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## Program Specification

### Program Title: Civil Engineering program Structures and Public Works

Faculty(s)/Institution: **Thebes Higher Institute of Engineering.**  
Department: **Civil Engineering.**  
Semester System – **2017 Bylaws**

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Program title: Civil Engineer

#### 1. Basic information

- 1- Program Type: Single  Double  Multiple
- 2- Department: Civil Engineering
- 3- Coordinator: **Dr. Yousra M. Hamdy**
- 4- Last date of program specifications approval: January 2021
- 5- Study system: Two Semesters system

#### 2. Mission

Civil engineering graduates should obtain a high degree of familiarity with basic sciences and engineering skills that are in line with international standards for university education and in a way that suits the local, Arab and international market as well. One of the tasks of the program is to prepare engineers with an engineering scientific base and high skills that enable them to enroll in postgraduate studies (Diploma - Master - PhD)

##### Mission of Structural Engineering

One of the goals of the program is to graduate engineers in the field of structural engineering who serve the various structural specializations and meet (fit) the national and international requirements.

##### Mission of Public Works Engineering

One of the goals of the program is to graduate engineers in different fields of public works such as roads, railways, sewage and water who serve and meet (fit) the national and international requirements for this specialization.

### **3. Program Objectives:**

In addition to the general features of the engineer, the graduate must have the following qualities:

- 1- Full knowledge of mathematical, physical and chemical basics so that they can accommodate the specialized courses and improves their analytical expertise to solve the problems it faces.**
- 2- The ability to analyze and design structures and to supervise All civil works.**
- 3- The ability to design and construct special structures and bridges.**
- 4. Full knowledge of different types of materials.**
- 5- Full knowledge of soil behavior and its effect on structures.**
- 6- The ability to design, plan, construct, operate and maintain highways , airports and railways.**
- 7. The ability to design against the unexpected environmental risks (Earthquakes).**
- 8. The ability to use software programs which are related to civil engineering.**
- 9. The ability to prepare schedules to plan and construct all civil works.**
- 10. Full knowledge of constructing methods, repairing and supporting all civil structures.**
- 11.The ability to design water, drainage and irrigation stations. measure water quality.**
- 12. Full knowledge of survey and its equipment.**
- 13. The ability to take advantage of all knowledge collected by various scientific topics in order to understand the evolution in civil engineering.**
- 14. The ability to communicate with others effectively and writing technical reports.**
- 15. The ability to manage civil engineering projects.**
- 16- The ability to write the technical specifications of the devices required for civil projects.**

### **4. Academic Standards**

**4.1. External references for engineering graduate competencies standards (benchmarks):**

The National Academic Reference Standards (NARS 2018)

**A. COMPETENCIES OF ENGINEERING GRADUATE:**

The Engineering Graduate must be able to:

1. Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.
2. Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.
3. 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.
4. Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues and risk management principles.
5. Practice research techniques and methods of investigation as an inherent part of learning.
6. Plan, supervise and monitor implementation of engineering projects, taking into consideration other trades requirements.
7. Function efficiently as an individual and as a member of multi-disciplinary and multicultural teams.
8. Communicate effectively – graphically, verbally and in writing – with a range of audiences using contemporary tools.
9. Use creative, innovative and flexible thinking and acquire entrepreneurial and leadership skills to anticipate and respond to new situations.
10. Acquire and apply new knowledge; and practice self, lifelong and other learning strategies.

**B. COMPETENCIES OF CIVIL ENGINEERING (B- Level):**

In addition to the above Competencies (A- Level) for All Engineering Programs the BASIC CIVIL Engineering graduate must be able to:

1. 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.

2. 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.
3. 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.
4. Deal with biddings, contracts and financial issues including project insurance and guarantees.

### **C. Competencies for Construction Engineering Graduates (C-Level):**

CC (1) Illustrate advanced concepts of construction project management, value and risk management, operations and maintenance, and human resources management.

CC (2) Analyze strategic management and engineering economics in construction and infrastructure projects including feasibility studies, decision support, and marketing techniques.

CC (3) Utilize advanced construction management techniques in project scheduling, cost estimation, procurement, and tendering.

CC (4) Integrate concepts of flexibility and stiffness, theory of finite elements, to solve determinate and indeterminate structures.

CC (5) Design, construction, operation, and management of special concrete and steel structures.

CC (6) Interpret advanced analytical models for decision support in construction management.

**D. Competencies for Public Works Graduates (C-Level):**

C-PW (1) Illustrate concepts of health and environmental engineering, water supply engineering, water needs, water resources, and water collection methods.

C-PW (2) Analyze sources of surface and groundwater pollution, pollution measurement techniques, industrial and domestic sewage discharge methods, and groundwater pollution treatment.

C-PW (3) Integrate principles and bases of chemical processes for biological treatment and purification of water and wastewater.

C-PW (4) Design and operation of water distribution networks, pipe lines, ground and high reservoirs, water treatment and desalination plants, and pump stations.

C-PW (5) Analyze main processes of operation, management, repair, and maintenance of water treatment plants and networks.

C-PW (6) Analyze main processes of operation, management, repair, and maintenance of water treatment plants and networks.

C-PW (7) Illustrate principles of transport planning and traffic engineering, including urban transport planning, transport demand prediction models, public transportation improvements, traffic and speed characteristics, and traffic management and control systems.

C-PW (8) Design highways and airports pavement mixes determine capacity of roads and airspace including operation and maintenance.

C-PW (9) Analyze railways systems and components including types of diversions and intersections, different types of signals, railways planning, operation, and maintenance.

C-PW (10) Analyze maritime transport, planning processes of ports, movement of ships (VTS), including planning, operation, and maintenance.

## 5. Program Structure & Graduation Requirements for Civil Engineering Program

### A. The Topics of the Program and Hours distribution according to course categories

	Compulsory	Elective	Total contact hours	Percentage	NARS standards range
Humanities and social sciences	16	6	22	10.3%	9 % - 12%
Business management	7	--	7		
Mathematics, basic and assistance sciences	53	--	53	19%	18%-22%
Engineering culture	17	--	17	6%	4%-6%
Basic engineering sciences	86	--	86	30%	25%- 30%
Applied engineering and design	59	24	83	30%	25%-30%
Project and field training	12	--	12	4.3%	4%-6%
<b>Total</b>	<b><u>250</u></b>	<b><u>30</u></b>	<b><u>280</u></b>		

Group	Percentage
Public culture Requirements	<u>10.4%</u>
Engineering Institute Requirement	<u>22.5%</u>
General specification requirement	<u>35%</u>
Major specification requirement	<u>32.1%</u>

## 6. Study Plans for each year

Table (1)

### Preparatory Year

#### First semester

No.	Course Code	Course Title	Hours				Exam time (Hr)	Examination marks				
			Lec	Tut	Lab	Total		Mid term	Class work	Prac/Oral	Final exam	Total
1	BAS011	Mathematics (1)	3	2	-	5	3	40	35	-	75	150
2	BAS021	Physics (1)	3	1	1	5	3	25	25	25	75	150
3	BAS031	Mechanics (1)	2	2	-	4	3	25	25	-	50	100
4	BAS051	Engineering Drawing and Projection (1)	2	3	-	5	3	30	30	-	65	125
5	BAS061	Production Technology	2	-	3	5	3	20	20	20	65	125
6	HUM031	Introduction to Engineering Sciences	2	-	-	2	2	15	10	-	25	50
7	HUM011	English Language (1)	2	-	-	2	2	15	10	-	25	50
<b>Total</b>						<b>28</b>						<b>750</b>

#### Second semester

No.	Course Code	Course Title	Hours				Exam time (Hr)	Examination marks				
			Lec	Tut	Lab	Total		Mid term	Class work	Prac/Oral	Final exam	Total
1	BAS012	Mathematics (2)	3	2	-	5	3	40	35	-	75	150
2	BAS022	Physics (2)	3	1	1	5	3	25	25	25	75	150
3	BAS032	Mechanics (2)	2	2	-	4	3	25	25	-	50	100
4	BAS052	Engineering Drawing and Projection (2)	1	3	-	4	3	20	30	-	50	100
5	BAS041	Engineering Chemistry	2	-	2	4	3	20	20	20	40	100
6	CEE041	Introduction to Computer and Programming	2	-	2	4	3	20	20	20	40	100
7	HUM012	English Language (2)	2	-	-	2	2	15	10	-	25	50
<b>Total</b>						<b>28</b>						<b>750</b>

**Table (2)**  
**First Year**

**Civil Engineering Department**

**First semester:**

NO.	Course Code	Course Title	Hours				Exam time (Hr)	Examination marks				
			Lec	Tut	Lab	Total		Mid term	Class work	Prac/Oral	Final exam	Total
1	CVE111	Structural Analysis (1)	3	2	-	5	3	30	30	-	65	125
2	CVE121	Properties and Testing of Materials (1)	2	1	1	4	3	20	20	20	65	125
3	CVE161	Civil Drawing	2	4	-	6	3	40	35	-	75	150
4	HUM113	Technical English	2	-	-	2	2	15	10	-	25	50
5	HUM 13X	Elective	2	-	-	2	2	15	10	-	25	50
6	BAS113	Mathematics (3)	2	2	-	4	3	25	25	-	50	100
7	ARC139	Building Construction	2	3	-	5	3	40	50	-	60	150
<b>Total</b>						<b>28</b>						<b>750</b>

**Second semester:**

NO.	Course Code	Course Title	Hours				Exam time (Hr)	Examination marks				
			Lec	Tut	Lab	Total		Mid term	Class work	Prac/Oral	Final exam	Total
1	CVE112	Structural Analysis (2)	3	2	-	5	3	30	30	-	65	125
2	CVE122	Properties and Testing of Materials (2)	2	1	1	4	3	20	20	20	65	125
3	CVE162	Fluid Mechanics	3	1	1	5	3	20	20	20	65	125
4	CVE181	Plane Surveying	2	1	2	5	3	25	25	25	75	150
5	HUM 13X	Elective	2	-	-	2	2	15	10	-	25	50
6	BAS116	Probability and Statistics	2	1	-	3	3	25	25	-	50	100
7	CEE181	Electrical Engineering	2	1	1	4	3	15	15	15	30	75
<b>Total</b>						<b>28</b>						<b>750</b>



**Table (3)**

**Second Year**

**Civil Engineering Department**

**First semester**

NO	Course Code	Course Title	Hours				Exam time (Hr)	Examination marks				
			Lec	Tut	Lab	Total		Mid term	Class work	Prac/Oral	Final exam	Total
1	CVE213	Structural Analysis (3)	3	2	-	5	3	30	30	-	65	125
2	CVE223	Properties and Testing of Materials (3)	2	1	1	4	3	20	20	20	65	125
3	CVE231	Design of Reinforced Concrete Structures (1)	3	2	-	5	3	40	35	-	75	150
4	CVE251	Geotechnical Engineering (1)	2	-	1	3	3	20	20	20	40	100
5	CVE263	Irrigation and Drainage Engineering	2	2	-	4	3	25	25	-	50	100
6	CVE282	Topographical Surveying	2	1	1	4	3	20	20	20	40	100
7	HUM211	Feasibility Studies and Operations Research	2	1	-	3	2	15	10	-	25	50
<b>Total</b>						<b>28</b>						<b>750</b>

**Second semester:**

NO.	Course Code	Course Title	Hours				Exam time (Hr)	Examination marks				
			Lec	Tut	Lab	Total		Mid term	Class work	Prac/Oral	Final exam	Total
1	CVE214	Structural Analysis using Computer	3	2	2	7	3	30	30	40	100	200
2	CVE232	Design of Reinforced Concrete Structures (2)	3	2	-	5	3	40	35	-	75	150
3	CVE252	Geotechnical Engineering (2)	2	-	1	3	3	20	20	20	40	100
4	CVE264	Hydraulics	3	1	1	5	3	20	20	20	65	125
5	CVE291	Field Training (1)	-	-	2	2	-	-	25	25	-	50
6	HUM212	Engineering Economics and Project Management	2	-	-	2	2	15	10	-	25	50
7	BAS262	Mechanical Engineering	2	1	1	4	3	15	15	15	30	75
<b>Total</b>						<b>28</b>						<b>750</b>

**Table (4)**

**Third Year**

**Civil Engineering Department**

**First semester**

NO.	Course Code	Course Title	Hours				Exam time (Hr)	Examination marks				
			Lec	Tut	Lab	Total		Mid term	Class work	Prac/Oral	Final exam	Total
1	CVE333	Design of Reinforced Concrete Structures (3)	3	2	-	5	3	40	35	-	75	150
2	CVE334	Steel Structures Design (1)	3	2	-	5	3	40	35	-	75	150
3	CVE365	Design of Irrigation Works	3	2	-	5	3	30	30	-	65	125
4	CVE366	Sanitary Engineering	2	2	-	4	3	30	30	-	65	125
5	CVE371	Transportation Planning and Traffic Engineering	3	2	-	5	3	25	25	-	50	100
6	HUM332	Technical Report Writing	2	-	-	2	2	15	10	-	25	50
7	HUM34X	Elective	2	-	-	2	2	15	10	-	25	50
<b>Total</b>						<b>28</b>						<b>750</b>

**Second semester**

No	Course Code	Course Title Mid term	Hours				Exam time (Hr)	Examination marks				
			Class work	Lab/Oral	Final exam	Total		Mid term	Class work	Lab/Oral	Final exam	Total
1	CVE335	Design of Reinforced Concrete Structures (4)	3	2	-	5	3	40	35	-	75	150
2	CVE336	Steel Structures Design (2)	3	2	-	5	3	40	35	-	75	150
3	CVE372	Highway and Airport Engineering	3	3	-	6	3	40	35	-	75	150
4	CVE392	Field Training (2)	-	-	2	2	-	-	25	25	-	50
5	HUM321	Human Rights	2	-	-	2	2	15	10	-	25	50
6	CVE 3XX	Elective (1)	2	2	-	4	3	25	25	-	50	100
7	CVE 3XX	Elective (1)	2	2	-	4	3	25	25	-	50	100
<b>Total</b>						<b>28</b>						<b>750</b>

**Table (5)**

**Fourth Year**

**Civil Engineering Department**

**First semester**

NO.	Course Code	Course Title	Hours				Exam time (Hr)	Examination marks				
			Lec	Tut	Lab	Total		Mid term	Class work	Prac/Oral	Final exam	Total
1	CVE437	Steel Structures Design (3)	3	2	-	5	3	40	35	-	75	150
2	CVE442	Construction Projects Management	2	2	-	4	3	25	25	-	50	100
3	CVE453	Foundation Engineering	3	2	-	5	3	30	30	-	65	125
4	CVE474	Railways Engineering	2	2	-	4	3	30	30	-	65	125
5	HUM413	Engineering Legislations	2	-	-	2	2	15	10	-	25	50
6	CVE 4XX	Elective (2)	2	2	-	4	3	25	25	-	50	100
7	CVE 4XX	Elective (2)	2	2	-	4	3	25	25	-	50	100
<b>Total</b>						<b>28</b>						<b>750</b>

**Second semester**

No	Course Code	Course Title	Hours				Exam time (Hr)	Examination marks				
			Lec	Tut	Lab	Total		Mid term	Class work	Prac/Oral	Final exam	Total
1	CVE415	Earthquake Engineering	2	2	-	4	3	25	25	-	50	100
2	CVE454	Design of Special structures and Prestressed Concrete	2	2	-	4	3	25	25	-	50	100
3	HUM422	Population, Reproduction Health and Family Planning	2	-	-	2	2	15	10	-	25	50
4	HUM423	Environmental Impact of Projects	2	-	-	2	2	15	10	-	25	50
5	CVE 4XX	Elective (2)	2	2	-	4	3	25	25	-	50	100
6	CVE 4XX	Elective (2)	2	2	-	4	3	25	25	-	50	100
7	CVE493	Project	4	4	-	8	-	-	125	125	-	250
<b>Total</b>						<b>28</b>						<b>750</b>

## Elective

### Elective (1): Student select two courses (4 contact hours)

No.	Course Code	Course Title	Hours			
			Lec	Tut	Lab	Total
1	HUM133	Study Skills	2	-	-	2
2	HUM134	Scientific Thinking	2	-	-	2
3	HUM135	Presentation and Communication Skills	2	-	-	2
4	HUM136	Professional Marketing Skills	2	-	-	2
<b>Total</b>			8			8

### Elective (2): Student selects one course (2 contact hours)

No.	Course Code	Course Title	Hours			
			Lec	Tut	Lab	Total
1	HUM341	Recent Egypt's History	2	-	-	2
2	HUM342	Islamic History	2	-	-	2
<b>Total</b>			4			4

## Elective

### Elective (1): Student select two courses ( 8 contact hours) :

No.	Course Code	Course Title	Hours			
			Lec	Tut	Lab	Total
1	CVE324	Repair and Strengthening of Structures	2	2	-	4
2	CVE325	Characteristics of Wastewater & Industrial Wastes	2	2	-	4
3	CVE341	Quantities, Contracts and Specifications	2	2	-	4
4	CVE373	Highways Construction Technology	2	2	-	4

### Elective (2): Student selects 4 courses from one group (16 contact hours):

#### Group - A

No.	Course Code	Course Title	Hours			
			Lec	Tut	Lab	Total
1	CVE416	Finite Elements Method	2	2	-	4
2	CVE417	The Concept of Using Models in Structural Analysis	2	2	-	4
3	CVE443	Construction Techniques For Concrete Structures	2	2	-	4
4	CVE455	Masonry Structures	2	2	-	4
5	CVE456	Soil & Rocks in Dry Regions	2	2	-	4

6	CVE457	Geotechnical Analysis Using Computer	2	2	-	4
7	CVE458	Advanced Analysis of Reinforced Concrete Bridges	2	2	-	4

**Group - B**

No.	Course Code	Course Title	Hours			
			Lec	Tut	Lab	Total
1	CVE467	Advanced Sanitary Engineering	2	2	-	4
2	CVE468	Environmental Engineering	2	2	-	4
3	CVE475	Maintenance of Roads & Airports	2	2	-	4
4	CVE476	Advanced Railway Engineering	2	2	-	4
5	CVE477	Airport Engineering	2	2	-	4

## 7. Course Description:

### 7.1. Basic and Assistance Sciences Department:

#### BAS011 Mathematics (1)

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
3	2	-	5	40	35	-	75	150

Differentiation and integration: Limits and continuity, derivatives and their applications, Indefinite and definite integrals, Integration by substitution, derivatives and integrals of transcendental functions. Geometry and Algebra: Conic sections including parabola, ellipse, circle, and hyperbola, theory of algebraic equations and inequalities, partial fractions, functions and inverse functions.

#### BAS012 Mathematics (2)

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
3	2	-	5	40	35	-	75	150

Techniques of integration; by substitution, by parts, and by partial fractions. Geometry and algebra: Linear algebra including determinants and matrices, systems of linear equations and eigenvalues and eigenvectors. Complex numbers, including polar form, De Moivre's theorem and its applications, sequence and series.

#### BAS021 Physics (1)

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
3	1	1	5	25	25	25	75	150

Measurements, Dimensions and Units. Physical mechanics, Linear motion. Free fall and gravitational motion. forces, Momentum, energy concept and elastic, inelastic collisions. Circular motion and projectiles. Properties of matter: Mechanical properties of matter, Elastic properties of materials. Hydrostatics and surface tension, Hydrodynamics, Viscosity, with applications. Oscillatory motion, simple harmonic oscillator, Analogy of motions and applications. Electricity and Magnetism: Electrostatics, Electric forces, Electric field, Dipole-moment and maximum electric energy, Gauss law and applications, Electric potential, Capacitors. Electrodynamics, Electric current, electromotive force and resistivity. Direct current electric circuits, Kirchhoff's rules, Magnetic forces, Electromagnetic induction and Ampere's law.

#### Laboratory: (Physics Lab)

No.	Experiment Name

1	Fine measurements of length vernier
2	Micrometer
3	Spherometer
4	The simple pendulum
5	Verification of Hook's law
6	Spiral spring, determination of the force constant
7	Determination of the viscosity of glycerin
8	Verification of Ohm's law parallel and series law of resistors
9	Wheatstone bridge
10	Charging and discharging a capacitor R-C circuits parallel and series law of capacitors
11	Pulling power of an electromagnet

### **BAS022 Physics (2)**

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
3	1	1	5	25	25	25	75	150

Heat: heat energy, temperature, measurements and scales, thermal expansion, heat transfer, heat and thermal work, kinetic theory of gases, first law of thermodynamics, Molar specific heat, Carnot-cycle and entropy, second law of thermodynamics with applications. Waves: types of waves, sinusoidal and standing waves, mechanical waves and sound waves, Doppler effect, electromagnetic oscillations, Maxwell's equations, electromagnetic waves, light, electromagnetic spectrum with applications.

### **Laboratory:(Physics Lab)**

No.	Experiment Name
1	Specific heat of a solid by mixture method
2	Newton's low of cooling
3	specific heat of liquid
4	Joule equivalent (joule constant)
5	Thermal conductivity of a bad conductor by lee's method
6	Power of convex lens by general method
7	Power of convex lens by coincident method
8	Power of concave lens
9	Power of convex mirror
10	Speed of sound in air

## **BAS031 Mechanics (1)**

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	2	-	4	25	25	-	50	100

Concurrent force systems, vector algebra, moments, couples, resultants of general, coplanar, and parallel force systems, frames and machines, trusses. Friction: dry friction, sliding and tipping, wedges friction, belt friction. Kinematics of a particle: rectilinear motion, curvilinear motion (cylindrical and rectangular components), orbital motion, projectile motion, relative motion. Kinetics of a particle: energy method, work, forces, fields, gravitational force, force, potential energy, kinetic energy, work - energy principle, conservation of energy. Linear impulse and momentum impact.

## **BAS032 Mechanics (2)**

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	2	-	4	25	25	-	50	100

Equilibrium of a rigid body in two dimensions, free body diagrams, center of gravity, center of mass and centroid of a system of particles and rigid bodies. Moment of inertia of an area: parallel-axis theorem, radius of gyration, composite areas, moments of inertia about inclined axes. Planar kinematics of a rigid body: translation motion, rotation motion and general plane motion about a fixed axis, instantaneous center of zero velocity. Kinetics of rigid bodies: energy principle, work, potential energy, kinetic energy, field forces, energy conservation principles, linear impulse - momentum relation, angular impulse - momentum relations, impulsive forces.

## **BAS041 Engineering Chemistry**

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	-	2	4	20	20	20	40	100

Equations of state, general properties of solutions, introduction to chemical thermodynamic and thermo-chemistry, balance in fuel combustion and chemical processes, basic principles in electro chemistry, introduction to corrosion engineering, environmental chemistry, selected topics in process chemical industries (chemistry of cement, petrochemical industries, building materials, dyes and dyeing industry).

### **Laboratory:(Chemistry Lab)**

No.	Experiment Name
1	Laboratory orientation and safety practices
2	Determination of the normality of an acid (or abase) by titration of Acid Base
3	Acid base titration using the PH meter
4	Factors affecting on reaction rate (effect of concentration)



5	Determination of the solubility product constant (KSP).
6	Dilute hydrochloric acid group and identification of all acidic radicals in it.
7	Concentrated sulphuric acid group and identification of all acidic radicals in it.
8	Miscellaneous group and identification of all Acidic Radicals in it.
9	Identification of basic radicals of inorganic salts.

### **BAS051 Engineering Drawing and Projection (1)**

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	3	-	5	30	30	-	65	125

Drawing technology and skills, drawing equipment, Engineering operations, Geometric construction, Theory of projection, Orthographic projection, Representation of the bodies, Isometric and oblique representation, writing dimensions, predicting missing views, Introduction to engineering sectioning.

### **BAS052 Engineering Drawing and Projection (2)**

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
1	3	-	4	20	30	-	50	100

Sections of solids, intersection of surfaces, development of solids, sectional views, auxiliary projection.

Drawing of fastening means: bolts, nuts, pivots and welding, drawing of steel sections and connections, Electrical circuits drawing.

### **BAS061 Production Technology**

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	-	3	5	20	20	20	65	125

Properties of engineering materials and material selection, Casting and joining metals, Forming processes, Basic machining processes, Measurements, Standardization, International measuring systems, Cost analysis and estimation, Maintenance (systems, types, and programming), Organization structure of production.

**Workshop:** Doing exercises in carpentry, lathe, Casting, Forging, electrical and gas welding drilling shaper, measurement and filing workshops.

### **BAS113 Mathematics (3)**

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	2	-	4	25	25	-	50	100

Calculus: Functions of several variables. Differential equations with some applications. Double, Triple, Linear, and surface integrals, and Green's theorem.

Analytic Geometry: Polar coordinates, Polar coordinate equations of some basic curves ,Intersections of polar curves and plane areas in polar coordinates.

### **BAS114 Mathematics (4)**

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	1	-	3	25	25	-	50	100

Calculus: complex functions, special functions, Laplace equation, Laplace transform and its use in solving differential and integral equations, Dirac function and periodic functions, with some applications to engineering problems. Probability theory. Numerical methods of finding roots of nonlinear equations, Approximation of functions and curves using Lagrange method, the divided-differences method. Numerical differentiation and integration methods.

### **BAS115 Numerical Analysis**

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	1	-	3	25	25	-	50	100

Theory of linear equations- Solving a system of linear equations using matrices with Gauss method, Gauss-Jordan method and Gauss-Seidel iteration method- Numerical methods of finding roots of nonlinear equations of  $n^{\text{th}}$  degree including Newton-Raphson' method- Perpendicular projection and realizing the sum of least squares of errors- Approximation of functions and curves using Lagrange's method, the divided-differences method, and the least squares method- Methods of numerical differentiation and integration, Numerical solution of a system of differential equations.

### **BAS116 Probability and Statistics**

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	1	-	3	25	25	-	50	100

Introduction in statistics, definition and functions of statistics, collection and organization of statistical data. Sets and Probabilities. Tendency and dispersion measures. Random variables of discrete random variables, continuous random variables. Moments, Skewness measures, kurtosis measures. Sampling theory and inferences statistic. Types of hypothesis testing and confidence limits. linear regression and correlation.

## **BAS123 Modern Physics**

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	1	2	5	25	25	25	75	150

Optical physics: geometrical optics, physical optics, interference, diffraction and polarization of waves, Lasers. Relativistic physics: Michelson, Morely experiment, special theory of relativity, time dilation and length contraction, relativistic mass and energy, with applications. Quantum physics: Planck's theory of quantization of energy of radiation, the photoelectric effect, X-rays and compton's effect. Atomic physics: wave properties of matter and wave function, Principles of quantum mechanics and Schrödinger's equation, atomic structure, quantum theory for free electrons in metals. Nuclear physics: lattice vibrations and thermal properties of solids, superconductivity.

### **Laboratory:(Physics Lab)**

No.	Experiment Name
1	Determination of the wavelength of sodium light.
2	Determination of the characteristics of photo-resistors.
3	Determination of the characteristics of photo-diode.
4	The absorption coefficient of glass.
5	Determination of the wavelength of sodium light using Newton's rings.
6	Verification of fourth power law of radiation.
7	Determination of the plateau curve of G.M.counter.
8	The absorption coefficient of lead to gamma radiation.

## **BAS262 Mechanical Engineering:**

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	1	1	4	15	15	15	30	75

Types of fluid, fluid statics, fluid dynamics, energy equation, pipelines. The ideal gas, the first law of thermodynamics, the second law of thermodynamics, Carnot cycle, thermal cycles. Refrigeration cycle and air-conditioners. Heat transfer by conduction, forced convection, heat transfer by radiation, heat exchangers. Power generation plants. pumps, gas turbines. Internal combustion engines and diesel engine units. Hydraulic cycles.

### **Laboratory:(Hydraulics Lab)**

No.	Experiment Name
1	Flow measurement using venturi meter
2	Flow measurement using orifice meter
3	Flow measurement using nozzle meter
4	Losses in pipes

5	Verification of 1 <sup>st</sup> law of thermodynamics
6	Verification of 2 <sup>nd</sup> law of thermodynamics
7	Measurement of Reynold's number of fluid
8	Pressure measurement and Bourdon gage calibration.

### **HUM011 English Language (1)**

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	-	-	2	15	10	-	25	50

Basic Verbs (to Be /Must/Might/Can/Do/May/Would...etc), basic nouns (Animal/Table/Chair/People.....etc), list of words with arabic translation related to engineering, writing basic sentences, introducing and holding short basic conversations in English, Past simple tense, present simple tense, future simple tense, irregular verbs (Begin/Become/Bring/Buy/Drive ...etc), List of nouns more advanced, list of words with Arabic translation related to Engineering,

Writing a paragraph and short story, past continuous tense, present continuous tense future continuous tense, list of words with arabic translation related to engineering, writing a curriculum vitae and official letters, holding a presentation in english, identifying proper and common nouns, reading a simple english book and writing a book report about it

### **HUM012 English Language (2)**

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	-	-	2	15	10	-	25	50

Identifying Concrete and Abstract Nouns, advanced list of words with arabic translation related to engineering, helping verbs ( primary auxiliaries ) revision of the past continuous tense, revision of the present continuous tense revision of the future continuous tense, presentation in english, reading an intermediate english book and writing a book review, identifying collective, countable and uncountable nouns, helping verbs (modal auxiliaries), finite verb phrases, advanced list of words with arabic translation related to engineering, past perfect tense, present perfect tense, future perfect tense, participles, pronouns, past perfect continuous tense, present perfect continuous tense, future perfect continuous tense, advanced list of words with arabic translation related to engineering, verbals (non finites verbs). Reading an intermediate english book and writing a book report.

### **HUM031 Introduction to Engineering Sciences**

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	-	-	2	15	10	-	25	50

Defining engineering disciplines in the institutes, introduction to engineering terminologies and industry standards and moral laws for engineers, technology transfer process and methods, optimal time and space of elements of the decision making, information revolution in the twenty first century, upgrading the curriculum of engineering sectors .

### **HUM113 Technical English**

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	-	-	2	15	10	-	25	50

Introduction, specialized engineering subjects, contents of technical report. How to write specialized technical report? Analysis of technical and engineering reports.

### **HUM133 Study Skills**

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	-	-	2	15	10	-	25	50

Introduction to learning skills, self-learning, active learning and effective study skills

### **HUM134 Scientific Thinking**

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	-	-	2	15	10	-	25	50

Introduction to Thinking Skills, axial thinking skills, creative thinking and methods of development and critical thinking and strategies.

### **HUM135 Presentation and Communication Skills**

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	-	-	2	15	10	-	25	50

Course aims to providing the student with the latest knowledge about the concepts, characteristics, and types of managerial and interpersonal communications, as well as the concepts and requirement of good listening and presentation and developing the student's abilities and skills of effective communication, and good listening, as well as how to use the interpersonal and managerial communication methods and the presentation techniques in performance and dealing with others inside and outside the organization. Course Contents: Concept and nature of communication - Communication model - Formal and informal communications - Interpersonal and managerial communications - Body language - Written communications (Reports and memos) - Ten Commandments of effective communication - Good listing - Elements of effective presentation model - Preparation of good presentation - Carrying out presentations - Discussion and dealing with objections - Evaluating presentation performance.

### **HUM136 Professional Marketing Skills**

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	-	-	2	15	10	-	25	50

Methods of documentation and presentation of management, technical and engineering data - Careful analysis of the documents, reports and articles ,the best ways to write and display Biography – types of correspondence art ,modern ways to present and discuss information ,information exchange ,management of personal and public interviewing ,management and ethics of professional meetings ,tools and methods of supply and marketing ,measuring return on marketing.

### **HUM211 Feasibility Studies and Operations Research**

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	1	-	3	15	10	-	25	50

#### **Feasibility studies**

Introduction to feasibility studies ,globalization and privatization ,initial feasibility studies ,strategic analysis ,the mechanics of marketing feasibility ,financial and economic feasibility ,generating Projects and Applications.

#### **Operations research**

Identify the problem ,decision analysis ,identifying data and targets ,mathematical simplification - use linear programming to solve the problem and achieve goals.

### **HUM212 Engineering Economics and Projects Management**

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	-	-	2	15	10	-	25	50

Origin of engineering economics, principles of engineering economics, design and manufacturing processes, cost terminologies and cost estimation, accounting, budgeting and balance sheet, profit/loss statement, equivalence, money value of time, applications, simple and compound interest rates, present value, internal rate of return, payback period, evaluation of alternatives for useful life periods, depreciation methods, replacement analysis, determination of the economic life of projects for replacement, engineering economic techniques for evaluating public projects. Project management: Definitions, project life cycle, project stages, relationship among different project parties, execution phase responsibilities, productivity and quality management.

## HUM321 Human Rights

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	-	-	2	15	10	-	25	50

The course aims to make the student recognizes the rights of the law of human nature and sources and explains the nature of the restrictions and differentiates between individual rights and collective rights and shows the rights of the areas of human educational and intellectual world and determine the duties and responsibilities partisan, professional and shows women and children with special needs.

## HUM332 Technical Report Writing

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	-	-	2	15	10	-	25	50

Essential elements of a technical report: Abstract - Summary - Contents - Objectives - Details of the report including figures, images, video ...etc, - Conclusions - Recommendations - References using a standard format and the different electronic sources. Report Classification: Technical (Requirement specification, analysis, design and implementation). Administrative (directed to different operational and management levels). Levels of confidentiality for the different reports. Report Composition: Logical presentation of the report and coordination between its components. Importance of using correct grammar and punctuation. Enhancing communication effectiveness by the use of different media. Report Implementation: Use of the appropriate software packages including any graphics or multimedia packages.

## HUM341 Recent Egypt's History

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	-	-	2	15	10	-	25	50

Egypt under Ottoman rule (1571 - 1798) (conquest - governance and socio-economic conditions) - French invasion of Egypt and its effects (1798-1801) (occupation- governance and control -national resistance - failure of colonial project - Outcomes of occupation) Muhammad Ali's regime (1805-1848 ) (political conflict - the rule of the Muhammad Ali –the modern state - building foreign policy) - national movement - Orabi revolution - (the successors of Muhammad Ali era - Ismael- national movement and the Orabi revolution). Egypt during the british occupation (1882-1914)) occupation policy - emission of the national movement) - Egypt during the reign of the british protectorate and World war I - authorship the delegation group and the revolution of 1919 - 28 Fberaar1922 announcement - Constitution of 1923 - evolving of the national case and the treaty of 1936 - Egypt during World war II). The political and social crises of Egypt and the way to revolution - the July revolution and change the political system - British evacuation 1954 - triple aggression in 1956.



### **HUM 342 Islamic History**

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	-	-	2	15	10	-	25	50

Features of Islamic history since the prophetic mission - Through the era of the Caliphs - Islamic conquest expansions - The Umayyad - Abbasid state and its culture through those times.

### **HUM413 Engineering Legislations**

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	-	-	2	15	10	-	25	50

The rights and liabilities governing work in all engineering specializations according to valid laws and regulations. Reviewing and explaining the engineering legislations. Regulations and laws governing engineering union, different syndicates, contractors and the environmental protection.

### **HUM422 Population, Reproductive Health and Family Planning**

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	-	-	2	15	10	-	25	50

Policy and health services in Egypt - Child and adolescent health - Areas of cooperation with the international organizations in the field of health and population - Family planning and reproductive health - Endemic diseases and how to combat it - Population activities in Egypt - Demographic Indicators.

### **HUM423 Environmental Impact of Projects**

Lec	Tut	Lab	Total Hours	Mid term	Class work	Lab/ Oral	Final exam	Total Grade
2	-	-	2	15	10	-	25	50

The Environment, Human surroundings. Human Influences of projects: Upgrading, development, economic factors, social factors, cultural factors, aesthetic factors, hygienic and psychological factors. Types of projects: Urban projects, infrastructure projects, industrial projects. Environmental impact of projects: Negative impact, positive impact, direct impact, indirect impacts. Assessment of projects: National assessment, international assessment. Approved rates and criteria for the compatibility of projects, environmental topics.

Textbook: John Glasson, Riki Therivel and Andrew Chadwick, Introduction to environmental impact assessment, Routledge, 2005.



## 7.2. Civil Engineering Department Course Description:

### CVE 111 Structural Analysis (1)

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
3	2	-	5	30	30	-	65	125

Types of loads, types of supports, reactions for beams and frames, stability of statically determinate structures (beams, frames and arches). Internal forces in statically determinate structures (beams, frames and arches) and analyses of statically determinate trusses. Influence lines for statically determinate beams, frames, arches and trusses.

### CVE 121 Properties and Testing of Materials (1)

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	1	1	4	20	20	20	65	125

Specifications of engineering materials and products, machines test, equipment for reactions measuring, main properties of engineering materials (physical, chemical, mechanical... etc). Tests for specification different properties. non-metallic building materials, building stones, lime, gypsum, timber, bricks, tiles and isolation materials for moisture, heat and sound. Advanced composite materials, glass, plastics.

Metallic building materials and units: structural and reinforcing steel, welded and welded connections, aluminum (types, uses and tests). Behavior of metals under static loads: tension, compression, flexure and shear. Behavior of metals under dynamic loads (fatigue-creep).

#### Laboratory:

No.	Experiment Name
1	Finesse of cement the sieve no.170
2	Determination of fineness cement using Blaine apparatus
3	Density of cement
4	Initial and final setting times of cement paste using vacates apparatus
5	LE Chatelier expansion of cement
6	Test method for the determination of sieve analysis of aggregates
7	Test method to determine the percentage of absorption for aggregate and percentage of voids for aggregate
8	Apparent and Bulk specific gravity of aggregate
9	Determination of clay and other fine materials in aggregates

### CVE 161 Civil Drawing

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	4	-	6	40	35	-	75	150

Irrigation structures: earth works, retaining walls, bridges, culverts, syphons, regulators, weirs, dams, symmetrical and unsymmetrical locks. Steel constructions: column base, riveted joints, connections between girders and beams, columns and beams. Steel bridges: truss connections, main girders (upper and lower chords, verticals and diagonals), cross girders and stringers. Reinforced concrete constructions: footings, columns, slabs and beams.

### CVE 112 Structural Analysis (2)

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
3	2	-	5	30	30	-	65	125

Properties of sections, normal stresses distribution in homogeneous sections, normal stresses distribution in non-homogeneous sections and composite sections, cores determination for sections, shear stresses in homogeneous sections due to shearing forces, shear stresses due to torsional moments, shear forces in bolts and welds, analytical and graphical determination of combined stresses. Deformations of elastic bodies, evaluation of deflection values: double integration method, conjugate beam method.

### CVE 122 Properties and Testing of Materials (2)

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	1	1	4	20	20	20	65	125

Concrete materials: cement, aggregate, mixing water and admixtures. Concrete manufacturing: storage materials, mixing, transportation, pouring, compacting, curing and construction joints, shrinkage and movement joints, formwork and ready mixed concrete. Properties and tests of fresh concrete: consistency, workability, cohesion, segregation and bleeding. Properties and tests of hardened concrete: compressive strength, tensile strength, shear strength, bond strength, bending strength, volumetric changes of concrete, elasticity and creep, guaranty, insurance and permeability.

### Laboratory:

No.	Experiment Name
1	Compressive strength of cement mortars
2	Test method for determination of coarse aggregate crushing value
3	Water required for cement paste of standard consistency
4	Test method for determination of fresh concrete slump.
5	Test method for determine compacting factor of fresh concrete.
6	Test method for determination air content of fresh concrete by pressure method.
7	Determination of tensile splitting strength of hardened concrete.
8	Determination of flexural strength of hardened concrete.

### CVE 162 Fluid Mechanics

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
3	1	1	5	20	20	20	65	125

Review of fluid properties and hydrostatics, fluid motion: fluid flow, flow lines, continuity equation. flow of incompressible fluid: one-dimensional flow, Euler's equation in three dimensions, Bernoulli's, energy equation, T.E.L and H.E.L, applications of Bernoulli's equation , pipe flow: laminar and turbulent flow, Reynolds number, moody curves , velocity distribution, main losses, secondary losses, single pipe, pipe connections (parallel and series), pipe branching, tank problems. The impulse-momentum equations, applications of pipes elbow and mechanical pushing, introduction for hydraulic machines. Effective forces on hydraulic structures .

#### Laboratory :( Hydraulics Lab)

No.	Experiment Name
1	Flow measurement using venturi meter
2	Flow measurement using orifice meter
3	Flow measurement using nozzle meter
4	Losses in pipes
5	Measurement of Reynold's number of fluid
6	Pressure measurement and Bourdon gage calibration.

### CVE181 Plane Surveying

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	1	2	5	25	25	25	75	150

Introduction of mapping and surveying science: historical background, definitions and branches of surveying science. source and types of errors , scales and measurements units ,graphic scales , types of surveying maps .discovery and manual survey drawing , total stations , distances measurement and their associated errors , types of bearings , methods of observing angles and their associated errors. Traverses and their adjust, area calculation, land division. Introduction to theory of errors in plane surveying. introduction of vertical control , different methods for height difference determination, ordinary levelling, survey level and survey staff, calculation of ordinary levelling, precise level and precise staff, calculations of precise levelling, applications of levelling, longitudinal levelling, cross section levelling and grid levelling.

### Laboratory: (Survey Lab)

No.	Experiment Name
1	Taping: instruments and techniques
2	Leveling: equipment, techniques, field observation and office data processing
3	Theodolite and Horizontal/Vertical angle Observations
4	Total stations and Electronic Tachometry
5	Intersection and Resection.
6	Control Surveys – Traversing Data Processing.

### CVE 213 Structural Analysis (3)

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
3	2	-	5	30	30	-	65	125

Virtual work method, analysis of statically indeterminate structures and calculations of internal forces in elements of structure under different type of loads, temperature change, support settlement, horizontal displacement by: consistent deformations method, virtual work method, three moment equation method, slope deflection method, moment distribution method, envelopes of internal forces. Euler theory for buckling of compressive members.

### CVE223 Properties and Testing of Materials (3)

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	1	1	4	20	20	20	65	125

Concrete mix design: engineered methods and empirical methods. Non-destructive: Schmidt hammer, ultrasonic pulse velocity, core test, steel detection and radiation test statistical quality control: to judge the concrete quality. Special concretes: polymer concrete, light-weight concrete and fiber concrete. Cast concrete at hot atmosphere, definitions hot atmosphere, mix concrete in hot atmosphere problems and precautions. Concrete floors: types of floors, properties of materials and execution methods of joints.

### Laboratory:

No.	Experiment Name
1	Procedure for obtaining and testing drilled cores.
2	Recommendations for surface hardness testing rebound hammer.
3	Preparation of concrete test cubes, cylinders and beams.
4	Determination of compressive strength of concrete test cubes, cylinders and beams.
5	Test of metals under static loads: tension – compression and flexure.
6	Determination of static modulus of elasticity of hardened concrete.

### **CVE231 Design of Reinforced Concrete Structures (1)**

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
3	2	-	5	40	35	-	75	150

Study of physical and mechanical properties of concrete and steel reinforcement, load distribution on different supporting elements. Behavior of reinforced concrete elements under flexure. Design and drawing details of reinforced concrete beams under bending moments, normal and shearing forces using the ultimate limit state design method. study of serviceability (deflection and cracks width), design of structure elements using the working stress design method, study of bond between concrete and steel, the development length of reinforcement.

### **CVE251 Geotechnical Engineering (1)**

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	-	1	3	20	20	20	40	100

Physical properties of soil: definitions, laboratory tests, basic relationships and soil classification. Hydraulic soil properties: soil water, laboratory and field soil permeability. Stress distribution within the soil mass: stresses under point and line loads, stress distribution under distributed load. Compressibility and consolidation: soil compression, estimation of settlement and consolidation theory of consolidation. Shear strength of soil: definitions, mohr's strength theory and types of shear tests. Subsurface exploration and sampling: methods of boring and basic field tests.

#### **Laboratory:**

No.	Experiment Name
1	Sieve analysis
2	Hydrometer
3	Standard proctor test
4	Modified proctor test

### **CVE263 Irrigation and Drainage Engineering**

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	2	-	4	25	25	-	50	100

Introduction for the water resources, irrigation water requirements, irrigation efficiency and calculating periods between irrigations, flow rates computation and irrigation time. Different types of field water, advantages, specifications, and selection of suitability method for common conditions, surface irrigation methods, sprinkler and drip irrigation, subsurface irrigation. Planning, design, management, operation and maintenance for different methods. Canal lining. An overview for the irrigation structures for control and distribution of water on the canals and field levels, crossing works, navigation works and water lifting devices. Introduction of the drainage, types, factors influencing selection and design. Design of open, subsurface and

vertical drains. Artificial works for drainage execution: how can dispose of drainage water. Design irrigation system: main, secondary and farm systems. Planning and design of distribution networks from open channels and pipes, design of lined canals.

### **CVE282 Topographic Surveying**

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	1	1	4	20	20	20	40	100

Create and use topographic maps, errors resulting from spherical earth and refraction of rays in the atmosphere to determine the heights, setting points using integrated meteorological station, the indirect ways to determine elevations, tacheometric, and triangulation leveling. Cartesian coordinates and geodetic coordinates, converting coordinates from one system to another. data projection on reference surfaces: types and methods of projection surfaces and types of reference surfaces. Introduction for monitoring the global satellite system (GPS), the basics of the GPS monitoring and different ways, the ways to calculate the coordinates in the GPS system, the planning of gps operations in civil projects.

### **Laboratory: (Survey Lab)**

No.	Experiment Name
1	Topographic mapping: lab exercise and drawing.
2	Topographic Surveys: field exercise and drawing.
3	Route Surveying: route layout: plan, control surveys and calculation (part 1: Preparation of the road staking-out data).
4	Route Surveying: route layout: plan, control surveys and calculation (part 1 cont'd and part 2: Road staking out in field).
5	Route Surveying: route layout: plan, control surveys and calculation (part 1 cont'd and part 2: Road staking out in field).

### **CVE214 Structural Analysis using Computer**

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
3	2	2	7	30	30	40	100	200

Analysis of plane frames and space trusses using the stiffness method, degrees of freedom and sign convention, element stiffness matrix in element local axes, transformation matrix for forces and displacements in global axes, equilibrium equations in global axes, internal forces in members of the structure, influence of temperature change and settlement of supports, effect of axial force on the stiffness of structures [p-delta effect], stability functions and equations of stability, buckling of trusses and frames, applications, structural dynamics, definitions, classification of structural systems, free vibration of SDOF systems, undamped vibration, damped vibration, forced vibration of SDOF systems, response to constant and harmonic forces, response to general type of forces (using double integration). Study of theoretical models for frames analysis – selection of suitable models to analyze different second-hand

elements (beams and their types – frames and their types – arches and trusses) – developing simple programs using these models. Training on the use of some building analysis programs – applications of different elements analysis.

### **CVE232 Design of Reinforced Concrete Structures (2)**

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
3	2	-	5	40	35	-	75	150

Design and drawing details of rectangular and square solid slabs and cantilever slab under different types of loads, design of one and two way hollow block slabs, design of paneled beams, flat slab: structural analysis, statical system, field usage, different methods, code limitations, analysis of internal stress of flat slab, punching of flat slab and columns with flat slab, openings in slabs, reinforcement details, design of slabs, analysis of concrete slabs by yield line, design of beams under torsional moment and taking into consideration the effect of shear stresses, design of short and long columns under centric and eccentric loads, design of columns under biaxial moments. Design of stairs with different types.

### **CVE252 Geotechnical Engineering (2)**

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	-	1	3	20	20	20	40	100

Soil compaction: relative density, laboratory compaction tests, field compaction, compaction equipment, site control of compaction. Seepage: flow net diagram, uplift pressure, critical hydraulic gradient. Slope stability: infinite slope, finite slope, mass methods, method of slices, design charts. Lateral earth pressure: active and passive earth pressure, water pressure. Gravity retaining structures: acting forces, rotational sliding, block stability, foundation contact stresses. Bearing capacity: shear strength parameters, bearing capacity loads equation, eccentric loads and inclined loads.

#### **Laboratory:**

No.	Experiment Name
1	Sand cone test
2	Atterberg limits test
3	Constant head test
4	Falling head test

### **CVE264 Hydraulics**

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
3	1	1	5	20	20	20	65	125

Pipe networks: analysis, design and optimal design. open channel flow: introduction, types of open channel flow, states of open channel flow, properties of open channels flow, velocity distribution, equations for uniform steady flow, energy equation, gradually varied flow, rapidly



varied flow, roughness coefficient, design of open channels cross sections, applications. Water hammer in pipes: unsteady flow equations, rigid water hammer theory, elastic water hammer theory, wave celerity, water hammer effects and control. Hydraulic machines: introduction, turbines, types of turbines, types of pumps, pump characteristics and performance, operation of pumps, cavitation phenomena..

**Laboratory : ( Hydraulics Lab)**

No.	Experiment Name
1	Open channel flow
2	Flow under sluice gate
3	Hydraulic jump
4	Flow over crested weir
5	Flow over broad crested weir

**CVE291 Field Training (1):**

Lec	Tut	Prac	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
-	-	2	2	-	25	25	-	50

Students should spend 4 weeks in field training, after completing the second level, in any engineering institution or engineering firms. Students should demonstrate the professional and practical skills they acquired during discussion with their assigned tutors.

**CVE333 Design of Reinforced Concrete Structures (3)**

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
3	2	-	5	40	35	-	75	150

Design of simple and continuous beams for large hall , design and drawing details of different concrete frames ( statically determinate and indeterminate structures ) under normal forces , bending , shear and torsion , design of connections for frames and supports with different types , design of radial frames and ring beams , design of trusses, Vierendeel and arches with two types ( slab and beam ) , design of saw tooth slabs with two types ( slab and beam ) . Structural system for resisting wind loads for frames.

**CVE334 Steel Structures Design (1)**

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
3	2	-	5	40	35	-	75	150

Metallurgy of steel, steel fracture, steel grades, fatigue. Design synthesis: structural systems, lateral resistance and bracing systems, codes and specifications. Elements design: structural behavior of members, introduction to design philosophies, local buckling and cross section classification, tension members, compression member, struts and columns, bending of beams, torsion of beams, beam-columns and frame structures, light-gauge steel members. Connection design: bolts: types of bolts. Analysis and design of group welds: types of welds, analysis and



design of welded connections. Composite structures: composite beams and composite columns. Construction: tolerances, fabrication, erection, fire protection and corrosion resistance.

### CVE365 Design of Irrigation Works

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
3	2	-	5	30	30	-	65	125

Irrigation structures: types and their functions, the style of design, the design basics, design steps, field Studies, alternatives, hydraulic design of the irrigation structures entrances and exits, design of roadway – waterway intersections : reinforced concrete bridges, culverts, siphons, locks. structural design of slope pipes and their foundation layers , waterway supplies , control structures : types , design basics , seepage, scour, pools of calm and weirs : types and functions , types of gates , the hydraulic design of gates , structural design of the barrage, operation of barrage and hydraulic control of canals.

### CVE366 Sanitary Engineering

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	2	-	4	30	30	-	65	125

Introduction of water supply works: sources of water, precipitation, ground water, surface water, pollutants, water quality of each source, drinking water standards. Rate of water consumption: required studies to estimate water demands for different water uses. Collection works: types of intake structures, surface water intakes, criteria for intake location, design of intake conduit and low lift pumps. Water purification works: rapid mixing, coagulation, sedimentation, slow and rapid filtration, chlorine disinfection. Storage works: elevated and ground storage. Water distribution works: high lift pumps, design of distribution networks using method of sections.

### CVE371 Transportation Planning and Traffic Engineering

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
3	2	-	5	25	25	-	50	100

Introduction: definition, traffic management, planning and management of traffic, traffic operation factors, one-way streets, coordinated traffic signals, restricting u-turn movements, tidal and reversible flow, monitoring of traffic, metering ramps. Management measures for public transport, pedestrians, and bicycles. Management of heavy goods vehicles and parking control. Traffic volumes: annual average daily traffic, design hourly volume, peak hour factor. level of service of different roads: freeway road, multilane road and two-way two-lane road. transportation planning: economic and social surveys, trip generation, trip distribution, modal-split and traffic assignment.

### **CVE335 Design of Reinforced Concrete Structures (4)**

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
3	2	-	5	40	35	-	75	150

Type of water tanks: (elevated, ground and underground tanks) with different types (shallow and deep), analysis and design of deep beam using different types of analysis and design. Different circular tanks forces affective on tanks, methods of loading, calculation of internal forces, arrangement of steel bars in cross section and horizontal plan.

### **CVE336 Steel Structures Design (2)**

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
3	2	-	5	40	35	-	75	150

Structural system of bridges: types of bridges: structural systems in longitudinal and transverse directions, material of construction, design philosophy. Design loads: road way loading, railway loading, other loads on bridges. Design of floor beams systems: stringer, cross girders, floor connections. Design of plate girder bridges: general design considerations, fatigue considerations, buckling of plates, actual strength of plate girder elements, flange to web weld, stiffeners, splices, curtailment of flange plates, details.

### **CVE372 Highway and Airport Engineering**

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
3	3	-	6	40	35	-	75	150

Classification of roads, planning and route selection. Geometric design criteria: sight distances, horizontal alignment, vertical alignment, cross section elements and planning and design of intersections. Pavement and construction materials: design and characteristics of asphalt mixes, characterization of pavement materials, testing and specifications, stresses in flexible and rigid pavements, load and truck considerations and pavement design (flexible and rigid). Planning and geometric design of airports: wind rose, selection of runway direction, measurement of standard and actual runway length.

### CVE324 Repair & Strengthening of Structures

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	2	-	4	25	25	-	50	100

Causes of deterioration of concrete structures, evaluation of concrete structures. Repair and strengthening materials (types, selection and handling) and its tests. Bond between repair and strengthening materials and substrate concrete. Different repair and strengthening techniques. Protection and maintenance of concrete structures. Repair and strengthening of some concrete elements (footing, column, beam, slab... etc). Structural analysis of repair and strengthening, design of repair and strengthening, cases studies.

### CVE325 Characteristics of Wastewater & Industrial Wastes

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	2	-	4	25	25	-	50	100

Industrial wastewater characteristics, effects of industrial wastes on streams and municipal wastewater treatment plants, pre-treatment regulations, management strategies for pollution and waste minimization. Pre-treatment technologies: physical pre-treatment, chemical pre-treatment, biological pre-treatment. Major industrial wastes: characteristics and treatment, food processing industries, energy industries (fuel, oil and coal), textile industries, rubber and plastic wastes, pulp and paper mill industries, steel industries, chemical industries, oil and fuel products

### CVE341 Quantities, Specifications and Contracts

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	2	-	4	25	25	-	50	100

Contracts: definitions, tendering and relation between stockholders. calculations of quantities: excavation and filling quantities, calculation of plain and reinforced concrete for foundation, insulation works, reinforced concrete works, masonry works, painting works, plumbing works, carpentry works and ceramic works. Pricing, abstracts preparation, training on different documents during project stages like specifications. Conflicts solution. Steel reinforcement quantities for different structure elements. Calculation of brick walls quantities with different types.

### **CVE372 Highways Construction Technology**

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	2	-	4	25	25	-	50	100

Technology of embankment construction, technology of pavement construction. Lay down of asphalt mixes: compaction of asphalt mixes. operation and supervision of asphalt mixing plants, equipment, inspection, quality control, surface treated pavements and methods of soil stabilization. Rigid pavements: technology of construction, quality control. Construction requirements for modified additives: polymers, sulphur, mineral filler and other additives. use of asphalt in hydraulic structures: paint dams and tanks with asphalt, canal lining, embankment protection and coastal structures.

### **CVE392 Field Training (2):**

Lec	Tut	Prac	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
-	-	2	2	-	25	25	-	50

Students should spend 4 weeks in field training, after completing the third level, in any engineering institution or engineering firms. They should prepare a technical report implying a full description of the processes they joined for training. Students should demonstrate the professional and practical skills they acquired during discussion of report with their assigned tutors.

### **CVE437 Design of Steel Structures (3)**

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
3	2	-	5	40	35	-	75	150

Design of truss bridges: general design considerations, fatigue considerations, buckling of truss members, actual strength of truss members , connections , general details , design details for bridge members : different bracings, bearings, design of railway bridges , topics relevant to bridge design: beam grids, curved and skew bridges, deflection , camber of beams , high heat affection , composite bridge.

### **CVE442 Construction Projects Management**

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	2	-	4	30	30	-	65	125

Definitions used in project management, the project life cycle, project stages, relationships and responsibilities of the different project parties, execution phase responsibilities, productivity, quality management. Development of a project manual detailed and conceptual cost estimating and construction scheduling analysis. Case studies on management of construction projects from implementation to completion (estimates, role of network pre-planning, project monitoring and control) manually and using computer. Projects planning methods: network planning , bar chart ,line of balance method , arrow method .

### **CVE453 Foundation Engineering**

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
3	2	-	5	30	30	-	65	125

Analysis and design of shallow foundations: isolated and combined footings, strip foundation, strap beams, raft foundation. Deep foundations: types, classification of piles, bearing capacity of a single pile, pile groups, settlement of piles, pile load tests, design of pile caps and laterally loaded piles. Supported deep excavation: types of in-situ walls, analysis and design of in-situ walls, struts and tiebacks, waling beams and braced supported excavation. Interaction of shallow foundations with elastic soil: subgrade reaction model, half-space model, contact pressure distribution, settlement. Soft ground tunneling: construction of tunnels, analysis of lining, calculation of settlement. earth dams and earth embankments: classification, empirical dimensioning, analysis and design

### **CVE474 Railways Engineering**

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	2	-	4	30	30	-	65	125

Railway dynamics: tractive effort and resistance, acceleration and braking, line capacity. Railway alignment: longitudinal and cross sections, railway path, vertical and horizontal curve design, cumulative curve. Structural design of track: wheel - rail interaction, forces acting on the rail, joined and welded rail design, sleeper and ballast design, unballasted track technology, turnouts, stations and signals, renewal and maintenance. Horizontal curve design: superelevation, transition length and superelevation attainment.

### **CVE415 Earthquake Engineering**

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	2	-	4	25	25	-	50	100

Introduction, reasons of earthquakes occurrence and influence of earthquakes, affective factors on behavior of structures subjected to earthquakes , structural analysis and design of concrete structures subjected to earthquakes and classification of seismic zones in egypt ,seismological background ,different methods of analysis structures under influence of earthquakes ,calculate and distribution of horizontal forces at different levels and different design methods for earthquakes resistance : multi degree of freedom system– response spectrum analysis – applications.

### CVE454 Design of Special Structures and Prestressed Concrete

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	2	-	4	25	25	-	50	100

Surfaces of revolution (SOR): different types of sor (domes, cones) , introduction to analysis surfaces of revolution structure theory and internal stresses under different loads , prestressed concrete: introduction, types of prestressing steel, material properties, analysis of statically determinate prestressed beams, calculation of prestressing forces, eccentricity of cables, calculation of losses design of end block and final stresses in different works stages without cracks .

### CVE416 Finite Elements Method

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	2	-	4	25	25	-	50	100

Assemblage of discrete elements, elastic continua, triangular elements for plane stress, rectangular elements for plane stress, transformation matrix, assembling the structure stiffness matrix, rectangular elements in bending, various elements for two- and three-dimensional analyses.

### CVE417 The Concept of using Models in Structural Analysis

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	2	-	4	25	25	-	50	100

Direct and indirect aspects, indirect models (displacement models) influence line diagrams for deflection, influence line diagrams for stress resultant, scale factors, practical applications of the indirect method, experimental procedure in the indirect method, direct method of model analysis, applications, influence surfaces for deformations and internal forces.

### CVE443 Construction Techniques for Concrete Structures

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	2	-	4	25	25	-	50	100

The course includes the presentation of the different construction methods used in construction of concrete structures. Different shuttering system are introduced, e.g. wooden shuttering, metallic shuttering, (scaffolding system) tunnel forms, climbing forms and slipforms for construction of concrete structures, e.g. buildings and bridges. Practical examples for these construction, specification and design of amount of wooden shuttering



### CVE455 Masonry Structures

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	2	-	4	25	25	-	50	100

Introduction: history of masonry, masonry elements, types of masonry construction, analysis and design methods. Masonry materials: masonry units, mortar, grout, reinforcement. masonry assemblages: compression, flexural, shear in plane tensile strength. Reinforced beams and lintels: flexural behaviour and design, shear behaviour and design, load distribution on lintel beams. Flexural walls: load resisting mechanisms, flexural behaviour, analysis and design of reinforced flexural walls. Load bearing walls under axial load and out of plane bending overview, effects of bending on the capacity of walls, effect of wall height, interaction between axial load and bending, linear elastic analysis of unreinforced and reinforced sections, effects of slenderness, moment magnification, special provisions for slender reinforced walls.

### CVE456 Soil and Rocks in Dry Places

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	2	-	4	25	25	-	50	100

Expansive soils: origin and position, mineralogy, identification and classification, laboratory testing, swelling pressure, swelling potential, foundations ways on swelling soils. Collapsible soils: origin and position, soil structure, classification and identification, laboratory testing, collapsibility potential, foundations on collapsible soils. Rock mechanics: classification of rocks, hard rock, geological structures, rock mass, laboratory testing, engineering classification of rocks, engineering applications on rock mechanics.

### CVE457 Geotechnical Analysis using Computer

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	2	-	4	25	25	-	50	100

Selection of geotechnical parameters for computer analysis. Software applications: slope stability, seepage analysis, settlement of shallow foundations, beams on elastic foundations, piles under lateral loads. Geotechnical applications using excel program: bearing capacity of shallow foundations, capacity of axially loaded piles.

### CVE458 Advanced Analysis of Reinforced Concrete Bridges

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	2	-	4	25	25	-	50	100

The course includes the conceptual design of concrete bridges and hybrid material bridges, for which various concrete sections are adopted. Different structural systems will be introduced, e.g. girder type bridges, box girder bridges, arch bridges. Analysis and design of different structural elements, decks, bearings, piers and footing are involved. The influence of the construction techniques and construction details on the design are included in design.

### CVE467 Advanced Sanitary Engineering

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	2	-	4	25	25	-	50	100

Modern systems for water purification: accelerator, pulsator, pressure and rapid sand filters, direct filtration. Design of under drainage system of filters: systems of back wash, measuring and control equipment, arrangement of filter building. methods of water disinfection: chlorine, breakpoint chlorination, getting rid of excessive chlorine, chloramines, ozone, ultra-violet rays. Design of water distribution system using method of circle. Design of wastewater pump stations: h-q curve, efficiency curve, system curve, types of pumps and motors, flow measuring and control equipment. Design of biological treatment works using activated sludge system: aerobic and anaerobic stabilization processes, types and growth kinetics of micro-organisms, fundamentals of microbiology, design criteria, determination of aeration volume and air flow, control methods, process technologies of activated sludge.

### CVE468 Environmental Engineering

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	2	-	4	25	25	-	50	100

Water pollution: introduction to water resources and its types, common impurities in water, water born diseases , sources of water pollution , water pollution categories , effect of oxygen demanding wastes on rivers , self-purification. Air pollution: definition, sources and effects of air pollution, classification and control of air pollution. Solid waste: sources, characteristics, management, methods of collection and transportation of the collected refuse, disposal of solid waste by sanitary land filling method.

### CVE475 Highways and Airport Maintenance

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	2	-	4	25	25	-	50	100

Assessment of pavement distresses: assessment of flexible pavement distresses and assessment of rigid pavement distresses, tests of pavement evaluation, methods of pavement evaluation, road maintenance, maintenance of flexible pavement. Maintenance of rigid pavement, maintenance of pedestrian crossing routes, road curbs and pitching, maintenance of unpaved roads, maintenance of drainage system, maintenance of opened and covered ditches, maintenance of surface water drainage system, recycling of road pavement materials, reconstruction works, pavement management systems.



### **CVE476 Advanced Railway Engineering**

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	2	-	4	25	25	-	50	100

Turnouts and switches: switch, diamond crossing, crossover, scissor crossover, slip, double junction. stations and yards: passenger and freight stations, locomotive and stabling yards, sorting and marshalling yard. Railway cost: price and subsidy. Signals: classification and types, mechanical devices of interlocking, train traffic control, automatic block system (ABS), centralized traffic control system (C.T.C), automatic train control (ATC) system

### **CVE477 Airport Engineering**

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	2	-	4	25	25	-	50	100

Airport planning: wind rose, elements of airport, runway orientation and defining landing and take-off positions. Aircraft characteristics, aircraft apron layout. design of runway length based on height , temperature and pavement slope. Selection of airport site. Geometric design of airports components: dimensions of runway , main taxiway dimensions, exit taxiway design and aprons dimensions . Structural design of pavement (flexible and rigid) . Signs and pavement marking. Airport operational capacity. Definition of runway number, imaginary surfaces.

### **CVE483 Geographic Information Systems and Remote Sensing**

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	2	-	4	25	25	-	50	100

Introduction to geographic information system (GIS), types of used data, transforming the analogue drawings to digital maps and study of the errors resulting from the process of transforming and merging, building database and linking it with the graphic data. methods of data input, storage and output. introduction to remote sensing basics and principals. Elements of imaging process. Introduction to aerial photos and satellite images interpretations. Thermal and spectral scanning. Remote sensing by microwave and radar. Introduction to satellites: ocean monitoring, metrological monitoring, terrestrial monitoring. digital image processing. Application of remote sensing. Land- use, mapping, wet land, geological maps, soil maps and environmental assessment.

### **CVE484 Geodetic and Photogrammetric Survey**

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	2	-	4	25	25	-	50	100

Introduction to geometric geodesy, introduction to map projection, introduction to grid coordinates and their transformation. astronomic coordinates and their relation to geographic coordinates, astronomic latitude and azimuth determination from astronomic triangle, least squares principles and its applications, different reference ellipsoids and geodetic datum. Introduction to different kinds of photos: terrestrial, aerial, and satellite. coordinates computations in photogrammetry, flight mission. the instruments used in processing, photos characteristics. Analytical photogrammetry: theories and applications. Digital photogrammetry: theories, applications. Method of digital aerial photos and satellite images processing: radio-metrical, geometrical. Methods of processing ortho-photos. Production of digital mapping and digital terrain models..

### **CVE493 Project**

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
4	4	-	8	-	125	125	-	250

The Student uses the fundamentals, principles and skills he gained during his study to analyze and design an engineering system to perform a specified task either individually or through a group work depending on the supervisor task. The detailed analysis and design must be included in the student report. The student deals with the analysis and design of a complete engineering project using the fundamentals principles and skills he gained during his study .The project report presented by the student should include the details of the analysis and design satisfying the concerned codes requirements ,the computer applications as well as the experimental work when necessary, in addition to the technical engineering drawing of his design. The student should prove his complete understanding of the elements of the project and his capability to apply them in his future engineering.

### **ARC139 Building Construction:**

Lec	Tut	Prac	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	3	-	5	40	50	-	60	150

Methods of building construction brick and stonework (bearing walls, skeleton buildings) and the study of types of foundations, buffer layers, floors, stairs, and to study how to implement the stages of construction theory and site practice (Practical research work, to emphasize the architectural and construction material symbols).

### **CEE181 Electrical Engineering**

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	1	1	4	15	15	15	30	75

Dc circuits, Kirchoff's Laws, magnetic circuits, operation theory and construction of DC machines, operation theory of Dc generators and Dc motors, single phase circuits, 3-phase balanced circuits, cables selection for different loads, operation theory of transformers, operation theory of Ac motors.

### **Laboratory: (Machine Lab)**

No.	Experiment Name
1	Current and Voltage Measurement in Series and Parallel Resistors
2	Current and Voltage Measurement in loop (KVL)
3	Electric Power Measurement
4	EMF Generation in Separately Excited DC generator
5	Operation of Shunt and Series DC Motor
6	Check up of RMS Values of Current and Voltage using Oscilloscope
7	No load Test and Short Circuit Test of Transformer

## 8. Program Admission Requirements:

Students are admitted to the programme specializations according to the internal regulations stating the minimum total marks for each programme. This minimum number is controlled only by the demand of students to join the various disciplines while maintaining approximate equal student number in each programme.

## 9. Student Evaluation:

The student's work is assessed on an ongoing basis during the semester in addition to the midterm and last semester exams in all theoretical, applied and practical courses, and the student is considered to have failed the course if he obtained less than 50% of the final exam score of the course or 40% of the final exam score for the course, regardless of the total score of the student in the course.

Students have to complete all courses in each programme year successfully in order to progress for the subsequent year. A student might fail in not more than two courses and still progresses to the subsequent year. However, in such a case, his/her total marks and grade is not calculated until the failed courses are cleared successfully.

The student gets a pass grade when he passes the examination successfully. In case the student has acceptable excuse for absence in a course, he gets the actual grade. The grades of the successful student in a course and in the general grade are evaluated as follows:

Excellent	from	85%	to less than	100%
Very Good	from	75%	to less than	85%
Good	from	65%	to less than	75%
Pass	from	50%	to less than	65%
<b>The course in which the student fails its examination is evaluated by one of the following grades:</b>				
Poor	from	30%	to less than	50%
Very poor			to less than	30%

Evaluation of programme intended learning outcomes:

Evaluators	Tools	Examples
Students of all levels	Questionnaire	استبيانات الطلاب للمقرر الدراسي ( للمحاضر و الهيئة المعاونة)
Final year students	Questionnaire	عينة من طلاب المستوى الرابع
Graduates	Questionnaire	الخريجين في جهات التوظيف المختلفة
Stakeholders	Questionnaire	جهات التوظيف
External Evaluators	Evaluation reports	المراجعة الخارجية و الممتحن الخارجي

- ❖ The general grade of graduation for students at the bachelor's level is calculated on the basis of the total number of degrees obtained in all years of study (cumulative total). Students are ranked based on this total, and the student is granted the general grade for graduation according to the above-mentioned ratios.
- ❖ The student is granted an honors degree if his final grade is excellent or very good, provided that his general grade in any of the study groups except for the preparatory division is not less than very good. In order for the student to obtain an honors degree, he must not have failed any of the exams he is given in Any band except for the junior band.

### **10. Field Training:**

- The student performs the first and second field training during the summer holidays after the second semester exam for the second and third division, respectively, for a period of 6 weeks for each of the two training at a rate of 6 hours per day, provided that the training takes place in factories and engineering companies that fit the general specialization of the student, and the training aims at linking what the student studied at the institute with practical applications, as well as to acquiring some skills in the field of specialization, and the student submits an accredited certificate to the institute for successfully completing the training and a report on what he has done, and the distribution of the training degree is as follows: 25% of the bone end to attend training and 25% On the report submitted by the student, 50% of the student's discussion of the report submitted by him.
- A faculty member and one of his assistants oversee the training and assist in organizing administrative training from the institute for every 20 students, in addition to an engineer from the factory, and the student pays the training fees decided by the institute's board of directors.

### **11. Graduation Project:**

The students of the fourth year prepare the bachelor's project, the department boards determine its topics and the students are allocated to the projects by the heads of the departments, and the preparation of the project extends four weeks after the written examination for the second semester and at the end of this period a report of the project is submitted, and they are discussed through a committee formed by a decision From the dean of the institute and is selected from the faculty members of the institute, universities, educational and research institutions, businessmen and industry.

Program Coordinator: **Dr. Yousra M. Hamdy**

Signature:

**COURSE MAPPING (NARS 2018) Civil Engineering ( Construction and Public Works) - LEVEL A & B Competencies**

Course Code	Course Title	A- Level Engineering Competencies										B- Level Civil Engineering Competencies			
		A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	B1	B2	B3	B4
BAS011	(1) Mathematics	x		x											
BAS021	(1) Physics	x	x			x				x	x				
BAS031	(1) Mechanics	x	x			x				x					
BAS051	(1) Engineering Drawing and Projection	x							x						
BAS061	Production Technology						x	x							
HUM031	Introduction to Engineering Sciences							x			x				
HUM011	(1) English Language							x	x						
BAS012	(2) Mathematics	x	x	x											
BAS022	(2) Physics	x	x			x				x	x				
BAS032	(2) Mechanics	x	x			x				x					
BAS052	(2) Engineering Drawing and Projection	x							x						
BAS041	Engineering Chemistry		x		x	x						x			
CEE041	Introduction to Computer and Programming	x				x						x			
HUM012	(2) English Language							x	x						
CVE111	Structural Analysis (1)	x	x		x								x		
CVE121	Properties and Testing of Materials (1)	x	x		x								x		
CVE161	Civil Drawing								x						
HUM113	Technical English							x	x	x	x				
HUM 13X	Elective														
BAS113	Mathematics (3)	x		x											
ARC139	Building Construction			x									x		
CVE112	Structural Analysis (2)	x	x		x								x		
CVE122	Properties and Testing of Materials (2)	x	x		x								x		
CVE162	Fluid Mechanics	x	x		x								x		
CVE181	Plane Surveying	x	x		x								x		
HUM 13X	Elective														
BAS116	Probability and Statistics	x	x			x									
CEE181	Electrical Engineering								x						
CVE213	Structural Analysis (3)	x	x		x								x		x
CVE223	Properties and Testing of Materials (3)	x	x	x	x					x	x		x		x
CVE231	Design of Reinforced Concrete Structures (1)	x	x	x	x								x		
CVE251	Geotechnical Engineering (1)		x		x								x		
CVE263	Irrigation and Drainage Engineering		x	x		x	x	x						x	
CVE282	Topographical Surveying		x	x	x								x		
HUM211	Feasibility Studies and Operations Research			x			x								x
CVE214	Structural Analysis using Computer	x	x		x			x					x		
CVE232	Design of Reinforced Concrete Structures (2)	x	x	x	x								x		
CVE252	Geotechnical Engineering (2)		x		x					x			x		
CVE264	Hydraulics	x	x	x	x								x		
CVE291	Field Training (1)						x						x	x	x
HUM212	Engineering Economics and Project Management			x			x		x						x
BAS262	Mechanical Engineering					x									
CVE333	Design of Reinforced Concrete Structures (3)	x	x	x	x								x		
CVE334	Steel Structures Design (1)	x	x	x	x				x				x		
CVE365	Design of Irrigation Works	x	x	x	x								x		
CVE366	Sanitary Engineering	x	x	x	x					x			x		
CVE371	Transportation Planning and Traffic Engineering							x					x		x
HUM332	Technical Report Writing					x									x
HUM34X	Elective														x
CVE335	Design of Reinforced Concrete Structures (4)	x	x	x	x								x		
CVE336	Steel Structures Design (2)	x	x	x	x					x			x		
CVE372	Highway and Airport Engineering	x	x	x	x								x		
CVE392	Field Training (2)						x	x					x		x
HUM321	Human Rights				x									x	
CVE 3XX	Elective (1)					x		x						x	
CVE 3XX	Elective (1)					x									x
CVE437	Steel Structures Design (3)	x	x	x	x				x				x		
CVE442	Construction Projects Management			x				x							x





