



1. Basic Information

Program Title	Civil Engineering Program
Department offering the Program	Structural Engineering Department
Department Responsible for the Course	Structural Engineering Department
Course Code	STE476
Year/ Level	Fourth year - First Semester
Specialization	Major
Authorization data of course specification	

Toophing Hours	Lectures	Tutorial	Practical
reaching nours	1	-	5

2. Course aims:

No.	Aim
6	Design different types of projects in different fields within structural
	engineering field, using new building materials and software.
7	Use the Egyptian codes of practice of all civil engineering fields effectively
	and Professionally according to the graduation project kind.

3. Learning Outcomes (LOs):

C1.1	Select appropriate and sustainable technologies for construction of buildings,
	infrastructures, and water structures
C1.2	Apply a full range of civil engineering concepts and techniques
C2.1	Achieve an optimum design
C3.1	Plan and manage construction processes
C3.2	Maintain safety measures in construction and materials
C4.1	Deal with biddings contracts and financial issues.
C4.2	Assess environmental impacts of civil engineering projects.
C5.1	Use the codes of practice of all civil engineering disciplines
C7.1	Design an adequate project.
C8.1	Define lands and resources.
C10.1	Manage a group of engineers in sites.

No.	Topics	week
1	Design different types of projects in different fields among Civil	1-14
	Engineering disciplines, and use the codes of practice of all civil engineering	
	fields effectively and professionally.	





No.	Teaching Method
1	Interactive lectures (hybrid learning)
2	Discussion Sessions
3	Flipped classroom

6. Teaching and Learning Methods for Disable Students:

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

7. Student Assessment:

7.1 Student Assessment Methods:

No.	Assessment Method	LOs
1	Practical Examination	C1.1, C1.2, C3.1
2	Semester work (Quizzes, presentation, Portfolio)	C4.1, C4.2
3	Dissection Report	C5.1, C7.1, C8.1, C10.1

7.2 Assessment Schedule:

No.	Assessment Method	Weeks
1	Practical Examination	8
2	Semester work (Quizzes, presentation, Portfolio)	weekly
3	Dissection Report	15

7.3 Weighting of Assessments:

No.	Assessment Method	Weights
1	Practical Examination	25%
2	Semester work (Quizzes, presentation, Portfolio)	25%
3	Dissection Report	50 %
Total		100 %

8. List of References

No.	Reference List	
1	According to the project subject	

9. Facilities Required for Teaching and Learning:





No.	Facility
1	Lecture Classroom
2	White Board
3	Data Show System
4	Visualizer
5	Presenter
6	Sound System
7	Laboratory

10. Matrix of Knowledge and Skills of the Course:

No	Торіс	aim	LO's
1	Design different types of projects in different		C1.1, C1.2, C2.1, C3.1, C3.2,
	fields among Civil Engineering disciplines,		C4.1, C4.2, C5.1, C7.1, C8.1,
	and use the codes of practice of all civil	6,7	C10.1
	engineering fields effectively and		
	professionally.		

Course Coordinator: According to the project subject

Head of Department: According to the project discipline

Date of Approval:

Course: Graduation Project		
Program LOs	Course LOs	
C1. Select appropriate and sustainable technologies for	C1.1. Select appropriate and sustainable	
construction of buildings, infrastructures, and water	technologies for construction of buildings,	
structures; using either numerical techniques or physical	infrastructures, and water structures	
measurements and/or testing by applying a full range of		
civil engineering concepts and techniques of: Structural	C1.2. Apply a full range of civil	
Analysis and Mechanics, Properties and strength of	engineering concepts and techniques	
Materials, Surveying, Soil Mechanics, Hydrology and		
Hydraulics		
C2. Achieve an optimum design of Reinforced Concrete	C2.1. Achieve an optimum design	
and Steel Structures, Foundations and Earth Retaining		
Structures, Transportation and Traffic, Roadways and		





Airports, Railways, Sanitary Works, Hydraulics, Water	
Resources and Harbors.	
C3. Plan and manage construction processes; address	C3.1. Plan and manage construction
construction defects, instability, and quality issues;	processes
maintain safety measures in construction and materials.	
	C3.2. Maintain safety measures in
	construction and materials
C4. Deal with biddings, contracts and financial issues	C4.1. Deal with biddings contracts and
including project insurance and guarantees; and assess	financial issues.
environmental impacts of civil engineering projects.	
	C4.2. Assess environmental impacts of
	civil engineering projects.
C5. Use the codes of practice of all civil engineering	C5.1. Use the codes of practice of all
disciplines effectively and Professionally.	civil engineering disciplines
C7. Select and design adequate water control structures,	C7.1. Design an adequate project.
irrigation and water networks, sewerage systems and	
pumping stations.	
C8. Define and preserve properties (lands, real estates)	C8.1. Define lands and resources.
of individuals, communities, and institutions, through	
different surveying and GIS tools.	
C10. Manage and supervise a group of designers in	C10.1. Manage a group of engineers in
construction sites or lab technicians.	sites.





1. Basic Information			
Program Title	Civil Engineering Program		
Department offering the Program	Irrigation and Hydraulics Dept.		
Department Responsible for the Course	Irrigation and Hydraulics Dept.		
Course Code	IRH 411		
Year/ Level	Fourth Year-First Semester		
Specialization	Major		
Authorization data of course specification			

Tooobing Hours	Lectures	Tutorial	Practical
Teaching Hours	2	2	-

2. Course aims:

No.	Aim	
6	Design different types of projects of hydraulic control structures on waterways.	
7 Use Egyptian code for water resources and irrigation works effectively and prof		
,	design of heading up structures.	

3. Learning Outcomes (LOs):

No.	LOs	
C1 1	Select appropriate and sustainable technologies for the construction of heading up and water	
C1.1.	control structures.	
C1 2	Apply the full range of civil engineering concepts and techniques for the design of foundations	
C1.2.	of heading-up structures.	
<u>C7</u> 1	Select appropriate structures to control the water distribution in the irrigation networks of	
C7.1	different degrees.	
C7.2	Design suitable structures to control water distribution in irrigation networks.	
C0 1	Design structures to control and protect against the dangers of unexpected natural events such	
C9.1	as floods and storms.	

No.	Topics	week
1	Introduction to heading up structures	W1
2	Seepage theories under heading up structures	W2
3	Criteria and methods for design and analysis of foundations of heading up structures	W3, W4
4	Weirs	W5, W6
5	Regulators and barrages	W7, W9
6	Navigable lock	W10, W12
7	Modern techniques in heading up structures design	W13
8	Important heading up structures in Egypt – case study applied projects.	W14





No.	Teaching Method
1	Interactive lectures (hybrid learning)
2	Discussion Sessions
3	Flipped classroom

6. Teaching and Learning Methods for Disable Students:

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

7. Student Assessment:

7.1 Student Assessment Methods:

No.	Assessment Method	LOs
1	Mid Term Examination	C1.1, C1.2, C7.2
2	Semester work (Quizzes, presentation, Portfolio)	C1.2, C7.1, C7.2, C9.1
3	Oral Examination	C1.1, C7.1
4	Final Term Examination	C1.1, C1.2, C7.2

7.2 Assessment Schedule:

No.	Assessment Method	Weeks
1	Mid Term Examination	8
2	Semester work (Quizzes, presentation, Portfolio)	weekly
3	Oral Examination	14
4	Final Term Examination	15

7.3 Weighting of Assessments:

No.	Assessment Method	Weights
1	Mid Term Examination	15 %
2	Semester work (Quizzes, presentation, Portfolio)	15 %
3	Oral Examination	10 %
4	Final Term Examination	60 %
Total		100 %

No.	Reference List
1	Sharma, Er Dr S K., "Irrigation Engineering and Hydraulic Structures", S. Chand Publishing, 2017.
2	Santosh Kumar Garg, "Irrigation Engineering and Hydraulic Structures: Water Resources Engineering, Vol. II", Khanna Publishers Pvt. Ltd, 2016.
3	Sheng-Hong Chen " Hydraulic Structures. " Springer-Verlag Berlin Heidelberg, 2015.
4	Houghtalen, R.J., Akan, A.O.H., & Hwang, N.H.C. "Fundamentals of Hydraulic Engineering Systems" 4th edition, Prentice Hall, 2011





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9. Facilities Required for Teaching and Learning:

No.	Facility
1	Lecture Classroom
2	White Board
3	Data Show System
4	Visualizer
5	Presenter
6	Sound System

10. Matrix of Knowledge and Skills of the Course:

No.	Торіс	aim	LO's	
1	Introduction to heading up structures	6	C1.1	
2	Seepage theories under heading up structures	6	C1.2	
3	Criteria and methods for design and analysis of foundations of	6	C1 1 C1 2	
5	heading up structures		C1.1, C1.2	
4	Weirs	6, 7	C7.1, C7.2	
5	Regulators and barrages	6, 7	C7.1, C7.2, C9.1	
6	Navigable lock	6, 7	C7.1, C7.2	
7	Modern techniques in heading up structures design	6	C1.2	
8	Important heading up structures in Egypt – case study applied projects.	6, 7	C7.1, C7.2	

Course Coordinator: Prof. Dr. Adel El-Masry. -

Head of Department: Assoc. Prof. Dr. Tharwat Eid Sarhan. (

Date of Approval: / /2021





Course: Design of water structures 2			
Program LOs	Course LOs		
C1. Select appropriate and sustainable technologies	C1.1. Select appropriate and sustainable		
for construction of buildings, infrastructures,	technologies for the construction of		
and water structures; using either numerical	heading up and water control structures.		
techniques or physical measurements and/or			
testing by applying a full range of civil	C1.2. Apply the full range of civil engineering		
engineering concepts and techniques of:	concepts and techniques for the design of		
Structural Analysis and Mechanics, Properties	foundations of heading-up structures.		
and strength of Materials, Surveying, Soil			
Mechanics, Hydrology and Hydraulics.			
C7. Select and design adequate water control structures,	C7.1 Select appropriate structures to control the		
irrigation and water networks, sewerage systems	water distribution in the irrigation networks		
and pumping stations.	of different degrees.		
	C7.2 Design suitable structures to control water		
	distribution in irrigation networks.		
C9. Design and construct structures for protection	C9.1 Design structures to control and protect		
against dangers of unexpected natural events	against the dangers of unexpected natural		
such as floods and storms.	events such as floods and storms.		





1. Basic Information		
Program Title	Civil Engineering Program	
Department offering the Program	Irrigation and Hydraulics Dept.	
Department Responsible for the Course	Irrigation and Hydraulics Dept.	
Course Code	IRH 431	
Year/ Level	Fourth Year-Second Semester	
Specialization	Major	
Authorization data of course specification		

Tooobing Hours	Lectures	Tutorial	Practical
Teaching Hours	2	2	-

2. Course aims:

No.	Aim
6	Design different types of ports, marinas, and shore protections using new building materials.

3. Learning Outcomes (LOs):

No.	LOs
C1.1	Select appropriate and sustainable technologies for construction of harbor structures marinas,
	breakwaters and shore protections applying a full range of civil engineering concepts and
	techniques of: structural analysis, properties and strength of materials, soil mechanics,
	hydrology and hydraulics.
C2.1	Achieve an optimum design of harbor components including breakwaters, navigation channels,
	quay walls, and berths.
C6.1	Select appropriate building materials of the harbor components considering the impact of seawater and environment.

No.	Topics	week
1	Introduction to harbor engineering and natural phenomena.	W1
2	Coastal water level fluctuations: tides and water levels, sea level rise, coastal currents, and wind.	W2
3	Wave mechanics: wave theories and characteristics, linear wave theory, wave forecasting, wave transformations (shoaling, refraction, diffraction, etc.), and design wave characteristics (breaking and non-breaking waves, extreme waves).	W3, W4
4	Wave Forces.	W5
5	Harbor planning and port facilities, port terminals modules, and port elements.	W6, W7, W9
6	Breakwater design (rubble mound, vertical and compound breakwaters), forces on quay walls, wall structural systems, and quay wall design.	W10, W11
7	Navigable channels and navigation aids (lighthouse – buoys).	W12, W13
8	Port furniture (fenders and bollards).	W14





No.	Teaching Method
1	Interactive lectures (hybrid learning)
2	Discussion Sessions
3	Flipped classroom

6. Teaching and Learning Methods for Disable Students:

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

7. Student Assessment:

7.1 Student Assessment Methods:

No.	Assessment Method	LOs
1	Mid Term Examination	C1.1, C6.1
2	Semester work (Quizzes, presentation, Portfolio)	C1.1, C2.1, C6.1
3	Oral Examination	C1.1, C6.1
4	Final Term Examination	C1.1, C2.1, C6.1

7.2 Assessment Schedule:

No.	Assessment Method	Weeks
1	Mid Term Examination	8
2	Semester work (Quizzes, presentation, Portfolio)	weekly
3	Oral Examination	14
4	Final Term Examination	15

7.3 Weighting of Assessments:

No.	Assessment Method	Weights
1	Mid Term Examination	10 %
2	Semester work (Quizzes, presentation, Portfolio)	10 %
3	Oral Examination	5 %
4	Final Term Examination	75 %
Total		100 %

No.	Reference List
1	J. William Kamphuis. "Advanced Series on Ocean Engineering: Volume 48 - Introduction to
	Coastal Engineering and Management (3rd Edition)". ISBN: 978-981-120-799-0, World
	scientific, 2020
2	Us Army Corps of Engineers. "Coastal Engineering Manual". EM1110-2-1100. US Army Coastal
	Research Center, 2008.
3	Tsinker, Gregory P., ed. "Port engineering: planning, construction, maintenance, and security",
5	John Wiley & Sons, 2004.





No.	Facility
1	Lecture Classroom
2	White Board
3	Data Show System
4	Visualizer
5	Presenter
6	Sound System

10. Matrix of Knowledge and Skills of the Course:

No.	Торіс	aim	LO's
1	Introduction to harbor engineering and natural phenomena.	6	C1.1
2	Coastal water level fluctuations: tides and water levels, sea level	6	C1.1
2	rise, coastal currents, and wind.		
	Wave mechanics: wave theories and characteristics, linear wave	6	C1.1
3	theory, wave forecasting, wave transformations (shoaling,		
5	refraction, diffraction, etc.), and design wave characteristics		
	(breaking and non-breaking waves, extreme waves).		
4	Wave Forces.	6	C1.1
5	Harbor planning and port facilities, port terminals modules, and	6	C1.1, C2.1, C6.1
5	port elements.		
	Breakwater design (rubble mound, vertical and compound	6	C1.1, C2.1, C6.1
6	breakwaters), forces on quay walls, wall structural systems, and		
	quay wall design.		
7	Navigable channels and navigation aids (lighthouse – buoys).	6	C1.1, C2.1, C6.1
8	Port furniture (fenders and bollards).	6	C1.1, C6.1

Course Coordinator: Assoc. Prof. Dr. Tharwat Eid Sarhan.

Head of Department: Assoc. Prof. Dr. Tharwat Eid Sarhan.

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Date of Approval: / / 2021





Course: Harbors Engineering			
Program LOs	Course LOs		
C1. Select appropriate and sustainable technologies	C1.1 Select appropriate and sustainable		
for construction of buildings, infrastructures, and	technologies for construction of harbor structures		
water structures; using either numerical techniques	marinas, breakwaters and shore protections		
or physical measurements and/or testing by	applying a full range of civil engineering concepts		
applying a full range of civil engineering concepts	and techniques of: structural analysis, properties		
and techniques of: Structural Analysis and	and strength of materials, soil mechanics,		
Mechanics, Properties and strength of Materials,	hydrology and hydraulics.		
Surveying, Soil Mechanics, Hydrology and			
Hydraulics.			
C2. Achieve an optimum design of Reinforced	C2.1 Achieve an optimum design of harbor		
Concrete and Steel Structures, Foundations and	components including breakwaters, navigation		
Earth Retaining Structures, Transportation and	channels, quay walls, and berths.		
Traffic, Roadways and Airports, Railways, Sanitary			
Works, Hydraulics, Water Resources and Harbors.			
C6. Select appropriate building materials from the	C6.1 Select appropriate building materials of the		
perspective of strength, durability, suitability of use	harbor components considering the impact of		
to location, temperature, weather conditions and	seawater and environment.		
impacts of seawater and environment.			





1. Basic Information

Program Title	Civil Engineering Program
Department offering the Program	Irrigation and Hydraulics Dept.
Department Responsible for the Course	Irrigation and Hydraulics Dept.
Course Code	IRH 474
Year/ Level	Fourth Year-Second Semester
Specialization	Major
Authorization data of course specification	

Toophing Hours	Lectures	Tutorial	Practical
Teaching Hours	2	-	-

2. Course aims:

No.	Aim				
6	Design different types of models that simulate flow and contamination transfer for surface and				
0	groundwater water, using GIS and remote sensing in environmental projects.				

3. Learning Outcomes (LOs):

No.	LOs
C1.1	Select appropriate and sustainable techniques for designing flow and contamination transport simulation models, using numerical techniques, remote sensing and GIS, by applying a full range of concepts and techniques of hydrology, hydraulics and computer science.
C9.1	Protect the environment from pollution using electronic control and remote sensing.
C9.2	Design different methods for assessing the environmental impact of projects on the Egyptian coasts.

No.	Topics	week
1	Introduction to the environmental hydraulics - Introduction to the flow and transfer of surface and groundwater water.	W1, W2
2	Surface and surface water pollution and methods of simulation.	W3
3	Numerical modeling methods and solving the governing equations of transition.	W4, W5
4	Applied studies on the behavior of rivers and coastal areas and their distribution.	W6, W7
5	Application of electronic control in the observation and study of northern areas on Egyptian coasts.	W9
6	Applications of remote sensing in environmental hydraulics.	W10, W11
7	Environmental impact assessment of projects affecting the coast.	W12
8	Case studies, models and results of existing projects and the development and comparison of results.	W13, W14





No.	Teaching Method
1	Interactive lectures (hybrid learning)
2	Discussion Sessions
3	Flipped classroom

6. Teaching and Learning Methods for Disable Students:

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

7. Student Assessment:

7.1 Student Assessment Methods:

No.	Assessment Method	LOs
1	Mid Term Examination	C1.1, C9.1
2	Semester work (Quizzes, presentation, Portfolio)	C1.1, C9.1, C9.2
3	Final Term Examination	C1.1, C9.1, C9.2

7.2 Assessment Schedule:

No.	Assessment Method	Weeks
1	Mid Term Examination	8
2	Semester work (Quizzes, presentation, Portfolio)	weekly
3	Final Term Examination	15

7.3 Weighting of Assessments:

No.	Assessment Method	Weights
1	Mid Term Examination	15 %
2	Semester work (Quizzes, presentation, Portfolio)	15 %
3	Final Term Examination	70 %
	Total	100 %

No.	Reference List
1	Arif Ahamad Sharf Siddiqui Pardeep Singh, "Contamination of Water", Academic Press, 2021.
2	Cushman, John H. and Daniel M. Tartakovsky, "The Handbook of Groundwater Engineering" Boca Raton: CRC Press, 2016.





No.	Facility
1	Lecture Classroom
2	White Board
3	Data Show System
4	Visualizer
5	Presenter
6	Sound System

10. Matrix of Knowledge and Skills of the Course:

No.	Торіс	aim	LO's
1	Introduction to the environmental hydraulics - Introduction to the flow and transfer of surface and groundwater water	6	C1.1
2	Surface and surface water pollution and methods of simulation	6	C1.1
3	Numerical modeling methods and solving the governing equations of transition	6	C1.1
4	Applied studies on the behavior of rivers and coastal areas and their distribution	6	C1.1, C9.1, C9.2
5	Application of electronic control in the observation and study of northern areas on Egyptian coasts	6	C1.1, C9.1, C9.2
6	Applications of remote sensing in environmental hydraulics	6	C1.1, C9.1
7	Environmental impact assessment of projects affecting the coast	6	C1.1, C9.1, C9.2
8	Case studies, models and results of existing projects and the development and comparison of results.	6	C1.1, C9.1, C9.2

Course Coordinator: Dr. Kareem Adel Nassar.

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Head of Department: Assoc. Prof. Dr. Tharwat Eid Sarhan.

Date of Approval: / / 2021





Course: Irrigation elective 2- Environmental hydraulics	
Program LOs	Course LOs
C1. Select appropriate and sustainable technologies for	C1.1 Select appropriate and sustainable techniques
construction of buildings, infrastructures, and water	for designing flow and contamination transport
structures; using either numerical techniques or	simulation models, using numerical techniques,
physical measurements and/or testing by applying a	remote sensing and GIS, by applying a full range of
full range of civil engineering concepts and techniques	concepts and techniques of hydrology, hydraulics
of: Structural Analysis and Mechanics, Properties and	and computer science.
strength of Materials, Surveying, Soil Mechanics,	
Hydrology and Hydraulics.	
C9. Design and construct structures for protection	C9.1 Protect the environment from pollution using
against dangers of unexpected natural events such	electronic control and remote sensing.
as floods and storms.	C9.2 Design different methods for assessing the
	environmental impact of projects on the Egyptian
	coasts.





1. Basic Information

Program Title	Civil Engineering Program
Department offering the Program	Irrigation and Hydraulics Dept.
Department Responsible for the Course	Irrigation and Hydraulics Dept.
Course Code	IRH 475
Year/ Level	Fourth Year-Second Semester
Specialization	Major
Authorization data of course specification	

Teaching Hours	Lectures	Tutorial	Practical
	2	-	-

2. Course aims:

No.	Aim
6	Design different types of river ports, river navigation structures and shore protections using new building materials.
7	Use the Egyptian code for marinas and river ports effectively and professionally

3. Learning Outcomes (LOs):

No.	LOs		
C1.1	Select appropriate and sustainable technologies for construction and maintenance of inland navigation structures applying a full range of civil engineering concepts and techniques of: structural analysis, properties and strength of materials, soil mechanics, hydrology and hydraulics.		
C2.1	Achieve an optimum design of inland navigation structures projects.		
C5.1	Use the Egyptian code for marinas and river ports effectively and professionally.		
C6.1	Select appropriate building materials for the construction of inland port elements and shore protections in terms of strength, durability, suitability of use for location, temperature, weather conditions, water effects and the environment.		

No.	Topics	week
1	Introduction to inland navigation	W1
2	Types of inland navigational channels and categories	W2
3	Studies necessary for the design of inland navigational channels	W3, W4
4	Design of navigable channels	W5
5	Natural phenomena affecting the design of navigable channels	W6
6	Flexible and rigid revetments	W7
7	Design of navigable locks	W9, W10
8	Maintenance of navigable channels	W11
9	Numerical modeling	W12, W13
10	Environmental studies	W14





No.	Teaching Method	
1	Interactive lectures (hybrid learning)	
2	Discussion Sessions	
3	Flipped classroom	

6. Teaching and Learning Methods for Disable Students:

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

7. Student Assessment:

7.1 Student Assessment Methods:

No.	Assessment Method	LOs
1	Mid Term Examination	C1.1, C5.1, C6.1
2	Semester work (Quizzes, presentation, Portfolio)	C1.1, C2.1, C5.1, C6.1
3	Final Term Examination	C1.1, C2.1, C5.1, C6.1

7.2 Assessment Schedule:

No.	Assessment Method	Weeks
1	Mid Term Examination	8
2	Semester work (Quizzes, presentation, Portfolio)	weekly
3	Final Term Examination	15

7.3 Weighting of Assessments:

No.	Assessment Method	Weights
1	Mid Term Examination	15 %
2	Semester work (Quizzes, presentation, Portfolio)	15 %
3	Final Term Examination	70 %
	Total	100 %

No.	Reference List		
1	Galieriková, A., & Sosedová, J. "Environmental aspects of transport in the context of		
	development of inland navigation" Ekológia, 35(3), 279, 2016.		
2	McCartney, B., et al. "Inland navigation channel training works" American Society of Civil		
2	Engineers, 2012.		
3	Beelen, M. "Structuring and modelling decision making in the inland navigation sector"		
	Universiteit Antwerpen (Belgium), 2011.		





No.	Facility
1	Lecture Classroom
2	White Board
3	Data Show System
4	Visualizer
5	Presenter
6	Sound System

10. Matrix of Knowledge and Skills of the Course:

No.	Торіс	aim	LO's
1	Introduction to inland navigation.	6	C1.1
2	Types of inland navigational channels and categories.	6	C1.1
3	Studies necessary for the design of inland navigational channels.	6	C1.1
4	Design of navigable channels.	6, 7	C1.1, C2.1, C5.1, C6.1
5	Natural phenomena affecting the design of navigable channels.	6, 7	C1.1, C2.1, C5.1, C6.1
6	Flexible and rigid revetments.	6, 7	C1.1, C2.1, C5.1, C6.1
7	Design of navigable locks.	6, 7	C1.1, C2.1, C5.1, C6.1
8	Maintenance of navigable channels.	6	C1.1
9	Numerical modeling.	6	C1.1
10	Environmental studies.	6	C1.1

Course Coordinator: Dr. Reda Mahmoud Diab.

Head of Department: Assoc. Prof. Dr. Tharwat Eid Sarhan.

Date of Approval: / /2021.





Course: Irrigation elective 2-Inland navigation			
Program LOs	Course LOs		
C1. Select appropriate and sustainable technologies	C1.1 Select appropriate and sustainable		
for construction of buildings, infrastructures, and	technologies for construction and maintenance of		
water structures; using either numerical techniques	inland navigation structures applying a full range of		
or physical measurements and/or testing by	civil engineering concepts and techniques of:		
applying a full range of civil engineering concepts	structural analysis, properties and strength of		
and techniques of: Structural Analysis and	materials, soil mechanics, hydrology and		
Mechanics, Properties and strength of Materials,	hydraulics.		
Surveying, Soil Mechanics, Hydrology and			
Hydraulics.			
C2. Achieve an optimum design of Reinforced	C2.1 Achieve an optimum design of inland		
Concrete and Steel Structures, Foundations and	navigation structures projects.		
Earth Retaining Structures, Transportation and			
Traffic, Roadways and Airports, Railways, Sanitary			
Works, Hydraulics, Water Resources and Harbors.			
C5. Use the codes of practice of all civil	C5.1 Use the Egyptian code for marinas and river		
engineering disciplines effectively and	ports effectively and professionally.		
professionally.			
C6. Select appropriate building materials from the	C6.1 Select appropriate building materials for the		
perspective of strength, durability, suitability of use	construction of inland port elements and shore		
to location, temperature, weather conditions and	protections in terms of strength, durability,		
impacts of seawater and environment.	suitability of use for location, temperature, weather		
	conditions, water effects and the environment.		





1. Basic Information

Program Title	Civil Engineering Program	
Department offering the Program	Irrigation and Hydraulics Dept.	
Department Responsible for the Course	Irrigation and Hydraulics Dept.	
Course Code	IRH 476	
Year/ Level	Fourth Year-Second Semester	
Specialization	Major	
Authorization data of course specification		

Tooching Hours	Lectures	Tutorial	Practical
reaching mours	2	-	-

2. Course aims:

No.	Aim			
6	Design different types of dams and reservoirs using new building materials for protection against			
0	dangers of unexpected natural events such as floods and storms			

3. Learning Outcomes (LOs):

No.	LOs		
C1.1	Select appropriate and sustainable technologies for the construction of dams and reservoirs.		
C12	Apply the full range of civil engineering concepts and techniques for the design of different		
C1.2	types of dams.		
	Select the appropriate building materials for dam construction from the perspective of strength,		
C6.1	durability, suitability of use for site, temperature, weather conditions, and various environmental		
	influences.		
C9.1	Design structures to control and protect against the dangers of unexpected natural events such as		
	floods and storms.		

No.	Topics	week
1	Introduction to dam engineering	W1
2	Reservoir planning and river refinement	W2
3	Flood routing	W3, W4
4	Dam types - Gravity dams - Earth dams - Composed dams - Shapes of Dams	W5, W6
5	Hydraulic design of gravity, mass and composite dams - Design of water reservoirs	W7, W9
6	Dam grouting works design and types	W10, W12
7	Numerical Modeling of Dam failure and Damages Collapse	W13
8	A Comparative Study between the Dams in Egypt and Dams of the Upstream	W14
	Countries and their Impact on the Future of Water demand on Egypt.	





No.	Teaching Method
1	Interactive lectures (hybrid learning)
2	Discussion Sessions
3	Flipped classroom

6. Teaching and Learning Methods for Disable Students:

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

7. Student Assessment:

7.1 Student Assessment Methods:

No.	Assessment Method	LOs	
1	Mid Term Examination	C1.1, C1.2, C6.1	
2	Semester work (Quizzes, presentation, Portfolio)	C1.1, C1.2, C6.1, C9.1	
3	Final Term Examination	C1.1, C1.2, C6.1, C9.1	

7.2 Assessment Schedule:

No.	Assessment Method	Weeks	
1	Mid Term Examination	8	
2	Semester work (Quizzes, presentation, Portfolio)	weekly	
3	Final Term Examination	15	

7.3 Weighting of Assessments:

No.	Assessment Method	Weights
1	Mid Term Examination	15 %
2	Semester work (Quizzes, presentation, Portfolio)	15 %
3	Final Term Examination	70 %
Total		100 %

No.	Reference List					
1	Anil K. Chopra "Earthquake Engineering for Concrete Dams: Analysis, Design, and					
	Evaluation" JohnWiley & Sons Ltd, 2020					
2	Ljubomir Tanchev "Dams and Appurtenant Hydraulic Structures" 2nd edition, Taylor &					
	Francis Group, London, UK, 2014.					
3	Barry Lewis "Small Dams: Planning, Construction and Maintenance" Taylor & Francis Group,					
	London, UK, 2013					





No.	Facility
1	Lecture Classroom
2	White Board
3	Data Show System
4	Visualizer
5	Presenter
6	Sound System

10. Matrix of Knowledge and Skills of the Course:

No.	Торіс	aim	LO's
1	Introduction to dam engineering	6	C1.1
2	Reservoir planning and river refinement	6	C1.1
3	Flood routing	6	C1.2
4	Dam types - Gravity dams - Earth dams - Composed dams - Shapes of Dams	6	C6.1
5	Hydraulic design of gravity, mass and composite dams - Design of water reservoirs	6	C1.2, C6.1, C9.1
6	Dam grouting works design and types	6	C1.2, C9.1
7	Numerical Modeling of Dam failure and Damages Collapse	6	C1.1, C9.1
8	A Comparative Study between the Dams in Egypt and Dams of the Upstream Countries and their Impact on the Future of Water demand on Egypt.	6	C6.1, C9.1

Course Coordinator: Dr. Reda Diab

Head of Department: Assoc. Prof. Dr. Tharwat Eid Sarhan.



Date of Approval: / / 2021.





Course: Irrigation elective 2- Dam engineering	
Program LOs	Course LOs
C1. Select appropriate and sustainable technologies	C1.1. Select appropriate and sustainable
for construction of buildings, infrastructures,	technologies for the construction of dams
and water structures; using either numerical	and reservoirs.
techniques or physical measurements and/or	
testing by applying a full range of civil	C1.2. Apply the full range of civil engineering
engineering concepts and techniques of:	concepts and techniques for the design of
Structural Analysis and Mechanics, Properties	different types of dams.
and strength of Materials, Surveying, Soil	
Mechanics, Hydrology and Hydraulics.	
C6. Select appropriate building materials from the	C6.1. Select the appropriate building materials for
perspective of strength, durability, suitability	dam construction from the perspective of
of use to location, temperature, weather	strength, durability, suitability of use for site,
conditions, and impacts of seawater and the	temperature, weather conditions, and various
environment	environmental influences.
C9. Design and construct structures for protection	C9.1 Design structures to control and protect
against dangers of unexpected natural events	against the dangers of unexpected natural
such as floods and storms.	events such as floods and storms.





1. Basic Information

Program Title	Civil Engineering Program
Department offering the Program	Irrigation and Hydraulics Dept.
Department Responsible for the Course	Irrigation and Hydraulics Dept.
Course Code	IRH 477
Year/ Level	Fourth Year-Second Semester
Specialization	Major
Authorization data of course specification	

Toophing Hours	Lectures	Tutorial	Practical
Teaching Hours	2	-	-

2. Course aims:

No.	Aim
6	Design different types of coastal protection systems, using satellite images and remote sensing in the
Ŭ	monitoring of erosion and accretion on the beaches, considering the impact of climate change.
7	Use the Egyptian code for water resources and irrigation works effectively and professionally.

3. Learning Outcomes (LOs):

No.	LOs
C2 1	Achieve an optimum design of coastal protection structures including breakwaters, seawalls,
C2.1	jetties and groins, in conjunction with remote intelligent sensors and satellite imagery.
C5 1	Use the Egyptian code for water resources and irrigation works (Volume VII: Techniques for
C3.1	seashore protection) effectively and professionally.
C6 1	Select appropriate building materials of the coastal structures, concerning the environmental
C0.1	factors in coastal areas studies and their impact on development plans.
C0 1	Design coastal structures to control and protect against the dangers of climate change and
C9.1	unexpected natural events such as storms like Tsunami.

No.	Topics	week
1	Introduction, coastal area Planning, and geophysical phenomena affecting coastal area.	W1, W2
2	Wave types, wave forecasting, tidal phenomenon, types of coastal currents and their equations.	W3, W4
3	Definition of sediments, sediment transport and types, calculation of sediments transport, and coastal protection systems.	W5, W6
4	Use of satellite images and remote sensing in the monitoring of erosion and accretion on the beaches, and case study of Egyptian beaches.	W7, W9
5	Integrated coastal zone management.	W10, W11
6	Environmental factors in coastal areas studies and their impact on development plans.	W12
7	Impact of climate change on Egyptian coasts.	W13
8	Modern systems in coastal protection.	W14





No.	Teaching Method	
1	Interactive lectures (hybrid learning)	
2	Discussion Sessions	
3	Flipped classroom	

6. Teaching and Learning Methods for Disable Students:

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

7. Student Assessment:

7.1 Student Assessment Methods:

No.	Assessment Method	LOs
1	Mid Term Examination	C2.1, C6.1
2	Semester work (Quizzes, presentation, Portfolio)	C2.1, C5.1, C6.1, C9.1
3	Final Term Examination	C2.1, C5.1, C6.1, C9.1

7.2 Assessment Schedule:

No.	Assessment Method	Weeks
1	Mid Term Examination	8
2	Semester work (Quizzes, presentation, Portfolio)	weekly
3	Final Term Examination	15

7.3 Weighting of Assessments:

No.	Assessment Method	Weights
1	Mid Term Examination	15 %
2	Semester work (Quizzes, presentation, Portfolio)	15 %
3	Final Term Examination	70 %
	Total	100 %

No.	Reference List
1	Reeve, D., Chadwick, A., and Fleming, C., "Coastal engineering: processes, theory and design
1	practice" 3 rd ed., CRC Press, 2018.
2	Ahlhorn, F. "Integrated coastal zone management: Status, challenges and prospects" Springer,
Z	2017.





No.	Facility
1	Lecture Classroom
2	White Board
3	Data Show System
4	Visualizer
5	Presenter
6	Sound System

10. Matrix of Knowledge and Skills of the Course:

No.	Торіс		LO's		
1	Introduction, Coastal Area Planning, and Geophysical phenomena affecting coastal area.	6	C2.1		
2	Wave types, Wave forecasting, Tidal phenomenon, Types of coastal currents and their equations.	6, 7	7 C2.1		
3	Definition of sediments, Sediment transport and types, Calculation of sediments transport, and Coastal protection systems.	6, 7	C2.1, C5.1, C6.1		
4	Use of satellite images and remote sensing in the monitoring of erosion and accretion on the beaches, and Case study of Egyptian beaches.	6, 7	C2.1		
5	Integrated coastal zone management.	6	C2.1, C5.1, C6.1, C9.1		
6	Environmental factors in coastal areas studies and their impact on development plans.	6, 7	C6.1		
7	Impact of climate change on Egyptian coasts.	6, 7	C9.1		
8	Modern systems in coastal protection.	6, 7	C2.1, C6.1		

Course Coordinator: Dr. Karim Adel Nassar

Komp

Head of Department: Assoc. Prof. Dr. Tharwat Eid Sarhan.

Date of Approval: / /2021





Course: Irrigation electiv	ve 2- Coastal engineering	
Program LOs	Course LOs	
C2. Achieve an optimum design of Reinforced	C2.1 Achieve an optimum design of coastal	
Concrete and Steel Structures, Foundations and	protection structures including breakwaters,	
Earth Retaining Structures, Transportation and	seawalls, jetties and groins, in conjunction with	
Traffic, Roadways and Airports, Railways, Sanitary	remote intelligent sensors and satellite imagery.	
Works, Hydraulics, Water Resources and Harbors.		
C5. Use the codes of practice of all civil	C5.1 Use the Egyptian code for water resources and	
engineering disciplines effectively and	irrigation works (Volume VII: Techniques for	
professionally.	seashore protection) effectively and professionally.	
C6. Select appropriate building materials from the	C6.1 Select appropriate building materials of the	
perspective of strength, durability, suitability of use	coastal structures, concerning the environmental	
to location, temperature, weather conditions and	factors in coastal areas studies and their impact on	
impacts of seawater and environment.	development plans.	
C9. Design and construct structures for protection	C9.1 Design coastal structures to control and	
against dangers of unexpected natural events such	protect against the dangers of climate change and	
as floods and storms.	unexpected natural events such as storms like	
	Tsunami.	





University: Mansoura University Faculty: Faculty of Engineering

Program: Civil Engineering Program 1. Basic Information

Program Title	Civil Engineering Program	
Department offering the Program	Irrigation and Hydraulics Dept.	
Department Responsible for the Course	Irrigation and Hydraulics Dept.	
Course Code	IRH 478	
Year/ Level	Fourth Year-Second Semester	
Specialization	Major	
Authorization data of course specification		

Tooching Hours	Lectures	Tutorial	Practical
reaching mours	1	-	5

2. Course aims:

No.	Aim
6	Design a selected project in the field of hydraulics, irrigation engineering or harbor engineering.
7	Use the codes of practice for irrigation, soil mechanics and reinforced concrete effectively.

3. Learning Outcomes (LOs):

No.	LOs	
C1.1	Select a suitable design method for constructing the different elements of the irrigation and	
	hydraulics projects.	
C2.1	Achieve an optimum design for the hydraulics, irrigation and drainage, water resources and	
	harbors project.	
C3.1	Prepare the master plan and general layout of the project considering safety and stability of all	
	project elements.	
C4.1	Prepare the calculation notes of the project and estimate its overall cost.	
C5.1	Design the project according to the codes of practice of soil mechanics, reinforced concrete and	
	irrigation and hydraulics.	
C7.1	Design adequate water control structures, irrigation and water networks, and pumping stations.	
C8.1	Define and preserve (lands, water structures)	
C10.1	Collaborate with a group of colleagues during the design and production of the project.	

No.	Topics	week
1	Introduction to irrigation and hydraulics projects, and selection of a specific project.	W1, W2
2	Preliminary studies and data collection.	W3
3	Data analysis and defining different components of the project.	W4, W5
4	Preparing the master plan and general layout.	W6
5	Design of foundations.	W7, W9
6	Design of the superstructures.	W10, W11
7	Preparing the engineering drawings.	W12, W13
8	Preparing the calculation notes of the project and estimating the overall cost.	W14





No.	Teaching Method
1	Interactive lectures (hybrid learning)
2	Discussion sessions.
3	Flipped classroom.
4	Computer simulation sessions.

6. Teaching and Learning Methods for Disable Students:

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

7. Student Assessment:

7.1 Student Assessment Methods:

No.	Assessment Method	LOs
1	Semester work (Quizzes, presentation, Portfolio)	C1.1, C2.1, C3.1, C5.1, C7.1
2	Practical Examination	C1.1, C2.1, C3.1, C7.1
3	Dissection Report	C4.1, C5.1, C10.1

7.2 Assessment Schedule:

No.	Assessment Method	Weeks
1	Semester work (Quizzes, presentation, Portfolio)	weekly
2	Practical Examination	14
3	Dissection Report	after the exams of the second semester

7.3 Weighting of Assessments:

No.	Assessment Method	Weights
1	Semester work (Quizzes, presentation, Portfolio)	25 %
2	Practical Examination	25 %
3	Dissection Report	50 %
	Total	100 %

No.	Reference List
1	Sharma, Er Dr S K., "Irrigation Engineering and Hydraulic Structures", S. Chand Publishing, 2017.
2	Santosh Kumar Garg, "Irrigation Engineering and Hydraulic Structures: Water Resources Engineering, Vol. II", Khanna Publishers Pvt. Ltd, 2016.





No.	Facility
1	Lecture Classroom
2	computer simulation lab.
3	White Board
4	Data Show System
5	Visualizer
6	Presenter
7	Sound System

10. Matrix of Knowledge and Skills of the Course:

No.	Торіс	aim	LO's
1	Introduction to irrigation and hydraulics projects, and selection of a specific project.	6	C1.1
2	Preliminary studies and data collection.	6	C1.1, C10.1
3	Data analysis and defining different components of the project.	6	C1.1, C3.1, C10.1
4	Preparing the general layout.	6	C3.1, C10.1
5	Design of foundations.	6,7	C2.1, C5.1, C7.1, C10.1
6	Design of the superstructures.	6,7	C2.1, C5.1, C7.1, C10.1
7	Preparing the engineering drawings.	6,7	C4.1, C5.1
8	Preparing the calculation notes of the project.	6,7	C4.1

Course Coordinator: Assoc. Prof. Dr. Tharwat Eid Sarhan.

Dr. Reda Mahmoud Diab.

Dr. Kareem Adel Nassar.

Head of Department: Assoc. Prof. Dr. Tharwat Eid Sarhan.

Date of Approval: / /2021





Course: Graduation project			
Program LOs	Course LOs		
C1. Select appropriate and sustainable technologies	C1.1 Select a suitable design method for		
for construction of buildings, infrastructures, and	constructing the different elements of the irrigation		
water structures; using either numerical techniques	and hydraulics projects.		
or physical measurements and/or testing by			
applying a full range of civil engineering concepts			
and techniques of: Structural Analysis and			
Mechanics, Properties and strength of Materials,			
Surveying, Soil Mechanics, Hydrology and			
Hydraulics.			
C2. Achieve an optimum design of Reinforced	C2.1 Achieve an optimum design for the		
Concrete and Steel Structures, Foundations and	hydraulics, irrigation and drainage, water resources		
Earth Retaining Structures, Transportation and	and harbors project.		
Traffic, Roadways and Airports, Railways, Sanitary			
Works, Hydraulics, Water Resources and Harbors.			
C3. Plan and manage construction processes;	C3.1 Prepare the master plan and general layout of		
address construction defects, instability, and quality	the project considering safety and stability of all		
issues; maintain safety measures in construction	project elements.		
and materials.			
C4. Deal with biddings, contracts and financial	C4.1 Prepare the calculation notes of the project		
issues including project insurance and guarantees;	and estimate its overall cost.		
and assess environmental impacts of civil			
engineering projects.			
C5. Use the codes of practice of all civil	C5.1 Design the project according to the codes of		
engineering disciplines effectively and	practice of soil mechanics, reinforced concrete and		
professionally.	irrigation and hydraulics.		
C7. Select and design adequate water control	C7.1 Design adequate water control structures,		
structures, irrigation and water networks, sewerage	irrigation and water networks, and pumping		
systems and pumping stations.	stations.		
C10. Manage and supervise a group of designers in	C10.1 Collaborate with a group of colleagues		
construction sites or lab technicians.	during the design and production of the project.		





1. Basic Information

Program Title	Civil Engineering Program
Department offering the Program	Public Work Engineering department
Department Responsible for the Course	Public Work Engineering department
Course Code	PWE 431
Year/ Level	Fourth Year-First Semester
Specialization	Major
Authorization data of course specification	

Taashing Hours	Lectures	Tutorial	Practical
reaching Hours	2	1	0

2. Course aims:

No.	Aim
6	Design different types of projects in different disciplines including railroad
	engineering and public works engineering using new building materials.

3. Learning Outcomes (LOs):

C2.1	Achieve an optimum design of Railways.
C2.2	Achieve an optimum design of signaling systems of railway lines
C3.1	Plan alignment of railway line and transition curves.
C3.2	Manage process of selecting appropriate railway stations and platform dimension.

No.	Topics	Week
1	Introduction and history of railway engineering, moving dynamic of trains,	
	moving resistance, hauling force and Braking distance.	
2	Alignment of railway lines, centrifugal acceleration	4
3	Equilibrium cant and transition curves	5
4	Design of railway track elements, rail joints	6
5	Tilting the vertical axis of rails.	7
	Fastening systems	9
6	Thermal stresses in welded rails, Principles of long welded rail and	10
	Breathing length	
7	Lateral strength of railway tracks, railway turnouts, common types of	11
	railway turnouts	
8	Railway stations, platform dimension	12
9	Signaling systems of railway lines	13
10	Types of signals and Mechanical signaling	14





No.	Teaching Method
1	Interactive lectures (hybrid learning)
2	Discussion Sessions
3	Flipped classroom

6. Teaching and Learning Methods for Disable Students:

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

7. Student Assessment:

7.1 Student Assessment Methods:

No.	Assessment Method	Los
1	Semester work (Quizzes, presentation, Portfolio)	C2.1, C2.2
2	Oral Examination	C3.1, C3.2, C2.1
3	Final Term Examination	C2.1, C2.2, C3.1, C3.2

7.2 Assessment Schedule:

No.	Assessment Method	Weeks
1	Semester work (Quizzes, presentation, Portfolio)	Weekly
2	Oral Examination	14
3	Final Term Examination	15

7.3 Weighting of Assessments:

No.	Assessment Method	Weights
1	Semester work (Quizzes, presentation, Portfolio)	20%
2	Oral Examination	10%
3	Final Term Examination	70%
Total		100 %





8. List of References

No.	Reference List
1	Profillidis, V., "Railway Management and Engineering". Routledge, 2016.
2	Chandra, S., & Agarwal, M.M., "Railway Engineering", 2 edition, 2013.

9. Facilities Required for Teaching and Learning:

No.	Facility
1	Lecture Classroom
2	White Board
3	Data Show System
4	Visualizer
5	Presenter
6	Sound System

10. Matrix of Knowledge and Skills of the Course:

No	Торіс	Aim	LO's
1	Introduction and history of railway		
	engineering, moving dynamic of trains,	6	C2 1
	moving resistance, hauling force and	0	02.1
	Braking distance.		
2	Alignment of railway lines, centrifugal	6	C3.1
	acceleration		
3	Equilibrium cant and transition curves	6	C3.1
4	Design of railway track elements, rail	6	C2.1
	joints		
5	Tilting the vertical axis of rails.	6	C2.1, C3.1
	Fastening systems	6	C2.1
6	Thermal stresses in welded rails,	6	C2.1
	Principles of long welded rail and		
	Breathing length		





7	Lateral strength of railway tracks, railway	6	C2.1
	turnouts, common types of railway		
	turnouts		
8	Railway stations, platform dimension	6	C3.2
9	Signaling systems of railway lines	6	C2.2

Course Coordinator:

El Sayed Ahmed Mohamed Shoaib
 Sanaa Hassan Ateya Ebrahim

Head of Department: Prof. Dr Muharram Fouad Abdo Allaa El Din.

Mon-Found

Date of Approval:

Course: Plane Survey			
Program Los	Course Los		
C2.Achieve an optimum design of Reinforced Concrete	C2.1. Achieve an optimum design of		
and Steel Structures, Foundations and Earth Retaining	Railways.		
Structures, Transportation and Traffic, Roadways and			
Airports, Railways, Sanitary Works, Hydraulics, Water	C2.2. Achieve an optimum design of		
Resources and Harbors.	signaling systems of railway lines		
C3.Plan and manage construction processes; address	C3.1. Plan alignment of railway line and		
construction defects, instability, and quality issues;	transition curves.		
maintain safety measures in construction and materials.			
	C3.2. Manage process of selecting		
	appropriate railway stations and platform		
	dimension.		




1. Basic Information

Program Title	Civil Engineering Program
Department offering the Program	Public Works Engineering department
Department Responsible for the Course	Public Works Engineering department
Course Code	PWE 441
Year/ Level	Fourth Year- First Semester
Specialization	Major
Authorization data of course specification	

Taashing Hours	Lectures	Tutorial	Practical
Teaching Hours	2	1	0

2. Course aims:

No.	Aim
6	Design different types of Wastewater projects like Wastewater treatment plant
	units and sewage network.

3. Learning Outcomes (LOs):

C2.1	Achieve an optimum design of wastewater treatment plant components
C2.2	Achieve an optimum design of sewage network
C7.1	design adequate sewerage systems
C7.2	design pump stations and force main sewage

No.	Topics	week
1	Characteristics of wastewater	1
2	wastewater analysis	2
3	domestic and industrial wastewater sources preliminary studies to calculate	3
	the discharged flow	
4	estimate the number of populations for the future	4
5	wastewater treatment plant components	5-7
6	sewage networks design	9
7	pump stations and force main design of sewage - design criteria for the	10-11
	design of primary stage and biological stage for wastewater treatment	
8	wastewater treatment using different technologies such as aerobic and anaerobic	12-13
	ponds, oxidation ditches, wetlands, SBR and MBBR	
9	Sludge treatment	14





5. Teaching and Learning Methods:

No.	Teaching Method	
1	Interactive lectures (hybrid learning)	
2	Discussion Sessions	
3	Flipped classroom	

6. Teaching and Learning Methods for Disable Students:

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

7. Student Assessment:

7.1 Student Assessment Methods:

No.	Assessment Method	LOs
1	Semester work (Quizzes, presentation, Portfolio)	C2.1, C2.2
2	Oral Examination	C2.1, C2.2
3	Final Term Examination	C2.1, C2.2, C7.1, C7.2

7.2 Assessment Schedule:

No.	Assessment Method	Weeks
1	Semester work (Quizzes, presentation, Portfolio)	weekly
2	Oral Examination	14
3	Final Term Examination	15

7.3 Weighting of Assessments:

No.	Assessment Method	Weights
1	Semester work (Quizzes, presentation, Portfolio)	20%
2	Oral Examination	10%
3	Final Term Examination	70%
Total		100 %

8. List of References

No.	Reference List
1	Ronald L. Droste, Ronald L. Gehr., "Theory and Practice of Water and Wastewater Treatment," 2nd Edition, WILEY, 2018.
2	Metcalf & Eddy, '' Wastewater Engineering (Treatment, Disposal& Reuse)'', Fourth Edition, Mc Graw-Hill Book Co., 2003.





9. Facilities Required for Teaching and Learning:

No.	Facility
1	Lecture Classroom
2	White Board
3	Data Show System
4	Visualizer
5	Presenter
6	Sound System

10. Matrix of Knowledge and Skills of the Course:

No	Торіс	aim	LO's
1	Characteristics of wastewater	6	C2.1, C2.2
2	wastewater analysis	6	C2.1, C2.2
	domestic and industrial wastewater	6	C2.1, C2.2
3	sources preliminary studies to calculate		
	the discharged flow		
4	estimate the number of populations for the	6	C2.1, C2.2
4	future		
5	wastewater treatment plant components	6	C2.1
6	sewage networks design	6	C2.2, C7.1
	pump stations and force main design of	6	C7.2, C2.1
7	sewage - design criteria for the design of		
/	primary stage and biological stage for		
	wastewater treatment		
	wastewater treatment using different	6	C2.1
8	technologies such as aerobic and anaerobic		
0	ponds, oxidation ditches, wetlands, SBR and		
	MBBR		
9	Sludge treatment	6	C2.1





Course Coordinator:



Head of Department: Prof. Dr. Muharram Fouad Abdo Allaa El Din



Date of Approval:

Course: Wastewater engineering		
Program LOs	Course LOs	
C2. Achieve an optimum design of Reinforced Concrete	C2.1 Achieve an optimum design of	
and Steel Structures, Foundations and Earth Retaining	wastewater treatment plant components	
Structures, Transportation and Traffic, Roadways and		
Airports, Railways, Sanitary Works, Hydraulics, Water	C2.2 Achieve an optimum design of	
Resources and Harbors.	sewage network	
C7. Select and design adequate water control	C7.1 design adequate sewerage systems	
structures, irrigation and water networks, sewerage		
systems and pumping stations.	C7.2 design pump stations and force	
	main sewage	





1. Basic Information

Program Title	Civil Engineering Program
Department offering the Program	Public Work Engineering department
Department Responsible for the Course	Public Work Engineering department
Course Code	PWE 471
Year/ Level	Fourth year – Second Semester
Specialization	Major
Authorization data of course specification	

Teaching Houng	Lectures	Tutorial	Practical
reaching Hours	1		5

2. Course aims:

No.	Aim
6	Design infrastructure engineering projects using surveying, transport, traffic
	, sanitary , roads and railway disciplines
7	Use the codes of practice of different public work engineering disciplines
	effectively and professionally

3. Learning Outcomes (LOs):

C1.1	Select appropriate and sustainable technologies for construction of infrastructures and water structures; as application of public work engineering concepts and techniques .
C2.1	Achieve an optimum design of Transportation and Traffic, Roadways, airports, Railways and Sanitary Works
C3.1	Manage construction processes and quality issues in Transportation and Traffic,
	Roadways, airports, Railways and Sanitary Works projects
C4.1	Deal with biddings, contracts and financial issues in infrastructure projects.
C5.1	Use the codes of practice of different public work engineering disciplines effectively and professionally
C7.1	Design water control structures, water networks and sewerage systems as application of sanitary engineering concepts
C8.1	Preserve properties (lands, real estates) of individuals, communities and institutions, through different surveying and GIS tools.
C10.1	Supervise a group of designers in public work construction sites





4. Course Contents:

No.	Topics	week
1	depend on type of project .	1-14

5. Teaching and Learning Methods:

No.	Teaching Method	
1	Interactive lectures (hybrid learning)	
2	Discussion Sessions	
3	Flipped classroom	
4	Practical	

6. Teaching and Learning Methods for Disable Students:

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

7. Student Assessment:

7.1 Student Assessment Methods:

No.	Assessment Method	LOs
1	Semester work (Quizzes, presentation, Portfolio)	C2.1, C3.1, C4.1, C5.1
2	Practical examination	C1.1, C8.1
3	Dissection Report	C.2.1 , C 3.1 , C4.1 , C5.1 , C7.1 , C8.1 , C10.1

7.2 Assessment Schedule:

No.	Assessment Method	Weeks
1	Semester work (Quizzes, presentation, Portfolio)	weekly
2	Practical examination	at the end of the term
3	Dissection Report	at the end of the term

7.3 Weighting of Assessments:

No.	Assessment Method	Weights
1	Semester work (Quizzes, presentation, Portfolio)	25 %
2	Practical examination	25 %
3	Dissection Report	50 %
Total		100 %





8. List of References

No.		Reference List
1	According to the project subject	

9. Facilities Required for Teaching and Learning:

No.	Facility
1	Lecture Classroom
2	White Board
3	Data Show System
4	Visualizer
5	Presenter
6	Sound System
7	Lab

10. Matrix of Knowledge and Skills of the Course:

No	Торіс	aim	LO's
1	depend on type of project .	6,7	

Head of Department: Prof. Dr. Muharram Fouad Abdo Allaa El Din

Mon-Found

Date of Approval:





Course: Graduation project			
Program LOs	Course LOs		
C1. Select appropriate and sustainable technologies for			
construction of buildings, infrastructures and water			
structures; using either numerical techniques or	C1.1 Select appropriate and sustainable		
physical measurements and/or testing by applying a	technologies for construction of		
full range of civil engineering concepts and techniques	infrastructures and water structures; as		
of: Structural Analysis and Mechanices, Properties and	concepts and techniques .		
strength of Materials, Surveying, Soil Mechanics,			
Hydrology and Hydraulics.			
C2. Achieve an optimum design of Reinforced Concrete and			
Steel Structures, Foundations and Earth Retaining	C2.1 Achieve an ontimum design of		
Structures, Transportation and Traffic, Roadways and	Transportation and Traffic, Roadways ,		
Airports, Railways, Sanitary Works, Hydraulics, Water	airports, Railways and Sanitary Works		
Resources and Harbors.			
C3. Plan and manage construction processes; address			
construction defects, instability and quality issues;	quality issues in Transportation and Traffic,		
maintain safety measures in construction and	Roadways , airports, Railways and Sanitary		
materials.	Works projects		
C4. Deal with biddings, contracts and financial issues			
including project insurance and guarantess; and	C4.1 Deal with biddings, contracts and		
assess environmental impacts of civil engineering	financial issues in infrastructure projects .		
projects.			
	C5.1 Use the codes of practice of different		
C5. Use the codes of practice of all civil engineering	public work engineering disciplines		
disciplines effectively and Professionally	effectively and professionally		
C7. Select and design adequate water control structures,	C7.1 Design water control structures, water		
irrigation and water networks, sewerage systems and	networks and sewerage systems as		
pumping stations.	application of sanitary engineering concepts		
C8. Define and preserve properties (lands, real estates) of	C8.1 Preserve properties (lands, real estates)		
individuals, communities and institutions, through	of individuals, communities and institutions,		
different surveying and GIS tools.	through different surveying and GIS tools.		
C10. Manage and supervise a group of designers in	C10.1 Supervise a group of designers in		
construction sites or lab technicians	public work construction sites		





1. Basic Information

Program Title	Civil Engineering Program	
Department offering the Program	Structural Engineering Department	
Department Responsible for the Course	Structural Engineering Department	
Course Code	STE432	
Year/ Level	Fourth Year- Second Semester	
Specialization	Major	
Authorization data of course specification		

Taashing Hours	Lectures	Tutorial	Practical
Teaching Hours	3	2	

2. Course aims:

No.	Aim		
7	Use the codes of practice of structural engineering disciplines effectively and Professionally		

3. Learning Outcomes (LOs):

C2.1	Achieve an optimum design of Reinforced Concrete Water Structures.
C2.2	Design Special Structures such as Prestressed members , Surface of Revolution.
C5.1	Use the codes of practice in Serviceability limit states and Lateral Load Design.

No.	Topics	week
1	- Types of water structures - loads on water structures - design of sections for crack	1-3
	control	
2	- Design of rectangular concrete tanks	4-6
3	- Design of circular concrete tanks	7-9
4	- Serviceability limit states - Deflection and crack control	10
5	- Design of surface of revolution structures	11
6	- Design of prestressed concrete Design and analysis of continuous prestressed	12-13
0	concrete beams - Calculation of losses and stresses in prestressed beams	
7	- introduction to the design of multi-story buildings under lateral loads.	14





5. Teaching and Learning Methods:

No.	Teaching Method	
1	Interactive lectures (hybrid learning)	
2	Discussion Sessions	
3	Flipped classroom	

6. Teaching and Learning Methods for Disable Students:

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

7. Student Assessment:

7.1 Student Assessment Methods:

No.	Assessment Method	LOs
1	Mid Term Examination	C2.1
2	Semester work (Quizzes, presentation, Portfolio)	C2.1 , C2.2
3	Oral Examination	C2.2.C5.1
4	Final Term Examination	C2.1 , C2.2 , C5.1

7.2 Assessment Schedule:

No.	Assessment Method	Weeks
1	Mid Term Examination	8
2	Semester work (Quizzes, presentation, Portfolio)	weekly
3	Oral Examination	14
4	Final Term Examination	15

7.3 Weighting of Assessments:

No.	Assessment Method	Weights
1	Mid Term Examination	20 %
2	Semester work (Quizzes, presentation, Portfolio)	10 %
3	Oral Examination	10 %
4	Final Term Examination	60 %
Total		100 %





8. List of References

No.	Reference List
1	El-Behairy, Shaker, "Handbook of Concrete Structures", 2019.
2	Hilal, M., "Design of Reinforced Concrete Halls", Cairo University, 2005.

9. Facilities Required for Teaching and Learning:

No.	Facility
1	Lecture Classroom
2	White Board
3	Data Show System
4	Visualizer
5	Presenter
6	Sound System

10. Matrix of Knowledge and Skills of the Course:

No	Торіс	aim	LO's
	- Types of water structures - loads on water structures - design of sections for crack control	7	C2.1
	- Design of rectangular concrete tanks	7	C2.1
	- Design of circular concrete tanks	7	C2.1
	- Serviceability limit states - Deflection and crack control	7	C5.1
	- Design of surface of revolution structures	7	C2.2
	- Design of prestressed concrete Design and analysis of continuous prestressed concrete beams - Calculation of losses and stresses in prestressed beams	7	C2.2
	- introduction to the design of multi-story buildings under lateral loads.	7	C5.1





Course Coordinator: Prof. Dr. Salah El-Din El-Said El-Metwally, Pro.Ass.Dr. Ahmed Amin Ghaleb

Head of Department: Prof. Dr. Ahmed Mahmoud Yousef

Date of Approval: December 2019

Course: Reinforced C	oncrete 3
Program LOs	Course LOs
C2. Achieve an optimum design of Reinforced Concrete	C2.1 Achieve an optimum design of
and Steel Structures, Foundations and Earth Retaining	Reinforced Concrete Water Structures.
Structures, Transportation and Traffic, Roadways and	
Airports, Railways, Sanitary Works, Hydraulics, Water	C2.2 Design Special Structures such as
Resources and Harbors.	Prestressed members , Surface of
	Revolution.
C5. Use the codes of practice of all civil engineering	C5.1 Use the codes of practice in
disciplines effectively and Professionally	Serviceability limit states and Lateral
	Load Design





1. Basic Information

Program Title Civil Engineering program			
Department offering the Program	tment offering the Program Structural Engineering Department		nt
Department Responsible for the Course	Structural Engineering Department		
Course Code	STE474		
Year/ Level	Fourth Year- Second Semester		
Specialization	Major		
Topphing Hours	Lectures	Tutorial	Practical
reaching rivers	2	0	0

2. Course aims:

No.	aim
6	Design different types of projects elements to repair and strengthening them.

3. Learning Outcomes (LOs):

C6.	Select appropriate building materials from the perspective of strength, durability,
	suitability of use to repair and strengthening construction building.
С7.	Design weak construction buildings to increase its life span

4. Course Contents:

No.	Topics	Week
1	Assessment of concrete - Causes of deterioration of concrete structures structures.	1-3
2	Repair and strengthening materials (types, selection and testing)	4-5
3	Bond between repair or strengthening materials and substrate concrete – Different techniques of repair and strengthening	6-9
4	Protection and maintenance of concrete structures	10-11
5	Repair and strengthening of different concrete elements (footing - column - beam - slab etc.)	12-13
6	Strength assessment of repaired and strengthened structures.	14

5. Teaching and Learning Methods:





No.	Teaching Method
1	Interactive lectures (hybrid learning)
2	Discussion lessons
3	Flipped classroom

6. Teaching and Learning Methods 0f Disable Students:

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

7. Student assessment:

7.1 Student Assessment Methods:

No.	Assessment Method	LOs
1	Mid Term Examination (written)	C6, C7
2	Semester work (Formative - quizzes – presentation)	C6, C7
3	Final Term Examination (written)	C6, C7

7.2 Assessment Schedule:

No.	Assessment Method	Weeks
1	Mid Term Examination (written)	8
2	Semester work (Formative - quizzes – presentation)	Weekly
3	Final Term Examination (written)	15

7.3 Weighting of Assessments:

No.	Assessment Method	Weights
1	Mid Term Examination (written)	15
2	Semester work (Formative - quizzes – presentation)	15
3	Final Term Examination (written)	70
Total		100%

8. List of References

No.	Reference List
1	A. El-Reedy, " Concrete Structures: Repair, Rehabilitation and Strengthening





", 1st Edition, 2020.

9. Facilities Required for Teaching and Learning:

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

10. Matrix of Knowledge and Skills of the Course:

No.	Торіс	aim	LO's
1	Causes of deterioration of concrete		C6, C7
	structures - Assessment of concrete structures.	6	
2	Repair and strengthening materials (types, selection and testing)	6	C6, C7
3	Bond between repair or strengthening materials and substrate concrete – Different techniques of repair and strengthening	6	C6
4	Protection and maintenance of concrete structures	6	C6, C7
5	Repair and strengthening of different concrete elements (footing - column - beam - slab etc.)	6	C6, C7
6	Strength assessment of repaired and strengthened structures.	6	C6, C7

Course Coordinator: Prof. Dr. Hamed Askar

Head of Department: Prof. Dr. / Ahmed Mahmoud Yousef Mohamed Salem

Date of Approval:





Course: Repair and Strength	ening of Structures	
Program LOs	Course LOs	
C6. Select appropriate building materials from	C6. Select appropriate building	
the perspective of strength, durability, suitability	materials from the perspective of strength durability suitability of use to	
of use to location, temperature, weather	repair and strengthening construction	
conditions and impacts of seawater and	building.	
environment.		
C7. Select and design adequate water control	C7. Design weak construction buildings	
structures, irrigation and water networks,	To increase its life span	
sewerage systems and pumping stations.		





1. Basic Information

Program Title	Civil Engineering Program
Department offering the Program	Structural Engineering department
Department Responsible for the Course	Structural Engineering department
Course Code	STE451
Year/ Level	fourth year – first semester
Specialization	Major
Authorization data of course specification	

Taashing Hours	Lectures	Tutorial	Practical
l eaching Hours	4	3	0

2. Course aims:

No.	Aim
7	Use the codes of practice of soil mechanics and foundation in design of pile
	foundation ,dewatering systems and earth retaining structures.

3. Learning Outcomes (ILOs):

C9.1 Design different types of pile foundation, earth retaining structures, dewatering systems.

No.	Topics	week
1	Introduction to soil hydraulics - Determination of soil hydraulic conductivity - Soil	1-2
	water flow - Introduction to soil mechanics and foundations	
2	Methods of solving flow problems in porous media - Types of piles types and	3-4
	methods of construction - Pile design	
3	One-dimensional flow - Two-dimensional flow - Vertical and horizontal bearing	5-6
	capacity of piles	
4	Groundwater flow and its effect on foundations Analysis of piles groups -	7-9
	Settlement of piles - Piles load tests.	
5	Design of piles caps - Studying the lateral earth pressure of different soils and its	10-11
	influences on construction-	
6	Design of retaining walls and sheet piles - Different retaining systems for	12
	neighboring structures -	
7	Soil hydraulics - Water seepage theories - Seepage applications - Dewatering	13
	systems	
8	Groundwater and its effects on concrete structures - different types of problematic	14





soil and methods of solutions - Replacement soil and its applications.

5. Teaching and Learning Methods:

No.	Teaching Method
1	Interactive lectures (hybrid learning)
2	Discussion Sessions
3	Flipped classroom

6. Teaching and Learning Methods for Disable Students:

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

7. Student Assessment:

7.1 Student Assessment Methods:

No.	Assessment Method	LOs
1	Mid Term Examination	C9.1
2	Semester work (Quizzes, presentation, Portfolio)	C9.1
3	Oral examination	C9.1
4	Final Term Examination	C9.1

7.2 Assessment Schedule:

No.	Assessment Method	Weeks
1	Mid Term Examination	8
2	Semester work (Quizzes, presentation, Portfolio)	weekly
3	Oral examination	14
4	Final Term Examination	15

7.3 Weighting of Assessments:

No.	Assessment Method	Weights





1	Mid Term Examination	13.3%
2	Semester work (Quizzes, presentation, Portfolio)	13.3%
4	Oral examination	6.6%
5	Final Term Examination	66.6%
Total		100 %

8. List of References

No.	Reference List
1	Pile Design and Construction Practice - Michael Tomlinson, John Woodward (2015)
2	Deep Excavations in Soil -John Endicott (2020)

9. Facilities Required for Teaching and Learning:

No.	Facility
1	Lecture Classroom
2	White Board
3	Data Show System
4	Visualizer
5	Presenter
6	Sound System

10. Matrix of Knowledge and Skills of the Course:

No	Торіс	aim	ILO's
	Introduction to soil hydraulics - Determination of		C9.1
1	soil hydraulic conductivity - Soil water flow -	7	
	Introduction to soil mechanics and foundations		
	Methods of solving flow problems in porous media	7	C9.1
2	- Types of piles types and methods of construction		
	- Pile design		
2	One-dimensional flow - Two-dimensional flow -	7	C9.1
5	Vertical and horizontal bearing capacity of piles		
	Groundwater flow and its effect on foundations	7	C9.1
4	Analysis of piles groups - Settlement of piles -		
	Piles load tests.		
	Design of piles caps - Studying the lateral earth	7	C9.1
5	pressure of different soils and its influences on		
	construction		





	Design of retaining walls and sheet piles -	7	C9.1
6	Different retaining systems for neighboring		
	structures -		
7	Soil hydraulics - Water seepage theories - Seepage	7	C9.1
/	applications - Dewatering systems		
	Groundwater and its effects on concrete structures	7	C9.1
	- different types of problematic soil and methods of		
8	solutions - Replacement soil and its applications.		

Course Coordinator:

- Prof. Adel Elsayed Dief
- Ass. Prof. Ayman Ibrahim El-tahrany

Head of Department: Prof. Dr. Ahmed Youssef

Date of Approval: August 2021

Course: Soil mechanics and foundations 2			
Program ILOs	Course ILOs		
C9. Design and construct structures for protection against dangers of unexpected natural events such as floods and storms	C9.1 Design different types of pile foundation, earth retaining structures, dewatering systems.		





1. Basic Information

Program Title	Civil Engineering Program
Department offering the Program	Structural Engineering Department
Department Responsible for the Course	Structural Engineering Department
Course Code	STE473
Year/ Level	Fourth year
Specialization	Major
Authorization data of course specification	

Teaching Houng	Lectures	Tutorial	Practical
reaching Hours	2	1	0

2. Course aims:

No.	Aim
6	Design different types of projects in different fields of structural engineering, public works and hydraulics and irrigation engineering, using new types of concrete.

3. Learning Outcomes (LOs):

C1.1	learn the properties of special concretes regarding strength and durability	
C1.2	use appropriate special concretes to be suitable for location, temperature, weather	
	conditions, and impacts of seawater and environment	

No.	Topics	week
1	Purpose of using special concretes- types of special concrete	1
2	Design methods of special concretes	2
3	Types of lightweight concretes	3
4	Self compacting concrete tests	4
5	Radiation resistant concrete	5
6	fiber reinforced concrete and its applications	6
7	Polymer concrete	7
8	High strength concrete	9-10
9	Ultra high performance concrete	11-12
10	High temperature resistant concrete- Effect of high temperature and fire	13-14
	exposure on concrete properties	
11	Technical and economic feasibility of special concretes	15





5. Teaching and Learning Methods:

No.	Teaching Method	
1	Interactive lectures (hybrid learning)	
2	Discussion Sessions	
3	Flipped classroom	

6. Teaching and Learning Methods for Disable Students:

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

7. Student Assessment:

7.1 Student Assessment Methods:

No.	Assessment Method	Los
1	Semester work (Quizzes, presentation, Portfolio)	C1.1, C1.2
2	Oral Examination	C1.1
3	Final Term Examination	C1.1, C1.2

7.2 Assessment Schedule:

No.	Assessment Method	Weeks
1	Semester work (Quizzes, presentation, Portfolio)	Weekly
2	Final Term Examination	15

7.3 Weighting of Assessments:

No.	Assessment Method	Weights
1	Semester work (Quizzes, presentation, Portfolio)	30%
2	Oral Examination	10%
3	Final Term Examination	60%
Total		100 %

8. List of References

No.	Reference List		
1	<i>P. Kumar Mehta, Paulo J. M. Monterio, Concrete: microstructure, properties and materials, McGraw Hill, 2013.</i>		
2	Edward G. Nawy, Concrete construction engineering handbook, Taylor & Francis Group, Second edition 2008.		

9. Facilities Required for Teaching and Learning:





No.	Facility
1	Lecture Classroom
2	White Board
3	Data Show System
4	Visualizer
5	Presenter
6	Sound System

10. Matrix of Knowledge and Skills of the Course:

No	Торіс	Aim	LO's
1	Purpose of using special concretes- types of	6	C1.1
2	Design methods of special concretes	6	C1.2
3	Types of lightweight concretes	6	C1.1, C1.2
4	Self compacting concrete tests	6	C1.1, C1.2
5	Radiation resistant concrete	6	C1.1, C1.2
6	fiber reinforced concrete and its applications	6	C1.1, C1.2
7	Polymer concrete	6	C1.1, C1.2
8	High strength concrete	6	C1.1, C1.2
9	Ultra high performance concrete	6	C1.1, C1.2
10	High temperature resistant concrete- Effect	6	C1.1, C1.2
	of high temperature and fire exposure on		
	concrete properties		
11	Technical and economic feasibility of special	6	C1.2
	concretes		

Course Coordinator: Prof. Dr. Ahmed tahwia

Head of Department: Prof. Dr. Ahmed Mahmoud Yousef

Date of Approval: September 2021

Course: Special concretes		
Program Los	Course Los	





C1. Select appropriate building materials from the	C1.1 learn the properties of special
perspective of strength, durability, suitability of use to location, temperature, weather conditions and impacts of seawater and environment	concretes regarding strength and durability
	C1.2 select appropriate special concretes to be suitable for location, temperature, weather conditions, and impacts of seawater and environment





1. Basic Information

Program Title	Civil Engineering Program
Department offering the Program	Structural Engineering Department
Department Responsible for the Course	Structural Engineering Department
Course Code	STE476
Year/ Level	Fourth year - First Semester
Specialization	Major
Authorization data of course specification	

Teaching Hours	Lectures	Tutorial	Practical
	1	-	5

2. Course aims:

No.	Aim		
6	Design different types of projects in different fields within structural		
	engineering field, using new building materials and software.		
7	Use the Egyptian codes of practice of all civil engineering fields effectively		
	and Professionally according to the graduation project kind.		

3. Learning Outcomes (LOs):

C1.1	Select appropriate and sustainable technologies for construction of buildings,
	infrastructures, and water structures
C1.2	Apply a full range of civil engineering concepts and techniques
C2.1	Achieve an optimum design
C3.1	Plan and manage construction processes
C3.2	Maintain safety measures in construction and materials
C4.1	Deal with biddings contracts and financial issues.
C4.2	Assess environmental impacts of civil engineering projects.
C5.1	Use the codes of practice of all civil engineering disciplines
C7.1	Design an adequate project.
C8.1	Define lands and resources.
C10.1	Manage a group of engineers in sites.

No.	Topics		
1	Design different types of projects in different fields among Civil	1-14	
	Engineering disciplines, and use the codes of practice of all civil engineering		
	fields effectively and professionally.		





5. Teaching and Learning Methods:

No.	Teaching Method
1	Interactive lectures (hybrid learning)
2	Discussion Sessions
3	Flipped classroom

6. Teaching and Learning Methods for Disable Students:

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

7. Student Assessment:

7.1 Student Assessment Methods:

No.	Assessment Method	LOs
1	Practical Examination	C1.1, C1.2, C3.1
2	Semester work (Quizzes, presentation, Portfolio)	C4.1, C4.2
3	Dissection Report	C5.1, C7.1, C8.1, C10.1

7.2 Assessment Schedule:

No.	Assessment Method	Weeks
1	Practical Examination	8
2	Semester work (Quizzes, presentation, Portfolio)	weekly
3	Dissection Report	15

7.3 Weighting of Assessments:

No.	Assessment Method	Weights
1	Practical Examination	25%
2	Semester work (Quizzes, presentation, Portfolio)	25%
3	Dissection Report	50 %
Total		100 %

8. List of References

No.	Reference List		
1	According to the project subject	According to the project subject	

9. Facilities Required for Teaching and Learning:





No.	Facility
1	Lecture Classroom
2	White Board
3	Data Show System
4	Visualizer
5	Presenter
6	Sound System
7	Laboratory

10. Matrix of Knowledge and Skills of the Course:

No	Торіс	aim	LO's
1	Design different types of projects in different		C1.1, C1.2, C2.1, C3.1, C3.2,
	fields among Civil Engineering disciplines,		C4.1, C4.2, C5.1, C7.1, C8.1,
	and use the codes of practice of all civil	6,7	C10.1
	engineering fields effectively and		
	professionally.		

Course Coordinator: According to the project subject

Head of Department: According to the project discipline

Date of Approval:

Course: Graduation Project		
Program LOs	Course LOs	
C1. Select appropriate and sustainable technologies for	C1.1. Select appropriate and sustainable	
construction of buildings, infrastructures, and water	technologies for construction of buildings,	
structures; using either numerical techniques or physical	infrastructures, and water structures	
measurements and/or testing by applying a full range of		
civil engineering concepts and techniques of: Structural	C1.2. Apply a full range of civil	
Analysis and Mechanics, Properties and strength of	engineering concepts and techniques	
Materials, Surveying, Soil Mechanics, Hydrology and		
Hydraulics		
C2. Achieve an optimum design of Reinforced Concrete	C2.1. Achieve an optimum design	
and Steel Structures, Foundations and Earth Retaining		
Structures, Transportation and Traffic, Roadways and		





Airports Railways Sanitary Works Hydraulics Water	
Pasouroos and Harbors	
C3. Plan and manage construction processes; address	C3.1. Plan and manage construction
construction defects, instability, and quality issues;	processes
maintain safety measures in construction and materials.	
	C3.2. Maintain safety measures in
	construction and materials
C4 Deal with biddings contracts and financial issues	C4.1 Deal with hiddings contracts and
including project insurance and guarantees: and assess	financial issues
meruding project insurance and guarantees, and assess	linancial issues.
environmental impacts of civil engineering projects.	
	C4.2. Assess environmental impacts of
	civil engineering projects.
C5. Use the codes of practice of all civil engineering	C5.1. Use the codes of practice of all
disciplines effectively and Professionally.	civil engineering disciplines
C7. Select and design adequate water control structures,	C7.1. Design an adequate project.
irrigation and water networks, sewerage systems and	
pumping stations.	
C8. Define and preserve properties (lands, real estates)	C8.1. Define lands and resources.
of individuals, communities, and institutions, through	
different surveying and GIS tools.	
C10. Manage and supervise a group of designers in	C10.1. Manage a group of engineers in
construction sites or lab technicians.	sites.





1. Basic Information

Program Title	Civil Engineering Program
Department offering the Program	Construction Engineering Department
Department Responsible for the Course	Construction Engineering Department
Course Code	STE441
Year/ Level	First term - 4 th year
Specialization	Major
Authorization data of course specification	

Toophing Houng	Lectures	Tutorial	Practical
Teaching Hours	3	2	

2. Course aims:

No.	Aim	
7	Exploit the codes of practice of all civil engineering	steel disciplines effectively and
	professionally.	

3. Learning Outcomes (LOs):

C5.1	Use the steel codes in Calculation of forces on the different elements of bridges and Permissible
	design stresses .
C5.2	Use the codes to design of joints, bridge bracings, Roadway bridges, side walk elements, truss
	bridges and bridges bearings.
C2.1	Achieve the optimum Design for fatigue ,stringers and cross girders and main girders of
	composite section.

No.	Topics	week
1	Types and components of steel bridges.	1
2	Calculation of forces on the different elements of bridges .	2
3	Permissible design stresses .	3
4	Design for fatigue .	4
5	Design of stringers and cross girders.	5





6	Design of main girders of composite section.	6
7	Design of joints.	7
8	Design of bridge bracings	9
9	Road way bridges.	10 - 11
10	Design of sidewalk elements .	12
11	Design of truss bridges.	13
12	Design of bridges bearings.	14

5. Teaching and Learning Methods:

No.	Teaching Method
1	Interactive lectures (hybrid learning)
2	Discussion Sessions
3	Flipped classroom

6. Teaching and Learning Methods for Disable Students:

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

7. Student Assessment:

7.1 Student Assessment Methods:

No.	Assessment Method	LOs
1	Mid Term Examination	C5.1
2	Semester work (Quizzes, presentation, Portfolio)	C5.2
3	Oral Examination	C2.1
4	Final Term Examination	C5.1 , C5.2 , C2.1

7.2 Assessment Schedule:

No.	Assessment Method	Weeks
1	Mid Term Examination	8
2	Semester work (Quizzes, presentation, Portfolio)	weekly
3	Oral Examination	14
4	Final Term Examination	15

7.3 Weighting of Assessments:

No.	Assessment Method	Weights





1	Mid Term Examination	13
2	Semester work (Quizzes, presentation, Portfolio)	13
3	Oral Examination	7
4	Final Term Examination	67
Total		100 %

8. List of References

No.	Reference List
1	Egyptian Code of Practice for Steel Construction (Load and Resistance Factor Design (LRFD) (205) Ministerial Decree No. 359-2007 Ministry of Housing Utilities and
-	Urban Development.
2	Egyptian Code of Practice for Steel Construction and Bridges (ASD) Code No. ECP
	205-2001, Edit 2009. Ministry of Housing, Utilities and Urban Development.
2	Unsworth, John F. "Design and Construction of Modern Steel Railway Bridges".
3	CRC Press, 2017.
4	Lebet, Jean-Paul, Hirt, Manfred A. "Steel Bridges - Conceptual and Structural Design
	of Steel and Steel-Concrete Composite Bridges". Taylor & Francis, 2013.

9. Facilities Required for Teaching and Learning:

No.	Facility
1	Lecture Classroom
2	White Board
3	Data Show System
4	Visualizer
5	Presenter
6	Sound System

10. Matrix of Knowledge and Skills of the Course:

No	Торіс	aim	LO's
1	Types and components of steel bridges.	7	C5.1
2	Calculation of forces on the different elements of bridges .	7	C5.1
3	Permissible design stresses .	7	C5.1





4	Design for fatigue.	7	C5.2, C2.1
5	Design of stringers and cross girders.	7	C5.2, C2.1
6	Design of main girders of composite section.	7	C5.2, C2.1
7	Design of joints.	7	C5.2
8	Design of bridge bracings	7	C5.2
9	Roadway bridges.	7	C5.2
10	Design of sidewalk elements .	7	C5.2
11	Design of truss bridges.	7	C5.2
12	Design of bridges bearings.	7	C5.2

Course Coordinator: Prof.Dr. Nabil El-Sayed & Prof.Dr .Saad El-Deen Moustafa

Head of Department: Prof. Dr. Ahmed Yossef

Date of Approval:

Course: Steel Constructions 2		
Program LOs	Course LOs	
C5. Use the codes of practice of all civil engineering disciplines effectively and professionally.	C5.1 use the steel codes in Calculation of forces on the different elements of bridges and Permissible design stresses .C5.2 Use the codes to design of joints ,	
	elements, truss bridges and bridges bearings.	
C2. Achieve an optimum design of Reinforced Concrete and Steel Structures, Foundations and Earth Retaining Structures, Transportation and Traffic, Roadways and Airports, Railways, Sanitary Works, Hydraulics, Water Resources and Harbors.	C2.1 Achieve the optimum Design for fatigue, stringers and cross girders and main girders of composite section.	









1. Basic Information

Program Title	Civil Engineering Program
Department offering the Program	Structural Engineering Department
Department Responsible for the Course	Structural Engineering Department
Course Code	STE472
Year/ Level	Fourth year - First Semester
Specialization	Major
Authorization data of course specification	December 2020

Teaching Hours	Lectures	Tutorial	Practical
	2	1	-

2. Course aims:

No.	Aim
6	Design FORTRAN programs for analyzing real structures and describe the
	fundamentals and basic theories of using computer in analyzing structural
	problems.

3. Learning Outcomes (LOs):

C1.1	Select appropriate mathematical methods for analysis Shear Building and Calculating natural			
	frequency of one and two degree of freedom dynamic problems.			
C1.2	Define the concepts of dynamic loads, types of nonlinearity in structures, mathematical			
	model and free body diagram, and Jacobi's method for calculating the natural frequency and			
	the corresponding Eigenvectors.			
C2.1	Achieve an optimum design of different structures by calculating Critical Buckling			
	Load of columns having different end conditions and transmissibility of dynamic			
	loads to the foundation and Steady State Response.			
C2.2	Design Fortran program for solving and analyzing the structural behavior of different			
	structures.			

No.	Topics	
1	Types of dynamic loads - Types of nonlinearity in structures- Mathematical model	1
	and free body diagram- Types of Damping	
2	Jacobi's method for calculating the natural frequency and the corresponding	2-4
	Eigenvectors	
3	Shear Building	5-6
4	Calculating natural frequency of one and two degree of freedom dynamic problems	7-9





5	Transmissibility of dynamic loads to the foundation and Steady State Response	10-11
6	Methods of calculating Critical Buckling Load of columns having different end	
	conditions	
7	Using computer FORTRAN program for solving Beams, Trusses and Frames	14

5. Teaching and Learning Methods:

No.	Teaching Method
1	Interactive lectures (hybrid learning)
2	Discussion Sessions
3	Flipped classroom

6. Teaching and Learning Methods for Disable Students:

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

7. Student Assessment:

7.1 Student Assessment Methods:

No.	Assessment Method	LOs
1	Mid Term Examination	C1.1, C1.2
2	Semester work (Quizzes, presentation, Portfolio)	C2.1
3	Oral Examination	C1.1, C2.1
4	Final Term Examination	C1.2, C2.1, C2.2

7.2 Assessment Schedule:

No.	Assessment Method	Weeks		
1	Mid Term Examination	8		
2	Semester work (Quizzes, presentation, Portfolio)	weekly		
3	Oral Examination	14		
4	Final Term Examination	15		

7.3 Weighting of Assessments:

No.	Assessment Method	Weights
1	Mid Term Examination	15%
2	Semester work (Quizzes, presentation, Portfolio)	15%
3	Oral Examination	10 %
4	Final Term Examination	60 %
Total		100 %





8. List of References

No.	Reference List
1	Igor A. Karnovsky, Advanced methods of structural analysis, 2010.
2	M. Paz and W. Leigh, Structural Dynamics. Boston, MA: Springer US, 2004.

9. Facilities Required for Teaching and Learning:

No.	Facility
1	Lecture Classroom
2	White Board
3	Data Show System
4	Visualizer
5	Presenter
6	Sound System

10. Matrix of Knowledge and Skills of the Course:

No	Торіс		LO's
1	Types of dynamic loads - Types of nonlinearity in structures- Mathematical model and free body diagram- Types of Damping	6	C1.1, C1.2
2	Jacobi's method for calculating the natural frequency and the corresponding Eigenvectors	6	C1.1, C1.2
3	Shear Building	6	C2.2, B1.1
4	Calculating natural frequency of one and two degree of freedom dynamic problems	6	C2.2, C1.2
5	Transmissibility of dynamic loads to the foundation and Steady State Response	6	C1.2, C2.1
6	Methods of calculating Critical Buckling Load of columns having different end conditions	6	C2.1, C2.2
7	Using computer FORTRAN program for solving Beams, Trusses and Frames	6	C2.1, C2.2




Course Coordinator: Prof. Dr/ Mohammed Naguib Abou El-Saad

Head of Department: Prof. Dr/ Ahmed Mahmoud Youssif Mohamed

Course: Structure analysis using Computer		
Program LOs	Course LOs	
C1. Select appropriate and sustainable technologies for construction of buildings, infrastructures, and water structures; using either numerical techniques or physical measurements and/or testing by applying a full range of civil engineering concepts and techniques of: Structural	C1.1-Select appropriate mathematical methods for analysis Shear Building and Calculating natural frequency of one and two degree of freedom dynamic problems.	
Analysis and Mechanics, Properties and strength of Materials, Surveying, Soil Mechanics, Hydrology and Hydraulics.	C1.2-Define the concepts of dynamic loads, types of nonlinearity in structures, mathematical model and free body diagram, and Jacobi's method for calculating the natural frequency and the corresponding Eigenvectors.	
C2. Achieve an optimum design of Reinforced Concrete and Steel Structures, Foundations and Earth Retaining Structures, Transportation and Traffic, Roadways and Airports, Railways, Sanitary Works, Hydraulics, Water Resources and Harbors.	C2.1- Achieve an optimum design of different structures by calculating Critical Buckling Load of columns having different end conditions and transmissibility of dynamic loads to the foundation and Steady State Response.	
	C2.2- Design Fortran program for solving and analyzing the structural behavior of different structures.	





1. Basic Information

Program Title	Civil Engineering Program
Department offering the Program	Civil Engineering Program
Department Responsible for the Course	Civil Engineering Program
Course Code	ENG113
Year/ Level	Summer of the 2 nd year or Summer of the 3 rd
	year
Specialization	Faculty requirement
Authorization data of course specification	
Time Period	4 Weeks / year

2. Course aims:

No.	aim
5	Lead and communicate effectively with multidisciplinary teams and display
	professional and ethical responsibilities; and contextual understanding to
	Manage and supervise construction project

3. Learning Outcomes (LOs):

No.	LOs
A4.1	Illustrate contemporary technologies, codes of practice and standards.
A7.1	Function efficiently as an individual or within group.
A8.1	Communicate effectively-graphically, verbally and in writing.
A10.1	Practice self and lifelong learning

4. Course Contents:

No.	Topics
1	Students promoted to the 3rd and 4th year are to carry out field training in
	specialized training sectors. Students trained outside the country should be
	approved by the Department Councils, the student will not be able to obtain
	his/her B.Sc. Graduation Certificate until Professional and Field Training are
	both accomplished successfully.

5. Teaching and Learning Methods:





No.	Teaching Method
1	Workshop
2	Discussion Sessions
3	Visit sites
4	Problem based learning

6. Teaching and Learning Methods 0f Disable Students:

No.	Teaching Method	Reason
1	Non	

7. Student Assessment:

7.1 Student Assessment Methods:

No.	Assessment Method	LOs
1	Observation [authority – faculty]	A7.1, A8.1
2	Short Reports	A4.1
3	Final report	A8.1
4	Discussion by a committee	A4.1, A10.1, A8.1

7.2 Assessment Schedule:

No.	Assessment Method	Weeks
1	Observation [authority – faculty]	Every week
2	Short Reports	Every week
3	Final report	5
4	Discussion by a committee	5

7.3 Weighting of Assessment:

No.	Assessment Method	Marking	Weights
1	Observation [authority – faculty]	5	20 %
2	Short Reports	5	5 %
3	Final report	15	25 %
4	Discussion by a committee	25	50 %
Total	·	50	100%





No.	Reference List
1	Scientific References and reports related to the discipline.

9. Facilities Required for Teaching and Learning:

No.	Facility
1	Authority for training
2	Library
3	Internet
4	Data Show System
5	Visualizer
6	Presenter

10. Matrix of Knowledge and Skills of the Course:

No.	Торіс	aim	LOs
1	The activities of the authority and the relation with the discipline.	1	A4.1, A7.1, A8.1, A10,1

Course Coordinator:

Head of Department:

Date of Approval:

Train	ing 2
Program' LOs	Course LOs
A4. Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues and risk management principles.	A4.1 Illustrate contemporary technologies, codes of practice and standards.
A7. Function efficiently as an individual and as a member of multi-disciplinary and multicultural teams.	A7.1 Function efficiently as an individual or within group.
A8. Communicate effectively–graphically, verbally and in writing–with a range of audiences using contemporary tools.	A8.1 Communicate effectively–graphically, verbally and in writing.
A10. Acquire and apply new knowledge; and practice self, lifelong and other	A10.1 Practice self and lifelong learning



Course Specification: Summer Training (2)



learning Strategies.





1. Basic Information

Program Title	gram Title Civil Engineering program		
Department offering the Program	epartment offering the Program Structural Engineering Department		nt
Department Responsible for the Course	Department Responsible for the Course Structural Engineering Department		nt
Course Code	STE475		
Year/ Level	Fourth Year- Second Semester:		
Specialization	Major		
Topohing Hours	Lectures	Tutorial	Practical
reaching rivers	2	0	0

2. Course aims:

No.	aim
6	Design different types of advanced concrete in different disciplines using new building
	materials.

3. Learning Outcomes (LOs):

C6.	Select appropriate building materials from the perspective of strength, durability, suitability
	to use it in design of advanced concrete.
С7.	Design construction buildings using waste and new materials to protect the environment and
	achieve good properties.

4. Course Contents:

No.	Topics	Week
1	Types of Fibers and Polymers – Advanced Composite Materials (ACM).	1-3
2	Advantages, Disadvantages, and Applications of ACM in construction - Carbon Fiber and applications in construction.	4-5
3	Strengthening of concrete elements using ACM according to the Egyptian code of practice (strengthening in flexure and shear).	6-9
4	Nano carbon fiber and its application in advanced concretes.	10
5	Nanotechnology and its applications in structural engineering field.	11
6	Sustainable building materials - Alkali-activated materials.	12-13
7	Waste materials as aggregates and binder for concrete.	14

5. Teaching and Learning Methods:





No.	Teaching Method
1	Interactive lectures (hybrid learning)
2	Discussion lessons
3	Flipped classroom

6. Teaching and Learning Methods 0f Disable Students:

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

7. Student assessment:

7.1 Student Assessment Methods:

No.	Assessment Method	LOs
1	Mid Term Examination (written)	C6
2	Semester work (Formative - quizzes – presentation)	C6
5	Final Term Examination (written)	C6, C7

7.2 Assessment Schedule:

No.	Assessment Method	Weeks
1	Mid Term Examination (written)	8
2	Semester work (Formative - quizzes – presentation)	Weekly
5	Final Term Examination (written)	15

7.3 Weighting of Assessments:

No.	Assessment Method	Weights
1	Mid Term Examination (written)	15
2	Semester work (Formative - quizzes – presentation)	15
5	Final Term Examination (written)	70
	Total	100%

No.	Reference List
1	Zhang, "Building Materials in Civil Engineering", 2016.





9. Facilities Required for Teaching and Learning:

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

10. Matrix of Knowledge and Skills of the Course:

No.	Торіс	aim	LO's
1	Types of Fibers and Polymers – Advanced Composite Materials (ACM).	6	C6
2	Advantages, Disadvantages, and Applications of ACM in construction - Carbon Fiber and applications in construction.	6	C6
3	Strengthening of concrete elements using ACM according to the Egyptian code of practice (strengthening in flexure and shear).	6	C6, C7
4	Nano carbon fiber and its application in advanced concretes.	6	C6
5	Nanotechnology and its applications in structural engineering field.	6	C6
6	Sustainable building materials - Alkali- activated materials.	6	C6, C7
7	Waste materials as aggregates and binder for concrete.	6	C6, C7

Course Coordinator: Prof. Dr. Ahmed Tahawya

Head of Department: Prof. Dr. / Ahmed Mahmoud Yousef Mohamed Salem

Date of Approval:





Course: Advanced construction materials			
Program LOs	Course LOs		
C6. Select appropriate building materials from the perspective of strength, durability, suitability of use to location, temperature, weather conditions and impacts	C6. Select appropriate building materials from the perspective of strength, durability, suitability to use it in design of advanced concrete.		
of seawater and environment.			
C7. Select and design adequate water control structures, irrigation and water networks, sewerage systems and pumping stations.	C7. Design construction buildings using waste and new materials to protect the environment and achieve good properties.		





1. Basic Information

Program Title	Civil Engineering Program	
Department offering the Program	Structural Engineering Department	
Department Responsible for the Course	Structural Engineering Department	
Course Code	ENG233	
Year/ Level	Forth year - Second Semester	
Specialization	Major	
Authorization data of course specification	December 2020	

Taashing Hours	Lectures	Tutorial	Practical
Teaching Hours	2	1	-

2. Course aims:

No.	Aim	
1	Master a wide range of building economy knowledge, and feasibility studies	
	techniques and skills to use them in real Civil engineering practice.	

3. Learning Outcomes (LOs):

A1.1	Identify time value of money, simple and compound interest		
A1.2	Formulate uniform series payment, gradient series payments, nominal and effective interest		
A1.3	Solve problems as economic evaluation of alternatives by benefit cost ratio by applying engineering fundamentals, basic science, and mathematics.		
A10.1	Apply new knowledge using value engineering		
A10.2	Practice self, lifelong and other learning strategies on some application in		
	construction field		

4. Course Contents:

No.	Topics	week
1	Time value of money	1
2	Simple and compound interest	2
3	Uniform series payment	3
4	Gradient series payments, Nominal and effective interest	4-5
5	Benefit cost ratio.	6
6	Economic evaluation of alternatives	7
7	Application in construction field	9
8	Depreciation.	10
9	Analysis of bids	11-12
10	Value Engineering	13-14





5. Teaching and Learning Methods:

No.	Teaching Method	
1	Interactive lectures (hybrid learning)	
2	Discussion Sessions	
3	Flipped classroom	

6. Teaching and Learning Methods for Disable Students:

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

7. Student Assessment:

7.1 Student Assessment Methods:

No.	Assessment Method	LOs
1	Mid Term Examination	A1.1, A1.2, A1.3
2	Semester work (Quizzes, presentation, Portfolio)	A10.1, A10.2
3	Final Term Examination	A1.1, A1.2, A1.3, A10.1, A10.2

7.2 Assessment Schedule:

No.	Assessment Method	Weeks
1	Mid Term Examination	8
2	Semester work (Quizzes, presentation, Portfolio)	weekly
3	Final Term Examination	15

7.3 Weighting of Assessments:

No.	Assessment Method	Weights
1	Mid Term Examination	20%
2	Semester work (Quizzes, presentation, Portfolio)	10%
3	Final Term Examination	70 %
Total		100 %

No.	Reference List
1	Ammar, M., Principles of Engineering Economy, Lecture Notes, Tanta University, 2008.
2	John A. White, Kenneth E. Case, David B. Pratt., Principles of Engineering Economic Analysis, 6th Edition, 2012.
3	Zahid A. Khan, Arshad N. Siddiquee, Brajesh Kumar, Mustufa H. Abidi, Principles of Engineering Economics with Applications, 2nd Edition, 2018.



9. Facilities Required for Teaching and Learning: No. Facility

I Lecture Classroom	
2 White Board	
3 Data Show System	
4 Visualizer	
5 Presenter	
6 Sound System	

10. Matrix of Knowledge and Skills of the Course:

No	Торіс	aim	LO's
1	Time value of money	1	A1.1
2	Simple and compound interest	1	A1.1
3	Uniform series payment	1	A1.2
4	Gradient series payments, Nominal and	1	A1.2
	effective interest		
5	Benefit cost ratio.	1	A1.3
6	Economic evaluation of alternatives	1	A1.3, A10.1
7	Application in construction field	1	A1.2
8	Depreciation.	1	A1.3
9	Analysis of bids	1	A10.2
10	Value Engineering	1	A10.1

Course Coordinator: Dr/ Islam Elmasoady

Head of Department: Prof. Dr/ Ahmed Mahmoud Youssif Mohamed





Course: Building Economies & Feasibility Studies		
Program LOs	Course LOs	
A1. Identify, formulate, and solve complex engineering	A1.1- Identify time value of money,	
problems by applying engineering fundamentals, basic	simple and compound interest	
science, and mathematics.		
	A1.2- Formulate uniform series payment,	
	gradient series payments, nominal and	
	effective interest	
	A1.3- Solve problems as economic	
	evaluation of alternatives by benefit cost	
	fundamentals basic science and	
	mathematics	
A10 Acquire and apply new knowledge and	A 10 1- Apply new knowledge using	
practice self lifelong and other learning strategies	value engineering	
practice sent, inclong and other rearining strategies.	value engineering	
	A10.2- Practice self lifelong and	
	other learning strategies on some	
	application in construction field	
	application in construction netu	





1. Basic Information

Program Title	Civil Engineering Program
Department offering the Program	Structural Engineering Department
Department Responsible for the Course	Structural Engineering Department
Course Code	STE477
Year/ Level	Fourth Year-First Semester
Specialization	Major
Authorization data of course specification	

Taashing Hours	Lectures	Tutorial	Practical
reaching nours	2	1	0

2. Course aims:

No.	Aim
6	Design different types of Composite Steel Structural Members to use them in
	wide range of Steel structures Projects.

3. Learning Outcomes (LOs):

C1.1	Select appropriate Steel Composite members to be used in different Steel Structures.
C1.2	Apply Structure Analysis to obtain straining actions on Steel Composite members.
C1.3	Apply Properties and Strength of Material to obtain Allowable Stresses.
C2.1	Achieve an optimum design of Steel Composite structures.

4. Course Contents:

No.	Topics	week
1	Types of composite structural elements and their properties – Methods of design	1-3
	according to the specifications	
2	Design, Loads and types of composite beams (Composite beams with shoring,	4-6
	Composite beams without shoring, Encased steel beams) - Design of shear	
	connectors	
3	Composite columns concrete filled steel tube (CFST) and Encased steel section	7-9
	under axial load	
4	Composite columns subjected to axial compression or tension and bending	10
5	Design of Composite slab	11
6	Design of composite walls	12
7	Detailing of composite structures	13
8	Fire behavior and design of steel concrete composite structures	14





5. Teaching and Learning Methods:

No.	Teaching Method
1	Interactive lectures (hybrid learning)
2	Discussion Sessions
3	Flipped classroom

6. Teaching and Learning Methods for disabled Students:

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

7. Student Assessment:

7.1 Student Assessment Methods:

No.	Assessment Method	LOs
1	Mid Term Examination	C1.2, C2.1
2	Semester work (Quizzes, presentation, Portfolio)	C1.1, C1.3
3	Oral Examination	C1.1, C1.3
4	Final Term Examination	C1.2, C2.1

7.2 Assessment Schedule:

No.	Assessment Method	Weeks
1	Mid Term Examination	8
2	Semester work (Quizzes, presentation, Portfolio)	weekly
3	Oral Examination	14
4	Final Term Examination	15

7.3 Weighting of Assessments:

No.	Assessment Method	Weights
1	Mid Term Examination	15%
2	Semester work (Quizzes, presentation, Portfolio)	15%
3	Oral Examination	10%
4	Final Term Examination	60%
Total		100 %





No.	Reference List
1	Egyptian Code of Practice for Steel Construction (Load and Resistance Factor Design (LRFD) (205) Ministerial Decree No. 359-2007, Ministry of Housing, Utilities and Urban Development.
2	Egyptian Code of Practice for Steel Construction and Bridges (ASD) Code No. ECP 205-2001, Edit 2009. Ministry of Housing, Utilities and Urban Development.
3	Qing Quan Liang "Analysis and Design of Steel and Composite Structures", Taylor & Francis Group, 2016

9. Facilities Required for Teaching and Learning:

No.	Facility
1	Lecture Classroom
2	White Board
3	Data Show System
4	Visualizer
5	Presenter
6	Sound System

10. Matrix of Knowledge and Skills of the Course:

No	Торіс	aim	LO's
	Types of composite structural elements and		
1	their properties – Methods of design	6	C1.1
	according to the specifications		
	Design, Loads and types of composite beams	6	C1.2, C2.1
2	(Composite beams with shoring, Composite		
2	beams without shoring, Encased steel		
	beams) - Design of shear connectors		
	Composite columns concrete filled steel	6	C1.3, C2.1
3	tube (CFST) and Encased steel section under		
	axial load		
4	Composite columns subjected to axial	6	C1.3, C2.1
	compression or tension and bending		
5	Design of Composite slab	6	C1.3 , C2.1
6	Design of composite walls	6	C1.3, C2.1
7	Detailing of composite structures	6	C1.1, C2.1





8	Fire behavior and design of steel concrete	6	C1.1, C1.2
0	composite structures		

Course Coordinator:

Head of Department: Prof. Dr.

Course: Design of composite steel structures		
Program LOs	Course LOs	
C1. Select appropriate and sustainable technologies for construction of buildings, infrastructures, and water structures; using either numerical techniques or	C1.1. Select appropriate Steel Composite members to be used in different Steel Structures.	
physical measurements and/or testing by applying a full range of civil engineering concepts and techniques of: Structural Analysis and Mechanics, Properties and strength of Materials, Surveying, Soil Mechanics,	C1.2. Apply Structure Analysis to obtain straining actions on Steel Composite members.	
Hydrology and Hydraulics.	C1.3. Apply Properties and Strength of Material to obtain Allowable Stresses.	
C2. Achieve an optimum design of Reinforced Concrete	C2.1. Achieve an optimum design of	
and Steel Structures, Foundations and Earth Retaining	Steel Composite structures.	
Structures, Transportation and Traffic, Roadways and		
Airports, Railways, Sanitary Works, Hydraulics, Water		
Resources and Harbors.		





1. Basic Information

Program Title	Civil Engineering Program
Department offering the Program	Structural Engineering Department
Department Responsible for the Course	Structural Engineering Department
Course Code	STE471
Year/ Level	Fourth Year- First Semester
Specialization	Major
Authorization data of course specification	

Teophing Houng	Lectures	Tutorial	Practical
Teaching Hours	2	1	

2. Course aims:

No.	Aim
6	Design different types of projects in different disciplines including structural engineering subjected to Earthquakes Loads.

3. Learning Outcomes (LOs):

C1.1	apply a full range of Earthquake engineering and Dynamics of Structures concepts of
	Structural Analysis and Mechanices.
C1.2	Select appropriate Seismic design of beams, columns and beam-column joints
	according to the Egyptian code.
C2.1	Achieve an optimum design of earthquake resistant design of structures.
C2.2	Achieve an optimum design of elements under earthquake type loading

4. Course Contents:

No.	Topics	week	
1	- Introduction to earthquake engineering	1	
2	- Earthquake Nature - Earthquake hazards - Seismic waves – Earthquake scales	2-3	
3	- Introduction to dynamics of structures	4	
4	- solution of equation of motion of multi-degree of freedom structures		
5	- design response spectrum for different soil types	6-7	
6	- behavior of structures and structural elements under earthquake type loading		
7	- Principles of earthquake resistant design of structures - Equivalent lateral force	10-12	
'	method		
8	- Seismic design of beams, columns and beam-column joints according to the	13-14	
0	Egyptian code.		





5. Teaching and Learning Methods:

No.	Teaching Method	
1	Interactive lectures (hybrid learning)	
2	Discussion Sessions	
3	Flipped classroom	

6. Teaching and Learning Methods for Disable Students:

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

7. Student Assessment:

7.1 Student Assessment Methods:

No.	Assessment Method	LOs
1	Mid Term Examination	C1.1 , C2.1
2	Semester work (Quizzes, presentation, Portfolio)	C2.2
3	Oral Examination	C1.2
4	Final Term Examination	C1.1 , C1.2 , C2.1 , C2.2

7.2 Assessment Schedule:

No.	Assessment Method	Weeks
1	Mid Term Examination	8
2	Semester work (Quizzes, presentation, Portfolio)	weekly
3	Oral Examination	14
4	Final Term Examination	15

7.3 Weighting of Assessments:

No.	Assessment Method	Weights
1	Mid Term Examination	15 %
2	Semester work (Quizzes, presentation, Portfolio)	15 %
3	Oral Examination	10 %
4	Final Term Examination	60 %
Total		100 %





8. List of References

No.	Reference List
1	Shrikhande, M., ''Earthquake Resistant Design of Structures'', Prentice Hall Aggarwal P
	India Learning Private Limited; 3 edition, 2014.

9. Facilities Required for Teaching and Learning:

No.	Facility
1	Lecture Classroom
2	White Board
3	Data Show System
4	Visualizer
5	Presenter
6	Sound System

10. Matrix of Knowledge and Skills of the Course:

No.	Торіс	aim	LO's
1	- Introduction to earthquake engineering	6	C1.1
2	- Earthquake Nature	6	C1.1
3	- Earthquake hazards	6	C1.1
4	- Seismic waves	6	C1.1
5	- Earthquake scales	6	C1.1
6	- Introduction to dynamics of structures	6	C1.1
7	- solution of equation of motion of multi-degree of	6	C1.1
,	freedom structures	0	
8	- design response spectrum for different soil types	6	C1.1
9	- behavior of structures and structural elements	6	C2.2
	under earthquake type loading		
10	- Principles of earthquake resistant design of	6	C2.1
	structures		
11	– Equivalent lateral force method	6	C2.1
12	- Seismic design of beams, columns and beam-	6	C1.2
	column joints according to the Egyptian code.		





Course Coordinator: Prof. Dr. Ahmed Mahmoud Yousef

Head of Department: Prof. Dr. Ahmed Mahmoud Yousef

Course: Design of earthquake resistant structures		
Program LOs	Course LOs	
C1. Select appropriate and sustainable technologies for construction of buildings, infrastructures and water structures; using either numerical techniques or physical measurements and/or testing by applying a full range of civil engineering concepts and techniques of: Structural Analysis and Mechanices, Properties and strength of Materials, Surveying, Soil Mechanics, Hydrology and Hydraulics.	 C1.1 apply a full range of Earthquake engineering and Dynamics of Structures concepts of Structural Analysis and Mechanices. C1.2 Select appropriate Seismic design of beams, columns and beam-column joints according to the Egyptian code. 	
C2. Achieve an optimum design of Reinforced Concrete and Steel Structures, Foundations and Earth Retaining Structures, Transportation and Traffic, Roadways and Airports, Railways, Sanitary Works, Hydraulics, Water Resources and Harbors.	C2.1 Achieve an optimum design of earthquake resistant design of structures.C2.2 Achieve an optimum design of elements under earthquake type loading	