



Civil Engineering BSc. Program



Program Specification

A- Basic Information

	Program Title			
	Civil Engineering			
Program Type	Single		Category	Undergraduate
Dept. Offering the Program	Civil Engineering Department		System	Credit Hours
Units Required for Graduation	212 units		Awarded Degree	BSc. in Civil Engineering
Program Stages	Preparatory Year (Level 0)	44 Units	No. of Levels	5 Levels
	Diploma (Level 1-2)	83.5 Units	No. of Semesters	15 Semesters
	Bachelor (Level 3-4)	84.5 Units	Academic Year	2022/2023
Program Coordinator	Assoc.Prof.Dr. Naglaa Kamal			
External Evaluator	Prof. Dr. Mohamed Abdel-Baset Abdo			
The most recent approval date of program specification		Dept. council	5/9/2022	
		Academic council	No. (46) 19/9/2022	

B- Specific Information

1- Program Vision and Mission

The program's vision and mission both originate from the vision and mission of the Higher Institute of Engineering and Technology, New Minya.

The Vision	The Mission
The program is looking forward to providing a distinguished education and research, and to graduating an outstanding civil engineer to serve the country as well as the regional community.	The program aims to prepare a graduate with engineering and humanitarian science and to qualify them for innovation and leadership in fields of structural design and construction to serve community.

2- Program Aims

Upon successful completion the program, the graduate should be able to:

3- Academic Standards

The program adopts the National Academic Reference Standards, NARS 2018 for engineering in general and Civil Engineering in specific approved by the department council on 8/2/2020 and the institute academic council No. (13) on 26/12/2019.

3.1- Attributes of Program Graduates

The Engineering Graduate must have the following attributes:

1. Master a wide spectrum of engineering knowledge and specialized skills and can apply acquired knowledge using theories and abstract thinking in real life situations.
2. Apply analytic critical and systemic thinking to identify, diagnose and solve engineering problems with a wide range of complexity and variation.
3. Behave professionally and adhere to engineering ethics and standards.
4. Work in and lead a heterogeneous team of professionals from different engineering specialties and assume responsibility for own and team performance.
5. Recognize his/her role in promoting the engineering field and contribute to the development of the profession and the community.
6. Value the importance of the environment, both physical and natural, and work to promote sustainability principles.
7. Use techniques, skills, and modern engineering tools necessary for engineering practice.

8. Assume full responsibility for own learning and self-development, engage in lifelong learning and demonstrate the capacity to engage in post- graduate and research studies.
9. Communicate effectively using different modes, tools, and languages with various audiences; to deal with academic/professional challenges in a critical and creative manner.
10. Demonstrate leadership qualities, business administration and entrepreneurial skills.

In addition to the Attributes of the Graduates of Engineering, the Graduates of Civil Engineering Program have the following attributes:

1. Act professionally in the engineering design and supervision of different civil engineering projects.
2. Comprehend the first principles in engineering design, with the ability to use codes of practice in different disciplines of civil engineering.
3. Think analytically to solve complex problems that may show up during work and to be able to take quick decisions.
4. Use the computer applications in engineering design for civil engineering projects and in preparing their shop drawings.
5. Manage the different components of construction sites, prepare time schedules, and evaluate the progress rates.
6. Select appropriate building materials from the perspective of strength, durability, and different environmental conditions.
7. Prepare technical reports and feasibility studies and carry out field inspections and examinations.

3.2-Program Competencies adopted from National Academic Reference Standards (NARS2018)

Competencies of National Academic Reference Standards (NARS2018)		Competencies of Civil Engineering program
Engineering	E1. Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science, and mathematics.	A1. Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science, and mathematics.
	E2. Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess, and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.	A2. Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess, and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.

	E3. Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global, cultural, social, economic, environmental, ethical, and other aspects as appropriate to the discipline and within the principles and contexts of sustainable design and development.	A3. Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global, cultural, social, economic, environmental, ethical, and other aspects as appropriate to the discipline and within the principles and contexts of sustainable design and development.
	E4. Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues, and risk management principles.	A4. Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues, and risk management principles.
	E5. Practice research techniques and methods of investigation as an inherent part of learning.	A5. Practice research techniques and methods of investigation as an inherent part of learning.
	E6. Plan, supervise and monitor implementation of engineering projects, taking into consideration other trades requirements.	A6. Plan, supervise and monitor implementation of engineering projects, taking into consideration other trades requirements.
	E7. Function efficiently as an individual and as a member of multi-disciplinary and multi-cultural teams.	A6. Function efficiently as an individual and as a member of multi-disciplinary and multi-cultural teams.
	E8. Communicate effectively – graphically, verbally and in writing – with a range of audiences using contemporary tools.	A8. Communicate effectively – graphically, verbally and in writing – with a range of audiences using contemporary tools.
	E9. Use creative, innovative, and flexible thinking and acquire entrepreneurial and leadership skills to anticipate and respond to new situations.	A9. Use creative, innovative, and flexible thinking and acquire entrepreneurial and leadership skills to anticipate and respond to new situations.
	E10. Acquire and apply new knowledge, and practice self, lifelong and other learning strategies.	A10. Acquire and apply new knowledge, and practice self, lifelong and other learning strategies.
Civil Engineering	M1 Select appropriate and sustainable technologies for construction of buildings, infrastructures, and water structures; using either numerical techniques or physical measurements and/or testing by applying a full range of civil engineering concepts and techniques of: Structural Analysis and Mechanics, Properties and Strength of Materials, Surveying, Soil Mechanics, Hydrology and Fluid Mechanics.	B1. Select appropriate and sustainable technologies for construction of buildings, infrastructures, and water structures; using either numerical techniques or physical measurements and/or testing by applying a full range of civil engineering concepts and techniques of: Structural Analysis and Mechanics, Properties and Strength of Materials, Surveying, Soil Mechanics, Hydrology and Fluid Mechanics.
	M2 Achieve an optimum design of Reinforced Concrete and Steel Structures, Foundations and Earth Retaining Structures; and at least three of the following civil engineering topics: Transportation and Traffic, Roadways and Airports, Railways, Sanitary Works, Irrigation, Water Resources and Harbors; or any other emerging field relevant to the discipline.	B2. Achieve an optimum design of Reinforced Concrete and Steel Structures, Foundations and Earth Retaining Structures; and at least three of the following civil engineering topics: Transportation and Traffic, Roadways and Airports, Railways, Sanitary Works, Irrigation, Water Resources and Harbors; or any other emerging field relevant to the discipline.
	M3 Plan and manage construction processes; address construction defects, instability, and quality issues; maintain safety measures in construction and materials; and assess environmental impacts of projects.	B3. Plan and manage construction processes; address construction defects, instability, and quality issues; maintain safety measures in construction and materials; and assess environmental impacts of projects.
	M4 Deal with biddings, contracts and financial issues including project insurance and guarantees	B4. Deal with biddings, contracts and financial issues including project insurance and guarantees

4- Program ILOs Matrix in Relation to Courses for Every Stage and Level:

Stage: Preparatory Year
Level :0

Category	Code	Course Title	Engineering													Civil Engineering			
			A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A-01	A-02	A-03	B1	B2	B3	B4
Core Courses (Mandatory)	CHM 001	Industrial Chemistry	X																
	ENG 005	Production Technology (A)	X		X													X	
	ENG 021	Mechanics (1)	X													X		X	
	MTH 001	Mathematics (A)	X													X		X	
	PHY 001	Physics (A)	X		X													X	
	CS 001	Introduction to Computer Science	X																
	LNG 001	English Language (A)					X												
	PHE 001	Physical Education (A)											X						
	ENG 011	Technology Concepts						X											
	ENG 009	Production Technology Workshop (A)			X			X											X
	ENG 003	Engineering Drawing (A)		X	X													X	X
	CHM 002	Chemistry Laboratory		X															
	ENG 022	Mechanics (2)	X		X											X		X	
	MTH 002	Mathematics (B)	X													X		X	
	PHY 002	Physics (B)	X		X													X	
	CS 002	Computer Programming (A)		X															
	HUM 001	Culture Heritage													X				
	LNG 002	English Language (B)					X												
	PHE 002	Physical Education (B)											X						
	ENG 004	Engineering Drawing (B)		X	X													X	X
	ENG 006	Production Technology (B)	X		X														
	ENG 010	Production Technology Workshop (B)			X			X											X
	ITR 001	Industrial Training (preparatory)		X				X	X								X	X	X

Stage: Diploma Stage

Level :1+2 Civil

Category	Code	Course Title	Engineering													Civil Engineering			
			A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A-01	A-02	A-03	B1	B2	B3	B4
Core Courses (Mandatory)	Level (1) Civil																		
	CT 151	Engineering Geology		X			X												
	ENG 199	Mechanics for Civil Engineering	X														X		
	MTH 101	Mathematics (C)	X																
	MTH 102	Mathematics (D)	X																
	CT 104	Fluid Mechanics	X	X					X								X		
	CT 111	Properties and Testing of Materials (1)		X		X	X		X								X		
	CT 113	Building Construction								X	X								
	CT 114	Properties and Testing of Materials (2)		X		X	X		X								X		
	CT 123	Soil Mechanics (1)		X			X		X								X		
	CT 152	Civil Engineering Drawing (1)								X	X								
	CT 153	Structural Analysis and Mechanics (1)	X														X		
	CT 155	Surveying (1)	X	X			X		X								X		
	CT 156	Civil Engineering Drawing (2)								X	X								
	ENG 151	Engineering Economy (1)	X			X													
	LNG 101	English (C)										X							
	MNG 101	Principles of Management			X	X													
	PHE 101	Physical Education and Activities (C)											X						
	FTR 101	Field Training (B)							X	X	X	X						X	
	Level (2) Civil																		
	PHY 106	Physics (C)	X		X														
	CS 199	Computer Programming for Civil Engineering		X						X	X	X							
	CT 112	Structural Analysis and Mechanics (2)	X														X		
	CT 121	Reinforced Concrete (1)				X				X	X	X						X	
	CT 122	Metallic Structures (1)				X				X	X	X						X	
	CT 142	Properties and Testing of Materials (3)		X		X	X		X								X		

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Category	Code	Course Title	Engineering													Civil Engineering			
			A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A-01	A-02	A-03	B1	B2	B3	B4
	CT 154	Principles of Irrigation and Drainage			X		X									X			
	CT 157	Diploma Project								X		X							
	CT 161	Hydraulics (1)		X			X		X							X			
	CT 163	Soil Mechanics (2)		X			X		X							X			
	CT 170	Surveying (2)	X	X			X		X							X			
	CT 191	Mechanical & Electrical Engineering	X		X							X							
	PHE 102	Physical Education and Activities (D)											X						
	PHE 103	Physical Education and Activities (E)							X	X	X	X						X	
	FTR 102	Field Training (C)	X		X														
Elective*	HUM 102	Modern Egyptian History													X				X
	HUM 103	Islamic Civilization (1)													X				X
	LNG 102	Technical English Language (A)										X							

*** Note: The student should select any number of courses in diploma stage with minimum 2 units through levels 1&2**

Stage: Bachelor Stage

Level :3+4 Civil

Category	Code	Course Title	Engineering													Civil Engineering				
			A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A-01	A-02	A-03	B1	B2	B3	B4	
Core Courses (Mandatory)	Level (3) Civil																			
	MTH 103	Numerical Methods	X																	
	MTH 105	Statistical Methods	X																	
	CT 200	Project Management						X		X		X						X	X	
	CT 211	Structural Analysis and Mechanics (3)	X														X			
	CT 212	Structural Analysis and Mechanics (4)	X														X			
	CT 215	Metallic Structures (2)				X				X	X	X					X			
	CT 216	Specifications, Bids and Contracts			X	X				X								X	X	
	CT 251	Inland Navigation and Harbor Engineering			X					X							X			
	CT 253	Transportation Planning and Traffic Engineering			X			X									X			
	CT 262	Hydraulics (2)		X			X		X								X			
	CT 264	Irrigation Works Design (1)								X	X	X					X	X		
	CT 277	Surveying (3)	X	X			X										X			
	CT 221	Reinforced Concrete (2)				X				X	X							X		
	PHE 201	Physical Education and Activities (1)											X							
	PHE 202	Physical Education and Activities (2)											X							
	FTR 201	Field Training (IV)							X	X	X	X							X	
	Level (4) Civil																			
	CT 213	Structural Analysis and Mechanics (5)	X															X		
	CT 252	Civil Engineering Project			X	X	X		X	X	X	X						X		
	CT 263	Water Supply and Sewerage Systems			X													X		
	CT 265	Irrigation Works Design (2)								X	X	X					X	X		
	CT 222	Foundation Engineering				X	X				X	X						X		
	CT 223	Reinforced Concrete (3)				X				X	X	X						X		
	CT 224	Reinforced Concrete (4)				X				X	X	X						X		
	CT 225	Metallic Structures (3)				X				X	X	X						X		
	CT 231	Highway & Airports Engineering		X		X			X			X						X		
	CT 271	Railways Engineering			X													X		
	CT 274	Water and Wastewater Treatment			X		X											X		
	LNG 201	English (D)										X								
	PHE 203	Physical Education And Activities (3)								X										
	FTR 202	Field Training (V)									X								X	X
Elective Courses*	ENG 221	Modeling and Simulation	X																	
	MTH 201	Mathematics (E)	X																	
	MTH 203	Numerical Analysis		X																
	MTH 204	Statistical Analysis		X																
	CT 254	Technical Report Writing					X			X										

Category	Code	Course Title	Engineering													Civil Engineering			
			A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A-01	A-02	A-03	B1	B2	B3	B4
	CT 327	Transportation Planning					X										X		
	CT 329	Selected Topics in Transportation Engineering					X										X		
	CT 355	Bridge Engineering				X	X				X	X					X		
	CT 361	Earthquake Resistant Design				X	X					X					X		
	CT 363	Structural Maintenance & Retrofitting				X	X				X	X						X	
	CT 383	Construction Management						X		X		X						X	X
	CT 379	Selected Topics in Geotechnical Engineering			X	X	X					X					X		
	HUM 201	History of Egypt													X				
	Hum 202	English Literature													X				
	HUM 203	Trade Law												X					
	HUM 204	Industrial Psychology													X				
	Hum 205	Islamic Civilization (2)													X				
	LNG 202	Technical English Language										X							
	MNG 221	Engineering Economy (2)	X		X	X													
	MNG 222	Behavior Discipline			X	X													
	MNG 223	Economics of Management			X	X													

*** Note: The student should select any number of courses in bachelor stage with minimum 5 units as basic courses, 5 units as engineering courses, and 3 units as humanity courses**

5- Program competences with adopted Teaching and Learning Methods:

Competences		Lectures	Tutorial	Open Discussion	Lab Experiment	Projects	Brain Storming	Site Visits	Team work	Self-reading	Distance learning
Engineering	A1	•	•	•			•			•	•
	A2	•	•	•	•		•		•	•	
	A3	•	•	•		•	•			•	•
	A4	•		•			•			•	
	A5					•	•			•	•
	A6			•		•	•	•	•		
	A7			•	•				•		
	A8				•	•			•	•	•
	A9	•					•			•	
	A10	•					•			•	
	A-01	•		•							•
	A-02	•		•			•				•
	A-03	•		•							•
Civil Engineering	B1	•	•	•	•	•	•	•	•	•	•
	B2	•	•	•		•	•			•	•
	B3	•					•	•		•	
	B4	•	•			•	•			•	•

6- Program Competences with adopted Assessment Methods:

Competences	Written Exam	Oral Exam	Lab Test	Tutorials	Reports	Quiz	Projects	Oral Presentation
Knowledge and Understanding	A1	•			•	•	•	
	A2	•	•	•	•	•		•
	A3	•		•	•		•	
	A4		•				•	•
	A5				•			•
	A6						•	
	A7		•				•	•
	A8				•	•		•
	A9		•				•	•
	A10				•		•	•
	A-01	•			•	•		
	A-02	•			•	•		
	A-03	•			•	•		
Intellectual Skills	B1	•	•	•				•
	B2	•	•	•	•	•	•	
	B3		•				•	•
	B4	•		•	•		•	

7- Program Courses Hours Gap analysis in Relation to NARS Subject Areas:

Stage	Level	Category	Code	Course Title	Total Credit Hours	NARS Subject Areas						
						A	B	C	D	E	F	G
						Humanities and Social Sciences	Mathematics and Basic Sciences	Basic Engineering Sciences	Applied Engineering and Design	Computer Applications and ICT	Projects and Practice	Discretionary Subjects
Preparatory Year	Level (0)	Core Courses (Mandatory)	CHM 001	Industrial Chemistry	2			2				
			ENG 005	Production Technology (A)	3			3				
			ENG 021	Mechanics (1)	2		2					
			MTH 001	Mathematics (A)	3		3					
			PHY 001	Physics (A)	3		3					
			CS 001	Introduction to Computer Science	1					1		
			LNG 001	English Language (A)	1	1						
			PHE 001	Physical Education (A)	0.5	0.5						
			ENG 011	Technology Concepts	1	1						
			ENG 009	Production Technology Workshop (A)	1				1			
			ENG 003	Engineering Graphics (A)	2			2				
			CHM 002	Chemistry Laboratory	1				1			
			ENG 022	Mechanics (2)	2		2					
			MTH 002	Mathematics (B)	3		3					
			PHY 002	Physics (B)	3		3					
			CS 002	Computer Programming (A)	2					2		
			HUM 001	Culture Heritage	1	1						
			LNG 002	English Language (B)	1	1						
			PHY002	Physical Education (B)	0.5	0.5						
			ENG 004	Engineering Graphics (B)	2			2				
			ENG 006	Production Technology (B)	3			3				
			ENG 010	Production Technology Workshop (B)	1				1			
			ITR 001	Industrial Training (preparatory)	5						5	
		C	CT 151	Engineering Geology	2			2				

						NARS Subject Areas						
Stage	Level	Category	Code	Course Title	Total Credit Hours	A	B	C	D	E	F	G
						Humanities and Social Sciences	Mathematics and Basic Sciences	Basic Engineering Sciences	Applied Engineering and Design	Computer Applications and ICT	Projects and Practice	Discretionary Subjects
			ENG 199	Mechanics for Civil Engineering	3		1.5	1.5				
			MTH 101	Mathematics (C)	3		3					
			MTH 102	Mathematics (D)	3		3					
			CT 104	Fluid Mechanics	3		3					
			CT 111	Properties and Testing of Materials (1)	4			4				
			CT 113	Building Construction	2				2			
			CT 114	Properties and Testing of Materials (2)	3			2.4		0.6		
			CT 123	Soil Mechanics (1)	3			2.1		0.9		
			CT 152	Civil Engineering Drawing (1)	1				1			
			CT 153	Structural Analysis and Mechanics (1)	3		3					
			CT 155	Surveying (1)	4		3				1	
			CT 156	Civil Engineering Drawing (2)	1				1			
			ENG 151	Engineering Economy (1)	1	1						
			LNG 101	English (C)	1	1						
			MNG 101	Principles of Management	1	1						
			PHE 101	Physical Education and Activities (C)	0.5	0.5						
			FTR 101	Field Training (B)	5					1	2	2
			PHY 106	Physics (C)	2			2				
			CS 199	Computer Programming for Civil Engineering	2					2		
			CT 112	Structural Analysis and Mechanics (2)	3		2.4			0.6		
			CT 121	Reinforced Concrete (1)	3				3			
			CT 122	Metallic Structures (1)	3				1.5	0.6	0.9	
			CT 142	Properties and Testing of Materials (3)	3			3				
			CT 154	Principles of Irrigation and Drainage	4			2	2			
			CT 157	Diploma Project	2					2		
			CT 161	Hydraulics (1)	3		3					
			CT 163	Soil Mechanics (2)	2			1.6		0.4		
			CT 170	Surveying (2)	3				1.5	1.5		
			CT 191	Mechanical & Electrical Engineering	2			2				
			PHE 102	Physical Education and Activities (D)	0.5	0.5						

						NARS Subject Areas						
Stage	Level	Category	Code	Course Title	Total Credit Hours	A	B	C	D	E	F	G
						Humanities and Social Sciences	Mathematics and Basic Sciences	Basic Engineering Sciences	Applied Engineering and Design	Computer Applications and ICT	Projects and Practice	Discretionary Subjects
			PHE 103	Physical Education and Activities (E)	0.5	0.5						
			FTR 102	Field Training (B)	5				1	2	2	
		Elective		Elective DH1*	1	1						
				Elective DH2*	1	1						
Bachelor Stage	Level (3) Civil	Core Courses (Mandatory)	MTH 103	Numerical Methods	3		3					
			MTH 105	Statistical Methods	2		2					
			CT 200	Project Management	1						1	
			CT 211	Structural Analysis and Mechanics (3)	3			2.4		0.6		
			CT 212	Structural Analysis and Mechanics (4)	2			2				
			CT 215	Metallic Structures (2)	3				1.5	0.6	0.9	
			CT 216	Specifications, Bids and Contracts	1						1	
			CT 251	Inland Navigation and Harbor Engineering	3							3
			CT 253	Transportation Planning and Traffic Engineering	3				3			
			CT 262	Hydraulics (2)	2			2				
			CT 264	Irrigation Works Design (1)	2				2			
			CT 277	Surveying (3)	3				1.5	1.5		
			CT 221	Reinforced Concrete (2)	3				3			
			PHE 201	Physical Education and Activities (1)	0.5	0.5						
			PHE 202	Physical Education and Activities (2)	0.5	0.5						
	FTR 201		Field Training (IV)	5					1	2	2	
	Level (4) Civil		CT 213	Structural Analysis and Mechanics (5)	2			1.6		0.4		
			CT 252	Civil Engineering Project	3					1.5	1.5	
			CT 263	Water Supply and Sewerage Systems	3				2.5		0.5	
			CT 265	Irrigation Works Design (2)	2				2			
			CT 222	Foundation Engineering	4				2.8	1.2		
			CT 223	Reinforced Concrete (3)	2				2			
			CT 224	Reinforced Concrete (4)	2				2			
			CT 225	Metallic Structures (3)	2				1	0.5	0.5	
			CT 231	Highway & Airports Engineering	3				2.4	0.6		
			CT 271	Railways Engineering	3				2.4	0.6		

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						NARS Subject Areas								
Stage	Level	Category	Code	Course Title	Total Credit Hours	A	B	C	D	E	F	G		
						Humanities and Social Sciences	Mathematics and Basic Sciences	Basic Engineering Sciences	Applied Engineering and Design	Computer Applications and ICT	Projects and Practice	Discretionary Subjects		
			CT 274	Water and Wastewater Treatment	2				1.8		0.2			
			LNG 201	English (D)	1	1								
			PHE 203	Physical Education And Activities (3)	0.5	0.5								
			FTR 202	Field Training (V)	5				1	2	2			
	Elective		Elective BB1**	2		2								
			Elective BB2**	3			3							
			Elective BE1***	2	2									
			Elective BE2***	3							3			
			Elective BH1****	1	1									
			Elective BH2****	1	1									
			Elective BH3****	1	1									
		Total					212	19	44.9	45.6	44.9	23.1	20.5	14

***Elective DH (Diploma Stage, Humanity)**

The student should select from the following humanity courses in diploma stage with minimum 2 units through levels 1&2:

- HUM 102 Modern Egyptian History – *1 credit hr.*
- HUM 103 Islamic Civilization (1) – *1 credit hr.*
- LNG 102 Technical English Language (A) – *1 credit hr.*

***Elective BB (Bachelor Stage, Basic)**

The student should select from the following basic courses in bachelor stage with minimum 5 units through levels 3&4:

- ENG 221 Modeling and Simulation – *2 credit hr.*
- MTH 201 Mathematics (E) – *3 credit hr.*
- MTH 203 Numerical Analysis – *3 credit hr.*
- MTH 204 Statistical Analysis – *3 credit hr.*

***Elective BE (Bachelor Stage, Engineering)**

The student should select from the following engineering courses in bachelor stage with minimum 5 units through levels 3&4:

- CT 254 Technical Report Writing – *2 credit hr.*
- CT 327 Transportation Planning – *3 credit hr.*
- CT 329 Selected Topics in Transportation Engineering – *3 credit hr.*
- CT 355 Bridge Engineering – *3 credit hr.*
- CT 361 Earthquake Resistant Design – *3 credit hr.*
- CT 363 Structural Maintenance & Retrofitting – *3 credit hr.*
- CT 383 Construction Management – *3 credit hr.*
- CT 379 Selected Topics in Geotechnical Engineering – *3 credit hr.*

***Elective BH (Bachelor Stage, Humanity)**

The student should select from the following humanity courses in bachelor stage with minimum 3 units through levels 3&4:

- HUM 201 History of Egypt – *1 credit hr.*
- Hum 202 English Literature – *1 credit hr.*
- HUM 203 Trade Law – *1 credit hr.*
- HUM 204 Industrial Psychology – *1 credit hr.*
- Hum 205 Islamic Civilization (2) – *1 credit hr.*
- LNG 202 Technical English Language – *1 credit hr.*
- MNG 221 Engineering Economy (2) – *1 credit hr.*
- MNG 222 Behavior Discipline – *1 credit hr.*
- MNG 223 Economics of Management – *1 credit hr.*

Gap Analysis Summary

	Subject Area	Hours	NARS	EXISTING
A	Humanities and Social Sciences	19	9:12	9
B	Mathematics and Basic Sciences	44.9	20:26	21.2
C	Basic Engineering Sciences	45.6	20:23	21.5
D	Applied Engineering and Design	44.9	20:22	21.2
E	Computer Applications and ICT	23.1	9:11	10.9
F	Projects and Practice	20.5	8:10	9.7
G	Discretionary Subjects	14	6:8	6.6
Total			100%	100%

8- Program Structure and Contents:

8-a- Program Duration:

The program duration is at least five academic years including 3 semesters per year (Summer semester is optional) with maximum total number of 15 semesters. Each semester may extend to 15 weeks except the summer, which may extend to 8 weeks only.

8-b- Program Structure:

The program is based on credit-hours system where the credit hour (Cr-h) is the study measurement unit that equals one lecture hour or two practical / exercise hours in a week within one semester.

Total (Cr-h) required for graduation = 212 Cr-h
Core (Mandatory) = 197 Cr-h
Elective = 15 Cr-h

8-c- Program Stages & Levels:

The program has two stages in addition to the preparatory year (Diploma stage and Bachelor stage). In general, it consists of five levels over its all stages as follow:

Preparatory year = Level (0) = 44 Cr-h
Diploma stage = Level (1) + Level (2) = 83.5 Cr-h
Bachelor stage = Level (3) + Level (4) = 84.5 Cr-h

8-d- Program Registration Rules:

- The student can apply for 20 Cr-h in each first and second semesters of the academic year.
- The student can apply for two courses only with 7 Cr-h or less in the summer semester.

9- Courses Contributing to the Program:**9.1- Preparatory Year:****Level (0)**

Code	Course Title	Weekly hours				
		Lect.	Exc.	Lab	Total	Total Cr-h
CHM 001	Industrial Chemistry	2	0	0	2	2
CHM 002	Chemistry Laboratory	0	0	2	2	1
ENG 005	Production Technology (A)	2	2	0	4	3
ENG 021	Mechanics (1)	2	1	0	3	2
ENG 022	Mechanics (2)	2	1	0	3	2
MTH 001	Mathematics (A)	2	2	0	4	3
MTH 002	Mathematics (B)	2	2	0	4	3
PHY 001	Physics (A)	2	0	2	4	3
PHY 002	Physics (B)	2	0	2	4	3
CS 001	Introduction To Computer Science	1	0	1	2	1
CS 002	Computer Programming(A)	1	0	2	3	2
ENG 003	English Graphics (A)	1	3	0	4	2
ENG 004	English Graphics (B)	1	3	0	4	2
ENG 006	Production Technology (B)	2	2	0	4	3
ENG 009	Production Technology Workshop (A)	0	0	2	2	1
ENG 010	Production Technology Workshop (B)	0	0	2	2	1
ENG 011	Technology Concepts	1	0	0	1	1
HUM 001	Culture Heritage	1	0	0	1	1
LNG 001	English Language (A)	1	1	0	2	1
LNG 002	English Language (B)	1	1	0	2	1
PHY 001	Physical Education (A)	0	0	1	1	0.5
PHY 002	Physical Education (B)	0	0	1	1	0.5
ITR 001	Industrial Training	0	0	30	30	5
Total Weekly Hours		26	18	45	89	44

9.2- Diploma Stage Core Courses (Mandatory):**Level (1)**

Code	Course Title	Weekly hours				
		Lect.	Exc.	Lab	Total	Total Cr-h
CT 151	Engineering Geology	2	1	0	3	2
ENG 199	Mechanics for Civil Engineering	2	2	0	4	3
MTH 101	Mathematics (C)	2	2	0	4	3
MTH 102	Mathematics (D)	2	2	0	4	3
PHE 106	Physics (C)	2	1	0	3	2
CT 104	Fluid Mechanics	2	0	2	4	3
CT 111	Properties and Testing of Material (1)	2	2	2	6	4
CT 113	Building Construction	1	2	0	3	2
CT 114	Properties and Testing of Material (2)	2	0	2	4	3

CT 123	Soil Mechanics (1)	2	2	1	5	3
CT 152	Civil Engineering Drawing (1)	0	3	0	3	1
CT 153	Structural Analysis and Mechanics (1)	2	2	0	4	3
CT 155	Surveying (1)	3	0	2	5	4
CT 156	Civil Engineering Drawing (2)	0	3	0	3	1
LNG 101	English (C)	1	1	0	2	1
PHE 101	Physical Education and Activities (c)	0	0	1	1	0.5
FTR 101	Field Training (1)	0	0	30	30	5
Total Weekly Hours		25	23	40	88	43.5

8-1 Diploma Stage Core Courses (Mandatory):**Level (2)**

Code	Course Title	Weekly hours				
		Lect.	Exc.	Lab	Total	Total Cr-h
CS 199	Computer Programing for Civil Engineering	1	0	2	3	2
CT 112	Structural Analysis and Mechanics (2)	2	2	0	4	3
CT 121	Reinforced Concrete (1)	2	2	0	4	3
CT 122	Metallic Structure (1)	2	2	0	4	3
CT 142	Properties and Testing of Material (3)	2	2	0	4	3
CT 154	Principal of Irrigation and Drainage	3	2	0	5	4
CT 157	Diploma Project	1	0	2	3	2
CT 161	Hydraulic (1)	2	2	0	4	3
CT 163	Soil Mechanics (2)	2	1	1	4	2
CT 170	Surveying (2)	2	0	2	4	3
CT 191	Mechanical &Electrical Engineering	2	1	0	3	2
ENG 151	Engineering Economy (1)	1	0	0	1	1
MNG 101	Principal of Management	1	0	0	1	1
PHE 102	Physical Education and Activities (D)	0	0	1	1	0.5
PHE 103	Physical Education and Activities (E)	0	0	1	1	0.5
FTR 102	Field Training (2)	0	0	30	30	5
Total Weekly Hours		23	14	39	76	38

9.3- Diploma Stage Elective Courses*:**Level (1&2)**

Code	Course Title	Weekly hours				
		Lect.	Exc.	Lab	Total	Total Cr-h
HUM 102	Modern Egyptian History	1	0	0	1	1
HUM 103	Islamic Civilization (1)	1	0	0	1	1
LNG 102	Technical English Language (A)	1	0	0	1	1
Total Weekly Hours		3	0	0	3	3

*** Note: The student should select any number of courses in diploma stage with minimum 2 units through levels 1&2**

9.4-Bachelor Stage Core Courses (Mandatory):**Level (3)**

Code	Course Title	Weekly hours				
		Lect.	Exc.	Lab	Total	Total Cr-h
MTH 103	Numerical Methods	2	2	0	4	3
MTH 105	Statistical Methods	2	1	0	3	2
CT 200	Project Management	1	1	0	2	1
CT 211	Structural Analysis and Mechanics (3)	2	2	0	4	3
CT 212	Structural Analysis and Mechanics (4)	2	1	0	3	2
CT 215	Metallic structure (2)	2	2	0	4	3
CT 216	Specification ,Bids and Contracts	1	1	0	2	1
CT 251	Inland Navigation and Harbor	2	2	0	4	3
CT 253	Transportation Planning and Traffic Engineering	2	2	0	4	3
CT 262	Hydraulic (2)	2	1	0	3	2
CT 264	Irrigation Work Design (1)	2	1	0	3	2
CT 277	Surveying (3)	2	2	0	4	3
CT 221	Reinforced Concrete (2)	2	2	0	4	3
PHE 201	Physical Education and Activities (1)	0	0	1	1	0.5
PHE 202	Physical Education and Activities (2)	0	0	1	1	0.5
FTR 201	Field Training (3)	0	0	30	30	5
Total Weekly Hours		24	20	32	76	37

9.5- Bachelor Stage Core Courses (Mandatory):**Level (4)**

Code	Course Title	Weekly hours				
		Lect.	Exc.	Lab	Total	Total Cr-h
CT 213	Structural Analysis and Mechanics (5)	2	1	0	3	2
CT 252	Civil Engineering Project	0	2	5	7	3
CT 263	Water Supply and Sewage System	2	2	0	4	3
CT 265	Irrigation Work Design (2)	2	1	0	3	2
CT 222	Foundation Engineering	3	2	0	5	4
CT 223	Reinforced Concrete (3)	2	1	0	3	2
CT 224	Reinforced Concrete (4)	2	1	0	3	2
CT 225	Metallic Structure (3)	2	1	0	3	2
CT 231	Highway & Airports Engineering	2	2	0	4	3
CT 271	Railway Engineering	2	2	0	4	3
CT 274	Water and Wastewater Treatment	2	1	0	3	2
LNG 201	English (D)	1	1	0	2	1
PHE 203	Physical Education and Activities (3)	0	0	1	1	0.5
FTR 202	Field Training (4)	0	0	30	30	5
Total Weekly Hours		22	17	36	75	34.5

9.6- Bachelor Stage Elective Courses*:**Level (3&4)**

Code	Course Title	Weekly hours				
		Lect.	Exc.	Lab	Total	Total Cr-h
ENG 221	Modeling and simulation	2	0	0	2	2
MTH 201	Mathematics (E)	2	2	0	4	3
MTH 203	Numerical Analysis	2	2	0	4	3
MTH 204	Statistical Analysis	2	2	0	4	3
CT 254	Technical Report Writing	2	0	0	2	2
CT 327	Transportation Planning	2	2	0	4	3
CT 329	Selected Topics in Transportation engineering	2	2	0	4	3
CT 355	Bridge engineering	2	2	0	4	3
CT 361	Earthquake Resistant Design	2	2	0	4	3
CT 363	Structural Maintenance & Retrofitting	2	2	0	4	3
CT 379	Selected topics in Geotechnical engineering	2	2	0	4	3
CT 383	Construction Management	2	2	0	4	3
HUM 201	History of Egypt	1	0	0	1	1
HUM 202	English Literature	1	0	0	1	1
HUM 203	Trade Law	1	0	0	1	1
HUM 204	Industrial Psychology	1	0	0	1	1
HUM 205	Islamic Civilization	1	0	0	1	1
LNH 202	Technical English Language	1	0	0	1	1
MNG 221	Engineering Economy (2)	1	0	0	1	1
MNG 222	Behavior Discipline	1	0	0	1	1
MNG 223	Economics of Managements	2	0	0	2	1
Total Weekly Hours		34	20	0	54	43

** Note: The student should select any number of courses in bachelor stage with minimum 5 units as basic courses, 5 units as engineering courses, and 3 units as humanity courses*

10- Courses Contents:

Code	Course title	Contents
Preparatory Year – Level (0)		
CHM 001	Industrial Chemistry	Kinetic molecular theory of gases, ideal gases. Boyle's law, Charlie's law, Avogadro's law, ideal gas equation, some useful forms derived from ideal gas equation, Dalton's law, Graham's law and its practical application, deviation of gases from ideal behavior, real gases, Van Der Waal's equation, liquifaction of gases and Joule-Thomson effect and its application, Liquid state. Environmental chemistry petroleum
CHM 002	Chemistry Laboratory	Qualitative analysis: identification of a simple salt. Quantitative analysis, volumetric analysis (neutralization, titration, oxidation, reduction, complex formation, precipitation).
ENG 005	Production Technology (A)	Introduction to production (manufacturing processes), manufacturing elements, properties of engineering materials, classification according to machinability, cast-ability. Principles of cutting and forming properties. Tools and tool geometry, machine tools simplified analysis, forming machines simplified analysis, wood working, timber kinds and properties, Wood working tools and equipment, wood working machines, types of

		<p>joints technology, finessing and protection processes, safety, costing. Sheet metal working, developing of surfaces. Shearing bending, duct tubes rolling, seam joints, safety, costing, Bench works, marking sawing, chiseling, filing, etc.</p> <p>Casting of metals, the foundry, foundry sands, molding technology, pattern making, core making, melting in the foundry, pouring different casting processes, felting, cleaning, finishing and inspection. Powder metallurgy, rolling, forging process, wire drawing, extrusion, cupping and deep drawings, spinning, blanking and piercing, enclosing, coining and stamping.</p>
ENG 021	Mechanics (1)	Introduction to engineering mechanics. Vector analysis. Forces on particles and rigid bodies, equilibrium of particles and rigid bodies, forces and moments, applications on beams. Analysis of simple structures, kinematics of particles. displacement, velocity and acceleration using scalar and vectorial methods, kinetics of particles- Newton's law, work and energy, impulse and momentum.
ENG 022	Mechanics (2)	Dynamics of a Particle: Kinematics of a Particle. Motion of a particle (position, displacement, velocity and acceleration). Coordinate systems (Cartesian, natural, polar and cylindrical). Kinetics of a Particle. Equation of motion. Applications (projectile, simple harmonic motion, motion in resisting medium). Work and energy. Principle of conservation of energy. Momentum. Impulse. Impact
MTH 001	Mathematics (A)	Functions, limits of functions, techniques for finding limits, limits involving infinity, continuous functions, the derivative, techniques of differentiation, differentials, the chain rule, implicit differentiation applications of the derivatives, extreme of functions, the mean value theorem, optimization problems, Newton's method, anti derivative and indefinite integration, the definite integral, the fundamental theorem of calculus.
MTH 002	Mathematics (B)	Applications of the definite integral, area, solids of revolution, arc length and surfaces of revolution, logarithmic and exponential functions and their derivatives, inverse trigonometric and hyperbolic functions and their derivatives and integrals, techniques of integration, integration by parts, trigonometric integrals, integrals of rational functions, reduction formulae, indetermined forms and improper integrals.
PHY 001	Physics (A)	Properties of Matter: physical quantities, standard units, dimensions, oscillations- Gravitation- Fluid statics, surface tension, fluid dynamics, viscosity. Elasticity, waves in elastic media, sound waves- Heat: temperature and temperature measurement, thermal expansion, heat transfer, the first law of thermodynamics, kinetic theory of gases, entropy and the second law of thermodynamics.
PHY 002	Physics (B)	Electricity and magnetism: charge and matter, the electric field, Gauss law, electric potential, capacitors and dielectrics, current resistance and electromotive forces, the magnetic field, Ampere's law, Biot- Savart law. Maxwell's equations in integral form.
CS 001	Introduction to Computer Science	Computer terminology and concepts. The history, state of the art and future of data processing Basic hardware and software concepts- The computer's effect on society, Operating Systems, DOS as an example.
CS 002	Computer Programming(A)	Structured programming with the high level language PASCAL. The techniques of good programming style and how to design, code, debug, and document program laboratory assignments. Topics progress from basic PASCAL syntax and semantics to sequential non-text files. The control features, data structures, standard I/O libraries and the operators of the language.
ENG 003	English Drawing (A)	Drawing practice, graphics geometry and tangency construction, projection of bodies of simple geometric, pictorial representation and technical sketching, orthographic projection, pictorial drawing and sectioned views.
ENG 004	English Drawing (B)	Types of sectioned views, assembly drawing, familiarity with specifications, reading of blue prints, interpretation of various symbols commonly used, interpretation of material lists and bills of materials.

ENG 006	Production Technology (B)	<p>Welding: Joining of metals, mechanical joining, metallurgical joining, fusion welding, oxyacetylene welding and cutting, under water welding and cutting, electric arc welding. Physics of arc, power sources, TIG and MIG, argon welding, coated electrodes classifications, standards, coding systems, CO2 welding, carbon arc welding. Cold welding cladding. Hot pressure welding, forge welding, electric resistance welding, spot and seam welding, flash welding, percussive welding, projection welding, friction welding, diffusion welding, ultrasonic welding. Brazing, soldering, surfacing tests, welding defects, safety, costing.</p> <p>Machining processes: Theory of metal cutting, tool geometry, cutting speeds, feeds, cutting fluids, tool materials, work piece materials and properties, machinability. Machine tools classification, the lathe, description of mechanisms, turning processes, cylindrical, internal, taper, threads. Profile copying, cam turning, NC and CNC machines.</p>
ENG 009	Production Technology Workshop (A)	<p>Practical training on the basic workshops like, machining (lathe, milling, shaping, drilling, and grinding machines). Identification of the main parts of each machine and how to select the cutting variables on each machine performance of simple exercises. Wood working; hand tools, types of wood and machines, filing. Welding; simple joints on arc welding and oxyacetylene welding. Length and angle measurements using micrometer, vernier and protractors. Sheet metal works; Cutting, Rolling, Binding and making joints on sheets. Casting; recognition of the main elements and tools used in casting and how to make a mold using a core and a pattern for a simple casting.</p>
ENG 010	Production Technology Workshop (B)	<p>Machining: Practical training on metal cutting, operations on center lathe, milling m/c, shaper and drilling m/c, gear cutting on milling m/c. hand press and mechanical press of different capacities, shearing (blanking, piercing and deep drawing processes).</p> <p>Welding: Oxyacetylene; different techniques used in oxyacetylene welding, fluxes, welding and cutting torches, prepare and make some joints, safety during welding operations. Arc welding; the main elements, different coatings, welding methods, prepare and make some joints, safety. Resistance welding; main elements, joints of different shapes. Soldering and brazing; the main differences between them and the tools used, joints by soldering.</p>
ENG 011	Technology Concept	<p>Industry and technology. Engineering materials, standardization and interchange-ability. Material handling and storage. Energy. Pollution and waste disposal. Information systems. Report writing. Selected industries (textiles, garment, plastics, refrigeration, pumps, electric, etc.).</p>
HUM 001	Culture Heritage	<p>Definition of Cultural heritage, its source, ups and downs, objectives and motivations. Throwing light on some of the scientific facts brought about by human civilization.</p>
LNG 001	English Language (A)	<p>Cambridge English course, developing reading skills, listening and keep listening- Basic technical English, from current course books and other authentic materials. English grammar in use.</p>
LNG 002	English Language (B)	<p>Headway intermediate course, developing reading skills, authentic reading, writing skills, task listening. Basic technical English interface, English for technical communication Grammar.</p>
PHY 001	Physical Education (A)	<p>General physical education concepts and theoretical topics. Introduction of sports psychology. The effect of movement activities on Organs of the body. Physical gymnastic exercises (1)</p>
PHY 002	Physical Education (B)	<p>Functional anatomy of muscles skeletal system, biomechanics of connective tissue, functional aspects of muscle and a discussion of mechanics and energetic. Factors that contribute to sport injuries, principles of prevention and car, first aid management, the treatment of injuries, rehabilitation techniques in sports medicine and safe practice and the low.</p>
ITR 001	Industrial Training	<p>The student learns to identify the various production units and the way they inter-connect in the production process. The student is also trained to operate the various pieces of machinery in order to recognize his technical</p>

		inclinations as a prelude to his selection of a specification within the institute. The student is also trained to identify the raw materials, as well as the handling, processing and machining of materials to obtain intermediate and final products. The duration of this industrial training is thirty hours per week spread over a minimum of five days for one academic term.
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Diploma Stage Core Courses (Mandatory)– Level (1)

CT 151	Engineering Geology	Sources and processing for both natural and synthetic aggregates needed for construction, minerals and rock types- Structural geology, and influence of geological features on engineering
ENG 199	Mechanics of Civil Engineering	Fundamentals of Mechanics, Forces in space, Equilibrium of Rigid Bodies, distributed forces, center of gravity and moment of Inertia, Internal actions-analysis of Simple Structures- Introduction to kinetics and Kinematics of Rigid Bodies, Free and Forced Vibrations, Work, Energy and Conservation laws.
MTH 101	Mathematics (C)	Sequences, convergent or divergent series, positive terms series, convergence tests, alternating series and absolute convergence, power series-Maclaurin and Taylor series, conic sections, rotation of axes, polar coordinates, integrals in polar coordinates, polar equations of conics, functions of several variables, limits and continuity, partial derivatives, chain rule, directional derivatives, extreme, double integrals, area and volume, double integrals in polar coordinates, change of variables and Jacobians.
MTH 102	Mathematics (D)	First order differential equations-separable and exact differential equations-linear differential equations-homogenous differential equations with constant coefficients- non homogenous differential equations- the method of undetermined coefficients- the method of variation of parameters- series solutions of differential equations- Legendre polynomials- Bessel functions- Laplace transformation- convolution theorem inverse Laplace transformation solution of initial and boundary value problems using Laplace transformation.
PHY 106	Physics (C)	Physical optics: interference, diffraction, polarization, electro- and magneto- optical effects. Modern physics: basic constituents of matter, the atomic structure, the interaction of similar and dissimilar atoms, the interaction of photons and electrons, basic properties of atomic nuclei, radioactivity.
CT 104	Fluid Mechanics	Properties of Fluids : Statics of Fluids , Equation of One Dimension- Flow over Notches and weirs , Rotary Motion of Fluids , Flow of Viscous Fluids-Surface Resistance ; Introduction to the Boundary Layer Theory; Resistance in Pipes and Conduits.
CT 111	Properties and Testing of Material (1)	Engineering materials; properties and testing of materials- specifications; building stones; bricks; lime; gypsum; plastering; painting; timber- testing machines; strain gauges; tension test; compression test; bending test; shear test; hardness test; impact; nondestructive tests; metallic materials.
CT 113	Building Construction	Building construction techniques; conventional methods, construction automation, Prefabrication methods- Architectural drawings and details, steps of the construction of a building, foundations, insulation, staircases, roofs, walls, paint, floorings, electrical and Plumbing services.
CT 114	Properties and Testing of Material (2)	Aggregates for concrete: types, properties, grading tests. Cement: manufacturing, properties, special types of cement, tests. Concrete: constituents, admixtures, proportioning, manufacturing - fresh concrete, hardening, stage-hardening concrete, tests.
CT 123	Soil Mechanics (1)	Soil Formation- Physical properties- Hydraulic properties and permeability, Stress Distribution- Consolidation-Shear strength- Soil Exploration and Soil Testing .
CT 152	Civil Engineering Drawing (1)	Metallic Structures : Columns and Bases, Trusses , Built - up Sections, Joints. Concrete Structures : Reinforcement details
CT 153	Structural Analysis and Mechanics (1)	Stress, strain, Hook's law- Modulus of elasticity, modulus of rigidity and Poisson's ratio- Statically determination of axial force, shear force, bending

		moment and torque in bars, beams and circular shafts- Load-shear-moment relationship in beams. Section Kinematics; strain and stress distribution and their resultants. Normal and shear stress distributions in beams of different shapes. Transformation of stress and strain, Mohr's circle. Spherical and cylindrical pressure vessels- Elastic buckling of columns.
CT 155	Surveying (1)	Introduction to surveying- Different Types of Scales. Mapping Using Linear Measurements-Compass Surveying and Traverse Computations Area Determination- Leveling: instrumentation, method of calculation, cross and longitudinal sections, contouring earth work.
CT 156	Civil Engineering Drawing (2)	Civil and Irrigation structures: Earth slopes, Retaining walls, Some Civil and Irrigation Structures, Introduction to Computer aided Drafting.
LNG 101	English (C)	Headway upper intermediate, developing ready - authentic materials, ideas for a story. English for communication. Grammar.
PHE 101	Physical Education and Activities (c)	General culture topic may be selected from the following areas: comparative study of liberal and socialist systems party systems, and their role in democratic societies the role of the.
FTR 101	Field Training (1)	Training shall concentrate on brick work, using different types of blocks and different techniques- The student shall try to apply such techniques manually if possible- The student shall be trained to use the surveying equipment, which he studied at the institute, to prepare and plan the site .

Diploma Stage Core Courses (Mandatory)– Level (2)

CS 199	Computer Programing for Civil Engineering	Principles of Programming: operating systems, storage devices and methods, organization of data, management of files, Advanced applications in programming, Basic, Fortran.
CT 112	Structural Analysis and Mechanics (2)	Types of structures, supports and loads. Idealization of structures and loads- Geometric stability and determinacy, analysis of determinate trusses, beams, plane frames and arches; reaction computation; axial force, shear force and bending moment diagrams- Internal force releases- Load-shear-moment relationships- Differential equation of elastic curve- Deflections by integration, moment-area, conjugate-beam and virtual work methods- Influence lines of determinate structures.
CT 121	Reinforced Concrete (1)	Fundamentals and design theories based on ultimate strength design and elastic concept. Egyptian and ACI Code requirements. Load factors. Analysis and design of reinforced concrete members subjected to flexure, shear and diagonal tension in accordance to strength method. Bond, anchorage and development length. Deflection and crack control.
CT 122	Metallic Structure (1)	Fundamentals and principles necessary for the design of steel structures. Egyptian and American codes. Steel properties, Loads, Design of Tension members, Design of Bolted Connections, Design of Welded Connections and Design of Compression members . Structural systems including Trusses.
CT 142	Properties and Testing of Material (3)	Metals : Hardness, Testing in Impact, Fatigue and Creep, Nondestructive tests, Welding : Types, Defects and Testing- Selected topics from : Atomic Arrangements, Structural imperfections, Single phase metals, Binary alloys, Iron carbon alloys, Heat treatment of Carbon steels- Cast iron, Copper and Copper alloys, Experimental Stress Analysis
CT 154	Principal of Irrigation and Drainage	Water Resources , Meteorology , Hydrology, Application to Nile Projects , Modern Irrigation Systems. Basin and Perronial Systems of Irrigation. Drainage with an Introduction Underground water.
CT 157	Diploma Project	The student selects one of sevral subjects offered including computer aided drafting, quantity take-off for engineering projects , etc... . Prerequisite: Department Approval
CT 161	Hydraulic (1)	Pipelines and pipe systems - hydraulic models and similitude - flow in open channels - hydraulic structures and flow measurements- Hydraulic pumps and turbines.
CT 163	Soil Mechanics (2)	Soil Compaction : Lab-oratory and Field Methods, stability of slopes, Seepage through soil , Dewatering, Introduction to Foundation Engineering : Shallow Foundations, Bearing Capacity , Settlement Analysis.

CT 170	Surveying (2)	Theodolite: temporary setting up, measuring of horizontal and vertical angles, permanent adjustment of theodolite, errors in measuring horizontal and vertical angles. Indirect Methods for Distance Measurement : stadia Method, tangent Methods, substance bar. Setting out of Horizontal and Vertical Curves.
CT 191	Mechanical &Electrical Engineering	Mechanical : Engineering principles of equipment used in civil engineering work, excavation equipment, concrete mixing equipment for asphalt making and paving, pumps, rates of operation and methods of control, rates of moving and handling of materials, maintenance methods. Electrical : Electrical Circuits for Direct and Alternating current, Three phase circuits, Distribution of Electric power, Electric motors and their applications in civil Engineering, Transformers and their use, Electronic Circuits in civil Engineering applications.
ENG 151	Engineering Economy (1)	Economy Principles, Economics of construction, housing, and transportation, Risk analysis, Bases of economic evaluation of engineering projects, Accounting systems, Financing- Legal relationships in the Practice of Civil Engineering, contractual law, Bids and Tenders, Housing law- Urban planning law, Land Ownership, traffic and transportation law, Dispute resolution laws and regulations, Professional responsibility.
MNG 101	Principal of Management	Overview of functional responsibilities of managers such as planning, organizing, leading and control. The student applies same to a real life project of his choice.
PHE 102	Physical Education and Activities (D)	Introduction to music, The main features include :theoretical orientation, musical instruments, musical note, playing music, training on solo and choir singing.
PHE 103	Physical Education and Activities (E)	Introduction to knitting : a brief study of knitting machines, kinds of strings, training on various types of hand made stitches, computerized knitting, basics of knitting machine maintenance.
FTR 102	Field Training (2)	The student shall be trained on how to execute reinforced concrete buildings ; concrete mix design on site ; the use of different mixing methods, such as manual, mechanical and the manner to employ the central mix station technique .Also the student shall be trained to prepare the shuttering for different concrete elements .

Diploma Stage Elective Courses – Level (1&2)

HUM 102	Modern Egyptian History	Particular attention is given to important events determining the life of the Egyptian in the twentieth century. The appearance development and growth of Egyptian middle class and its role in the national movement.
HUM 103	Islamic Civilization (1)	Difference between culture and civilization , Ibn Khaldun's concept of civilization, the foundation of Islamic civilization. The decline of Islamic civilization.
LNG 102	Technical English Language (A)	

Bachelor Stage Core Courses (Mandatory)– Level (3)

MTH 103	Numerical Methods	Types of errors, algorithms and convergence, solutions of equations in one variable, interpolation and polynomial approximation, divided differences, central differences, inverse interpolation, numerical differentiation and integration, composite integration, Romberg integration, numerical solution of ordinary differential equations, initial value problems, Euler's method, Runge - Kutta methods, multi step methods.
MTH 105	Statistical Methods	Definition of statistics, frequency tables and histograms, cumulative frequency, basic statistical concepts, probability, conditional probability and independence, rules of probability, random variables and their expected values, discrete probability distributions, continuous probability distributions, bivariate and marginal probability distribution expected values of functions of random variables.
CT 200	Project Management	Definition of engineering projects, Modeling of projects, tasks and subtasks as activity, networks, Principles and practices of critical path methodology under conditions of certainty (CPM) and uncertainty (PERT). Resource

		loading and cost crashing concepts with and without resource limitations. Use of computer programs in managing engineering projects.
CT 211	Structural Analysis and Mechanics (3)	Analysis of indeterminate structures; trusses, beams, plane frames and arches. Axial force, shear force and bending moment diagrams. Method of consistent deformations, prestrain and support movement effects. Slope deflection method. Reciprocal law. Moment distribution; sway consideration. Analysis of non-prismatic members.
CT 212	Structural Analysis and Mechanics (4)	Strain due to axial force, bending moment, shear force and torsion. Energy and complementary energy concepts. Virtual work method; linear and nonlinear systems. Castigliano's theorems. Principle of minimum potential energy. Differential equations of beams and beam-columns in static and dynamic equilibrium. Finite difference and Rayleigh-Ritz method of solution; approximate methods of structural analysis; portal and cantilever methods; sketching of deflected shapes. Influence lines of indeterminate structures; trusses and beams, Introduction to Matrix Methods of Analysis.
CT 215	Metallic structure (2)	Basic behavior of steel structures, including both the component parts and the completed structures. Allowable stress Design and Plastic Design concepts. Laterally supported and unsupported Beams, Continuous Beams, Composite Design, Beam - Column Elements, Bracing Systems, Connection Detailing and stiffening . Structural systems include Rigid Frames, Floor Systems and Buildings
CT 216	Specification ,Bids and Contracts	Introduction to the legal and contractual aspects of the construction industry. Techniques for coordinating decisions and actions in the design and construction of engineering projects. Bidding strategies and procedures. Different types of Specifications. Contract documents.
CT 251	Inland Navigation and Harbor	Kinds of Harbours , Studies of the Natural Phenomena , Quays. Hydraulic Model Studies , Planning of Harbours , Light Houses and Guiding Signals. Breakwaters , Spillways , Dry Docks. Inland Navigation.
CT 253	Transportation Planning and Traffic Engineering	Principles of Transportation Planning and Traffic Engineering, Road-User and Vehicle Characteristics. Travel Time, Speed and Volume Studies, Highway Capacity, Pedestrian, Parking and Accident Studies, Traffic Control Devices, Grade Separations and / or Interchanges.
CT 262	Hydraulic (2)	Fluid flow around immersed objects, unsteady flow in open and closed conduits, engineering applications.
CT 264	Irrigation Work Design (1)	Canals and Drains : Classification , Synoptic Diagrams , Design of cross and Longitudinal Sections. Culverts : Hydraulic and Structural Design. Small Bridges for Irrigation Works : Hydraulic and Structural Design. Intermediate and Tail Escapes.
CT 277	Surveying (3)	Introduction to Theory of Errors and Error Analysis of Surveying Measurements. Coordinate Systems and Transformations. Coordinate Computations: polar method, intersection, resection. Modern Methods for Distance Measurements: Electronic Distance Measurement (EDM) and total stations. Setting out of Engineering Projects.
CT 221	Reinforced Concrete (2)	Design of floor systems, one way, two way, ribbed, hollow and flat slabs. Design for torsion, combined shear and torsion by the strength method. Design of continuous beams. Moment redistribution for minimum rotation capacity. Design of columns under axial and eccentric loading, short and long columns, Staircases, Footings.
PHE 201	Physical Education and Activities (1)	Introduction to Plastic Arts : Appreciation of the artistic aspects of natural elements, studying the artistic effect of light and shadow, arts workshop woodwork practice, making simple original color designs on glass material, metal and leather artistic creation.
PHE 202	Physical Education and Activities (2)	Introduction to Dramatic Arts : Origin and development of dramatic art vocal training and oral performance character representation dealing with the audience study of different dramatic forms, play acting .
FTR 201	Field Training (3)	The student shall be trained to control the work and manage its different stages on site with the following : Communicate with different types of workers; Reviewing quantities, prices and quality control; Training to read

		drawings and apply it on site, Planning and management of the site to guarantee to finish all works on time .
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Bachelor Stage Core Courses (Mandatory)– Level (4)

CT 213	Structural Analysis and Mechanics (5)	Matrix Stiffness Analysis, element and structural stiffness assembly, development of computer programs for linear elastic structural analysis.
CT 252	Civil Engineering Project	An independent research and/or design project to be carried out under the supervision of a staff member, running over two semesters in the fifth year. The results must be submitted in the form of a thesis, judged and marked by a jury of at least two staff members.
CT 263	Water Supply and Sewage System	Quantity of water and wastewater. Design of water supply networks including pumping stations and storage capacity. Design of sanitary and storm sewers, including appurtenances.
CT 265	Irrigation Work Design (2)	Heading Up Structures : Overflow and Standing Wave Weirs , Head and Partial Regulators , Barrages. Navigation Structures : Locks, Gates, Navigation Connections. Crossing Structures : Syphon's, Aqueducts , Tunnels. Storage Structures : Dams (Aswan Dam , High Dam).
CT 222	Foundation Engineering	Types of foundation systems and design criteria, design of shallow foundations and deep foundations, construction methods, effects of construction on nearby structures, special topics and case studies.
CT 223	Reinforced Concrete (3)	Rectangular and circular tanks and fluids containers, Underground, on the ground and elevated tanks, Design end working drawings of beams, frames, arches, trusses and saw tooth roofs .
CT 224	Reinforced Concrete (4)	Prestressed concrete elements : Introduction, stresses under working loads, ultimate loads and flexural strength, shear, camber and deflection, dimensioning . Tall buildings under lateral loads, lateral load resisting systems . Repair of concrete structures . special structures .
CT 225	Metallic Structure (3)	Fundamentals and Principles of Steel Bridges. Egyptian code. Distinctive features, Analysis procedure and Design of the most widely used Bridge Systems. Loads, Deck Systems and Structural Systems. Structural Systems include Truss Bridges, Plate Girder Bridges, Parallel Girder Systems, Stiffened Suspension Bridges and Cable Stayed Bridges. Additional topics include orthotropic plate decks, grid reinforced decks, bracing systems, structural details and elastomeric bearings .
CT 231	Highway & Airports Engineering	Basic Design Control : Motion of Vehicles, Sight Distances, Alignment, Intersections. Earthwork : Soil Classification, Soil Stabilization, Flexible and Rigid Pavements, Highway Drain . Introduction to Airport Engineering.
CT 271	Railway Engineering	Dynamics of Rolling, Track Alignment, Railway Branches. Design and Details of Track Parts. Stations and Yards. Signals , Maintenance , Renewing.
CT 274	Water and Wastewater Treatment	Water quality and standards. water treatment, including clarification, filtration, disinfection and softening. Characteristics of wastewater. Sewage treatment, including solids removal and biological processes.
LNG 201	English (D)	Language power, discovering discourse, writing academic English, Technical English.
FTR 202	Field Training (4)	The student shall be trained to execute the following : Prepare design calculation sheets ; Prepare design drawings and working details to be used on site; Prepare all notes related to the works to guarantee the execution of all works according to project specifications .

Bachelor Stage Elective Courses – Level (3&4)

ENG 221	Modeling and simulation	An introduction to the basic role of simulation in system modeling. Presents approaches to organizing and conducting simulation studies. Emphasis is on the principles and practice of discrete-event simulation using one or more applicable programming languages.
MTH 201	Mathematics (E)	Complex numbers, regions in the complex plane, limits, continuity, derivative, analytic functions, Cauchy-Riemann conditions, elementary functions and mapping by them, definite integral, line integrals in the complex plane, Cauchy's theorem, Cauchy's integral theorem, derivatives of analytic functions, power series, Taylor series, Laurent series, Poles,

		singularities, residue theorem, evaluation of real integrals, conformal mapping
MTH 203	Numerical Analysis	Linear system of equations, Gauss elimination method, matrix inversion, norms of vectors and matrices, iterative techniques for solving linear systems, boundary value problems for ordinary differential equations, the shooting methods for linear and nonlinear problems, finite difference methods for linear and nonlinear problems, numerical solutions to partial differential equations, elliptic, parabolic and hyperbolic types.
MTH 204	Statistical Analysis	Statistics and sampling distributions, the sample mean and variance, the normal approximation to the binomial distribution Hypothesis testing, two sided test of the mean, testing the variance, the chi - square test, testing of randomness, testing for goodness of fit, simple regression, probabilistic models, acceptance sampling.
CT 254	Technical Report Writing	Study of basic organization, style and mechanics of technical and administrative reports. Practice in assignments such as technical descriptions, proposals, recommendations, and instruction. Emphasis on planning, organizing, and writing reports; design of visual aids; elements of technical editing and preparation of final drafts.
CT 327	Transportation Planning	Urban and regional transportation planning. The transportation planning process Models. Case studies.
CT 329	Selected Topics in Transportation engineering	Selected Topics among the Following: Pavement Systems and Management, Specific Issues in Transportation Planning, Advanced Techniques in Materials and Pavement Characterization, Traffic Models, Analysis of Traffic Accidents.
CT 355	Bridge engineering	Types and components of bridges. Loads on bridges. Fundamental behavior and practical design of shallow superstructures ,with emphasis on slab-on-girder deck systems. Design of composite sections. Bridge substructures. Bridge rating. Use of relevant codes.
CT 361	Earthquake Resistant Design	Seismicity, Code forces, distribution of shear and moments, dynamic effects, ductility; Seismic design in steel, concrete and masonry. Seismic analysis methods.
CT 363	Structural Maintenance & Retrofitting	Repair of concrete structures, causes and positions of cracks, materials used in repair, strengthening of structures and foundation, repair and strengthening of steel structures, seismic retrofitting.
CT 379	Selected topics in Geotechnical engineering	A Selection Made From: Soil Stabilization Using Conventional Stabilizers, such as Cement, Bituminous Materials and Chemicals. Soil Improvement by: Compaction, Vibroprobes, Preloading etc. Desert Soil Characteristics Including Swelling and Shrinkage, Dessication, Collapse, Erosion and Cementation. Salt-bearing Soils, Cemented Sands and Wind-Blown Sands. Influence of water Table Fluctuation on Soil Properties. Soil Properties by Field Tests. Use of Geomembranes and Geotextiles.
CT 383	Construction Management	The nature of construction industry. Construction administration. Factors affecting the selection of construction equipment. Construction equipment and methods, work improvement in construction management. Cost estimating. Concrete forms. Safety in construction.
HUM 201	History of Egypt	The development of the social, political and economic systems. The rise and development of the national movement and its role in achieving independence and democracy.
HUM 202	English Literature	Introduction to the forms of literature, short story, novel, drama and poetry. Developing students' critical ability through carefully selected sample literary texts.
HUM 203	Trade Law	Kinds of contracts, contract constituents, contract administration, the limitations as imposed by law, disputes, claims, arbitration, the legal variables encountered in business and commercial transactions.
HUM 204	Industrial Psychology	An introduction to the history, methods and the major theories, concepts of industrial psychology. The course provides non-majors with an overview of the field of industrial psychology, while majors gain a foundation for further study.

HUM 205	Islamic Civilization	Intellectual aspect of Islam prominent Arab and Muslim scholars and their contribution to various scientific feed mathematics, astronomy, chemistry, medicine.....etc.
LNG 202	Technical English Language	
MNG 221	Engineering Economy (2)	Costing and costing systems, depreciation methods, breakeven analysis, replacement analysis, decision making under certainty, decision making under risk, evaluation of public projects.
MNG 222	Behavior Discipline	A study of organization theories, concepts and structures, individual and group behavior, communication process, leadership, conflict management, motivation, management of change.
MNG 223	Economics of Managements	Resource allocation money, material, machine and manpower. Economic aspects in marketing, economic considerations in decision making.

11- Program Admission Requirements:

The Higher Institute of Engineering and Technology at New Minia accepts the Egyptian high school certificate (scientific division) or equivalent certificate awarded by foreign country according to the rules and grades that applied by the national admission office in the supreme council of universities. The specialist stages of the program start after a successful pass of the preparatory year (level 0) with at least 33 units out of the required 44 units. The students are then distributed among the different programs in the Higher Institute according to rules set by the institute council that depend on the final grade in the preparatory year as well as students' self-selection and departments requirements.

12- Regulations for Progression and Program Completion:

- The student should achieve at least 212 units in order to be graduated from the program with at least GPA of 1.0.
- The student is promoted to the next level of the program specialist stages if he/she fulfills the minimum registered and required units of his/her academic year.
- The student must attend more than 75% of the lectures, tutorials and laboratory exercises for each course, as a condition to be allowed to take the final exam. The student who does not meet the 75% attendance will not be allowed to take the final exam. He should make a request with an excuse that the department and institute councils can accept in order to be allowed to go through the final exam. In the case of request rejection, the student is considered “fail” in the course he/she was not allowed to attend its finals.
- The student is required to select and submit a graduation project in one of the fields of civil engineering, according to the rules set by the department council. An extension of four weeks is given to students after the summer semester of level (4).
- The student is entitled to be examined in courses he failed. In case the student’s score is 65% or above of the course maximum mark, his mark is reduced to that of the upper limit of “Pass” grade.
- The mark and grade remain the same without change for the student who failed to appear for an examination due to an acceptable excuse.
- Without desecration of Articles 83, 84 and 85 of the executive bylaws of the University Regulation Law, the successful completion of a course is evaluated according to grade points as follows:

Grade	GPA	Equivalent Grade	Percentage
A+	4.0	Distinct (+)	More than 95%
A	3.7	Distinct	From 90 to less than 95%
A-	3.3	Distinct (-)	From 85 to less than 90%
B+	3.0	Very Good (+)	From 80 to less than 85%
B	2.7	Very Good	From 75 to less than 80%
C+	2.3	Good (+)	From 70 to less than 75%
C	2.0	Good	From 65 to less than 70%
D+	1.7	Pass (+)	From 60 to less than 65%
D	1.3	Pass	From 55 to less than 60%
D-	1.0	Pass (-)	From 50 to less than 55%
F	0.0	Fail	Less than 50%

13- Program Evaluation Methods:

Evaluator	Tool	Sample
1- Senior students	Questionnaire	Sample of 25% out of students in years 1,2 and 3
2- Alumni	Questionnaire	Sample of 25% of final year students
3- Stakeholders (Employers)	Questionnaire	Samples from different sectors
4-Internal Evaluator(s)	Internal Report	1-2 reports
5-External Evaluator(s)	External Report	1-2 reports
6- Other	Student's scientific conference according to the universities law of 49 in 1972.	1-Senior students 2-Alumni 3-Employees 4-Stakeholders (Employers)

We certify that all of the information required to deliver this program is contained in the above specification and will be implemented.

Program Coordinator	
Head of Civil Engineering Dept.	Assoc.Prof .Dr. Naglaa Kamal
Signature:	<i>Naglaa Kamal</i>

Quality Assurance Unit	
Dr. Medhat Mohammed Osman	
Signature:	<i>Medhat Osman</i>

Dean and Chairman	
Prof. Dr. Gamal El-Din Ali Abouelmagd	
Signature:	<i>Gamal Abouelmagd</i>