinge formation	12	8	4	--	A1-2 & , C1.1
7-10	3. Development and analysis of collapse mechanism, beam	12	8	4	--	A1-2 & ,C1.1

	mechanism and sway mechanism					
11-16	4. Bases of plastic design	12	8	4	--	A1-2 & b7-1,
17-20	5. Analysis and design of flexural beams	12	8	4	--	A1-2 & b7-1,
21-24	6. Analysis and design of flexural frames and connections	12	8	4	--	A1-2 & b7-1
25-28	7. Secondary design problemes	12	8	4	--	& b7-1
	Total	84	56	28	--	& b7-1

5- Relationship between the course and the programme

Field	**National Academic Reference Standard (NARS)**			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Programme Academic Standards that the course contributes in achieving	A1	B-2, B-7	C-1	D-1

6- Course Subject Area:

A	**B**	**C**	**D**	**E**	**F**	**G**	
Humanities and Social Science	Mathematics and Basic Sciences	Basic Engineering Science	Applied Engineering And Design	Computer Applications and ICT	Projects and practice	Disccretionry subjects	Total
---	---	40%	60%				100%

7- Course Topics.

Topic No.	**Topic**	**Weeks**
1st	Basic concepts of plastic analysis.	**1-2**
2nd	Plastic hinge formation	**3-6**
3rd	Development and analysis of collapse mechanism, beam mechanism and sway mechanism.	**7-10**

4th	Bases of plastic design.	**11-16**
5th	Analysis and design of flexural beams.	**17-20**
6th	Analysis and design of flexural frames and connections.	**21-24**
7th	Secondary design problemes.	**25-28**

8- ILOs Matrix Topics

Course Intended Learning Outcomes (ILOs)		**Course topics**							
		1st	**2nd**	**3rd**	**4th**	**5th**	**6th**	**7th**	**8th**
Knowledge & Understanding	A1-1	x							
	A1-2	x	x						
Intellectual Skills	B2-3	x	x	x					
	B7-1				x	x	x	x	x
Professional Skill	C1.1	x	x	x					
General Skills	D1.1						x	x	x

9- Teaching and Learning Method:

Course Intended Learning Outcome (ILOs)		**Teaching and Learning Method:**												
		Lecture	**Presentation and**	**Discussion**	**Tutorial**	**Problem solving**	**Brain storming**	**Projects**	**Site visits**	**Self learning**	**Cooperative**	**Discovering**	**Modeling**	**Playing**
A- Knowledge & Understanding	A1--1	x			x	x								
	A1-2	x			x	x								
B-Intellectual Skills	B2-3	x			x	x								
	b7-1	x			x	x								
C-Professional Skills	C1.1	x			x	x								
D-General Skills	D1.1			x							x			

10- Teaching and learning method for low capacity and outstanding Student

For low capacity students	Assign a portion of the office hours for those students.
	Give them specific tasks.
	Repeat the explanation of some of the material and tutorials.
	Assign a teaching assistance to follow up the performance of this group of students.
For outstanding Students	Hand out project assignments to those students.
	Give them some research topics to be searched using the internet and conduct presentation.
	Encourage them to take parts in the running research projects.

11- Assessment

11.1 Assessment Methods

Final Written Examination : To assess students' knowledge, understanding, analysis, creativity, problem solving, and problem identification.

11.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	Week
Final Examination	100%	32
Total	100%	

12- Facilities required for teaching and learning

Whiteboard – Classroom Equipped with Computer and Video Projector - Library.

13- List of references:

1. *Colin Caprani "Plastic Analysis 3rd Year Structural Engineering", 2009, Monash University (Australia).*
2. *Wai-Fah Chen, "Plastic Design and Second-Order Analysis of Steel Frames", Springer-Verlag New York.*
3. *Bill Wong, "Plastic Analysis and Design of Steel Structures", 2009, Elsevier.*
4. *T.H.G. Megson,"Structural and Stress Analysis", 2nd Ed., 2005, Elsevier.*
5. *"Chapter 35: PLASTIC ANALYSIS", Version 2, INSTITUTE FOR STEEL DEVELOPMENT & GROWTH, http://www.steel-insdag.org.*

14- Program Coordination Committee:

Course Coordinator: **Dr. Ashraf I. El-Sabbagh**

Programme coordinator: **Dr. Ahmed Turk**

Head of the Department: **Prof. Dr. Hassan M. Hassan**

August 2019

Course Specification

Program on which the course is given	Civil Engineering
Major or minor element of program	Major
Department offering the program	Civil Engineering
Department offering the course	Civil Engineering
Academic year/Level	M. Sc. & PhD 2019-2020
Date of specification approval	2019

A- Basic Information

Title: Steel Structures 1	**Code Symbol: CES-611**	
Lecture	2	
Tutorial	**1**	
Laboratory	-	
Total	3	Bylaw 2014
First term	prerequisite	

B- Professional Information

1- Course Aims:

The aims of this course are to provide the student, upon completing the Civil Engineering Programmer, with the basic knowledge of the engineering thought process through the design of steel structures. The course uses fundamentals of statics, mechanics of materials, and structural analysis and applies them to analysis and design of steel tall structures and its connections, with emphasis on satisfying real-world needs. The design is based on the design equations presented by the Egyptian Code of Practice for Steel Construction and Bridge – Allowable Stress Design (2001).

2- Course Objectives

By the end of the course the students will be able to:

- Understanding the main concept of steel tall building.
- Ability to define and calculate loads affecting different types of steel tall buildings.
- Ability to calculate earthquake, seismic and wind loads and distribution.
- Ability to define the material properties and steel section.
- Recognize and design tension and compression members.

- Design the different types of riveted, bolted, and welded connections.

3- Intended Learning Outcomes (ILOs):

Field	Programme ILOs that the course contribute in achieving	Course ILOs
Knowledge& Understanding	**a-3** Principles of design including elements design and system related to steel structures.	**a-3-1** Define the structural systems and basic concepts of design of steel tall buildings.
		a-3-2 Define the different types of loads on the tall buildings.
	a-1 Engineering principles in the fields of metallic structures' analysis and design.	**a-1-1** Describe the behavior of different tall buildings.
		a-1-2 Describe the behavior of the various types of steel fasteners and connections.
		a-1-3 Describe the behavior of the steel beams.
Intellectual skills	**b-2** Select appropriate solutions for engineering problems based on analytical thinking.	**b-2-1** Use the appropriate structural system for a steel tall buildings.
	b-5 Analyze and select codes of practices in designing metallic structures.	**b-5-1** Analyze the steel members and connections.
Professional skills	**c-2** Apply quality assurance procedures and follow codes and standards.	**c-2-1** Evaluate the design results according to the current Egyptian code of practice for design of steel structures.
General skills	**d-8** Acquire entrepreneurial skills.	**d-8-1** Produce design and details of structural steel members.

4- Course Contents

Week No.	*Topic*	*Total Hours*	*Contact hrs*			*Course ILOs Covered (By No.)*
			Lec.	**Tut.**	**Lab.**	
Week-1-2	Introduction, Systems and Uses, Materials, Design Philosophies	6	2	1	-	**a-3-1**
Week-3-4	Different types of tall buildings.	6	2	1	-	**a-3-1 & b-2-1**
Week-5-6	types of loads on tall buildings.	6	2	1	-	**a-3-2 & b-5-1**

Week-7-8	Classification of Sections, Slenderness Ratios and Buckling Lengths	6	2	1	-	**a-1-1 & a-1-3**
Week-9-10	Design of Tension Members and Applications	6	2	1	-	**a-1-1, b-5-1, & c-2-1**
Week-11-12	Design of Compression Members and Applications	6	2	1	-	**a-1-1, b-5-1, & c-2-1**
Week-13-14	Design of Non-Pretensioned Bolted Connections (Shear, Tension & Shear + Tension)	6	2	1	-	**a-1-2, b-5-1, , c-2-1, & d-8-1**
Week-15-16	Design of Pretensioned (High Strength) Bolted Connections (Shear, Tension & Shear + Tension)	6	2	1	-	**a-1-2, b-5-1, , c-2-1, & d-8-1**
Week-17-18	Design of welded connections (Shear, Tension & Shear + Tension)	6	2	1	-	**a-1-2, b-5-1, , c-2-1, & d-8-1**
Week-19-20	Design of steel section subjected to bending and shear.	6	2	1	-	**a-3-2, a-1-3**
Week-21-22	Design of floor beams	6	2	1	-	**a-1-3, b-5-1, & c-2-1**
Week-23-24	Design of floor beams connections	6	2	1	-	**a-1-3, b-5-1, & c-2-1**
Week-25-26	Design of Purlins as rolled sections	6	2	1	-	**a-1-3, b-5-1, & c-2-1**
Week-27-28	Design of Purlins as cold-formed sections	6	2	1	-	**a-1-3, b-5-1, & c-2-1, & d-8-1**

5- Relationship between the course and the programme

Field	**Academic Reference Standard (ARS)**			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Programme Academic Standards that the course contribute in achieving	**a3 & a1**	**b2 & b5**	**c2**	**d8**

6- Course Subject Area:

A	B	C	D	E	F	G	
Humanities and Social Science	Mathematics and Basic Sciences	Basic Engineering Science	Applied Engineering And Design	Computer Applications and ICT	Projects and practice	Discretionary subjects	Total
----	**5 %**	**50 %**	**10 %**	**---**	**30 %**	**5 %**	**100%**

7- Course Topics.

Topic No.	Topic	Weeks
1st	Introduction and steel tall buildings	**1-2**
2nd	Different types of steel buildings	**3-5**
3rd	Loads on steel tall buildings	**6-8**
4th	Design of tension and compression members	**9-14**
5th	Design of bolted and welded connections	**15-22**
6th	Design of steel section subjected to bending and shear	**23-28**

8- ILOs Matrix Topics

Course Intended Learning Outcomes (ILOs)		Course topics					
		1st	**2nd**	**3rd**	**4th**	**5th**	**6th**
Knowledge & Understanding	**a-3-1** Define the structural systems and basic concepts of design of steel tall buildings.	x	**x**				
	a-3-2 Define the different types of loads on the tall buildings.			**x**			**x**
	a-1-1 Describe the behavior of different steel tall buildings.				x		
	a-1-2 Describe the behavior of the various types of steel fasteners and connections.					x	
	a-1-3 Describe the behavior of the steel beams.					x	x
Intellectual Skills	**b-2-1** Use the appropriate structural system for a steel structure.		x				
	b-5-1 Analyze the steel members and connections.			x	x	x	x

Professional Skill	**c-2-1** Evaluate the design results according to the current Egyptian code of practice for design of steel structures.				x	x	x
General Skills	**d-8-1** Produce design and details of structural steel members.				x	x	x

9- Teaching and Learning Method:

Course Intended Learning Outcome (ILOs)		**Teaching and Learning Method:**												
		Lecture	**Presentation and Movies**	**Discussion**	**Tutorial**	**Problem solving**	**Brain storming**	**Projects**	**Site visits**	**Self-learning**	**Cooperative**	**Discovering**	**Modeling**	**Playing**
A- Knowledge & Understanding	**a3-1**	**x**			**x**									
	a3-2	**x**			**x**									
	a1-1	**x**			**x**									
	a1-2	**x**			**x**									
	a1-3	**x**			**x**									
B-Intellectual Skills	**b2-1**	**x**			**x**									
	b5-1	**x**			**x**									
C-Professional Skills	**c2-1**	**x**			**x**			**x**						
	c2-2	**x**			**x**			**x**						
D-General Skills	**d8-1**	**x**		**x**	**x**			**x**	**x**	**x**				
	d8-2	**x**		**x**	**x**			**x**	**x**	**x**				

10- Teaching and learning method for low capacity and outstanding Student

For low capacity students	Assign a portion of the office hours for those students.
	Give them specific tasks.
	Repeat the explanation of some of the material and tutorials.
	Assign a teaching assistance to follow up the performance of this group of students.
For outstanding Students	Hand out project assignments to those students.
	Give them some research topics to be searched using the internet and conduct presentation.
	Encourage them to take parts in the running research projects.

11- Assessment:

11.1 Assessment Methods

Course Intended Learning Outcome (ILOs)		Assessment Methods											
		Written Exam	Oral Exam	Tutorial Assessment	Project Assessment	Model Assessment	Report Assessment	Quiz assessment	Presentation Assessment	Discussion	Laboratory Test	Sketching drawings	Monitoring
A- Knowledge & Understanding	a3-1	x											
	a3-2	x		x									
	a1-1	x		x									
	a1-2	x		x									
	a1-3	x		x									
B-Intellectual Skills	b2-1	x		x									
	b5-1	x		x									
C-Professional Skills	c2-1	x		x									
	c2-2	x		x									
D-General Skills	d8-1	x		x			x						
	d8-2	x		x			x						

11.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	week
Final examination	*100*	16th
Mid-term written examination		
End of term laboratory examination	-	
Tutorial and report assessment	-	
Total	100%	

12- Facilities required for teaching and learning

A. Laboratory Usage:

B. Library Usage:

Students should be encouraged to use library technical resources in the preparation of reports and oral presentation. At least one oral presentation should involve a significant component of library research to encourage this component of study.

13- List of references:

13.1- Course Notes	▪ The course notes are to be prepared by groups of students after reviewing of the course coordinator.
13.2- Essential Books (Text Books)	▪ Egyptian Code of Practice for Steel Construction and Bridges (2004). ▪ Egyptian Code of Practice for Loads on Buildings (2008). ▪ Abdelrahim, Kh. D. (2009), "Steel Structures Design – Allowable Stress Design", First Edition, Cairo.
13.3 Recommended books	▪ Buick D., and Graham W. (2003). "Steel Designer's Manual", Blackwell Publishers. ▪ AISC (2005). *Manual of Steel Construction – Load and Resistance Factor Design*, 13th Edition, American Institute of Steel Construction, Chicago, IL. ▪ Alan H., and Frank W. (2002), "Steel Detailer's Manual", Second Edition, Blackwell Science. ▪ Lawrence M., and John P. (2008), "Structural Design of Steelwork to EN1993 and EN1994", Third Edition,Elsevier.

Course Prof: **Prof. Dr. Mohamed El-Ghandour.**

Program coordinator: **Dr. Ahmed Turk**

Head of Department: **Prof.Dr. Hassan M. Hassan**

Date: **August/2019**

Course Specification

Program on which the course is given	Civil Engineering
Major or minor element of program	Major
Department offering the program	Civil Engineering
Department offering the course	Civil Engineering
Academic year/Level	M. Sc. & PhD 2019-2020
Date of specification approval	2019

A- Basic Information

Title: **Structures Masonry**	**Code Symbol**: CES 613	
Lecture	2 hours	
Tutorial	1 hours	
Laboratory	-	
Total	3 hours	Bylaw 2000
First term	prerequisite	-

B- Professional Information

1- Course Aims:

This course aims, in general, to discuss and explain masonry materials and its characteristics. The course also illustrates different type of walls as well as method of methods of design, construction, strengthening and retrofitting.

2- Course objectives:

The main Objectives of this course are to equip the students with:

1- Knowledge and understanding of masonry materials and its characteristics.
2- Indenting different type of walls.
3- Identifying and computing loads applied on walls
4- Understanding and performing design of walls and drawing of details.
5- Understanding and selecting different methods of construction, strengthening, and retrofitting of walls

3- Intended Learning Outcomes (ILOs)

NAQAAE Academic Reference Standards (ARS)	Program ILOs	Course ILOs
A. Knowledge and understanding		
A1. Theories and basics related to learning field, as well as other related fields.	a1-1 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics, and specialized knowledge in the field of structural Engineering.	a1-1-1 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in masonry materials and its characteristics. a1-1-2 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in wall types. a1-1-3 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in methods of design of walls. a1-1-4 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in methods of wall construction. a1-1-5 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in strengthening and retrofitting of walls.
A3- Main scientific advances in the field of specialization.	a3-3 Discuss the recent and update developments in the most important themes related to civil engineering.	a3-3-1 Discuss the recent and update developments in methods masonry manufacturing. a3-3-2 Discuss the recent and update developments in methods of wall construction. a3-3-3 Discuss the recent and update developments in methods of strengthening and retrofitting of walls.
B. Intellectual skills		
B1- Analyze and evaluate the information in the field of specialization, and solve the problems based on that.	b1-1 Demonstrate an investigatory and analytic thinking approach (Problem solving) to solve problems related to civil engineering.	b1-1-1 Demonstrate an investigatory and analytic thinking approach to design and check of walls.
	b1-2 Interpret, analyze, and evaluate a given system specific information and relate it to the design of the required	b1-2-1 Interpret, analyze, and evaluate stress on walls.

	system.	
D. General and transferrable skills		
D2- Use information technology to improve his/her professional practice.	d2-1 Use state-of-the-art computer design tools and applications for solving civil engineering problems.	d2-1-1 Use computer softeware in design and check of walls
D5- Use different resources to obtain knowledge and information	d5-1 Use different resources of information like libraries, internet access facilities, etc. to upgrade and enhance their conceptual knowledge.	d5-1-1 Use different resources of information to get most recenet information about the course topics.

4- Course Contents

Topic	*Total Hours*	*Contact hrs*			*Course ILOs Covered (By No.)*
		Lec.	Tut.	Lab.	
1- Masonry materials and its characteristics	3	2	1	--	a1-1-1, a3-3-1, d5-1-1
2- Classifiction and properties of walls	3	2	1	--	a1-1-2, d5-1-1
3- Design of walls	3	2	1		a1-1-3, b1-1-1, b1-2-1, d2-1-1
4- Methods of walls construction	3	2	1		a1-1-4, a3-3-2, d5-1-1
5- Strengthenig and retrofitting of walls	3	2	1		a1-1-3, a3-3-3, d5-1-1
Total	15	10	5	--	

5- Relationship between the course and the program

Field	Academic Reference Standard(ARS)			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Program Academic Standards that the course contribute in achieving	A1(a1-1), A3(a3-3)	B1 (b1-1, b1-2)	-	D2 (d2-1) D5 (d5-1)

6- Course Subject Area:

A	B	C	D	E	F	G	
Humanities and Social Science	Mathematics and Basic Sciences	Basic Engineering Science	Applied Engineering And Design	Computer Applications and ICT	Projects and practice	Disccretionry subjects	Total
---	---	65%	35 %	---	---	---	100%

7- Course Topics.

Topic No.	Topic	Weeks
1st	Masonry	1-4
2nd	Walls Calssifications	5-7
3rd	Walls Design	8-17
4th	Methods of walls construction	18-20
5th	Strengthenig and retrofitting of walls	21-28

8- ILOs Matrix Topics

Course topics	1st	2nd	3rd	4th	5th
Course ILOs	Knowledge & Understanding				
a1-1-1 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in masonry materials and its characteristics	X				
a1-1-2 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in wall types.		X			
a1-1-3 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in methods of design of walls.			X		
a1-1-4 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in methods of wall construction.				X	
a1-1-5 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in strengthening and retrofitting of walls.					X

a3-3-1 Discuss the recent and update developments in methods masonry manufacturing.	X				
a3-3-2 Discuss the recent and update developments in methods of wall construction				X	
a3-3-3 Discuss the recent and update developments in methods of strengthening and retrofitting of walls.					X
Course ILOs	Intellectual skills				
b1-1-1 Demonstrate an investigatory and analytic thinking approach to design and check of walls.			X		
b1-2-1 Interpret, analyze, and evaluate stress on walls.			X		
Course ILOs	General and transferrable skills				
d2-1-1 Use computer softeware in design and check of walls			X		
d5-1-1 Use different resources of information to get most recent information about the course topics.	X	X		X	X

9- Teaching and Learning Method:

Course Intended learning outcomes (ILOs)		Teaching and Learning Method											
		Lecture	Presentation and	Discussion	Tutorial	Problem solving	Brain storming	Projects	Report	Self learning	Cooperative	Discovering	Computer Simulation	Practical Experiments
Knowledge & understanding	a1-1-1	X		X										
	a1-1-2	X		X										
	a1-1-3	X		X										
	a1-1-4	X		X				X						
	a1-1-5	X		X				X						
	a3-3-1	X		X				X						
	a3-3-2	X		X				X						
	a3-3-3	X		X				X						
Intellectual Skills	b1-1-1	X		X		X								
	b1-2-1	X		X		X								
General Skills	d2-1-1	X		X		X								
	d5-1-1								X					

10- Assessment

10.1 Assessment Methods

Final Written Examination : to assess students' knowledge, understanding, analysis, solving and problem identification.

10.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	Week
Final Examination	100	Decided by the faculty council
Total	100%	

11- Facilities required for teaching and learning

Class Room Equipped with Computer and Data show.

A. laboratory Usage:

non.

B. Library Usage:

Students should be encouraged to use library technical resources in the preparation of the required reports and oral presentation.

12- List of references:

- Codes and standard sepcifications.
- ACI Technical Reports.

13- Program Coordination Committee:

Course Coordinator: **Dr. Eng. Shady Rizk Ragheb**

Program coordinator: **Dr. Ahmed Turk**

Head of the Department: **Prof .Dr. Hassan M. Hassan**

Date: **August - 2019**

Course Specification

Program on which the course is given	M. Sc./PhD. in Civil Engineering (Specialization: Construction Engineering)
Major or minor element of program	Major
Department offering the program	Civil Engineering
Department offering the course	Civil Engineering
Academic year/Level	M. Sc. & PhD 2019-2020
Date of specification approval	2019

A- Basic Information

Title: Testing of Materials, Products, and Structures	**Code Symbol: CES 615**	
Lecture	**2 hours**	
Tutorial / Laboratory	**1 hours**	
Total	**3 hours**	**By law 2000**

B- Professional Information

1- Course Aims:

This course aims, in general, to activate the student knowledge and understanding in the direction of implementing testing of materials, products and structures topics. Having learned his/her basic testing of materials in undergraduate courses, the student is subjected in this course to four main advanced topics. These topics are: The basis and types of tests, materials tests, products tests, structures tests. During the course, the student covers several testing cases to cover all the mentioned topic and have the ability to solving testing problems and design tests for researches puproposes.

2- Course objectives:

The main Objectives of this course are to equip the students with:

1- Demonstration of the knowledge and understanding the basis and types of tests.
2- Demonstration of the knowledge and understanding the materials tests.
3- Demonstration of the knowledge and understanding the products tests.
4- Demonstration of the knowledge and understanding the structures tests.
5- Design tests for research puroposes

1- Intended Learning Outcomes (ILOs)

NAQAAE Academic Reference Standards (ARS)	Program ILOs	Course ILOs
A. Knowledge and understanding		
A1. Theories and basics related to learning field, as well as other related fields.	a1-1 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics, and specialized knowledge in the field of structural Engineering.	a1-1-1 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics, and specialized knowledge of different testing methods.
B. Intellectual skills		
B1- Analyze and evaluate the information in the field of specialization, and solve the problems based on that.	b1-2 Interpret, analyze, and evaluate a given system specific information and relate it to the design of the required system.	b1-2-1 Interpret, analyze, and evaluate a given test results and determine the required equipment.
B3- Link and integrate diverse knowledge to solve professional problems.	b3-2 Use integrated approaches to solve problems scientifically.	b3-2-1 Use more than testing method to evaluate a certain phenomenon.
C. Professional and practical skills		
C3- Evaluate means and tools available in the field of practice.	c3-1 Evaluate methods and tools reported in a specified published articles and researches concerning to civil engineering field.	c3-1-1 Evaluate testing methods and tools reported in published researches.
D. General and transferrable skills		
D5- Use different resources to obtain knowledge and information.	d5-1 Use different resources of information like libraries, internet access facilities, etc. to upgrade and enhance their conceptual knowledge.	d5-1-1 Use different resources of information to get most recenet information about the course topics.

2- Course Contents

Topic	*Total Hours*	*Contact hrs*			*Course ILOs Covered (By No.)*
		Lec.	Tut.	Lab.	
1- The basis and types of tests.	3	2	1	--	a1-1-1
2- The Materials tests.	3	2	1	--	a1-1-1, b1-2-1, b3-2-1, d5-1-1
3- The Products tests.	3	2	1	--	a1-1-1, b1-2-1, b3-2-1, d5-1-1
4- The Structures tests.	3	2	1	--	a1-1-1, b1-2-1, b3-2-1, d5-1-1
5- Design tests for research puroposes	3	2	1	--	b1-2-1, b3-2-1, c3-1-1, d5-1-1

3- Relationship between the course and the program

Field	Academic Reference Standard(ARS)			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Program Academic Standards that the course contribute in achieving	A1 (a1-1)	B1 (b1-2, b3-2)	C1 (c3-1)	D2 (d5-1-1)

4- Course Subject Area:

A	B	C	D	E	F	G	
Humanities and Social Science	Mathematics and Basic Sciences	Basic Engineering Science	Applied Engineering And Design	Computer Applications and ICT	Projects and practice	Disccretionry subjects	Total
---	---	30%	70%	---	---	---	100%

5- Course Topics.

Topic No.	Topic	Weeks
1st	The basis and types of tests.	1-6
2nd	The Materials tests.	7-10
3rd	The Products tests.	11-16
4th	The Structures tests.	17-22
5th	Design of test for research purposes	23-28

6- ILOs Matrix Topics

Course topics	1st	2nd	3rd	4th	5th
Course ILOs	Knowledge & Understanding				
a1-1-1 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics, and specialized knowledge of different testing methods.	X	X	X	X	
Course ILOs	Intellectual skills				
b1-2-1 Interpret, analyze, and evaluate a given test results and determine the required equipment.		X	X	X	X
b3-2-1 Use more than testing method to evaluate a certain phenomenon.		X	X	X	X
Course ILOs	Professional and practical skills				
c3-1-1 Evaluate testing methods and tools reported in published researches.					X
Course ILOs	General and transferrable skills				
d5-1-1 Use different resources of information to get most recenet information about the course topics.		X	X	X	X

7- Teaching and Learning Method:

Course Intended learning outcomes (ILOs)		Teaching and Learning Method												
		Lecture	Presentation and	Discussion	Tutorial	Problem solving	Brain storming	Projects	Report	Self learning	Cooperative	Discovering	Computer Simulation	Practical Experiments
Knowledge & understanding	a1-1-1	X		X					X					
Intellectual Skills	b1-2-1 b3-2-1	X X		X X					 X					
Professional Skills	c3-1-1	X		X			X		X					
General Skills	d5-1-1	X		X					X					

8- Assessment

8.1 Assessment Methods

Final Written Examination : to assess students' knowledge, understanding, analysis, creativity in testing.

8.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	week
Final Examination	100	Decided by the faculty council
Total	100%	

9- Facilities required for teaching and learning

Class Room Equipped with Computer and Data show.

A. laboratory Usage:

Students are expected to investigate tools and equipment available in testing lab.

B. Library Usage:

Students should be encouraged to use library technical resources in the preparation of laboratory reports and oral presentation. At least one oral presentation should involve a significant component of library research to encourage this component of study.

10- List of references:

- Books dealt with nondistuctive tests.
- ACI technical reports.

11- Program Coordination Committee:

Course Coordinator: **Dr. Eng. Shady Rizk Ragheb**

Program coordinator: **Dr. Ahmed Turk**

Head of the Department: **Prof .Dr. Hassan M. Hassan**

Date: **August - 2019**

Course Specification

Program on which the course is given	Civil Engineering
Major or minor element of program	Major
Department offering the program	Civil Engineering
Department offering the course	Civil Engineering
Academic year/Level	M. Sc. & PhD 2019-2020
Date of specification approval	2019

A- Basic Information

Title: Advanced Design and Study in Foundations	**Code Symbol**: **CES 622**	
Lecture	2	
Tutorial	**1**	
Laboratory	**0**	
Total	3	Bylaw 2000
First term	prerequisite	

B- Professional Information

1- Course Aims:

This course introduces the Study design and methods of calculation of different types of piles in different soils, Study of raft foundation, strengthening of existing foundations, Choose of suitable foundations for soils with problems, Underground structures

2- Course Objectives

By the end of the course the students will be able to:

- Design and study methods of calculation of different types of piles in different soils.
- Design and study of raft foundation.
- Strengthening of existing foundations.
- Choose of suitable foundations for soils with problems
- Underground structures.

3- Intended Learning Outcomes (ILOs):

Field	Program ILOs that the course contribute in achieving	Course ILOs
Knowledge and understanding	**a-4** Fundamentals of ethical & legal professional practice in the field of specialization.	**a-4-1** Recognize ethnical and professional responsibility issues arising in the practice of the engineering profession.
Intellectual skills	**b-2** Solve specialized problems even with lack of some data and variables, (incomplete data).	**b-2-1** Apply broad knowledge of modern computational methods and think critically to solve unstructured problems (with incomplete data) related to Design and study of raft foundation. .
	b-3 Link and integrate diverse knowledge to solve professional problems.	**b-3-2** Analyze, interpret and manipulate data from a variety of sources and relate it to Choose of suitable foundations for soils with problems

4- Course Contents

Week No.	*Topic*	*Total Hours*	*Contact hrs*			*Course ILOs Covered(By No.)*
			Lec.	**Tut.**	**Lab.**	
Week(1-5)	Introduction to advanced Design and Study in Foundations	3	3			**a-4-1**
Week(5-11)	Design and study methods of calculation of different types of piles in different soils.	3	3			**b-2-1, b-3-2**
Week(12-17)	Design and study of raft foundation.	3	3			**b-2-1, b-3-2**
Week(18-23)	Strengthening of existing foundations.	3	3			**b-2-1, b-3-2**
Week(24-27)	Choose of suitable foundations for soils with problems	3	3			**b-2-1, b-3-2**
Week(28-30)	Underground structures.	3	3			**b-2-1, b-3-2**

5- Relationship between the course and the program

Field	Academic Reference Standard(ARS)			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Program Academic Standards that the course contribute in achieving	**a4**	**b2, b3**	**-----**	**-----**

6- Course Subject Area:

A	B	C	D	E	F	G	
Humanities and Social Science	Mathematics and Basic Sciences	Basic Engineering Science	Applied Engineering And Design	Computer Applications and ICT	Projects and practice	Disccretionry subjects	Total
10%	**----**	**20 %**	**30%**	**20%**	**10%**	**10%**	**100%**

7- Course Topics.

Topic No.	Topic	Weeks
1st	Introduction to advanced Design and Study in Foundations	**1-5**
2nd	Design and study methods of calculation of different types of piles in different soils.	**6-11**
3rd	Design and study of raft foundation.	**12-17**
4th	Strengthening of existing foundations.	**18-23**
5th	Choose of suitable foundations for soils with problems	**24-27**
6th	Underground structures.	**28-30**

8- ILOs Matrix Topics

Course Intended Learning Outcomes (ILOs)		Course topics					
		1st	2nd	3rd	4th	5th	6th
Knowledge and understanding	**a-4** Fundamentals of ethical & legal professional practice in the field of specialization.	x					
Intellectual Skills	**b-2** Solve specialized problems even with lack of some data and variables, (incomplete data).		x	x	x	x	x
	b-3 Link and integrate diverse knowledge to solve professional problems.		x	x	x	x	x

9- Teaching and Learning Method:

Course Intended Learning Outcome (ILOs)		Teaching and Learning Method:												
		Lecture	Presentation and Movies	Discussion	Tutorial	Problem solving	Brain storming	Projects	Site visits	Self-learning	Cooperative	Discovering	Modeling	Playing
A-Knowledge and understanding	a4-1	x												
B-IntellectualSkills	b2-1	x				x		x		x			x	
	b3-2	x				x		x		x			x	

10- Teaching and learning method for low capacity and outstanding Student

For low capacity students	Assign a portion of the office hours for those students.
	Give them specific tasks.
	Repeat the explanation of some of the material and tutorials.
	Assign a teaching assistance to follow up the performance of this group of students.
For outstanding Students	Hand out project assignments to those students.
	Give them some research topics to be searched using the internet and conduct presentation.
	Encourage them to take parts in the running research projects.

11- Assessment:

11.1 Assessment Methods

Course Intended Learning Outcome (ILOs)		Assessment Methods											
		Written Exam	Oral Exam	Tutorial Assessment	Project Assessment	Model Assessment	Report Assessment	Quiz assessment	Presentation Assessment	Discussion	Laboratory Test	Sketching drawings	Monitoring
A-Knowledge and understanding	a4-1	x								x			
B-IntellectualSkills	b2-1				x	x	x			x			
	b3-2				x	x	x			x			

11.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	week
Final examination	100%	
Mid-term written examination	0%	
End of term laboratory examination	0%	
Tutorial and report assessment	0%	
Total	100%	

12- Facilities required for teaching and learning

A. Library Usage:

Students should be encouraged to use library technical resources in the preparation of reports and oral presentation. At least one oral presentation should involve a significant component of library research to encourage this component of study.

13- List of references:

a- Handbook of Slope Stabilisation, J. A. R. Ortigao ،Alberto Sayao
b- Soil Mechanics in Engineering Practice, Karl Terzaghi ،Ralph B. Peck ،Gholamreza Mesri
c- Principles of Geotechnical Engineering 9th Edition, Braja M. Das, Khaled Sobhan, 2019
d- Analysis and design of raft and piled Raft-Program ELPLA, GEOTEC Software Inc., Canada, EL Gendy M., El Gendy A. (2019)

Course Prof: **Prof. Dr. Mohamed El Gendy**

Program coordinator: **Dr. Ahmed Turk**

Head of Department: **Prof. Dr. Hassan M. Hassan**

Date: August 2019

Course Specification

Program on which the course is given	Ph.D & M. Sc. in Civil Engineering (Specialization:Structure Engineering)
Major or minor element of program	Major
Department offering the program	Civil Engineering
Department offering the course	Civil Engineering
Academic year/Level	M. Sc. & PhD 2019-2020
Date of specification approval	2019

A- Basic Information

Title: Productivity in Construction Projects	**Code Symbol: CES624**	
Lecture	2	
Tutorial	**1**	
Laboratory	**0**	
Total	3	Bylaw 2000
First term	prerequisite	

B- Professional Information

1- Course Aims:

This course introduces the basic concepts of Productivity in Construction Projects for the civilengineer. The basics of Productivity in Construction Projectsare well studied.

2- Course Objectives

By the end of the course the students will be able to:

- Understanding the main concept Productivity in Construction Projects.
- Understanding planning ofConstruction Projects.
- Understandingimportance of Productivity in Construction Projects.

3- Intended Learning Outcomes (ILOs):

Field	Program ILOs that the course contribute in achieving	Course ILOs
Knowledge& Understanding	**a-5** Methodologies of solving engineering problems, data collection and interpretation.	**a-5-1** Define the Methodologies of solving engineering problems
	a-6 Professional ethics and impacts of engineering solutions on society and environment.	**a-6-1** Describe the ethics and impacts of engineering solutions on society and environment.
Intellectual skills	**b-2** Select appropriate solutions for engineering problems based on analytical thinking.	**b-2-1** Use the appropriate solution for engineering problems
	b-3 Think in a creative and innovative way in problem solving and design.	**b-3-1** Analyze the problem and find a creative solution.
Professional skills	**c-1** Apply numerical modeling methods to engineering problems.	**c-1-1** Analyze the problem into points to determine the solution.
General skills	**d-2** Work in stressful environment and within constraints.	**d-2-1** Describe the stressful environment in construction projects and how to solve any problems at this environment

4- Course Contents

Week No.	*Topic*	*Total Hours*	*Contact hrs*			*Course ILOs Covered(By No.)*
			Lec.	Tut.	Lab.	
Week(1-5)	Factors affecting productivity	6	4	2		**a-5**
Week(6-10)	productivity, productivity engineering and management	6	4	2		**a-6**
Week(11-16)	Productivity measurement	6	5	1		**b-2**
Week(17-22)	work study, method study	6	5	1		**d-2**
Week(23-26)	***Midterm written examination***					

Week(27-28)	total productivity	6	4	2		**b-3**
Week(29-30)	productivity improvement techniques.	6	5	1		**c-1**

5- Relationship between the course and the program

Field	**Academic Reference Standard(ARS)**			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Program Academic Standards that the course contribute in achieving	**a5& a6**	**b2 & b3**	**c1**	**d2**

6- Course Subject Area:

A	**B**	**C**	**D**	**E**	**F**	**G**	
Humanities and Social Science	Mathematics and Basic Sciences	Basic Engineering Science	Applied EngineeringAnd Design	Computer Applications and ICT	Projects and practice	Disccretionry subjects	Total
----	**5%**	**50 %**	**10%**	**---**	**30%**	**5%**	**100%**

7- Course Topics.

Topic No.	**Topic**	**Weeks**
1st	Factors affecting productivity	(1-5)
2nd	productivity, productivity engineering and management	(6-10)
3rd	Productivity measurement	(11-16)
4th	work study, method study	(17-22)
5th	total productivity	(23-26)
6th	productivity improvement techniques.	(27-30)

8- ILOs Matrix Topics

Course Intended Learning Outcomes (ILOs)		Course topics					
		1st	2nd	3rd	4th	5th	6th
Knowledge & Understanding	**a-5-1** Define the Methodologies of solving engineering problems	x	**x**				
	a-6-1 Describe the ethics and impacts of engineering solutions on society and environment.			**x**			**x**
Intellectual Skills	**b-2-1**Use the appropriate solution for engineering problems		x				
	b-3-1 Analyze the problem and find a creative solution.			X	x	x	x
Professional Skill	**c-1-1**Analyze the problem into points to determine the solution.				x	x	x
General Skills	**d-2-1**Describe the stressful environment in construction projects and how to solve any problems at this environment					x	x

9- Teaching and Learning Method:

Course Intended Learning Outcome (ILOs)		Teaching and Learning Method:												
		Lecture	Presentation and Movies	Discussion	Tutorial	Problem solving	Brain storming	Projects	Site visits	Self learning	Cooperative	Discovering	Modeling	Playing
A- Knowledge& Understanding	a5-1	x		x										
	a6-2	x		x										
B-IntellectualSkills	b2-1	x		x										
	b3-1	x		x										
C-Professional Skills	c1-1	x		x				x						
D-General Skills	d2-1	x		x				x						

10- Teaching and learning method for low capacity and outstanding Student

For low capacity students	Assign a portion of the office hours for those students.
	Give them specific tasks.
	Repeat the explanation of some of the material and tutorials.
	Assign a teaching assistance to follow up the performance of this group of students.
For outstanding Students	Hand out project assignments to those students.
	Give them some research topics to be searched using the internet and conduct presentation.
	Encourage them to take parts in the running research projects.

11- Assessment:

11.1 Assessment Methods

Course Intended Learning Outcome (ILOs)		Assessment Methods											
		Written Exam	Oral Exam	Tutorial Assessment	Project Assessment	Model Assessment	Report Assessment	Quiz assessment	Presentation Assessment	Discussion	Laboratory Test	Sketching drawings	Monitoring
A- Knowledge& Understanding	a5-1	x											
	a6-2	x											
B-IntellectualSkills	b2-1	x											
	b3-1	x											
C-Professional Skills	c1-1	x								x			
D-General Skills	d2-1	x						x					

11.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	week
Final examination	70%	
Mid-term written examination	20%	
End of term laboratory examination	--------	
Tutorial and report assessment	10%	
Total	100%	

12- Facilities required for teaching and learning

A. Laboratory Usage:

B. Library Usage:

Students should be encouraged to use library technical resources in the preparation of reports and oral presentation. At least one oral presentation should involve a significant component of library research to encourage this component of study.

13- List of references:

Course Prof: **Dr .TarekSelim**

Program coordinator: **Dr. Ahmed Turk**

Head of Department: **Prof. Dr. Hassan M. Hassan**

Date: **August - 2019**

Course Specification

Program on which the course is given	Msc. And PhD in Civil Engineering (Specialization: Structural Engineering)
Major or minor element of program	Major
Department offering the program	Civil Engineering
Department offering the course	Civil Engineering
Academic year/Level	2018/2019 PhD
Date of specification approval	***2018***

A- Basic Information

Title: Numerical analysis in structural engineering	**Code Symbol: CES 600**	
Lecture	**3 hours**	
Tutorial / Laboratory	**--**	
Total	**3 hours**	**By law 2000**

B- Professional Information

1- Course Aims:

This course is designed to extend basic concepts learned in numerical analysis in structural engineering. For those students who look toward a structural project position after graduation, this course is designed to widen background in the numerical solutions of structural engineering problems. This course will also provide an excellent opportunity to prepare the graduates for advanced study in different areas of numerical applications in structural engineering. The course is meant to create the deep understanding of the basics and theories behind the numerical analysis in structural engineering.

The main Objectives of this course are to equip the students with:

1. Knowledge and understanding of key and advanced facts, theories, concepts, principles and techniques relevant to solve the problems using advanced computer software's.
2. Advanced skills in the analysis and solving of problems related structural engineering using unusual numerical solutions.
3. The ability to know analytical and numerical methods for solving partial differential equations related to structural engineering.
4. Identify current problems in structural engineering and find acceptable solutions using numerical analysis.
5. Select from alternative numerical methods the one method that is most appropriate for a specific problem.
6. Formulate algorithms to solve problems numerically.

7. Understand the limitations of each numerical method, especially the conditions under which they fail to converge to a solution.

2- Intended Learning Outcomes (ILOs)

NAQAAE Academic Reference Standards (ARS)	Program ILOs	Course ILOs
A. Knowledge and understanding		
A1. Theories and basics related to learning field, as well as other related fields.	a1-2 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in the field of **Structural Engineering**.	a1-2-1 Numerical solutions for root finding. a1-2-2 Numerical solutions for linear equations. a1-2-3 Numerical interpretation for experimental results. a1-2-4 Numerical solutions for engineering problems related to differentiation, integration and differental equations.
B. Intellectual skills		
B2- Solve specialized problems with available givens and parameters. .	b2-1 Apply broad knowledge of modern computational methods and think critically to solve unstructured problems (with incomplete data) related to civil engineering.	b2-1 Demonstrate an investigatory and analytic thinking approach to solve the problems in structural engineering field using numerical analysis.
	b3-1 Analyze, interpret and manipulate data from a variety of sources and relate it to solve professional problems.	b3-1 Analyze, interpret and manipulate data from a variety of sources and relate it to solve professional problems related to structural engineering .
C. Professional and practical skills		
C3- Evaluate means and tools available in the field of practice	c3-1 Evaluate methods and tools reported in a specified published articles and researches concerning to civil engineering field.	C3-1-1 Handle different types of complicated engineering problems for which no analytical solution can be obtained. C3-1-2 Use spread sheets together with the numerical techniques to facilitate the solution of design problems.
D. General and transferrable skills		
D2- Use information technology to improve his/her professional practice	d2-1 Use state-of-the-art computer design tools and applications for solving civil engineering problems	d2-1 Use state-of-the-art computer and Internet tools for getting latest information and standards related to numerical analysis tools and software in structural engineering.

3- Course Contents

Topic	*Total Hours*	*Contact hrs*			*Course ILOs Covered (By No.)*
		Lec.	Tut.	Lab.	
Introduction to numerical analysis	3	3	--	--	a1-2-1, b2-1
Matrices and Determinants	9	9	--	--	a1-2-2
Equation roots (1): the direct search method and the bisection method	6	6	--	--	a1-2-1
Equation roots (2): Newton-Raphson method and Secant method	6	6	--	--	a1-2-1
Sets of linear equations (1): Elimination methods	6	6	--	--	a1-2-2, d2-1
Sets of linear equations (2): Iteration methods, Nonlinear equation sets	12	12	--	--	a1-2-2, b2-1, c3-1-1
Numerical Interpolation (1): Coefficient method	6	6	--	--	a1-2-3
Numerical Interpolation (2): Gregory-Newton method	3	3	--	--	a1-2-3
Numerical Interpolation (3): Finite difference method	3	3	--	--	a1-2-3
Numerical Differentiation: Finite difference Table	6	6	--	--	a1-2-4, b3-1, c3-1-2
Numerical Integration (1): Integrating Interpolation polynomials	3	3	--	--	a1-2-4, b3-1, c3-1-2
Numerical Integration (2): Trapezoidal rule	3	3	--	--	a1-2-4, b3-1, c3-1-2
Numerical Integration (3): Simpson's rules	6	6	--	--	a1-2-4, b3-1, c3-1-2
Solution of ordinary differential equations	12	12	--	--	a1-2-4, d2-1

4- Relationship between the course and the programme

Field	Academic Reference Standard(ARS)			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Programme Academic Standards that the course contribute in achieving	A1(a1-2)	B2(b2-1), B3(b3-1)	C3(c3-1)	D2(d2-1)

5- Course Subject Area:

A	B	C	D	E	F	G	
Humanities and Social Science	Mathematics and Basic Sciences	Basic Engineering Science	Applied Engineering And Design	Computer Applications and ICT	Projects and practice	Disccretionry subjects	Total
---	---	20%	10%	70%			100%

6- Course Topics.

Topic No.	Topic	Weeks
1st	Introduction, Matrices and Determinants	1-4
2nd	Equation roots (direct search, bisection, Newton-Raphson, and Secant methods)	5-8
3rd	Sets of linear equations (Elimination methods and Iteration methods), Nonlinear equation sets	9-14
4th	Numerical Interpolation (Coefficient method, Gregory-Newton method and Finite difference method)	15-18
5th	Numerical Differentiation: Finite difference Table	19-20
6th	Numerical Integration (Integrating Interpolation polynomials, Trapezoidal rule, and Simpson's rules)	21-24
7th	Solution of ordinary differential equations	25-28

7- ILOs Matrix Topics

Course topics	1st	2nd	3rd	4th	5th	6th	7th
Course ILOs	Knowledge & Understanding						
a1-2-1 Numerical solutions for root finding.		X					
a1-2-2 Numerical solutions for linear equations.			X				
a1-2-3 Numerical interpretation for experimental results.				X			
a1-2-4 Numerical solutions for engineering problems related to differentiation, integration and differental equations.					X	X	X
Course ILOs	Intellectual skills						
b2-1 Demonstrate an investigatory and analytic thinking approach to solve the problems in structural engineering field using numerical analysis.	X	X	X	X	X	X	X

Course topics	1st	2nd	3rd	4th	5th	6th	7th
Course ILOs	Intellectual skills						
b3-1 Analyze, interpret and manipulate data from a variety of sources and relate it to solve professional problems related to structural engineering .				X	X	X	
Course ILOs	Professional and practical skills						
C3-1-1 Handle different types of complicated engineering problems for which no analytical solution can be obtained.		X	X	X	X	X	X
C3-1-2 Use spread sheets together with the numerical techniques to facilitate the solution of design problems.	X	X	X	X	X	X	X
Course ILOs	General and transferrable skills						
d2-1 Use state-of-the-art computer and Internet tools for getting latest information and standards related to numerical analysis tools and software in structural engineering.	X	X	X	X	X	X	X

8- Teaching and Learning Method:

Course Intended learning outcomes (ILOs)		Teaching and Learning Method												
		Lecture	Presentation and Movies	Discussion	Tutorial	Problem solving	Brain storming	Projects	Report	Self learning	Cooperative	Discovering	Computer Simulation	Practical Experiments
Knowledge & understanding	a1-2	X												
Intellectual Skills	b2-1	X		X									X	
	b3-1	X		X									X	
Professional Skills	C3-1		X										X	
General Skills	d2-1												X	

9- Assessment

9.1 Assessment Methods

Final Written Examination : to assess students' knowledge, understanding, analysis, creativity, problem solving, and problem identification.

9.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	week
Final Examination	100	28
Total	100%	

10- Facilities required for teaching and learning

Class Room Equipped with Computer and Video Projector - Library.

A. laboratory Usage:

Students are expected to prepare and formulate some computer spread sheets to solve assignments using general computer labs.

B. Library Usage:

Students should be encouraged to use library technical resources in the preparation of spread sheets related to design problems using numerical analysis techniques. At least spread sheet should involve a significant component of library research to encourage this component of study.

11- List of references:

1. Endre Suli and David Mayers, An Introduction to Numerical Analysis, Cambridge University Press 2003.
2. http://www.maths.manchester.ac.uk/~cp/frontpage157.htm

12- Program Coordination Committee:

Course Coordinator: **Associate Prof. Dr Ibrahim Ahmed Elarabi**

Programme coordinator: **Dr. Ahmed Turk**

Head of the Department: **Prof .Dr. Mamdouh Salah**

8/8/2018

Course Specification

Program on which the course is given	MSc and PhD in Civil Engineering (Specialization: Structural Engineering).
Major or minor element of program	Major
Department offering the program	Civil Engineering
Department offering the course	Civil Engineering
Academic year/Level	2018/2019 PhD
Date of specification approval	2018

A- Basic Information

Title: Computer Applications in Civil Engineering	**Code Symbol**: **CES601**	
Lecture	2 hours	
Tutorial	1 hours	
Laboratory	-	
Total	3 hours	Bylaw 2000
First term	prerequisite	-

B- Professional Information

1- CourseAims:

Advances in computer-based engineering technology are directly related to machine and communications capabilities and the ability of engineers to make optimum use of these capabilities. To this end it is important that engineers act in anticipation of new hardware and software advances as opposed to reacting to an existing technology. This course surveys the developments in computer hardware and software in civil engineering. In addition, this course will also provide an excellent opportunity to practice programming of standard mathematical engineering problems. Programs are made using both Visual Basic for Applications (VBA) within EXCEL environment.

2- Course Objectives

By the end of the course the students will be able to:

1. Understand the key and advanced facts, theories, concepts, principles and techniques relevant to engineering software.
2. Apply computer skills in the definition, analysis, and solving of problems related to civil engineering problems.
3. Develop models and methods and use techniques, principles and laws of engineering science in order to lead to engineering applications design.

4. Apply mathematical models using computer software effectively with classical and modern theories to identify/solve complex and open-ended engineering problems related to civil engineering.
5. Aware of the need to develop him/her-self and to engage in continuous learning in the field of civil engineering software development.
6. Apply specialized knowledge and combining it with relevant knowledge in his / her professional practice to produce civil engineering software.

3- Intended Learning Outcomes (ILOs) forthewholeprogram

This course is designed to achieve the above objectives through the following **Intended Learning Outcomes (ILOs)**:

NAQAAE Academic Reference Standards (ARS)	Program ILOs	Course ILOs
A. Knowledge and understanding		
A1. Theories, basics and specialized knowledge in the field of learning, as well as other related subjects.	a1-1 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in the field of Structural Engineering.	a1-1-1 Recognize the main engineering software concepts. a1-1-2 Recognize the main computer methods used in solving structural problems. a1-1-3 Understand source of errors in computations during analysis.
B. Intellectual skills		
B1- Analyze and evaluate information in the field of specialization and relate it to solve problems and formulate theories.	b1-1 Demonstrate an investigatory and analytic thinking approach (Problem solving) to solve problems related to civil engineering.	b1-1-1 Analyze, interpret and manipulate data from a variety of sources and relate it to solve computational problems related to civil engineering.
B2- Solve specialized problems with available givens and parameters.	b2-1 Apply broad knowledge of modern computational methods and think critically to solve unstructured problems (with incomplete data) related to civil engineering.	b2-1-1 Apply interpolation or curve-fitting methods to deduce exact or approximate formulas that express a mathematical model or relationship.
C. Professional and practical skills		
C1- Mastering the basics as well as the latest professional skills in the field of	c1-1 Express competence skills, such as identifying, formulating, analyzing, and creating engineering	c1-1-1 Select the suitable civil engineering software for a specific problem. c1-1-2 Express competence skills, such

specialization.	solutions, using latest engineering techniques, skills, and tools.	as identifying, formulating, analyzing, and creating engineering solutions using modern computer software related to civil engineering.
D. General and transferrable skills		
D2- Use information technology to improve his/her professional practice	d2-1 Use state-of-the-art computer design tools and applications for solving civil engineering problems.	d2-1-1 Use state-of-the-art computer aided design tools for solving professional problems related civil engineering.
	d2-2 Employ the information technology skills to serve his / her career development.	d2-2-1 Employ the information technology skills to serve his / her career development.
D5- Use different resources to obtain knowledge and information.	d5-1 Use different resources of information like libraries, internet access facilities, etc. to upgrade and enhance their conceptual knowledge.	d5-1-1 Use different sources of information like library, internet access facilities, etc. to upgrade and enhance their conceptual knowledge about up-to-date software in civil engineering.

4- Course Contents

Lecture Topic	Total Hours	Lec. Hours	Tut. Hours	ILOs covered (By No.)
1- Introduction to principals of engineering software.	6	4	2	a1-1-1 & d5-1-1
2- Commercial engineering software.	6	4	2	a1-1-1, c1-1-1, d2-1-1, d2-2-1 & d5-1-1
3- Introduction to Visual Basic for Applications.	18	12	6	a1-1-2, c1-1-2 & d2-1-1
4- Applications on matrix algebra.	6	4	2	a1-1-2 & b1-1-1
5- Applications to numerical integration.	6	4	2	a1-1-2 & b1-1-1
6- Roots of equations.	6	4	2	a1-1-2 & b1-1-1
7- Solution of system of linear equations.	12	8	4	a1-1-2 & b1-1-1
8- Interpolation.	6	4	2	a1-1-2 & b2-1-1
9- Curve fitting and least-squares.	6	4	2	a1-1-2 & b2-1-1
10- Solution of system of nonlinear equations.	6	4	2	a1-1-2 & b2-1-1
11- Sources of errors in computations.	6	4	2	a1-1-3
Total	**84**	**56**	**28**	**---**

5- Relationship between the course and the program

Field	Academic Reference Standard (ARS)			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Program Academic Standards that the course contributes in achieving.	A1 (a1-1)	B1 (b1-1), B2 (b2-1)	C1 (c1-1)	D2 (d2-1, d2-2), D5(d5-1)

6- CourseSubject Area:

A	B	C	D	E	F	G	
Humanities and Social Science	Mathematics and Basic Sciences	Basic Engineering Science	Applied Engineering and Design	Computer Applications and ICT	Projects and practice	Disccretionry subjects	Total
---	20%	10%	10%	60%	---	---	100%

7- Course Topics.

Topic No.	Topic	Weeks
1st	Introduction to principals of engineering software.	1-2
2nd	Commercial engineering software.	3-4
3rd	Introduction to Visual Basic for Applications.	5-10
4th	Applications on matrix algebra.	11-12
5th	Applications to numerical integration.	13-14
6th	Roots of equations.	15-16
7th	Solution of system of linear equations.	17-20
8th	Interpolation.	21-22
9th	Curve fitting and least-squares.	23-24
10th	Solution of system of nonlinear equations.	25-26
11th	Sources of errors in computations.	27-28

8- ILOs Matrix Topics

Course Topics	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th
Course ILOs	**Knowledge & Understanding**										
a1-1-1 Recognize the main engineering software concepts.	×	×									
a1-1-2 Recognize the main computer methods used in solving structural problems.			×	×	×	×	×	×	×	×	
a1-1-3 Understand source of errors in computations during analysis.											×
Course ILOs	**Intellectual Skills**										
b1-1-1 Analyze, interpret and manipulate data from a variety of sources and relate it to solve computational problems related to civil engineering.				×	×	×	×				
b2-1-1 Apply interpolation or curve-fitting methods to deduce exact or approximate formulas that express a mathematical model or relationship.								×	×	×	
Course ILOs	**Professional Skill**										
c1-1-1 Select the suitable civil engineering software for a specific problem.		×									
c1-1-2 Express competence skills, such as identifying, formulating, analyzing, and creating engineering solutions using modern computer software related to civil engineering.			×								
Course ILOs	**General Skills**										
d2-1-1 Use state-of-the-art computer aided design tools for solving professional problems related civil engineering.		×	×								
d2-2-1 Employ the information technology skills to serve his / her career development.		×	×								
d5-1-1 Use different sources of information like library, internet access facilities, etc. to upgrade and enhance their conceptual knowledge about up-to-date software in civil engineering.	×	×									

9- Teaching and Learning Method:

Course Intended learning outcomes (ILOs)		Teaching and Learning Method												
		Lecture	Presentation and Movies	Discussion	Tutorial	Problem solving	Brain storming	Projects	Report	Self-learning	Cooperative	Discovering	Computer Simulation	Practical Experiments
Knowledge & understanding	a1-1-1			×					×	×				
	a1-1-2	×	×		×	×								
	a1-1-3	×	×		×	×								
Intellectual Skills	b1-1-1	×	×		×	×								
	b2-1-1	×	×		×	×								
Professional Skills	c1-1-1	×	×		×									
	c1-1-2	×	×		×									
General Skills	d2-1-1	×	×		×									
	d2-2-1	×	×		×									
	d5-1-1	×	×	×	×				×	×				

10- Teaching and learning method for low capacity and outstanding Student

For low capacity students	Assign a portion of the office hours for those students.
	Give them specific tasks.
	Repeat the explanation of some of the material and tutorials.
	Assign a teaching assistance to follow up the performance of this group of students.
For outstanding Students	Hand out project assignments to those students.
	Give them some research topics to be searched using the internet and conduct presentation.
	Encourage them to take parts in the running research projects.

11- Assessment

11.1 Assessment Methods

Final Written Examination : To assess students' knowledge, understanding, analysis, creativity, problem solving, and problem identification.

11.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	Week
Final Examination	100%	32
Total	100%	

12- Facilities required for teaching and learning

Whiteboard – Classroom Equipped with Computer and Video Projector - Computer Lab with Preinstalled EXCEL & VBA software packages (latest version) - Library.

A. Laboratory usage:

Students are expected to prepare and conduct some computer program assignments using EXCEL & VBA software using general computer labs.

B. Library usage:

Students should be encouraged to use library technical resources in the preparation of laboratory reports and oral presentation. At least one oral presentation should involve a significant component of library research to encourage this component of study.

13- List of References:

Course and Lab Notes:

There are lecture notes prepared by the course coordinator.

Essential Books (Textbooks):

- Steven C. Chapra - Raymond P. Canale, 2014, Numerical Methods for Engineers, 7th Ed, McGraw-Hill Education - Europe.
- E. Joseph Billo, 2007, "Excel for Scientists and Engineers – Numerical Methods", Wiley Publishing Inc.
- Y. C. Pao, 2001, "Engineering Analysis, Interactive Methods and Programs with FORTRAN, QuickBASIC, MATLAB, and Mathematica", CRC Press.
- John Walkenbach, 2010, "Excel 2010 Formulas", Wiley Publishing Inc.

14- Program Coordination Committee:

Course Coordinator:	**Dr. Ashraf I. El-Sabbagh**
Program coordinator:	**Dr. Ahmed Turk**
Head of the Department:	**Prof. Dr. Mamdouh Salah**

8/8/2018

Course Specification

Program on which the course is given	Civil Engineering
Major or minor element of program	Major
Department offering the program	Civil Engineering
Department offering the course	Civil Engineering
Academic year/Level	2018/2019 PHD
Date of specification approval	2018

A- Basic Information

Title: Elasticity Theory and Design of Steel Structures	**Code Symbol**: **CES602**	
Lecture	2 hours	
Tutorial	1 hours	
Laboratory	-	
Total	3 hours	Bylaw 2000
First term	prerequisite	-

B- Professional Information

1- Course Aims:

This course is designed to extend basic concepts learned in elastic theory in civil engineering. For those students who look toward advanced analysis and design of steel structures after graduation. This course will also provide an excellent opportunity to provide students with learning about concepts of elastic analysis (ASD). The course is meant to create the deep understanding of the basics and theories of elastic design. The main Objectives of this course are to equip the students with:

1. Knowledge and understanding of key and advanced design, theories, concepts, principles and techniques relevant to solve the problems in elastic analysis.
2. Understanding the behavior of the structure that considering elastic analysis.
3. Understanding the elastic material behavior.
4. Analyze and design of the flexural beams and frames.
5. Understanding the beam mechanism and sway mechanism.

2- Course Objectives

By the end of the course the students will be able to:

- Understanding the main concept of collapse Mechanics.
- Understanding main elasticity theory.
- Understanding behavior equations of structures considering elastic design.

3- Intended Learning Outcomes (ILOs):

Field	Programme ILOs that the course contribute in achieving	Course ILOs
Knowledge & Understanding	**A-1 Theories and basics related to learning field, as well as other related fields**	A1-1 Describe the behavior of structure using elastic analysis.
		A1-2 Recognize the behavior of supports under elastic loadings.
Intellectual skills	**B-2 Select appropriate solutions for engineering problems based on analytical thinking.**	B2-1 Employ the principle of the plastic hinge formation in the design.
	B-7 Take professional decisions in different professional practical contexts	B7-1 Sketch combined mechanism under loading.
Professional skills	**C-1 Apply knowledge of mathematics, science, information technology, design, business context and engineering practice integrally to solve engineering problems.**	C1-1 Apply knowledge of mathematics to derive and calculate the failure load.
General skills	**D-1 Communicate effectively using all methods.**	D1-1 Collaborate effectively within multidisciplinary team to design structure.

4- Course Contents

Week No.	*Topic*	*Total Hours*	*Contact hrs*			*Course ILOs Covered (By No.)*
			Lec.	**Tut.**	**Lab.**	
1-2	1. Basic concepts of elastic theory.	12	8	4	--	A1-1, A1-2 & C1-1
3-6	2. Failure load and mechanism.	12	8	4	--	A1-2 & , C1-1
7-10	3. Development and analysis of failure load, beam loads and sway loads.	12	8	4	--	A1-2 & ,C1-1, D1-1
11-16	4. Bases of elastic design.	12	8	4	--	A1-2 & B7-1, D1-1
17-20	5. Analysis and design of flexural	12	8	4	--	A1-2 & B7-1, D1-1

	beams.					
21-24	6. Analysis and design of flexural frames and connections.	12	8	4	--	A1-2 & B7-1, D1-1
25-28	7. Secondary design problems.	12	8	4	--	B2-1& B7-1, D1-1

5- Relationship between the course and the programme

Field	**Academic Reference Standard (ARS)**			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Programme Academic Standards that the course contribute in achieving	A1	B-2, B-7	C-1	D-1

6- Course Subject Area:

A	**B**	**C**	**D**	**E**	**F**	**G**	
Humanities and Social Science	Mathematics and Basic Sciences	Basic Engineering Science	Applied Engineering And Design	Computer Applications and ICT	Projects and practice	Disccretionry subjects	Total
---	---	80%	20%				100%

7- Course Topics.

Topic No.	**Topic**	**Weeks**
1st	Basic concepts of elastic theory.	**1-2**
2nd	Failure load and mechanism.	**3-6**
3rd	Development and analysis of failure load, beam loads and sway loads.	**7-10**
4th	Bases of elastic design.	**11-16**
5th	Analysis and design of flexural beams.	**17-20**
6th	Analysis and design of flexural frames and connections.	**21-24**
7th	Secondary design problems.	**25-28**

8- ILOs Matrix Topics

Course Intended Learning Outcomes (ILOs)		Course topics						
		1st	2nd	3rd	4th	5th	6th	7th
Knowledge & Understanding	A1-1	x						
	A1-2	x	x	x	x	x	x	
Intellectual Skills	B2-1							x
	B7-1			x	x	x	x	x
Professional Skill	C1-1	x	x	x				
General Skills	D1-1			x	x	x	x	x

9- Teaching and Learning Method:

Course Intended Learning Outcome (ILOs)		Teaching and Learning Method:												
		Lecture	Presentation and	Discussion	Tutorial	Problem solving	Brain storming	Projects	Site visits	Self learning	Cooperative	Discovering	Modeling	Playing
A- Knowledge & Understanding	A1--1	x			x	x								
	A1-2	x			x	x								
B-Intellectual Skills	b2-1	x			x	x								
	b7-1	x			x	x								
C-Professional Skills	C1.1	x			x	x								
D-General Skills	D1.1			x										

10- Teaching and learning method for low capacity and outstanding Student

For low capacity students	Assign a portion of the office hours for those students.
	Give them specific tasks.
	Repeat the explanation of some of the material and tutorials.
	Assign a teaching assistance to follow up the performance of this group of students.
For outstanding Students	Hand out project assignments to those students.
	Give them some research topics to be searched using the internet and conduct presentation.
	Encourage them to take parts in the running research projects.

11- Assessment:

11.1 Assessment Methods

Course Intended Learning Outcome (ILOs)		Assessment Methods											
		Written Exam	Oral Exam	Tutorial Assessment	Project Assessment	Model Assessment	Report Assessment	Quiz assessment	Presentation Assessment	Discussion	Laboratory Test	Sketching drawings	Monitoring
A- Knowledge & Understanding	A1-1		x							x			
	A1-2		x							x			
B-Intellectual Skills	b2-1							x					
	B7-1	x		x				x					
C-Professional Skills	C1.1	x		x				x					
D-General Skills	D1.1									x		**x**	

11.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	week
Final Examination	100	32
Total	100%	

12- Facilities required for teaching and learning

A. Laboratory Usage: None.

B. Library Usage: Students should be encouraged to use library technical resources in the study of the

13- List of references:

1. Alan Williams, Steel Structures Design.

Course Prof.: Assoc. Prof. Dr. Tarek Sharaf

Program Coordinator: Dr. Ahmed Turk

Head of Department: Prof. Dr. Mamdoh Saleh

Date 8/8/2018

Course Specification

Program on which the course is given	Civil Engineering
Major or minor element of program	Major
Department offering the program	Civil Engineering
Department offering the course	Civil Engineering
Academic year/Level	2018-2019/ Mr.sc
Date of specification approval	2019

A- Basic Information

Title: Plastic Theory and Design of Steel Structures	**Code Symbol**: **CES603**	
Lecture	2 hours	
Tutorial	1 hours	
Laboratory	-	
Total	3 hours	Bylaw 2000
First term	prerequisite	-

B- Professional Information

1- Course Aims:

This course is designed to extend basic concepts learned in plastic analysis in civil engineering. For those students who look toward advanced analysis and design of steel structures after graduation. This course will also provide an excellent opportunity to provide students with learning about concepts of plastic analysis. The course is meant to create the deep understanding of the basics and theories of plastic design and plastic hinge formation. The main Objectives of this course are to equip the students with:

1. Knowledge and understanding of key and advanced design, theories, concepts, principles and techniques relevant to solve the problems in plastic analysis.
2. Understanding the behavior of the structure that considering plastic analysis.
3. Understanding the plastic hinge formation.
4. Analyze and design of the flexural beams and frames.
   Understanding the beam mechanism and sway mechanism.

2- Course Objectives

By the end of the course the students will be able to:

- Understanding the main concept of collapse Mechanics.
- Understanding main theory plasticity.
- Understanding behavior equations of structures considering plastic theory.

3- Intended Learning Outcomes (ILOs):

Field	Programme ILOs that the course contribute in achieving	Course ILOs
Knowledge & Understanding	A-1 Theories and basics related to learning field, as well as other related fields	A1-1 Describe the behavior of structure using plastic analysis.
		A1-2 Recognize the behavior of supports under plastic loadings.
Intellectual skills	**B-2** Select appropriate solutions for engineering problems based on analytical thinking.	b-2-1 Employ the plastic hinge formation.
	B-7 Take professional decisions in different professional practical contexts.	B7-1 Sketch combined mechanism under plastic loading.
Professional skills	**C-1** Apply knowledge of mathematics, science, information technology, design, business context and engineering practice integrally to solve engineering problems.	C1.1 Apply knowledge of mathematics to derive and calculate the collapse load using plastic analysis.
General skills	D-1 Communicate effectively using all methods.	d1-1 Collaborate effectively within multidisciplinary team to design structure using plastic analysis.

4- Course Contents

Week No.	*Topic*	*Total Hours*	*Contact hrs*			*Course ILOs Covered (By No.)*
			Lec.	**Tut.**	**Lab.**	
1-2	1. Basic concepts of plastic analysis	12	8	4	--	A1-1, A1-2 & , C1.1
3-6	2. Plastic hinge formation	12	8	4	--	A1-2 & , C1.1
7-10	3. Development and analysis of collapse mechanism, beam mechanism and sway mechanism	12	8	4	--	A1-2 & ,C1.1

11-16	4. Bases of plastic design	12	8	4	--	A1-2 & b7-1,
17-20	5. Analysis and design of flexural beams	12	8	4	--	A1-2 & b7-1,
21-24	6. Analysis and design of flexural frames and connections	12	8	4	--	A1-2 & b7-1
25-28	7. Secondary design problemes	12	8	4	--	B2-1& b7-1
	Total	84	56	28	--	B2-1& b7-1

5- Relationship between the course and the programme

Field	**Academic Reference Standard (ARS)**			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Program Academic Standards that the course contributes in achieving	A1	B-2, B-7	C-1	D-1

6- Course Subject Area:

A	**B**	**C**	**D**	**E**	**F**	**G**	
Humanities and Social Science	Mathematics and Basic Sciences	Basic Engineering Science	Applied Engineering And Design	Computer Applications and ICT	Projects and practice	Discretionary subjects	Total
---	---	80%	20%				100%

7- Course Topics.

Topic No.	**Topic**	**Weeks**
1st	Basic concepts of plastic theory.	**1-2**
2nd	Plastic hinge formation	**3-6**
3rd	Development and analysis of collapse mechanism, beam mechanism and sway mechanism.	**7-10**
4th	Bases of plastic design.	**11-16**
5th	Analysis and design of flexural beams.	**17-20**

6th	Analysis and design of flexural frames and connections.	**21-24**
7th	Secondary design problems.	**25-28**

8- ILOs Matrix Topics

Course Intended Learning Outcomes (ILOs)		**Course topics**							
		1st	**2nd**	**3rd**	**4th**	**5th**	**6th**	**7th**	**8th**
Knowledge & Understanding	A1-1	x							
	A1-2	x	x						
Intellectual Skills	b-2-1			x					
	B7-1		x	x	x	x			
Professional Skill	C1.1	x							
General Skills	D1.1		x						
	D1.2			x		x			

9- Teaching and Learning Method:

Course Intended Learning Outcome (ILOs)		**Teaching and Learning Method:**												
		Lecture	**Presentation and**	**Discussion**	**Tutorial**	**Problem solving**	**Brain storming**	**Projects**	**Site visits**	**Self learning**	**Cooperative**	**Discovering**	**Modeling**	**Playing**
A- Knowledge & Understanding	A1--1	x			x	x								
	A1-2	x			x	x								
B-Intellectual Skills	b2-1	x			x	x								
	b7-1	x			x	x								
C-Professional Skills	C1.1	x			x	x								
D-General Skills	D1.1			x							**x**			
	D1.2			x							**x**			

10- Teaching and learning method for low capacity and outstanding Student

For low capacity students	Assign a portion of the office hours for those students.
	Give them specific tasks.
	Repeat the explanation of some of the material and tutorials.
	Assign a teaching assistance to follow up the performance of this group of students.
For outstanding Students	Hand out project assignments to those students.
	Give them some research topics to be searched using the internet and conduct presentation.
	Encourage them to take parts in the running research projects.

11- Assessment:

11.1 Assessment Methods

Course Intended Learning Outcome (ILOs)		Assessment Methods											
		Written Exam	Oral Exam	Tutorial Assessment	Project Assessment	Model Assessment	Report Assessment	Quiz assessment	Presentation Assessment	Discussion	Laboratory Test	Sketching drawings	Monitoring
A- Knowledge & Understanding	A1-1		x							x			
	A1-2		x							x			
B-Intellectual Skills	b2-1							x					
	B7-1	x		x				x					
C-Professional Skills	C1.1	x		x				x					
D-General Skills	D1.1									x		**x**	
	D1.2									x		**x**	

11.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	week
Final Examination	100	32
Total	100%	

12- Facilities required for teaching and learning

A. Laboratory Usage: None.

B. Library Usage:

Students should be encouraged to use library technical resources in the study of the

13- List of references:

1. ***Alan Williams, Steel Structures Design.***

Course Prof.: Assoc. Prof. Dr. Tarek Sharaf

Program Coordinator: Dr. Ahmed Turk

Head of Department: Prof. Dr. Mamdouh Saleh

8/8/2018

Course Specification

Program on which the course is given	MsC.
Major or minor element of program	Major
Department offering the program	Civil Engineering
Department offering the course	Civil Engineering
Academic year/Level	M. Sc. & PhD 2018-2019
Date of specification approval	2018

A- Basic Information

Title: Fracture Mechanics	**Code Symbol**: CES 604	
Lecture	2 hours	
Tutorial	1 hours	
Laboratory	-	
Total	3 hours	Bylaw 2000
First term	prerequisite	-

B- Professional Information

1- Course Aims:

This course aims; in general, to activate the student knowledge and understanding in the direction of implementing design aspects to the real life structures. The student is subjected in this course to important topics in the fracture mechanics of concrete and steel structures. These topics are: Fundamentals of fracture mechanics and fatigue, linear elastic fracture mechanics, method of elastic stress field, method of energy balance, factors of stress intensity, elastic plastic fracture mechanics, and applications for concrete and steel structures using fracture mechanics.

2- Course Objectives

By the end of the course the students will be able to:

- Understanding the principles of fractures mechanics and fatigue.
- Identify the different fracture mechanics methods.
- Ability to determine the stress intensity factors
- Ability to apply fracture mechanics methods on concrete and steel structures

3- Intended Learning Outcomes (ILOs):

Field	Programme ILOs that the course contribute in achieving	Course ILOs
Knowledge& Understanding	a1-1 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in the field of **Structural Engineering**.	**a-1-1** Understanding the principles of fractures mechanics and fatigue.
		a-1-2 Identify the different fracture mechanics methods.
		a-1-3 Ability to determine the stress intensity factors
		a-1-4 Ability to apply fracture mechanics methods on concrete and steel structures
Intellectual skills	**b1-1** Demonstrate an investigatory and analytic thinking approach (Problem solving) to solve problems related to civil engineering.	**b-1-1** Excite his/her previous structural and material knowledge to integrate to the apply on fracture mechanics. **b-1-2** Upgrade his/her structural analysis skills to be used in concrete structures.
	b2-1 Apply broad knowledge of modern computational methods and think critically to solve unstructured problems (with incomplete data) related to civil engineering.	**b-2-1** Analyze the solution alternatives to choose the optimum one.
		b-2-2 Activate his/her overall structural engineering skills of using more than one subject in the design of a real life problem. **b-2-3** Imagine the behavior of R.C structures and there cracking
Professional skills	**c1-1** Express competence skills, such as identifying, formulating, analyzing, and creating engineering solutions, using latest engineering techniques, skills, and tools.	**c-1-1** Build a large design principles bank to be used later in full-scale design. **c-1-2** Deal in a well-defined logical steps to reach a most economic design output. **c-1-3** Select most suitable materials for a certain type of structures.
General skills	**d2-1** Use state-of-the-art computer design tools and applications for solving civil engineering problems..	**d-2-1** Pickup an Architectural design and develop his/her own structural design. **d-2-2** Break a real life structural down to primary elements.
	d5-1 Use different resources of information like libraries, internet access facilities, etc. to upgrade and enhance their conceptual knowledge.	**d-5-1** Use text books and published information to seek his/her piece of knowledge for other design techniques. **d-5-2** Write a short report about a certain type of structures.

4- Course Contents

Week No.	*Topic*	*Total Hours*	*Contact hrs*			*Course ILOs Covered (By No.)*
			Lec.	**Tut.**	**Lab.**	
Weeks-1-2	Introduction and Course Outline	6	2	1	-	**a1-1**
Weeks 3-4	Principles of fractures mechanics and fatigue.	6	2	1	-	**a1-1**
Weeks 5-6	Fracture mechanics methods.	6	2	1	-	**a1-2, b1-1, b2-1**
Weeks 7-8	Method of elastic stress field	6	2	1	-	**a1-2, b1-1, b2-1,c1-1**
Weeks 9-10	Method of energy balance	6	2	1	-	**a1-2, b1-1, b2-1**
Weeks 11-12	Method of energy balance	6	2	1	-	**a1-2 b1-1, b2-1,c1-1**
Weeks 13-14	Factors of stress intensity	6	2	1	-	**a1-3 b1-1, b2-1,c1-1**
Weeks 15-16	Factors of stress intensity	6	2	1	-	**a1-3 b1-1, b2-1,c1-1**
Weeks 17-18	Elastic-plastic fracture mechanics	6	2	1	-	**a1-3 b1-1, b2-1,c1-1**
Weeks 19-20	Elastic-plastic fracture mechanics	6	2	1	-	**a1-3 b1-1, b2-1,c1-1**
Weeks 21-22	Applications for concrete fracture mechanics	6	2	1	-	**a1-4 b1-1, b2-1,c1-1**
Weeks 23-24	Applications for concrete fracture mechanics	6	2	1	-	**a1-4 b1-1, b2-1, ,c1-1**
Weeks 25-26	Applications for steel structures using fracture mechanics	6	2	1	-	**a1-4, b1-1, b2-1,d2-1**
Weeks 27-28	Applications for steel structures using fracture mechanics	6	2	1	-	**b1-1, b2-1,d2-1,d5-1**

5- Relationship between the course and the programme

Field	National Academic Reference Standard (ARS)			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Programme Academic Standards that the course contribute in achieving	**a1-1**	**b1-1 & b2-1**	**C1-1**	**d2-1 & d5-1**

6- Course Subject Area:

A	B	C	D	E	F	G	
Humanities and Social Science	Mathematics and Basic Sciences	Basic Engineering Science	Applied Engineering And Design	Computer Applications and ICT	Projects and practice	Discretionary subjects	Total
----	**5 %**	**10 %**	**50 %**	**20 %**	**10 %**	**5 %**	**100%**

7- Course Topics.

Topic No.	Topic	Weeks
1st	Introduction and Course Outline, Principles of fractures mechanics	**1-4**
2nd	Fracture mechanics methods.	**5-10**
3rd	Factors of stress intensity	**11-15**
4th	Elastic-plastic fracture mechanic	**16-19**
5th	Applications for concrete fracture mechanics	**20-25**
6th	Applications for steel structures using fracture mechanics	**26-30**

8- ILOs Matrix Topics

Course Intended Learning Outcomes (ILOs)		Course topics					
		1st	2nd	3rd	4th	5th	6th
Knowledge & Understanding	**a-1-1** Understanding the principles of fractures mechanics and fatigue.	x					
	a-1-2 Identify the different fracture mechanics methods.				x		x
	a-1-3 Ability to determine the stress intensity factors		x				
	a-1-4 Ability to apply fracture mechanics methods on concrete and steel structures			x			
Intellectual Skills	**b-1-1** Excite his/her previous structural and material knowledge to integrate to the apply on fracture mechanics.	x		x			
	b-1-2 Upgrade his/her structural analysis skills to be used in concrete design.	x		x			
	b-2-1 Analyze the solution alternatives to choose the optimum one.		x			x	
	b-2-2 Activate his/her overall structural engineering skills of using more than one subject in the design of a real life problem.		x				
	b-2-3 Imagine the behavior of R.C structures under different load conditions.		x	x			
Professional Skill	**c-1-1** Build a large design principles bank to be used later in full-scale design.		x		x		x
	c-1-2 Deal in a well-defined logical steps to reach a most economic design output.		x				
	c-1-3 Select most suitable materials for a certain type of structures.		x			x	
General Skills	**d-2-1** Pickup an Architectural design and develop his/her own structural design.					x	x
	d-2-2 Break a real life structural down to primary elements.			x			x
	d-2-3 Use text books and published information to seek his/her piece of knowledge for other design techniques.		x				
	d-5-4 Write a short report about a certain type of structures.		x			x	x
	d-5-5 Review the design of a pre-designed structure.		x				x

9- Teaching and Learning Method:

Course Intended Learning Outcome (ILOs)		Teaching and Learning Method:												
		Lecture	Presentation and Movies	Discussion	Tutorial	Problem solving	Brain storming	Projects	Site visits	Self learning	Cooperative	Discovering	Modeling	Playing
A- Knowledge & Understanding	a1-1	x			x									
	a1-2	x			x									
	a1-3	x			x									
	a1-4	x			x									
B-Intellectual Skills	b1-1	x			x									
	b1-2	x			x									
	b2-1	x			x									
	b2-2	x			x									
	b2-3	x			x									
C-Professional Skills	c1-1	x			x			x						
	c1-2	x			x									
	c1-3	x			x									
D-General Skills	d2-1	x		x	x			x						
	d2-2	x		x	x			x						
	d5-1	x		x	x			x						
	d5-2	x		x	x			x						

10- Teaching and learning method for low capacity and outstanding Student

For low capacity students	Assign a portion of the office hours for those students.
	Give them specific tasks.
	Repeat the explanation of some of the material and tutorials.
	Assign a teaching assistance to follow up the performance of this group of students.
For outstanding Students	Hand out project assignments to those students.
	Give them some research topics to be searched using the internet and conduct presentation.
	Encourage them to take parts in the running research projects.

11- Assessment:

11.1 Assessment Methods

Course Intended Learning Outcome (ILOs)		Assessment Methods											
		Written Exam	Oral Exam	Tutorial Assessment	Project Assessment	Model Assessment	Report Assessment	Quiz assessment	Presentation Assessment	Discussion	Laboratory Test	Sketching drawings	Monitoring
A- Knowledge & Understanding	a1-1	x											
	a1-2	x											
	a1-2	x											
	a1-3	x											
	a1-4	x											
B-Intellectual Skills	b1-1	x											
	b1-2	x											
	b2-1	x											
	b2-2	x											
	b2-3	x											
C-Professional Skills	c1-1	x											
	c1-2	x											
	c1-3	x											
	c1-4	x											
D-General Skills	d2-1	x											
	d2-2	x											
	d5-1	x											
	d5-2	x											

11.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	week
Final examination	100	32
Total	100%	

12- Facilities required for teaching and learning

A. Laboratory Usage: None.

B. Library Usage:
Students should be encouraged to use library technical resources in the preparation of reports and oral presentation. At least one oral presentation should involve a significant component of library research to encourage this component of study.

13- List of references:

13.1- Course Notes

- The course notes are to be prepared by groups of students after reviewing of the course coordinator.

13.2- Essential Books (Text Books)

- Nestor Perez, Fracture Mechanics, Springer Science & Business Media, May 8, 2007
- A. Ghali, R. Favre, M. Elbadry, Stresses and Deformations: Analysis and Design for Serviceability, Third Edition, Taylor & Francis, Mar 14, 2002 - Technology & Engineering

13.3 Recommended books

- Egyptian Code for Design and Construction of Reinforced Concrete Structures 203-2001.
- Design Aids and Examples in Accordance with the Egyptian Code for Design and Construction of Reinforced Concrete Structures 203-2001.
- Chu-Kia Wang and Charles G. Salmon, "Reinforced Concrete Design," 4th Edition, Harper and Row Publishers, New York, 1985.
- MacGregor J., "Reinforced Concrete: Mechanics and Design," Printice Hall, New Jersey, 1988.
- Abdul-Rahman, Ali, "Fundamentals of Reinforced Concrete," Faculty of Engineering, Cairo University.

13.4 Periodicals, Web sites, etc

Course Prof: **Prof. Dr. Emad Y. Abdel Galil**

Program Coordinator: **Dr. Ahmed Turk**

Head of Department: **Prof. Dr. Mamdouh Youssef Salleh**

Date: 8/8/2018

Course Specification

Program on which the course is given	MSc and PhD in Civil Engineering (Specialization: Structural Engineering).
Major or minor element of program	Major
Department offering the program	Civil Engineering
Department offering the course	Civil Engineering
Academic year/Level	M. Sc. & PhD 2018-2019
Date of specification approval	2018

A- Basic Information

Title: Experimental Stress Analysis and Strain Measurement	**Code Symbol**: **CES605**	
Lecture	2 hours	
Tutorial	1 hours	
Laboratory	-	
Total	3 hours	Bylaw 2000
First term	prerequisite	-

B- Professional Information

1- Course Aims:

Elementary elasticity, Photo-elasticity, Model analysis, Strain measurements methods and related instrumentation.

2- Course Objectives

By the end of the course the students will be able to:

- Understanding Elementary elasticity
- Understanding Photo-elasticity
- Understanding Model analysis
- Understanding Strain measurements methods and related instrumentation

3- Intended Learning Outcomes (ILOs):

Field	Programme ILOs that the course contribute in achieving	Course ILOs
Knowledge& Understanding	A-1 Theories and basics related to learning field, as well as other related fields	A1-1 Describe the behavior of structure using plastic analysis.
		A1-2 Recognize the behavior of supports under plastic loadings.
Intellectual skills	**B-2** Select appropriate solutions for engineering problems based on analytical thinking.	b-2-1 Employ the plastic hinge formation.
	B-7 Take professional decisions in different professional practical contexts	B7-1 Sketch combined mechanism under plastic loading.
Professional skills	**C-1** Apply knowledge of mathematics, science, information technology, design, business context and engineering practice integrally to solve engineering problems.	C1.1 Apply knowledge of mathematics to derive and calculate the collapse load using plastic analysis.
General skills	D-1 Communicate effectively using all methods.	d1-1 Collaborate effectively within multidisciplinary team to design structure using plastic analysis.

4- Course Contents

Week No.	*Topic*	*Total Hours*	*Contact hrs*			*Course ILOs Covered (By No.)*
			Lec.	**Tut.**	**Lab.**	
1-2	1. Basic concepts of plastic analysis	6	2	1	--	A1-1, A1-2 & b2-1, C1.1
3-6	2. Plastic hinge formation	12	2	1	--	A1-2 & b2-1, C1.1
7-10	3. Development and analysis of collapse mechanism, beam mechanism and sway mechanism	12	2	1	--	A1-2 & b2-1,C1.1
11-16	4. Bases of plastic design	18	2	1	--	A1-2 & b7-1,
17-20	5. Analysis and design of flexural beams	12	2	1	--	A1-2 & b7-1,
21-26	6. Analysis and design of flexural frames and connections	18	2	1	--	A1-2 & b7-1, D1-1

27-28	7. Secondary design problemes	6	2	1	--	& b7-1, D1-1
	Total	84	56	28	--	& b7-1, D1-1

5- Relationship between the course and the programme

Field	**Academic Reference Standard (ARS)**			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Programme Academic Standards that the course contributes in achieving	A1	B-2, B-7	C-1	D-1

6- Course Subject Area:

A	**B**	**C**	**D**	**E**	**F**	**G**	
Humanities and Social Science	Mathematics and Basic Sciences	Basic Engineering Science	Applied Engineering And Design	Computer Applications and ICT	Projects and practice	Disccretionry subjects	Total
---	---	40%	60%				100%

7- Course Topics.

Topic No.	**Topic**	**Weeks**
1st	Basic concepts of plastic analysis.	**1-2**
2nd	Plastic hinge formation	**3-6**
3rd	Development and analysis of collapse mechanism, beam mechanism and sway mechanism.	**7-10**
4th	Bases of plastic design.	**11-16**
5th	Analysis and design of flexural beams.	**17-20**
6th	Analysis and design of flexural frames and connections.	**21-26**
7th	Secondary design problemes.	**27-30**

8- ILOs Matrix Topics

Course Intended Learning Outcomes (ILOs)		Course topics							
		1st	2nd	3rd	4th	5th	6th	7th	8th
Knowledge & Understanding	A1-1	x							
	A1-2	x	x						
Intellectual Skills	B2-3	x	x	x					
	B7-1				x	x	x	x	x
Professional Skill	C1.1	x	x	x					
General Skills	D1.1						x	x	x

9- Teaching and Learning Method:

Course Intended Learning Outcome (ILOs)		Teaching and Learning Method:												
		Lecture	Presentation and	Discussion	Tutorial	Problem solving	Brain storming	Projects	Site visits	Self learning	Cooperative	Discovering	Modeling	Playing
A- Knowledge & Understanding	A1--1	x			x	x								
	A1-2	x			x	x								
B-Intellectual Skills	B2-3	x			x	x								
	b7-1	x			x	x								
C-Professional Skills	C1.1	x			x	x								
D-General Skills	D1.1			x							x			

10- Teaching and learning method for low capacity and outstanding Student

For low capacity students	Assign a portion of the office hours for those students.
	Give them specific tasks.
	Repeat the explanation of some of the material and tutorials.
	Assign a teaching assistance to follow up the performance of this group of students.
For outstanding Students	Hand out project assignments to those students.
	Give them some research topics to be searched using the internet and conduct presentation.
	Encourage them to take parts in the running research projects.

11- Assessment

11.1 Assessment Methods

Final Written Examination : To assess students' knowledge, understanding, analysis, creativity, problem solving, and problem identification.

11.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	Week
Final Examination	100%	32
Total	100%	

12- Facilities required for teaching and learning

Whiteboard – Classroom Equipped with Computer and Video Projector - Library.

13- List of references:

1. *Colin Caprani "Plastic Analysis 3rd Year Structural Engineering", 2009, Monash University (Australia).*
2. *Wai-Fah Chen, "Plastic Design and Second-Order Analysis of Steel Frames", Springer-Verlag New York.*
3. *Bill Wong, "Plastic Analysis and Design of CONCERETE", 2009, Elsevier.*
4. *T.H.G. Megson,"Structural and Stress Analysis", 2nd Ed., 2005, Elsevier.*
5. *"Chapter 35: PLASTIC ANALYSIS", Version 2, INSTITUTE FOR STEEL DEVELOPMENT & GROWTH, http://www.steel-insdag.org.*

14- Program Coordination Committee:

Course Coordinator: **Dr. Nur Allah Hussein**

Programme coordinator: **Dr. Ahmed Turk**

Head of the Department: **Prof. Dr. Mamdouh Salah**

DATE : 8 /8/2018

Course Specification

Program on which the course is given	Civil Engineering
Major or minor element of program	Major
Department offering the program	Civil Engineering
Department offering the course	Civil Engineering
Academic year/Level	M. Sc. & PhD 2018-2019
Date of specification approval	2018

A- Basic Information

Title: Structural Optimization	**Code Symbol**: **CES 607**	
Lecture	2	
Tutorial	**1**	
Laboratory	**0**	
Total	3	Bylaw 2000
First term	prerequisite	

B- Professional Information

1- Course Aims:

This course introduces Classical optimization, numerical programming, optimization criterion, optimum design of structural elements, optimum design for frames with suspended and guyed structural elements.

2- Course Objectives

By the end of the course the students will be able to:

- Understanding Classical optimization
- Understanding numerical programming
- Understanding optimization criterion
- Understanding optimum design of structural elements
- Understanding optimum design for frames with suspended structural elements
- Understanding optimum design for frames with guyed structural elements

3- Intended Learning Outcomes (ILOs):

Field	Programme ILOs that the course contribute in achieving	Course ILOs
Knowledge& Understanding	**A-1** Theories and basics related to learning field, as well as other related fields.	**a1-3** Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in the field of Public Work Engineering.
	A-6 Basics and ethics of scientific research	**a6-1** Recognize Basics and ethics of scientific research.
Intellectual skills	**B-2** Solve specialized problems even with lack of some data and variables, (incomplete data).	**b2-1** Apply broad knowledge of modern computational methods and think critically to solve unstructured problems (with incomplete data) related to civil engineering.
	B-3 Link and integrate diverse knowledge to solve professional problems	**b3-2** Use integrated approaches to solve problems scientifically.
Professional skills	**C-3** Evaluate means and tools available in the field of practice	**c3-1** Evaluate methods and tools reported in a specified published articles and researches concerning to civil engineering field.
General skills	**D-2** Use information technology to improve his/her professional practice.	**d2-1** Use state-of-the-art computer design tools and applications for solving civil engineering problems.

4- Course Contents

Week No.	*Topic*	*Total Hours*	*Contact hrs*			*Course ILOs Covered(By No.)*
			Lec.	Tut.	Lab.	
Week(1-4)	Understanding Classical optimization	12	3			**a1-3, a6-1**
Week(5-8)	Understanding numerical programming	12	3			**a1-3, a6-1 , b2-1**
Week(9-12)	Understanding optimization criterion	12	3			**a6-1 , b2-1, b3-2**
Week(13-18)	Understanding optimum design of structural elements	18	3			**a6-1 , b2-1, b3-2**
Week(19-24)	Understanding optimum design for frames with suspended structural elements	18	3			**b2-1, b3-2, c3-1**
Week(25-28)	Understanding optimum design for frames with guyed structural elements	12	3			**c3-1 ,** d2-1

5- Relationship between the course and the programme

Field	Academic Reference Standard(ARS)			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Programme Academic Standards that the course contribute in achieving	**a1& a6**	**b2 & b3**	**c3**	**d2**

6- Course Subject Area:

A	B	C	D	E	F	G	
Humanities and Social Science	Mathematics and Basic Sciences	Basic Engineering Science	Applied Engineering And Design	Computer Applications and ICT	Projects and practice	Disccretionry subjects	Total
----	**5%**	**50 %**	**10%**	**---**	**30%**	**5%**	**100%**

7- Course Topics.

Topic No.	Topic	Weeks
1st	Understanding Classical optimization	**1-4**
2nd	Understanding numerical programming	**5-8**
3rd	Understanding optimization criterion	**9-12**
4th	Understanding optimum design of structural elements	**13-18**
5th	Understanding optimum design for frames with suspended structural elements	**19-24**
6th	Understanding optimum design for frames with guyed structural elements	**25-28**

8- ILOs Matrix Topics

Course Intended Learning Outcomes (ILOs)		Course topics					
		1st	**2nd**	**3rd**	**4th**	**5th**	**6th**
ledge & Under standi	**a-1** Theories and basics related to learning field, as well as other related fields.	x			**x**	**x**	**x**

	a-6 Basics and ethics of scientific research	**x**			**x**	**x**	**x**
Intellectual Skills	**b-2** Solve specialized problems even with lack of some data and variables, (incomplete data).		**x**	**x**	**x**		
	b-3 Link and integrate diverse knowledge to solve professional problems		**x**	**x**	**x**		
Professional Skill	**c-3** Evaluate means and tools available in the field of practice		**x**	**x**	**x**		
General Skills	**d-2** Use information technology to improve his/her professional practice.					x	x

9- Teaching and Learning Method:

Course Intended Learning Outcome (ILOs)		**Teaching and Learning Method:**												
		Lecture	**Presentation and Movies**	**Discussion**	**Tutorial**	**Problem solving**	**Brain storming**	**Projects**	**Site visits**	**Self-learning**	**Cooperative**	**Discovering**	**Modeling**	**Playing**
A- Knowledge& Understanding	**a1-3**	**x**		**x**										
	a6-1	**x**		**x**										
B-IntellectualSkills	**b2-1**	**x**		**x**										
	b3-2	**x**		**x**										
C-Professional Skills	**c3-1**	**x**		**x**				**x**						
D-General Skills	**d2-1**	**x**		**x**				**x**						

10- Teaching and learning method for low capacity and outstanding Student

For low capacity students	Assign a portion of the office hours for those students.
	Give them specific tasks.
	Repeat the explanation of some of the material and tutorials.
	Assign a teaching assistance to follow up the performance of this group of students.
For outstanding Students	Hand out project assignments to those students.
	Give them some research topics to be searched using the internet and conduct presentation.
	Encourage them to take parts in the running research projects.

11- Assessment:

11.1 Assessment Methods

Course Intended Learning Outcome (ILOs)		Assessment Methods											
		Written Exam	Oral Exam	Tutorial Assessment	Project Assessment	Model Assessment	Report Assessment	Quiz assessment	Presentation Assessment	Discussion	Laboratory Test	Sketching drawings	Monitoring
A- Knowledge& Understanding	**a1-3**	x											
	a6-1	x											
B-IntellectualSkills	**b2-1**	x											
	b3-2	x											
C-Professional Skills	**c3-1**	x								x			
D-General Skills	**d2-1**	x						x					

11.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	week
Final examination		
Mid-term written examination		
End of term laboratory examination		
Tutorial and report assessment		
Total	**100%**	

12- Facilities required for teaching and learning

A. Laboratory Usage:

B. Library Usage:

Students should be encouraged to use library technical resources in the preparation of reports and oral presentation. At least one oral presentation should involve a significant component of library research to encourage this component of study.

13- List of references:

1- Egyptian code of practice
2- Abdelrahim, Kh. D (2009) (Steel structures design- allowable stress design)
3- Buick D (designer manual)

Course Prof:

Programme coordinator: Dr. Ahmed Turk

Head of Department: Prof.Dr. Mamdouh Salah

Date: 8-8-2018

Course Specification

Program on which the course is given	Civil Engineering
Major or minor element of program	Major
Department offering the program	Civil Engineering
Department offering the course	Civil Engineering
Academic year/Level	2018-2019/ PHD
Date of specification approval	2018

A- Basic Information

Title: Cable Sayed Structures.	**Code Symbol**: **CES609**	
Lecture	2 hours	
Tutorial	1 hours	
Laboratory	-	
Total	3 hours	Bylaw 2000
First term	prerequisite	-

B- Professional Information

1- Course Aims:

This course is designed to extend basic concepts learned in cable stayed structures in civil engineering. For those students who look toward advanced analysis and design of steel structures after graduation. This course will also provide an excellent opportunity to provide students with learning about concepts of cable stayed structures. The course is meant to create the deep understanding of the basics and theories of force analysis and load mechanisms. The main objectives of this course are to equip the students with:

1. Knowledge and understanding of key and advanced design, theories, concepts, principles and techniques relevant to solve the problems in cable stayed structures.
2. Understanding the behavior of the structure that considering cables.
3. Understanding the force transmissions for different cabel systems.
4. Analyze and design of the bridges.
5. Understanding the sway mechanism.

2- Course Objectives

By the end of the course the students will be able to:

- Understanding the main concept of cable force calculations.
- Understanding main theory of cable stayed structures.
- Understanding behavior equations of structures considering cables.

3- Intended Learning Outcomes (ILOs):

Field	Program ILOs that the course contribute in achieving	Course ILOs
Knowledge & Understanding	A-1 Theories and basics related to learning field, as well as other related fields	A1-1 Basic types of cables.
		A1-2 Corrosion protection and mechanical properties.
Intellectual skills	**B-2** Select appropriate solutions for engineering problems based on analytical thinking.	b-2-1 Single cable as structural element.
	B-7 Take professional decisions in different professional practical contexts.	B7-1 Sketch combined mechanism under loading.
Professional skills	**C-1** Apply knowledge of mathematics, science, information technology, design, business context and engineering practice integrally to solve engineering problems.	C1.1 Suspension systems.
General skills	D-1 Communicate effectively using all methods.	d1-1 Collaborate effectively within multidisciplinary team to design structure using plastic analysis.

4- Course Contents

Week No.	*Topic*	*Total Hours*	*Contact hrs*			*Course ILOs Covered (By No.)*
			Lec.	**Tut.**	**Lab.**	
1-2	1. Evaluation of cable structures and advantages.	12	8	4	--	A1-1, A1-2 & B2-1, C1.1
3-6	2. Cable types and mechanical properties.	12	8	4	--	A1-2 & B2-1 , C1.1
7-10	3. Cable Fan type.	12	8	4	--	A1-2 & B2-1 ,C1.1

11-16	4. Cable harp type.	12	8	4	--	A1-2 & b7-1,
17-20	5. Hybrid systems.	12	8	4	--	A1-2 & b7-1, d1-1
21-24	6. Lateral loads and deck analysis.	12	8	4	--	A1-2 & b7-1, d1-1
25-28	7. Secondary design problems.	12	8	4	--	B2-1& b7-1, d1-1
	Total	84	56	28	--	

5- Relationship between the course and the programme

Field	**Academic Reference Standard (ARS)**			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Program Academic Standards that the course contributes in achieving	A1	B-2, B-7	C-1	D-1

6- Course Subject Area:

A	**B**	**C**	**D**	**E**	**F**	**G**	
Humanities and Social Science	Mathematics and Basic Sciences	Basic Engineering Science	Applied Engineering And Design	Computer Applications and ICT	Projects and practice	Discretionary subjects	Total
---	---	80%	20%				100%

7- Course Topics.

Topic No.	**Topic**	**Weeks**
1st	Evaluation of cable structures and advantages.	**1-2**
2nd	Cable types and mechanical properties.	**3-6**
3rd	Cable Fan type.	**7-10**
4th	Cable harp type.	**11-16**
5th	Hybrid systems.	**17-20**
6th	Lateral loads and deck analysis.	**21-24**
7th	Secondary design problems.	**25-28**

8- ILOs Matrix Topics

Course Intended Learning Outcomes (ILOs)		Course topics						
		1st	2nd	3rd	4th	5th	6th	7th
Knowledge & Understanding	A1-1	x						
	A1-2	x	x	x	x	x	x	
Intellectual Skills	B2-1	x	x	x				x
	B7-1				x	x	x	x
Professional Skill	C1.1	x	x	x				
General Skills	D1.1					x	x	x

9- Teaching and Learning Method:

Course Intended Learning Outcome (ILOs)		Teaching and Learning Method:												
		Lecture	Presentation and	Discussion	Tutorial	Problem solving	Brain storming	Projects	Site visits	Self learning	Cooperative	Discovering	Modeling	Playing
A- Knowledge & Understanding	A1-1	x			x	x								
	A1-2	x			x	x								
B-Intellectual Skills	B2-3	x			x	x								
	b7-1	x			x	x								
C-Professional Skills	C1.1	x			x	x								
D-General Skills	D1.1			x							x			

10- Teaching and learning method for low capacity and outstanding Student

For low capacity students	Assign a portion of the office hours for those students.
	Give them specific tasks.
	Repeat the explanation of some of the material and tutorials.
	Assign a teaching assistance to follow up the performance of this group of students.
For outstanding Students	Hand out project assignments to those students.
	Give them some research topics to be searched using the internet and conduct presentation.
	Encourage them to take parts in the running research projects.

11- Assessment:

11.1 Final Examination — Written : To assess students' knowledge, understanding, analysis, creativity, problem solving, and problem identification.

11.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	Week
Final Examination	100%	32
Total	100%	

12- Facilities required for teaching and learning

A. Laboratory Usage: None.

B. Library Usage:

Students should be encouraged to use library technical resources in the study of the

13- List of references:

1. ***Niels J. Gimsing and Christos T. Georgakis, Cable Supported Bridges, Concept and Design.***

Course Prof.: Assoc. Prof. Dr. Tarek Sharaf

Program Coordinator: Dr. Ahmed Turk

Head of Department: Prof. Dr. Mamdouh Saleh

8/8/2018

Course Specification

Program on which the course is given	Civil Engineering
Major or minor element of program	Major
Department offering the program	Civil Engineering
Department offering the course	Civil Engineering
Academic year/Level	M. Sc. & PhD 2018-2019
Date of specification approval	2018

A- Basic Information

Title: Wind and Earthquakes Engineering	**Code Symbol**: **CES 610**	
Lecture	2	
Tutorial	**1**	
Laboratory	**0**	
Total	3	Bylaw 2000
First term	prerequisite	

B- Professional Information

1- Course Aims:

This course introduces Principals of structure dynamics, Nature and Characteristics of wind and earthquakes, Main assumptions, Governing equations for analysis, Quasi static method, Step by step integration method, Code requirements, Applications.

2- Course Objectives

By the end of the course the students will be able to:

- Understanding Principals of structure dynamics
- Understanding Nature and Characteristics of wind and earthquakes
- Understanding Main assumptions
- Understanding Governing equations for analysis
- Understanding Quasi static method
- Understanding Step by step integration method

3- Intended Learning Outcomes (ILOs):

Field	Programme ILOs that the course contribute in achieving	Course ILOs
Knowledge& Understanding	**A-1** Theories and basics related to learning field, as well as other related fields.	**a1-3** Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in the field of Public Work Engineering.
	A-6 Basics and ethics of scientific research	**a6-1** Recognize Basics and ethics of scientific research.
Intellectual skills	**B-2** Solve specialized problems even with lack of some data and variables, (incomplete data).	**b2-1** Apply broad knowledge of modern computational methods and think critically to solve unstructured problems (with incomplete data) related to civil engineering.
	B-3 Link and integrate diverse knowledge to solve professional problems	**b3-2** Use integrated approaches to solve problems scientifically.
Professional skills	**C-3** Evaluate means and tools available in the field of practice	**c3-1** Evaluate methods and tools reported in a specified published articles and researches concerning to civil engineering field.
General skills	**D-2** Use information technology to improve his/her professional practice.	**d2-1** Use state-of-the-art computer design tools and applications for solving civil engineering problems.

4- Course Contents

Week No.	*Topic*	*Total Hours*	*Contact hrs*			*Course ILOs Covered(By No.)*
			Lec.	Tut.	Lab.	
Week(1-4)	Understanding Principals of structure dynamics	12	3			**a1-3, a6-1**
Week(5-8)	Understanding Nature and Characteristics of wind and earthquakes	12	3			**a1-3, a6-1 , b2-1**
Week(9-14)	Understanding Main assumptions	18	3			**a6-1 , b2-1, b3-2**
Week(15-20)	Understanding Governing equations for analysis	18	3			**a6-1 , b2-1, b3-2**
Week(21-24)	Understanding Quasi static method	12	3			**b2-1, b3-2, c3-1**
Week(25-28)	Understanding Step by step integration method	12	3			**c3-1 ,** d2-1

5- Relationship between the course and the programme

Field	Academic Reference Standard(ARS)			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Programme Academic Standards that the course contribute in achieving	**a1& a6**	**b2 & b3**	**c3**	**d2**

6- Course Subject Area:

A	B	C	D	E	F	G	
Humanities and Social Science	Mathematics and Basic Sciences	Basic Engineering Science	Applied EngineeringAnd Design	Computer Applications and ICT	Projects and practice	Disccretionry subjects	Total
----	**5%**	**50 %**	**10%**	**---**	**30%**	**5%**	**100%**

7- Course Topics.

Topic No.	Topic	Weeks
1st	Understanding Principals of structure dynamics	*Week(1-4)*
2nd	Understanding Nature and Characteristics of wind and earthquakes	*Week(5-8)*
3rd	Understanding Main assumptions	*Week(9-14)*
4th	Understanding Governing equations for analysis	*Week(15-20)*
5th	Understanding Quasi static method	*Week(21-24)*
6th	Understanding Step by step integration method	*Week(25-28)*

8- ILOs Matrix Topics

Course Intended Learning Outcomes (ILOs)		Course topics					
		1st	2nd	3rd	4th	5th	6th
Knowledge & Understanding	**a-1** Theories and basics related to learning field, as well as other related fields.	x			**x**	**x**	**x**
	a-6 Basics and ethics of scientific research	**x**			**x**	**x**	**x**
Intellectual Skills	**b-2** Solve specialized problems even with lack of some data and variables, (incomplete data).		**x**	**x**	**x**		
	b-3 Link and integrate diverse knowledge to solve professional problems		**x**	**x**	**x**		
Professional Skill	**c-3** Evaluate means and tools available in the field of practice		**x**	**x**	**x**		
General Skills	**d-2** Use information technology to improve his/her professional practice.					x	x

9- Teaching and Learning Method:

Course Intended Learning Outcome (ILOs)		Teaching and Learning Method:												
		Lecture	Presentation and Movies	Discussion	Tutorial	Problem solving	Brain storming	Projects	Site visits	Self-learning	Cooperative	Discovering	Modeling	Playing
A- Knowledge& Understanding	a1-3	x		x										
	a6-1	x		x										
B-IntellectualSkills	b2-1	x		x										
	b3-2	x		x										
C-Professional Skills	c3-1	x		x				x						
D-General Skills	d2-1	x		x				x						

10- Teaching and learning method for low capacity and outstanding Student

For low capacity students	Assign a portion of the office hours for those students.
	Give them specific tasks.
	Repeat the explanation of some of the material and tutorials.
	Assign a teaching assistance to follow up the performance of this group of students.
For outstanding Students	Hand out project assignments to those students.
	Give them some research topics to be searched using the internet and conduct presentation.
	Encourage them to take parts in the running research projects.

11- Assessment:

11.1 Assessment Methods

Course Intended Learning Outcome (ILOs)		Assessment Methods											
		Written Exam	Oral Exam	Tutorial Assessment	Project Assessment	Model Assessment	Report Assessment	Quiz assessment	Presentation Assessment	Discussion	Laboratory Test	Sketching drawings	Monitoring
A- Knowledge& Understanding	a1-3	x											
	a6-1	x											
B-IntellectualSkills	b2-1	x											
	b3-2	x											
C-Professional Skills	c3-1	x								x			
D-General Skills	d2-1	x						x					

11.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	week
Final examination		
Mid-term written examination		
End of term laboratory examination		
Tutorial and report assessment		
Total	100%	

12- Facilities required for teaching and learning

A. Laboratory Usage:

B. Library Usage:

Students should be encouraged to use library technical resources in the preparation of reports and oral presentation. At least one oral presentation should involve a significant component of library research to encourage this component of study.

13- List of references:

1- Egyptian code of practice
2- Abdelrahim, Kh. D (2009) (Steel structures design- allowable stress design)
3- Buick D (designer manual)

Course Prof:

Programme coordinator: Dr. Ahmed Turk

Head of Department: Prof.Dr. Mamdouh Salah

Date: 8-8-2018

Course Specification

Program on which the course is given	MsC.
Major or minor element of program	Major
Department offering the program	Civil Engineering
Department offering the course	Civil Engineering
Academic year/Level	M. Sc. & PhD 2018-2019
Date of specification approval	2018

A- Basic Information

Title: Dynamics of Concrete Structures	**Code Symbol**: CES 612	
Lecture	2 hours	
Tutorial	1 hours	
Laboratory	-	
Total	3 hours	Bylaw 2000
First term	prerequisite	-

B- Professional Information

1- Course Aims:

This course aims; in general, to activate the student knowledge and understanding in the direction of implementing design aspects to the real life structures. Having learned his/her design principles and structural modeling in the underground courses, he is subjected in this course to important topics in the dynamic of concrete structures. These topics are: behavior of dynamically loaded concrete elements, concrete dynamic properties, dynamic response of concrete elements to earthquake motions, seismic design philosophy, Seismic loads on building elements, soil structure interaction, and design standards and code requirements. During the course, the student is trained on several real life problems so the instructor makes sure of his/her capability to face the profession.

2- Course Objectives

By the end of the course the students will be able to:

- Understanding the behavior of dynamically loaded concrete elements, concrete dynamic properties.
- Define the dynamic response of concrete elements to earthquake motions
- Understand seismic design philosophy, seismic loads on building elements

- Ability to analyze soil structure interaction
- Understand design standards and code requirements

3- Intended Learning Outcomes (ILOs):

Field	Program ILOs that the course contribute in achieving	Course ILOs
Knowledge& Understanding	A1-1 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in the field of Structural Engineering.	**a-1-1** Understanding the behavior of dynamically loaded concrete elements and concrete dynamic properties.
		a-1-2 Know how to deal with dynamic response of concrete elements to earthquake motions.
		a-1-3 Understand seismic design philosophy, seismic loads on building elements
		a-1-4 Ability to analyze soil structure interaction
Intellectual skills	**B1-1** Demonstrate an investigatory and analytic thinking approach (Problem solving) to solve problems related to civil engineering.	**b-1-1** Excite his/her previous structural and material knowledge to integrate to the design principles of RC sections.
	B2-1 Apply broad knowledge of modern computational methods and think critically to solve unstructured problems (with incomplete data) related to civil engineering.	**b-2-1** Analyze the solution alternatives to choose the optimum one.
Professional skills	**C1-1** Express competence skills, such as identifying, formulating, analyzing, and creating engineering solutions, using latest engineering techniques, skills, and tools.	**c-1-1** Build a large design principles bank to be used later in full-scale design.
General skills	**D2-1** Use state-of-the-art computer design tools and applications for solving civil engineering problems..	**d-2-1** Pickup an Architectural design and develop his/her own structural design. **d-2-2** Break a real life structural down to primary elements.
	D5-1 Use different resources of information like libraries, internet access facilities, etc. to upgrade and enhance their conceptual knowledge.	**d-5-1** Use text books and published information to seek his/her piece of knowledge for other design techniques.

4- Course Contents

Week No.	*Topic*	*Total Hours /week*	*Contact hrs*			*Course ILOs Covered (By No.)*
			Lec.	**Tut.**	**Lab.**	
Week(1:3)	Introduction and Course Outline	3	2	1	-	**a1-1**
Week(4:7)	Introduction to dynamic analysis of structures and lateral force calculations.	3	2	1	-	**a1-1**
Week(8:11)	Behavior of dynamically loaded concrete elements	3	2	1	-	**a1-1, b1-1, b2-1**
Week(12:15)	Behavior of dynamically loaded concrete elements	3	2	1	-	**a1-1 b1-1, b2-1,c1-1**
Week(16:19)	Concrete dynamic properties.	3	2	1	-	**a1-1 b1-1, b2-1**
Week(19:21)	dynamic response of concrete elements to earthquake motions	3	2	1	-	**a1-2 b1-1, b2-1,c1-1**
Week-(22:23)	Seismic design philosophy	3	2	1	-	**a1-3 b1-1, b2-1,c1-1**
Week(24)	Seismic loads on building elements	3	2	1	-	**a1-3 b1-1, b2-1,c1-1**
Week-25	Seismic loads on building elements	3	2	1	-	**a1-3 b1-1, b2-1,c1-1**
Week-26	Soil structure interaction	3	2	1	-	**a1-3 b1-1, b2-1,c1-1**
Week-27	Soil structure interaction	3	2	1	-	**a1-4 b1-1, b2-1,c1-1**
Week-28	Soil structure interaction	3	2	1	-	**a1-4 b1-1, b2-1, ,c1-1**
Week-29	design standards and code requirements	3	2	1	-	**a1-4 b1-1, b2-1,d2-1**
Week-30	design standards and code requirements	3	2	1	-	**a1-4 b1-1, b2-1,d2-1,d5-1**

5- Relationship between the course and the program

Field	Academic Reference Standard (ARS)			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Program Academic Standards that the course contribute in achieving	**a1-1**	**b1-1 & b2-1**	**C1-1**	**d2-1 & d5-1**

6- Course Subject Area:

A	B	C	D	E	F	G	
Humanities and Social Science	Mathematics and Basic Sciences	Basic Engineering Science	Applied Engineering And Design	Computer Applications and ICT	Projects and practice	Discretionary subjects	Total
----	**5 %**	**10 %**	**50 %**	**20 %**	**10 %**	**5 %**	**100%**

7- Course Topics.

Topic No.	Topic	Weeks
1st	Introduction and Course Outline	*Week(1:3)*
2nd	Introduction to dynamic analysis of structures and lateral force calculations.	*Week(4:7)*
3rd	Behavior of dynamically loaded concrete elements	*Week(8:11)*
4th	Behavior of dynamically loaded concrete elements	*Week(12:15)*
5th	Concrete dynamic properties.	*Week(16:19)*
6th	dynamic response of concrete elements to earthquake motions	*Week(19:21)*
7th	Seismic design philosophy	*Week-(22:23)*
8th	Seismic loads on building elements	*Week(24)*

9th	Seismic loads on building elements	*Week-25*
10th	Soil structure interaction	*Week-26*
11th	Soil structure interaction	*Week-27*
12th	Soil structure interaction	*Week-28*
13th	design standards and code requirements	*Week-29*
14th	design standards and code requirements	*Week-30*

8- ILOs Matrix Topics

Course Intended Learning Outcomes (ILOs)		**Course topics**					
		1st	**2nd**	**3rd**	**4th**	**5th**	**6th**
Knowledge & Understanding	**a-1-1** Understanding the behavior of dynamically loaded concrete elements and concrete dynamic properties.	**x**					
	a-1-2 Know how to deal with dynamic response of concrete elements to earthquake motions.				**x**		**x**
	a-1-3 Understand seismic design philosophy, seismic loads on building elements		**x**				
	a-1-4 Ability to analyze soil structure interaction			**x**			
	a-1-4 Understand design standards and code requirements					**x**	
Intellectual Skills	**b-1-1** Excite his/her previous structural and material knowledge to integrate to the design principles of RC sections.	**x**		**x**			
	b-1-1 Upgrade his/her structural analysis skills to be used in concrete design.	**x**		**x**			
	b-1-1 Analyze the solution alternatives to choose the optimum one.		**x**			**x**	
	b-2-1 Activate his/her overall structural engineering skills of using more than one subject in the design of a real life problem.		**x**				

	b-2-1 Imagine the behavior of R.C structures under different load conditions.		**x**	**x**			
Professional Skill	**c-1-1** Build a large design principles bank to be used later in full-scale design.		**x**		**x**		**x**
	c-1-1 Deal in a well-defined logical steps to reach a most economic design output.		**x**				
	c-1-1 Select most suitable materials for a certain type of structures.		**x**			**x**	
General Skills	**d-2-1** Pickup an Architectural design and develop his/her own structural design.					**x**	**x**
	d-2-2 Break a real life structural down to primary elements.			**x**			**x**
	d-5-1 Write a short report about a certain type of structures.		**x**			**x**	**x**

9- Teaching and Learning Method:

Course Intended Learning Outcome (ILOs)		Teaching and Learning Method:												
		Lecture	Presentation and Movies	Discussion	Tutorial	Problem solving	Brain storming	Projects	Site visits	Self learning	Cooperative	Discovering	Modeling	Playing
A- Knowledge & Understanding	a1-1	x			x									
	a1-2	x			x									
	a1-3	x			x									
	a1-4	x			x									
	a1-4	x			x									
B-Intellectual Skills	b1-1	x			x									
	b1-2	x			x									
	b2-1	x			x									
	b2-2	x			x									
	b2-3	x			x									
C-Professional Skills	c1-1	x			x			x						
	c1-2	x			x									
	c1-3	x			x									
D-General Skills	d2-1	x		x	x			x						
	d2-2	x		x	x			x						
	d5-1	x		x	x			x						
	d5-2	x		x	x			x						

10- Teaching and learning method for low capacity and outstanding Student

For low capacity students	Assign a portion of the office hours for those students.
	Give them specific tasks.
	Repeat the explanation of some of the material and tutorials.
	Assign a teaching assistance to follow up the performance of this group of students.
For outstanding Students	Hand out project assignments to those students.
	Give them some research topics to be searched using the internet and conduct presentation.
	Encourage them to take parts in the running research projects.

11- Assessment:

11.1 Assessment Methods

Course Intended Learning Outcome (ILOs)		Assessment Methods											
		Written Exam	Oral Exam	Tutorial Assessment	Project Assessment	Model Assessment	Report Assessment	Quiz assessment	Presentation Assessment	Discussion	Laboratory Test	Sketching drawings	Monitoring
A- Knowledge & Understanding	a1-1	x											
	a1-2	x											
	a1-2	x											
	a1-3	x											
	a1-4	x											
B-Intellectual Skills	b1-1	x											
	b1-2	x											
	b2-1	x											
	b2-2	x											
	b2-3	x											
C-Professional Skills	c1-1	x											
	c1-2	x											
	c1-3	x											
	c1-4	x											
D-General Skills	d2-1	x											
	d2-2	x											
	d5-1	x											
	d5-2	x											

11.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	week
Final examination	100	16th
Total	100%	

12- Facilities required for teaching and learning

A. Laboratory Usage: None.

B. Library Usage:
Students should be encouraged to use library technical resources in the preparation of reports and oral presentation. At least one oral presentation should involve a significant component of library research to encourage this component of study.

13- List of references:

13.1- Course Notes

- The course notes are to be prepared by groups of students after reviewing of the course coordinator.

13.2- Essential Books (Text Books)

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

13.3 Recommended books

- Chu-Kia Wang and Charles G. Salmon, "Reinforced Concrete Design," 4th Edition, Harper and Row Publishers, New York, 1985.
- MacGregor J., "Reinforced Concrete: Mechanics and Design," Printice Hall, New Jersey, 1988.
- Abdul-Rahman, Ali, "Fundamentals of Reinforced Concrete," Faculty of Engineering, Cairo University.
- Mario Paz, "Structural Dynamics: Theory and Computation" ,5th eddition, 1980

13.4 Periodicals, Web sites, etc

Course Prof: **Prof. Dr. Emad Y. Abdel Galil**

Head of Department: **Prof. Dr. Mamdouh Youssef Salleh**

Date: 8/8/2018

Course Specification

Program on which the course is given	Civil Engineering
Major or minor element of program	Major
Department offering the program	Civil Engineering
Department offering the course	Civil Engineering
Academic year/Level	M. Sc. & PhD 2018-2019
Date of specification approval	2018

A- Basic Information

Title: Deformations and Fracture Mechanics of Concrete Structures	**Code Symbol**: CES 613	
Lecture	2 hours	
Tutorial	1 hours	
Laboratory	-	
Total	3 hours	Bylaw 2000
First term	prerequisite	-

B- Professional Information

1- Course Aims:

This course aims; in general, to activate the student knowledge and understanding in the direction of implementing design aspects to the real life structures. The student is subjected in this course to important topics in the deformations of concrete structures. These topics are: Principles of fracture mechanics, Moment-curvature relationship, load-deflection relationship, Elastic deformation of concrete structures, Long-term deflection of concrete structures, Evaluation of stress intensity factors for reinforced concrete.

2- Course Objectives

By the end of the course the students will be able to:

- Understanding the principles of fractures mechanics.
- Evaluating the moment-curvature and load deflection relationships
- Ability to analyze elastic deformations of structures and long-term deflections
- Determine the stress intensity factors of reinforced concrete

3- Intended Learning Outcomes (ILOs):

Field	Program ILOs that the course contribute in achieving	Course ILOs
Knowledge& Understanding	**A-1** Theories and basics related to learning field, as well as other related fields.	**a-1-1** Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in the field of Structural Engineering.
		a-1-2 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in the field of Irrigation and hydraulic Engineering.
		a-1-3 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in the field of Public Work Engineering.
		a1-4 Exhibit ability to indetail, creatively, with a high level of clarity and authority, using scientific scrutiny and adequate tools identify, explain, analyze and assess issues pertinent to a MS.c thesis in the research field, within which the thesis project is placed.
Intellectual skills	**B-1** Analyze and evaluate the information in the field of specialization, and solve the problems based on that.	**b-1-1** Demonstrate an investigatory and analytic thinking approach (Problem solving) to solve problems related to civil engineering. **b-1-2** Interpret, analyze, and evaluate a given system specific information and relate it to the design of the required system.
	B-2 Solve specialized problems even with lack of some data and variables, (incomplete data).	**b-2-1** Apply broad knowledge of modern computational methods and think critically to solve unstructured problems (with incomplete data) related to civil engineering.
Professional skills	**C-1** Mastering the basics as well as the latest professional skills in the field of specialization.	**c-1-1** Express competence skills, such as identifying, formulating, analyzing, and creating engineering solutions, using latest engineering techniques, skills, and tools.
General skills	**D-2** Use information technology to improve his/her professional practice.	**d-2-1** Use state-of-the-art computer design tools and applications for solving civil engineering problems. **d-2-2** Employ the information technology skills to serve his / her career development.

	D-5 Use different resources of information like libraries, internet access facilities, etc. to upgrade and enhance their conceptual knowledge.	**d-5-1** Use text books and published information to seek his/her piece of knowledge for other design techniques.

4- Course Contents

Week No.	*Topic*	*Total Hours*	*Contact hrs*			*Course ILOs Covered (By No.)*
			Lec.	**Tut.**	**Lab.**	
Week-1-2	Introduction and Course Outline	3	2	1	-	**a1-1**
Week-3-4	Principles of fractures mechanics	3	2	1	-	**a1-1**
Week-5-6	Moment-curvature Relationship	3	2	1	-	**a1-2, b1-1, b2-1**
Week-7-8	Numerical analysis for M-phi diagrams	3	2	1	-	**a1-2, b1-1, b2-1,c1-1**
Week-9-10	Load-deflection relationships	3	2	1	-	**a1-2, b1-1, b2-1**
Week-11-12	Load-deflection relationships	3	2	1	-	**a1-2 b1-1, b2-1,c1-1**
Week-13-14	Elastic Deformations of Concrete Structures	3	2	1	-	**a1-3 b1-1, b2-1,c1-1**
Week-15-16	Creep-deformations	3	2	1	-	**a1-3 , b1-1, b2-1,c1-1**
Week-17-18	Shrinkage Deformations	3	2	1	-	**a1-3 b1-1, b2-1,c1-1**
Week-19-20	Long Term Deflections	3	2	1	-	**a1-3 b1-1, b2-1,c1-1**
Week-21-22	Elastic stress and deflections of composite structures	3	2	1	-	**a1-4 b1-1, b2-1,c1-1**
Week-23-25	Elastic stress and deflections of composite structures	3	2	1	-	**a1-4 b1-1, b2-1, ,c1-1**
Week-26-28	Stress intensity factors of reinforced concrete structures	3	2	1	-	**b1-1, b2-1,d2-1**
Week-29-30	Stress intensity factors of reinforced concrete structures	3	2	1	-	**b1-1, b2-1,d2-1,d5-1**
Week 32	**Final Exam**					

5- Relationship between the course and the program

Field	Academic Reference Standard (ARS)			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Program Academic Standards that the course contribute in achieving	**A-1**	**B-1&B-2**	**C-1**	**D-2&D-5**

6- Course Subject Area:

A	B	C	D	E	F	G	
Humanities and Social Science	Mathematics and Basic Sciences	Basic Engineering Science	Applied Engineering And Design	Computer Applications and ICT	Projects and practice	Discretionary subjects	Total
----	**5 %**	**10 %**	**50 %**	**20 %**	**10 %**	**5 %**	**100%**

7- Course Topics.

Topic No.	Topic	Weeks
1st	Principals of fracture mechanics, Experimental evaluation of fracture properties	**1-4**
2nd	Moment-curvature relationship	**5-8**
3rd	Load-deflection relationship	**9-12**
4th	Elastic Deformations of Concrete Structures	**13-18**
5th	Long-term deflection of concrete structures	**19-25**
6th	Evaluation of stress intensity factors for reinforced concrete	**26-30**

8- ILOs Matrix Topics

Course Intended Learning Outcomes (ILOs)		Course topics					
		1st	2nd	3rd	4th	5th	6th
Knowledge & Understanding	**a-1-1** Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in the field of Structural Engineering.	x					
	a-1-2 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in the field of Irrigation and hydraulic Engineering.				x		x
	a-1-3 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in the field of Public Work Engineering.		x				
	a-1-4 Exhibit ability to indetail, creatively, with a high level of clarity and authority, using scientific scrutiny and adequate tools identify, explain, analyze and assess issues pertinent to a MS.c thesis in the research field, within which the thesis project is placed.			x			
Intellectual Skills	**b-1-1** Demonstrate an investigatory and analytic thinking approach (Problem solving) to solve problems related to civil engineering.	x		x			
	b-1-2 Interpret, analyze, and evaluate a given system specific information and relate it to the design of the required system.	x		x			
	b-2-1 Analyze the solution alternatives to choose the optimum one.		x			x	
ssi on al	**c-1-1** Build a large design principles bank to be used later in full-scale design.		x		x		x
General Skills	**d-2-1** Use state-of-the-art computer design tools and applications for solving civil engineering problems.					x	x
	d-2-2 Employ the information technology skills to serve his / her career development.			x			x
	d-5-1 Use text books and published information to seek his/her piece of knowledge for other design techniques		x			x	x

9- Teaching and Learning Method:

Course Intended Learning Outcome (ILOs)		Teaching and Learning Method:												
		Lecture	Presentation and Movies	Discussion	Tutorial	Problem solving	Brain storming	Projects	Site visits	Self learning	Cooperative	Discovering	Modeling	Playing
A- Knowledge & Understanding	a1-1	x			x									
	a1-2	x			x									
	a1-3	x			x									
	a1-4	x			x									
B-Intellectual Skills	b1-1	x			x									
	b1-2	x			x									
	b2-1	x			x									
C-Professional Skills	c1-1	x			x			x						
D-General Skills	d2-1	x		x	x			x						
	d2-2	x		x	x			x						
	d5-1	x		x	x			x						

10- Teaching and learning method for low capacity and outstanding Student

For low capacity students	Assign a portion of the office hours for those students.
	Give them specific tasks.
	Repeat the explanation of some of the material and tutorials.
	Assign a teaching assistance to follow up the performance of this group of students.
For outstanding Students	Hand out project assignments to those students.
	Give them some research topics to be searched using the internet and conduct presentation.
	Encourage them to take parts in the running research projects.

11- Assessment:

11.1 Assessment Methods

Course Intended Learning Outcome (ILOs)		Assessment Methods											
		Written Exam	Oral Exam	Tutorial Assessment	Project Assessment	Model Assessment	Report Assessment	Quiz assessment	Presentation Assessment	Discussion	Laboratory Test	Sketching drawings	Monitoring
A- Knowledge & Understanding	a1-1	x											
	a1-2	x											
	a1-2	x											
	a1-3	x											
	a1-4	x											
B-Intellectual Skills	b1-1	x											
	b1-2	x											
	b2-1	x											
C-Professional Skills	c1-1	x											
D-General Skills	d2-1	x											
	d2-2	x											
	d5-1	x											

11.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	week
Final examination	100	16th
Total	100%	

12- Facilities required for teaching and learning

A. Laboratory Usage: None.

B. Library Usage:
Students should be encouraged to use library technical resources in the preparation of reports and oral presentation. At least one oral presentation should involve a significant component of library research to encourage this component of study.

13- List of references:

13.1- Course Notes

- The course notes are to be prepared by groups of students after reviewing of the course coordinator.

13.2- Essential Books (Text Books)

- A. Ghali, R. Favre, M. Elbadry, Stresses and Deformations: Analysis and Design for Serviceability, Third Edition, Taylor & Francis, Mar 14, 2002 - Technology & Engineering

13.3 Recommended books

- Egyptian Code for Design and Construction of Reinforced Concrete Structures 203-2001.
- Design Aids and Examples in Accordance with the Egyptian Code for Design and Construction of Reinforced Concrete Structures 203-2001.
- Chu-Kia Wang and Charles G. Salmon, "Reinforced Concrete Design," 4th Edition, Harper and Row Publishers, New York, 1985.
- MacGregor J., "Reinforced Concrete: Mechanics and Design," Printice Hall, New Jersey, 1988.
- Abdul-Rahman, Ali, "Fundamentals of Reinforced Concrete," Faculty of Engineering, Cairo University.

13.4 Periodicals, Web sites, etc

Course Prof: **Prof. Dr. Emad Y. Abdel Galil**

Head of Department: **Prof. Dr. Mamdouh Youssef Salleh**

Date: 8/8/2018

Course Specification

Program on which the course is given	Civil Engineering
Major or minor element of program	Major
Department offering the program	Civil Engineering
Department offering the course	Civil Engineering
Academic year/Level	M. Sc. & PhD 2018-2019
Date of specification approval	2018

A- Basic Information

Title: Deterioration and Durability of Concrete	**Code Symbol**: **CES616**	
Lecture	2 hours	
Tutorial	1 hours	
Laboratory	-	
Total	3 hours	Bylaw 2000
First term	prerequisite	-

B- Professional Information

1- Course Aims:

This course aims, in general, to illustrate factors affecting on durability of concretes and the discuss the different forms of deterioration. The factors covered in the course are permeability of concrete, weathering, sea water, carbonation of concrete, sulfate attack, freezing and thawing resistance, corrosion of steel reinforcement, alkali and carbonate aggregate reaction, abrasion resistance of concrete and fire resistance of concrete.

2- Course objectives:

The main Objectives of this course are to equip the students with:

1- Knowledge and understanding transport of fluid into concrete including: diffusion, sorption, absorption, and permeability.
2- Knowledge, understanding and assessment of factors affecting concrete durability including: weathering, sea water, carbonation of concrete, sulfate attack, freezing and thawing resistance, corrosion of steel reinforcement, alkali and carbonate aggregate reaction, abrasion resistance of concrete and fire resistance of concrete.

3- Intended Learning Outcomes (ILOs)

NAQAAE Academic Reference Standards (ARS)	Program ILOs	Course ILOs
A. Knowledge and understanding		
A1. Theories and basics related to learning field, as well as other related fields.	a1-1 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in the field of structural Engineering.	a1-1-1 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in transport of fluid into concrete. a1-1-2 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in each factor affecting on durability of concrete
A3- Main scientific advances in the field of specialization.	a3-3 Discuss the recent and update developments in the most important themes related to civil engineering.	a3-3-1 Discuss the recent and update developments in transport of fluid into concrete. a3-3-2 Discuss the recent and update developments in assessment of each factor affecting on durability of concrete
B. Intellectual skills		
B1- Analyze and evaluate the information in the field of specialization, and solve the problems based on that.	b1-2 Interpret, analyze, and evaluate a given system specific information and relate it to the design of the required system.	b1-2-1 Interpret, analyze, and evaluate each transport property of fluid in concrete. b1-2-2 Interpret, analyze, and evaluate each factor affecting on durability of concrete.
D. General and transferrable skills		
D5- Use different resources to obtain knowledge and information	d5-1 Use different resources of information like libraries, internet access facilities, etc. to upgrade and enhance their conceptual knowledge.	d5-1-1 Use different resources of information to get most recenet information about the course topics.

4- Course Contents

Topic	*Total Hours*	*Contact hrs*			*Course ILOs Covered (By No.)*
		Lec.	Tut.	Lab.	
1- Transport of fluid into concrete.	12	8	4	--	a1-1-1, a3-3-1, b1-2,1, d5-1-1
2- Factors affecting concrete durability.	72	48	24	--	a1-1-2, a3-3-2, b1-2,2, d5-1-2

Total	84	56	28	--	

5- Relationship between the course and the program

Field	Academic Reference Standard(ARS)			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Program Academic Standards that the course contribute in achieving	A1(a1-1), A3(a3-3)	B1(b1-2)	-	D5(d5-1)

6- Course Subject Area:

A	B	C	D	E	F	G	
Humanities and Social Science	Mathematics and Basic Sciences	Basic Engineering Science	Applied Engineering And Design	Computer Applications and ICT	Projects and practice	Disccretionry subjects	Total
---	---	30%	70%	---	---	---	100%

7- Course Topics.

Topic No.	Topic	Weeks
1st	The basis and types of tests.	1-4
2nd	The Materials tests.	5-28

8- ILOs Matrix Topics

Course topics	1st	2nd
Course ILOs	Knowledge & Understanding	
a1-1-1 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in transport of fluid into concrete.	x	
a1-1-2 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in each factor affecting on durability of concrete		x
a3-3-1 Discuss the recent and update developments in transport of fluid into concrete.	x	
a3-3-2 Discuss the recent and update developments in assessment of each factor affecting on durability of concrete		x
Course ILOs	Intellectual skills	

b1-2-1 Interpret, analyze, and evaluate each transport property of fluid in concrete.	x	
b1-2-2 Interpret, analyze, and evaluate each factor affecting on durability of concrete.		x
Course ILOs	General and transferrable skills	
d5-1-1 Use different resources of information to get most recent information about the course topics.	x	x

9- Teaching and Learning Method:

Course Intended learning outcomes (ILOs)		Teaching and Learning Method												
		Lecture	Presentation and	Discussion	Tutorial	Problem solving	Brain storming	Projects	Report	Self learning	Cooperative	Discovering	Computer Simulation	Practical Experiments
Knowledge & understanding	a1-1-1	X		X										
	a1-1-2	X		X										
	a3-3-1	X		X										
	a3-3-2	X		X					X					
Intellectual Skills	b1-2-1	X		X										
	b1-2-2	X		X										
General Skills	d5-1-1	X		X					X					

10- Assessment

10.1 Assessment Methods

Final Written Examination : to assess students' knowledge, understanding, analysis, and problem identification.

10.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	Week
Final Examination	100	Decided by the faculty council
Total	100%	

11- Facilities required for teaching and learning

Class Room Equipped with Computer and Data show.

A. laboratory Usage:

Students are expected to investigate measuring devices available in the laboratory.

B. Library Usage:

Students should be encouraged to use library technical resources in the preparation of the required reports and oral presentation.

12- List of references:

- A.M. Nivelle, Properties of Concrete, 5th edition.
- ACI Technical Reports.

13- Program Coordination Committee:

Course Coordinator: **Dr. Eng. Noor Allah Mohammed Hussein**

Program coordinator: **Dr. Ahmed Turk**

Head of the Department: **Prof .Dr. Mamdouh Salah**

Date: 8- 8 - 2018

Course Specification

Program on which the course is given	Civil Engineering
Major or minor element of program	Major
Department offering the program	Civil Engineering
Department offering the course	Civil Engineering
Academic year/Level	M. Sc. & PhD 2018-2019
Date of specification approval	2018

A- Basic Information

Title: Underground Structures	**Code Symbol: CES 617**	
Lecture	2	
Tutorial	**1**	
Laboratory	**0**	
Total	3	Bylaw 2000
First term	prerequisite	

B- Professional Information

1- Course Aims:

This course introduces the Study of Underground Structures, with studding tunneling and underground construction technology, Pressure and displacement associated with supported deep excavation, ground response for tunneling, Design of underground structures, Monitoring and observational methods.

2- Course Objectives

By the end of the course the students will be able to:

- Understanding tunneling and underground construction technology.
- Calculate pressure and displacement associated with supported deep excavation.
- Understanding ground response for tunneling.
- Design of underground structures
- Understanding monitoring and observational methods.

3- Intended Learning Outcomes (ILOs):

Field	Program ILOs that the course contribute in achieving	Course ILOs
Knowledge and understanding	A1- Theories and basics related to learning field, as well as other related fields.	a1-1 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in the field of Structural Engineering.
	A3- Main scientific advances in the field of specialization.	a3-1 Classify the Potential applications of advanced civil engineering applications..
		a3-2 Report new advances in analysis and design methodologies in civil engineering and its application paradigms.
		a3-3 Discuss the recent and update developments in the most important themes related to civil engineering.

4- Course Contents

Week No.	*Topic*	*Total Hours*	*Contact hrs*			*Course ILOs Covered(By No.)*
			Lec.	Tut.	Lab.	
Week(1-5)	Introduction to underground Structures.	3	3			a1-1
Week(6-10)	Tunneling and underground construction technology	3	3			a1-1, a3-1, a3-2, a3-3
Week(11-16)	Pressure and displacement associated with supported deep excavation	3	3			a1-1, a3-1, a3-2, a3-3
Week(17-22)	Ground response for tunneling	3	3			a1-1, a3-1, a3-2, a3-3
Week(23-26)	Design of underground structures	3	3			a1-1, a3-1, a3-2, a3-3
Week(27-30)	Monitoring and observational methods	3	3			b-2-1, b-3-2

5- Relationship between the course and the program

Field	Academic Reference Standard(ARS)			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Program Academic Standards that the course contribute in achieving	**A1, A3**	**-----**	**-----**	**-----**

6- Course Subject Area:

A	B	C	D	E	F	G	
Humanities and Social Science	Mathematics and Basic Sciences	Basic Engineering Science	Applied Engineering And Design	Computer Applications and ICT	Projects and practice	Disccretionry subjects	Total
----	**20 %**	**10 %**	**50%**	**20%**	**10%**	**----**	**100%**

7- Course Topics.

Topic No.	Topic	Weeks
1st	Introduction to underground Structures.	(1-5)
2nd	Tunneling and underground construction technology	(6-10)
3rd	Pressure and displacement associated with supported deep excavation	(11-16)
4th	Ground response for tunneling	(17-22)
5th	Design of underground structures	(23-26)
6th	Monitoring and observational methods	(27-30)

8- ILOs Matrix Topics

Course Intended Learning Outcomes (ILOs)		Course topics					
		1st	**2nd**	**3rd**	**4th**	**5th**	**6th**
Knowledge and understanding	**A1-** Theories and basics related to learning field, as well as other related fields.	**x**	**x**	**x**	**x**	**x**	**x**
	A3- Main scientific advances in the field of specialization.		**x**	**x**	**x**	**x**	**x**

9- Teaching and Learning Method:

Course Intended Learning Outcome (ILOs)		Teaching and Learning Method:												
		Lecture	Presentation and Movies	Discussion	Tutorial	Problem solving	Brain storming	Projects	Site visits	Self-learning	Cooperative	Discovering	Modeling	Playing
A-Knowledge and understanding	A1-1	x				x		x		x			x	
	A3-1	x				x		x		x			x	
	A3-1	x				x		x		x			x	
	A3-1	x				x		x		x			x	

10- Teaching and learning method for low capacity and outstanding Student

For low capacity students	Assign a portion of the office hours for those students.
	Give them specific tasks.
	Repeat the explanation of some of the material and tutorials.
	Assign a teaching assistance to follow up the performance of this group of students.
For outstanding Students	Hand out project assignments to those students.
	Give them some research topics to be searched using the internet and conduct presentation.
	Encourage them to take parts in the running research projects.

11- Assessment:

11.1 Assessment Methods

Course Intended Learning Outcome (ILOs)		Assessment Methods											
		Written Exam	Oral Exam	Tutorial	Project	Model	Report	Quiz	Presentation	Discussion	Laboratory	Sketching	Monitoring
A-Knowledge and understanding	A1-1	x			x	x	x			x			
	A3-1	x			x	x	x			x			
	A3-1	x			x	x	x			x			
	A3-1	x			x	x	x			x			

11.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	week
Final examination	100%	
Total	100%	

12- Facilities required for teaching and learning

A. Library Usage:

Students should be encouraged to use library technical resources in the preparation of reports and oral presentation. At least one oral presentation should involve a significant component of library research to encourage this component of study.

13- List of references:

a- Underground Engineering Planning, Design, Construction and Operation of the Underground Space, B. Yun 1st Edition 2018

b- Principles of Geotechnical Engineering 9th Edition, Braja M. Das, Khaled Sobhan, 2019

Course Prof: **Dr. Ahmed Reda**

Program coordinator: **Dr. Ahmed Turk**

Head of Department: **Prof.Dr. Mamdouh Salah**

Date: **8- 8 - 2018**

Course Specification

Program on which the course is given	Civil Engineering
Major or minor element of program	Major
Department offering the program	Civil Engineering
Department offering the course	Civil Engineering
Academic year/Level	M. Sc. & PhD 2018-2019
Date of specification approval	2018

A- Basic Information

Title: Numerical Analysis in Geotechnical Engineering	**Code Symbol**: **CES 618**	
Lecture	2	
Tutorial	**1**	
Laboratory	**0**	
Total	3	Bylaw 2000
First term	prerequisite	

B- Professional Information

1- Course Aims:

This course introduces the Study different methods of analyzing geotechnical problems, usage numerical analysis of case studies in geotechnical engineering.

2- Course Objectives

By the end of the course the students will be able to analyze geotechnical problems using:

- mathematical methods.
- Finite difference method.
- Finite element method.
- Boundary element method

3- Intended Learning Outcomes (ILOs):

Field	Program ILOs that the course contribute in achieving	Course ILOs
Knowledge and understanding	A1- Theories and basics related to learning field, as well as other related fields.	a1-1 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in the field of Structural Engineering.
	A3- Main scientific advances in the field of specialization.	a3-1 Classify the Potential applications of advanced civil engineering applications..
		a3-2 Report new advances in analysis and design methodologies in civil engineering and its application paradigms.
		a3-3 Discuss the recent and update developments in the most important themes related to civil engineering.

4- Course Contents

Week No.	*Topic*	*Total Hours*	*Contact hrs*			*Course ILOs Covered(By No.)*
			Lec.	Tut.	Lab.	
Week(1-5)	Introduction to numerical analysis.	3	3			a1-1
Week(6-11)	Analyze geotechnical problems using mathematical methods.	3	3			a1-1, a3-1, a3-2, a3-3
Week(12-17)	Analyze geotechnical problems using Finite difference method.	3	3			a1-1, a3-1, a3-2, a3-3
Week(18-23)	Analyze geotechnical problems using Finite element method.	3	3			a1-1, a3-1, a3-2, a3-3
Week(24-27)	Analyze geotechnical problems using Boundary element method.	3	3			a1-1, a3-1, a3-2, a3-3
Week(28-30)	usage numerical analysis of case studies in geotechnical engineering.	3	3			b-2-1, b-3-2

5- Relationship between the course and the program

Field	Academic Reference Standard(ARS)			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Program Academic Standards that the course contribute in achieving	**A1, A3**	**-----**	**-----**	**-----**

6- Course Subject Area:

A	B	C	D	E	F	G	
Humanities and Social Science	Mathematics and Basic Sciences	Basic Engineering Science	Applied Engineering And Design	Computer Applications and ICT	Projects and practice	Disccretionry subjects	Total
----	**20 %**	**10 %**	**50%**	**20%**	**10%**	**----**	**100%**

7- Course Topics.

Topic No.	Topic	Weeks
1st	Introduction to numerical analysis.	**1-2**
2nd	Analyze geotechnical problems using mathematical methods.	**3-4**
3rd	Analyze geotechnical problems using Finite difference method.	**5-6**
4th	Analyze geotechnical problems using Finite element method.	**7-9**
5th	Analyze geotechnical problems using Boundary element method.	**10-11**
6th	usage numerical analysis of case studies in geotechnical engineering.	**12-13**

8- ILOs Matrix Topics

Course Intended Learning Outcomes (ILOs)		Course topics					
		1st	**2nd**	**3rd**	**4th**	**5th**	**6th**
Knowledge and understanding	**A1-** Theories and basics related to learning field, as well as other related fields.	**x**	**x**	**x**	**x**	**x**	**x**
	A3- Main scientific advances in the field of specialization.		**x**	**x**	**x**	**x**	**x**

9- Teaching and Learning Method:

Course Intended Learning Outcome (ILOs)		Teaching and Learning Method:												
		Lecture	Presentation and Movies	Discussion	Tutorial	Problem solving	Brain storming	Projects	Site visits	Self-learning	Cooperative	Discovering	Modeling	Playing
A-Knowledge and understanding	A1-1	x				x		x		x			x	
	A3-1	x				x		x		x			x	
	A3-1	x				x		x		x			x	
	A3-1	x				x		x		x			x	

10- Teaching and learning method for low capacity and outstanding Student

For low capacity students	Assign a portion of the office hours for those students.
	Give them specific tasks.
	Repeat the explanation of some of the material and tutorials.
	Assign a teaching assistance to follow up the performance of this group of students.
For outstanding Students	Hand out project assignments to those students.
	Give them some research topics to be searched using the internet and conduct presentation.
	Encourage them to take parts in the running research projects.

11- Assessment:

11.1 Assessment Methods

Course Intended Learning Outcome (ILOs)		Assessment Methods											
		Written Exam	Oral Exam	Tutorial	Project	Model	Report	Quiz	Presentation	Discussion	Laboratory	Sketching	Monitoring
A-Knowledge and understanding	A1-1	x			x	x	x			x			
	A3-1	x			x	x	x			x			
	A3-1	x			x	x	x			x			
	A3-1	x			x	x	x			x			

11.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	week
Final examination	100%	
Total	100%	

12- Facilities required for teaching and learning

A. Library Usage:

Students should be encouraged to use library technical resources in the preparation of reports and oral presentation. At least one oral presentation should involve a significant component of library research to encourage this component of study.

13- List of references:

a- Finite Element Analysis in Geotechnical Engineering, D. M. Potts, L. Zdravkovic 2nd Edition 2009

b- Principles of Geotechnical Engineering 9th Edition, Braja M. Das, Khaled Sobhan, 2019

c- Analysis and design of raft and piled Raft-Program ELPLA, GEOTEC Software Inc., Canada, EL Gendy M., El Gendy A. (2019)

Course Prof: **Prof. Dr. Mohamed El Gendy**

Program coordinator: **Dr. Ahmed Turk**

Head of Department: **Prof.Dr. Mamdouh Salah**

Date: **8- 8 - 2018**

Course Specification

Program on which the course is given	Civil Engineering
Major or minor element of program	Major
Department offering the program	Civil Engineering
Department offering the course	Civil Engineering
Academic year/Level	M. Sc. & PhD 2018-2019
Date of specification approval	2018

A- Basic Information

Title: Advanced Topics in Soil Mechanics	**Code Symbol**: **CES 619**	
Lecture	2	
Tutorial	**1**	
Laboratory	**0**	
Total	3	Bylaw 2000
First term	prerequisite	

B- Professional Information

1- Course Aims:

This course introduces methods for settlement computation for sand and clay, Pre-loading of clay to control settlement, Shear strength of sand and clay under different loading and drainage conditions, Study of collapsible soil, Study of swelling soil.

2- Course Objectives

By the end of the course the students will be able to:

- Calculate settlements for sand and clay based on varying loading and soil conditions.
- Understanding pre-loading of clay to control settlement
- Understanding shear strength of sand and clay under different loading and drainage conditions.
- Understanding collapsible soil and swelling soil.

3- Intended Learning Outcomes (ILOs):

Field	Program ILOs that the course contribute in achieving	Course ILOs
Knowledge& Understanding	**A-1** Theories and basics related to learning field, as well as other related fields.	**a-1-1** Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in the field of **Structural Engineering**.
	A-5 Basics and principles of quality in professional practice in the field of specialization.	**a-5-1** Explain Quality Assurance concepts of different civil engineering disciplins and systems development phases.
Intellectual skills	**B-2** Solve specialized problems even with lack of some data and variables, (incomplete data)..	**b-2-1** Apply broad knowledge of modern computational methods and think critically to solve unstructured problems (with incomplete data) related to civil engineering.
	B-3 Link and integrate diverse knowledge to solve professional problems.	**b-3-1** Analyze, interpret and manipulate data from a variety of sources and relate it to solve professional problems.
Professional skills	**C-1** Mastering the basics as well as the latest professional skills in the field of specialization.	**c-1-1** Express competence skills, such as identifying, formulating, analyzing, and creating engineering solutions, using latest engineering techniques, skills, and tools.
General skills	**D-2** Use information technology to improve his/her professional practice.	**d-2-1** Use state-of-the-art computer design tools and applications for solving civil engineering problems.

4- Course Contents

Week No.	*Topic*	*Total Hours*	*Contact hrs*			*Course ILOs Covered(By No.)*
			Lec.	**Tut.**	**Lab.**	
Week(1-5)	Introduction of soil settlements	3	2	1	0	**A-1, A-5**
Week(6-9)	Settlement computation for sand and clay	3	2	1	0	**B-2, B-3, C-1**
Week(10-16)	Pre-loading of clay to control settlement	3	2	1	0	**B-2, B-3, C-1**
Week(17-20)	Shear strength of sand and clay under different loading and drainage conditions	3	2	1	0	**B-2, B-3, C-1**

Week(21-25)	Collapsible soil	3	2	1	0	**A-1, A-5, D-2**
Week(26-30)	Swelling soil	3	2	1	0	**A-1, A-5, D-2**
Week 32	Final examination					

5- Relationship between the course and the program

Field	Academic Reference Standard(ARS)			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Program Academic Standards that the course contribute in achieving	**A1& A5**	**B2 & B3**	**C1**	**D2**

6- Course Subject Area:

A	B	C	D	E	F	G	
Humanities and Social Science	Mathematics and Basic Sciences	Basic Engineering Science	Applied Engineering And Design	Computer Applications and ICT	Projects and practice	Disccretionry subjects	Total
----	**5%**	**50 %**	**10%**	**---**	**30%**	**5%**	**100%**

7- Course Topics.

Topic No.	Topic	Weeks
1st	Introduction of soil settlements	**1-5**
2nd	Settlement computation for sand and clay	**6-9**
3rd	Pre-loading of clay to control settlement	**10-16**
4th	Shear strength of sand and clay under different loading and drainage conditions	**17-20**
5th	Collapsible soil	**21-25**
6th	Swelling soil	**26-30**

8- ILOs Matrix Topics

Course Intended Learning Outcomes (ILOs)		Course topics					
		1st	2nd	3rd	4th	5th	6th
Knowledge & Understanding	**a-1-1** Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in the field of Structural Engineering.	x			**x**	**x**	**x**
	a-5-1 Explain Quality Assurance concepts of different civil engineering disciplins and systems development phases.	**x**			**x**	**x**	**x**
Intellectual Skills	**b-2-1** Apply broad knowledge of modern computational methods and think critically to solve unstructured problems (with incomplete data) related to civil engineering.		**x**	**x**	**x**		
	b-3-1 Analyze, interpret and manipulate data from a variety of sources and relate it to solve professional problems.		**x**	**x**	**x**		
Professional Skill	**c-1-1** Express competence skills, such as identifying, formulating, analyzing, and creating engineering solutions, using latest engineering techniques, skills, and tools.		**x**	**x**	**x**		
General Skills	**d-2-1** Use state-of-the-art computer design tools and applications for solving civil engineering problems.					x	x

9- Teaching and Learning Method:

Course Intended Learning Outcome (ILOs)		Teaching and Learning Method:												
		Lecture	Presentation and Movies	Discussion	Tutorial	Problem solving	Brain storming	Projects	Site visits	Self-learning	Cooperative	Discovering	Modeling	Playing
A- Knowledge& Understanding	a1-1	x		x										
	a5-1	x		x										
B-IntellectualSkills	b2-1	x		x										
	b3-1	x		x										
C-Professional Skills	c1-1	x		x				x						
D-General Skills	d2-1	x		x				x						

10- Teaching and learning method for low capacity and outstanding Student

For low capacity students	Assign a portion of the office hours for those students.
	Give them specific tasks.
	Repeat the explanation of some of the material and tutorials.
	Assign a teaching assistance to follow up the performance of this group of students.
For outstanding Students	Hand out project assignments to those students.
	Give them some research topics to be searched using the internet and conduct presentation.
	Encourage them to take parts in the running research projects.

11- Assessment:

11.1 Assessment Methods

Course Intended Learning Outcome (ILOs)		Assessment Methods											
		Written Exam	Oral Exam	Tutorial Assessment	Project Assessment	Model Assessment	Report Assessment	Quiz assessment	Presentation Assessment	Discussion	Laboratory Test	Sketching drawings	Monitoring
A- Knowledge& Understanding	a1-1	x											
	a5-1	x											
B-IntellectualSkills	b2-1	x											
	b3-1	x											
C-Professional Skills	c1-1	x								x			
D-General Skills	d2-1	x						x					

11.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	week
Final examination	100%	
Mid-term written examination		
End of term laboratory examination		
Tutorial and report assessment		
Total	100%	

12- Facilities required for teaching and learning

A. Laboratory Usage:

B. Library Usage:

Students should be encouraged to use library technical resources in the preparation of reports and oral presentation. At least one oral presentation should involve a significant component of library research to encourage this component of study.

13- List of references:

- Knappett, J. and Craig, R., Craig's Soil Mechanics 8th edition, 2012
- Das, B. Principles of Geotechnical Engineering 8th edition, 2013
- Egyptian Code for Soil Mechanics, design and construction of foundations (2007).

Course Prof: **Pro.Dr. Mohammed El Gendy**

Program coordinator: **Dr. Ahmed Turk**

Head of Department: **Prof.Dr. Mamdouh Salah**

Date: **8/8/ 2018**

Course Specification

Program on which the course is given	Civil Engineering
Major or minor element of program	Major
Department offering the program	Civil Engineering
Department offering the course	Civil Engineering
Academic year/Level	M. Sc. & PhD 2018-2019
Date of specification approval	2018

A- Basic Information

Title: methods of soil strengthening	**Code Symbol**: **CES 620**	
Lecture	2	
Tutorial	**1**	
Laboratory	**0**	
Total	3	Bylaw 2000
First term	prerequisite	

B- Professional Information

1- Course Aims:

This course introduces the study of reinforcing of vertical and inclined excavated slopes (using of soil nailing), Study and design of different type of slope facing, Study construction, reinforcing, and design of embankments and walls using geogrids, geotextile or steel strips, Soil grouting, Use of dewatering for soil strengthening, Use of drainage for soil strengthening (example sand drains).

2- Course Objectives

By the end of the course the students will be able to:

- Understanding the reinforcing of vertical and inclined excavated slopes.
- Design the different type of slope facing.
- Understanding the construction, reinforcing, and design of embankments and walls using geogrids.
- Understanding the construction, reinforcing, and design of embankments and walls using geotextile or steel strips.
- Understanding the construction, reinforcing, and design of embankments and walls using Soil grouting.

- Use of dewatering for soil strengthening.
- Use of drainage for soil strengthening.

3- Intended Learning Outcomes (ILOs):

Field	Program ILOs that the course contribute in achieving	Course ILOs
Intellectual skills	**b-1** Analyze and evaluate the information in the field of specialization, and solve the problems based on that.	**b-1-1** Demonstrate an investigatory and analytic thinking approach to solve problems related to the reinforcing of vertical and inclined excavated slopes.
		b-1-2 Interpret, analyze, and evaluate a given system specific information and relate it to the design of the different types of slope facing.
	b-3 Link and integrate diverse knowledge to solve professional problems.	**b-3-1** Analyze, interpret and manipulate data from a variety of sources and relate it to the construction, reinforcing, and design of embankments and walls using geogrids.
	b-4 Conduct a research study and/or writing systematic scientific study about Research problem.	**b-4-1** Write an research plan to conduct applied research on soil dewatering.
Professional skills	**c-3** Evaluate means and tools available in the field of practice.	**c-3-1** Evaluate methods and tools reported in a specified published articles and researches concerning to use of drainage for soil strengthening.

4- Course Contents

Week No.	*Topic*	*Total Hours*	*Contact hrs*			*Course ILOs Covered(By No.)*
			Lec.	Tut.	Lab.	
Week(1-5)	Introduction to the reinforcing of vertical and inclined excavated slopes.	3	3			**b-1-1**
Week(6-11)	Design the different type of slope facing.	3	3			**b-1-1 , b-1-2**
Week(12-17)	the construction, reinforcing, and design of embankments and walls using geogrids.	3	3			**b-3-1**
Week(18-23)	the construction, reinforcing, and design of embankments and walls using geotextile or steel strips.	3	3			**b-3-1**
Week(24-27)	the construction, reinforcing, and design of embankments and walls using Soil	3	3			**b-3-1**

	grouting.					
Week(28-30)	Use of dewatering for soil strengthening. Swelling soil	3	3			**b-4-1 , c-3-1**

5- Relationship between the course and the program

Field	**Academic Reference Standard(ARS)**			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Program Academic Standards that the course contribute in achieving	**---**	**b1 & b3 & b4**	**c3**	**---**

6- Course Subject Area:

A	**B**	**C**	**D**	**E**	**F**	**G**	
Humanities and Social Science	Mathematics and Basic Sciences	Basic Engineering Science	Applied EngineeringAnd Design	Computer Applications and ICT	Projects and practice	Disccretionry subjects	Total
----	**----**	**30 %**	**50%**	**---**	**10%**	**10%**	**100%**

7- Course Topics.

Topic No.	**Topic**	**Weeks**
1st	Introduction to the reinforcing of vertical and inclined excavated slopes.	**1-5**
2nd	Design the different type of slope facing.	**6-11**
3rd	the construction, reinforcing, and design of embankments and walls using geogrids.	**12-17**
4th	the construction, reinforcing, and design of embankments and walls using geotextile or steel strips.	**18-23**
5th	the construction, reinforcing, and design of embankments and walls using Soil grouting.	**24-27**
6th	Use of dewatering for soil strengthening. Swelling soil	**28-30**

8- ILOs Matrix Topics

Course Intended Learning Outcomes (ILOs)		Course topics					
		1st	2nd	3rd	4th	5th	6th
Intellectual Skills	**b-1** Analyze and evaluate the information in the field of specialization, and solve the problems based on that.	x	x	x			
	b-3 Link and integrate diverse knowledge to solve professional problems.			x	x		
	b-4 Conduct a research study and/or writing systematic scientific study about Research problem.				x	x	
Professional Skill	**c-3** Evaluate means and tools available in the field of practice.					x	

9- Teaching and Learning Method:

Course Intended Learning Outcome (ILOs)		Teaching and Learning Method:												
		Lecture	Presentation and Movies	Discussion	Tutorial	Problem solving	Brain storming	Projects	Site visits	Self-learning	Cooperative	Discovering	Modeling	Playing
B-IntellectualSkills	b1-1	x	x							x				
	b1-2	x		x						x				
	b3-1	x				x				x	x		x	
	b4-1	x				x				x	x		x	

C-Professional Skills	**c3-1**	**x**					**x**	**x**		**x**		**x**		

10- Teaching and learning method for low capacity and outstanding Student

For low capacity students	Assign a portion of the office hours for those students.
	Give them specific tasks.
	Repeat the explanation of some of the material and tutorials.
	Assign a teaching assistance to follow up the performance of this group of students.
For outstanding Students	Hand out project assignments to those students.
	Give them some research topics to be searched using the internet and conduct presentation.
	Encourage them to take parts in the running research projects.

11- Assessment:

11.1 Assessment Methods

Course Intended Learning Outcome (ILOs)		Assessment Methods											
		Written Exam	**Oral Exam**	**Tutorial Assessment**	**Project Assessment**	**Model Assessment**	**Report Assessment**	**Quiz assessment**	**Presentation Assessment**	**Discussion**	**Laboratory Test**	**Sketching drawings**	**Monitoring**
B-IntellectualSkills	**b1-1**	**x**		**x**									
	b1-2	**x**		**x**									
	b3-1	**x**		**x**									
	b4-1	**x**			**x**		**x**			**x**			
C-Professional Skills	**c3-1**	**x**			**x**		**x**			**x**			

11.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	week
Final examination	**100%**	
Mid-term written examination	**0%**	
End of term laboratory examination	**0%**	
Tutorial and report assessment	**0%**	
Total	**100%**	

12- Facilities required for teaching and learning

A. Library Usage:

Students should be encouraged to use library technical resources in the preparation of reports and oral presentation. At least one oral presentation should involve a significant component of library research to encourage this component of study.

13- List of references:

a- Handbook of Slope Stabilisation, J. A. R. Ortigao ،Alberto Sayao

b- Soil Mechanics in Engineering Practice, Karl Terzaghi ،Ralph B. Peck ،Gholamreza Mesri

c- Principles and Practice of Ground Improvement

Course Prof: **Dr. Eng.Adel Ramdan**

Program coordinator: **Dr. Ahmed Turk**

Head of Department: **Prof.Dr. Mamdouh Salah**

Date: **8- 8 - 2018**

Course Specification

Program on which the course is given	Civil Engineering
Major or minor element of program	Major
Department offering the program	Civil Engineering
Department offering the course	Civil Engineering
Academic year/Level	M. Sc. & PhD 2018-2019
Date of specification approval	2018

A- Basic Information

Title: control of ground water and side excavation support.	**Code Symbol**: **CES 621**	
Lecture	2	
Tutorial	**1**	
Laboratory	**0**	
Total	3	Bylaw 2000
First term	prerequisite	

B- Professional Information

1- Course Aims:

This course introduces the design and study methods of ground water dewatering for different types of soils, Using of diaphragm walls, Surface settlement resulted from excavation, Using of tie backs in side excavation support, advanced techniques for earth support.

2- Course Objectives

By the end of the course the students will be able to:

- Design and study methods of ground water dewatering for different types of soils.
- Design and study methods of diaphragm walls.
- Surface settlement resulted from excavation.
- Using of tie backs in side excavation support.
- Design and study methods of advanced techniques for earth support.

3- Intended Learning Outcomes (ILOs):

Field	Program ILOs that the course contribute in achieving	Course ILOs
Knowledge and understanding	**A-1** Theories and basics related to learning field, as well as other related fields.	**a-1-1** Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in the field of control of ground water.
Intellectual skills	**b-7** Take professional decisions in different professional practical contexts.	**b-7-1** Acquire decision making capabilities in different situation when facing problems related to analysis, design and development of side excavation support.
Professional skills	**c-2** Write and evaluate technical and professional reports.	**c-2-1** Write and evaluate a professional report on specialized systems related to Design and study methods of ground water dewatering for different types of soils.
General and transferrable skills	**d-2** Use information technology to improve his/her professional practice.	**d-2-1** Use state-of-the-art computer design tools and applications for solving methods of diaphragm walls
	d-4 Set evaluation criteria and benchmarks to evaluate others performance.	**d-4-1** Design standards to evaluate others performance of surface settlement resulted from excavation.
	d-8 Learn independently and seek continuous learning.	**d-8-1** Express a strong foundation of continuous learning so they can maintain their technical competency.
		d-8-2 Seek continuous learning through continuous education, organizing and participating in seminars, workshops, national and international conferences.

4- Course Contents

Week No.	*Topic*	*Total Hours*	*Contact hrs*			*Course ILOs Covered(By No.)*
			Lec.	**Tut.**	**Lab.**	
Week(1-5)	Introduction to control of ground water and side excavation support.	3	3			**a-1-1**
Week(6-11	Design and study methods of ground water dewatering for different types of soils.	3	3			**b-7-1**
Week(12-17)	Design and study methods of diaphragm walls.	3	3			**c-2-1**
Week(18-23)	Surface settlement resulted from excavation.	3	3			**d-2-1**
Week(24-27)	Using of tie backs in side excavation support.	3	3			**d-4-1, d-8-1, d-8-2**
Week(28-30)	Design and study methods of advanced techniques for earth support.	3	3			**d-4-1, d-8-1, d-8-2**

5- Relationship between the course and the program

Field	**Academic Reference Standard(ARS)**			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Program Academic Standards that the course contribute in achieving	**a1**	**b7**	**c1**	**d2&d4&d8**

6- Course Subject Area:

A	**B**	**C**	**D**	**E**	**F**	**G**	
Humanities and Social Science	Mathematics and Basic Sciences	Basic Engineering Science	Applied EngineeringAnd Design	Computer Applications and ICT	Projects and practice	Disccretionry subjects	Total
10%	**----**	**20 %**	**30%**	**20%**	**10%**	**10%**	**100%**

7- Course Topics.

Topic No.	Topic	Weeks
1st	Introduction to control of ground water and side excavation support.	**1-5**
2nd	Design and study methods of ground water dewatering for different types of soils.	**6-11**
3rd	Design and study methods of diaphragm walls.	**12-17**
4th	Surface settlement resulted from excavation.	**18-23**
5th	Using of tie backs in side excavation support.	**24-27**
6th	Design and study methods of advanced techniques for earth support.	**28-30**

8- ILOs Matrix Topics

Course Intended Learning Outcomes (ILOs)		Course topics					
		1st	**2nd**	**3rd**	**4th**	**5th**	**6th**
Knowledge and understanding	**A-1** Theories and basics related to learning field, as well as other related fields.	**x**					
Intellectual Skills	**b-7** Take professional decisions in different professional practical contexts.		**x**				
Professional Skill	**c-2** Write and evaluate technical and professional reports.			**x**			
General and transferrable skills	**d-2** Use information technology to improve his/her professional practice.				**x**	**x**	
	d-4 Set evaluation criteria and benchmarks to evaluate others performance.					**x**	**x**
	d-8 Learn independently and seek continuous learning.				**x**	**x**	**x**

9- Teaching and Learning Method:

Course Intended Learning Outcome (ILOs)		Teaching and Learning Method:												
		Lecture	Presentation and Movies	Discussion	Tutorial	Problem solving	Brain storming	Projects	Site visits	Self-learning	Cooperative	Discovering	Modeling	Playing
A-Knowledge and understanding	a1-1	x			x					x				
B-IntellectualSkills	b7-1	x			x								x	
C-Professional Skills	c2-1	x			x								x	
D- General and transferrable skills	d2-1	x			x			x						
	d4-1				x			x		x	x			
	d8-1							x		x	x			
	d8-2							x		x	x			

10- Teaching and learning method for low capacity and outstanding Student

For low capacity students	Assign a portion of the office hours for those students.
	Give them specific tasks.
	Repeat the explanation of some of the material and tutorials.
	Assign a teaching assistance to follow up the performance of this group of students.
For outstanding Students	Hand out project assignments to those students.
	Give them some research topics to be searched using the internet and conduct presentation.
	Encourage them to take parts in the running research projects.

11- Assessment:

11.1 Assessment Methods

Course Intended Learning Outcome (ILOs)		Assessment Methods											
		Written Exam	Oral Exam	Tutorial Assessment	Project Assessment	Model Assessment	Report Assessment	Quiz assessment	Presentation Assessment	Discussion	Laboratory Test	Sketching drawings	Monitoring
A-Knowledge and understanding	a1-1	x		x									
B-IntellectualSkills	b7-1	x		x									
C-Professional Skills	c2-1	x		x									
D- General and transferrable skills	d2-1				x					x			
	d4-1				x					x			
	d8-1				x					x			
	d8-2				x					x			

11.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	week
Final examination	100%	
Mid-term written examination	0%	
End of term laboratory examination	0%	
Tutorial and report assessment	0%	
Total	100%	

12- Facilities required for teaching and learning

A. Library Usage:

Students should be encouraged to use library technical resources in the preparation of reports and oral presentation. At least one oral presentation should involve a significant component of library research to encourage this component of study.

13- List of references:

a- Handbook of Slope Stabilisation, J. A. R. Ortigao ،Alberto Sayao

b- Soil Mechanics in Engineering Practice, Karl Terzaghi ،Ralph B. Peck ،Gholamreza Mesri

c- Principles and Practice of Ground Improvement

Course Prof: ***Dr. Eng.Mervat El-Azab***

Program coordinator: **Dr. Ahmed Turk**

Head of Department: **Prof.Dr. Mamdouh Salah**

Date: **8- 8 - 2018**

Course Specification

Program on which the course is given	Civil Engineering
Major or minor element of program	Major
Department offering the program	Civil Engineering
Department offering the course	Civil Engineering
Academic year/Level	M. Sc. & PhD 2018-2019
Date of specification approval	2018

A- Basic Information

Title: System Analysis for Civil Engineering	**Code Symbol**: **CES 623**	
Lecture	**2**	
Tutorial	**1**	
Laboratory	**0**	
Total	**3**	Bylaw 2000
	prerequisite	

B- Professional Information

1- Course Aims:

This course introduces system analysis approach, Resources allocations and mathematical models, Optimization methods, Design analysis, Economic considerations for resource constraints and unit costs.

2- Course Objectives

By the end of the course the students will be able to:

- Understand system analysis approach.
- Calculate the economic considerations for resource constraints and unit costs
- Understand Resources allocations and mathematical models, Optimization methods.
- Address the design analysis.

3- Intended Learning Outcomes (ILOs):

Field	Program ILOs that the course contribute in achieving	Course ILOs
Knowledge& Understanding	A1. Theories and basics related to learning field, as well as other related fields.	a1-1 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in the field of Structural Engineering.
	A3- Main scientific advances in the field of specialization.	a3-2 Report new advances in analysis and design methodologies in civil engineering and its application paradigms.solutions on society and environment.
Intellectual skills	B2- Solve specialized problems even with lack of some data and variables, (incomplete data).	b2-1 Apply broad knowledge of modern computational methods and think critically to solve unstructured problems (with incomplete data) related to civil engineering.
	B6- Planning for performance development in the field of practice	b6-1 Plan to guide progress in his / her professional career.
Professional skills	C1- Mastering the basics as well as the latest professional skills in the field of specialization.	c1-1 Express competence skills, such as identifying, formulating, analyzing, and creating engineering solutions, using latest engineering techniques, skills, and tools.
	C3- Evaluate means and tools available in the field of practice.	c3-1 Evaluate methods and tools reported in a specified published articles and researches concerning to civil engineering field.
General skills	D5- Use different resources to obtain knowledge and information.	d5-1 Use different resources of information like libraries, internet access facilities, etc. to upgrade and enhance their conceptual knowledge.

4- Course Contents

Week No.	*Topic*	*Total Hours*	*Contact hrs*			*Course ILOs Covered(By No.)*
			Lec.	**Tut.**	**Lab.**	
Week(1-5)	System analysis approach	3	2	1		a1-1, b2-1, c1-1
Week(6-10)	Resources allocations	3	2	1		b6-1, c3-1
Week(11-16)	mathematical models	3	2	1		a3-2, c1-1, d5-1
Week(17-22)	Optimization methods	3	2	1		b2-1, b6-1, c1-1

Week(23-26)	Design analysis	3	2	1		b2-1, c1-1
Week(27-30)	Economic considerations for resource constraints and unit costs	3	2	1		a3-2, b6-1, c3-1, d5-1

5- Relationship between the course and the program

Field	Academic Reference Standard (ARS)			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Program Academic Standards that the course contribute in achieving	a1-1 & a3-2	b2-1 & b6-1	c1-1, c3-1	d5-1

6- Course Subject Area:

A	B	C	D	E	F	G	
Humanities and Social Science	Mathematics and Basic Sciences	Basic Engineering Science	Applied Engineering And Design	Computer Applications and ICT	Projects and practice	Disccretionry subjects	Total
----	**5%**	**50 %**	**10%**	**---**	**30%**	**5%**	**100%**

7- Course Topics.

Topic No.	Topic	Weeks
1st	System analysis approach	(1-5)
2nd	Resources allocations	(6-10)
3rd	mathematical models	(11-16)
4th	Optimization methods	(17-22)
5th	Design analysis	(23-26)
6th	Economic considerations for resource constraints and unit costs	(27-30)

8- ILOs Matrix Topics

Course Intended Learning Outcomes (ILOs)		Course topics					
		1st	2nd	3rd	4th	5th	6th
Knowledge & Understanding	a1-1 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in the field of **Structural Engineering**.	x			**x**	**x**	**x**
	a3-2 Report new advances in analysis and design methodologies in civil engineering and its application paradigms.solutions on society and environment.	**x**			**x**		**x**
Intellectual Skills	b2-1 Apply broad knowledge of modern computational methods and think critically to solve unstructured problems (with incomplete data) related to civil engineering.		**x**	**x**			
	b6-1 Plan to guide progress in his / her professional career.		**x**	**x**	**x**		
Professional Skill	c1-1 Express competence skills, such as identifying, formulating, analyzing, and creating engineering solutions, using latest engineering techniques, skills, and tools.		**x**		**x**		
	c3-1 Evaluate methods and tools reported in a specified published articles and researches concerning to civil engineering field.	**x**		**x**		**x**	
General Skills	d5-1 Use different resources of information like libraries, internet access facilities, etc. to upgrade and enhance their conceptual knowledge.	**x**				x	x

9- Teaching and Learning Method:

Course Intended Learning Outcome (ILOs)		Teaching and Learning Method:												
		Lecture	Presentation and Movies	Discussion	Tutorial	Problem solving	Brain storming	Projects	Site visits	Self-learning	Cooperative	Discovering	Modeling	Playing
A- Knowledge& Understanding	a1-1	x		x										
	a3-2	x			x					x				
B-IntellectualSkills	b2-1	x		x	x									
	b6-1	x		x			x							
C-Professional Skills	c1-1	x		x	x		x						x	
	c3-1	x			x					x			x	
D-General Skills	d5-1	x		x				x						

10- Teaching and learning method for low capacity and outstanding Student

For low capacity students	Assign a portion of the office hours for those students.
	Give them specific tasks.
	Repeat the explanation of some of the material and tutorials.
	Assign a teaching assistance to follow up the performance of this group of students.
For outstanding Students	Hand out project assignments to those students.
	Give them some research topics to be searched using the internet and conduct presentation.
	Encourage them to take parts in the running research projects.

11- Assessment:

11.1 Assessment Methods

Course Intended Learning Outcome (ILOs)		Assessment Methods											
		Written Exam	Oral Exam	Tutorial Assessment	Project Assessment	Model Assessment	Report Assessment	Quiz assessment	Presentation Assessment	Discussion	Laboratory Test	Sketching drawings	Monitoring
A- Knowledge& Understanding	a1-1	x											
	a3-2	x		x						x			
B-IntellectualSkills	b2-1	x											
	b6-1	x		x						x			
C-Professional Skills	c1-1	x	x			x							
	c3-1					x	x						
D-General Skills	d5-1	x						x					

11.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	week
Final examination	100	32
Total	100%	

12- Facilities required for teaching and learning

A. Laboratory Usage:

B. Library Usage:

Students should be encouraged to use library technical resources in the preparation of reports and oral presentation. At least one oral presentation should involve a significant component of library research to encourage this component of study.

13- List of references:

Course Prof:

Program coordinator: **Dr. Ahmed Turk**

Head of Department: **Prof.Dr. Mamdouh Salah**

Date: **8- 8 - 2018**

Course Specification

Program on which the course is given	M. SC in Civil Engineering.
Major or minor element of program	Major
Department offering the program	Civil Engineering
Department offering the course	Physics and Mathematical Engineering
Academic year/Level	M. Sc. & PhD 2018-2019
Date of specification approval	2018

A- Basic Information

Course Title: Statistics in Structural Engineering	**Lecture:** 2 hours
Course Code : CES 625	**Tutorial/ Laboratory:** 1 hour
Bylaw 2000	Total: 3 hours

B- Professional Information

1- Course Aims:

This course aims to equip the student with the essential knowledge and stimulate intuitive understanding of some basic concepts and methods of Statistics.

By the end of the course the students will be able to:

1. Apply the basics and the methodologies of Statistics and to use its different tools
2. Use the statistical approach in the area of civil Engineering.
3. Combine some applications of the statistical knowledge with relevant knowledge in the professional practice.
4. Show awareness of some of the current problems and modern visions in statistics.
5. Identify professional problems and find statistical solutions for it.
6. Recognize an appropriate range of statistical professional skills and the use of appropriate technology tools to serve professional application.

2- Intended Learning Outcomes (ILOs):

NAQAAE Academic Reference Standards (ARS)	Program ILOs	Course ILOs
A. Knowledge and understanding		
A3- Main scientific advances in the field of specialization.	a3-1 Classify the Potential applications of advanced computer and control systems.	a3-1-1 Classify the applications of statistical methods in civil Engineering.
B. Intellectual skills		
B2- Solve specialized problems even with lack of some data and variables, (incomplete data).	b2-1 Apply broad knowledge of modern computational methods and think critically to solve unstructured problems (with incomplete data) related to civil engineering.	b2-1-1 Apply broad knowledge of statistical methods and think critically to solve unstructured problems (with incomplete data) related to civil engineering.
C. Professional and practical skills		
C1- Be competent in all basic and some of the advanced professional skills related to the field of computer engineering	c1-1 Express competence skills, such as identifying, formulating, analyzing, and creating engineering solutions, using latest engineering techniques, skills, and tools.	c1-1-1 Express skills, such as identifying, formulating, analyzing, and creating statistical solutions by using latest computerized techniques, skills, and tools.

3- Course Contents:

No.	*Topic*	*Total hours*	*Lec. hours*	*Tut. Hours*
Week(1-4)	Measures of central tendency	12	8	4
Week(5-9)	Measures of dispersion	10	8	2
Week(10-14)	Measures of Position	10	8	2
Week(15-19)	Data graph	10	6	4
Week(20-22)	Frequency distribution.	10	6	4
Week(23-25)	Normal distribution	12	8	4
Week(26-28)	Introduction to SPSS	10	6	4
Week(29-30)	Reading and transforming data in SPSS	10	6	4
Total	84	56	28	

4- Relationship between the course and the program

Fields	**Knowledge & Understanding**	**Intellectual Skills**	**Professional Skills**
Program Academic Standards that the course contribute in achieving	A3 (a3-1)	B2 (b2-1)	C1 (c1-1)

5- Course Subject Area:

A	**B**	**C**	**D**	**E**	**F**	**G**	
Humanities and Social Science	Mathematics and Basic Sciences	Basic Engineering Science	Applied Engineering And Design	Computer Applications and ICT	Projects and practice	Disccretionry subjects	Total
	80%			20%			100%

6- Course Topics.

Topic No.	*Topic*	*weeks*
1	Measures of central tendency	*Week(1-4)*
2	Measures of dispersion	*Week(5-9)*
3	Measures of Position	*Week(10-14)*
4	Data graph	*Week(15-19)*
5	Frequency distribution.	*Week(20-22)*
6	Normal distribution	*Week(23-25)*
7	Introduction to SPSS	*Week(26-28)*
8	Reading and transforming data in SPSS	*Week(29-30)*

7- ILOs Matrix Topics

Course (ILOs)	**1st**	**2nd**	**3rd**	**4th**	**5th**	**6th**	**7th**	**8th**
a3-1-1 Classify the applications of statistical methods in civil Engineering.	**X**	**X**	**X**					
b2-1-1 Apply broad knowledge of statistical methods and think critically to solve unstructured problems (with incomplete data) related to civil engineering.				**X**	**X**	**X**		
c1-1-1 Express skills, such as identifying, formulating, analyzing, and creating statistical solutions by using latest computerized techniques, skills, and tools.							**X**	**X**

8- Teaching and Learning Method:

Course Intended learning outcomes (ILOs)		Teaching and Learning Method												
		Lecture	Presentation and Movies	Discussion	Tutorial	Problem solving	Brain storming	Projects	Report	Self learning	Cooperative	Discovering	Computer Simulation	Practical Experiments
Knowledge & understanding	a3-1-1	X		X	X	X								
Intellectual Skills	b2-1-1	X		X	X	X								
Professional Skills	c1-1-1		X		X	X								X

9- Assessment

9.1 Assessment Methods

Final Written Examination : to assess students' knowledge, understanding, analysis, creativity, problem solving, and problem identification.

9.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	Week
Final Examination	100	32nd
Total	100%	

10- Facilities required for teaching and learning

Whiteboard – Class Room Equipped with Computer and Video Projector - Library.

A. Library Usage:

Students are encouraged to use library technical resources in the studying of the course.

11- List of references:

An Introduction to Statistical Methods and Data Analysis, Lyman Ott, PWS-KENT Publishing Company, Boston, 1988.

Course coordinator : Dr/ Moenes Moaaz

Head of Department: Prof. Dr/ Yousef Hashim

Date: 8 / 8 / 2018

Course Specification

Program on which the course is given	Civil Engineering
Major or minor element of program	Major
Department offering the program	Civil Engineering
Department offering the course	Civil Engineering
Academic year/Level	2018/2019 PhD
Date of specification approval	2018

A- Basic Information

Title: Transportation Engineering(2)	**Code Symbol**: **CEP 600**	
Lecture	3	
Tutorial	**0**	
Laboratory	**0**	
Total	3	Bylaw 2000
First term	prerequisite	

B- Professional Information

1- Course Aims:

This course introduces the basic concepts of the Transportation Engineering for the civilengineer. The basics of the Transportation Engineering are well studied.

2- Course Objectives

By the end of the course the students will be able to:

- Understanding the main concept of Transportation Engineering.
- Understanding planning and design of highway.
- Understanding planning , design and improvement of rail way.

3- Intended Learning Outcomes (ILOs):

Field	Programme ILOs that the course contribute in achieving	Course ILOs
Knowledge& Understanding	**a-5** Methodologies of solving engineering problems, data collection and interpretation.	**a-5-1** Define the Methodologies of solving engineering problems
	a-6 Professional ethics and impacts of engineering solutions on society and environment.	**a-6-1** Describe the ethics and impacts of engineering solutions on society and environment.
Intellectual skills	**b-2** Select appropriate solutions for engineering problems based on analytical thinking.	**b-2-1** Use the appropriate solution for engineering problems
	b-3 Think in a creative and innovative way in problem solving and design.	**B-3-1** Analyze the problem and find a creative solution.
Professional skills	**c-2** Apply numerical modeling methods to engineering problems.	**c-2-1** Analyze the problem into points to determine the solution.
General skills	**d-2** Work in stressful environment and within constraints.	**d-2-1** Describe the stressful environment in construction projects and how to solve any problems at this environment

4- Course Contents

Week No.	*Topic*	*Total Hours*	*Contact hrs*			*Course ILOs Covered(By No.)*
			Lec.	**Tut.**	**Lab.**	
Week(1-2)	Data collection – transportation planning					**a-5**
Week(3-4)	Demand supply analysis – zoning – transportation demand model.					**a-6**
Week(5-6)	Trip generation-trip distribution-traffic assignment- design of traffic signals.					**b-2**
Week(7-8)	Highway planning and structural design of highway.					**d-2**
Week 9	***Midterm written examination***					
Week(10-11)	Introduction of railway lines,technology and improvement ,.					**b-3**
Week(12-13)	Track alignment and surveying track structural system and rolling contact					**c-2**

5- Relationship between the course and the programme

Field	Academic Reference Standard(ARS)			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Programme Academic Standards that the course contribute in achieving	**a5& a6**	**b2 & b3**	**c2**	**d2**

6- Course Subject Area:

A	B	C	D	E	F	G	
Humanities and Social Science	Mathematics and Basic Sciences	Basic Engineering Science	Applied Engineering And Design	Computer Applications and ICT	Projects and practice	Disccretionry subjects	Total
----	**5%**	**50 %**	**10%**	**---**	**30%**	**5%**	**100%**

7- Course Topics.

Topic No.	Topic	Weeks
1st	Data collection – transportation planning	**1-2**
2nd	Data collection – transportation planning Demand supply analysis – zoning – transportation demand model.	**3-4**
3rd	Trip generation-trip distribution-traffic assignment-design of traffic signals.	**5-6**
4th	Highway planning and structural design of highway.	**7-8**
5th	Introduction of railway lines, technology and improvement.	**10-11**
6th	Track alignment and surveying track structural system and rolling contact.	**12-13**

8- ILOs Matrix Topics

Course Intended Learning Outcomes (ILOs)		Course topics					
		1st	2nd	3rd	4th	5th	6th
Knowledge & Understanding	**a-5-1** Define the Methodologies of solving engineering problems	x	**x**				
	a-6-1 Describe the ethics and impacts of engineering solutions on society and environment.			**x**			**x**
Intellectual Skills	**b-2-1**Use the appropriate solution for engineering problems		x				
	B-3-1 Analyze the problem and find a creative solution.			X	x	x	x
Professional Skill	**c-2-1**Analyze the problem into points to determine the solution.				x	x	x
General Skills	**d-2-1**Describe the stressful environment in construction projects and how to solve any problems at this environment					x	x

9- Teaching and Learning Method:

Course Intended Learning Outcome (ILOs)		Teaching and Learning Method:												
		Lecture	Presentation and Movies	Discussion	Tutorial	Problem solving	Brain storming	Projects	Site visits	Self learning	Cooperative	Discovering	Modeling	Playing
A- Knowledge& Understanding	a5-1	x		x										
	a6-1	x		x										
B-IntellectualSkills	b2-1	x		x										
	b3-1	x		x										
C-Professional Skills	c2-1	x		x				x						
D-General Skills	d2-1	x		x				x						

10- Teaching and learning method for low capacity and outstanding Student

For low capacity students	Assign a portion of the office hours for those students.
	Give them specific tasks.
	Repeat the explanation of some of the material and tutorials.
	Assign a teaching assistance to follow up the performance of this group of students.
For outstanding Students	Hand out project assignments to those students.
	Give them some research topics to be searched using the internet and conduct presentation.
	Encourage them to take parts in the running research projects.

11- Assessment:

11.1 Assessment Methods

Course Intended Learning Outcome (ILOs)		Assessment Methods											
		Written Exam	Oral Exam	Tutorial Assessment	Project Assessment	Model Assessment	Report Assessment	Quiz assessment	Presentation Assessment	Discussion	Laboratory Test	Sketching drawings	Monitoring
A- Knowledge& Understanding	a5-1	x											
	a6-1	x											
B-IntellectualSkills	b2-1	x											
	b3-1	x											
C-Professional Skills	c2-1	x								x			
D-General Skills	d2-1	x						x					

11.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	week
Final examination		
Mid-term written examination		
End of term laboratory examination		
Tutorial and report assessment		
Total	100%	

12- Facilities required for teaching and learning

A. Laboratory Usage:

B. Library Usage:

Students should be encouraged to use library technical resources in the preparation of reports and oral presentation. At least one oral presentation should involve a significant component of library research to encourage this component of study.

13- List of references:

Course Prof: Prof. Dr .Mohammed Ismaiil

Programme coordinator: Dr. Ahmed Turk

Head of Department:Prof.Dr. Mamdouh salah

Date: 8/8/2018

Course Specification

Program on which the course is given	Civil Engineering
Major or minor element of program	Major
Department offering the program	Civil Engineering
Department offering the course	Civil Engineering
Academic year/Level	2018/2019 PhD
Date of specification approval	2018

A- Basic Information

Title: Modern Railway Tracks	**Code Symbol: CEP 601**	
Lecture	3	
Tutorial	**0**	
Laboratory	**0**	
Total	3	Bylaw 2000
First term	prerequisite	

B- Professional Information

1- Course Aims:

This course introduces Modern railway track concept and different aspects associated with it such as track structure, Interlocking and Inspection.

2- Course Objectives

By the end of the course the students will be able to:

- Understanding the difference between traditional and modern railway tracks.
- Understanding design concepts of modern railway tracks.
- Design different components of modern railway tracks.
- Understanding the concepts and new advances in railway interlocking.
- Knowing the new methods in modern railway track inspection.

3- Intended Learning Outcomes (ILOs):

Field	Programme ILOs that the course contribute in achieving	Course ILOs
Knowledge& Understanding	**a-5** Methodologies of solving engineering problems, data collection and interpretation.	**a-5-1** Define the Methodologies of solving engineering problems
	a-2 Professional ethics and impacts of engineering solutions on society and environment.	**a-2-1** Describe the ethics and impacts of engineering solutions on society and environment.
Intellectual skills	**b-2** Select appropriate solutions for engineering problems based on analytical thinking.	**b-2-1** Use the appropriate solution for engineering problems
	b-3 Think in a creative and innovative way in problem solving and design.	**b-3-1** Analyze the problem and find a creative solution.
Professional skills	**c-3** Apply numerical modeling methods to engineering problems.	**c-3-1** Analyze the problem into points to determine the solution.
General skills	**d-2** Work in stressful environment and within constraints.	**d-2-1** Describe the stressful environment in construction projects and how to solve any problems at this environment

4- Course Contents

Week No.	*Topic*	*Total Hours*	*Contact hrs*			*Course ILOs Covered(By No.)*
			Lec.	**Tut.**	**Lab.**	
Week(1-2)	traditional vs. modern railway tracks					**a-5**
Week(3-4)	Modern railway tracks components and the importance and role of each one					**a-2**
Week(5-6)	Desiging each component of modern railway tracks					**b-2**
Week(7-8)	Desiging each component of modern railway tracks.					**d-2**
Week 9	***Midterm written examination***					
Week(10-11)	Understand and know the concept of modern railways interlocking					**b-3**
Week(12-13)	Modern railway track inspection					**c-3**

5- Relationship between the course and the programme

Field	Academic Reference Standard(ARS)			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Programme Academic Standards that the course contribute in achieving	**a5& a2**	**b2 & b3**	**c3**	**d2**

6- Course Subject Area:

A	B	C	D	E	F	G	
Humanities and Social Science	Mathematics and Basic Sciences	Basic Engineering Science	Applied Engineering And Design	Computer Applications and ICT	Projects and practice	Disccretionry subjects	Total
----	**5%**	**50 %**	**10%**	**---**	**30%**	**5%**	**100%**

7- Course Topics.

Topic No.	Topic	Weeks
1st	traditional vs. modern railway tracks	**1-2**
2nd	Modern railway tracks components and the importance and role of each one	**3-4**
3rd	Desiging each component of modern railway tracks	**5-8**
5th	Understand and know the concept of modern railways interlocking	**10-11**
6th	Modern railway track inspection	**12-13**

8- ILOs Matrix Topics

Course Intended Learning Outcomes (ILOs)		Course topics					
		1st	2nd	3rd	4th	5th	6th
Knowledge & Understanding	**a-5-1** Define the Methodologies of solving engineering problems	x	**x**				
	a-2-1 Describe the ethics and impacts of engineering solutions on society and environment.			**x**			**x**
Intellectual Skills	**b-2-1**Use the appropriate solution for engineering problems		x				
	b-3-1 Analyze the problem and find a creative solution.			X	x	x	x
Professional Skill	**c-3-1**Analyze the problem into points to determine the solution.				x	x	x
General Skills	**d-2-1**Describe the stressful environment in construction projects and how to solve any problems at this environment					x	x

9- Teaching and Learning Method:

Course Intended Learning Outcome (ILOs)		Teaching and Learning Method:												
		Lecture	Presentation and Movies	Discussion	Tutorial	Problem solving	Brain storming	Projects	Site visits	Self learning	Cooperative	Discovering	Modeling	Playing
A- Knowledge& Understanding	a5-1	x		x										
	a2-1	x		x										
B-IntellectualSkills	b2-1	x		x										
	b3-1	x		x		x								
C-Professional Skills	c3-1	x		x		x		x						
D-General Skills	d2-1	x		x		x		x						

10- Teaching and learning method for low capacity and outstanding Student

For low capacity students	Assign a portion of the office hours for those students.
	Give them specific tasks.
	Repeat the explanation of some of the material and tutorials.
	Assign a teaching assistance to follow up the performance of this group of students.
For outstanding Students	Hand out project assignments to those students.
	Give them some research topics to be searched using the internet and conduct presentation.
	Encourage them to take parts in the running research projects.

11- Assessment:

11.1 Assessment Methods

Course Intended Learning Outcome (ILOs)		Assessment Methods											
		Written Exam	Oral Exam	Tutorial Assessment	Project Assessment	Model Assessment	Report Assessment	Quiz assessment	Presentation Assessment	Discussion	Laboratory Test	Sketching drawings	Monitoring
A- Knowledge& Understanding	**a5-1**	x											
	a2-1	x											
B-IntellectualSkills	**b2-1**	x						x					
	b3-1	x						x					
C-Professional Skills	**c3-1**	x						x		x			
D-General Skills	**d2-1**	x						x					

11.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	week
Final examination	**70%**	
Mid-term written examination	**15%**	
Tutorial and report assessment	**15%**	
Total	**100%**	

12- Facilities required for teaching and learning

Class room with projector is required

13- List of references:

- Modern Railway Track by Coenraad Esveld.
- The railway track and its long term behaviour by Konstantinos Tzanakakis.

Course Prof: Assoc. Prof. Dr . Mohamed Ismail & Dr. Ahmed Turk

Programme coordinator: Dr. Ahmed Turk

Head of Department: Prof.Dr. Hassan Ibrahim El-Ghattas

Date: 8/8/2018

Course Specification

Program on which the course is given	Civil Engineering
Major or minor element of program	Major
Department offering the program	Civil Engineering
Department offering the course	Civil Engineering
Academic year/Level	2018/2019 PhD
Date of specification approval	2018

A- Basic Information

Title: Development and Applications of Railways Engineering	**Code Symbol: CEP 602**	
Lecture	3	
Tutorial	**0**	
Laboratory	**0**	
Total	3	Bylaw 2000
First term	prerequisite	

B- Professional Information

1- Course Aims:

This course introduces the basic concepts of the Transportation Engineering for the civilengineer. The basics of the Transportation Engineering are well studied.

2- Course Objectives

By the end of the course the students will be able to:

- Understanding the main concept of Transportation Engineering.
- Understanding planning and design of highway.
- Understanding planning , design and improvement of rail way.

3- Intended Learning Outcomes (ILOs):

Field	Programme ILOs that the course contribute in achieving	Course ILOs
Knowledge& Understanding	**a-5** Methodologies of solving engineering problems, data collection and interpretation.	**a-5-1** Define the Methodologies of solving engineering problems
	a-6 Professional ethics and impacts of engineering solutions on society and environment.	**a-6-1** Describe the ethics and impacts of engineering solutions on society and environment.
Intellectual skills	**b-2** Select appropriate solutions for engineering problems based on analytical thinking.	**b-2-1** Use the appropriate solution for engineering problems
	b-3 Think in a creative and innovative way in problem solving and design.	**b-3-1** Analyze the problem and find a creative solution.
Professional skills	**c-1** Apply numerical modeling methods to engineering problems.	**c-1-1** Analyze the problem into points to determine the solution.
General skills	**d-2** Work in stressful environment and within constraints.	**d-2-1** Describe the stressful environment in construction projects and how to solve any problems at this environment

4- Course Contents

Week No.	*Topic*	*Total Hours*	*Contact hrs*			*Course ILOs Covered(By No.)*
			Lec.	**Tut.**	**Lab.**	
Week(1-2)	General maintenance aspects- manual method of track geometry- rail grinding train.					**a-5**
Week(3-4)	Correcting weld geometry- mobile weld correction-maintenance machine.					**a-6**
Week(5-6)	General observations on truck renewal-wheel and rail system-track structure system.					**b-2**
Week(7-8)	Rolling contact- track construction and maintenance cost-assessment of track quality through vehicle response.					**d-2**
Week 9	***Midterm written examination***					
Week(10-11)	Mechanized track maintenance control – development of track defects,rals,ties , ballast, subgrade.					**b-3**
Week(12-13)	Fabrication and maintenance of continuously welded rails – design of railway project timing schedule.					**c-1**

5- Relationship between the course and the programme

Field	**Academic Reference Standard(ARS)**			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Programme Academic Standards that the course contribute in achieving	**a5& a6**	**b2 & b3**	**c1**	**d2**

6- Course Subject Area:

A	**B**	**C**	**D**	**E**	**F**	**G**	
Humanities and Social Science	Mathematics and Basic Sciences	Basic Engineering Science	Applied Engineering And Design	Computer Applications and ICT	Projects and practice	Disccretionry subjects	Total
----	**5%**	**50 %**	**10%**	**---**	**30%**	**5%**	**100%**

7- Course Topics.

Topic No.	Topic	Weeks
1st	General maintenance aspects- manual method of track geometry- rail grinding train.	**1-2**
2nd	Correcting weld geometry- mobile weld correction- maintenance machine.	**3-4**
3rd	General observations on truck renewal-wheel and rail system-track structure system.	**5-6**
4th	Rolling contact- track construction and maintenance cost-assessment of track quality through vehicle response.	**7-8**
5th	Mechanized track maintenance control – development of track defects,rals,ties , ballast, subgrade.	**10-11**
6th	Fabrication and maintenance of continuously welded rails – design of railway project timing schedule	**12-13**

8- ILOs Matrix Topics

Course Intended Learning Outcomes (ILOs)		Course topics					
		1st	2nd	3rd	4th	5th	6th
Knowledge & Understanding	**a-5-1** Define the Methodologies of solving engineering problems	x	**x**				
	a-6-1 Describe the ethics and impacts of engineering solutions on society and environment.			**x**			**x**
Intellectual Skills	**b-2-1**Use the appropriate solution for engineering problems		x				
	b-3-1 Analyze the problem and find a creative solution.			X	x	x	x
Professional Skill	**c-1-1**Analyze the problem into points to determine the solution.				x	x	x
General Skills	**d-2-1**Describe the stressful environment in construction projects and how to solve any problems at this environment					x	x

9- Teaching and Learning Method:

Course Intended Learning Outcome (ILOs)		Teaching and Learning Method:												
		Lecture	Presentation and Movies	Discussion	Tutorial	Problem solving	Brain storming	Projects	Site visits	Self learning	Cooperative	Discovering	Modeling	Playing
A- Knowledge& Understanding	a5-1	x		x										
	a6-1	x		x										
B-IntellectualSkills	b2-1	x		x										
	b3-1	x		x										
C-Professional Skills	c1-1	x		x				x						
D-General Skills	d2-1	x		x				x						

10- Teaching and learning method for low capacity and outstanding Student

For low capacity students	Assign a portion of the office hours for those students.
	Give them specific tasks.
	Repeat the explanation of some of the material and tutorials.
	Assign a teaching assistance to follow up the performance of this group of students.
For outstanding Students	Hand out project assignments to those students.
	Give them some research topics to be searched using the internet and conduct presentation.
	Encourage them to take parts in the running research projects.

11- Assessment:

11.1 Assessment Methods

Course Intended Learning Outcome (ILOs)		Assessment Methods											
		Written Exam	Oral Exam	Tutorial Assessment	Project Assessment	Model Assessment	Report Assessment	Quiz assessment	Presentation Assessment	Discussion	Laboratory Test	Sketching drawings	Monitoring
A- Knowledge& Understanding	a5-1	x											
	a6-1	x											
B-IntellectualSkills	b2-1	x											
	b3-1	x											
C-Professional Skills	c1-1	x								x			
D-General Skills	d2-1	x						x					

11.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	week
Final examination		
Mid-term written examination		
End of term laboratory examination		
Tutorial and report assessment		
Total	100%	

12- Facilities required for teaching and learning

A. Laboratory Usage:

B. Library Usage:

Students should be encouraged to use library technical resources in the preparation of reports and oral presentation. At least one oral presentation should involve a significant component of library research to encourage this component of study.

13- List of references:

Course Prof: Dr . Mohammed Ismail

Programme coordinator: Dr. Ahmed Turk

Head of Department: Prof.Dr. Mamdouh Salah

Date: 8/8/2018

Course Specification

Program on which the course is given	Civil Engineering
Major or minor element of program	Major
Department offering the program	Civil Engineering
Department offering the course	Civil Engineering
Academic year/Level	2018/2019 PhD
Date of specification approval	2018

A- Basic Information

Title: Alignment and Design of Roadways	**Code Symbol**: **CEP ٦٠٣**	
Lecture	3	
Tutorial	**0**	
Laboratory	**0**	
Total	3	Bylaw 2000
First term	prerequisite	

B- Professional Information

1- Course Aims:

This course introduces the basic concepts of the Transportation Engineering for the civil engineer. The basics of the Transportation Engineering are well studied.

2- Course Objectives

By the end of the course the students will be able to:

- Understanding planning and design of highway.

3- Intended Learning Outcomes (ILOs):

Field	Programme ILOs that the course contribute in achieving	Course ILOs
Knowledge& Understanding	**a-5** Methodologies of solving engineering problems, data collection and interpretation.	**a-5-1** Define the Methodologies of solving engineering problems
	a-2 Professional ethics and impacts of engineering solutions on society and environment.	**a-2-1** Describe the ethics and impacts of engineering solutions on society and environment.
Intellectual skills	**b-2** Select appropriate solutions for engineering problems based on analytical thinking.	**b-2-1** Use the appropriate solution for engineering problems
	b-3 Think in a creative and innovative way in problem solving and design.	**b-3-1** Analyze the problem and find a creative solution.
Professional skills	**c-2** Apply numerical modeling methods to engineering problems.	**c-2-1** Analyze the problem into points to determine the solution.
General skills	**d-2** Work in stressful environment and within constraints.	**d-2-1** Describe the stressful environment in construction projects and how to solve any problems at this environment

4- Course Contents

Week No.	*Topic*	*Total Hours*	*Contact hrs*			*Course ILOs Covered(By No.)*
			Lec.	**Tut.**	**Lab.**	
Week(1-2)	Traffic loads and cars properties - Streets analysis of roadways					**a-5**
Week(3-4)	structural Design of roads pavements					**a-2**
Week(5-6)	Roads classification - Traffic properties					**b-2**
Week(7-8)	Limits of structural design of road ways					**d-2**
Week 9	***Midterm written examination***					
Week(10-11)	Vertical and horizontal design of roadways					**b-3**
Week(12-13)	grade and at-grade alignment and design - Traffic control Instruments.					**c-2**

5- Relationship between the course and the programme

Field	Academic Reference Standard(ARS)			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Programme Academic Standards that the course contribute in achieving	**a5& a2**	**b2 & b3**	**c2**	**d2**

6- Course Subject Area:

A	B	C	D	E	F	G	
Humanities and Social Science	Mathematics and Basic Sciences	Basic Engineering Science	Applied Engineering And Design	Computer Applications and ICT	Projects and practice	Discretionary subjects	Total
----	**5%**	**50 %**	**10%**	**---**	**30%**	**5%**	**100%**

7- Course Topics.

Topic No.	Topic	Weeks
1st	Traffic loads and cars properties - Streets analysis of roadways	**1-2**
2nd	structural Design of roads pavements	**3-4**
3rd	Roads classification - Traffic properties	**5-6**
4th	Limits of structural design of road ways	**7-8**
5th	Vertical and horizontal design of roadways	**10-11**
6th	grade and at-grade alignment and design - Traffic control Instruments.	**12-13**

8- ILOs Matrix Topics

Course Intended Learning Outcomes (ILOs)		Course topics					
		1st	2nd	3rd	4th	5th	6th
Knowledge & Understanding	**a-5-1** Define the Methodologies of solving engineering problems	x	**x**				
	a-2-1 Describe the ethics and impacts of engineering solutions on society and environment.			**x**			**x**
Intellectual Skills	**b-2-1**Use the appropriate solution for engineering problems		x				
	b-3-1 Analyze the problem and find a creative solution.			X	x	x	x
Professional Skill	**c-2-1**Analyze the problem into points to determine the solution.				x	x	x
General Skills	**d-2-1**Describe the stressful environment in construction projects and how to solve any problems at this environment					x	x

9- Teaching and Learning Method:

Course Intended Learning Outcome (ILOs)		Teaching and Learning Method:												
		Lecture	Presentation and Movies	Discussion	Tutorial	Problem solving	Brain storming	Projects	Site visits	Self-learning	Cooperative	Discovering	Modeling	Playing
A- Knowledge& Understanding	a5-1	x		x										
	a2-1	x		x										
B-IntellectualSkills	b2-1	x		x										
	b3-1	x		x										
C-Professional Skills	c2-1	x		x				x						
D-General Skills	d2-1	x		x				x						

10- Teaching and learning method for low capacity and outstanding Student

For low capacity students	Assign a portion of the office hours for those students.
	Give them specific tasks.
	Repeat the explanation of some of the material and tutorials.
	Assign a teaching assistance to follow up the performance of this group of students.
For outstanding Students	Hand out project assignments to those students.
	Give them some research topics to be searched using the internet and conduct presentation.
	Encourage them to take parts in the running research projects.

11- Assessment:

11.1 Assessment Methods

Course Intended Learning Outcome (ILOs)		Assessment Methods											
		Written Exam	Oral Exam	Tutorial Assessment	Project Assessment	Model Assessment	Report Assessment	Quiz assessment	Presentation Assessment	Discussion	Laboratory Test	Sketching drawings	Monitoring
A- Knowledge& Understanding	a5-1	x											
	a2-1	x											
B-IntellectualSkills	b2-1	x											
	b3-1	x											
C-Professional Skills	c2-1	x								x			
D-General Skills	d2-1	x						x					

11.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	week
Final examination	100%	
Mid-term written examination		
End of term laboratory examination		
Tutorial and report assessment		
Total	100%	

12- Facilities required for teaching and learning

A. Laboratory Usage:

B. Library Usage:

Students should be encouraged to use library technical resources in the preparation of reports and oral presentation. At least one oral presentation should involve a significant component of library research to encourage this component of study.

13- List of references:

Course Prof: Prof. Dr . Nabih El-Mansy

Programme coordinator: Dr. Ahmed Turk

Head of Department :Prof. Dr. Mamdouh Salah

Date: 8/8/2018

Course Specification

Program on which the course is given	Civil Engineering
Major or minor element of program	Major
Department offering the program	Civil Engineering
Department offering the course	Civil Engineering
Academic year/Level	2018/2019 PhD
Date of specification approval	2018

A- Basic Information

Title: Development of Roadways	**Code Symbol: CEP 604**	
Lecture	2	
Tutorial	1	
Laboratory	0	
Total	3	Bylaw 2000
Both terms	prerequisite	

B- Professional Information

1- Course Aims:

The aims of this course are to provide the postgraduate students, upon completing the Civil Engineering Program, with the basic knowledge of development of roadways which includes ; roadway construction materials properties – base and sub base course materials – asphaltic materials – asphaltic mixes and concrete asphaltic mixes – fundamental and management of roadway projects and construction – applied studies of roadway projects and management – engineering calibration and applications in roadway field –roadway specifications – stipulation contractors – quantities tables and accounting fundamentals – executable documents .

2- Course Objectives

By the end of the course the students will be able to:

- Understanding the main concept of roadway projects.
- Determine the fundamental and management of road construction.
- Ability to define road materials.
- Define and design the different types of asphalt mixes.
- Recognize and design project time table , stipulation contractors , executable documents ,quantities tables and accounting fundamentals
- Have the field experience in road construction.
- Understanding the Egyptian specification of road construction.
- collaborate effectively within multidisciplinary team.

3- Intended Learning Outcomes (ILOs):

Field	Programme ILOs that the course contribute in achieving	Course ILOs
Knowledge& Understanding	**A-3-** Characteristics of engineering materials related to road materials.	**a-3-1** Explain Celestial, Bodies
		a-3-2 types of celestial coordinate systems
	A-1 Theories and basics related to learning field, as well as other related fields. .	**a-1-1** properties of celestial spare
		a-1-2 Limits of special star positions.
	A-6 Basics and ethics of scientific research	**a-6-1** Define concept of time systems.
Intellectual skills	**B-1** Analyze and evaluate the information in the field of specialization, and solve the problems based on that. .	**b-1-1** astronomic triangle.
	B-2 Solve specialized problems even with lack of some data and variables, (incomplete data).	**b-2-1** catalogues and Epheinerids.
	B-3 Link and integrate diverse knowledge to solve professional problems.	**b-3-1** Different techniques for astronomic latitude.
	B-4 Conduct a research study and/or writing systematic scientific study about Research problem	**b-4-1** Describe Azimuth determination.
Professional skills	**C-1** Mastering the basics as well as the latest professional skills in the field of specialization.	**c-1-1** Apply of Astronomic Measurements.
	C-3 Evaluate means and tools available in the field of practice.	**c-3-1** Recognize concept of time systems (sidereal , solar , atomic) Variations.
General skills	**D-2** Use information technology to improve his/her professional practice.	**d-2-1** Co-operate with the engineers interested in **Astronomy**... etc

4- Course Contents

Week No.	*Topic*	*Total Hours*	*Contact hrs*			*Course ILOs Covered (By No.)*
			Lec.	**Tut.**	**Lab.**	
Week(1-4)	roadway construction materials properties and base and sub base course materials.	3	2	1	-	**a-1-2& a-3-1**
Week (4-8)	asphaltic materials and asphaltic mixes and concrete asphaltic mixes.	3	2	1	-	**a-1-1& a-3-1**
Week (8-14)	fundamental and management of roadway projects and construction.	3	2	1	-	**a-1-1& a-3-1 & d-2-1**
Week (14-18)	fundamental and management of roadway projects and construction.	3	2	1	-	**a-1-1& a-3-1 & d-2-1**
Week (18-20)	applied studies of roadway projects and management	3	2	1	-	**a-1-2& a-3-2& b-2-1& c-1-1& c-3-1**
Week (20-30)	engineering calibration and applications in roadway field, roadway specifications, stipulation contractors, quantities tables and accounting fundamentals and executable documents	3	2	1	-	**a-1-2& a-3-2& b-2-1& c-1-1 & d-2-1**

5- Relationship between the course and the programme

Field	**Academic Reference Standard (ARS)**			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Programme Academic Standards that the course contribute in achieving	**A1 & A3 & A6**	**B1 & B2 & B3 & B4**	**C1 & C3**	**D2**

6- Course Subject Area:

A	B	C	D	E	F	G	
Humanities and Social Science	Mathematics and Basic Sciences	Basic Engineering Science	Applied Engineering And Design	Computer Applications and ICT	Projects and practice	Disccretionry subjects	Total
---	**10 %**	**10 %**	**60 %**	---	**20 %**	---	**100%**

7- Course Topics.

Topic No.	Topic	Weeks
1st	roadway construction materials properties and base and sub base course materials.	**1-4**
2nd	asphaltic materials and asphaltic mixes and concrete asphaltic mixes.	**4-8**
3rd	fundamental and management of roadway projects and construction	**8-18**
4th	applied studies of roadway projects and management	**18-20**
5th	engineering calibration and applications in roadway field, roadway specifications, stipulation contractors, quantities tables and accounting fundamentals and executable documents	**20-30**

8- ILOs Matrix Topics

		Topic No.				
Course Intended Learning Outcomes (ILOs)		**1st**	**2nd**	**3rd**	**4th**	**5th**
Knowledge& Understanding	A3- A3-1 Characteristics of engineering materials related to road materials.	**X**	**X**			
Intellectual skills	B4-2 judge engineering decisions considering balanced costs, benefits, safety, quality, reliability, and environmental impact.					**X**
Professional skills	C2-2 demonstrate basic organizational and project management skills...			**X**		**X**
	C3-1 apply quality assurance procedures and follow codes and standards.			**X**		**X**
General Skills	D1-1 collaborate effectively within multidisciplinary team	**X**		**X**		

9- Teaching and Learning Method:

Course Intended Learning Outcome (ILOs)		Teaching and Learning Method:												
		Lecture	Presentation and Movies	Discussion	Tutorial	Problem solving	Brain storming	Projects	Site visits	Self learning	Cooperative	Discovering	Modeling	Playing
A- Knowledge & Understanding	a-3-1	x		x										
	a-3-2	x		x										
	a-1-1	x		x										
	a-1-2	x		x										
	a-6-1	x		x										
B-Intellectual Skills	b-1-1	x		x									x	
	b-2-1	x		x										
	b-3-1	x		x									x	
	b-4-1	x		x									x	
C-Professional Skills	c-1-1	x		x		x	x							
	c-3-1		x	x		x	x							
D-General Skills	d-2-1			x		x			x	x	x			

10- Teaching and learning method for low capacity and outstanding Student

For low capacity students	Assign a portion of the office hours for those students.
	Give them specific tasks.
	Repeat the explanation of some of the material and tutorials.
	Assign a teaching assistance to follow up the performance of this group of students.
For outstanding students	Hand out project assignments to those students.
	Give them some research topics to be searched using the internet and conduct presentation.
	Encourage them to take parts in the running research projects.

11- Assessment:

11.1 Assessment Methods

Course Intended Learning Outcome (ILOs)		Assessment Methods											
		Written Exam	Oral Exam	Tutorial Assessment	Project Assessment	Model Assessment	Report Assessment	Quiz assessment	Presentation Assessment	Discussion	Laboratory Test	Sketching drawings	Monitoring
A- Knowledge& Understanding	A3-1	x											
	A6-2	x											
B-IntellectualSkills	B2-1	x											
	B3-1	x							x				
C-Professional Skills	C1-1	x							x	x			
D-General Skills	D2-1	x							x				

11.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	week
Final examination	100	Final week of academic year
Mid-term written examination	-	
End of term laboratory examination	-	
Tutorial and report assessment	-	
Total	100%	

12- Facilities required for teaching and learning

A. Laboratory Usage:

B. Library Usage:

Students should be encouraged to use library technical resources in the preparation of reports and oral presentation. At least one oral presentation should involve a significant component of library research to encourage this component of study.

13- List of references:

13.1- Course Notes	▪ The course notes are to be prepared by groups of students after reviewing of the course coordinator.
13.2- Essential Books (Text Books)	▪ Egyptian Code of Practice for Steel Construction and Bridges (2004). ▪ Egyptian Code of Practice for Loads on Buildings (2008). ▪ Abdelrahim, Kh. D. (2009), "Steel Structures Design – Allowable Stress Design", First Edition, Cairo.
13.3 Recommended books	▪ Buick D., and Graham W. (2003). "Steel Designer's Manual", Blackwell Publishers. ▪ AISC (2005). *Manual of Steel Construction – Load and Resistance Factor Design*, 13th Edition, American Institute of Steel Construction, Chicago, IL. ▪ Alan H., and Frank W. (2002), "Steel Detailer's Manual", Second Edition, Blackwell Science. ▪ Lawrence M., and John P. (2008), "Structural Design of Steelwork to EN1993 and EN1994", Third Edition, Elsevier.
13.4 Periodicals, Web sites, etc	▪ Web site road economy ▪ Web site road projects ▪ Web site contracts

Course Prof: Prof. Dr. Nabih elmansy

Programme coordinator: Dr. Ahmed Turk

Head of Department: Prof.Dr. Mamdouh Saleh

Date: 8/8/2018

Course Specification

Program on which the course is given	Civil Engineering
Major or minor element of program	Major
Department offering the program	Civil Engineering
Department offering the course	Civil Engineering
Academic year/Level	2018/2019 PhD
Date of specification approval	2018

A- Basic Information

Title: Development of Roadways	**Code Symbol: CEP 605**	
Lecture	2	
Tutorial	1	
Laboratory	0	
Total	3	Bylaw 2000
Both terms	prerequisite	

B- Professional Information

1- Course Aims:

This course introduces the basic concepts of transportation planning and traffic engineering. The transportation planning part focuses on the analysis of transportation demand. The Traffic Engineering part covers the analysis of traffic capacity and its interactions with other traffic engineering elements, and prepares the engineer to interact with the field of traffic control..

2- Course Objectives

Provide engineers with a solid grounding in the fundamentals of transport planning, traffic engineering, and contextual issues;

- Develop engineers' practical skills in traffic/transportation and knowledge of how and when they should be applied;
- Cover the theory of traffic engineering practice;
- Enable engineers to recognize and deal effectively with traffic/transport situations where standard methods are unlikely to work well.

3- Intended Learning Outcomes (ILOs):

Field	Programme ILOs that the course contribute in achieving	Course ILOs
n	A-5 Methodologies of solving engineering problems, data collection and interpretation.	a-5-1 Define the transportation planning stages.
Intellectual	B-1 Select appropriate mathematical and computer-base methods for modeling and analyzing problems. .	b-1-1 Use different modeling techniques for forecasting transportation demand
	B-2 Select appropriate solutions for engineering problems based on analytical thinking.	b-2-1 Design and Select the appropriate traffic signal phasing system and timing.
Professional skills	C-1 Mastering the basics as well as the latest professional skills in the field of specialization.	c-1-1 Apply numerical modeling methods to solve congestion on transport networks and modes of transport.
	C-3 Evaluate means and tools available in the field of practice.	c-3-1 Get the awareness of the surrounding transportation and traffic issues of Port Said network.
General skills	D-2 Use information technology to improve his/her professional practice.	d-2-1 Prepare reports about the state-of-the-art technologies used to solve traffic problems.

4- Course Contents

Week No.	*Topic*	*Total Hours*	*Contact hrs*			*Course ILOs Covered (By No.)*
			Lec.	**Tut.**	**Lab.**	
Week(1-2)	Traffic Flow Characteristics (Volume, Speed, and Density)	3	2	1	-	**a-1-2& a-3-1**
Week (3-4)	Traffic Flow Characteristics (Volume, Speed, and Density)	3	2	1	-	**a-1-1& a-3-1**
Week (4-8)	Traffic control methods	3	2	1	-	**a-1-1& a-3-1 & d-2-1**
Week (9-12)	Design of Traffic signals	3	2	1	-	**a-1-1& a-3-1 & d-2-1**
Week (13-20)	Trip Generation Modeling	3	2	1	-	**a-1-2& a-3-2& b-2-1& c-1-1& c-3-1**
Week (20-30)	Modal choice	3	2	1	-	**a-1-2& a-3-2& b-2-1& c-1-1 & d-2-1**

5- Relationship between the course and the programme

Field	**Academic Reference Standard (ARS)**			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Programme Academic Standards that the course contribute in achieving	**A1 & A3 & A6**	**B1 & B2 & B3 & B4**	**C1 & C3**	**D2**

6- Course Subject Area:

A	B	C	D	E	F	G	
Humanities and Social Science	Mathematics and Basic Sciences	Basic Engineering Science	Applied Engineering And Design	Computer Applications and ICT	Projects and practice	Disccretionry subjects	Total
---	**10 %**	**10 %**	**60 %**	---	**20 %**	---	**100%**

7- Course Topics.

Topic No.	Topic	Weeks
1st	Traffic Flow Characteristics (Volume, Speed, and Density)	**1-2**
2nd	Traffic Flow Characteristics	**3-4**
3rd	Design of Traffic signals	**4-8**
4th	Transportation Planning Stages	**9-12**
5th	Future Transport Demand forecast	**13-20**

8- ILOs Matrix Topics

		Topic No.				
Course Intended Learning Outcomes (ILOs)		**1st**	**2nd**	**3rd**	**4th**	**5th**
owledg e&	A3-1 Characteristics of engineering materials related to road materials.	**X**	**X**			

	B4-2 judge engineering decisions considering balanced costs, benefits, safety, quality, reliability, and environmental impact.					X
Professional skills	C2-2 demonstrate basic organizational and project management skills...			X		X
	C3-1 apply quality assurance procedures and follow codes and standards.			X		X
General Skills	D1-1 collaborate effectively within multidisciplinary team	X		X		

9- Teaching and Learning Method:

Course Intended Learning Outcome (ILOs)		Teaching and Learning Method:												
		Lecture	Presentation and Movies	Discussion	Tutorial	Problem solving	Brain storming	Projects	Site visits	Self learning	Cooperative	Discovering	Modeling	Playing
A- Knowledge & Understanding	**a-3-1**	x		x										
	a-3-2	x		x										
	a-1-1	x		x										
	a-1-2	x		x										
	a-6-1	x		x										

B-Intellectual Skills	**b-1-1**	x		x									x	
	b-2-1	x		x										
	b-3-1	x		x									x	
	b-4-1	x		x									x	
C-Professional Skills	**c-1-1**	x		x		x	x							
	c-3-1		x	x		x	x							
D-General Skills	**d-2-1**			x		x			x	x	x			

10- Teaching and learning method for low capacity and outstanding Student

For low capacity students	Assign a portion of the office hours for those students.
	Give them specific tasks.
	Repeat the explanation of some of the material and tutorials.
	Assign a teaching assistance to follow up the performance of this group of students.
For outstanding students	Hand out project assignments to those students.
	Give them some research topics to be searched using the internet and conduct presentation.
	Encourage them to take parts in the running research projects.

11- Assessment:

11.1 Assessment Methods

Course Intended Learning Outcome (ILOs)		**Assessment Methods**											
		Written Exam	**Oral Exam**	**Tutorial Assessment**	**Project Assessment**	**Model Assessment**	**Report Assessment**	**Quiz assessment**	**Presentation Assessment**	**Discussion**	**Laboratory Test**	**Sketching drawings**	**Monitoring**
A- Knowledge& Understanding	**A3-1**	x											
	A6-2	x											
B-IntellectualSkills	**B2-1**	x											
	B3-1	x							x				
C-Professional Skills	**C1-1**	x							x	x			
D-General Skills	**D2-1**	x							x				

11.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	week
Final examination	**100**	**Final week of academic year**
Mid-term written examination	**-**	
End of term laboratory examination	**-**	
Tutorial and report assessment	**-**	
Total	**100%**	

12- Facilities required for teaching and learning

A. Laboratory Usage:

B. Library Usage:

Students should be encouraged to use library technical resources in the preparation of reports and oral presentation. At least one oral presentation should involve a significant component of library research to encourage this component of study

13- List of references:

13.1- Course Notes

- The course notes are to be prepared by groups of students after reviewing of the course coordinator.

13.2- Essential Books (Text Books)

- Transportation Engineering, an Introduction, C. Jotin Khisty, Prentice Hall, Englewood Cliffs, New Jersey, 1990. Egyptian Code of Practice for Loads on Buildings (2008).
- Traffic Engineering, William R. McShane, Prentice Hall, Englewood Cliffs, New Jersey, 1990.

13.3 Recommended books

- Ott, Introduction to Statistical Methods and Data Analysis, PWS-Kent, 199 AISC (2005). *Manual of Steel Construction – Load and Resistance Factor Design*, 13th Edition, American Institute of Steel Construction, Chicago, IL.

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Course Prof:

Programme coordinator: Dr. Ahmed Turk

Head of Department: Prof.Dr. Mamdouh Saleh

Date: 8/8/2018

Course Specification

Program on which the course is given	Civil Engineering
Major or minor element of program	Major
Department offering the program	Civil Engineering
Department offering the course	Civil Engineering
Academic year/Level	2018/2019 PhD
Date of specification approval	2018

A- Basic Information

Title: Application of Traffic	**Code Symbol**: **CEP 606**	
Lecture	2	
Tutorial	**1**	
Laboratory	**0**	
Total	3	Bylaw 2000
First term	prerequisite	

B- Professional Information

1- Course Aims:

This course introduces Fundamental and management of roadway projects and construction - Applied studies of roadway projects and management - Engineering calibration and applications in roadway field - Roadway specifications - Stipulation contractors - Quantities tables and accounting fundamentals - Executable documents- Types of Accidents - Definition of Hazardous Zones - Human factors and drivers behavior - Methods of data collection

2- Course Objectives

By the end of the course the students will be able to understand Transportation Models:

- Understanding Fundamental and management of roadway projects
- Understanding Applied studies of roadway projects and management
- Understanding - Roadway specifications
- Understanding Types of Accidents
- Understanding Definition of Hazardous Zones
- Understanding Human factors and drivers behavior

3- Intended Learning Outcomes (ILOs):

Field	Programme ILOs that the course contribute in achieving	Course ILOs
Knowledge and understanding	a1. Theories and basics related to learning field, as well as other related fields.	a1-3 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in the field of Public Work Engineering.
	a2- Mutual relation between professional aspects of professional practice and its effects on the Environment.	a2-1 Discuss the effects of civil engineering technologies on the surrounding environment.
B. Intellectual skills	b1- Analyze and evaluate the information in the field of specialization, and solve the problems based on that.	b1-1 Demonstrate an investigatory and analytic thinking approach (Problem solving) to solve problems related to civil engineering.
	b2- Solve specialized problems even with lack of some data and variables, (incomplete data).	b2-1 Apply broad knowledge of modern computational methods and think critically to solve unstructured problems (with incomplete data) related to civil engineering.
C. Professional and practical skills	c1- Mastering the basics as well as the latest professional skills in the field of specialization.	c1-1 Express competence skills, such as identifying, formulating, analyzing, and creating engineering solutions, using latest engineering techniques, skills, and tools.
	c2- Write and evaluate technical and professional reports.	c2-1 Write and evaluate a professional report on specialized systems related to civil engineering technical matters.
	c3- Evaluate means and tools available in the field of practice.	c3-1 Evaluate methods and tools reported in a specified published articles and researches concerning to civil engineering field.
D. General and transferrable skills	d2- Use information technology to improve his/her professional practice.	d2-1 Use state-of-the-art computer design tools and applications for solving civil engineering problems.
	d5- Use different resources to obtain knowledge and information.	d5-1 Use different resources of information like libraries, internet access facilities, etc. to upgrade and enhance their conceptual knowledge.

4- Course Contents

Week No.	*Topic*	*Total Hours*	*Contact hrs*			*Course ILOs Covered(By No.)*
			Lec.	**Tut.**	**Lab.**	
Week(1-2)	Understanding Fundamental and management of roadway projects	3	3	-	-	**a1-3, a2-1, b1-1, b2-1, c1-1, c2-1, c3-1 , d2-1, d5-1**
Week(3-4)	Understanding Applied studies of roadway projects and management	3	3	-	-	**a1-3, a2-1, b1-1, b2-1, c1-1, c2-1, c3-1 , d2-1, d5-1**
Week(5-6)	Understanding - Roadway specifications	3	3	-	-	**a1-3, a2-1, b1-1, b2-1, c1-1, c2-1, c3-1 , d2-1, d5-1**
Week(7-9)	Understanding Types of Accidents	3	3	-	-	**a1-3, a2-1, b1-1, b2-1, c1-1, c2-1, c3-1 , d2-1, d5-1**
Week(10-11)	Understanding Definition of Hazardous Zones	3	3	-	-	**a1-3, a2-1, b1-1, b2-1, c1-1, c2-1, c3-1 , d2-1, d5-1**
Week(12-13)	Understanding Human factors and drivers behavior	3	3	-	-	**a1-3, a2-1, b1-1, b2-1, c1-1, c2-1, c3-1 , d2-1, d5-1**

5- Relationship between the course and the programme

Field	Academic Reference Standard(ARS)			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Programme Academic Standards that the course contribute in achieving	**A1, A2**	**B1, B2**	**C1, C2, C3**	**D2, D5**

6- Course Subject Area:

A	B	C	D	E	F	G	
Humanities and Social Science	Mathematics and Basic Sciences	Basic Engineering Science	Applied Engineering And Design	Computer Applications and ICT	Projects and practice	Disccretionry subjects	Total
----	**20 %**	**10 %**	**50%**	**20%**	**10%**	**----**	**100%**

7- Course Topics.

Topic No.	Topic	Weeks
1st	Understanding Fundamental and management of roadway projects	**1-2**
2nd	Understanding Applied studies of roadway projects and management	**3-4**
3rd	Understanding - Roadway specifications	**5-6**
4th	Understanding Types of Accidents	**7-9**
5th	Understanding Definition of Hazardous Zones	**10-11**
6th	Understanding Human factors and drivers behavior	**12-13**

8- ILOs Matrix Topics

Course Intended Learning Outcomes (ILOs)		Course topics						
		1st	2nd	3rd	4th	5th	6th	7th
Knowledge and understanding	A1. Theories and basics related to learning field, as well as other related fields.	x	x	x	x	x	x	x
	A2- Mutual relation between professional aspects of professional practice and its effects on the Environment.	x			x	x	x	x
B. Intellectual skills	B1- Analyze and evaluate the information in the field of specialization, and solve the problems based on that.	x					x	x
	B2- Solve specialized problems even with lack of some data and variables, (incomplete data).	x					x	x
C. Professional and practical skills	C1- Mastering the basics as well as the latest professional skills in the field of specialization.	x	x	x	x	x	x	x
	C2- Write and evaluate technical and professional reports.	x	x			x	x	x
	C3- Evaluate means and tools available in the field of practice.	x	x			x	x	x
D. General and transferrable skills	D2- Use information technology to improve his/her professional practice.	x					x	x
	D5- Use different resources to obtain knowledge and information.	x					x	x

9- Teaching and Learning Method:

Course Intended Learning Outcome (ILOs)		Teaching and Learning Method:												
		Lecture	Presentation and Movies	Discussion	Tutorial	Problem solving	Brain storming	Projects	Site visits	Self-learning	Cooperative	Discovering	Modeling	Playing
A-Knowledge and understanding	A1-3	x				x		x		x			x	
	A2-1	x				x		x		x			x	
B. Intellectual skills	B1-1	x				x		x		x			x	
	B2-1	x				x		x		x			x	
C. Professional and practical skills	C1-1	x				x		x		x			x	
	C2-1	x				x		x		x			x	
	C3-1	x				x		x		x			x	
D. General and transferrable skills	D2-1	x				x		x		x			x	
	D5-1	x				x		x		x			x	

10-Teaching and learning method for low capacity and outstanding Student

For low capacity students	Assign a portion of the office hours for those students.
	Give them specific tasks.
	Repeat the explanation of some of the material and tutorials.
	Assign a teaching assistance to follow up the performance of this group of students.
For outstanding Students	Hand out project assignments to those students.
	Give them some research topics to be searched using the internet and conduct presentation.
	Encourage them to take parts in the running research projects.

11- Assessment:

11.1 Assessment Methods

Course Intended Learning Outcome (ILOs)		Assessment Methods											
		Written Exam	Oral Exam	Tutorial	Project	Model	Report	Quiz	Presentation	Discussion	Laboratory	Sketching	Monitoring
A-Knowledge and understanding	A1-3	x			x	x	x			x			
	A2-1	x			x	x	x			x			
B. Intellectual skills	B1-1	x			x	x	x			x			
	B2-1	x			x	x	x			x			
C. Professional and practical skills	C1-1	x			x	x	x			x			
	C2-1	x			x	x	x			x			
	C3-1	x			x	x	x			x			
D. General and transferrable skills	D2-1	x			x	x	x			x			
	D5-1	x			x	x	x			x			

11.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	week
Final examination	100%	
Total	100%	

12- Facilities required for teaching and learning

A. Library Usage:

Students should be encouraged to use library technical resources in the preparation of reports and oral presentation. At least one oral presentation should involve a significant component of library research to encourage this component of study.

13- List of references:

Transportation Engineering, an Introduction, C. Jotin Khisty, Prentice Hall, Englewood Cliffs, New Jersey, 1990.

Traffic Engineering, William R. McShane, Prentice Hall, Englewood Cliffs, New Jersey, 1990.

Ott, Introduction to Statistical Methods and Data Analysis, PWS-Kent, 1990.

Programme coordinator: Dr. Ahmed Turk

Head of Department: Prof.Dr. Mamdouh Salah

8/8/2018

Course Specification

Program on which the course is given	**Msc or Ph. D in Civil Engineering (Specialization: Public works Engineering).**
Major or minor element of program	**Major**
Department offering the program	**Civil Engineering**
Department offering the course	**Civil Engineering**
Academic year/Level	**Msc or Ph. D Preparatory Year**
Date of specification approval	**2018**

A- Basic Information

Title: Computer Applications of Transportation Systems	**Code Symbol: CEP 607**	
Lecture	**2 hours**	
Tutorial / Laboratory	**1**	
Total	**3 hours**	**Bylaw 2000**

B- Professional Information

1- Course Aims:

This course aims at providing students with the basic knowledge and understanding of the available computer software/tool using in transportation planning field with the principles of transportation modeling, result analysis, expect index, simulate, and examine on practical examples of transportation systems.

2- Course Objectives:

The main Objectives of this course are to provide students with:

1. Knowledge and understanding of key and advanced facts, theories, concepts, principles and techniques relevant to the available computer software.
2. Advanced skills in solving of problems related to transportation systems.
3. The ability to extend knowledge and develop models and methods and use techniques, principles and laws of theories in order to lead to engineering applications design using computer software.
4. The ability to deal effectively with classical and significant statistics to identify/solve complex and open ended engineering problems related to the new transportation systems.
5. Identify current transport problems and find solutions using computer software.

6. Using software to design the expected transportation policy routes and analyzing the results on a practical example.

3- Intended Learning Outcomes (ILOs) for the whole program

Civil Engineering Master Program is designed to achieve the above objectives through the following Intended **Learning Outcomes (ILOs)**:

Program ILOs	Course ILOs
A. Knowledge and understanding	
a-3 Main scientific advances in the field of specialization.	**a-3-1** Classify the Potential applications of advanced civil engineering applications.
a-4 Fundamentals of ethical & legal professional practice in the field of specialization.	**a-4-1** Recognize ethnical and professional responsibility issues arising in the practice of the engineering profession.
B. Intellectual skills	
b-1 Analyze and evaluate the information in the field of specialization, and solve the problems based on that. .	**b-1-1** Demonstrate an investigatory and analytic thinking approach (Problem solving) to solve problems related to civil engineering.
b-3 Link and integrate diverse knowledge to solve professional problems.	**b-3-1** Analyze, interpret and manipulate data from a variety of sources and relate it to solve professional problems.
C. Professional and practical skills	
C-1 Mastering the basics as well as the latest professional skills in the field of specialization.	**c-1-1** Express competence skills, such as identifying, formulating, analyzing, and creating engineering solutions, using latest engineering techniques, skills, and tools.
C-3 Evaluate means and tools available in the field of practice.	**c-3-1** Evaluate methods and tools reported in a specified published articles and researches concerning to civil engineering field.
D. General and transferrable skills	
d-1 Communicate effectively using all methods.	**d-1-1** Express professional and communication skills to innovate and to interact with the scientific community, research team and technocrats involved in multinational companies at global level in the related fields to civil

4- Course Contents

Lecture Topic	Total Hours	Lecture Hours	Practical /Tutorial Hours
1- Introduction of transportation engineering and computer methods.	3	2	1
2- Computation methods in transportation	3	2	1
3- Describe the analysis and design programs in the field of transportation engineering.	3	2	1
4- Selection of the most effective and the useful Programs like SIDRA and HCS2000..	3	2	1
5- Describe the Programs/tools available in the market with solved example..	3	2	1
6- Midterm written and on computer examination	3	2	1
7- Application for all studied programs	3	2	1

5- Course Subject Area:

A	B	C	D	E	F	G	
Humanities and Social Science	**Mathematics and Basic Sciences**	**Basic Engineering Science**	**Applied Engineering And Design**	**Computer Applications and ICT**	**Projects and practice**	**Disccretionry subjects**	**Total**
---	**5%**	**5 %**	**15%**	**25%**	**45%**	**5%**	100 %

6- Course Topics.

Topic No.	Topic	Weeks
1st	1- Introduction of transportation engineering and computer methods.	**1-2**
2nd	2- Computation methods in transportation	**3-6**
3rd	3- Describe the analysis and design programs in the field of transportation engineering.	**7-8**
4th	4- Selection of the most effective and the useful Programs like SIDRA and HCS2000.	**9-12**
5th	5- Describe the Programs/tools available in the market with solved example.	**13-16**
6th	6- Midterm written on computer examination	**17-25**
7th	7- Application for all studied programs	**26-30**

7- ILOs Matrix Topics

Course topics	Course topics						
	1st	2nd	3rd	4th	5th	6th	7th
a-3-1 Classify the Potential applications of advanced civil engineering applications.	x	x					
a-4-1 Recognize ethnical and professional responsibility issues arising in the practice of the engineering profession.		x	x	x			
b-1-1 Demonstrate an investigatory and analytic thinking approach (Problem solving) to solve problems related to civil engineering.				x	x		
b-3-1 Analyze, interpret and manipulate data from a variety of sources and relate it to solve professional problems.			x	x	x		
c-1-1 Express competence skills, such as identifying, formulating, analyzing, and creating engineering solutions, using latest engineering techniques, skills, and tools.	x	x	x		x	x	
c-3-1 Evaluate methods and tools reported in a specified published articles and researches concerning to civil engineering field.					x	x	
d-1-1 Express professional and communication skills to innovate and to interact with the scientific community, research team and technocrats involved in multinational companies at global level in the related fields to civil				x	x	x	x

8- Teaching and Learning Method:

Course Intended learning outcomes (ILOs)		Teaching and Learning Method												
		Lecture	Presentation and Movies	Discussion	Tutorial	Problem solving	Brain storming	Projects	Report	Self learning	Cooperative	Discovering	Computer Simulation	Practical Experiments
Knowledge & understanding	**a-3-1**	x	x	x										
	a-4-1	x	x	x		x			x					
Intellectual Skills	**b-1-1**	x	x											
	b-3-1	x	x											
Professional Skills	**c-1-1**		x										x	
	c-3-1		x	x					x				x	
General Skills	**d-1-1**	x	x		x				x				x	x

9- Assessment

For low capacity students	Assign a portion of the office hours for those students.
	Give them specific tasks like reports and assignments with high supervision.
	Repeat the explanation of some materials and tutorials.
	Assign a teaching assistance to follow up the performance of this group of students.
For outstanding Students	Hand out project assignments to those students.
	Give them some research topics to be searched using the internet and conduct presentation.
	Encourage them to take parts in the running research projects and software.

10.1 Assessment Methods

- Midterm written on computer examination : to assess students' knowledge, understanding, analysis, creativity, problem solving, and problem identification by the computer software
- Final Written: Examination to assess students' knowledge, understanding, analysis, creativity, problem solving

10.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	week
Final Examination	100	Decided by the College Council
Total	100%	

11- Facilities required for teaching and learning

Computer lab with Blackboard and Equipped with Computers and Video Projector , and Library.

A. Laboratory Usage:

Students should use COMPUTER laboratory and use the studied tools/software for applications.

B. Library Usage:

Students should be encouraged to use library technical resources in the preparation of reports and oral presentation. At least one oral presentation should involve a significant component of library research to encourage this component of study.

12- List of References:

Course and Lab Notes:

No lectures and Labs notes.

Essential Books (Text Books):

Highway capacity manual, SIDRA at intersection by Abduraouf B.Z Alshetwi "Application of Sidra 4.0 Software Traffic Flow in Intersection in Kuala Lumpur", 2018

13- Program Coordination Committee:

Course Coordinator:	**Associate Prof. Dr. Mohamed Sadek Serag**
Program coordinator:	**Associate Prof. Dr. Ahmed Turk**
Head of the Department:	**Prof. Dr. mamdouh saleh**

Updated Date: 8 / 8/2018

Course Specification

Program on which the course is given	Civil Engineering
Major or minor element of program	Major
Department offering the program	Civil Engineering
Department offering the course	Civil Engineering
Academic year/Level	2018/2019 PhD
Date of specification approval	2018

A- Basic Information

Title: Computer Applications in Railways	**Code Symbol**: **CEP 608**	
Lecture	3	
Tutorial	**0**	
Laboratory	**0**	
Total	3	Bylaw 2000
First term	prerequisite	

B- Professional Information

1- Course Aims:

This course introduces the basic concepts of the Transportation Engineering for the civilengineer. The basics of the Transportation Engineering are well studied.

2- Course Objectives

By the end of the course the students will be able to:

- Understanding the main concept of Transportation Engineering.
- Understanding planning and design of highway.
- Understanding planning , design and improvement of rail way.

3- Intended Learning Outcomes (ILOs):

Field	Programme ILOs that the course contribute in achieving	Course ILOs
Knowledge& Understanding	**A-5** Basics and principles of quality in professional practice in the field of specialization.	**a-5-1** Explain Quality Assurance concepts of different civil engineering disciplins and systems development phases.
Intellectual skills	**B-2** Solve specialized problems even with lack of some data and variables, (incomplete data).	**b-2-1** Apply broad knowledge of modern computational methods and think critically to solve unstructured problems (with incomplete data) related to civil engineering.
Professional skills	**C-1** Mastering the basics as well as the latest professional skills in the field of specialization.	**c-2-1** Write and evaluate a professional report on specialized systems related to civil engineering technical matters.
General skills	**D-2** Use information technology to improve his/her professional practice.	**d-2-1** Use state-of-the-art computer design tools and applications for solving civil engineering problems.

4- Course Contents

Week No.	*Topic*	*Total Hours*	*Contact hrs*			*Course ILOs Covered(By No.)*
			Lec.	**Tut.**	**Lab.**	
Week(1-2)	General maintenance aspects- manual method of track geometry- rail grinding train.					**a-5**
Week(3-4)	Correcting weld geometry- mobile weld correction-maintenance machine.					**a-5**
Week(5-6)	General observations on truck renewal-wheel and rail system-track structure system.					**b-2**
Week(7-8)	Rolling contact- track construction and maintenance cost-assessment of track quality through vehicle response.					**d-2**
Week 9	***Midterm written examination***					
Week(10-11)	Mechanized track maintenance control – development of track defects,rals,ties , ballast, subgrade.					**c-2**

Week(12-13)	Fabrication and maintenance of continuously welded rails – design of railway project timing schedule.					**d-2**

5- Relationship between the course and the programme

Field	**Academic Reference Standard(ARS)**			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Programme Academic Standards that the course contribute in achieving	**a5**	**b2**	**c7**	**d2**

6- Course Subject Area:

A	**B**	**C**	**D**	**E**	**F**	**G**	
Humanities and Social Science	Mathematics and Basic Sciences	Basic Engineering Science	Applied Engineering And Design	Computer Applications and ICT	Projects and practice	Disccretionry subjects	Total
----	**5%**	**50 %**	**10%**	**---**	**30%**	**5%**	**100%**

7- Course Topics.

Topic No.	**Topic**	**Weeks**
1st	Introduction of railway computer programs-track modeling-vehicles dynamic modeling	**1-2**
2nd	Programs of quality railway-costs programs.	**3-4**
3rd	Computer aided track maintenance and renewal-programs of rail defects measurements.	**5-6**
4th	Programs of track inspection and geometry	**7-8**
5th	Programs of track equipment and mechanization.	**10-11**
6th	Programs of railway projects construction management	**12-13**

8- ILOs Matrix Topics

Course Intended Learning Outcomes (ILOs)		Course topics					
		1st	2nd	3rd	4th	5th	6th
Knowledge & Understanding	**a-5-1** Define the Methodologies of solving engineering problems	x	**x**				
Intellectual Skills	**b-2-1**Use the appropriate solution for engineering problems		x				
Professional Skill	**c-2-1** Write and evaluate a professional report on specialized systems related to civil engineering technical matters.				x	x	x
General Skills	**d-2-1**Describe the stressful environment in construction projects and how to solve any problems at this environment					x	x

9- Teaching and Learning Method:

Course Intended Learning Outcome (ILOs)		Teaching and Learning Method:												
		Lecture	Presentation and Movies	Discussion	Tutorial	Problem solving	Brain storming	Projects	Site visits	Self learning	Cooperative	Discovering	Modeling	Playing
A- Knowledge& Understanding	a5-1	x		x										
B-IntellectualSkills	b2-1	x		x										
C-Professional Skills	c2-1	x		x				x						
D-General Skills	d2-1	x		x				x						

10- Teaching and learning method for low capacity and outstanding Student

For low capacity students	Assign a portion of the office hours for those students.
	Give them specific tasks.
	Repeat the explanation of some of the material and tutorials.
	Assign a teaching assistance to follow up the performance of this group of students.
For outstanding Students	Hand out project assignments to those students.
	Give them some research topics to be searched using the internet and conduct presentation.
	Encourage them to take parts in the running research projects.

11- Assessment:

11.1 Assessment Methods

Course Intended Learning Outcome (ILOs)		Assessment Methods											
		Written Exam	Oral Exam	Tutorial Assessment	Project Assessment	Model Assessment	Report Assessment	Quiz assessment	Presentation Assessment	Discussion	Laboratory Test	Sketching drawings	Monitoring
A- Knowledge& Understanding	a5-1	x											
B-IntellectualSkills	b2-1	x											
C-Professional Skills	c2-1	x								x			
D-General Skills	d2-1	x						x					

11.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	week
Final examination		
Mid-term written examination		
End of term laboratory examination		
Tutorial and report assessment		
Total	100%	

12- Facilities required for teaching and learning

A. Laboratory Usage:

B. Library Usage:

Students should be encouraged to use library technical resources in the preparation of reports and oral presentation. At least one oral presentation should involve a significant component of library research to encourage this component of study.

13- List of references:

Course Prof: **Assoc. Prof. Dr . Mohamed Ismail**

Programme coordinator: **Dr. Ahmed Turk**

Head of Department: **Prof.Dr. Mamdouh Salah**

Date:

Course Specification

Program on which the course is given	Civil Engineering
Major or minor element of program	Major
Department offering the program	Civil Engineering
Department offering the course	Civil Engineering
Academic year/Level	2018/2019 PhD
Date of specification approval	2018

A- Basic Information

Title: Advanced Water Treatment	**Code Symbol: CEP 609**	
Lecture	2	
Tutorial	**1**	
Laboratory	**0**	
Total	3	Bylaw 2000
First term	prerequisite	

B- Professional Information

1- Course Aims:

This course introduces the basic concepts of Advanced Water Treatment for the civilengineer. The basics of Advanced Water Treatmentare well studied.

2- Course Objectives

By the end of the course the students will be able to:

- Understanding the main concept Advanced Water Treatment.
- Understanding planning of Water Treatment units.
- Understanding design of Water Treatment units.

3- Intended Learning Outcomes (ILOs):

Field	Programme ILOs that the course contribute in achieving	Course ILOs
Knowledge& Understanding	**a-5** Methodologies of solving engineering problems, data collection and interpretation.	**a-5-1** Define the Methodologies of solving engineering problems
	a-6 Professional ethics and impacts of engineering solutions on society and environment.	**a-6-1** Describe the ethics and impacts of engineering solutions on society and environment.
Intellectual skills	**b-2** Select appropriate solutions for engineering problems based on analytical thinking.	**b-2-1** Use the appropriate solution for engineering problems
	b-3 Think in a creative and innovative way in problem solving and design.	**b-3-1** Analyze the problem and find a creative solution.
Professional skills	**c-2** Apply numerical modeling methods to engineering problems.	**c-2-1** Analyze the problem into points to determine the solution.
General skills	**d-2** Work in stressful environment and within constraints.	**d-2-1** Describe the stressful environment in construction projects and how to solve any problems at this environment

4- Course Contents

Week No.	*Topic*	*Total Hours*	*Contact hrs*			*Course ILOs Covered(By No.)*
			Lec.	**Tut.**	**Lab.**	
Week(1-4)	Theory of Coagulation and Flocculation.	6	4	2		**a-5**
Week(4-8)	Theory of Filtration, Types of Filters.	6	4	2		**a-6**
Week(8-12)	Adsorption, Iron and Management Removal.	6	5	1		**b-2**
Week(12-16)	Water Softening.	6	5	1		**d-2**
Week(16-24)	Organic Matter and Heavy Metals Removal.	6	4	2		**b-3**
Week(24-30)	Removal of traces.	6	5	1		**c-2**

5- Relationship between the course and the programme

Field	Academic Reference Standard(ARS)			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Programme Academic Standards that the course contribute in achieving	**a5& a6**	**b2 & b3**	**c3**	**d2**

6- Course Subject Area:

A	B	C	D	E	F	G	
Humanities and Social Science	Mathematics and Basic Sciences	Basic Engineering Science	Applied Engineering And Design	Computer Applications and ICT	Projects and practice	Disccretionry subjects	Total
----	**5%**	**50 %**	**10%**	**---**	**30%**	**5%**	**100%**

7- Course Topics.

Topic No.	Topic	Weeks
1st	Theory of Coagulation and Flocculation.	**1-2**
2nd	Theory of Filtration, Types of Filters.	**3-4**
3rd	Adsorption, Iron and Management Removal.	**5-6**
4th	Water Softening.	**7-8**
5th	Organic Matter and Heavy Metals Removal.	**10-11**
6th	Removal of traces.	**12-13**

8- ILOs Matrix Topics

Course Intended Learning Outcomes (ILOs)		Course topics					
		1st	2nd	3rd	4th	5th	6th
Knowledge & Understanding	**a-5-1** Define the Methodologies of solving engineering problems	x	**x**				
	a-6-1 Describe the ethics and impacts of engineering solutions on society and environment.			**x**			**x**
Intellectual Skills	**b-2-1**Use the appropriate solution for engineering problems		x				
	b-3-1 Analyze the problem and find a creative solution.			X	x	x	x
Professional Skill	**c-2-1**Analyze the problem into points to determine the solution.				x	x	x
General Skills	**d-2-1**Describe the stressful environment in construction projects and how to solve any problems at this environment					x	x

9- Teaching and Learning Method:

Course Intended Learning Outcome (ILOs)		Teaching and Learning Method:												
		Lecture	Presentation and Movies	Discussion	Tutorial	Problem solving	Brain storming	Projects	Site visits	Self learning	Cooperative	Discovering	Modeling	Playing
A- Knowledge& Understanding	a5-1	x		x										
	a6-2	x		x										
B-IntellectualSkills	b2-1	x		x										
	b3-1	x		x										
C-Professional Skills	c3-1	x		x				x						
D-General Skills	d2-1	x		x				x						

10- Teaching and learning method for low capacity and outstanding Student

For low capacity students	Assign a portion of the office hours for those students.
	Give them specific tasks.
	Repeat the explanation of some of the material and tutorials.
	Assign a teaching assistance to follow up the performance of this group of students.
For outstanding Students	Hand out project assignments to those students.
	Give them some research topics to be searched using the internet and conduct presentation.
	Encourage them to take parts in the running research projects.

11- Assessment:

11.1 Assessment Methods

Course Intended Learning Outcome (ILOs)		Assessment Methods											
		Written Exam	Oral Exam	Tutorial Assessment	Project Assessment	Model Assessment	Report Assessment	Quiz assessment	Presentation Assessment	Discussion	Laboratory Test	Sketching drawings	Monitoring
A- Knowledge& Understanding	a5-1	x											
	a6-2	x											
B-IntellectualSkills	b2-1	x											
	b3-1	x											
C-Professional Skills	c3-1	x								x			
D-General Skills	d2-1	x						x					

11.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	week
Final examination	70%	
Mid-term written examination	20%	
End of term laboratory examination	--------	
Tutorial and report assessment	10%	
Total	100%	

12- Facilities required for teaching and learning

A. Laboratory Usage:

B. Library Usage:

Students should be encouraged to use library technical resources in the preparation of reports and oral presentation. At least one oral presentation should involve a significant component of library research to encourage this component of study.

13- List of references:

Course Prof: **Prof .Dr. Mamdouh Salah**

Programmer coordinator: Dr. Ahmed Turk

Head of Department: Prof.Dr. MamdouhSalah

Date: 8/2018

Course Specification

Program on which the course is given	Civil Engineering
Major or minor element of program	Major
Department offering the program	Civil Engineering
Department offering the course	Civil Engineering
Academic year/Level	2018/2019 PhD
Date of specification approval	2018

A- Basic Information

Title: Advanced Domestic Wastewater Treatment	**Code Symbol: CEP 610**	
Lecture	2	
Tutorial	**1**	
Laboratory	**0**	
Total	3	Bylaw 2000
First term	prerequisite	

B- Professional Information

1- Course Aims:

This course introduces the basic concepts of Advanced Domestic Wastewater Treatment for the civilengineer. The basics of Advanced Domestic Wastewater Treatment are well studied.

2- Course Objectives

By the end of the course the students will be able to:

- Understanding the main concept Advanced Domestic Water Treatment.
- Understanding planning of Domestic Water Treatment units.
- Understanding design of Domestic Water Treatment units.

3- Intended Learning Outcomes (ILOs):

Field	Programme ILOs that the course contribute in achieving	Course ILOs
Knowledge& Understanding	**a-5** Methodologies of solving engineering problems, data collection and interpretation.	**a-5-1** Define the Methodologies of solving engineering problems
	a-6 Professional ethics and impacts of engineering solutions on society and environment.	**a-6-1** Describe the ethics and impacts of engineering solutions on society and environment.
Intellectual skills	**b-2** Select appropriate solutions for engineering problems based on analytical thinking.	**b-2-1** Use the appropriate solution for engineering problems
	b-3 Think in a creative and innovative way in problem solving and design.	**b-3-1** Analyze the problem and find a creative solution.
Professional skills	**c-1** Apply numerical modeling methods to engineering problems.	**c-1-1** Analyze the problem into points to determine the solution.
General skills	**d-2** Work in stressful environment and within constraints.	**d-2-1** Describe the stressful environment in construction projects and how to solve any problems at this environment

4- Course Contents

Week No.	*Topic*	*Total Hours*	*Contact hrs*			*Course ILOs Covered(By No.)*
			Lec.	Tut.	Lab.	
Week(1-2)	Methods of Ammonia Removal	6	5	1		**a-5**
Week(3-4)	Nitrate Removal	6	4	2		**a-6**
Week(5-6)	Phosphorus Removal	6	4	2		**b-2**
Week(7-8)	Chemical Treatment	6	5	1		**d-2**
Week 9	***Midterm written examination***					
Week(10-11)	Filtration Treatment by using Activated Carbon	6	4	2		**b-3**
Week(12-13)	Anaerobic Treatment	6	5	1		**c-1**

5- Relationship between the course and the programme

Field	Academic Reference Standard(ARS)			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Programme Academic Standards that the course contribute in achieving	**a5& a-6**	**b2 & b3**	**c1**	**d2**

6- Course Subject Area:

A	B	C	D	E	F	G	
Humanities and Social Science	Mathematics and Basic Sciences	Basic Engineering Science	Applied Engineering And Design	Computer Applications and ICT	Projects and practice	Disccretionry subjects	Total
----	**5%**	**50 %**	**10%**	**---**	**30%**	**5%**	**100%**

7- Course Topics.

Topic No.	Topic	Weeks
1st	Methods of Ammonia Removal	**1-2**
2nd	Nitrate Removal	**3-4**
3rd	Phosphorus Removal	**5-6**
4th	Chemical Treatment	**7-8**
5th	Filtration Treatment by using Activated Carbon	**10-11**
6th	Anaerobic Treatment	**12-13**

8- ILOs Matrix Topics

Course Intended Learning Outcomes (ILOs)		Course topics					
		1st	2nd	3rd	4th	5th	6th
Knowledge & Understanding	**a-5-1** Define the Methodologies of solving engineering problems	x	**x**				
	a-6-1 Describe the ethics and impacts of engineering solutions on society and environment.			**x**			**x**
Intellectual Skills	**b-2-1**Use the appropriate solution for engineering problems		x				
	b-3-1 Analyze the problem and find a creative solution.			X	x	x	x
Professional Skill	**c-1-1**Analyze the problem into points to determine the solution.				x	x	x
General Skills	**d-2-1**Describe the stressful environment in construction projects and how to solve any problems at this environment					x	x

9- Teaching and Learning Method:

Course Intended Learning Outcome (ILOs)		Teaching and Learning Method:												
		Lecture	Presentation and Movies	Discussion	Tutorial	Problem solving	Brain storming	Projects	Site visits	Self learning	Cooperative	Discovering	Modeling	Playing
A- Knowledge& Understanding	a5-1	x		x										
	a-6-2	x		x										
B-IntellectualSkills	b2-1	x		x										
	b3-1	x		x										
C-Professional Skills	c1-1	x		x				x						
D-General Skills	d2-1	x		x				x						

10- Teaching and learning method for low capacity and outstanding Student

For low capacity students	Assign a portion of the office hours for those students.
	Give them specific tasks.
	Repeat the explanation of some of the material and tutorials.
	Assign a teaching assistance to follow up the performance of this group of students.
For outstanding Students	Hand out project assignments to those students.
	Give them some research topics to be searched using the internet and conduct presentation.
	Encourage them to take parts in the running research projects.

11- Assessment:

11.1 Assessment Methods

Course Intended Learning Outcome (ILOs)		Assessment Methods											
		Written Exam	Oral Exam	Tutorial Assessment	Project Assessment	Model Assessment	Report Assessment	Quiz assessment	Presentation Assessment	Discussion	Laboratory Test	Sketching drawings	Monitoring
A- Knowledge& Understanding	a5-1	x											
	a-6-2	x											
B-IntellectualSkills	b2-1	x											
	b3-1	x											
C-Professional Skills	c1-1	x								x			
D-General Skills	d2-1	x						x					

11.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	week
Final examination	70%	
Mid-term written examination	20%	
End of term laboratory examination	-------	
Tutorial and report assessment	10%	
Total	100%	

12- Facilities required for teaching and learning

A. Laboratory Usage:

B. Library Usage:

Students should be encouraged to use library technical resources in the preparation of reports and oral presentation. At least one oral presentation should involve a significant component of library research to encourage this component of study.

13- List of references:

Course Prof: **Prof .Dr. Mamdouh Salah**

Programmer coordinator: **Dr. Ahmed Turk**

Head of Department: **Prof .Dr. Mamdouh Salah**

Date: **8/2018**

Course Specification

Program on which the course is given	Civil Engineering
Major or minor element of program	Major
Department offering the program	Civil Engineering
Department offering the course	Civil Engineering
Academic year/Level	2018/2019 PhD
Date of specification approval	2018

A- Basic Information

Title: Master Planning for Sanitary Projects	**Code Symbol: CEP 611**	
Lecture	2	
Tutorial	**1**	
Laboratory	**0**	
Total	3	Bylaw 2000
First term	prerequisite	

B- Professional Information

1- Course Aims:

This course introduces the basic concepts of the Master Planning for Sanitary Projects for the civilengineer. The basics of the Master Planning for Sanitary Projects are well studied.

2- Course Objectives

By the end of the course the students will be able to:

- Understanding the main concept of Master Planning for Sanitary Projects.
- Understanding planning of Sanitary Projects.
- Understanding design of Sanitary Projects.

3- Intended Learning Outcomes (ILOs):

Field	Programme ILOs that the course contribute in achieving	Course ILOs
Knowledge& Understanding	**a-5** Basics and principles of quality in professional practice in the field of specialization.	**a-5-1** Explain Quality Assurance concepts of different civil engineering disciplins and systems development phases.
	a-6 Basics and ethics of scientific research	**a-6-1** Recognize Basics and ethics of scientific research.
Intellectual skills	**b-2** Solve specialized problems even with lack of some data and variables, (incomplete data).	**b-2-1** Apply broad knowledge of modern computational methods and think critically to solve unstructured problems (with incomplete data) related to civil engineering.
	b-3 Link and integrate diverse knowledge to solve professional problems.	**b-3-1** Analyze, interpret and manipulate data from a variety of sources and relate it to solve professional problems.
Professional skills	**c-1** Mastering the basics as well as the latest professional skills in the field of specialization.	**c-1-1** Express competence skills, such as identifying, formulating, analyzing, and creating engineering solutions, using latest engineering techniques, skills, and tools.
General skills	**d-2** Use information technology to improve his/her professional practice.	**d-2-1** Use state-of-the-art computer design tools and applications for solving civil engineering problems.

4- Course Contents

Week No.	*Topic*	*Total Hours*	*Contact hrs*			*Course ILOs Covered(By No.)*
			Lec.	**Tut.**	**Lab.**	
Week(1-4)	Basic studies, population, Rate of water consumption.	6	4	2		**a-5**
Week(5-9)	Rate of Sanitary wastewater Disposal, Climatic condition.	6	4	2		**a-6**
Week(10-14)	topographical and Surveying studies	6	5	1		**b-2**
Week(15-18)	Geotechnical studies	6	5	1		**d-2**
Week 19	***Midterm written examination***					
Week(20-25)	Feasibility and economic studies, Optimization and Design	6	4	2		**b-3**
Week(26-30)	Environment Consideration.	6	5	1		**c-1**

5- Relationship between the course and the programme

Field	**Academic Reference Standard(ARS)**			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Programme Academic Standards that the course contribute in achieving	**a5& a6**	**b2 & b3**	**c1**	**d2**

6- Course Subject Area:

A	**B**	**C**	**D**	**E**	**F**	**G**	
Humanities and Social Science	Mathematics and Basic Sciences	Basic Engineering Science	Applied Engineering And Design	Computer Applications and ICT	Projects and practice	Disccretionry subjects	Total
----	**5%**	**50 %**	**10%**	**---**	**30%**	**5%**	**100%**

7- Course Topics.

Topic No.	Topic	Weeks
1st	Basic studies, population, Rate of water consumption.	**1-4**
2nd	Rate of Sanitary wastewater Disposal, Climatic condition.	**5-9**
3rd	topographical and Surveying studies	**10-14**
4th	Geotechnical studies	**15-18**
5th	Feasibility and economic studies, Optimization and Design	**20-25**
6th	Environment Consideration.	**26-30**

8- ILOs Matrix Topics

Course Intended Learning Outcomes (ILOs)		Course topics					
		1st	**2nd**	**3rd**	**4th**	**5th**	**6th**
Knowledge & Understanding	**a-5-1** Define the Methodologies of solving engineering problems	x	**x**				
	a-6-1 Describe the ethics and impacts of engineering solutions on society and environment.			**x**			**x**
Intellectual Skills	**b-2-1**Use the appropriate solution for engineering problems		x				
	b-3-1 Analyze the problem and find a creative solution.			X	x	x	x
Professional Skill	**c-1-1**Analyze the problem into points to determine the solution.				x	x	x
General Skills	**d-2-1**Describe the stressful environment in construction projects and how to solve any problems at this environment					x	x

9- Teaching and Learning Method:

Course Intended Learning Outcome (ILOs)		Teaching and Learning Method:												
		Lecture	Presentation and Movies	Discussion	Tutorial	Problem solving	Brain storming	Projects	Site visits	Self learning	Cooperative	Discovering	Modeling	Playing
A- Knowledge& Understanding	a5-1	x		x										
	a6-2	x		x										
B-IntellectualSkills	b2-1	x		x										
	b3-1	x		x										
C-Professional Skills	c1-1	x		x				x						
D-General Skills	d2-1	x		x				x						

10- Teaching and learning method for low capacity and outstanding Student

For low capacity students	Assign a portion of the office hours for those students.
	Give them specific tasks.
	Repeat the explanation of some of the material and tutorials.
	Assign a teaching assistance to follow up the performance of this group of students.
For outstanding Students	Hand out project assignments to those students.
	Give them some research topics to be searched using the internet and conduct presentation.
	Encourage them to take parts in the running research projects.

11- Assessment:

11.1 Assessment Methods

Course Intended Learning Outcome (ILOs)		Assessment Methods											
		Written Exam	Oral Exam	Tutorial Assessment	Project Assessment	Model Assessment	Report Assessment	Quiz assessment	Presentation Assessment	Discussion	Laboratory Test	Sketching drawings	Monitoring
A- Knowledge& Understanding	a5-1	x											
	a6-2	x											
B-IntellectualSkills	b2-1	x											
	b3-1	x											
C-Professional Skills	c1-1	x								x			
D-General Skills	d2-1	x						x					

11.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	week
Final examination	70 %	
Mid-term written examination	20%	
End of term laboratory examination	-------	
Tutorial and report assessment	10%	
Total	100%	

12- Facilities required for teaching and learning

A. Laboratory Usage:

B. Library Usage:

Students should be encouraged to use library technical resources in the preparation of reports and oral presentation. At least one oral presentation should involve a significant component of library research to encourage this component of study.

13- List of references:

Course Prof: **Prof .Dr. Mamdouh Salah**

Programmer coordinator: **Dr. Ahmed Turk**

Head of Department: **Prof .Dr. Mamdouh Salah**

Date: 8/8/ 2018

Course Specification

Program on which the course is given	Civil Engineering
Major or minor element of program	Major
Department offering the program	Civil Engineering
Department offering the course	Civil Engineering
Academic year/Level	2018 /2019 Mr.sc or PhD
Date of specification approval	2018

A- Basic Information

Title: Computer applications in hydraulic engineering	**Code Symbol: CEI 601**	
Lecture	2	
Tutorial	**1**	
Laboratory	**0**	
Total	3	Bylaw 2000
First term	prerequisite	

B- Professional Information

1- Course Aims:

Advances in computer based engineering technology are directly related to machine and communications capabilities and the ability of engineers to make optimum use of these capabilities. To this end it is important that engineers act in anticipation of new software advances as opposed to reacting to an existing technology. This course surveys the developments in computer software in civil engineering. In addition, this course will also provide an excellent opportunity to practice programming of standard Hydraulic engineering problems.

This course introduces the basic concepts of the Computer Applications of Hydraulic Engineering for the civil engineer.

2- Course Objectives

The main Objectives of this course are to equip the students with:

1. Knowledge and understanding of key and advanced facts, theories, concepts, principles and techniques relevant to engineering software.

2. Advanced computer skills in the definition, analysis, and solving of problems related to hydraulic engineering problems.

3. The ability to extend knowledge and develop models and methods and use techniques, principles and laws of engineering science in order to lead to engineering applications design.

4. The ability to apply mathematical models using computer software effectively with classical and modern theories to identify/solve complex and open-ended engineering problems related to hydraulic engineering.

5. Awareness of the need to develop him/her self and to engage in continuous learning in the field of civil engineering software development.

6. Application of specialized knowledge and combining it with relevant knowledge in his / her professional practice to produce hydraulic engineering software.

3- Intended Learning Outcomes (ILOs):

This course is designed to achieve the above objectives through the following Intended **Learning Outcomes (ILOs)**:

NAQAAE Academic Reference Standards ((ARS	**Program ILOs**	**Course ILOs**
A. Knowledge and understanding		
A1. Theories, basics and specialized knowledge in the field of learning, as well as other related subjects.	a1-2 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in the field of **Irrigation and hydraulic Engineering**.	a1-2-1 Recognize the main Hydraulic engineering software concepts. a1-2-2 Recognize the main computer methods used in solving Hydraulic problems.

B. Intellectual skills		
B1- Analyze and evaluate information in the field of specialization, and relate it to solve problems and formulate theories.	b1-1 Demonstrate an investigatory and analytic thinking approach (Problem solving) to solve problems related to civil engineering.	b1-1-1 Analyze, interpret and manipulate data from a variety of sources and relate it to solve computational problems related to Hydraulic engineering.
B2- Solve specialized problems with available givens and parameters.	b2-1 Apply broad knowledge of modern computational methods and think critically to solve unstructured problems (with incomplete data) related to civil engineering.	b2-1-1 Apply interpolation or curve-fitting methods to deduce exact or approximate formulas that express a mathematical model or relationship.
C. Professional and practical skills		
C1- Mastering the basics as well as the latest professional skills in the field of specialization.	c1-1 Express competence skills, such as identifying, formulating, analyzing, and creating engineering solutions, using latest engineering techniques, skills, and tools.	c1-1-1 Select the suitable hydraulic engineering software for a specific problem. c1-1-2 Express competence skills, such as identifying, formulating, analyzing, and creating engineering solutions using modern computer software related to hydraulic engineering.
D. General and transferrable skills		
D2- Use information technology to improve his/her professional practice	d2-1 Use state-of-the-art computer design tools and applications for solving civil engineering problems.	d2-1-1 Use state-of-the-art computer aided design tools for solving professional problems related hydraulic engineering.
D4- Use different resources to obtain knowledge and information.	d4-1 Use different resources of information like libraries, internet access facilities, etc. to upgrade and enhance their conceptual knowledge.	d4-1-1 Use different sources of information like library, internet access facilities, etc. to upgrade and enhance their conceptual knowledge about up-to-date software in hydraulic engineering.

4- Course Contents

Lecture Topic	Total Hours	Lec. Hours	Tut. Hours	ILOs covered (By No.)
Introduction of Hydraulic engineering and computer methods.	6	4	2	a1-2-1, a-1-2-2 & d4-1-1
Computation methods in hydraulic and hydrology.	12	8	4	a1-2-2, b1-1-1, c1-1-2 & d4-1-1
Describe the analysis and design programs in the field of hydraulic engineering.	24	16	8	a1-2-2,b2-1-1, c1-1-2 & d2-1-1
Selection of the most effective and the useful Programs.	12	8	4	a1-2-2 & c1-1-1
Describe the Programs available in the market.	12	8	4	a1-2-2 & c1-1-1
Application for all studied programs	18	12	6	b2-1-1, c1-1-2 & d2-1-1
Total	84	56	28	---

5- Relationship between the course and the Program

Field	Academic Reference Standard(ARS)			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Program Academic Standards that the course contribute in achieving	**a1 (a1,2)**	**b1(b1-1) & b2(b2-1)**	**c1(c1-1)**	**d2(d2-1)& d4(d4-1)**

6- Course Subject Area:

A	B	C	D	E	F	G	
Humanities and Social Science	Mathematics and Basic Sciences	Basic Engineering Science	Applied Engineering And Design	Computer Applications and ICT	Projects and practice	Discretionary subjects	Total
----	**5%**	**5 %**	**10%**	**50%**	**30%**	**-**	**100%**

7- Course Topics.

Topic No.	Topic	Weeks
1st	Introduction of Hydraulic engineering and computer methods.	**1-2**
2nd	Computation methods in hydraulic and hydrology.	**3-7**
3rd	Describe the analysis and design programs in the field of hydraulic engineering.	**8-14**
4th	Selection of the most effective and the useful Programs.	**15-19**
5th	Describe the Programs available in the market.	**20-22**
6th	Application for all studied programs	**23-28**

8- ILOs Matrix Topics

Course Intended Learning Outcomes (ILOs)		Course topics					
		1st	**2nd**	**3rd**	**4th**	**5th**	**6th**
Knowledge & Understanding	a1-2 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in the field of **Irrigation and hydraulic Engineering**.	x	**x**	**x**	**x**	**x**	
Intellectual Skills	b1-1 Demonstrate an investigatory and analytic thinking approach (Problem solving) to solve problems related to civil engineering.	**x**					
	b2-1 Apply broad knowledge of modern computational methods and think critically to solve unstructured problems (with incomplete data) related to civil engineering.			x			x
Professional Skill	c1-1 Express competence skills, such as identifying, formulating, analyzing, and creating engineering solutions, using latest engineering techniques, skills, and tools.		x	x	x	x	x
General Skills	d2-1 Use state-of-the-art computer design tools and applications for solving civil engineering problems.			x			x
	d4-1 Use different resources of information like libraries, internet access facilities, etc. to upgrade and enhance their conceptual knowledge.	x	x				

9- Teaching and Learning Method:

Course Intended Learning Outcome (ILOs)		Teaching and Learning Method:												
		Lecture	Presentation and Movies	Discussion	Tutorial	Problem solving	Brain storming	Projects	Site visits	Self learning	Cooperative	Discovering	Modeling	Playing
A- Knowledge& Understanding	a1-2	x		x										
B-Intellectual Skills	b1-1	x		x		x								
	b2-1	x		x		x								
C-Professional Skills	c1-1	x		x				x						
D-General Skills	d1-1	x		x		x		x						
	d4-1													

10- Teaching and learning method for low capacity and outstanding Student

For low capacity students	Assign a portion of the office hours for those students.
	Give them specific tasks.
	Repeat the explanation of some of the material and tutorials.
	Assign a teaching assistance to follow up the performance of this group of students.
For outstanding Students	Hand out project assignments to those students.
	Give them some research topics to be searched using the internet and conduct presentation.
	Encourage them to take parts in the running research projects.

11- Assessment:

11.1 Assessment Methods

Course Intended Learning Outcome (ILOs)		Assessment Methods											
		Written Exam	Oral Exam	Tutorial Assessment	Project Assessment	Model Assessment	Report Assessment	Quiz assessment	Presentation Assessment	Discussion	Laboratory Test	Sketching drawings	Monitoring
A- Knowledge& Understanding	a1-2	x											
B-Intellectual Skills	b1-1	x											
	b2-1	x											
C-Professional Skills	c1-1	x				x				x			
D-General Skills	d1-1	x			x	x		x					
	d4-1	x			x	x		x					

11.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	week
Final examination	100%	32
Mid-term written examination		
End of term laboratory examination		
Tutorial and report assessment		
Total	100%	

12- Facilities required for teaching and learning

A. Laboratory Usage:

B. Library Usage:

Students should be encouraged to use library technical resources in the preparation of reports and oral presentation. At least one oral presentation should involve a significant component of library research to encourage this component of study.

13- List of references:

1 - Computer Applications in Hydraulic Engineering	Heasted Methods, Inc. Waterbury, CT 06708 USA, 2014
2 - Computational Hydraulics	Lecture Notes, UNESCO-IHE
3 - Numerical Modelling and Hydraulics	Nils Reidar B. Olsen, Norwegian University of Science & Technology.
4 - Journal of Hydraulic Division (ASCE).	Periodical

Course coordinator:Prof. Dr . Mohamed Elkiki
Program coordinator: Dr. Ahmed Turk

Head of the Department: Prof. Dr. Mamdouh Salah

Date: 8/8/2018

Course Specification

Program on which the course is given	Civil Engineering
Major or minor element of program	Major
Department offering the program	Civil Engineering
Department offering the course	Civil Engineering
Academic year/Level	2018 /2019 Mr.sc or PhD
Date of specification approval	2018

A- Basic Information

Title: Fluid Mechanics	**Code Symbol**: **CEI 602**	
Lecture	2	
Tutorial	**1**	
Laboratory	**0**	
Total	3	Bylaw 2000
First term	prerequisite	

B- Professional Information

1- Course Aims:

The course aims to :

- Activate the student knowledge and understanding the science of fluid mechanics and define the necessary engineering applications
- Provide the students with the essential knowledge of the advanced theories of fluid mechanics and the corresponding engineering applications.
- Allowing the student to study within an educational frame work problems of great complexity and relevance in fluid mechanics
- During the course, the student must have the ability to design, water and space fluid mechanics systems.

2- Course Objectives

The main Objectives of this course are to equip the students with:

1 - Knowledge and understanding of key and advanced facts, theories, concepts, principles and techniques relevant toengineering.

2 – Study the equation for flow.

3-Study of lamiar and turbulent flow in pipes.

4-Sudy the flow in open channels.

5-The ability to deign different water systems.

3- Intended Learning Outcomes (ILOs):

This course is designed to achieve the above objectives through the following Intended **Learning Outcomes (ILOs)**:

NAQAAE Academic Reference Standards ((ARS	**Program ILOs**	**Course ILOs**
A. Knowledge and understanding		
A1. Study of hydrostatics of flow .	a1-2 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in the field of **fluid mechanics engineering**	a1-2-1 Recognize the main Hydraulic engineering theories.
B. Intellectual skills		
B2- Study the theory of flow and the basic equation of fluid flow	b2-1 Apply broad knowledge of modern computational methods and think critically to solve unstructured problems (with incomplete data) related to civil engineering.	b2-1-1 Use the modern computational methods to predict the efficiencies of water distribution network, hydraulic machinery and Pollutant dispersal.
B4- Conduct a research study of potential flow	b4-1 Write an research plan to conduct applied research.	b4-1-1 Write an research plan to conduct a laboratory work and a design project..

and dynamical pressure forces.		
C. Professional and practical skills		
C3- Study the the laminar and turbulent flow.	c3-1 Evaluate methods and tools reported in a specified published articles and researches concerning to civil engineering field.	c3-1-1 Evaluate methods and tools reported in a specified published articles and researches concerning to hydraulic engineering field.
D. General and transferrable skills		
D2-Open channel flow.	d2-1 Use state-of-the-art computer design tools and applications for solving civil engineering problems.	d2-1-1 Use state-of-the-art computer and Internet tools for getting latest information and standards related to different hydraulic engineering topics.

4- Course Contents

Lecture Topic	Total Hours	Lec. Hours	Tut. Hours	ILOs covered (By No.)
Introduction of fluid mechanics.	6	4	2	a1-2-1 & c3-1-1
Equation of fluid flow.	12	8	4	a1-2-1, b2-1-1, c3-1-1 & d2-1-1
Dimensional Analasis.	12	8	4	a1-2-1, b2-1-1 & c3-1-1
Laminar flow .	12	8	4	a1-2-1, b2-1-1, c3-1-1 & d2-1-1
Turbulent flow.	12	8	4	a1-2-1, c3-1-1 & d2-1-1
Open channel flow.	6	4	2	a1-2-1, b2-1-1 & c3-1-1
Best hydraulic concept.	6	4	2	a1-2-1, b2-1-1 & c3-1-1
Design principles in water supply systems.	6	4	2	a1-2-1, b2-1-1 & c3-1-1
Hydraulic shemes.	12	8	4	a1-2-1, b4-1-1 & c3-1-1
Total	84	56	28	---

5- Relationship between the course and the Program

Field	Academic Reference Standard(ARS)			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Program Academic Standards that the course contribute in achieving	**a1 (a1,2)**	**b2(b2-1) & b4(b4-1)**	**c3(c3-1)**	**d2(d2-1)**

6- Course Subject Area:

A	B	C	D	E	F	G	
Humanities and Social Science	Mathematics and Basic Sciences	Basic Engineering Science	Applied Engineering And Design	Computer Applications and ICT	Projects and practice	Discretionary subjects	Total
----	**5%**	**5 %**	**40%**	**10%**	**30%**	**-**	**100%**

7- Course Topics.

Topic No.	Topic	Weeks
1st	Introduction of fluid mechanics.	**1-2**
2nd	Equation of fluid flow.	**3-6**
3rd	Dimensional Analasis.	**7-10**
4th	Laminar flow .	**11-14**
5th	Turbulent flow.	**15-18**
6th	Open channel flow.	**19-23**
7th	Best hydraulic concept.	**24-26**
8th	Design principles in water supply systems.	**27-28**
9th	Hydraulic shemes.	**29**

8- ILOs Matrix Topics

Course Intended Learning Outcomes (ILOs)		Course topics								
		1st	**2nd**	**3rd**	**4th**	**5th**	**6th**	**7th**	**8th**	**9th**
Knowledge & Understanding	a1-2 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in the field of **Irrigation and hydraulic Engineering**.	x	**x**	**x**	**x**	**x**	**x**	**x**	**x**	x
Intellectual Skills	b2-1 Apply broad knowledge of modern computational methods and think critically to solve unstructured problems (with incomplete data) related to civil engineering.		**x**	**x**	**x**		**x**	**x**	**x**	
	b4-1 Write an research plan to conduct applied research.									**x**
Professional Skill	c3-1 Evaluate methods and tools reported in a specified published articles and researches concerning to civil engineering field.	x	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**
General Skills	d2-1 Use state-of-the-art computer design tools and applications for solving civil engineering problems.		x		x	x				

9- Teaching and Learning Method:

Course Intended Learning Outcome (ILOs)		Teaching and Learning Method:												
		Lecture	Presentation and Movies	Discussion	Tutorial	Problem solving	Brain storming	Projects	Site visits	Self learning	Cooperative	Discovering	Modeling	Playing
A- Knowledge& Understanding	a1-2	x		x										
B-Intellectual Skills	b2-1	x		x		x								
	b4-1	x		x		x								
C-Professional Skills	c3-1	x		x				x						
D-General Skills	d2-1	x		x		x		x						

10-Teaching and learning method for low capacity and outstanding Student

For low capacity students	Assign a portion of the office hours for those students.
	Give them specific tasks.
	Repeat the explanation of some of the material and tutorials.
	Assign a teaching assistance to follow up the performance of this group of students.
For outstanding Students	Hand out project assignments to those students.
	Give them some research topics to be searched using the internet and conduct presentation.
	Encourage them to take parts in the running research projects.

11- Assessment:

11.1 Assessment Methods

Course Intended Learning Outcome (ILOs)	Assessment Methods											
	Written Exam	Oral Exam	Tutorial Assessment	Project Assessment	Model Assessment	Report Assessment	Quiz assessment	Presentation Assessment	Discussion	Laboratory Test	Sketching drawings	Monitoring

A- Knowledge& Understanding	**a1-2**	**x**											
B-IntellectualSkills	**b2-1**	**x**											
	b4-1	**x**											
C-Professional Skills	**c3-1**	**x**				**x**				**x**			
D-General Skills	**d2-1**	**x**			**x**	**x**		**x**					

11.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	week
Final examination	**100%**	**32**
Mid-term written examination		
End of term laboratory examination		
Tutorial and report assessment		
Total	**100%**	

12- Facilities required for teaching and learning

A. Laboratory Usage:

B. Library Usage:

Students should be encouraged to use library technical resources in the preparation of reports and oral presentation. At least one oral presentation should involve a significant component of library research to encourage this component of study.

Course coordinator: Prof. .Dr. Mohamed M. Amin Somaida

Program coordinator: Dr. Ahmed Turk

Head of the Department: Prof. Dr. Mamdouh Salah

Date: 8/8/2018

Course Specification

Program on which the course is given	Civil Engineering
Major or minor element of program	Major
Department offering the program	Civil Engineering
Department offering the course	Civil Engineering
Academic year/Level	2018 /2019 Mr.sc or PhD
Date of specification approval	2018

A- Basic Information

Title: Hydraulic engineering	**Code Symbol: CEI 603**	
Lecture	2	
Tutorial	**1**	
Laboratory	**0**	
Total	3	Bylaw 2000
First term	prerequisite	

B- Professional Information

1- Course Aims:

This course is designed to extend basic concepts learned of essential knowledge and information for the Hydraulic Engineering and understanding the science of Hydraulic and define the necessary engineering applications. Also it provides the students with the essential knowledge of the advanced theories of Hydraulic and the corresponding engineering applications. Also it aims to studying River basin modeling including reservoir design and operation. The course provides the student to recognize the Water distribution systems, different Water Machinery, the concepts of Ground water flow and Pollutant dispersal. For those students who look toward irrigation project position after graduation, this course is designed to widen background in Hydraulic engineering and help them to meet the irrigation project demand. This course will also provide an excellent opportunity to prepare the graduates for advanced study in different areas of Hydraulic engineering. The course is meant to create the deep understanding of the basics and theories behind the Hydraulic engineering. Finally it allows the student to study within an educational

frame work problems of great complexity and relevance in Hydraulic. During the course, the student must have the ability to design, water and space Hydraulics.

This course introduces the basic concepts of Hydraulic Engineering for the civil engineer.

2- Course Objectives

The main Objectives of this course are to equip the students with:

1 - Knowledge and understanding of key and advanced facts, theories, concepts, principles and techniques relevant to Hydraulic engineering.

2 - The ability to extend knowledge and develop models and methods and use techniques, principles and laws of engineering science in order to lead to engineering applications design.

3 - Analyze and design of the water distribution networks, open channels and hydraulic machines.

4 - Evaluate the impact of the Pollutant dispersal on the environment, and the suitable methods of groundwater extraction.

5 - Proficiency in the application of the basics and the methodologies of scientific research and the use of its different tools in the area of hydraulic engineering.

3- Intended Learning Outcomes (ILOs):

This course is designed to achieve the above objectives through the following Intended **Learning Outcomes (ILOs)**:

NAQAAE Academic Reference Standards ((ARS	**Program ILOs**	**Course ILOs**
A. Knowledge and understanding		
A1. Theories, basics and specialized knowledge in the field of learning, as well as other related subjects.	a1-2 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in the field of **Irrigation and hydraulic Engineering**.	a1-2-1 Recognize the main Hydraulic engineering theories.

B. Intellectual skills		
B2- Solve specialized problems even with lack of some data and variables, (incomplete data).	b2-1 Apply broad knowledge of modern computational methods and think critically to solve unstructured problems (with incomplete data) related to civil engineering.	b2-1-1 Use the modern computational methods to predict the efficiencies of water distribution network, hydraulic machinery and Pollutant dispersal.
B4- Conduct a research study and/or writing systematic scientific study about Research problem.	b4-1 Write an research plan to conduct applied research.	b4-1-1 Write an research plan to conduct a laboratory work and a design project..
C. Professional and practical skills		
C3- Evaluate means and tools available in the field of practice.	c3-1 Evaluate methods and tools reported in a specified published articles and researches concerning to civil engineering field.	c3-1-1 Evaluate methods and tools reported in a specified published articles and researches concerning to hydraulic engineering field.
D. General and transferrable skills		
D2- Use information technology to improve his/her professional practice.	d2-1 Use state-of-the-art computer design tools and applications for solving civil engineering problems.	d2-1-1 Use state-of-the-art computer and Internet tools for getting latest information and standards related to different hydraulic engineering topics.

4- Course Contents

Lecture Topic	Total Hours	Lec. Hours	Tut. Hours	ILOs covered (By No.)
Introduction of Hydraulic engineering.	6	4	2	a1-2-1 & c3-1-1
Application of fluid-mechanical principles to problems of engineering practice and design.	12	8	4	a1-2-1, b2-1-1, c3-1-1 & d2-1-1
Hydraulic machinery.	12	8	4	a1-2-1, b2-1-1 & c3-1-1
Water distribution systems.	12	8	4	a1-2-1, b2-1-1, c3-1-1 & d2-1-1
Open channel design.	12	8	4	a1-2-1, c3-1-1 & d2-1-1
River engineering.	6	4	2	a1-2-1, b2-1-1 &

				c3-1-1
Ground water flow.	6	4	2	a1-2-1, b2-1-1 & c3-1-1
Pollutant dispersal	6	4	2	a1-2-1, b2-1-1 & c3-1-1
Lectures supplemented by laboratory work and a design project.	12	8	4	a1-2-1, b4-1-1 & c3-1-1
Total	84	56	28	---

5- Relationship between the course and the Program

Field	**National Academic Reference Standard(NARS)**			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Program Academic Standards that the course contribute in achieving	**a1 (a1,2)**	**b2(b2-1) & b4(b4-1)**	**c3(c3-1)**	**d2(d2-1)**

6- Course Subject Area:

A	**B**	**C**	**D**	**E**	**F**	**G**	
Humanities and Social Science	Mathematics and Basic Sciences	Basic Engineering Science	Applied Engineering And Design	Computer Applications and ICT	Projects and practice	Discretionary subjects	Total
----	**5%**	**5 %**	**40%**	**10%**	**30%**	**-**	**100%**

7- Course Topics.

Topic No.	**Topic**	**Weeks**
1st	Introduction of Hydraulic engineering.	**1-2**
2nd	Application of fluid-mechanical principles to problems of engineering practice and design.	**3-6**
3rd	Hydraulic machinery.	**7-10**
4th	Water distribution systems.	**11-14**

5th	Open channel design.	**15-18**
6th	River engineering.	**19-20**
7th	Ground water flow.	**21-22**
8th	Pollutant dispersal	**23-24**
9th	Lectures supplemented by laboratory work and a design project.	**25-28**

8- ILOs Matrix Topics

Course Intended Learning Outcomes (ILOs)		**Course topics**								
		1st	**2nd**	**3rd**	**4th**	**5th**	**6th**	**7th**	**8th**	**9th**
Knowledge & Understanding	a1-2 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in the field of **Irrigation and hydraulic Engineering**.	x	**x**	**x**	**x**	**x**	**x**	**x**	**x**	x
Intellectual Skills	b2-1 Apply broad knowledge of modern computational methods and think critically to solve unstructured problems (with incomplete data) related to civil engineering.		**x**	**x**	**x**		**x**	**x**	**x**	
	b4-1 Write an research plan to conduct applied research.									**x**
Professional Skill	c3-1 Evaluate methods and tools reported in a specified published articles and researches concerning to civil engineering field.	x	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**
General Skills	d2-1 Use state-of-the-art computer design tools and applications for solving civil engineering problems.		x		x	x				

9- Teaching and Learning Method:

Course Intended Learning Outcome (ILOs)		Teaching and Learning Method:												
		Lecture	Presentation and Movies	Discussion	Tutorial	Problem solving	Brain storming	Projects	Site visits	Self learning	Cooperative	Discovering	Modeling	Playing
A- Knowledge& Understanding	a1-2	x		x										
B-Intellectual Skills	b2-1	x		x		x								
	b4-1	x		x		x								
C-Professional Skills	c3-1	x		x				x						
D-General Skills	d2-1	x		x		x		x						

10-Teaching and learning method for low capacity and outstanding Student

For low capacity students	Assign a portion of the office hours for those students.
	Give them specific tasks.
	Repeat the explanation of some of the material and tutorials.
	Assign a teaching assistance to follow up the performance of this group of students.
For outstanding Students	Hand out project assignments to those students.
	Give them some research topics to be searched using the internet and conduct presentation.
	Encourage them to take parts in the running research projects.

11- Assessment:

11.1 Assessment Methods

Course Intended Learning Outcome (ILOs)	Assessment Methods											
	Written Exam	Oral Exam	Tutorial Assessment	Project Assessment	Model Assessment	Report Assessment	Quiz assessment	Presentation Assessment	Discussion	Laboratory Test	Sketching drawings	Monitoring

A- Knowledge& Understanding	**a1-2**	**x**											
B-IntellectualSkills	**b2-1**	**x**											
	b4-1	**x**											
C-Professional Skills	**c3-1**	**x**				**x**				**x**			
D-General Skills	**d2-1**	**x**			**x**	**x**		**x**					

11.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	week
Final examination	**100%**	**32**
Mid-term written examination		
End of term laboratory examination		
Tutorial and report assessment		
Total	**100%**	

12- Facilities required for teaching and learning

A. Laboratory Usage:

B. Library Usage:

Students should be encouraged to use library technical resources in the preparation of reports and oral presentation. At least one oral presentation should involve a significant component of library research to encourage this component of study.

13- List of references:

1 - Fundamentals of Hydraulic Engineering	Alan L. Prasuhan, Oxford University press, 2015
2 - Hydraulic Engineering	Roberson, Cassidy, Chaudhry, John Willy & Sons Inc.
3 - A text book of Fluid Mechanics and Hydraulic Machines.	R.K. Rajput (S. Chand & Company LTD) Fluid Mechanics - Frank M.White (Mc Graw Hill) ,2005
4 - Journal of Hydraulic Division (ASCE).	Periodical

Course coordinator: Prof. Dr . Mohamed Elkiki

Program coordinator: Dr. Ahmed Turk

Head of the Department: Prof. Dr. Mamdouh Salah

Date: 8/8/2018

Course Specification

Program on which the course is given	Civil Engineering
Major or minor element of program	Major
Department offering the program	Civil Engineering
Department offering the course	Civil Engineering
Academic year/Level	2018 /2019 Mr.sc or PhD
Date of specification approval	2018

A- Basic Information

Title: Hydrology	**Code Symbol: CEI 604**	
Lecture	2	
Tutorial	**1**	
Laboratory	**0**	
Total	3	Bylaw 2000
First term	prerequisite	

B- Professional Information

1- Course Aims:

This course is designed to extend basic concepts learned of essential knowledge and information for the Hydrology and understanding the science of Hydrology and define the necessary engineering applications. Also it aims to studying surface water hydrology including reservoir design and operation. The course provides the student to recognize the concepts of Ground water flow. This course will also provide an excellent opportunity to prepare the graduates for advanced study in different areas of Hydrology. Finally it allows the student to study within an educational frame work problems of great complexity and relevance in Hydrology.

This course introduces the basic concepts of the Hydrology for the civil engineer.

2- Course Objectives

The main Objectives of this course are to equip the students with:

1 - Knowledge and understanding of key and advanced facts, theories, concepts, principles and techniques relevant to water cycle, different water resources systems, Development and application of water resources systems

2 - The ability to extend knowledge and develop models and methods and use techniques, principles and laws of engineering science in order to lead to Simulation models for water resources planning and management.

3 - Analyze and design of the water distribution networks, Surface water Hydrology and Reservoir design and operation.

4 - Evaluate the impact of the Linear and nonlinear theories of hydrologic systems.

5 - Proficiency in the application of the basics and the methodologies of scientific research and the use of its different tools in the area of Hydrology.

3- Intended Learning Outcomes (ILOs):

This course is designed to achieve the above objectives through the following Intended **Learning Outcomes (ILOs)**:

NAQAAE Academic Reference Standards ((ARS	**Program ILOs**	**Course ILOs**
A. Knowledge and understanding		
A1. Theories, basics and specialized knowledge in the field of learning, as well as other related subjects.	a1-2 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in the field of **Irrigation and hydraulic Engineering**.	a1-2-1 Recognize the main Hydrology theories.
B. Intellectual skills		
B1- Analyze and evaluate the information in the field of specialization, and solve the problems based on that.	b1-2 Interpret, analyze, and evaluate a given system specific information and relate it to the design of the required system.	b1-2-1 Analyze, and evaluate the impact of the Linear and nonlinear theories of hydrologic systems

B2- Solve specialized problems even with lack of some data and variables, (incomplete data).	b2-1 Apply broad knowledge of modern computational methods and think critically to solve unstructured problems (with incomplete data) related to civil engineering.	b2-1-1 Use the modern computational methods to develop different water resources system and simulation models for water resources planning and management.
C. Professional and practical skills		
C3- Evaluate means and tools available in the field of practice.	c3-1 Evaluate methods and tools reported in a specified published articles and researches concerning to civil engineering field.	c3-1-1 Evaluate methods and tools reported in a specified published articles and researches concerning to Hydrology field.
D. General and transferrable skills		
D5- Use different resources to obtain knowledge and information.	d5-1 Use different resources of information like libraries, internet access facilities, etc. to upgrade and enhance their conceptual knowledge.	d5-1-1 Use libraries and internet access facilities to upgrade and enhance their conceptual knowledge of Hydrology.

4- Course Contents

Lecture Topic	Total Hours	Lec. Hours	Tut. Hours	ILOs covered (By No.)
Introduction of Hydrology.	6	4	2	a1-2-1 & c3-1-1
Description of water cycle, different water resources systems, Development and application of water resources systems	12	8	4	a1-2-1, b2-1-1, c3-1-1 & d5-1-1
Water distribution systems.	12	8	4	a1-2-1, b2-1-1 & d5-1-1
Simulation models for water resources planning and management.	12	8	4	a1-2-1, b2-1-1 & d5-1-1
Surface water Hydrology.	12	8	4	a1-2-1, b2-1-1 & d5-1-1
Linear theory of hydrologic systems.	12	8	4	a1-2-1, b1-2-1, c3-1-1 & d5-1-1
Nonlinear theory of hydrologic systems.	6	4	2	a1-2-1, b1-2-1, c3-1-1 & d5-1-1
Reservoir design and operation.	12	8	4	a1-2-1, b2-1-1, c3-1-1 & d5-1-1
Total	84	56	28	---

5- Relationship between the course and the Program

Field	National Academic Reference Standard(NARS)			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Program Academic Standards that the course contribute in achieving	**a1 (a1,2)**	**b1(b1-2) & b2(b2-1)**	**c3(c3-1)**	**d5(d5-1)**

6- Course Subject Area:

A	B	C	D	E	F	G	
Humanities and Social Science	Mathematics and Basic Sciences	Basic Engineering Science	Applied Engineering And Design	Computer Applications and ICT	Projects and practice	Discretionary subjects	Total
----	**5%**	**5 %**	**40%**	**10%**	**30%**	**-**	**100%**

7- Course Topics.

Topic No.	Topic	Weeks
1st	Introduction of Hydrology.	**1-2**
2nd	Description of water cycle, different water resources systems, Development and application of water resources systems	**3-6**
3rd	Water distribution systems.	**7-10**
4th	Simulation models for water resources planning and management.	**11-14**
5th	Surface water Hydrology.	**15-18**
6th	Linear theory of hydrologic systems.	**19-22**
7th	Nonlinear theory of hydrologic systems.	**23-24**
8th	Reservoir design and operation.	**25-30**

8- ILOs Matrix Topics

Course Intended Learning Outcomes (ILOs)		Course topics								
		1st	2nd	3rd	4th	5th	6th	7th	8th	
Knowledge & Understanding	a1-2 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in the field of **Irrigation and hydraulic Engineering**.	x	**x**	**x**	**x**	**x**	**x**	**x**	**x**	
Intellectual Skills	b1-2 Interpret, analyze, and evaluate a given system specific information and relate it to the design of the required system.							**x**	**x**	
	b2-1 Apply broad knowledge of modern computational methods and think critically to solve unstructured problems (with incomplete data) related to civil engineering.		**x**	**x**	**x**	**x**	**x**			
Professional Skill	c3-1 Evaluate methods and tools reported in a specified published articles and researches concerning to civil engineering field.	x	**x**				**x**	**x**	**x**	
General Skills	d5-1 Use different resources of information like libraries, internet access facilities, etc. to upgrade and enhance their conceptual knowledge.		x	**x**	x	x	**x**	**x**	**x**	

9- Teaching and Learning Method:

Course Intended Learning Outcome (ILOs)		Teaching and Learning Method:												
		Lecture	Presentation and Movies	Discussion	Tutorial	Problem solving	Brain storming	Projects	Site visits	Self learning	Cooperative	Discovering	Modeling	Playing
A- Knowledge& Understanding	a1-2	x		x										
B-Intellectual Skills	b1-2	x		x		x								
	b2-1	x		x		x								
C-Professional Skills	c3-1	x		x				x						
D-General Skills	d5-1	x		x		x		x						

10- Teaching and learning method for low capacity and outstanding Student

For low capacity students	Assign a portion of the office hours for those students.
	Give them specific tasks.
	Repeat the explanation of some of the material and tutorials.
	Assign a teaching assistance to follow up the performance of this group of students.
For outstanding Students	Hand out project assignments to those students.
	Give them some research topics to be searched using the internet and conduct presentation.
	Encourage them to take parts in the running research projects.

11- Assessment:

11.1 Assessment Methods

Course Intended Learning Outcome (ILOs)		Assessment Methods											
		Written Exam	Oral Exam	Tutorial Assessment	Project Assessment	Model Assessment	Report Assessment	Quiz assessment	Presentation Assessment	Discussion	Laboratory Test	Sketching drawings	Monitoring
A- Knowledge& Understanding	a1-2	x											

B-IntellectualSkills	**b1-2**	**x**											
	b2-1	**x**											
C-Professional Skills	**c3-1**	**x**				**x**				**x**			
D-General Skills	**d5-1**	**x**			**x**	**x**		**x**					

11.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	week
Final examination	**100%**	**32**
Mid-term written examination		
End of term laboratory examination		
Tutorial and report assessment		
Total	**100%**	

12- Facilities required for teaching and learning

A. Laboratory Usage:

B. Library Usage:

Students should be encouraged to use library technical resources in the preparation of reports and oral presentation. At least one oral presentation should involve a significant component of library research to encourage this component of study.

1 - Fundamentals of Hydraulic Engineering	Alan L. Prasuhan, Oxford University press,2015
2 - Hydraulic Engineering	Roberson, Cassidy, Chaudhry, John Willy & Sons Inc.
3 - Journal of Hydrology Division (ASCE).	Periodical

Course coordinator: Prof. Dr . Mohamed Elkiki

Program coordinator: Dr. Ahmed Turk

Head of the Department: Prof. Dr. Mamdouh Salah

Date: 8/8/2018

Course Specification

Program on which the course is given	Civil Engineering
Major or minor element of program	Major
Department offering the program	Civil Engineering
Department offering the course	Civil Engineering
Academic year/Level	2018/2019 / Mr.sc or PhD
Date of specification approval	2018

A- Basic Information

Title: Risk Analysis and Management	**Code Symbol**: CEI 605	
Lecture	3	
Tutorial	0	
Laboratory	0	
Total	3	Bylaw 2000
	prerequisite	-

B- Professional Information

1- Course Aims:

This course builds the basic knowledge of risk technology and reliability engineering. It also provides analytical tools for analyzing the environment for social impact assessment and risk management. It provides examples of risk mitigation for waste and air pollution and public health.

2- Course Objectives

By the end of the course, the students will be able to:

- **Understanding the risk technology and reliability**
- **Identifying the analytic tools used to analyze the environment and technological risks**
- **Address the risk for transportation, waste incineration, air pollution**
- **Understand the regulatory policies, risk communications and risk management**

3- Intended Learning Outcomes (ILOs):

Field	Program ILOs that the course contribute to achieving	Course ILOs
Knowledge& Understanding	**A-2** Engineering principles in the fields of risk management	**a-2-1** Classify the potential applications of advanced civil engineering applications.
	A-8 Current engineering technologies as related to disciplines.	a-8-1Describe the Computation methods of engineering solutions by using current engineering technologies.
Intellectual skills	**B-1** Select appropriate solutions for engineering problems based on analytical thinking.	**b-1-1** Use the proper solution for soil problems
	B-3 Think creatively and innovatively in problem-solving and design.	b-3-1 Analyze the problem and find a creative solution.
Professional skills	**C-7** Apply numerical modelling methods to engineering problems.	**c-7-1** Analyze the problem into points to determine the solution of risk assessment
General skills	**D-2** Work in a stressful environment and within constraints.	**d-2-1** Describe the stressful situation in construction projects and how to solve any problems in this environment.

4- Course Contents

Week No.	*Topic*	*Total Hours*	*Contact hrs*			*Course ILOs Covered(By No.)*
			Lec.	**Tut.**	**Lab.**	
Week (1-4)	• Risk Technology and reliability engineering					**a-2-1 & a-8-1**
Week (5-10)	• Social and psychological environmental impact assessment					**b-1-1 & b-3-1**
Week (11-20)	• Transportation risk, waste incineration, air pollution modelling, and public health					**c-7-1 & d-2-1**
Week (21-30)	• Regulations and policy, risk communications and management					**c-7-1 & d-2-1**

5- Relationship between the course and the program

Field	National Academic Reference Standard(NARS)			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Program Academic Standards that the course contribute in achieving	**a2 & a8**	**b1 & b3**	**c7**	**d2**

6- Course Subject Area:

A	B	C	D	E	F	G	
Humanities and Social Science	Mathematics and Basic Sciences	Basic Engineering Science	Applied Engineering and Design	Computer Applications and ICT	Projects and practice	Discretionary subjects	Total
----	**5%**	**40 %**	**20%**	**---**	**30%**	**5%**	**100%**

7- Course Topics.

Topic No.	Topic	Weeks
1st	• Risk Technology and reliability engineering	**1-4**
2nd	• Social and psychological environmental impact assessment	**5-10**
3rd	• Transportation risk, solid waste incineration, air pollution modelling, and public health	**11-20**
4th	• Regulations and policy, risk communications and management	**20-30**

8- ILOs Matrix Topics

Course Intended Learning Outcomes (ILOs)		1st - 4th	5th - 8th	9th - 10th	11th - 14th
Knowledge & Understanding	**a-2** Engineering principles in the fields of soil mechanics and hydraulics.	**x**			
	a-8 Current engineering technologies as related to disciplines.	**x**			

Intellectual Skills	**b-1** Select appropriate solutions for engineering problems based on analytical thinking.		**x**		
	b-3 Think creatively and innovatively in problem-solving and design.		**x**		
Professional Skill	**c-7-1** Analyze the problem into points to determine the solution.			**x**	**x**
General Skills	**d-2-1** Describe the stressful environment in construction projects and how to solve any problems in this environment			**x**	**x**

9- Teaching and Learning Method:

Course Intended Learning Outcome (ILOs)		Teaching and Learning Method:												
		Lecture	**Presentation and Movies**	**Discussion**	**Tutorial**	**Problem-solving**	**Brainstorming**	**Projects**	**Site visits**	**Self-learning**	**Cooperative**	**Discovering**	**Modelling**	**Playing**
A- Knowledge& Understanding	**A2-1**	**x**		**x**										
	A8-2	**x**		**x**										
B-Intellectual Skills	**B1-1**	**x**		**x**										
	B3-1	**x**		**x**										
C-Professional Skills	**C7-1**	**x**		**x**				**x**						
D-General Skills	**D2-1**	**x**		**x**				**x**						

10- Teaching and learning method for low capacity and outstanding Student

For low capacity students	Assign a portion of the office hours for those students.
	Give them specific tasks.
	Repeat the explanation of some of the material and tutorials.
	Assign teaching assistant to follow up the performance of this group of students.
For outstanding Students	Hand out project assignments to those students.
	Give them some research topics to be searched using the internet and conduct presentation.
	Encourage them to take parts in the running research projects.

11- Assessment:

11.1 Assessment Methods

Course Intended Learning Outcome (ILOs)		Assessment Methods											
		Written Exam	Oral Exam	Tutorial Assessment	Project Assessment	Model Assessment	Report Assessment	Quiz assessment	Presentation Assessment	Discussion	Laboratory Test	Sketching drawings	Monitoring
A- Knowledge& Understanding	A2-1	x				x							
	A8-1	x				x							
B- Intellectual Skills	B1-1	x					x						
	B3-1	x							x				
C-Professional Skills	C7-1	x										x	
D-General Skills	D2-1	x										x	

11.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	week
Final examination	100	
Mid-term written examination		
End of term laboratory examination		
Tutorial and report assessment		
Total	100%	

12- Facilities required for teaching and learning

A. Laboratory Usage:

B. Library Usage:

Students should be encouraged to use library technical resources in the preparation of reports and oral presentation. At least one oral presentation should involve a significant component of library research to help this component of the study.

13- List of references:

- Risk Management, by Michel Crouhy, Dan Galai, Robert Mark, 2000, by McGraw Hill Professional
- Identifying and Managing Project Risk, by Tom Kendrick, 2003, American Management Association
- Risk Analysis: A Quantitative Guide, by David Vose, 2008, John Wiley & Sons

Course Coordinator: Dr. Mohamed Eltarabily

Program Coordinator: Dr. Ahmed Turk

Head of Department: Prof. Dr. Mamdouh Salah

Date: 8/8/2018

Course Specification

Program on which the course is given	Civil Engineering
Major or minor element of program	Major
Department offering the program	Civil Engineering
Department offering the course	Civil Engineering
Academic year/Level	2018/2019 / Mr.sc or PhD
Date of specification approval	2018

A- Basic Information

Title: Water-resources system (1)	**Code Symbol: CEI 606**	
Lecture	**2 hours**	
Tutorial / Laboratory	**1 hour**	
Total	**3 hours**	**By law 2000**

B- Professional Information

1- Course Aims:

This course is designed to extend basic concepts learned of essential knowledge and information for the different water resources systems, starting from development and application of deterministic and stochastic optimization and simulation models for water resources planning and management. Also it aims to studying river basin modeling including reservoir design and operation. The course provides the student to recognize the irrigation planning and operation, hydropower capacity development, the flood control and protection and water quality prediction and control. For those students who look toward irrigation project position after graduation, this course is designed to widen background in water-resources system engineering and help them to meet the irrigation project demand. This course will also provide an excellent opportunity to prepare the graduates for advanced study in different areas of water-resources system engineering. The course is meant to create the deep understanding of the basics and theories behind the water-resources system engineering.

The main Objectives of this course are to equip the students with:

1. Recognize development and application of deterministic and stochastic optimization and simulation models for water resources planning and management.
2. Recognize development and application of simulation models for water resources planning and management.
3. How to construct river basin modeling, including reservoir design and operation.

4. Recognize irrigation planning and operation and hydropower capacity development.
5. Recognize the different flood control and protection, and water quality prediction and control.

2- Intended Learning Outcomes (ILOs)

NAQAAE Academic Reference Standards (ARS)	Program ILOs	Course ILOs
A. Knowledge and understanding		
A1. Theories and basics related to learning field, as well as other related fields.	a1-2 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in the field of **Irrigation and hydraulic Engineering**.	a1-2 Deterministic and stochastic optimization and simulation models for water resources ,hydrologic processes probability, risk, and uncertainty analysis for hydrologic and hydraulic design.
A3- Main scientific advances in the field of specialization.	a3-1 Classify the Potential applications of advanced civil engineering applications.	a3-1 Discuss the social effects of the simulation models for water resources ,hydrologic processes probability and management in water resources.
	a3-3 Discuss the recent and update developments in the most important themes related to civil engineering.	a3-3 Discuss the recent and update developments in the most important themes related to hydrologic design for water excess management in water resources.
B. Intellectual skills		
B1- Analyze and evaluate the information in the field of specialization, and solve the problems based on that. .	b1-1 Demonstrate an investigatory and analytic thinking approach (Problem solving) to solve problems related to civil engineering.	b1-1 Demonstrate an investigatory and analytic thinking approach to solve the water resources science in irrigation engineering problems.
B3- Link and integrate diverse knowledge to solve professional problems.	b3-1 Analyze, interpret and manipulate data from a variety of sources and relate it to solve professional problems.	b3-1 Analyze, interpret and manipulate data from a variety of sources and relate it to solve Irrigation planning and operation problems related to application of water resources engineering, like computer models for Rain fall – Run off Analysis..

C. Professional and practical skills		
C1- Mastering the basics as well as the latest professional skills in the field of specialization.	c1-1 Express competence skills, such as identifying, formulating, analyzing, and creating engineering solutions, using latest engineering techniques, skills, and tools.	c1-1 Express competence skills, such as identifying, formulating, analyzing, and creating engineering solutions related to application of water resources science in hydraulics engineering problems, using latest engineering techniques, skills, and tools.
D. General and transferrable skills		
D2- Use information technology to improve his/her professional practice	d2-1 Use state-of-the-art computer design tools and applications for solving civil engineering problems	d2-1 Use state-of-the-art computer and Internet tools for getting latest information and standards related to application of water resources science in hydraulics engineering.

3- Course Contents

Topic	*Total Hours*	*Contact hrs*			*Course ILOs Covered (By No.)*
		Lec.	Tut.	Lab.	
Development and application of deterministic and stochastic optimization and simulation models for water resources planning and management.	12	8	4	--	a1-2, a3-1,a3-3, b1-1,b3-1, c1-1
River basin modeling.	12	8	4	--	a1-2, a3-1,a3-3, b1-1, c1-1, d2-1
Reservoir design and operation.	12	8	4	--	a3-1,a3-3, b1-1,b3-1, c1-1, d2-1
Irrigation planning and operation.	12	8	4	--	a1-2, a3-1,a3-3, b1-1,b3-1, c1-1, d2-1
Hydropower capacity development.	12	8	4	--	a1-2, a3-1, b1-1,b3-1, c1-1, d2-1
Flood control and protection.	12	8	4	--	a3-1,a3-3, b1-1,b3-1, c1-1, d2-1
Water quality prediction and control.	12	8	4		a3-1,a3-3, b1-1,b3-1, c1-1, d2-1
Total	84	56	28	--	

4- Relationship between the course and the program

Field	National Academic Reference Standard(NARS)			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Program Academic Standards that the course contribute in achieving	A1(a1-2) A3(a3-1, a3-3)	B1(b1-1), B3(b3-1)	C1(c1-1)	D2(d2-1)

5- Course Subject Area:

A	B	C	D	E	F	G	
Humanities and Social Science	Mathematics and Basic Sciences	Basic Engineering Science	Applied Engineering And Design	Computer Applications and ICT	Projects and practice	Disccretionry subjects	Total
---	---	50%	30%	10%			100%

6- Course Topics.

Topic No.	Topic	Weeks
1st	Development and application of deterministic and stochastic optimization and simulation models for water resources planning and management.	1-4
2nd	River basin modeling.	5-8
3rd	Reservoir design and operation.	9-12
4th	Irrigation planning and operation.	13-16
5th	Hydropower capacity development.	17-20
6th	Flood control and protection.	21-24
7th	Water quality prediction and control.	25-28

7- ILOs Matrix Topics

Course topics	1st	2nd	3rd	4th	5th	6th	7th
Course ILOs	Knowledge & Understanding						
a1-2 Deterministic and stochastic optimization and simulation models for water resources ,hydrologic processes probability, risk, and uncertainty analysis for hydrologic and hydraulic design.	x		x	x	x	x	X

a3-1 Discuss the social effects of the simulation models for water resources ,hydrologic processes probability and management in water resources.		x					
a3-3 Discuss the recent and update developments in the most important themes related to hydrologic design for water excess management in water resources	x	x	x	x	x	x	X
Course ILOs	Intellectual skills						
b1-1 Demonstrate an investigatory and analytic thinking approach to solve the water resources science in irrigation engineering problems.	x	x	x	x	x	x	X
b3-1 Analyze, interpret and manipulate data from a variety of sources and relate it to solve Irrigation planning and operation problems related to application of water resources engineering, like computer models for Rain fall – Run off Analysis.		x					X
Course ILOs	Professional and practical skills						
c1-1 Express competence skills, such as identifying, formulating, analyzing, and creating engineering solutions related to application of water resources science in hydraulics engineering problems, using latest engineering techniques, skills, and tools.	x	x	x	x	x	x	x
Course ILOs	General and transferrable skills						
d2-1 Use state-of-the-art computer and Internet tools for getting latest information and standards related to application of water resources science in hydraulics engineering.	x		x	x	x	x	x

8- Teaching and Learning Method:

Course Intended learning outcomes (ILOs)		Teaching and Learning Method												
		Lecture	Presentation and	Discussion	Tutorial	Problem solving	Brain storming	Projects	Report	Self learning	Cooperative	Discovering	Computer Simulation	Practical Experiments
Knowledge & understanding	a1-2	X				x								
	a3-1	X				x								
	a3-3		x	X					x	x				
Intellectual Skills	b1-1		x											
	b3-1		x											

Professional Skills	c1-1		x											
General Skills	d2-1												x	

9- Assessment

9.1 Assessment Methods

Final Written Examination :	To assess students' knowledge, understanding, analysis, creativity, problem solving, and problem identification.

9.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	week
Final Examination	100	32
Total	100%	

10- Facilities required for teaching and learning

Class Room Equipped with Computer and Video Projector - Computer Lab with HYDRUS 2D/3D software package (last version) – MODFLOW model-Library.

A. laboratory Usage:

Students are expected to prepare and conduct some computer simulation assignments using digital systems simulators on general computer labs.

B. Library Usage:

Students should be encouraged to use library technical resources in the preparation of laboratory reports and oral presentation. At least one oral presentation should involve a significant component of library research to encourage this component of study.

11- List of references:

1. Water R resources Engineering. (Text book) Larry W. Mays 2005 Edition.
2. Numerical Methods for engineering , Second Edition MC Graw-Hill,New York1988.
3. Thoma M. Walski, Haested Methods Engineering staff, "Computer Application in Hydraulic Engineering", Fifth edition (CAIHE), Haested Methods Inc. 2002
4. R. S. Khurmi, " A Text Book of, Hydraulics, Fluid Mechanics and Hydraulic Mechanics" , Twelfth Edition, 1982.

12- Program Coordination Committee:

Course Coordinator: **Associate Prof. Dr Ahmed Mirdan**

Program coordinator: **Dr. Ahmed Turk**

Head of the Department: **Prof .Dr. Mamdouh Salah**

Date: 8/8/2018

Course Specification

Program on which the course is given	Civil Engineering
Major or minor element of program	Major
Department offering the program	Civil Engineering
Department offering the course	Civil Engineering
Academic year/Level	2018/2019 / Mr.sc or PhD
Date of specification approval	2018

A- Basic Information

Title: Water-resources system (2)	**Code Symbol:** CEI 607	
Lecture	2 hours	
Tutorial / Laboratory	1 hour	
Total	3 hours	By law 2000

B- Professional Information

1- Course Aims:

This course is designed to extend basic concepts learned of essential knowledge and information for the different water resources systems, starting from examination of the statistical time series and stochastic optimization methods used to address resources problems. Also it aims to studying statistical issues include maximum likihood and moments estimators. The course provides the student to recognize the censored datasets and historical information – probability plotting – Bayesian influence – index flood methods – ARMA models – multivariate stochastic streamflow models – stochastic simulation – and reservoir-operation optimization models. For those students who look toward irrigation project position after graduation, this course is designed to widen background in water-resources system engineering and help them to meet the irrigation project demand. This course will also provide an excellent opportunity to prepare the graduates for advanced study in different areas of water-resources system engineering. The course is meant to create the deep understanding of the basics and theories behind the water-resources system engineering.

2- Course Objectives:

The main Objectives of this course are to equip the students with:

- Examination of the statistical time series and stochastic optimization methods used to address resources problems.
- Recognizing tatistical issues include maximum likihood and moments estimators.

- Recognizing censored datasets and historical information – probability plotting – bayesian influence – index flood methods.
- Dealing with ARMA models – multivariate stochastic streamflow models – stochastic simulation – and reservoir-operation optimization models.

3- Intended Learning Outcomes (ILOs):

NAQAAE Academic Reference Standards (ARS)	Program ILOs	Course ILOs
A. Knowledge and understanding		
A1. Theories and basics related to learning field, as well as other related fields.	a2-1 Discuss the effects of civil engineering technologies on the surrounding environment.	a2-1 Statistical time series and stochastic optimization methods used to address water resources problems.
A3- Main scientific advances in the field of specialization.	a3-1 Classify the Potential applications of advanced civil engineering applications.	a3-1 Discuss the social effects of the simulation models for water resources ,hydrologic processes probability and management in water resources.
	a3-3 Discuss the recent and update developments in the most important themes related to civil engineering.	a3-3 Discuss the recent and update developments in the most important themes related to hydrologic design for water excess management in water resources.
B. Intellectual skills		
B1- Analyze and evaluate the information in the field of specialization, and solve the problems based on that. .	b1-1 Demonstrate an investigatory and analytic thinking approach (Problem solving) to solve problems related to civil engineering.	b1-1 Demonstrate an investigatory and analytic thinking approach to solve the water resources science in irrigation engineering problems.
B3- Link and integrate diverse knowledge to solve professional problems.	b3-1 Analyze, interpret and manipulate data from a variety of sources and relate it to solve professional problems.	b3-1 Analyze, interpret and manipulate data from a variety of sources and relate it to solve Irrigation planning and operation problems related to application of water resources engineering, like computer models for Rain fall – Run off Analysis..
C. Professional and practical skills		
C1- Mastering the basics as well as the latest professional skills in the field of specialization.	c1-1 Express competence skills, such as identifying, formulating, analyzing, and creating engineering solutions, using latest engineering techniques, skills, and tools.	c1-1 Express competence skills, such as identifying, formulating, analyzing, and creating engineering solutions related to application of water resources science in hydraulics engineering problems, using latest engineering techniques, skills, and tools.

D. General and transferrable skills		
D2- Use information technology to improve his/her professional practice	d2-1 Use state-of-the-art computer design tools and applications for solving civil engineering problems	d2-1 Use state-of-the-art computer and Internet tools for getting latest information and standards related to application of water resources science in hydraulics engineering.

4- Course Contents:

Topic	*Total Hours*	*Contact hrs*			*Course ILOs Covered (By No.)*
		Lec.	**Tut.**	**Lab.**	
Examination of statistical time series and stochastic optimization methods used to address resources problems.	12	8	4	--	a2-1, a3-1,a3-3, b1-1,b3-1, c1-1
Statistical issues include maximum likihood and moments estimators.	12	8	4	--	a2-1, a3-1,a3-3, b1-1, c1-1, d2-1
Censored datasets and historical information.	12	8	4	--	a3-1,a3-3, b1-1,b3-1, c1-1, d2-1
Probability plotting, bayesian influence, and index flood methods.	12	8	4	--	a2-1, a3-1,a3-3, b1-1,b3-1, c1-1, d2-1
ARMA models	12	8	4	--	a2-1, a3-1, b1-1,b3-1, c1-1, d2-1
Multivariate stochastic streamflow models and stochastic simulation.	12	8	4	--	a3-1,a3-3, b1-1,b3-1, c1-1, d2-1
Reservoir operation optimization models.	12	8	4		a3-1,a3-3, b1-1,b3-1, c1-1, d2-1
Total	84	56	28	--	

5- Relationship between the course and the program:

Field	National Academic Reference Standard(NARS)			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Program Academic Standards that the course contribute in achieving	A2(a2-1) A3(a3-1, a3-3)	B1(b1-1), B3(b3-1)	C1(c1-1)	D2(d2-1)

6- Course Subject Area:

A	B	C	D	E	F	G	
Humanities and Social Science	**Mathematics and Basic Sciences**	**Basic Engineering Science**	**Applied Engineering And Design**	**Computer Applications and ICT**	**Projects and practice**	**Disccretionry subjects**	**Total**
---	---	50%	30%	10%			100%

7- Course Topics.

Topic No.	Topic	Weeks
1st	Examination of statistical time series and stochastic optimization methods used to address resources problems.	1-4
2nd	Statistical issues include maximum likihood and moments estimators.	5-8
3rd	Censored datasets and historical information.	9-12
4th	Probability plotting, bayesian influence, and index flood methods.	13-16
5th	ARMA models	17-20
6th	Multivariate stochastic streamflow models and stochastic simulation.	21-24
7th	Reservoir operation optimization models.	25-28

8- ILOs Matrix Topics:

Course topics	1st	2nd	3rd	4th	5th	6th	7th
Course ILOs	Knowledge & Understanding						
a2-1 Statistical time series and stochastic optimization methods used to address water resources problems.	x		x	x	x	x	X
a3-1 Discuss the social effects of the simulation models for water resources ,hydrologic processes probability and management in water resources.		x					
a3-3 Discuss the recent and update developments in the most important themes related to hydrologic design for water excess management in water resources	x	x	x	x	x	x	X
Course ILOs	Intellectual skills						
b1-1 Demonstrate an investigatory and analytic thinking approach to solve the water resources science in irrigation engineering problems.	x	x	x	x	x	x	X

b3-1 Analyze, interpret and manipulate data from a variety of sources and relate it to solve Irrigation planning and operation problems related to application of water resources engineering, like computer models for Rain fall – Run off Analysis.		x					X
Course ILOs	Professional and practical skills						
c1-1 Express competence skills, such as identifying, formulating, analyzing, and creating engineering solutions related to application of water resources science in hydraulics engineering problems, using latest engineering techniques, skills, and tools.	x	x	x	x	x	x	x
Course ILOs	General and transferrable skills						
d2-1 Use state-of-the-art computer and Internet tools for getting latest information and standards related to application of water resources science in hydraulics engineering.	x		x	x	x	x	x

9- Teaching and Learning Method:

Course Intended learning outcomes (ILOs)		Teaching and Learning Method												
		Lecture	Presentation and	Discussion	Tutorial	Problem solving	Brain storming	Projects	Report	Self learning	Cooperative	Discovering	Computer Simulation	Practical Experiments
Knowledge & understanding	a2-1	X				x								
	a3-1	X				x								
	a3-3		x	X					x	x				
Intellectual Skills	b1-1		x											
	b3-1		x											
Professional Skills	c1-1		x											
General Skills	d2-1												x	

10- Assessment

10.1 Assessment Methods

Final Written Examination : To assess students' knowledge, understanding, analysis, creativity, problem solving, and problem identification.

10.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	week
Final Examination	100	32
Total	100%	

11- Facilities required for teaching and learning

Class Room Equipped with Computer and Video Projector - Computer Lab

with HYDRUS 2D/3D software package (last version), MODFLOW model - Library.

A. laboratory Usage:

Students are expected to prepare and conduct some computer simulation assignments using digital systems simulators on general computer labs.

B. Library Usage:

Students should be encouraged to use library technical resources in the preparation of laboratory reports and oral presentation. At least one oral presentation should involve a significant component of library research to encourage this component of study.

12- List of references:

1. Water R resources Engineering. (Text book) Larry W. Mays 2005 Edition.
2. Numerical Methods for engineering , Second Edition MC Graw-Hill,New York1988.
3. Thoma M. Walski, Haested Methods Engineering staff, "Computer Application in Hydraulic Engineering", Fifth edition (CAIHE), Haested Methods Inc. 2002
4. R. S. Khurmi, " A Text Book of, Hydraulics, Fluid Mechanics and Hydraulic Mechanics" , Twelfth Edition, 1982.

13- Program Coordination Committee:

Course Coordinator: *Associate Prof. Dr Ahmed Mirdan*

Program coordinator: *Dr. Ahmed Turk*

Head of the Department: *Prof .Dr. Mamdouh Salah*

Course Specification

Program on which the course is given	Civil Engineering
Major or minor element of program	Major
Department offering the program	Civil Engineering
Department offering the course	Civil Engineering
Academic year/Level	2018/2019 / Mr.sc or PhD
Date of specification approval	2018

A- Basic Information

Title: Environmental Quality Systems Engineering	**Code Symbol**: CEI 608	
Lecture	2	
Tutorial	1	
Laboratory	0	
Total	3	Bylaw 2000
First term	prerequisite	Hydraulic

B- Professional Information

1- Course Aims:

This course introduces the basic concepts of the Environmental Impact Assessment, solid and fluid wats, trasnport of pollutants, and impact of civil projects on environments. Case studies for river and sea projects. The basics of preparation EIA reports for water projects are well studied.

2- Course Objectives:

By the end of the course the students will be able to:

- Understanding the main concept of EIA studies.
- Understanding Transportation of pollutants in water.
- Understanding available software for study pollutants dispersion.

3- Intended Learning Outcomes (ILOs):

Field	Program ILOs that the course contribute in achieving	Course ILOs
Knowledge& Understanding	**a-5** Methodologies of solving engineering problems, data collection and interpretation.	**a-5-1** Define the problem and method of study.
	a-6 Professional ethics and impacts of engineering solutions on society and environment.	**a-6-1**Describe the ethics and impacts of engineering solutions on society and environment.
Intellectual skills	**b-2** Select appropriate solutions for engineering problems based on analytical thinking.	**b-2-1**Use the appropriate solution for engineering problems
	b-7 Solve engineering problems, often on the basis of limited and possibly contradicting information.	**b-7-1** Analyze the data, integrate data from available sources and find a creative solution.
Professional skills	**c-2** Use computational facilities and techniques, measuring instruments, workshops and laboratory	**c-2-1** Analyze the problem into points to determine the solution.
General skills	**d-7** Search for information and engage in life-long self-learning discipline.	**d-7-1** Describe the phenomena, collect similar calculations methods, and prepare comparison and validation report.

Applications of optimization methods and uncertainly analysis to the prevention and remediation of pollution – Case studies include regional waste and wastewater treatment – restoration of dissolved oxygen levels in rivers and reclamation of contaminated groundwater – applications use linear programming integer, dynamic, nonlinear programming and sensitivity analysis.

4- Course Contents:

Week No.	*Topic*	*Total Hours*	*Contact hrs*			*Course ILOs Covered (By No.)*
			Lec.	Tut.	Lab.	
Week(1-6)	Introduction of EIA studies					**a-5**
Week(7-10)	Types of river and sea projects and its impacts.					**a-6**
Week(11-15)	Field data and desk data collection methods					**a-5&b-2**
Week(16-19)	Methods of pollutants transportation					**b-7**

Week(20-24)	Analysis Methods of pollutants dispersions					**c-2**
Week(25-30)	Cases study					**d-7**

5- Relationship between the course and the program

Field	**Academic Reference Standard (ARS)**			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Program Academic Standards that the course contribute in achieving	**a 5& a6**	**b2 & b7**	**C2**	**d7**

6- Course Subject Area:

A	**B**	**C**	**D**	**E**	**F**	**G**	
Humanities and Social Science	Mathematics and Basic Sciences	Basic Engineering Science	Applied EngineeringAnd Design	Computer Applications and ICT	Projects and practice	Discretionary subjects	Total
----	**10%**	**20 %**	**20%**	**---**	**30%**	**20%**	**100%**

7- Course Topics:

Topic No.	**Topic**	**Weeks**
1st	Introduction of EIA studies	**1-6**
2nd	Types of river and sea projects and its impacts.	**7-10**
3rd	Field data and desk data collection methods	**11-15**
4th	Methods of pollutants transportation	**16-19**
5th	Analysis Methods of pollutants dispersions	**20-24**
6th	Cases study	**25-30**

8- ILOs Matrix Topics

Course Intended Learning Outcomes (ILOs)		Course topics					
		1st	2nd	3rd	4th	5th	6th
Knowledge & Understanding	**a-5-1** Define the problem and method of study.	x	**x**				
	a-6-1 Describe the ethics and impacts of engineering solutions on society and environment.			**x**			**x**
Intellectual Skills	**b-2-1**Use the appropriate solution for engineering problems				x		
	b-7-1 Analyze the data, integrate data from available sources and find a creative solution			X	x	x	x
Professional Skill	**c-2-1**Analyze the problem into points to determine the solution.				x	x	x
General Skills	**d-7-1** Describe the phenomena, collect similar calculations methods, and prepare comparison and validation report.					x	x

9- Teaching and Learning Method:

Course Intended Learning Outcome (ILOs)		Teaching and Learning Method:												
		Lecture	Presentation and Movies	Discussion	Tutorial	Problem solving	Brain storming	Projects	Site visits	Self learning	Cooperative	Discovering	Modeling	Playing
A- Knowledge& Understanding	a 5-1	x		x										
	a6-1	x		x										
B-IntellectualSkills	b2-1	x		x										
	B7-1	x		x										
C-Professional Skills	C2-1	x		x				x						
D-General Skills	d7-1	x		x				x						

10- Teaching and learning method for low capacity and outstanding Student:

For low capacity students	Assign a portion of the office hours for those students.
	Give them specific tasks.
	Repeat the explanation of some of the material and tutorials.
	Assign a teaching assistance to follow up the performance of this group of students.
For outstanding Students	Hand out project assignments to those students.
	Give them some research topics to be searched using the internet and conduct presentation.
	Encourage them to take parts in the running research projects.

11- Assessment:

11.1 Assessment Methods:

Course Intended Learning Outcome (ILOs)		Assessment Methods											
		Written Exam	Oral Exam	Tutorial Assessment	Project Assessment	Model Assessment	Report Assessment	Quiz assessment	Presentation Assessment	Discussion	Laboratory Test	Sketching drawings	Monitoring
A- Knowledge& Understanding	a 5-1	x											
	a6-1	x											
B-IntellectualSkills	b2-1	x											
	B7-1	x											
C-Professional Skills	c 2-1	x								x			
D-General Skills	d7-1	x						x					

11.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	week
Final examination	70%	
Mid-term written examination		
End of term laboratory examination		
Tutorial and report assessment	30%	
Total	100%	

12- Facilities required for teaching and learning:

A. Laboratory Usage:

B. Library Usage:

Students should be encouraged to use library technical resources in the preparation of reports and oral presentation. At least one oral presentation should involve a significant component of library research to encourage this component of study.

13- List of references:

- Coastal engineering Manual, USACE, EM 1110-2-1100
- Environmental Sciences Europe, Springer Science
- Water Pollution Control - A Guide to the Use of Water Quality Management Principles- World Health Organization
- Hydraulics in Civil and Environmental Engineering 2nd Edition A. Chadwick and J. Morfett
- Hydraulic Structures 2nd Edition P. Novak, A. Moffat, C. Nalluri and R. Naryanan
- International River Water Quality G. Best, T. Bogacka and E. Neimircyz
- Standard Methods for the Examination of Water and Wastewater 19th Edition Water Environment Federation

Course Prof:

Assoc. Prof. Dr . Sherif Abdellah

Program Coordinator:

Dr. Ahmed Turk

Head of Department:

Prof. Dr. Mamdouh Salah

Date: 8/8/2018

Course Specification

Program on which the course is given	Civil Engineering
Major or minor element of program	Major
Department offering the program	Civil Engineering
Department offering the course	Civil Engineering
Academic year/Level	2018 /2019 Mr.sc or PhD
Date of specification approval	2018

A- Basic Information

Title: Hydraulic engineering	**Code Symbol**: CEI 609	
Lecture	3	
Tutorial	0	
Laboratory	0	
Total	3	Bylaw 2000
First term	prerequisite	

B- Professional Information

1- Course Aims:

The course aims to:

- Activate the student knowledge and understanding the science of fluid mechanics and define the necessary engineering applications
- Provide the students with the essential knowledge of the advanced theories of fluid mechanics and the corresponding engineering applications.
- Allowing the student to study within an educational frame work problems of great complexity and relevance in fluid mechanics
- During the course, the student must have the ability to design, water and space fluid mechanics systems

2- Course Objectives

The main Objectives of this course are to equip the students with:

- Knowledge and understanding of key and advanced facts, theories, concepts, principles and techniques relevant to Hydraulic engineering.
- The ability to extend knowledge and develop models and methods and use techniques, principles and laws of engineering science in order to lead to engineering applications design.
- Analyze and design of the water distribution networks, open channels and hydraulic machines.
- Evaluate the impact of the Pollutant dispersal on the environment, and the suitable methods of groundwater extraction.
- Proficiency in the application of the basics and the methodologies of scientific research and the use of its different tools in the area of hydraulic engineering.

3- Intended Learning Outcomes (ILOs):

This course is designed to achieve the above objectives through the following Intended Learning Outcomes (ILOs):

NAQAAE Academic Reference (Standards (ARS	Program ILOs	Course ILOs
A. Knowledge and understanding		
A1. Theories, basics and specialized knowledge in the field of learning, as well as other related subjects.	a1-2 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in the field of Irrigation and hydraulic Engineering.	a1-2-1 Recognize the main Hydraulic engineering theories.
B. Intellectual skills		
B2- Solve specialized problems even with lack of some data and variables, (incomplete data).	b2-1 Apply broad knowledge of modern computational methods and think critically to solve unstructured problems (with incomplete data) related to civil engineering.	b2-1-1 Use the modern computational methods to predict the efficiencies of water distribution network, hydraulic machinery and Pollutant dispersal.
B4- Conduct a research study and/or writing systematic scientific study about Research problem.	b4-1 Write an research plan to conduct applied research.	b4-1-1 Write an research plan to conduct a laboratory work and a design project..
C. Professional and practical skills		
C3- Evaluate means and tools available in the field of practice.	c3-1 Evaluate methods and tools reported in a specified published articles and researches concerning to civil engineering field.	c3-1-1 Evaluate methods and tools reported in a specified published articles and researches concerning to hydraulic engineering field.
D. General and transferrable skills		
D2- Use information technology to improve his/her professional practice.	d2-1 Use state-of-the-art computer design tools and applications for solving civil engineering problems.	d2-1-1 Use state-of-the-art computer and Internet tools for getting latest information and standards related to different hydraulic engineering topics.

4- Course Contents

Lecture Topic	Total Hours	Lec. Hours	Tut. Hours	ILOs covered (By No.)
Principle of conservation of mass, functions and practical applications	6	4	2	a1-2-1 & c3-1-1
Naiver Stokes equations for real-fluid flow in three dimensions, assumptions of development , solution trials and practical examples	12	8	4	a1-2-1, b2-1-1, c3-1-1 & d2-1-1
Turbulent flow, mechanism producing shear stress and defining equation for mixing length in turbulent flow	12	8	4	a1-2-1, b2-1-1 & c3-1-1
Equations for wall shear stress in pipe flow according to Prandtl assumptions and mixing length and corresponding velocity distribution equations and practical examples	12	8	4	a1-2-1, b2-1-1, c3-1-1 & d2-1-1

Energy equation for fluid flow and modifications for energy loss in fluid flow and applications	12	8	4	a1-2-1, c3-1-1 & d2-1-1
Dimensional analysis, functions, π- theorem and applications	6	4	2	a1-2-1, b2-1-1 & c3-1-1
Dynamical similarity expressing flow situations and application in pipe flow	6	4	2	a1-2-1, b2-1-1 & c3-1-1
Governing equations and practical application of Cross-Hardy method in solution of pipe networks and practical examples	6	4	2	a1-2-1, b2-1-1 & c3-1-1
Lectures supplemented by laboratory work and a design project.	12	8	4	a1-2-1, b4-1-1 & c3-1-1
Total	84	56	28	---

5- Relationship between the course and the program

Field	**Academic Reference Standard (ARS)**			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Program Academic Standards that the course contribute in achieving	**a1 (a1,2)**	**b2(b2-1) & b4(b4-1)**	**c3(c3-1)**	**d2(d2-1)**

6- Course Subject Area:

A	**B**	**C**	**D**	**E**	**F**	**G**	
Humanities and Social Science	Mathematics and Basic Sciences	Basic Engineering Science	Applied Engineering And Design	Computer Applications and ICT	Projects and practice	Discretionary subjects	Total
----	**5%**	**5 %**	**40%**	**10%**	**30%**	**-**	**100%**

7- Course Topics:

Topic No.	**Topic**	**Weeks**
1st	Principle of conservation of mass, functions and practical applications.	1-2
2nd	Naiver Stokes equations for real-fluid flow in three dimensions, assumptions of development , solution trials and practical examples	3-6
3rd	Turbulent flow, mechanism producing shear stress and defining equation for mixing length in turbulent flow	7-10
4th	Equations for wall shear stress in pipe flow according to Prandtl assumptions and mixing length and corresponding velocity distribution equations and practical examples	11-14
5th	Energy equation for fluid flow and modifications for energy loss in fluid flow and applications	15-18
6th	Dimensional analysis, functions, π- theorem and applications	19-20

7th	Dynamical similarity expressing flow situations and application in pipe flow	21-22
8th	Governing equations and practical application of Cross-Hardy method in solution of pipe networks and practical examples	23-24
9th	Lectures supplemented by laboratory work and a design project.	25-28

8- ILOs Matrix Topics

Course Intended Learning Outcomes (ILOs)		**Course topics**								
		1st	**2nd**	**3rd**	**4th**	**5th**	**6th**	**7th**	**8th**	**9th**
Knowledge & Understanding	a1-2 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in the field of **fluid Engineering**.	x	**x**	**x**	**x**	**x**	**x**	**x**	**x**	x
Intellectual Skills	b2-1 Apply broad knowledge of modern computational methods and think critically to solve unstructured problems (with incomplete data) related to civil engineering.		**x**	**x**	**x**		**x**	**x**	**x**	
	b4-1 Write an research plan to conduct applied research.									**x**
Professional Skill	c3-1 Evaluate methods and tools reported in a specified published articles and researches concerning to civil engineering field.	x	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**
General Skills	d2-1 Use state-of-the-art computer design tools and applications for solving civil engineering problems.		x		x	x				

9- Teaching and Learning Method:

Course Intended Learning Outcome (ILOs)		Teaching and Learning Method:												
		Lecture	Presentation and Movies	Discussion	Tutorial	Problem solving	Brain storming	Projects	Site visits	Self learning	Cooperative	Discovering	Modeling	Playing
A- Knowledge& Understanding	a1-2	x		x										
B-Intellectual Skills	b2-1	x		x		x								
	b4-1	x		x		x								
C-Professional Skills	c3-1	x		x				x						
D-General Skills	d2-1	x		x		x		x						

10- Teaching and learning method for low capacity and outstanding Student

For low capacity students	Assign a portion of the office hours for those students.
	Give them specific tasks.
	Repeat the explanation of some of the material and tutorials.
	Assign a teaching assistance to follow up the performance of this group of students.
For outstanding Students	Hand out project assignments to those students.
	Give them some research topics to be searched using the internet and conduct presentation.
	Encourage them to take parts in the running research projects.

11- Assessment:

11.1 Assessment Methods

Course Intended Learning Outcome (ILOs)		Assessment Methods											
		Written Exam	Oral Exam	Tutorial Assessment	Project Assessment	Model Assessment	Report Assessment	Quiz assessment	Presentation Assessment	Discussion	Laboratory Test	Sketching drawings	Monitoring
A- Knowledge& Understanding	a1-2	x											
B-Intellectual Skills	b2-1	x											
	b4-1	x											
C-Professional Skills	c3-1	x				x				x			

D-General Skills	**d2-1**	**x**			**x**	**x**		**x**					

11.2 Assessment Schedule and Grades Distribution:

Assessment Method	Percentage	week
Final examination	100%	32
Mid-term written examination		
End of term laboratory examination		
Tutorial and report assessment		
Total	100%	

12- Facilities required for teaching and learning:

A. Laboratory Usage:

B. Library Usage:

Students should be encouraged to use library technical resources in the preparation of reports and oral presentation. At least one oral presentation should involve a significant component of library research to encourage this component of study.

13- List of references:

1 - Fundamentals of Hydraulic Engineering Alan L. Prasuhan, Oxford University press, 2015
2 - Hydraulic Engineering Roberson, Cassidy, Chaudhry, John Willy & Sons Inc.
3 - A text book of Fluid Mechanics and Hydraulic Machines. R.K. Rajput (S. Chand & Company LTD)
Fluid Mechanics - Frank M.White (Mc Graw Hill) ,2005
4 - Journal of Hydraulic Division (ASCE). Periodical

Course coordinator:
Prof. .Dr. Mohamed M. Amin Somaida

Program coordinator:

Dr. Ahmed Turk

Head of Department:

Prof. Dr. Mamdouh Salah

Date: 8/8/2018

Course Specification

Program on which the course is given	Ph.D in Civil Engineering (Specialization: Irrigation and Hydraulic Engineering).
Major or minor element of program	Major
Department offering the program	Civil Engineering
Department offering the course	Civil Engineering
Academic year/Level	2018/ PhD
Date of specification approval	2018

A- Basic Information:

Title: Flow and Contaminant Transport Modeling in Groundwater	**Code Symbol**: CEI 610	
Lecture	3	
Tutorial	0	
Laboratory	0	
Total	3	Bylaw 2000
First term	prerequisite	-

B- Professional Information:

1- Course Aims:

This course introduces the basic concepts of the solute transport modelling in saturated and unsaturated zones. All the equations related to such kind of modeling will be explained. Different kinds of contaminations will be studied.

2- Course Objectives:

By the end of the course the students will be able to:

- Understanding the main concept of solute transport modeling and the related equations and definitions.
- Identifying different types of pollutants.
- Understanding saltwater intrusion phenomenon as an example of groundwater contaminations (its causes, effects and modeling).

3- Intended Learning Outcomes (ILOs):

Field	Program ILOs that the course contribute in achieving	Course ILOs
Knowledge& Understanding	**a-5** Methodologies of solving engineering problems, data collection and interpretation.	**a-5-1** Define the Methodologies of solving engineering problems
	a-6 Professional ethics and impacts of engineering solutions on society and environment.	**a-6-1** Describe the ethics and impacts of engineering solutions on society and environment.
Intellectual skills	**b-1** Select appropriate mathematical and computer-base methods for modeling and analyzing problems	**b-1-1** Use the appropriate mathematical and computer-base methods for modeling and analyzing problems
	b-2 Select appropriate solutions for engineering problems based on analytical thinking.	**b-2-1** Use the appropriate solution for engineering problems
	b-3 Think in a creative and innovative way in problem solving and design.	**b-6-1** Analyze the problem and find a creative solution.
Professional skills	**c-2** Apply numerical modeling methods to engineering problems.	**c-2-1** Analyze the problem into points to determine the solution.
General skills	**d-2** Work in stressful environment and within constraints.	**d-2-1** Describe the stressful environment in construction projects and how to solve any problems at this environment

4- Course Contents:

Week No.	*Topic*	*Total Hours*	*Contact hrs*			*Course ILOs Covered (By No.)*
			Lec.	**Tut.**	**Lab.**	
Week (1-8)	Introduction - Darcy's Law and Hydraulic Conductivity					**a-5-1**
Week (9-15)	Types of Groundwater Contaminants					**a-6-1**
Week (16-23)	Solute Transport in Saturated Media and related equations- principal of solute transport modeling					**b-2-1, a-5-1,b1-1**
Week (24-29)	Saltwater intrusion phenomenon as an example of groundwater contaminations: Introduction-Definitions-Monitoring techniques for groundwater salinity-Previous studies dealing with sea water intrusion in coastal regions worldwide and related modeling-Salt water intrusion problem in coastal regions in Egypt-Salt water intrusion in Nile Delta Aquifer and previous studies related-Mitigations and adaptations suggested for the salt water intrusion problem in Nile Delta Aquifer					**a-6-1, C-2-1, b-6-1, b-2-1,d-2-1,b1-1**

5- Relationship between the course and the program:

Field	Academic Reference Standard (ARS)			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Program Academic Standards that the course contribute in achieving	**a5& a6**	**b1,b2 & b3**	**c2**	**d2**

6- Course Subject Area:

A	B	C	D	E	F	G	
Humanities and Social Science	Mathematics and Basic Sciences	Basic Engineering Science	Applied EngineeringAnd Design	Computer Applications and ICT	Projects and practice	Discretionary subjects	Total
----	5%	40 %	20%	---	30%	5%	100%

7- Course Topics:

Topic No.	Topic	Weeks
1st	Introduction - Darcy's Law and Hydraulic Conductivity	**1-8**
2nd	Types of Groundwater Contaminants.	**9-15**
3rd	Solute Transport in Saturated Media and related equations- principal of solute transport modeling.	**16-23**
4th	Saltwater intrusion phenomenon as an example of groundwater contaminations: Introduction-Definitions-Monitoring techniques for groundwater salinity-Previous studies dealing with sea water intrusion in coastal regions worldwide and related modeling-Salt water intrusion problem in coastal regions in Egypt-Salt water intrusion in Nile Delta Aquifer and previous studies related- Mitigations and adaptations suggested for the salt water intrusion problem in Nile Delta Aquifer	**24-29**

8- ILOs Matrix Topics:

Course Intended Learning Outcomes (ILOs)		1st	2nd	3rd	4th
Knowledge & Understanding	**a-5-1** Define the Methodologies of solving engineering problems	x		**x**	
	a-6-1 Describe the ethics and impacts of engineering solutions on society and environment.		**x**		**x**
Intellectual Skills	**b-1-1**Use the appropriate mathematical and computer-base methods for modeling and analyzing problems			x	x
	b-2-1 Use the appropriate solution for engineering problems			x	x
	b-6-1 Analyze the problem and find a creative solution.				x
Professional Skill	**c-2-1** Analyze the problem into points to determine the solution.				x
General Skills	**d-2-1** Describe the stressful environment in construction projects and how to solve any problems at this environment				x

9- Teaching and Learning Method:

Course Intended Learning Outcome (ILOs)		Teaching and Learning Method:												
		Lecture	Presentation and Movies	Discussion	Tutorial	Problem solving	Brain storming	Projects	Site visits	Self-learning	Cooperative	Discovering	Modeling	Playing
A- Knowledge& Understanding	a5-1	x		x										
	a6-2	x		x										
B-Intellectual Skills	b1-1	x		x										
	b2-1	x		x										
	b6-1	x		x										
C-Professional Skills	c2-1	x		x				x						
D-General Skills	d2-1	x		x				x						

10- Teaching and learning method for low capacity and outstanding Student:

For low capacity students	Assign a portion of the office hours for those students.
	Give them specific tasks.
	Repeat the explanation of some of the material and tutorials.
	Assign a teaching assistance to follow up the performance of this group of students.
For outstanding Students	Hand out project assignments to those students.
	Give them some research topics to be searched using the internet and conduct presentation.
	Encourage them to take parts in the running research projects.

11- Assessment:

11.1 Assessment Methods:

Course Intended Learning Outcome (ILOs)		Assessment Methods											
		Written Exam	Oral Exam	Tutorial Assessment	Project Assessment	Model Assessment	Report Assessment	Quiz assessment	Presentation Assessment	Discussion	Laboratory Test	Sketching drawings	Monitoring
A- Knowledge& Understanding	**a5-1**	x											
	a6-2	x											
B-Intellectual Skills	**b1-1**	x											
	b2-1	x											
	b3-1	x											
C-Professional Skills	**c2-1**	x											
D-General Skills	**d2-1**	x											

11.2 Assessment Schedule and Grades Distribution:

Assessment Method	Percentage	week
Final examination	100	
Mid-term written examination		
End of term laboratory examination		
Tutorial and report assessment		
Total	100%	

12- Facilities required for teaching and learning:

A. Laboratory Usage:

B. Library Usage:

Students should be encouraged to use library technical resources in the preparation of reports and oral presentation. At least one oral presentation should involve a significant component of library research to encourage this component of study.

13- List of references:

- Bear, J., and Cheng, A.H.D., 2010. Modeling Groundwater Flow and Contaminant Transport.
- Dordrecht: Springer, Bnjamin MM, Water Chemistry, New York.

Course Prof:
Dr. Tarek Selim

Program coordinator:

Dr. Ahmed Turk

Head of Department:

Prof. Dr. Mamdouh Salah

Date: 8/8/2018

Course Specification

Program on which the course is given	Civil Engineering
Major or minor element of program	Major
Department offering the program	Civil Engineering
Department offering the course	Civil Engineering
Academic year/Level	2018 /2019 Mr.sc or PhD
Date of specification approval	2018

A. Basic Information

Title: Hydraulic engineering	**Code Symbol**: CEI 612	
Lecture	2	
Tutorial	1	
Laboratory	0	
Total	3	Bylaw 2000
First term	prerequisite	

B. Professional Information

1- Course Aims:

The course aims to:

- Knowledge of physical and mathematical fundamentals of ground water flow in porous media, ground water theory and reaching the equations of motion.
- Ground water reservoirs and physical properties of porous media.
- Considerable and enough information about the field of ground water and knowledge of methods of site investigatiogs in ground water promising areas.
- Ability to design water producing projects in ground water areas and management of fresh ground water resources.

2- Course Objectives:

The main Objectives of this course are to equip the students with:

- Knowledge and understanding of key and advanced facts, theories, concepts, principles and techniques relevant to Hydraulic engineering.
- The ability to extend knowledge and develop models and methods and use techniques, principles and laws of engineering science in order to lead to engineering applications design.

- Analyze and design of the water distribution networks, open channels and hydraulic machines.
- Evaluate the impact of the Pollutant dispersal on the environment, and the suitable methods of groundwater extraction.
- Proficiency in the application of the basics and the methodologies of scientific research and the use of its different tools in the area of hydraulic engineering.

3- Intended Learning Outcomes (ILOs):

This course is designed to achieve the above objectives through the following Intended **Learning Outcomes (ILOs)**:

NAQAAE Academic (Reference Standards (ARS	**Program ILOs**	**Course ILOs**
A. Knowledge and understanding		
A1. Theories, basics and specialized knowledge in the field of learning, as well as other related subjects.	a1-2 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in the field of **Irrigation and hydraulic Engineering**.	a1-2-1 Recognize the main Hydraulic engineering theories.
B. Intellectual skills		
B2- Solve specialized problems even with lack of some data and variables, (incomplete data).	b2-1 Apply broad knowledge of modern computational methods and think critically to solve unstructured problems (with incomplete data) related to civil engineering.	b2-1-1 Use the modern computational methods to predict the efficiencies of water distribution network, hydraulic machinery and Pollutant dispersal.
B4- Conduct a research study and/or writing systematic scientific study about Research problem.	b4-1 Write an research plan to conduct applied research.	b4-1-1 Write an research plan to conduct a laboratory work and a design project..
C. Professional and practical skills		
C3- Evaluate means and tools available in the field of practice.	c3-1 Evaluate methods and tools reported in a specified published articles and researches concerning to civil engineering field.	c3-1-1 Evaluate methods and tools reported in a specified published articles and researches concerning to hydraulic engineering field.

D. General and transferrable skills		
D2- Use information technology to improve his/her professional practice.	d2-1 Use state-of-the-art computer design tools and applications for solving civil engineering problems.	d2-1-1 Use state-of-the-art computer and Internet tools for getting latest information and standards related to different hydraulic engineering topics.

4- Course Contents:

Lecture Topic	Total Hours	Lec. Hours	Tut. Hours	ILOs covered (By No.)
Classification of ground -water reservoirs and physical properties of porous media	6	4	2	a1-2-1 & c3-1-1
Laboratory and field equipment used in ground-water reservoir to measure reservoir characteristics	12	8	4	a1-2-1, b2-1-1, c3-1-1 & d2-1-1
Mathematical fundamentals of ground water flow and equations of motion of ground water	12	8	4	a1-2-1, b2-1-1 & c3-1-1
Ground water theory as applied in hydraulics of wells	12	8	4	a1-2-1, b2-1-1, c3-1-1 & d2-1-1
Energy losses due to ground water movement in porous media and the corresponding head loss equation as related to the friction factor in porous media	12	8	4	a1-2-1, c3-1-1 & d2-1-1
Evaluation and management of promising ground water resources.	6	4	2	a1-2-1, b2-1-1 & c3-1-1
Analysis of seepage theory in homogeneous porous media	6	4	2	a1-2-1, b2-1-1 & c3-1-1
Equations describing pollutant transport in ground water flow and solutions	6	4	2	a1-2-1, b2-1-1 & c3-1-1
Ground water modeling	12	8	4	a1-2-1, b4-1-1 & c3-1-1
Total	84	56	28	---

5- Relationship between the course and the program:

Field	Academic Reference Standard (ARS)			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Program Academic Standards that the course contribute in achieving	**a1 (a1,2)**	**b2(b2-1) & b4(b4-1)**	**c3(c3-1)**	**d2(d2-1)**

6- Course Subject Area:

A	B	C	D	E	F	G	
Humanities and Social Science	Mathematics and Basic Sciences	Basic Engineering Science	Applied EngineeringAnd Design	Computer Applications and ICT	Projects and practice	Discretionary subjects	Total
----	**5%**	**5 %**	**40%**	**10%**	**30%**	**-**	**100%**

7- Course Topics:

Topic No.	Topic	Weeks
1st	Classification of ground -water reservoirs and physical properties of porous media	**1-2**
2nd	Laboratory and field equipment used in ground-water reservoir to measure reservoir characteristics	**3-6**
3rd	Mathematical fundamentals of ground water flow and equations of motion of ground water	**7-10**
4th	Ground water theory as applied in hydraulics of wells	**11-14**
5th	Energy losses due to ground water movement in porous media and the corresponding head loss equation as related to the friction factor in porous media	**15-18**
6th	Analysis of seepage theory in homogeneous porous media	**19-20**
7th	Equations describing pollutant transport in ground water flow and solutions	**21-22**
8th	Evaluation and management of promising ground water resources	**23-24**
9th	Ground water modeling	**25-28**

8- ILOs Matrix Topics:

Course Intended Learning Outcomes (ILOs)		Course topics								
		1st	2nd	3rd	4th	5th	6th	7th	8th	9th
Knowledge & Understanding	a1-2 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in the field of **flow the porous media and ground water**	x	**x**	**x**	**x**	**x**	**x**	**x**	**x**	x
Intellectual Skills	b2-1 Apply broad knowledge of modern computational methods and think critically to solve unstructured problems (with incomplete data) related to civil engineering.		**x**	**x**	**x**		**x**	**x**	**x**	
	b4-1 Write an research plan to conduct applied research.									**x**
Professional Skill	c3-1 Evaluate methods and tools reported in a specified published articles and researches concerning to civil engineering field.	x	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**
General Skills	d2-1 Use state-of-the-art computer design tools and applications for solving civil engineering problems.		x		x	x				

9- Teaching and Learning Method:

Course Intended Learning Outcome (ILOs)		Teaching and Learning Method:												
		Lecture	Presentation and Movies	Discussion	Tutorial	Problem solving	Brain storming	Projects	Site visits	Self learning	Cooperative	Discovering	Modeling	Playing
A- Knowledge& Understanding	a1-2	x		x										
B-Intellectual Skills	b2-1	x		x		x								
	b4-1	x		x		x								
C-Professional Skills	c3-1	x		x				x						
D-General Skills	d2-1	x		x		x		x						

10- Teaching and learning method for low capacity and outstanding Student

For low capacity students	Assign a portion of the office hours for those students.
	Give them specific tasks.
	Repeat the explanation of some of the material and tutorials.
	Assign a teaching assistance to follow up the performance of this group of students.
For outstanding Students	Hand out project assignments to those students.
	Give them some research topics to be searched using the internet and conduct presentation.
	Encourage them to take parts in the running research projects.

11- Assessment:

11.1 Assessment Methods

Course Intended Learning Outcome (ILOs)		Assessment Methods											
		Written Exam	Oral Exam	Tutorial Assessment	Project Assessment	Model Assessment	Report Assessment	Quiz assessment	Presentation	Discussion	Laboratory Test	Sketching drawings	Monitoring
A- Knowledge& Understanding	**a1-2**	x											
B-Intellectual Skills	**b2-1**	x											
	b4-1	x											
C-Professional Skills	**c3-1**	x				x				x			
D-General Skills	**d2-1**	x			x	x		x					

11.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	week
Final examination	100%	32
Mid-term written examination		
End of term laboratory examination		
Tutorial and report assessment		
Total	100%	

12- Facilities required for teaching and learning

A. Laboratory Usage:

B. Library Usage:

Students should be encouraged to use library technical resources in the preparation of reports and oral presentation. At least one oral presentation should involve a significant component of library research to encourage this component of study

13- List of references:

1 - Fundamentals of Hydraulic Engineering Alan L. Prasuhan, Oxford University press, 2015
2 - Hydraulic Engineering Roberson, Cassidy, Chaudhry, John Willy & Sons Inc.
3 - A text book of Fluid Mechanics and Hydraulic Machines. R.K. Rajput (S. Chand & Company LTD)
Fluid Mechanics - Frank M.White (Mc Graw Hill) ,2005
4 - Journal of Hydraulic Division (ASCE). Periodical

Course coordinator:
Prof. .Dr. Mohamed M. Amin Somaida

Program coordinator:

Dr. Ahmed Turk

Head of Department:

Prof.Dr. Mamdouh Salah

Date: 8/8/2018

Course Specification

Program on which the course is given	Civil Engineering
Major or minor element of program	Major
Department offering the program	Civil Engineering
Department offering the course	Civil Engineering
Academic year/Level	2018/2019 / Mr.sc or PhD
Date of specification approval	2018

A. Basic Information

Title: Small and Finite Amplitude Water Waves	**Code Symbol**: CEI 613	
Lecture	3	
Tutorial	0	
Laboratory	0	
Total	3	Bylaw 2000
First term	prerequisite	

B. Professional Information

1- Course Aims:

This course introduces the basic concepts of the Waves mechanics-Coastal Engineering for the civil engineer. The basics of the Coastal Engineering are well studied.

2- Course Objectives:

By the end of the course the students will be able to:

- Understanding the main concept of Waves Mechanics.
- Understanding main theory assumptions.
- Understanding equations derivation and its applications in wave propagation and refraction/diffraction.

3- Intended Learning Outcomes (ILOs):

Field	Program ILOs that the course contribute in achieving	Course ILOs
Knowledge& Understanding	**A-1** Theories and basics related to learning field, as well as other related fields.	**a-1-1** Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in the field of Structural Engineering.
	A-3 Main scientific advances in the field of specialization	**a-3-1** Classify the Potential applications of advanced civil engineering applications.
Intellectual skills	**B-2** Solve specialized problems even with lack of some data and variables, (incomplete data).	**b-2-1** Apply broad knowledge of modern computational methods and think critically to solve unstructured problems (with incomplete data) related to civil engineering.
	B-3 Link and integrate diverse knowledge to solve professional problems.	**b-3-1** Analyze, interpret and manipulate data from a variety of sources and relate it to solve professional problems.
Professional skills	**C-3** Evaluate means and tools available in the field of practice.	**c-3-1** Evaluate methods and tools reported in a specified published articles and researches concerning to civil engineering field.
General skills	**D-7** Time management effectively	**d-7-1** Manage the time use in a perfect way.

4- Course Contents:

Week No.	*Topic*	*Total Hours*	*Contact hrs.*			*Course ILOs Covered (By No.)*
			Lec.	**Tut.**	**Lab.**	
Week (1-5)	Introduction of wave theories	3	3			**a-1**
Week (6-10)	Wave Propagation process	3	3			**a-3**
Week (11-15)	Applications on wave propagations	3	3			**b-3**
Week (16-20)	Methods of wave refraction estimation	3	3			**b-2**
Week (21-25)	Analysis Methods of wave diffraction	3	3			**c-3**
Week (26-30)	Analysis Methods of wave reflection	3	3			**d-7**

5- Relationship between the course and the program:

Field	Academic Reference Standard (ARS)			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Program Academic Standards that the course contribute in achieving	**a 1& a3**	**b2 & b3**	**C3**	**d7**

6- Course Subject Area:

A	B	C	D	E	F	G	
Humanities and Social Science	Mathematics and Basic Sciences	Basic Engineering Science	Applied Engineering And Design	Computer Applications and ICT	Projects and practice	Discretionary subjects	Total
----	**10%**	**50 %**	**10%**	**---**	**20%**	**10%**	**100 %**

7- Course Topics:

Topic No.	Topic	Weeks
1st	Introduction of wave theories	1-5
2nd	Wave Propagation process	6-10
3rd	Applications on wave propagations	11-15
4th	Methods of wave refraction estimation	16-20
5th	Analysis Methods of wave diffraction	21-25
6th	Analysis Methods of wave reflection	26-30

8- ILOs Matrix Topics:

Course Intended Learning Outcomes (ILOs)		Course topics					
		1st	2nd	3rd	4th	5th	6th
Knowledge & Understanding	**a-1-1** Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in the field of Structural Engineering.	x	**x**				
	a-3-1 Classify the Potential applications of advanced civil engineering applications.			**x**			**x**
Intellectual Skills	**b-2-1** Apply broad knowledge of modern computational methods and think critically to solve unstructured problems (with incomplete data) related to civil engineering.		x				
	b-3-1 Analyze, interpret and manipulate data from a variety of sources and relate it to solve professional problems.			X	x	x	x
Professional Skill	**c-3-1** Evaluate methods and tools reported in a specified published articles and researches concerning to civil engineering field.				x	x	x
General Skills	**d-7-1** Manage the time use in a perfec way.					x	x

9- Teaching and Learning Method:

Course Intended Learning Outcome (ILOs)		Teaching and Learning Method:												
		Lecture	Presentation and Movies	Discussion	Tutorial	Problem solving	Brain storming	Projects	Site visits	Self learning	Cooperative	Discovering	Modeling	Playing
A- Knowledge& Understanding	a 1-1	x		x										
	A3-1	x		x										
B-Intellectual Skills	b2-1	x		x										
	b3-1	x		x										
C-Professional Skills	c 3-1	x		x				x						
D-General Skills	d7-1	x		x				x						

10- Teaching and learning method for low capacity and outstanding Student:

For low capacity students	Assign a portion of the office hours for those students.
	Give them specific tasks.
	Repeat the explanation of some of the material and tutorials.
	Assign a teaching assistance to follow up the performance of this group of students.
For outstanding Students	Hand out project assignments to those students.
	Give them some research topics to be searched using the internet and conduct presentation.
	Encourage them to take parts in the running research projects.

11- Assessment:

11.1 Assessment Methods:

Course Intended Learning Outcome (ILOs)		Assessment Methods											
		Written Exam	Oral Exam	Tutorial Assessment	Project Assessment	Model Assessment	Report Assessment	Quiz assessment	Presentation Assessment	Discussion	Laboratory Test	Sketching drawings	Monitoring
A- Knowledge& Understanding	a 1-1	x											
	A3-1	x											
B-Intellectual Skills	b2-1	x											
	b3-1	x											
C-Professional Skills	c 3-1	x								x			
D-General Skills	d7-1	x						x					

11.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	week
Final examination		
Mid-term written examination		
End of term laboratory examination		
Tutorial and report assessment		
Total	100%	

12- Facilities required for teaching and learning:

Whiteboard – Class Room Equipped with Computer and Video Projector - Computer Lab - Library.

A. Laboratory Usage:

B. Library Usage:

Students should be encouraged to use library technical resources in the preparation of reports and oral presentation. At least one oral presentation should involve a significant component of library research to encourage this component of study.

13- List of references:

1. U S. Army Coastal Engineering Research, "Shore Protection Manual".
2. Robert M. Sorensen, "Basic Coastal Engineering", Springer, 1997.

Course Prof:

Assistant Prof. Dr. Elsayed Galal Elghandour

Assoc. Prof. Dr. Mohamed Elkiki

Program coordinator:

Dr. Ahmed Turk

Head of Department:

Prof. Dr. Mamdouh Salah

Date: *August 2018*

Course Specification

Program on which the course is given	Civil Engineering
Major or minor element of the program	Major
Department offering the program	Civil Engineering
Department offering the course	Civil Engineering
Academic year/Level	2018/2019 Mr.sc or PhD
Date of specification approval	2018

A- Basic Information

Title: Environmental Fluid Mechanics	**Code Symbol**: CEI 614	
Lecture	2	
Tutorial	1	
Laboratory	0	
Total	3	Bylaw 2000
	prerequisite	-

B- Professional Information

1- Course Aims:

This course builds the basic concepts of Mechanics of layered and continuously stratified fluids – Internal waves, density currents, selective withdrawal, and baroclinic motions – Turbulence in stratified fluids – Tets and plumes and their behavior in the environment- Turbulence diffusion, shear flow dispersion, wave-induced and tidal mixing processes – Applications to mixing processes in rivers, lakes, estuaries and oceans .

2- Course Objectives

By the end of the course, the students will be able to:

- Understanding the Internal waves.
- Identifying Tets and plumes and their behavior in the environment.
- Applications to mixing processes in rivers, lakes.

3- Intended Learning Outcomes (ILOs):

Field	Program ILOs that the course contribute to achieving	Course ILOs
Knowledge& Understanding	**A-1** Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in the field of soil mechanics and hydraulics.	**a1-1** Demonstrate sufficient essential knowledge and a deep understanding of waves.
	A-2 Mutual relation between professional aspects of professional practice and its effects on the Environment.	**a2-1** Discuss the effects of civil engineering technologies on the surrounding environment.
Intellectual skills	**B-1** Analyze and evaluate the information in the field of specialization, and solve the problems based on that.	**b1-1** Demonstrate an investigatory and analytic thinking approach for fluid mechancis.
	B-2 Solve specialized problems even with lack of some data and variables, (incomplete data).	**b2-1** Apply broad knowledge of modern computational methods and think critically to solve unstructured problems find a creative solution .
Professional skills	**C-3** Evaluate means and tools available in the field of practice.	**c3-1** Evaluate methods and tools reported in a specified published articles and researches concerning to fluid mechanics.
General skills	**D-2** Use information technology to improve his/her professional practice.	**d2-1** Use state-of-the-art computer design tools and applications for solving and how to solve any problems in this environment**.**

4- Course Contents

Week No.	*Topic*	*Total Hours/week*	*Contact hrs*			*Course ILOs Covered (By No.)*
			Lec.	**Tut.**	**Lab.**	
Week (1-7)	Mechanics of layered and continuously stratified fluids	3	2	1	0	**a1-1 & a2-1**
Week (8-15)	Internal waves, density currents, selective withdrawal, and baroclinic motions	3	2	1	0	**b1-1 & b2-1**
Week (16-22)	Turbulence in stratified fluids – Test and plumes and their behavior in the environment	3	2	1	0	**c3-1 & d2-1**
Week (23-30)	Turbulence diffusion, shear flow dispersion, wave-induced and tidal	3	2	1	0	**c3-1 & d2-1**

	mixing processes budget and flow processes					

5- Relationship between the course and the program

Field	Academic Reference Standard (ARS)			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Program Academic Standards that the course contribute in achieving	**a1 & a2**	**b1 & b2**	**C3**	**d2**

6- Course Subject Area:

A	B	C	D	E	F	G	
Humanities and Social Science	Mathematics and Basic Sciences	Basic Engineering Science	Applied Engineering and Design	Computer Applications and ICT	Projects and practice	Discretionary subjects	Total
----	**5%**	**40 %**	**20%**	**---**	**30%**	**5%**	**100%**

7- Course Topics.

Topic No.	Topic	Weeks
1st	Mechanics of layered and continuously stratified fluids	1-7
2nd	Internal waves, density currents, selective withdrawal, and baroclinic motions	8-15
3rd	Turbulence in stratified fluids – Tets and plumes and their behavior in the environment	16-22
4th	Turbulence diffusion, shear flow dispersion, wave-induced and tidal mixing processes budget and flow processes	23-30

8- ILOs Matrix Topics

Course Intended Learning Outcomes (ILOs)		1st - 7th	8th - 15th	16th - 22th	23th - 30th
Knowledge & Understanding	**a1-1** Demonstrate sufficient essential knowledge and a deep understanding of waves.	x			
	a2-1 Discuss the effects of civil engineering technologies on the surrounding environment.	x			
Intellectual Skills	**b1-1** Demonstrate an investigatory and analytic thinking approach for fluid mechancis.		x		
	b2-1 Apply broad knowledge of modern computational methods and think critically to solve unstructured problems find a creative solution .		x		
Professional Skill	**c3-1** Evaluate methods and tools reported in a specified published articles and researches concerning to fluid mechanics.			x	x
General Skills	**d2-1** Use state-of-the-art computer design tools and applications for solving and how to solve any problems in this environment**.**			x	x

9- Teaching and Learning Method:

Course Intended Learning Outcome (ILOs)		Teaching and Learning Method:												
		Lecture	Presentation and	Discussion	Tutorial	Problem-solving	Brainstorming	Projects	Site visits	Self-learning	Cooperative	Discovering	Modelling	Playing
A- Knowledge& Understanding	a1-1	x		x										

	a2-2	x		x										
B-Intellectual Skills	b1-1	x		x										
	b2-1	x		x										
C-Professional Skills	c3-1	x		x				x						
D-General Skills	d2-1	x		x				x						

10- Teaching and learning method for low capacity and outstanding Student:

For low capacity students	Assign a portion of the office hours for those students.
	Give them specific tasks.
	Repeat the explanation of some of the material and tutorials.
	Assign teaching assistant to follow up the performance of this group of students.
For outstanding Students	Hand out project assignments to those students.
	Give them some research topics to be searched using the internet and conduct presentation.
	Encourage them to take parts in the running research projects.

11- Assessment:

11.1 Assessment Methods:

Course Intended Learning Outcome (ILOs)		Assessment Methods											
		Written Exam	Oral Exam	Tutorial Assessment	Project Assessment	Model Assessment	Report Assessment	Quiz assessment	Presentation Assessment	Discussion	Laboratory Test	Sketching drawings	Monitoring
A- Knowledge& Understanding	a1-1	x				x							
	a2-1	x				x							
B- Intellectual Skills	b1-1	x					x						
	b2-1	x							x				
C-Professional Skills	c3-1	x										x	
D-General Skills	d2-1	x										x	

11.2 Assessment Schedule and Grades Distribution:

Assessment Method	Percentage	week
Final examination	100	
Mid-term written examination		
End of term laboratory examination		
Tutorial and report assessment		
Total	100%	

12- Facilities required for teaching and learning:

A. Laboratory Usage:

B. Library Usage:

Students should be encouraged to use library technical resources in the preparation of reports and oral presentation. At least one oral presentation should involve a significant component of library research to encourage this component of the study.

13- List of references:

1 - Fundamentals of Hydraulic Engineering Alan L. Prasuhan, Oxford University press, 2015
2 - Hydraulic Engineering Roberson, Cassidy, Chaudhry, John Willy & Sons Inc.
3 - A text book of Fluid Mechanics and Hydraulic Machines. R.K. Rajput (S. Chand & Company LTD)
Fluid Mechanics - Frank M.White (Mc Graw Hill) ,2005
4 - Journal of Hydraulic Division (ASCE). Periodical

Course Coordinator:

Dr. Mohamed Eltarabily

Program Coordinator:

Dr. Ahmed Turk

Head of Department:

Prof. Dr. Mamdouh Salah

Date: 8/8/2018

Course Specification

Program on which the course is given	*M. Sc. & Ph.D. in Civil Eng. (Specialization: Irrigation and Hydraulic Engineering)*
Major or minor element of program	*Major*
Department offering the program	*Civil Engineering*
Department offering the course	*Civil Engineering*
Academic year/Level	*2018/ 2019 M. Sc. & Ph.D.*
Date of specification approval	*2018*

A- Basic Information

Title: Natural phenomena	**Code Symbol**: CEI 615	
Lecture	2 hours	
Tutorial / Laboratory	1	
Total	3 hours	By law 2000

B- Professional Information

1- Course Aims:

This course is designed to extend basic concepts learned in Oceanic and coastal natural phenomena. For those students who look toward harbor and coastal engineering after graduation, this course is designed to widen background in coastal engineering and help them to meet the coastal projects demand. This course will also provide an excellent opportunity to provide students with learning about how to predict the wind waves and make students aware with currents and tide issues. The course is meant to create the deep understanding of the basics and theories behind the different types of currents and tides.

2- Course Objectives

The main Objectives of this course are to equip the students with:

1. Knowledge and understanding of key and advanced facts, theories, concepts, principles and techniques relevant to solve the problems in coastal areas using the data of wind, waves, currents , and tide data.
2. Recognize the governing factors control the choice Wind measurements and

data collection.

3. Evaluate the impact of the wave data on the environment, and the suitable estimated empirical dimensions of the elements of the harbor.
4. Analyze and design of the harbor structures related to the natural phnomena data.
5. Proficiency in the application of the basics and the methodologies of scientific research and the use of its different tools in the area of coastal engineering.

3- Intended Learning Outcomes (ILOs)

NAQAAE Academic Reference Standards (ARS)	Program ILOs	Course ILOs
A. Knowledge and understanding		
A1- Theories and basics related to learning field, as well as other related fields.	**a1-2** Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in the field of **Irrigation and hydraulic Engineering**.	**a1-2** Describe the different types of natural phenomena related to the coastal and Ocean area.
B. Intellectual skills		
B2- Solve specialized problems with available givens and parameters. .	**b2-1** Apply broad knowledge of modern computational methods and think critically to solve unstructured problems (with incomplete data) related to civil engineering.	**b2-1** Use the modern computational methods to predict the wind and current data.
C. Professional and practical skills		
C1- Mastering the basics as well as the latest professional skills in the field of specialization.	**C1-1** Express competence skills, such as identifying, formulating, analyzing, and creating engineering solutions, using latest engineering techniques, skills, and tools.	**C1-1** Express competence skills, such as identifying, formulating, analyzing, and creating engineering solutions related to the prediction of natural phenomena such as wind, waves, and current, using latest engineering techniques, skills, and tools.
D. General and transferrable skills		
D2- Use information technology to improve his/her professional practice	**d2-1** Use state-of-the-art computer design tools and applications for solving civil engineering problems	**d2-1** Use state-of-the-art computer and Internet tools for getting latest information and standards related to wind and wave data prediction.

4- Course Contents

Topic	*Total Hours*	*Contact hrs*			*Course ILOs Covered (By No.)*
		Lec.	Tut.	Lab.	
1. Introduction about Natural Phenomena.	**12**	**8**	**4**	**--**	**a1-2**
2. Wind generation.	**12**	**8**	**4**	**--**	**a1-2, b2-1**
3. Wind measurements and data collection.	**12**	**8**	**4**	**--**	**a1-2, b2-1, C1-1, d2-1**
4. Wave generated from wind.	**12**	**8**	**4**	**--**	**a1-2, C1-1**
5. Wave Prediction from wind studies.	**12**	**8**	**4**	**--**	**a1-2, b2-1, C1-1, d2-1**
6. Types of Currents.	**12**	**8**	**4**	**--**	**a1-2, d2-1**
7. Types of Tides.	**12**	**8**	**4**	**--**	**a1-2, d2-1**
Total	**84**	**56**	**28**	**--**	

5- Relationship between the course and the program

Field	National Academic Reference Standard(NARS)			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Program Academic Standards that the course contribute in achieving	**A1(a1-2)**	**B1(b2-1**	**C1(C1-1)**	**D2(d2-1)**

6- Course Subject Area:

A	B	C	D	E	F	G	
Humanities and Social Science	Mathematics and Basic Sciences	Basic Engineering Science	Applied Engineering And Design	Computer Applications and ICT	Projects and practice	Disccretionry subjects	Total
---	5%	50%	30%	15%	---	---	100%

7- Course Topics.

Topic No.	Topic	Weeks
1st	Introduction about Natural Phenomena.	**1-4**
2nd	Wind generation.	**5-8**
3rd	Wind measurements and data collection.	**9-12**
4th	Wave generated from wind.	**13-16**
5th	Wave Prediction from wind studies.	**17-20**
6th	Types of Currents.	**21-24**
7th	Types of Tides.	**25-28**

8- ILOs Matrix Topics

Course topics	1st	2nd	3rd	4th	5th	6th	7th
Course ILOs	**Knowledge & Understanding**						
a1-2 Describe the different types of natural phenomena related to the coastal and Ocean area.	x	x	x	x	x	x	x
Course ILOs	**Intellectual skills**						
b2-1 Use the modern computational methods to predict the wind and current data.		x	x		x		
Course ILOs	**Professional and practical skills**						
C1-1 Express competence skills, such as identifying, formulating, analyzing, and creating engineering solutions related to the prediction of natural phenomena such as wind, waves, and current, using latest engineering techniques, skills, and tools.			x	x	x		
Course ILOs	**General and transferrable skills**						
d2-1 Use state-of-the-art computer and Internet tools for getting latest information and standards related to wind and wave data prediction.			x		x	x	x

9- Teaching and Learning Method:

Course Intended learning	Teaching and Learning Method

outcomes (ILOs)		Lecture	Presentation and	Discussion	Tutorial	Problem solving	Brain storming	Projects	Report	Self learning	Cooperative	Discovering	Computer Simulation	Practical Experiments
Knowledge & understanding	**a1-2**	x	x	x	x	x			x	x				
Intellectual Skills	**B2-1**		x						x			x	x	
Professional Skills	**C1-1**		x						x			x	x	
General Skills	**d2-1**									x	x		x	

10- Assessment:

10.1 Assessment Methods

Final Written Examination : To assess students' knowledge, understanding, analysis, creativity, problem solving, and problem identification.

10.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	week
Final Examination	**100**	**32**
Total	**100%**	

11- Facilities required for teaching and learning:

Whiteboard – Class Room Equipped with Computer and Video Projector - Computer Lab - Library.

A. Library Usage:

Students should be encouraged to use library technical resources in the studying the course.

12- List of references:

1. Leo H. Holthuijsen, " Waves in Oceabic and Coastal Waters" Cambridge University Press, 2007.
2. Robert M. Sorensen, "Basic Coastal Engineering", Springer, 1997.
3. J. William Kamphuis, " Introduction To Coastal Engineering And Management", Advanced Series on Ocean Engineering: Volume 16, 2000.
4. Dominic Reeve, Andrew Chadwick, and Christopher Fleming, "Coastal Engineering: Processes, theory and design practice", Spon Press, 2004.
5. V. Sundar, "Ocean Wave Mechanics: Applications in Marine Structures", John Wiley & Sons Ltd, 2016
6. Joseph Pedlosky, Waves in the Ocean and Atmosphere: Introduction to wave dynmaics“, Springer, 2003.

13- Program Coordination Committee:

Signature

Course Prof: *Assoc. Prof. Dr. Elsayed Galal*

Program coordinator: *Dr. Ahmed Turk*

Head of Department: *Prof. Dr. Mamdouh Saleh*

Date: August 2018

Course Specification

Program on which the course is given		Civil Engineering
Major or minor element of program		Major
Department offering the program		Civil Engineering
Department offering the course		Civil Engineering
Academic year/Level		2018 / Mr.sc or PhD
Date of specification approval		2018

A- Basic Information

Title: Wave Theory	**Code Symbol:** CEI 616	
Lecture	2 hours	
Tutorial / Laboratory	1	
Total	3 hours	By law 2000

B- Professional Information

1- Course Aims:

This course is designed to extend basic concepts learned in Oceanic and coastal wave Mechanics. For those students who look toward harbor and coastal engineering after graduation, this course is designed to widen background in coastal engineering and help them to meet the coastal projects demand. This course will also provide an excellent opportunity to provide students with learning about how to predict the waves and make students aware with their theories. The course is meant to create the deep understanding of the basics and theories behind the different types of waves.

2- Course Objectives

The main Objectives of this course are to equip the students with:

1. Knowledge and understanding of key and advanced facts, theories, concepts, principles and techniques relevant to Wave Mechanics.
2. Recognize the governing factors control the choice Wind measurements and wave data collection.
3. Understanding the main theory assumptions.
4. Understanding equations derivation and its applications in wave propagation and refraction/diffraction.

3- Intended Learning Outcomes (ILOs)

NAQAAE Academic Reference Standards (ARS)	Program ILOs	Course ILOs
A. Knowledge and understanding		
A1- Theories and basics related to learning field, as well as other related fields.	**a1-2** Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in the field of **Irrigation and hydraulic Engineering**.	**a1-2** Describe the different types of oceanic wave theories.
B. Intellectual skills		
B2- Solve specialized problems with available givens and parameters. .	**b2-1** Apply broad knowledge of modern computational methods and think critically to solve unstructured problems (with incomplete data) related to civil engineering.	**b2-1** Use the modern computational methods to predict the propagation of waves.
C. Professional and practical skills		
C1- Mastering the basics as well as the latest professional skills in the field of specialization.	**C1-1** Express competence skills, such as identifying, formulating, analyzing, and creating engineering solutions, using latest engineering techniques, skills, and tools.	**C1-1** Express competence skills, such as identifying, formulating, analyzing, and creating engineering solutions related to the prediction of waves using latest engineering techniques, skills, and tools.
D. General and transferrable skills		
D2- Use information technology to improve his/her professional practice	**d2-1** Use state-of-the-art computer design tools and applications for solving civil engineering problems	**d2-1** Use state-of-the-art computer and Internet tools for getting latest information and standards related to wave data prediction.

4- Course Contents

Topic	*Total Hours*	*Contact hrs*			*Course ILOs Covered (By No.)*
		Lec.	Tut.	Lab.	
1. Introduction of wave theories	**12**	**8**	**4**	**--**	**a1-2**
2. Wave theories assumptions	**12**	**8**	**4**	**--**	**a1-2, b2-1**
3. Wave Propagation process	**12**	**8**	**4**	**--**	**a1-2, b2-1, C1-1, d2-1**
4. Applications on wave propagations	**12**	**8**	**4**	**--**	**a1-2, C1-1**
5. Methods of wave refraction estimation	**12**	**8**	**4**	**--**	**a1-2, b2-1, C1-1, d2-1**
6. Analysis Methods of wave reflection	**12**	**8**	**4**	**--**	**a1-2, b2-1, d2-1**
7. Analysis Methods of wave diffraction	**12**	**8**	**4**	**--**	**a1-2, b2-1, d2-1**
Total	**84**	**56**	**28**	**--**	

5- Relationship between the course and the program

Field	Academic Reference Standard (ARS)			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Program Academic Standards that the course contribute in achieving	**A1(a1-2)**	**B1(b2-1)**	**C1(C1-1)**	**D2(d2-1)**

6- Course Subject Area:

A	B	C	D	E	F	G	
Humanities and Social Science	Mathematics and Basic Sciences	Basic Engineering Science	Applied Engineering And Design	Computer Applications and ICT	Projects and practice	Discretionry subjects	Total
---	5%	50%	30%	15%	---	---	100%

7- Course Topics.

Topic No.	Topic	Weeks
1st	Introduction of wave theories	**1-4**
2nd	Wave theories assumptions	**5-8**
3rd	Wave Propagation process	**9-12**
4th	Applications on wave propagations	**13-16**
5th	Methods of wave refraction estimation	**17-20**
6th	Analysis Methods of wave diffraction	**21-24**
7th	Analysis Methods of wave reflection	**25-28**

8- ILOs Matrix Topics

Course topics	1st	2nd	3rd	4th	5th	6th	7th
Course ILOs	**Knowledge & Understanding**						
a1-2 Describe the different types of oceanic wave theories.	x	x	x				
Course ILOs	**Intellectual skills**						
b2-1 Use the modern computational methods to predict the propagation of waves.			x	x	x	x	x
Course ILOs	**Professional and practical skills**						
C1-1 Express competence skills, such as identifying, formulating, analyzing, and creating engineering solutions related to the prediction of waves using latest engineering techniques, skills, and tools.					x	x	x
Course ILOs	**General and transferrable skills**						
d2-1 Use state-of-the-art computer and Internet tools for getting latest information and standards related to wave data prediction.			x		x	x	x

9- Teaching and Learning Method:

Course Intended learning outcomes (ILOs)		Teaching and Learning Method												
		Lecture	Presentation and	Discussion	Tutorial	Problem solving	Brain storming	Projects	Report	Self learning	Cooperative	Discovering	Computer Simulation	Practical Experiments
Knowledge & understanding	**a1-2**	x	x	x	x	x			x	x				
Intellectual Skills	**B2-1**		x						x			x	x	
Professional Skills	**C1-1**		x						x			x	x	
General Skills	**d2-1**									x	x		x	

10- Assessment:

10.1 Assessment Methods

Final Written Examination : To assess students' knowledge, understanding, analysis, creativity, problem solving, and problem identification.

10.2 Assessment Schedule and Grades Distribution:

Assessment Method	Percentage	week
Final Examination	**100**	**32**
Total	**100%**	

11- Facilities required for teaching and learning

Whiteboard – Class Room Equipped with Computer and Video Projector - Computer Lab - Library.

A. Library Usage:

Students should be encouraged to use library technical resources in the studying the course.

12- List of references:

1. Leo H. Holthuijsen, " Waves in Oceabic and Coastal Waters" Cambridge University Press, 2007.
2. Robert M. Sorensen, "Basic Coastal Engineering", Springer, 1997.
3. J. William Kamphuis, " Introduction To Coastal Engineering And Management", Advanced Series on Ocean Engineering: Volume 16, 2000.
4. Dominic Reeve, Andrew Chadwick, and Christopher Fleming, "Coastal Engineering: Processes, theory and design practice", Spon Press, 2004.
5. V. Sundar, "Ocean Wave Mechanics: Applications in Marine Structures", John Wiley & Sons Ltd, 2016
6. Joseph Pedlosky, Waves in the Ocean and Atmosphere: Introduction to wave dynmaics“, Springer, 2003.

13- Program Coordination Committee:

Signature

Course Prof: Assoc. Prof. Dr. Elsayed Galal

Program coordinator: Dr. Ahmed Turk

Head of Department: Prof. Dr. Mamdouh Saleh

Date: August 2018

Course Specification

Program on which the course is given		Civil Engineering
Major or minor element of program		Major
Department offering the program		Civil Engineering
Department offering the course		Civil Engineering
Academic year/Level		2018 / Mr.sc or PhD
Date of specification approval		2018

A- Basic Information

Title: Sediment Motion and Transport	**Code Symbol**: CEI 617	
Lecture	2	
Tutorial	1	
Laboratory	0	
Total	3	Bylaw 2000

B- Professional Information

1- Course Aims:

This course introduces the basic concepts of Sediment Motion and Transport for the civil engineer. The basics of the Coastal Engineering are well studied.

2- Course Objectives:

By the end of the course the students will be able to:

- Understanding the Boundary layer
- Understanding Suspended load.
- Understanding principles of sediment transport.

3- Intended Learning Outcomes (ILOs):

Field	Program ILOs that the course contribute in achieving	Course ILOs
Knowledge& Understanding	**a-1** Concepts and theories of mathematics and sciences, appropriate to the discipline.	**a-1-1** Define the Boundary layer
	a-2 Professional ethics and impacts of engineering solutions on society and environment.	**a-2-1** Describe the ethics and impacts of engineering solutions on society and environment.
Intellectual skills	**b-2** Select appropriate solutions for engineering problems based on analytical thinking.	**b-2-1** Use the appropriate solution for engineering problems
	b-3 Think in a creative and innovative way in problem solving and design.	**b-3-1** Analyze the problem and find a creative solution.
Professional skills	**c-3**Use computational facilities and techniques, measuring instruments, workshops and laboratory	**c-3-1** Analyze the problem into points to determine the solution.
General skills	**d-7** Search for information and engage in life-long self-learning discipline.	**d-7-1** Describe the phenomena, collect similar calculations methods, and prepare comparison and validation report.

4- Course Contents:

Week No.	*Topic*	*Total Hours*	*Contact hrs.*			*Course ILOs Covered (By No.)*
			Lec.	**Tut.**	**Lab.**	
Week (1-6)	Introduction of **S**ediment					**a-1**
Week (7-12)	Sediment Motion					**a-2**
Week (13-18)	Sediment Transport					**b-3**
Week (19-25)	Boundary layer					**b-2**
Week (26-28)	Suspended load					**c-3**
Week (29-30)	Principles of sediment transport.					**d-7**

5- Relationship between the course and the program:

Field	Academic Reference Standard (ARS)			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Program Academic Standards that the course contribute in achieving	**a 1& a2**	**b2 & b3**	**c3**	**d7**

6- Course Subject Area:

A	B	C	D	E	F	G	
Humanities and Social Science	Mathematics and Basic Sciences	Basic Engineering Science	Applied Engineering And Design	Computer Applications and ICT	Projects and practice	Discretionary subjects	Total
----	**10%**	**50 %**	**10%**	**---**	**20%**	**10%**	**100 %**

7- Course Topics:

Topic No.	Topic	Weeks
1st	Introduction of Sediment	1-5
2nd	Sediment Motion	6-11
3rd	Sediment Transport	12-17
4th	Boundary layer	18-25
5th	Suspended load	25-28
6th	Principles of sediment transport.	29-30

8- ILOs Matrix Topics:

Course Intended Learning Outcomes (ILOs)		Course topics					
		1st	2nd	3rd	4th	5th	6th
Knowledge & Understanding	**a-1-1** Define the Boundary layer.	x	**x**				
	a-2-1 Describe the ethics and impacts of engineering solutions on society and environment.			**x**			**x**
Intellectual Skills	**b-2-1** Use the appropriate solution for engineering problems		x				
	b-3-1 Analyze the problem and find a creative solution.			X	x	x	x
Professional Skill	**c-3-1** Analyze the problem into points to determine the solution.				x	x	x
General Skills	**d-7-1** Describe the phenomena, collect similar calculations methods, and prepare comparison and validation report.					x	x

9- Teaching and Learning Method:

Course Intended Learning Outcome (ILOs)		Teaching and Learning Method:												
		Lecture	Presentation and Movies	Discussion	Tutorial	Problem solving	Brain storming	Projects	Site visits	Self-learning	Cooperative	Discovering	Modeling	Playing
A- Knowledge& Understanding	a 1-1	x		x										
	a2-1	x		x										
B-Intellectual Skills	b2-1	x		x										
	b3-1	x		x										
C-Professional Skills	c 3-1	x		x				x						
D-General Skills	d7-1	x		x				x						

10- Teaching and learning method for low capacity and outstanding Student:

For low capacity students	Assign a portion of the office hours for those students.
	Give them specific tasks.
	Repeat the explanation of some of the material and tutorials.
	Assign a teaching assistance to follow up the performance of this group of students.
For outstanding Students	Hand out project assignments to those students.
	Give them some research topics to be searched using the internet and conduct presentation.
	Encourage them to take parts in the running research projects.

11- Assessment:

11.1 Assessment Methods

Course Intended Learning Outcome (ILOs)		Assessment Methods											
		Written Exam	Oral Exam	Tutorial Assessment	Project Assessment	Model Assessment	Report Assessment	Quiz assessment	Presentation Assessment	Discussion	Laboratory Test	Sketching drawings	Monitoring
A- Knowledge& Understanding	a 1-1	x											
	a2-1	x											
B-IntellectualSkills	b2-1	x											
	b3-1	x											
C-Professional Skills	c 3-1	x								x			
D-General Skills	d7-1	x						x					

11.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	week
Final examination	70%	
Mid-term written examination	10%	
End of term laboratory examination	10%	
Tutorial and report assessment	10%	
Total	100%	

12- Facilities required for teaching and learning:

Whiteboard – Class Room Equipped with Computer and Video Projector - Computer Lab - Library.

A. Laboratory Usage:

B. Library Usage:

Students should be encouraged to use library technical resources in the preparation of reports and oral presentation. At least one oral presentation should involve a significant component of library research to encourage this component of study.

13- List of references:

1. U S. Army Coastal Engineering Research, "Shore Protection Manual".
2. Robert M. Sorensen, "Basic Coastal Engineering", Springer, 1997.

Course Prof: Prof. *Dr. Ehab Tolba*

Program coordinator: *Dr. Ahmed Turk*

Head of Department: *Prof. Dr. Mamdouh Salah*

Date: *8/8/2018*

Course Specification

Program on which the course is given	*M. Sc. & Ph.D. in Civil Eng. (Specialization: Irrigation and Hydraulic Engineering)*
Major or minor element of program	*Major*
Department offering the program	*Civil Engineering*
Department offering the course	*Civil Engineering*
Academic year/Level	*M. Sc. & Ph.D.*
Date of specification approval	*2018*

A- Basic Information

Title: Wave dynamics	**Code Symbol:** CEI 618	
Lecture	2 hours	
Tutorial / Laboratory	1	
Total	3 hours	By law 2000

B- Professional Information

1- Course Aims:

This course is designed to extend basic concepts learned in Oceanic wave dynamics. For those students who look toward harbor and coastal engineering after graduation, this course is designed to widen background in coastal engineering and help them to meet the coastal projects demand. This course will also provide an excellent opportunity to provide students with learning about how to predict the waves and make students aware about its forces. The course is meant to create the deep understanding of the basics and theories behind the different types wave force.

2- Course Objectives:

The main Objectives of this course are to equip the students with:

1. Knowledge and understanding of key and advanced facts, theories, concepts, principles and techniques relevant to solve the problems in coastal areas using the data of wind, waves data.
2. Recognize the governing factors control the calculations of waves forces on strcutures.
3. Evaluate the impact of the wave forces on the environment, and the suitable estimated empirical dimensions of the elements of the harbor.
4. Analyze and design of the harbor structures related to the wave forces.
5. Proficiency in the application of the basics and the methodologies of scientific research and the use of its different tools in the area of coastal engineering.

3- Intended Learning Outcomes (ILOs):

NAQAAE Academic Reference Standards (ARS)	Program ILOs	Course ILOs
A. Knowledge and understanding		
A1- Theories and basics related to learning field, as well as other related fields.	**a1-2** Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in the field of **Irrigation and hydraulic Engineering**.	**a1-2** Describe the basics of Wave Motion and the wave mechanics.
B. Intellectual skills		
B2- Solve specialized problems with available givens and parameters. .	**b2-1** Apply broad knowledge of modern computational methods and think critically to solve unstructured problems (with incomplete data) related to civil engineering.	**b2-1** Use the modern computational methods to predict the wave forces on costal structures.
C. Professional and practical skills		
C1- Mastering the basics as well as the latest professional skills in the field of specialization.	**C1-1** Express competence skills, such as identifying, formulating, analyzing, and creating engineering solutions, using latest engineering techniques, skills, and tools.	**C1-1** Express competence skills, such as identifying, formulating, analyzing, and creating engineering solutions related to the prediction of wave forces, using latest engineering techniques, skills, and tools.
D. General and transferrable skills		
D2- Use information technology to improve his/her professional practice	**d2-1** Use state-of-the-art computer design tools and applications for solving civil engineering problems	**d2-1** Use state-of-the-art computer and Internet tools for getting latest information and standards related to wave data prediction.

4- Course Contents:

Topic	*Total Hours*	*Contact hrs.*			*Course ILOs Covered (By No.)*
		Lec.	Tut.	Lab.	
1. Introduction of wave mechanics.	12	8	4	--	a1-2
2. Wave Dynamic process.	12	8	4	--	a1-2
3. Modelling of Ocean Waves.	12	8	4	--	a1-2, b2-1, C1-1, d2-1
4. Wave Forces on coastal structures.	12	8	4	--	a1-2, b2-1, C1-1
5. Wave forces on offshore structures.	12	8	4	--	a1-2, b2-1, C1-1, d2-1
6. Wave forces on piers.	12	8	4	--	a1-2, b2-1, C1-1, d2-1
7. Applications of wave dynamics in projects.	12	8	4	--	b2-1, C1-1, d2-1
Total	84	56	28	--	

5- Relationship between the course and the program:

Field	Academic Reference Standard (ARS)			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Program Academic Standards that the course contribute in achieving	**A1(a1-2)**	**B1(b2-1**	**C1(C1-1)**	**D2(d2-1)**

6- Course Subject Area:

A	B	C	D	E	F	G	
Humanities and Social Science	Mathematics and Basic Sciences	Basic Engineering Science	Applied Engineering And Design	Computer Applications and ICT	Projects and practice	Disccretionry subjects	Total
---	5%	50%	30%	15%	---	---	100%

7- Course Topics.

Topic No.	Topic	Weeks
1st	Introduction of wave mechanics.	**1-4**
2nd	Wave Dynamic process.	**5-8**
3rd	Modelling of Ocean Waves.	**9-12**
4th	Wave Forces on coastal structures.	**13-16**
5th	Wave forces on offshore structures.	**17-20**
6th	Wave forces on piers.	**21-24**
7th	Applications of wave dynamics in projects.	**25-28**

8- ILOs Matrix Topics

Course topics	**1st**	**2nd**	**3rd**	**4th**	**5th**	**6th**	**7th**
Course ILOs	**Knowledge & Understanding**						
a1-2 Describe the basics of Wave Motion and the wave mechanics.	x	x	x	x	x	x	
Course ILOs	**Intellectual skills**						
b2-1 Use the modern computational methods to predict the wave forces on costal structures.			x	x	x	x	x
Course ILOs	**Professional and practical skills**						
C1-1 Express competence skills, such as identifying, formulating, analyzing, and creating engineering solutions related to the prediction of wave forces, using latest engineering techniques, skills, and tools.			x	x	x	x	x
Course ILOs	**General and transferrable skills**						
d2-1 Use state-of-the-art computer and Internet tools for getting latest information and standards related to wave data prediction.			x	x	x	x	x

9- Teaching and Learning Method:

Course Intended learning outcomes (ILOs)		Teaching and Learning Method												
		Lecture	Presentation and	Discussion	Tutorial	Problem solving	Brain storming	Projects	Report	Self learning	Cooperative	Discovering	Computer Simulation	Practical Experiments
Knowledge & understanding	**a1-2**	x	x	x	x	x			x	x				
Intellectual Skills	**B2-1**		x						x			x	x	
Professional Skills	**C1-1**		x						x			x	x	
General Skills	**d2-1**									x	x		x	

10- Assessment:

10.1 Assessment Methods:

Final Written Examination : To assess students' knowledge, understanding, analysis, creativity, problem solving, and problem identification.

10.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	week
Final Examination	100	32
Total	100%	

11- Facilities required for teaching and learning

Whiteboard – Class Room Equipped with Computer and Video Projector - Computer Lab - Library.

A. Library Usage:

Students should be encouraged to use library technical resources in the studying the course.

12- List of references:

1. Hu Huang, "Dynamics of Surface Waves in Coastal Waters: waqve-current-bottom interactions“, Springer 2009.
2. Leo H. Holthuijsen, " Waves in Oceabic and Coastal Waters" Cambridge University Press, 2007.
3. Robert M. Sorensen, "Basic Coastal Engineering", Springer, 1997.
4. Dominic Reeve, Andrew Chadwick, and Christopher Fleming, "Coastal Engineering: Processes, theory and design practice", Spon Press, 2004.
5. V. Sundar, "Ocean Wave Mechanics: Applications in Marine Structures", John Wiley & Sons Ltd, 2016
6. Joseph Pedlosky, Waves in the Ocean and Atmosphere: Introduction to wave dynmaics“, Springer, 2003.

13- Program Coordination Committee:

Signature

Course Prof: *Assoc. Prof. Dr. Elsayed Galal*

Program coordinator: *Dr. Ahmed Turk*

Head of Department: *Prof. Dr. Mamdouh Saleh*

Date: *August 2018*

Course Specification

Program on which the course is given	*M. Sc. & Ph.D. in Civil Eng. (Specialization: Irrigation and Hydraulic Engineering)*
Major or minor element of program	*Major*
Department offering the program	*Civil Engineering*
Department offering the course	*Civil Engineering*
Academic year/Level	*M. Sc. & Ph.D.*
Date of specification approval	*2018*

A- Basic Information

Title: Design of Breakwaters	**Code Symbol:** CEI 616	
Lecture	2 hours	
Tutorial / Laboratory	1	
Total	3 hours	By law 2000

B- Professional Information

1- Course Aims:

This course is designed to extend basic concepts learned in breakwater design which considered one of the most important structures used in coastal engineering. For those students who look toward harbor engineering and coastal protection project position after graduation, this course is designed to widen background in coastal engineering and help them to meet the coastal protection project demand. This course will also provide an excellent opportunity to provide students with learning about shore line stability and make students aware with shore protection issues. The course is meant to create the deep understanding of the basics and theories behind the different types breakwater structures and there hydraulic design.

2- Course Objectives:

The main Objectives of this course are to equip the students with:

1. Knowledge and understanding of key and advanced facts, theories, concepts, principles and techniques relevant to solve the problems in coastal areas using different types of breakwater structures.
2. Recognize the governing factors control the choice of shore protection structures and there influence on shoreline stability.

3. Evaluate the impact of the man-made structure on the environment, the shoreline change due to existence of coastal structures, and the suitable estimated empirical dimensions of the elements of the harbor.
4. Analyze and design of the harbor structures and study the stability of different marine structures.
5. Proficiency in the application of the basics and the methodologies of scientific research and the use of its different tools in the area of shore protection science in coastal engineering.

3- Intended Learning Outcomes (ILOs):

NAQAAE Academic Reference Standards (ARS)	Program ILOs	Course ILOs
A. Knowledge and understanding		
A3- Main scientific advances in the field of specialization.	**a3-1** Classify the Potential applications of advanced civil engineering applications.	**a3-1** Discuss the Potential applications of the increasing usage of breakwater structures for shore protection.
	a3-3 Discuss the recent and update developments in the most important themes related to civil engineering.	**a3-3** Discuss the recent and update developments in the most important themes related to the different types of breakwater structures.
B. Intellectual skills		
B1- Analyze and evaluate the information in the field of specialization, and solve the problems based on that.	**b1-2** Interpret, analyze, and evaluate a given system specific information and relate it to the design of the required system.	**b1-2** Interpret, analyze, and evaluate a given system specific information and relate it to the design of the required system of breakwater structures.
B3- Link and integrate diverse knowledge to solve professional problems.	**b3-1** Analyze, interpret and manipulate data from a variety of sources and relate it to solve professional problems.	**b3-1** Analyze, interpret and manipulate data from a variety of sources and relate it to solve professional problems related to the breakwater structures against coastal hazards.
C. Professional and practical skills		
C1- Mastering the basics as well as the latest professional skills in the field of specialization.	**c1-1** Express competence skills, such as identifying, formulating, analyzing, and creating engineering solutions, using latest engineering techniques, skills, and tools.	**c1-1** Express competence skills, such as identifying, formulating, analyzing, and creating engineering solutions related to shore protection in coastal engineering problems, using latest engineering techniques, skills, and tools.
D. General and transferrable skills		
D2- Use information technology to improve his/her professional practice	**d2-1** Use state-of-the-art computer design tools and applications for solving civil engineering problems	d2-1 Use state-of-the-art computer and Internet tools for getting latest information and standards related to shore protection using breakwater structures in coastal engineering.

4- Course Contents:

Topic	*Total Hours*	*Contact hrs*			*Course ILOs Covered (By No.)*
		Lec.	Tut.	Lab.	
1. Introduction about the Functional design of breakwaters.	**12**	**8**	**4**	--	**a3-1, a3-3, d2-1**
2. Choise of Breakwater Type and Optimum Safety Levels.	**12**	**8**	**4**	--	**a3-1, a3-3, b1-2**
3. Forces acting on Breakwaters.	**12**	**8**	**4**	--	**b1-2, b3-1, c1-1**
4. Review of Empirical Methods, functional design procedur, and Physical Models.	**12**	**8**	**4**	--	**a3-3, b1-2, b3-1, c1-1, d2-1**
5. Stability of Breakwaters.	**12**	**8**	**4**	--	**b1-2, b3-1, c1-1**
6. Design of connected breakwater structures.	**12**	**8**	**4**	--	**a3-1, a3-3, b1-2, b3-1, c1-1**
7. Design of offshore detached breakwater structures.	**12**	**8**	**4**	--	**a3-1, a3-3, b1-2, b3-1, c1-1**
Total	**84**	**56**	**28**	--	

5- Relationship between the course and the program

Field	Academic Reference Standard (ARS)			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Program Academic Standards that the course contribute in achieving	**A3(a3-1, a3-3)**	**B1(b1-2), B3(b3-1)**	**C1(c1-1)**	**D2(d2-1)**

6- Course Subject Area:

A	B	C	D	E	F	G	
Humanities and Social Science	Mathematics and Basic Sciences	Basic Engineering Science	Applied Engineering And Design	Computer Applications and ICT	Projects and practice	Disccretionry subjects	Total
---	5%	30%	50%	15%	---	---	100%

7- Course Topics:

Topic No.	Topic	Weeks
1st	Introduction about the Functional design of breakwaters.	1-4
2nd	Choice of Breakwater Type and Optimum Safety Levels.	5-8
3rd	Forces acting on Breakwaters.	9-12
4th	Review of Empirical Methods, functional design procedure, and Physical Models.	13-16
5th	Stability of Breakwaters.	17-20
6th	Design of connected breakwater structures.	21-24
7th	Design of offshore detached breakwater structures.	25-28

8- ILOs Matrix Topics:

Course topics	1st	2nd	3rd	4th	5th	6th	7th
Course ILOs	**Knowledge & Understanding**						
a3-1 Discuss the social and environmental effects of the increasing usage of breakwater structures.	x	x				x	x
a3-3 Discuss the recent and update developments in the most important themes related to the different types of breakwater structures.	x	x		x		x	x
Course ILOs	**Intellectual skills**						
b1-2 Interpret, analyze, and evaluate a given system specific information and relate it to the design of the required system of breakwater structures.		x	x	x	x	x	x
b3-1 Analyze, interpret and manipulate data from a variety of sources and relate it to solve professional problems related to the breakwater structures against coastal hazards.			x	x	x	x	x
Course ILOs	**Professional and practical skills**						
c1-1 Express competence skills, such as identifying, formulating, analyzing, and creating engineering solutions related to shore protection in coastal engineering problems, using latest engineering techniques, skills, and tools.			x	x	x	x	x
Course ILOs	**General and transferrable skills**						
d2-1 Use state-of-the-art computer and Internet tools for getting latest information and standards related to shore protection using breakwater structures in coastal engineering.	x			x			

9- Teaching and Learning Method:

Course Intended learning outcomes	Teaching and Learning Method

(ILOs)		Lecture	Presentation and	Discussion	Tutorial	Problem solving	Brain storming	Projects	Report	Self-learning	Cooperative	Discovering	Computer Simulation	Practical Experiments
Knowledge & understanding	**a3-1**	x				x								
	a3-3		x	x					x	x				
Intellectual Skills	**b1-2**		x											
	b3-1		x											
Professional Skills	**c1-1**		x											
General Skills	**d2-1**										x		x	

10- Assessment:

10.1 Assessment Methods

Final Written Examination : To assess students' knowledge, understanding, analysis, creativity, problem solving, and problem identification.

10.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	week
Final Examination	**100**	**32**
Total	**100%**	

11- Facilities required for teaching and learning

Whiteboard – Class Room Equipped with Computer and Video Projector - Computer Lab - Library.

A. Library Usage:

Students should be encouraged to use library technical resources in the studying the course.

12- List of references:

1. Y Goda, " Random Seas And Design Of Maritime Structures" Advanced Series on Ocean Engineering: Volume 15, 2nd Edition , 2000.
2. K. Mohan Ram, Orville T. Magoon, Mark Pirrello, " Advances in Coastal Structure Design", ASCE Publications, 2003.
3. U S. Army Coastal Engineering Research, "Shore Protection Manual".
4. Robert M. Sorensen, "Basic Coastal Engineering", Springer, 1997.
5. J. William Kamphuis, " Introduction To Coastal Engineering And Management", Advanced Series on Ocean Engineering: Volume 16, 2000.
6. Young C Kim, Design Of Coastal Structures And Sea Defenses (Coastal and Ocean Engineering Practice) , world scientific, 2014.
7. Young C Kim, Coastal and Ocean Engineering Practice, world scientific, 2012.
8. Young C Kim, Handbook of Coastal and Ocean Engineering, world scientific, 2018.

13- Program Coordination Committee:

Signature

Course Prof: *Assoc. Prof. Dr. Elsayed Galal*

Program coordinator: *Dr. Ahmed Turk*

Head of Department: *Prof. Dr. Mamdouh Saleh*

Date: *August 2018*

Course Specification

Program on which the course is given	Civil Engineering
Major or minor element of program	Major
Department offering the program	Civil Engineering
Department offering the course	Civil Engineering
Academic year/Level	2018-2019 / PhD
Date of specification approval	2018

A- Basic Information

Title: Design of shore connected breakwaters	**Code Symbol**: CEI 620	
Lecture	2	
Tutorial	1	
Laboratory	0	
Total	3	Bylaw 2000
First term	prerequisite	

B- Professional Information

1- Course Aims:

This course introduces the basic concepts of Waves mechanics, rubble mound breakwater types and design, and vertical breakwaters types and design. The application of breakwaters are well reviewed.

2- Course Objectives:

By the end of the course the students will be able to:

- Understanding the main concept of Waves mechanics.
- Understanding different types of breakwaters.
- Understanding main design criteria of rubble mound breakwaters and design equations.
- Understanding main design criteria of vertical breakwaters and design equations.

3- Intended Learning Outcomes (ILOs):

Field	Program ILOs that the course contribute in achieving	Course ILOs
Knowledge& Understanding	**a-1** Concepts and theories of mathematics and sciences, appropriate to the discipline.	**a-1-1** Define the theory and method of solving waves.
	a-3 Professional ethics and impacts of engineering solutions on society and environment.	**a-3-1**Describe the ethics and impacts of engineering solutions on society and environment.
Intellectual skills	**b-2** Select appropriate solutions for engineering problems based on analytical thinking.	**b-2-1**Use the appropriate solution for engineering problems
	b-3 Think in a creative and innovative way in problem solving and design.	**b-3-1** Analyze the problem and find a creative solution.
Professional skills	**c-3** Use computational facilities and techniques, measuring instruments, workshops and laboratory	**c-3-1** Analyze the problem into points to determine the solution.
General skills	**d-7** Search for information and engage in life-long self-learning discipline.	**d-7-1** Describe the phenomena, collect similar calculations methods, and prepare comparison and validation report.

4- Course Contents:

Week No.	*Topic*	*Total Hours*	*Contact hrs.*			*Course ILOs Covered (By No.)*
			Lec.	**Tut.**	**Lab.**	
Week(1-2)	Introduction of wave mechanics					**a-1**
Week(3-4)	Different types of breakwaters					**a-3**
Week(5-6)	Performance criteria; run-up and overtopping.					**b-3**
Week(7-8)	Design of rubble mound breakwaters					**b-2**
Week 9	***Midterm written examination***					
Week(10-11)	Design of vertical breakwaters					**c-3**
Week(12-13)	Study geotechnical breakwater overall stability					**d-7**

5- Relationship between the course and the program:

Field	Academic Reference Standard (ARS)			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Program Academic Standards that the course contribute in achieving	**a 1& a3**	**b2 & b3**	**c3**	**d7**

6- Course Subject Area:

A	B	C	D	E	F	G	
Humanities and Social Science	Mathematics and Basic Sciences	Basic Engineering Science	Applied Engineering And Design	Computer Applications and ICT	Projects and practice	Disccretionry subjects	Total
----	10%	50 %	10%	---	20%	10%	100%

7- Course Topics:

Topic No.	Topic	Weeks
1st	Introduction of wave mechanics	1-2
2nd	Different types of breakwaters	3-4
3rd	Performance criteria; run-up and overtopping.	5-6
4th	Design of rubble mound breakwaters	7-8
5th	Design of vertical breakwaters	10-11
6th	Study geotechnical breakwater overall stability	12-13

8- ILOs Matrix Topics

Course Intended Learning Outcomes (ILOs)		Course topics					
		1st	2nd	3rd	4th	5th	6th
Knowledge & Understanding	**a-1-1** Define the theory and method of solving waves.	x	**x**				
	a-3-1 Describe the ethics and impacts of engineering solutions on society and environment.			**x**			**x**
Intellectual Skills	**b-2-1**Use the appropriate solution for engineering problems		x				
	b-3-1 Analyze the problem and find a creative solution.			X	x	x	x
Professional Skill	**c-3-1**Analyze the problem into points to determine the solution.				x	x	x
General Skills	**d-7-1** Describe the phenomena, collect similar calculations methods, and prepare comparison and validation report.					x	x

9- Teaching and Learning Method:

Course Intended Learning Outcome (ILOs)		Teaching and Learning Method												
		Lecture	Presentation and	Discussion	Tutorial	Problem solving	Brain storming	Projects	Site visits	Self-learning	Cooperative	Discovering	Modeling	Playing
A- Knowledge& Understanding	**a 1-1**	**x**		**x**										
	a3-1	**x**		**x**										
B-IntellectualSkills	**b2-1**	**x**		**x**										
	b3-1	**x**		**x**										
C-Professional Skills	**c 3-1**	**x**		**x**				**x**						
D-General Skills	**d7-1**	**x**		**x**				**x**						

10- Teaching and learning method for low capacity and outstanding Student

For low capacity students	Assign a portion of the office hours for those students.
	Give them specific tasks.
	Repeat the explanation of some of the material and tutorials.
	Assign a teaching assistance to follow up the performance of this group of students.
For outstanding Students	Hand out project assignments to those students.
	Give them some research topics to be searched using the internet and conduct presentation.
	Encourage them to take parts in the running research projects.

11- Assessment:

11.1 Assessment Methods

Course Intended Learning Outcome (ILOs)		Assessment Methods											
		Written Exam	Oral Exam	Tutorial Assessment	Project Assessment	Model Assessment	Report Assessment	Quiz assessment	Presentation Assessment	Discussion	Laboratory Test	Sketching drawings	Monitoring
A- Knowledge& Understanding	**a 1-1**	x											
	a3-1	x											
B-Intellectual Skills	**b2-1**	x											
	b3-1	x											
C-Professional Skills	**c 3-1**	x								x			
D-General Skills	**d7-1**	x						x					

11.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	week
Final examination		
Mid-term written examination		
End of term laboratory examination		
Tutorial and report assessment		
Total	**100%**	

12- Facilities required for teaching and learning

A. Laboratory Usage:

B. Library Usage:

Students should be encouraged to use library technical resources in the preparation of reports and oral presentation. At least one oral presentation should involve a significant component of library research to encourage this component of study.

13- List of references:

1. J. William Kamphuis, " Introduction To Coastal Engineering And Management", Advanced Series on Ocean Engineering: Volume 16, 2000.
2. Young C Kim, Design Of Coastal Structures And Sea Defenses (Coastal and Ocean Engineering Practice) , world scientific, 2014.
3. Young C Kim, Coastal and Ocean Engineering Practice, world scientific, 2012.
4. Young C Kim, Handbook of Coastal and Ocean Engineering, world scientific, 2018.

Course Prof:

Assoc. Prof. Dr. Ehab Rashad Tolba

Program Coordinator:

Dr. Ahmed Turk

Head of Department:

Prof. Dr. Mamdouh Salah

Date: 8/8/2018