

Program Specification

Program Title: Architectural Engineering program

Faculty(s)/Institution: **Thebes Higher Institute of Engineering.**

Department: **Architectural Engineering.**

2020/2021

Program Title: Architecture

A- Basic Information

1.1- Program type: Single Double Multiple

1.2- Department (or Departments): Architecture

1.3- Coordinator: Assoc. Prof. Dr. Ahmed ElMenshawy

1.4- External evaluator(s):N.A.

1.5- Last date of program specifications approval: January 2021

B- Professional Information

1- Vision:

Vision The vision of the Architectural Engineering program is looking forward to reach the highest levels of efficiency and quality in preparing such specialized architectural cadres to meet the requirements of the local and regional labor market in the fields of architectural creativity and urban development.

2- Mission:-

The Department of Architecture aims to prepare an innovative graduate who keeps pace with the contemporary trend, who is able to use his modern technological tools and is able to compete locally and regionally through an advanced scientific, cultural and social climate.

3- Program Objectives and Specifications of Graduate:

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 it can accommodate the specialized courses and improves their analytical expertise to solve the problems it faces.**
- 2) **The ability to artistic perfection.**
- 3) **The skill of research and analysis, and the ability of imagination, creation and innovation in design with respect of local and world architectural trends.**
- 4) **A distinct personality interacting with the community character and identity and cultural characteristics.**
- 5) **The ability to deal with structural problems, and the realization of construction techniques in the framework of a comprehensive understanding of construction methods related to architecture.**
- 6) **Characterized by analytical mind to understand the correlation between the buildings and the community and the surrounding environment, preserving the environment, and the ability to work within team work.**
- 7) **Skills of correlation between the architectural building masses and external and internal spaces.**
- 8) **The ability to achieve sustainable designs preserves the environment and works to achieve comfort to users.**
- 9) **The ability to use developed technology and software in the field of architecture.**
- 10) **The ability to design buildings by construction, environmental and legislative problems.**
- 11) **The ability to take advantage of all knowledge collected by the various scientific aspects in order to keep up with scientific and technological progress and computer programs that help creation and innovation in design.**
- 12) **The ability to communicate with others effectively and writing technical reports.**
- 13) **The ability to manage architecture projects.**

4- Academic standards

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

The National Academic Reference Standards (NARS 2018) for engineering has been adapted as an external reference for the programme. The benchmarks of the reference are as follows:

A. COMETENCIES 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- ARCHITECTURAL ENGINEERING COMPETENCIES:

In addition to the Competencies for All Engineering Programs the BASIC ARCHITECTURAL Engineering graduate and similar programs must be able to:

1. Create architectural, urban and planning designs that satisfy both aesthetic and technical requirements, using adequate knowledge of: history and theory, related fine arts, local culture and heritage, technologies and human sciences.
2. Produce designs that meet building users' requirements through understanding the relationship between people and buildings, and between buildings and their environment; and the need to relate buildings and the spaces between them to human needs and scale.
3. Generate ecologically responsible, environmental conservation and rehabilitation designs; through understanding of: structural design, construction, technology, and engineering problems associated with building designs.
4. Transform design concepts into buildings and integrate plans into overall planning within the constraints of: project financing, project management, cost control and methods of project delivery; while having adequate knowledge of industries, organizations, regulations and procedures involved.
5. Prepare design project briefs and documents and understand the context of the architect in the construction industry, including the architect's role in the processes of bidding, procurement of architectural services and building production.

C. Competencies for Architectural Engineering Graduates:

In addition to the above Competencies for All BASIC ARCHITECTURE Engineering Programs Thebes Academy Architectural program graduates must be able to:

- C1. Address urban issues, and human aspects into design projects, taking into consideration cultural diversity, social differences and the impact of a built form on people's daily life and community identity.
- C2. Demonstrate knowledge and understanding of public spaces; their dynamics, significance, and multi-dimensional impact drawing upon understanding the interaction between people and their built and natural environment.
- C3. Achieve desirable experience of place through integrating different scales of intervention (architecture, urban design, landscape, city planning, regional planning), and understanding the complexity of cities.
- C4. Assimilate different forms of knowledge from other disciplines into the knowledge base of architecture and urban design formulating them into integrative design criteria to inform and evaluate design solutions.
- C5. Conduct and utilize scientific research, apply explanatory and normative theory, in a highly conscious and deliberate design process of architecture and urban design.
- C6. Reflect and discern lessons learnt from practical experience in real professional environments; through internships, knowledge exchange workshops, and project based, blended learning pedagogies.
- C7. Demonstrate knowledge and understanding of a range of ICT-based and digital design tools to enhance the documentation, analysis, production and presentation of architectural and urban design projects.

5- Curriculum Structure and Contents

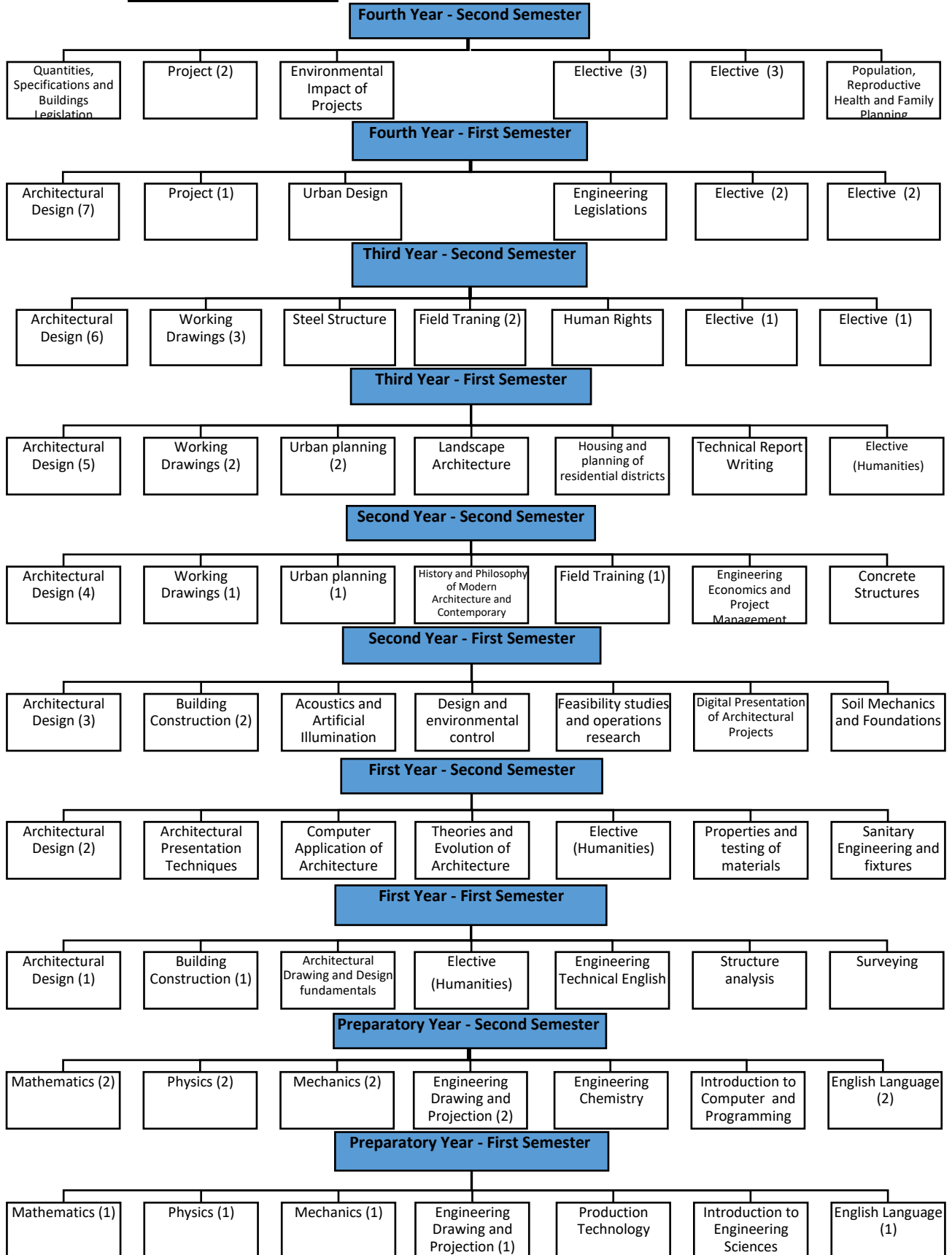
4.A- Programme duration5Years.....

4-b- Programme structure and 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	46	--	46	16.4%	18%-22%
Engineering culture	13	--	13	4.64%	4%-6%
Basic engineering sciences	56	28	84	30%	25%- 30%
Applied engineering and design	91	--	91	32.5%	25%-30%
Project and field training	17	--	17	6%	4%-6%
Total	<u>250</u>	<u>30</u>	<u>280</u>		

Group	Percentage
Public culture Requirements	<u>10.4%</u>
Engineering Institute Requirement	<u>26.4%</u>
General specification requirement	<u>30.7%</u>
Major specification requirement	<u>32.5%</u>

6- Courses Tree



7- Study Plan:

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
Total						28						750

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
Total						28						750

Table (2)
First Year

Architecture Engineering Department

First semester

NO	Course Code	Course Title	Hours				Exam time (Hr)	Examination marks				
			Lec	Tut	Prac	Total		Mid term	Class work	Prac/Oral	Final exam	Total
1	ARC112	Architectural Drawing and Design fundamentals	2	3	-	5	4	25	50	-	50	125
2	ARC131	Building Construction (1)	2	3	-	5	4	25	50	-	50	125
3	ARC151	Architectural Design (1)	2	3	-	5	6	40	80	-	80	200
4	CVE118	Structure analysis	2	3	-	5	3	25	25	-	50	100
5	CVE185	Survey	2	1	1	4	3	20	20	20	40	100
6	HUM113	Technical English	2	-	-	2	2	15	10	-	25	50
7	HUM13X	Elective	2	-	-	2	2	15	10	-	25	50
Total						28						750

Second semester

NO.	Course Code	Course Title	Hours				Exam time (Hr)	Examination marks				
			Lec	Tut	Prac	Total		Mid term	Class work	Prac/Oral	Final exam	Total
1	ARC111	Architectural Presentation Techniques	2	3	-	5	2	20	40	-	40	100
2	ARC113	Computer Applications of Architecture	1	-	3	4	2	20	20	20	40	100
3	ARC121	Theories and Evolution of Architecture	3	-	-	3	3	25	25	-	50	100
4	ARC152	Architectural Design (2)	2	3	-	5	6	40	80	-	80	200
5	CVE126	Properties and testing of materials	2	1	2	5	3	20	20	20	40	100
6	CVE169	Sanitary Engineering and fixtures	2	2	-	4	3	25	25	-	50	100
7	HUM13X	Elective	2	-	-	2	2	15	10	-	25	50
Total						28						750

**Table (3)
Second Year**

Architecture Engineering Department

First semester

NO.	Course Code	Course Title	Hours				Exam time (Hr)	Examination marks				
			Lec	Tut	Prac	Total		Mid term	Class work	Prac/Oral	Final exam	Total
1	ARC232	Building Construction (2)	2	3	-	5	4	25	50	-	50	125
2	ARC241	Acoustics and Artificial Illumination	2	2	-	4	2	25	25	-	50	100
3	ARC242	Design and Environmental Control	2	2	-	4	2	20	40	-	40	100
4	ARC253	Architectural Design(3)	2	3	-	5	6	40	80	-	80	200
5	ARC214	Digital Presentation of Architectural Projects	1	-	2	3	3	15	30	-	30	75
6	CVE259	Soil Mechanics and Foundations	2	2	-	4	3	20	20	20	40	100
7	HUM211	Feasibility Studies and Operations Research	2	-	1	3	2	15	10	-	25	50
Total						28						750

Second semester

NO.	Course Code	Course Title	Hours				Exam time (Hr)	Examination marks				
			Lec	Tut	Prac	Total		Mid term	Class work	Prac/Oral	Final exam	Total
1	ARC222	History and Philosophy of Modern Architecture and Contemporary	3	-	-	3	3	25	25	-	50	100
2	ARC233	Working Drawings (1)	2	4	-	6	4	25	50	-	50	125
3	ARC254	Architectural Design (4)	2	4	-	6	6	40	80	-	80	200
4	ARC261	Urban planning (1)	2	3	-	5	4	25	50	-	50	125
5	CVE238	Concrete Structures	2	2	-	4	3	25	25	-	50	100
6	HUM 212	Engineering Economics and Project Management	2	-	-	2	2	15	10	-	25	50
7	ARC291	Field Training (1)	-	-	2	2	-	-	25	25	-	50
Total						28						750

**Table (4)
Third Year**

Architecture Engineering Department

First semester

NO.	Course Code	Course Title	Hours				Exam time (Hr)	Examination marks				
			Lec	Tut	Prac	Total		Mid term	Class work	Prac/Oral	Final exam	Total
1	ARC355	Architectural Design (5)	2	4	-	6	6	40	80	-	80	200
2	ARC334	Working Drawings (2)	2	3	-	5	4	25	50	-	50	125
3	ARC362	Urban Planning (2)	2	3	-	5	4	25	50	-	50	125
4	ARC363	Landscape Architecture	2	2	-	4	4	20	40	-	40	100
5	ARC364	Housing and Planning of Residential Districts	2	2	-	4	4	20	40	-	40	100
6	HUM 332	Technical Report Writing	2	-	-	2	2	15	10	-	25	50
7	HUM34x	Elective	2	-	-	2	2	15	10	-	25	50
Total						28						750

Second semester

NO.	Course Code	Course Title	Hours				Exam time (Hr)	Examination marks				
			Lec	Tut	Prac	Total		Mid term	Class work	Prac/Oral	Final exam	Total
1	ARC335	Working Designs (3)	2	4	-	6	4	30	60	-	60	150
2	ARC356	Architectural Design (6)	2	4	-	6	6	40	80	-	80	200
3	ARC3XX	Elective (1)	2	2	-	4	3	25	25	-	50	100
4	ARC3XX	Elective (1)	2	2	-	4	3	25	25	-	50	100
5	CVE339	Steel Structure	2	2	-	4	3	25	25	-	50	100
6	HUM 321	Human Rights	2	-	-	2	2	15	10	-	25	50
7	ARC392	Field Training (2)	-	-	2	2	-	-	25	25	-	50
Total						28						750

Table (5)
Fourth Year

Architecture Engineering Department

First semester

NO.	Course Code	Course Title	Hours				Exam time (Hr)	Examination marks				
			Lec	Tut	Prac	Total		Mid term	Class work	Prac/Oral	Final exam	Total
1	ARC457	Architectural Design (7)	3	5	-	8	8	50	100	-	100	250
2	ARC465	Urban Design	2	3	-	5	4	30	60	-	60	150
3	ARC493	Project (1)	3	-	-	3	-	-	50	-	-	50
4	ARC4XX	Elective (2)	3	2	-	5	3	30	30	-	65	125
5	ARC4XX	Elective (2)	3	2	-	5	3	30	30	-	65	125
6	HUM 413	Engineering Legislations	2	-	-	2	2	15	10	-	25	50
Total						28						750

Second semester

NO.	Course Code	Course Title	Hours				Exam time (Hr)	Examination marks				
			Lec	Tut	Prac	Total		Mid term	Class work	Prac/Oral	Final exam	Total
1	ARC494	Project (2)	3	7	-	10	-	-	150	150	-	300
2	ARC471	Quantities, Specifications and Buildings Legislation	2	2	-	4	3	25	25	-	50	100
3	ARC4XX	Elective (3)	2	3	-	5	3	30	30	-	65	125
4	ARC4XX	Elective (3)	2	3	-	5	3	30	30	-	65	125
5	HUM422	Population, Reproductive Health and Family Planning	2	-	-	2	2	15	10	-	25	50
6	HUM 423	Environmental Impact of Projects	2	-	-	2	2	15	10	-	25	50
Total						28						750

Elective

Elective (1): student selects 2 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
Total			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
Total			4			4

Elective: Student selects 2 courses from each elective group (28 contact Hours)

Elective(1)

No.	Course Code	Course Title	Hours			
			Lec	Tut	Prac	Total
1	ARC343	Environmental Studies	2	2	-	4
2	ARC358	Green Architecture	2	2	-	4
3	ARC337	Building and Construction Economics	2	2	-	4
4	ARC344	Energy Management and Sustainable Development	2	2	-	4

Elective (2)

No.	Course Code	Course Title	Hours			
			Lec	Tut	Prac	Total
1	ARC459	Studies of Modern and Contemporary Architecture	3	2	-	5
2	ARC469	Visual Studies of City	3	2	-	5
3	ARC421	Study of Islamic Architecture	3	2	-	5
4	ARC466	Sustainable Urban Development	3	2	-	5

Elective (3)

No.	Course Code	Course Title	Hours			
			Lec	Tut	Prac	Total
1	ARC467	GIS (Urban Planning)	2	3	-	5
2	ARC455	Theories of Architectural Form	2	3	-	5
3	ARC436	Advanced Technology and Buildings with Large Span	2	3	-	5
4	ARC438	Maintenance and Restoration of Buildings	2	3	-	5

8- Course Description:

8.1. 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 law 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 thermos-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 dying 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, pivodts 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^{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 ventury meter
2	Flow measurement using orifice meter
3	Flow measurement using nozzle meter
4	Losses in pipes

5	Verification of 1 st law of thermodynamics
6	Verification of 2 nd 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.

8.2. Architecture Engineering Department:

ARC111 Architectural Presentation Techniques

Lec	Tut	Prac	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	3	-	5	20	40	-	40	100

The Course aims to identify principles of basics of drawing and architectural expressions. It develops imagination and the use of presentation techniques. It improves capabilities of using drawing tools and student's freehand drawing. The course emphasizes on the importance of light and shadow in the architectural expression - ratios and different relations of the surfaces and masses – as well as the study of the shadows on the facades of buildings and how shadow appear in the various protrusions and folds. It contains the principles of perspective – perspective types - shadows in perspective. Applications on different levels and forms with the application of shadows in perspective.

ARC112 Architectural Drawing and Design Fundamentals

Lec	Tut	Prac	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	3	-	5	25	50	-	50	125

The course is an introduction to study the basics of form, mass and space. The course includes study of different design elements: (point, line direction, size, texture, and color) - principles of architectural composition: (the central unit, control, balance, symmetry, harmony, rhythm and repetition, the gradient, diversity within unity) - the study of ratios: (the golden ratio and Modular). The study emphasis on the principles of design process: (a preliminary simple project focuses on design process and presentation).

ARC113 Computer Applications of Architecture:

Lec	Tut	Prac	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
1	-	3	4	20	20	20	40	100

The use of computers in the field of architecture, the study of architectural two-dimensional drawing programs "CAD", and get to know the basic tools that helps in preparing the architectural working drawings - preparation of architectural design projects using computer aided programs – Training on the above elements.

ARC214 Digital Presentation of Architectural Projects

Lec	Tut	Prac	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
1	-	2	3	15	30	-	30	75

Introduction to three-dimensional programs through two Themes: Identify the most important programs which gives aid to the work of the three-dimensional architectural models and presentation, focusing on the study of one of those programs to deal with the software needed for the work of virtual models graphics of three-dimensions with finishes materials, lighting, shadows and animation realistically

ARC121 Theories and Evolution of Architecture

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

The course contains analytical study of ancient civilizations and the most important aesthetic values that characterized the architecture in every culture, and the structural systems in: the prehistoric architecture, the ancient Egyptian civilization, the West Asiatic architecture. It studies classical ages: Greek civilization, Romania, the early Christianity, and Byzantine architecture

The course also illustrates the elements of architecture, the governing rules which relates the different elements of architecture, the visual and functional aspects of the different building types, also deals with the study of philosophy of global architecture in the early twentieth century and focuses on modern architecture.

ARC222 History and Philosophy of Modern and Contemporary Architecture

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

The course includes the study of introduction to the emergence of Islamic Architecture and the arts and it's development during different eras, also deals with

the study of Western Christian architecture across different ages: Romanesque architecture - Gothic architecture, Renaissance architecture, in terms of features and study the structural evolution of architectural elements that characterized each period . The course also aims to increase student's ability to analyze the different schools of architecture, recognize the characteristics of the different architectural schools, realize the interaction between scientific and technological evolutions and the architectural schools in (modern, postmodern.....till contemporary architecture).

ARC131 Building Construction (1)

Lec	Tut	Prac	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	3	-	5	25	50	-	50	125

Identify building constructions systems (wall bearing, skeleton building systems, and building methods by using bricks and stones).The study of insulating materials, floors, stairs. The study of the different layers of building materials. Study implementation various phases of the establishment theoretically and practically (practical research, emphasis on the symbols of architectural building and construction materials).

ARC232 Building Construction (2)

Lec	Tut	Prac	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	3	-	5	25	50	-	50	125

The course aims to develop detailed drawing skills, the study of different types of foundations and various methods of roofing systems, and its details. Architectural study of displacement and expansion joints - the study of the timber: the carpentry of wood and its details - the study of metal acts - decoration works of: (finishing, plastering, and paints) and the study of the glass works (security details).

(The course emphasizes on practical field advantages and disadvantages of the previous topics throughout studies of theoretical researches and in the practical field).

ARC233 Working Drawings (1)

Lec	Tut	Prac	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	4	-	6	25	50	-	50	125

The course aims to study the project general framework and linking working drawings for a project already designed by sequence of the executive drawings sheets with symbols and executive terminology of the project as a whole. Preparing an architectural working drawing for a medium-sized skeleton structural building (for ground and first floor: Residential Villa, or A small medical health unit.....etc.). Thus, with the study of the Executive elementary documents for the (Drawings

of habitual architectural executive drawings for: Plans, Sections, Elevations and Layout, The basic architectural details, Model types of doors, windows and finishing tables). Also studying in a research work the various finishing types.

ARC334 Working Drawings (2)

Lec	Tut	Prac	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	3	-	5	25	50	-	50	125

Student learn how to Prepare an executive working drawings for skeleton structural building more than the median size (Multi-story: ground floor/ multiple floors). The study of how to set up the Executive elementary documents from the habitual architectural drawings (such as: Plans, Sections, Elevations, Layout, dimensions and levels). Studying the structural system and the construction working drawings for the project, sanitary, electrical circuits and wiring working drawings, finishing materials, the basic architectural details, model types of doors and windows with sophisticated systems and its details. Architectural detailing:(Stairs, flowerboxes, fixing marble and cladding.....etc).

ARC335 Working Designs (3):

Lec	Tut	Prac	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	4	-	6	30	60	-	60	150

The course studies constructions using modern technology methods of wide spanning, prefabricated elements and curtain walls. The student assigns numbers of architectural and constructional working drawings sheets for a multi-storey building, he prepares details and technical drawings for the same building, in addition to the sanitary and electrical working drawings.

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).

ARC241 Acoustics and Artificial Illumination

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

Definitions and determinants, audio units, the behavior of sound waves in enclosed spaces, sound absorption, reflection of sound, sound insulation, acoustic defects, the foundations of noise control and achieve considerations and objectives of the successful audio design and successful criteria on planning levels. Light of units, industrial lighting and electrical wiring calculations, measurement of light intensity, light sources, design standards for the quality and quantity of lighting, integration with natural lighting.

ARC242 Design and Environmental Control

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

The course Includes the studies of recognition surrounding environment with its aspects and the interactions between the parts of this system, this is through the thermal environmental studies: elements and factors that affecting the climate in the site - climate data presented in thermal comfort map - solar radiation - the study of the sun path - designing means of shading - the heat exchange between inside the building and the surroundings outside it- ventilation and air movement around the building and inside it - orientation – opening slots. A study of design goals aims to control the thermal environment, architectural treatments used to gain thermal comfort.

ARC151 Architectural Design (1)

Lec	Tut	Prac	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	3	-	5	40	80	-	80	200

The course aims to raise design student efficiency through knowledge of methods of functional designs for simple buildings. This will be achieved through designing simple architectural projects, "relatively" small, which consists of one building. The course focuses on achieving optimal functional relationships between the constituent elements of the project, best orientation of project's elements and the study of the suitable design of forms and facades of these buildings. Project examples: (a separate dwelling, a small rest house, small restaurant, public cafeteria ... etc.).

ARC152 Architectural Design (2)

Lec	Tut	Prac	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	3	-	5	40	80	-	80	200

In the design studio a great care to be given to develop student's capabilities in the architectural design process. Dealing with small types of projects that contain many elements or prototype designs. The student studies the functional relationships between the project elements in respect with the site and surrounded environment. Projects examples: (nursery, Primary School, small shopping center, a small touristic village..... etc.).

ARC253 Architectural Design (3)

Lec	Tut	Prac	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	3	-	5	40	80	-	80	200

The study of architectural medium-sized and large-sized projects consists of one building that has many elements and various spaces, taking into account developing the virtual capabilities of student to create architectural forms coping with different architectural trends. The course focuses on solving circulation problems inside the building, methods of appropriate constructional systems and how to adapt them. Examples of projects such as: (children primary and nursery schools, gallery, social house club, children's library, a small health center, a small apartment building etc.).

ARC254 Architectural Design (4)

Lec	Tut	Prac	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	4	-	6	40	80	-	80	200

The course is concerned with developing skills of solving composite problems including different functions, circulation system and construction system. Studying of architectural projects relatively big in size, with medium heights, and with a variety of attached or separated buildings with a focus on the building form of these projects -how to solve the spatial relationship between buildings - the relationship between the internal and external spaces. Types of the projects such as:.....(Primary and preparatory school, An integrated rest house on the highway , A branch of the bank building , public library , A small museum , Cultural Palace – Commercial Mall.....etc.).

ARC355 Architectural Design (5)

Lec	Tut	Prac	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	4	-	6	40	80	-	80	200

The study of architectural projects of multiple elements and roles, consisting of a single building or group of buildings, with a focus on finding alternatives and the method of logical thinking in solving various movement paths – spatial relationships between buildings - the relationship between the

components of the project in a public site and respect of the site environmental framework. Types of the projects, such as: (a Cultural Center, Administrative Center, a Shopping mall, Union Building, Cinemas Complex, a general or specialized Secondary School..... etc).

ARC356 Architectural Design (6)

Lec	Tut	Prac	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	4	-	6	40	80	-	80	200

Rapporteur directs students to adopted a trend from different architectural schools of design: "technological architecture - environmental - green - digital – smart and vernacular architecture." This is applied to design complex buildings. Environmental concerns in design within site limitations. Types of the projects such as: Office Buildings, Commercial, Hotel, Residential .. etc.).

ARC457 Architectural Design (7)

Lec	Tut	Prac	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
3	5	-	8	50	100	-	100	250

The study of architectural complex projects with multiple functions and complex circulation systems, with a focus on the development of a design idea for the project which reflects in turn on the existence of a clear architectural design trend in terms of form and function and respect of natural environmental factors. Take advantage of the capabilities of the student on the use of electronic multi-media, and using them to present the project and it's idea. The types of the projects, such as: (a Public or a Specialized Large Hospital, Airport, Hotel or Tourist Resort 4/5 star hotel, a Museum of Civilization, the Exhibition land area, Conference Center, the center of Scientific or Environmental studies etc ...)

ARC261 Urban planning (1)

Lec	Tut	Prac	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	3	-	5	25	50	-	50	125

History of Town Planning before and after the Industrial Revolution – Objectives and Principles of Town Planning - objectives – Planning levels– Trends – Theories - Models of city - city components - planning criteria and standards. A field study for one of the cities to introduce and clarify the city components and structure through the site data survey and analysis - explore solutions for the upgrading of urban area.

ARC362 Urban planning (2)

Lec	Tut	Prac	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	3	-	5	25	50	-	50	125

City structure - elements and characteristics – basic standards criteria affects city - Identify the existing and new cities - introduction of urban and sustainable planning – impact of several factors (environment, economics and social) – Planning methodology (comprehensive pl. and strategic) – Planning steps and its implementation on existing and new cities – City types and classifications – local and international experience. New city Project - with research for one new city in Egypt.

ARC363 Landscape Architecture

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

Definition of Landscape and its importance - design approaches from classic to design with the nature – stages of Landscape design process - elements - the principle of design - hardscape elements and softscape elements – landform –plantation – water – pavement - site construction. Case study application deals with from site analysis, ideas and alternatives, proposal design, design and working drawing.

ARC364 Housing and planning of residential districts:

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

Housing definitions - housing principals and components - types and levels – factors affecting housing – problems and constrains - methods of identifying the needs of the target population of residential units - development and implementation phases of residential communities. Research or project to apply the design considerations and the determinants of assembly residential groups in the district or in the neighborhood.

ARC465 Urban Design

Lec	Tut	Prac	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	3	-	5	30	60	-	60	150

Definitions and concepts of urban design – character, type and urban identity - elements of urban design (buildings, spaces, the streets, transportation, landscape) - masses - open spaces and activities - elements of visual form and how to draw a visual map - urban spaces identification - typologies and open spaces principle design – policies and strategies for the urban areas development physically and visually. Case study application on an area to apply visual and urban development

policies.

ARC471 Quantities, Specifications and Building Legislation:

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

Study the general terms and conditions for tendering, lay the tender, contracting, extracts, calculating the quantities of different items from the nature, a study of technical specifications for the implementation of projects, quality control of different building materials, costing the building materials and employment. Case studies. discussing the building codes and its implementing regulations and applied examples.

ARC491 Filed 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 6 weeks in field training, after completing the second year, in any engineering institution or engineering firms. Students should demonstrate the professional and practical skills they acquired during discussion with their assigned tutors.

ARC492 Filed 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 6 weeks in field training, after completing the third year, 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.

ARC493 Project (1)

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

The course includes data collection about the site and the project elements which will be designed. Comparative study about Similar projects: projects design concept - elements -circulation studies - functional studies and architectural character...etc. At the end of the course the student presents a technical report deals with: study and analysis of the chosen location for the project, identify the environmental, climatic determinants, and functional aspects. The search concludes to a final architectural program for the project, and determinations of functional relationships between project

elements in order to use it in the graduation project.

ARC494 Project (2)

Lec	Tut	Prac	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
3	7	-	10	-	150	150	-	300

A technical report is prepared by the student for the graduation project. Student is supposed to benefits of engineering skills which he gained during the different years of his study. Graduation project submitted by the student includes of analysis and design steps and details which he relied on, the project also includes illustration of design idea. The student must demonstrate full understanding to the project board when discussing the principles, fundamentals and elements based on his project and proves his ability to apply it in his future career work.

ARC343 Environmental Studies

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

The course identifies problems facing the environment, it's different causes, as well as means of monitoring and analysis of these problems, the recent trends which aims to find solutions. Also includes the study of the environmental pollution problems, whether inside or outside the buildings, different damages from it, and the role of architect to solve these problems. It deals with the study of sustainable development, and the role of the social system in solving the problems they are facing. An application for these studies to be applied on a case study building or an existing area to prepare a comprehensive study about it and find a solution to the local environmental problems which face them.

ARC337 Construction Economics

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

The Course aims to study the economic aspects of the buildings and awareness of the elements and features of the cost during the design, implementation, operation, demolition, provide skills and techniques to control the cost of construction in addition to the definition of a feasibility study for the project and its components.

ARC358 Green Architecture

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

The course sets the foundations and principles of green architecture; in order to gain deep understanding of the systems and the basic concepts and ideas for green architecture appropriate and compatible with various design problems. This happens through the study of selected global, regional and local architectural projects in general and in developing countries in particular. This study discusses global trends and attempts towards green architecture.

ARC344 Energy Management and Sustainable Development

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

The course discusses concepts of building management systems and energy management systems at different levels. It analyzes the key objectives of development and its various aspects and methods to control energy consumption, procedures for assessing and evaluating energy systems in buildings. It discusses the relationship of energy management systems with building management systems and their applications in buildings.

ARC459 Studies of Modern and Contemporary Architecture

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

The course discusses the architectural design processes that affect the formulation of design goals and criteria for evaluating projects. The course demonstrates models of cultural, social, political and economical problems. In addition, it discusses the Problems of the environment and urbanization, resources. It includes the analysis and evaluation of projects contemporary design.

ARC461 Visual Studies of City

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

The course Includes image of the city and the mental map of the city through the identification visual form elements (landmark, nodes, identity and character of distracts, edges, gates) and identification of factors and characterize the elements of the visual image (differentiation, exposure, structure, meaning).

ARC421 Islamic Architecture Studies

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

The course is concerned with the study of Islamic architecture in the early ages of Islam. It demonstrates the elements and characteristics distinguishes it. By studying examples of various kinds of religious and civil buildings. It studies the architectural patterns and development of mosques - the first Islamic city planning –urban tissue in Islamic city. With a focus on Egypt in each of the ages: Tulunid - Fatimid - Ayyoubid - Mamluk and Ottoman.

ARC466 Sustainable Urban Development

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

The course Includes the concepts and the main approaches to basics and principals of sustainable urban development related to environment and its importance – Problems - issues and solutions - Impact of the urban development process and the environment -systems and tools (upgrading, development, urban revival, renewal, urban control, conservation, re-use, restoration) with some local and international examples to clarify the most important projects in this field. Practical study to apply one or more these methods to develop an informal urban area.

ARC467 GIS Urban Planning

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

Basics, definition, theories and applications of GIS in urban planning - Analysis and evaluation – national and international co-ordinates - system components and operations - The importance and usage of GIS to support the planning process - basic functions and basic concepts of data and information manipulating - types and stages of dealing with information of input and output operations (Data in and out, presentation) - Hardware and software components.

ARC455 Theories of Architectural Form

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

The course studies concepts and generation of architectural form, the effect of functional, structural, aesthetic and cultural aspects. Also deals with the relationship between principles of form, aesthetics of architecture and urbanism, and spaces. It

studies historical approaches of forming architecture. Using these grounds as a backdrop for studies in the student's assignments and field work.

ARC436 Advanced Technology and Wide Span Buildings

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

The course scheduled to study modern building materials, and their use in accordance with the local environmental conditions, as well as studying the modern systems of construction, manufacturing building systems which need special requirements. The course also aims to train the student to prepare working drawings for internal and external details of wide span buildings (roof construction systems) as: shell structures – folded roofs – suspended and tent roofs - by using methods and new techniques of construction. Also preparation of working drawings and sanitary, electrical connections and air conditioning works, the usual basic details for the project, and the openings types of advanced systems.

ARC438 Maintenance and Restoration of Buildings

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

To study the impacts of environmental, chemical, and biological factors such as heat, humidity, pollution and fungi on buildings. It identifies the principles of maintenance - maintaining methods - the rehabilitation of buildings and facilities and construction materials.

CVE118 Structural Analysis

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

Plane statics theory , loads and reactions , normal forces , shear forces , bending moment , statically determinate frames , properties of plane surfaces , introduction to normal stresses , stresses due to shear forces and torsion , statically and main stresses , deflection of beams , continuous beams , live loads on beams , introduction to instability , buckling .

CVE126 Properties and Testing of Materials

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	1	2	5	20	20	20	40	100

Standard specifications of engineering materials and products , Test machines and their calibration and dial gauges , main properties of engineering materials (physical, chemical, mechanical,.. Etc). Tests for getting different properties. Behavior of different materials under effect of statical tension test, properties of concrete materials , cement properties and standard tests , aggregates properties and standard tests , sieve analysis ,concrete industry .Properties and tests of fresh concrete: consistency, workability, cohesion, segregation, bleeding. Properties and tests of hardened concrete: compressive strength, tensile Strength ,shear strength , bond strength , bending strength ,volumetric changes of concrete , elasticity and creep, durability and permeability.

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	Water required for cement paste of standard consistency
5	Initial and setting times of cement paste using vacates apparatus
6	LE Chatelier expansion of cement
7	Compressive strength of cement mortars
8	Test method for the determination of sieve analysis of aggregates
9	Test method to determine the percentage of absorption for aggregate
10	Apparent specific gravity of aggregate

CVE185 Survey

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

Study the types of maps - Scales – Survey with chain - Longitudinal measurements and their corrections - Verniers– Area calculation and dividing –The planimeter - Compass - Polygons - Levelling - Sections - Contour lines – Cut and fill Quantities - Plane surveying- Theodolites–Tachymetry principles.

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

CVE169 Sanitary Engineering and Fixtures

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

Introduction - The fields of sanitary engineering and environment - Cities water supply - Liquid waste disposal- Buildings water supply - Planning of sanitation facilities for buildings- Sanitary installations for buildings- Liquid waste disposal in isolated regions.

CVE238 Reinforced Concrete Structures

Lec	Tut	Lab	Total Hrs	Mid term	Class work	Lab/ Oral	Final exam	Total degrees
2	2	-	4	25	25	-	50	100

A history of concrete and its uses 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. 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 , design of short columns, concrete structures and formations suitable for architectural structures.

CVE339 Steel Structures

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

Steel structures industry technology: Steel grades, Structural behavior and models of steel elements failure, fatigue. Design synthesis: Structural systems, Lateral resistance and bracing systems, codes and specifications. Elements design: Structural behaviour of members, Introduction to design philosophies, Local buckling and cross section classification, tension members, struts and columns, Bending of beams, Torsion of beams, Beam-columns and frame structures. Connection design: bolts (types of bolts, analysis and design) welds: types of welds, analysis and design of welded connections.

CVE259 Soil Mechanics and Foundations

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

Classified properties of the soil - Soil classification - Sandy soil -Transmission of stresses through the soil - Soil consolidation - The theory of consolidation - Lateral earth pressure - Shallow foundation design - Piles foundations - Retaining walls - Soil field researches – Foundation type selection.

Laboratory :

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

CVE286 Civil Engineering

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	-	1	3	15	15	15	30	75

Distance measurements using tape and electronic devices – Scale and maps numbering - Leveling- Measuring angles using theodolites – Area calculation – Levels calculation – Longitudinal and cross sections – Traverse analyzing and controlling – Setting out – Verticality of structures – Determinate structures analysis: loads and reactions – Axial forces – Shear and bending forces - Determinate frames – Foundations – Impact loads.

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

9. 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.

10. 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%
The course in which the student fails its examination is evaluated by one of the following grades:				
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.

11.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.

12.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: **Assoc. Prof. Dr. Ahmed ElMenshawy**

COURSE MAPPING (NARS 2018) Architectural Engineering

Course Code	Course Title	A- Level Engineering Competencies										B- Level Architectural Engineering Competencies					C- Level Competencies						
		A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	B1	B2	B3	B4	B5	C1	C2	C3	C4	C5	C6	C7
BAS011	Mathematics (1)	x		x																			
BAS021	Physics (1)	x	x			x					x	x											
BAS031	Mechanics (1)	x	x			x					x												
BAS051	Engineering Drawing and Projection (1)	x								x													
BAS061	Production Technology							x	x														
HUM031	Introduction to Engineering Sciences								x				x										
HUM011	English Language (1)								x	x													
BAS012	Mathematics (2)	x	x	x																			
BAS022	Physics (2)	x	x			x					x	x											
BAS032	Mechanics (2)	x	x			x					x												
BAS052	Engineering Drawing and Projection (2)	x								x													
BAS041	Engineering Chemistry		x		x	x																	
CEE041	Introduction to Computer and Programming	x				x																	
HUM012	English Language (2)									x	x												
ARC112	Architectural Drawing and Design fundamentals	x		x	x	x			x		x	x				x	x			x		x	x
ARC131	Building Construction (1)	x			x	x	x	x	x	x	x	x									x	x	
ARC151	Architectural Design (1)	x	x	x	x	x			x	x	x	x				x					x	x	
CVE118	Structure analysis	x	x			x			x														
CVE185	Survey	x	x			x			x														
HUM113	Technical English					x			x	x	x	x											
HUM13x	Elective																						
ARC111	Architectural Presentation Techniques		x		x	x			x	x	x	x				x	x			x	x	x	x
ARC113	Computer Applications of Architecture		x		x	x			x	x	x	x				x	x			x	x	x	x
ARC121	Theories and Evolution of Architecture				x	x			x	x	x	x								x	x		x
ARC152	Architectural Design (2)	x	x	x	x	x			x		x	x				x					x	x	
CVE126	Properties and testing of materials	x	x			x			x														
CVE169	Sanitary Engineering and fixtures	x	x			x			x														
HUM13x	Elective																						
ARC232	Building Construction (2)	x			x	x	x	x	x	x	x	x									x	x	
ARC241	Acoustics and Artificial Illumination	x	x	x	x	x			x							x	x				x	x	
ARC242	Design and Environmental Control	x	x	x	x	x	x	x	x	x	x					x	x				x		x
ARC253	Architectural Design(3)	x	x	x	x	x			x		x	x				x	x				x	x	
ARC214	Digital Presentation of Architectural Projects		x		x	x			x	x	x	x				x	x				x	x	x
CVE259	Soil Mechanics and Foundations	x	x			x			x														
HUM211	Feasibility Studies and Operations Research	x	x	x		x	x	x	x		x					x	x				x	x	
ARC222	History and Philosophy of Modern Architecture and Contemporary				x	x			x	x	x	x									x	x	
ARC233	Working Drawings (1)	x			x	x			x	x	x	x									x	x	
ARC254	Architectural Design (4)	x	x	x	x	x			x		x	x				x					x	x	
ARC261	Urban planning (1)			x		x	x	x	x	x	x	x				x	x	x			x		x
CVE238	Concrete Structures	x	x			x			x														
HUM212	Engineering Economics and Project Management	x	x	x		x	x	x	x		x					x	x						
ARC291	Field Training (1)																						
ARC355	Architectural Design (5)	x	x	x	x	x			x		x	x									x	x	
ARC334	Working Drawings (2)	x			x	x			x	x	x	x										x	x
ARC362	Urban Planning (2)			x		x	x	x	x	x	x	x				x	x				x		x

