ARE 222: Steel Constructions, 2 (1, 2, -)

Properties of steel, specifications, loads, allowable stresses, members subject to centric and eccentric tension or compression, roof trusses, riveted connections, bracing, columns and their bases, beams, frames consisting of co1umns and trusses, frames extending over several halls, brackets, cranes, joints and connections.

PREREQUISITE: ARE 202

ARE 223: Passive Heating & Cooling, 2 (1, -, 3)

Characteristics of solar radiation, transparent surfaces and glasses, characteristics of building materials, effect of wind directions, passive designs, thermal storage walls, thermal storage roofs, direct gain and passive architectural design.

ARE 224: Applications of Computers in Architecture (B), 2 (1, -, 3)

Main thrust is enhancement of human / machine communication at computer graphics interface. Formulation of individual projects using 3-D and modeling software.

PREREQUISITE: ARE 124

ARE 225: Computer Aided Design, 2 (1, -, 3)

Overview of the techniques of computer image synthesis, including both the hardware & software, color raster graphics, homogeneous coordinates, hidden surfaces & smooth shading algorithms.

PREREQUISITE: ARE 224

ARE 226: Modern Technology & Desert Architecture, 2 (1, -, 3)

This Course is designed to give the students the properties & characteristics of new building materials suitable for desert architecture. It also gives the students the applications of new technology in desert architecture such as solar, ventilation, lighting .. etc.

ARE 230: Special Topics, 2 (1, -, 3)

To be designed according to requirements.

DDP 100: Desert Environment, 3 (2, 2, -)

To equip the student with an understanding of the basic characteristics of the desert environment. Theories of desert formation. Desert climate & meteorology, geological & hydra-geological resources of the desert. Bedouins & desert environment, ecology, Eco-system, & socio-cultural factors affecting design in desert regions.

PREREQUISITE: ARE 112

DDP 110: Solar Energy Utilization, 2 (1, -, 3)

Solar Energy Conversion Technology: Storage systems, collection of solar energy, solar cooling, solar space heating, and solar water heaters. Economic analysis and applications.

FTR 101: Field Training (1), 5 (-, -, 30)

Training on Excavation & Foundation works, Concrete mix (material proportion & properties) water proofing for foundation & retaining walls.

PREREQUISITE: ITR 001

FTR 102: Field Training (2), 5 (-, -, 30)

Training on Wood and metal scaffolding methods of construction of concrete skeleton (columns, beams) different structural systems for slabs, and brick work for walls.

PREREQUISITE: FTR 101

FTR 201: Field Training (3), 5 (-, -, 30)

Training on different methods of finishing (floors, walls, ceilings) sanitary & electrical works, heat & sound insulation, damp proofing courses, metal & wood works for windows & doors.

PREREQUISITE: FTR 102

FTR 202: Field Training (4), 5 (-, -, 30)

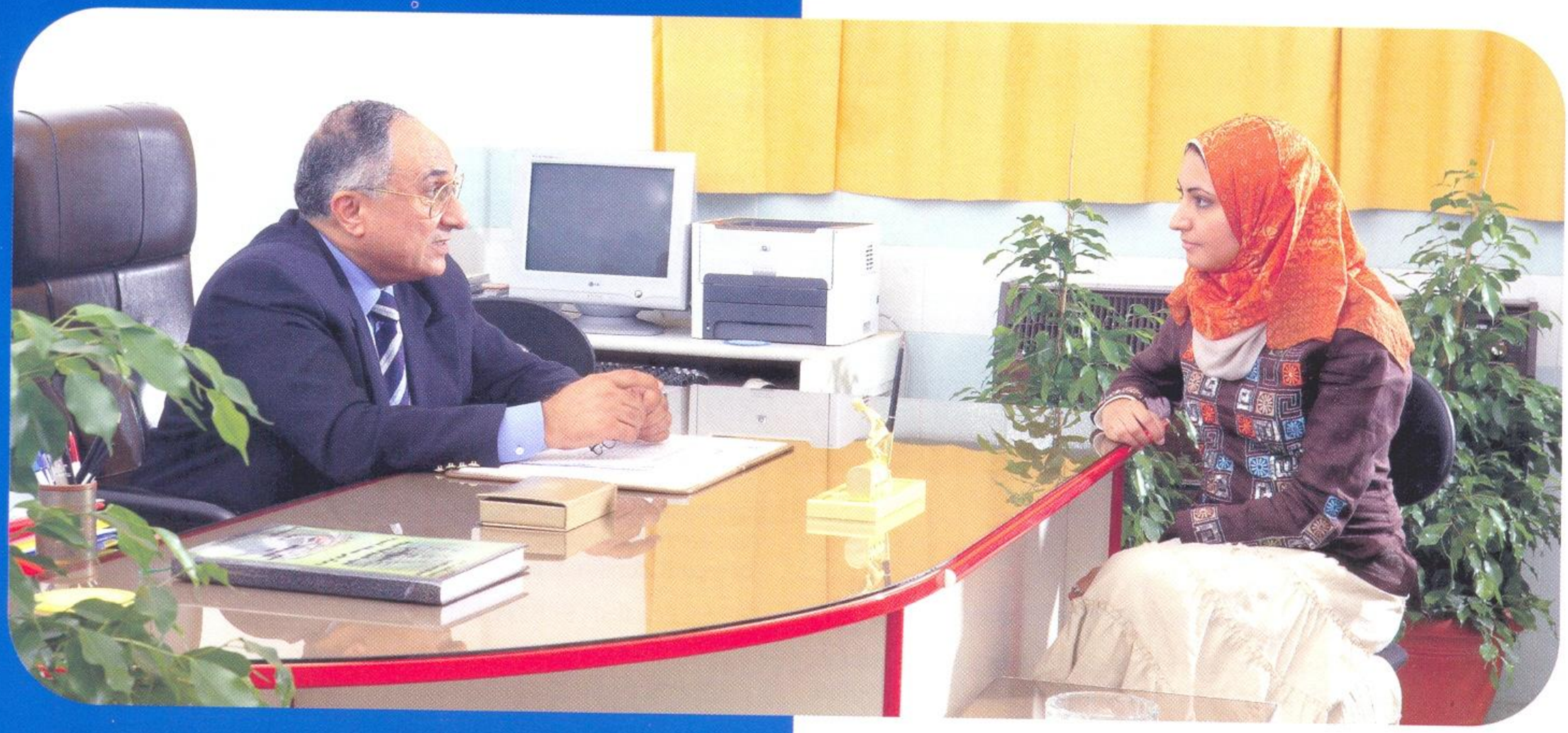
Training in an architectural office where students will be familiar with clients requirements, building regulations, project budgets, design process & execution design.

PREREQUISITE: FTR 201

DEPARTMENT OF ARCHITECTURE ENGINEERING

Chairman : **Medhat Mahfouz Hassan**

Staff Members : **Hanaa Shokry, Hebat Allah Tarek, Nafissa El-Nacharty**



The aim of this department is to provide the students with the basic academic knowledge and adequate training to enable them to qualify as architects.

The program is organized around courses in architecture and urban design, architectural history and theory, and architectural science and technology.

The program also offers elective courses in the environmental and solar architecture, & other related fields. Courses in design involve the student in a series of design case studies, from actual situations of the surrounding environment. Science, technology & design courses utilize field trips, hands on experience and lectures.

The department is fully equipped with design studios, computer lab, and architectural library.

Graduation Requirements

Engineering students need to complete 44 credits in the preparatory year consisting mainly of basic sciences, languages and introductory technical courses of general nature. The Architectural Engineering student is required to complete an additional 81.5 credit units to obtain a diploma, or 165 credit units to earn a Bachelor Degree in Architectural Engineering.

ARCHITECTURE ENGINEERING DEPARTMENT PROGRAM

DIPLOMA STAGE (81.5 UNITS)

I) Compulsory Courses (75.5 Units)

1) Basic Courses: (3 Units)

Code	Course Title	Pre. Req.	Units	Lec.	Ex.	Lab.
MTH 101	Mathematics (C)	MTH 002	3	2	2	-

2) Engineering Courses: (38 Units)

Code	Course Title	Pre. Req.	Units	Lec.	Ex.	Lab.
ARE 100	Fundamentals of Architectural Design		4	2	-	6
ARE 101	Theories of Design		2	1	-	3
ARE 102	Theory of Structures (A)		3	2	2	-
ARE 103	History of Architecture		2	2	-	-
ARE 104	History & Theories of Urban Planning	ARE 103	3	2	2	-
ARE 105	Theories of Architecture (1)		3	3	-	-
ARE 106	Architectural Design of Simple Units	ARE 101 & ARE 110 & ARE 129	4	2	-	6
ARE 107	Architectural Design of Complex Units	ARE 106	4	2	-	6
ARE 110	Elements of Architectural Design	ARE 100	4	2	-	6
ARE 112	Climate & Desert Architecture		2	1	-	3
ARE 114	Urban Design in New Towns	ARE 112	3	2	-	3
ARE 116	Materials & its Properties		2	1	2	-
ARE 118	Surveying		2	1	-	3

3) Technological Courses: (20 Units)

Code	Course Title	Pre. Req.	Units	Lec.	Ex.	Lab.
ARE 121	Environmental Control	ARE 112	2	2	-	-
ARE 122	Building Construction		2	1	2	-
ARE 117	Perspective & Sciagraphy		2	1	-	3
ARE 119	Visual Training (A)		1	-	-	3
ARE 124	App. of Computers in Architecture (A)	CS 002	3	1	-	6

ARE 126	Building Construction & Materials	ARE116 & ARE 122	4	2	4	-
ARE 128	Technical Installation for Buildings (A)		2	1	-	3
ARE 129	Visual Training (B)	ARE 119	1	-	-	3
ARE 111	Diploma Project	ARE 106 & ARE 126	3	1	-	6

4) Humanity & Language Courses: (4.5 Units)

Code	Course Title	Pre. Req.	Units	Lec.	Ex.	Lab.
LNG 101	English Language (C)	LNG 002	1	-	-	3
ENG 151	Engineering Economics (A)		1	2	-	-
MNG 101	Principles of Management		1	-	2	-
PHE 101	Physical Education & Activities (C)	PHE 002	0.5	-	-	3
PHE 102	Physical Education & Activities (D)	PHE 101	0.5	-	-	3
PHE 103	Physical Education & Activities (E)	PHE 102	0.5	-	-	3

5) Industrial Training: (10 Units)

Code	Course Title	Pre. Req.	Units	Lec.	Ex.	Lab.
FTR 101	Field Training (1)	ITR 001	5	-	-	30
FTR 102	Field Training (2)	FTR 101	5	-	-	30

II) Elective Courses (6 Units)

1) Basic Courses: (4 Units Required)

Code	Course Title	Pre. Req.	Units	Lec.	Ex.	Lab.
MTH 102	Mathematics (D)	MTH 101	3	2	2	-
MTH 103	Numerical Methods	MTH 101	3	2	2	-
MTH 104	Mathematical Analysis	MTH 002	3	2	2	-
ENG 122	Applied Mechanics	ENG 022	2	1	2	-

2) Humanity and Language Courses: (2 Units Required)

Code	Course Title	Pre. Req.	Units	Lec.	Ex.	Lab.
HUM 102	Modern Egyptian History		1	2	-	-
HUM 103	Islamic Civilization (I)		1	2	-	-
HUM 104	Arabic Literature		1	2	-	-
LNG 103	German Language (A)		1	-	-	3
LNG 104	French Language (A)		1	-	-	3

BACHELOR STAGE (83.5 Units)

I) Compulsory Courses (73.5 Units)

1) Basic Courses: (4 Units)

Code	Course Title	Pre. Req.	Units	Lec.	Ex.	Lab.
MTH 105	Statistical Methods	MTH 101	2	2	2	0
ME 142	Principles of Operation Research		2	2	-	-

2) Engineering Courses: (40 Units)

Code	Course Title	Pre. Req.	Units	Lec.	Ex.	Lab.
DDP 100	Desert Environment	ARE 112	3	2	2	-
ARE 203	Architectural Design (A)	ARE 107	4	2	-	6
ARE 206	Architectural Design (B)	ARE 203	4	2	-	6
ARE 207	Architectural Design of Complex Buildings	ARE 206	4	2	-	6
ARE 202	Theory of Structures (B)	ARE 102	3	2	2	-
ARE 222	Steel Constructions	ARE 202	2	1	2	-
ARE 204	Town Planning (A)	ARE 104	3	2	-	3
ARE 214	Town Planning (B)	ARE 204	4	2	6	-
ARE 208	Soil Mechanics & Foundations	ARE 212	3	3	-	-
ARE 205	Theories of Architecture (2)	ARE 105	4	4	-	-
ARE 212	Reinforced Concrete	ARE 202	2	1	2	-
ARE 217	Environmental Design	ARE 207	4	2	-	6

3) Technological Courses: (15 Units)

Code	Course Title	Pre. Req.	Units	Lec.	Ex.	Lab.
ARE 224	App. of Computers in Architecture (B)	ARE 124	2	1	-	3
ARE 218	Technical Installation for Buildings (B)		3	2	-	3
ARE 219	Execution Design	ARE 111 & ARE 218	3	2	-	3
ARE 220	Execution Documents & Specifications	ARE 111 & ARE 218	3	2	2	-
ARE 211	B.SC. Project	ARE 217	4	1	-	9

4) Humanity and Language Courses: (4.5 Units)

Code	Course Title	Pre. Req.	Units	Lec.	Ex.	Lab.
HUM 201	History of Egypt Tech. Development		1	2	-	-
LNG 201	English Language (D)	LNG 101	1	-	-	3
MNG 201	Project Management		1	2	-	-
PHE 201	Physical Education & Activities (1)	PHE 103	0.5	-	-	3
PHE 202	Physical Education & Activities (2)	PHE 201	0.5	-	-	3
PHE 203	Physical Education & Activities (3)	PHE 202	0.5	-	-	3

5) Industrial Training: (10 Units)

Code	Course Title	Pre. Req.	Units	Lec.	Ex.	Lab.
FTR 201	Field Training (3)	FTR 102	5	-	-	30
FTR 202	Field Training (4)	FTR 201	5	-	-	30

II) Elective Courses (10 Units)

1) Technological Courses: (8 Units Required)

Code	Course Title	Pre. Req.	Units	Lec.	Ex.	Lab.
DDP 110	Solar Energy Utilization		2	1	-	3
ARE 221	Solar Architecture		2	1	-	3
ARE 223	Passive Heating & Cooling		2	1	-	3
ARE 225	Computer Aided Design	ARE 224	2	1	-	3
ARE 226	Modern Technology & Desert Architecture		2	1	-	3
ARE 230	Special Topics		2	1	-	3

2) Humanity & Language Courses: (2 Units Required)

Code	Course Title	Pre. Req.	Units	Lec.	Ex.	Lab.
MNG 221	Engineering Economy (II)		1	2	-	-
MNG 222	Behavior Discipline		1	2	-	-
HUM 202	English Literature	LNG 201	1	-	-	3
LNG 203	German Language (B)	LNG 103	1	-	-	3
LNG 204	French Language (B)	LNG 104	1	-	-	3
HUM 203	Trade Law		1	2	-	-
HUM 204	Industrial Psychology		1	2	-	-
HUM 205	Islamic Civilization (II)		1	2	-	-
HUM 206	Islamic Studies		1	2	-	-

ARCHITECTURE ENGINEERING COURSES DESCRIPTION

ARE 100: Fundamentals of Architectural Design, 4 (2, -, 6)

Study of architectural programs & development of design for simple buildings & different uses such as: dwellings, services, cultural & recreational buildings. The course envisages the emphasis on the study of various spaces in architectural design.

ARE 101: Theories of Design, 2 (1, -, 3)

Types and principles of design of public building, profitable buildings: Residential, commercial (offices & commercial centers) & recreational. Non-profitable buildings: educational, cultural, medical, sport facilities, public services & religious.

ARE 102: Theory of Structures (A), 3 (2, 2, -)

Reactions internal actions in statically determinate beams & cantilever beam, internal actions in statically determinate frames & statically determinate trusses. Properties of plane areas, members under axial forces, normal stresses, shear stresses & combined stresses

ARE 103: History of Architecture, 2 (2 , -, -)

Prehistoric, Egyptian, Greek & Roman Architecture. Early Christian Architecture. Byzantine Architecture. Islamic Architecture.

ARE 104: History & Theories of Urban Planning, 3 (2, 2, -)

A Study for the urban and city evolution through history (starting from ancient Egypt, Mesopotamia, Greek, Roman, Middle ages, Renaissance). The industrial revolution and its effect on the pattern of the city. Trends & theory of city planning.

PREREQUISITE: ARE 103

ARE 105: Theories of Architecture (1), 3 (3, -, -)

Theories of architecture: roots of contemporary architecture Revivalism: romantic, classicism, revolutionary architects in France, development in France, England, U.S.A, & Germany. Gothic Revival: England, Germany & U.S.A. Picturesque, Renaissance, revival, Eclecticism, Philosophy, 2nd Empire France, U.S.A. Higher Victorian. Structural logic: development of iron & reinforced concrete, writing of violet le Due & Chicago school. Functional logic: biological analogy, Wright, Mechanical Analogy, Le Corbusier, Bauhaus School. Formal development: Effect of Art, Cubism, Purism, De Stjill & Picturesque Tendencies.

ARE 106: Architectural Design of Simple Units, 4 (2, -, 6)

Program analysis, functional studies, & design of simple building elements, site planning analysis. Introduction to constructional expression in architecture.

PREREQUISITE: ARE 101, ARE 110 & ARE 129

ARE 107: Architectural Design of Complex Units, 4 (2, -, 6)

Data gathering & analysis, study of different units & components separately & compound together, followed by design of complex elements. Sketch designs of special nature will be used.

PREREQUISITE: ARE 106

ARE 110: Elements of Architectural Design, 4 (2, -, 6)

Functional logic: manipulation of human environment, functional elements, public, private, service elements, circulation elements, horizontal & vertical. Structural logic: development, material & geometric continuity, linear elements & surface elements.

PREREQUISITE: ARE 100

ARE 111: Diploma Project, 3 (1, -, 6)

The student selects one of the available projects in the department with the help of academic staff. The fulfillment of the project should prove that the student has enough experience in modeling & Architectural Design.

PREREQUISITE: ARE 106 & ARE 126

ARE 112: Climate & Desert Architecture, 2 (1, -, 3)

Man and environment, desert, sun, heat, heat transfer, wind, wind control, pollution, humidity, natural lighting & comfort zone. Desert architectural components, & design considerations in desert regions.

ARE 114: URBAN Design in New Towns, 3 (2, -, 3)

The course introduces three main aspects of urban design: the elements of urban design (nodes, paths, public spaces, etc.); the levels of perception (user, analyzer, critic & designer perceptions); the elements of analysis & design of urban spaces (components, activities, forms, materials, colors, characteristics, style). Applications on new communities.

PREREQUISITE: ARE 112

ARE 116: Materials & its Properties, 2 (1, 2, -)

Engineering materials: classification, sources of raw materials, selection properties, testing & inspection, specification, standardization & standard specification. Concrete ingredients: aggregates, general classification, properties, requirements & testing. Ferrous & non Ferrous metals: types properties, alloys scope of use & effect of heat treatment on mechanical properties. Lab tests to study the behavior of engineering materials under static loads.

ARE 117: Perspective & Sciagraphy, 2 (1, -, 3)

A study of shades & shadows of point, line, circle, & mass (cylinder, sphere) & their architectural applications. A study of picture planes: the vanishing point, parallel or one vanishing point perspective, two vanishing points perspective, the cone of vision, the inverse perspective, & shades & shadows in perspective.

ARE 118: Surveying, 2 (1, -, 3)

Plane & geodesic surveying, triangulation points kinds of maps, longitudinal & diagonal scales & enlarging maps. Pantograph & Areas.

ARE 119: Visual Training (A), 1 (-, -, 3)

Pencil points & line techniques, proportions & blocking in proportions, values & value scale, different planes, foreground, middle ground & background, depth, representation of buildings, building details & interiors, study of nature & tree representation, study of factors leading to the artistic success of sketches, sketching objects; & different architectural elements & nature. This is both in & out the studio by means of the pencil, charcoal, pen & ink, for training student's eyes & hands, & to let him achieve good proportions & beauty.

ARE 121: Environmental Control, 2 (2, -, -)

Sun: Geographical relations between sun & earth; & methods of knowing sun angles in different points on earth at different days & hours of the year. Architectural control of sun rays on buildings. Air: Study of movements of wind; & architectural control of air movements in & between buildings.

PREREQUISITE: ARE 112

ARE 122: Building Construction, 2 (1, 2, -)

Introduction to two ways of construction: Bearing & skeleton types; & sequence of constructing the various structural & non-structural elements of simple structures. Stone & brick work, lintels, arches & centering, wood, steel, reinforced concrete (flat roofs), & exterior & interior stairways.

ARE 124: Applications of Computers in Architecture (A), 3 (1, -, 6)

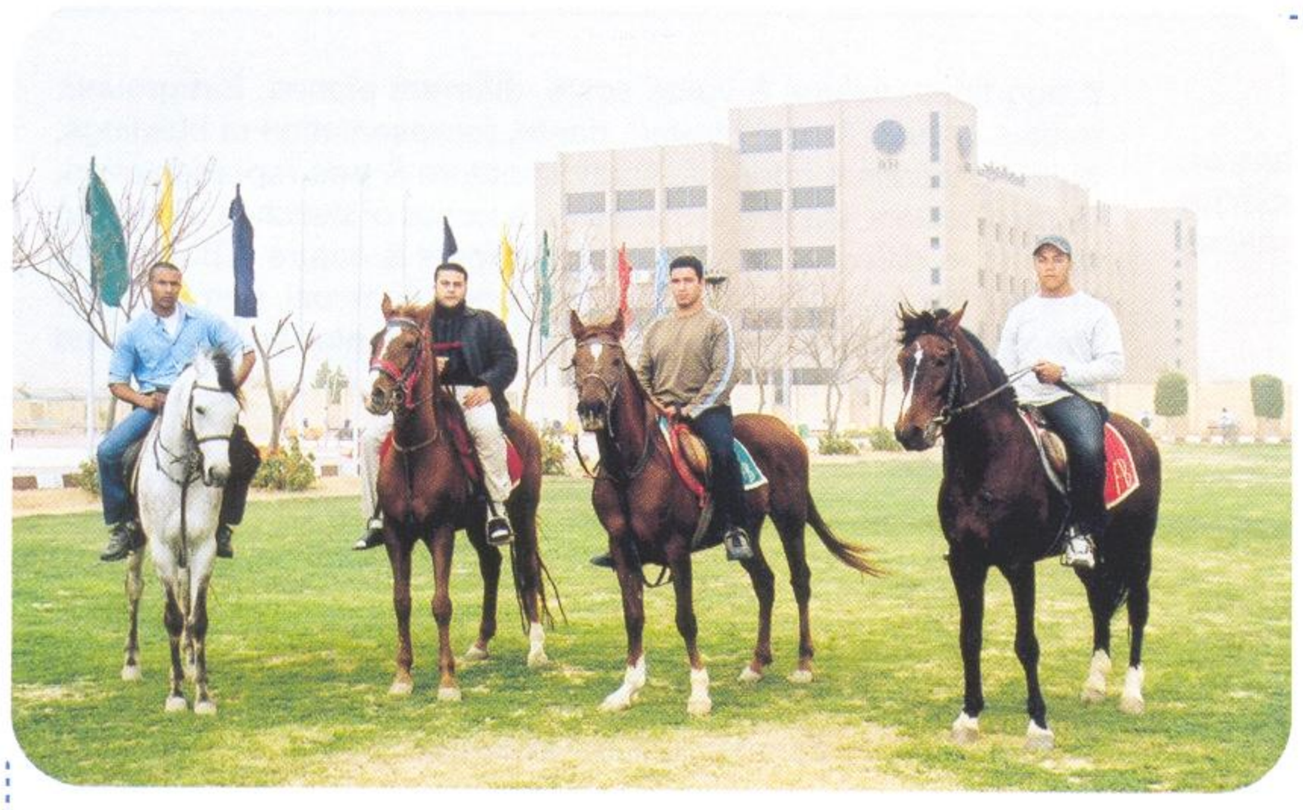
A general introduction to computer graphics & its application in architectural design & the graphic arts. Practical assignments are included.

PREREQUISITE: CS 002

ARE 126: Building Construction & Materials, 4 (2, 4, -)

Concrete: mixing water, types of mix design, & properties of wet & hardened concrete. Special types, quality control, influencing factors, & effects of varying mix proportions. Prefabricated units, fiber glass reinforcement. Insulation materials, joints,& details of constructional elements. Analysis of building construction methods.

PREREQUISITE: ARE 116 & ARE 122



ARE 128: Technical Installation for Buildings (A), 2 (1, -, 3)

Sanitary engineering; p1umbing and building equipment sanitation, public health education, and sewage disposal system. Water supply; public intakes, sedimentation and clarifies, filtration, chlorinating, disinfecting, storing and distribution. Plumbing system, plumbing fixtures, and distribution system. The main and branches, connections, and piping materials. Building mechanical equipments: lifts, escalators, kitchens and laundries.

ARE 129: Visual Training (B), 1 (-, -, 3)

Study of colors, chromatic & achromatic sensations, color theory & color circles, plates & worlds, color intensity, & color harmony. Applications on theory of colors. Interiors of buildings, painting objects.

PREREQUISITE: ARE 119

ARE 202: Theory of Structures (B), 3 (2, 2, -)

Elastic deformation of statically determinate structures. Method of continuous beams, method of virtual work, statically indeterminate beams and frames. Consistent deformation method, equation of 3- moments, moment distribution method, live loads on continuous beams and internal normal stresses. Oblique bending, eccentric compression or tension and buckling of columns.

PREREQUISITE: ARE 102

ARE 203: Architectural Design (A), 4 (2, -, 6)

Design of architectural compounds made up of several units (study of functional and formal relationships). Special importance is attached to functions and forms of spaces between units. The course also includes development of structural sense through models, trials of special types of advanced structures, & applications on creating architectural spaces for different functions.

PREREQUISITE: ARE 107

ARE 204: Town Planning (A), 3 (2, -, 3)

General definition for physical planning at different levels. Comprehensive planning studies (goals, objectives, stages & tools). Studies cover planning criteria, programming & stages of implementation, principles of land uses, neighborhood theory, slum clearance & replanning of slum areas. Study of housing problems, housing prototypes & solutions. Factors & planning methodology influencing housing areas. Combined project on housing & planning.

PREREQUISITE: ARE 104

ARE 205: Theories of Architecture (2), 4 (4, -, -)

Principles & directions of contemporary architecture: pre-international architecture, international style; expressionism architecture between two World Wars, technical advances of the late 20 century, & new trends in 21st century.

PREREQUISITE: ARE 105

ARE 206: Architectural Design (b), 4 (2, -, 6)

Design of a housing project, including the design of related community facilities. Emphasis will be on local environmental conditions, urban context, and building regulations.

PREREQUISITE: ARE 203

ARE 207: Architectural Design of Complex Buildings, 4 (2, -, 6)

Data gathering & analysis of different programs for buildings of complex nature or groups of buildings. Development of the

architectural design of these buildings taking into consideration space and visual aspects. This course is carried out with special emphasis on modeling.

PREREQUISITE: ARE 206

ARE 208 : Soil Mechanics & Foundations, 3 (3, -, -)

Physical and mechanical properties of soil and soil testing, formation of soil of different types. Theory of consolidation: choice of the type of foundations. Design of the shallow foundations: isolated footings, combined footings and strap footings.

PREREQUISITE: ARE 212

ARE 211 B.Sc. Project, 4 (1, -, 9)

The student should achieve the following:

Architectural research: Independent investigation on the topic of the final project, (data gathering, analysis, programming, etc.) Architectural design: Application of the research & development on the architectural design of the final project.

PREREQUISITE: ARE 217

ARE 212 : Reinforced Concrete, 2 (1, 2, -)

Properties of reinforced concrete as a building material & factors affecting concrete strength. Design of R. C, sections subject to simple beam loads, & loads distribution. Design of R. C, slabs: one & two way slabs (crash off, Marcus & Egyptian solutions), hollow block, paneled beams, & flat slab details.

PREREQUISITE: ARE 202

ARE 214: Town Planning (B), 4 (2, 6, -)

A comprehensive planning project on a certain part of the city; including field & office studies, stages of implementation, & reports.

PREREQUISITE: ARE 204

ARE 217: Environmental Design, 4 (2, -, 6)

Urban context, environmental factors in design, perception of the urban environment, the visual form of traditional neighborhoods, major principles of urban design, analysis & design of existing spaces. Landscape elements, construction and analysis, site survey and analysis. Movement system details and projects.

PREREQUISITE: ARE 207

ARE 218: Technical Installation for Buildings (B), 3 (2, -, 3)

Illumination: Eye and vision, light characteristics and measurements, light sources, introduction to lighting design. Acoustics: the characteristics, absorption, distribution of sound absorbents, building materials, insulation of sound, and hints on acoustic design. Air conditioning: Psychometric charts, physical and physiological principles, fundamentals of heat transfer, duct design, heating and cooling cycles.

ARE 219: Execution Design, 3 (2, -, 3)

Detailed studies of wide-span & span structures, cladding & facing for skeleton structures, design & application of metal sections for openings & partitions, detailed studies of stair cases with different designs & materials, preparations of complete working drawings & details ready for execution; including architectural drawings, details, structural sections, plumbing & sanitary drawings, electrical drawing, miscellaneous drawings (i.e. elevators..., etc.)

PREREQUISITE: ARE 111, ARE 218

ARE 220: Execution Documents & Specifications, 3 (2, 2, -)

The preparation of a complete set of execution documents of a given project; containing large span elements designed by the student.

PREREQUISITE: ARE 111, ARE 218

ARE 221: Solar Architecture, 2 (1, -, 3)

Solar movement, Solar reclamation, fundamentals of solar heating and cooling, active solar design for space heating, cooling and domestic hot water, passive solar design for space heating and cooling, performance, economic analysis, and the integration of solar concepts into building design.