



BENHA UNIVERSITY

ARCHITECTURAL ENGINEERING
PROGRAM CURRICULUM
2021



FACULTY OF ENGINEERING AT SHOUBRA

ARCHITECTURAL ENGINEERING PROGRAM





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Program Information



1. Faculty Vision:

The Faculty of Engineering at Shoubra, Benha University, aspires to be a pioneering college at the national, regional, and international levels in the fields of engineering education, scientific research, innovation and entrepreneurship in order to achieve the goals of sustainable development.

2. Faculty Mission

The Faculty of Engineering at Shoubra, Benha University, is committed to prepare a graduate with competencies and problem-solving skills[1] that qualify each engineer to compete in regional and international labor markets[2], the graduate will be able to innovate and become an entrepreneur[3], the faculty is also committed to the development of engineering sciences[4] and producing internationally distinguished scientific research[5], within the framework of human values and social responsibility[6].

3. Program Vision

The Architectural Engineering Program, Faculty of Engineering at Shoubra, aspires to be a pioneering program among the academic communities in the field of architectural education and distinguished in scientific research at the regional and international levels, and to provide a promising community service to enhance the quality of life.

4. Program Mission

The Architectural Engineering Program, Faculty of Engineering in Shubra, is committed to provide a distinguished educational service for graduating a competent architect equipped with the capabilities, knowledge and mental, scientific, research, technical, professional and behavioral skills that qualify him to practice the profession of architecture at a professional level, to compete in the labor market locally and regionally, to provide distinguished services to society, and to promote The profession of architecture, within the framework of human and moral values.



To judge the compatibility between the program mission and faculty mission, the following matrix is used.

Faculty Mission Program Mission	prepare a graduate with competencies and problem-solving skills [1]	compete in local and regional labor markets [2]	innovate and become an entrepreneur [3]	development of engineering sciences [4]	producing internationally distinguished scientific research [5]	human values and social responsibility [6].
Provide an outstanding educational service	✓		✓			
Prepare a skilled architect equipped with knowledge and skills	✓	✓			✓	✓
Compete in the labor market locally and regionally		✓		✓	✓	
Provide superior services to the community		✓	✓			
Upgrade the profession of architecture		✓	✓	✓		
Commitment to human and moral values						✓

5. Program Aims

1. Provide students with modern theoretical and applied sciences related to architecture as well as engineering and human sciences, related to it and compatible with both society needs and market in a manner ensuring continuous self-learning and fulfills the requirements of sustainability.
2. Graduate a competent architect who has the necessary scientific understanding and knowledge of the specialization requirements. In addition to supporting his ability to adhere to the ethics and traditions of the profession honestly.
3. Expanding students' vision, training, and developing their abilities and skills in all fields related to architecture.
4. Support students' ability to follow the scientific approach in solving problems by defining the problem and collecting the necessary information about it, classifying it, analyzing it and developing appropriate solutions for it, to produce architectural, urban and planning design projects with the required efficiency and quality, using advanced technologies and tools.



- Provide students with the necessary practical experiences in the field of design through training them on projects similar to reality with different limitations and considerations, whether economic, environmental, social, political, security or ethical, and developing their capabilities to participate in an integrated and effective way with work teams to propose different alternatives to the solution and evaluate them to choose The most suitable ones, preparing the necessary documents and fees, and supervising their implementation.

To judge the compatibility of program mission with its objectives, the following matrix is used:

Program objectives	Objective #1	Objective #2	Objective #3	Objective #4	Objective #5
Program Mission					
Providing a distinct educational service	✓		✓		✓
Graduating a competent architect equipped with knowledge and skills	✓	✓		✓	
Competing in the labor market, locally and regionally		✓	✓		✓
Providing distinguished services to the community		✓			✓
Upgrading the profession of Architecture		✓	✓	✓	
Commitment to human and moral values	✓		✓		✓

6. Graduate Attributes

1) A graduate who are Familiar with knowledge, theoretical sciences, applied sciences, engineering, humanities and social sciences related to architecture and urban design that qualifies graduates to practice the profession of architecture and be compatible with both the needs of society and the labor market.

2) A graduate who are familiar with continuous self-learning, developing skills, and keeping pace with developments in the field of specialization to generate innovative ideas and achieve sustainability requirements.



- 3) A graduate who can use the scientific method in monitoring, identifying, and analyzing architectural and urban problems by defining the problem and collecting the necessary information, classifying, analyzing, and developing appropriate solutions for facing problems and produce architectural, urban, and planning design projects with due efficiency and quality.
- 4) A graduate who can use modern technology techniques in all areas of specialization related to buildings, coordination with constructional and electromechanical disciplines, and the ability to use advanced digital tools in the design and implementation of buildings and virtual simulation to evaluate and produce innovative designs that achieve efficient performance considering the surrounding environmental and urban influences.
- 5) A graduate who can communicate effectively with presentation, discussion, and persuasion with work teams to suggest various alternatives to the solution and evaluate them to choose the most suitable one.
- 6) A graduate who has ethics of the profession and has honest of competition with others. He has the scientific understanding and knowledge necessary for the requirements of the architectural specialization.
- 7) A graduate who can coordinate with all other disciplines. He can work with and lead a team of different engineering disciplines during the design and implementation phase. He also can manage human resources from workers and technicians.
- 8) A graduate who are familiarity with architectural and urban codes, laws, and requirements, and he can apply them to match local needs and aspirations to keep pace with global developments.

7. Program Competencies

According to the National Academic Reference Standard, the program in Architectural Engineering must satisfy the following Competencies:

1- General Engineering NARS Competencies in 2018		
Level A (NARS)	A.1	Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.
	A.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.
	A.3	Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global, cultural, social, economic,



Level A (NARS)	A.4	environmental, ethical and other aspects as appropriate to the discipline and within the principles and contexts of sustainable design and development. Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues and risk management principles.	
	A.5	Practice research techniques and methods of investigation as an inherent part of learning.	
	A.6	Plan, supervise and monitor implementation of engineering projects, taking into consideration other trades requirements.	
	A.7	Function efficiently as an individual and as a member of multi-disciplinary and multi-cultural teams.	
	A.8	Communicate effectively – graphically, verbally and in writing – with a range of audiences using contemporary tools.	
	A.9	Use creative, innovative, and flexible thinking and acquire entrepreneurial and leadership skills to anticipate and respond to new situations.	
	A.10	Acquire and apply new knowledge; and practice self, lifelong and other learning strategies.	

2- Architecture NARS

Level B (NARS)	B.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.
	B.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.
	B.3	Generate ecologically responsible, environmental conservation and rehabilitation designs; through understanding of structural design, construction, technology, and engineering problems associated with building designs.
	B.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.



B.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.
B.6	Be able to utilize technology as a tool in a wide range of documentation, presentation, analysis applications, visualization, simulation of building performance and form generation, using CAD, BIM Parametric & Generative design software in Interior Design, Architecture Design, urban design, and urban planning.
B.7	Demonstrate ability to recognize and manipulate the interplay between form, function, structure, and materials in 3D spaces

To judge the compatibility of program objectives with its competencies, the following matrix is used:

Program Objectives	Program Competencies																
	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	B1	B2	B3	B4	B5	B6	B7
Objective #1	√		√			√	√			√							
Objective #2	√				√	√					√	√	√				√
Objective #3			√			√		√	√		√			√		√	
Objective #4	√				√			√	√	√			√	√	√	√	√
Objective #5		√		√					√			√		√	√	√	√



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PROGRAM REQUIREMENTS



ARCHITECTURAL ENGINEERING PROGRAM REQUIREMENTS

The following Tables list the subjects, its classification and compare them with the requirements of the reference framework for the two-semester system undergraduate programs issued by the committee of engineering, technological and industrial studies sector at the Supreme Council of the Egyptian Universities in ٢٠٢٠.

#	Requirements	% according to reference framework	Contact Hours	Achieved percentage %
1	Humanities & Social Science	8-12	20	8
2	Mathematics & Basic Sciences	٢٦-٢٠	50	20
3	Basic Engineering Science	25-30	73	29.2
4	Applied Engineering and Design	25-30	73	29.2
5	Business Management	2-4	9	3.6
6	Engineering Knowledge	٣-6	15	6
7	Project & Field Training	٣-6	10	4
		100	250	100

#	Subjects	Min. Percentage according to reference framework (%)	Contact Hours	Achieved percentage %
1	University Requirements	8	20	8
2	Faculty Requirements	20	70	28
3	Major Specialization Subjects	٣٥	96	38.4
4	Minor Specialization Subjects	Maximum 30	64	25.6
			250	100



**LIST OF COURSES
ARCHITECTURAL ENGINEERING PROGRAM**

No.	Code	Course	Contact Hrs				Credit Hours
			Lec.	Tut.	Lab.	Total	
University Requirements (12+7+1 = 20 Contact Hours)							
1	GEN0x0	Elective - Language requirements List	2	0	0	2	2
2	GEN011	Computer Skills	1	0	1	2	1
3	GEN012	History of Engineering & Technology	2	0	0	2	2
4	GEN90x	Elective - University Requirements list	1	1	0	2	1
5	GEN90x	Elective - University Requirements list	1	1	0	2	1
6	GEN90x	Elective - University Requirements list	1	1	0	2	1
7	GEN90x	Elective - University Requirements list	1	1	0	2	1
8	GEN90x	Elective - University Requirements list	1	1	0	2	1
9	GEN90x	Elective - University Requirements list	1	1	0	2	1
10	GEN90x	Elective - University Requirements list	1	1	0	2	1
Faculty Requirements (23+30+17 = 70 Contact Hours)							
1	BAS010	Differential Calculus and Algebra	2	2	0	4	3
2	BAS011	Statics	2	1	2	5	3
3	BAS012	Engineering Chemistry	2	1	2	5	3
4	BAS013	Physics of Materials & Electricity	2	1	3	6	3
5	BAS014	Integral Calculus & Analytical Geometry	2	2	0	4	3
6	BAS015	Dynamics	2	1	2	5	3
7	BAS016	Physics of Light, Heat and Magnetism	2	1	2	5	3
8	BAS213	Statistics and Probabilities	2	2	0	4	3
9	MEC011	Production Technology & workshops	1	0	2	3	2
10	MEC010	Engineering Drawing (1)	0	2	0	2	1
11	MEC012	Engineering Drawing (2)	0	3	1	4	2
12	CIV110	Material Science	1	0	1	2	1
13	ARC114	Physics of Heat transfer and Airflow	2	2	1	5	3
14	ARC217	Physics of Lighting and Acoustics	2	2	1	5	3
15	ARC100	Summer Training (1)	0	0	0	0	0
16	ARC200	Summer Training (2)	0	0	0	0	0
17	ARC300	Field Training (1)	0	0	0	0	0
18	AEC400	Field Training (2)	0	0	0	0	0
19	ARC416	Graduation Project	2	8	0	10	6
Major Specialization Subjects (34+55+7 = 96 Contact Hours)							
1	ARC111	Architecture and construction	1	4	0	5	3
2	ARC116	Building Construction (1)	1	4	0	5	3
3	ARC212	Building Construction (2)	1	4	0	5	3



4	ARC113	Methods of Visual Expression	1	3	.	ξ	2
5	ARC111	History & Theories of Architecture (1)	2	2	0	4	3
6	ARC115	History & Theories of Architecture (2)	2	2	0	4	3
7	ARC211	History & Theories of Architecture (3)	2	2	0	4	3
8	ARC117	Computer Applications (1)	1	0	3	4	2
9	ARC213	Computer Applications (2)	1	0	2	3	2
10	CIV176	Structural Analysis	2	2	0	4	3
11	GED231	Surveying and Measurement	1	1	1	3	2
12	CIV273	Reinforced Concrete	2	2	0	4	3
13	CIV374	Steel Structures in Architecture	2	2	0	4	3
14	ARC311	Executive Design (1)	1	4	0	5	3
15	ARC315	Executive Design (2)	1	4	0	5	3
16	ARC411	Executive Design (3)	1	4	0	5	3
17	CIV373	Soil Mechanics & foundations	1	1	1	3	2
18	ARC413	Specification & Construction Management	2	2	0	4	3
19	ARC313	Plumbing & Electro-Mechanical Installation in buildings	2	3	0	5	3
20	ARCϣϣ	Urban Design	ϣ	ϣ	.	ξ	2
21	ARCεϣ	Urban Planning (1)	ϣ	ϣ	.	ξ	2
22	ARC4xx	Specialized Elective Course list (2)	1	3	0	4	2
23	ARC4xx	Specialized Elective Course list (2)	2	0	0	2	2
24	ARC4xx	Specialized Elective Course list (3)	2	0	0	2	2
Minor Specialization Subjects (12+52+0 = 64 Contact Hours)							
1	ARC110	Architectural Design (ϣ)	ϣ	5	.	6	4
2	ARC114	Architectural Design (ϣ)	ϣ	5	.	6	4
3	ARC210	Architectural Design (ϣ)	ϣ	5	.	6	4
4	ARC215	Architectural Design (ξ)	ϣ	5	.	6	4
5	ARC310	Architectural Design (ο)	ϣ	5	.	6	4
6	ARC314	Architectural Design (ϕ)	ϣ	5	.	6	4
7	ARC410	Architectural Design (ϕ)	ϣ	5	.	6	4
8	Arc317	Interior Design	1	3	0	4	2
9	ARC415	New Technology in Execution	1	4	0	5	3
10	ARC216	Building Construction (ϣ)	ϣ	ξ	.	ο	3
11	ARC316	Planning and Landscaping of Urban Areas	1	3	0	4	2
12	ARCεϣ	Urban Planning (ϣ)	ϣ	ϣ	.	ξ	2



**COURSES CLASSIFICATION
ARCHITECTURAL ENGINEERING PROGRAM**

No.	Code	Course	Contact Hrs			
			Lec.	Tut.	Lab.	Total
Humanities & Social Science Subjects (12+7+1 = 20 Contact Hours)						
1	GEN0x0	Elective - Language requirements List	2	0	0	2
2	GEN011	Computer Skills	1	0	1	2
3	GEN012	History of Engineering & Technology	2	0	0	2
4	GEN90x	Elective - University Requirements list	1	1	0	2
5	GEN90x	Elective - University Requirements list	1	1	0	2
6	GEN90x	Elective - University Requirements list	1	1	0	2
7	GEN90x	Elective - University Requirements list	1	1	0	2
8	GEN90x	Elective - University Requirements list	1	1	0	2
9	GEN90x	Elective - University Requirements list	1	1	0	2
10	GEN90x	Elective - University Requirements list	1	1	0	2
Mathematics & Basic Sciences (21+15+14 = 50 Contact Hours)						
1	BAS010	Differential Calculus and Algebra	2	2	0	4
2	BAS011	Statics	2	1	2	5
3	BAS012	Engineering Chemistry	2	1	2	5
4	BAS013	Physics of Materials & Electricity	2	1	3	6
5	BAS014	Integral Calculus & Analytical Geometry	2	2	0	4
6	BAS015	Dynamics	2	1	2	5
7	BAS016	Physics of Light, Heat and Magnetism	2	1	2	5
8	BAS213	Statistics and Probabilities	2	1	0	3
9	CIV115	Material Science	1	1	1	3
10	ARC114	Physics of Heat Transfer and Airflow	2	2	1	5
11	ARC217	Physics of Lighting and Acoustics	2	2	1	5
Business Management (3+6+0 = 9 Contact Hours)						
1	ARC413	Specification & Construction Management	2	2	0	4
2	ARC415	New Technologies in Execution	1	4	0	5
Engineering Knowledge Subjects (7+5+3 = 15 contact Hours)						
1	MEC011	Production Technology & Workshops	1	0	2	3
2	ARC112	Architecture and Construction	1	4	0	5
3	ARC4xx	Specialized Elective Course list (2)	2	0	0	2
4	ARC4xx	Specialized Elective Course list (3)	2	0	0	2
5	GED231	Surveying and Measurement	1	1	1	3
Basic Engineering Science Subjects (23+43+7 = 73 Contact Hours)						
1	MEC010	Engineering Drawing (1)	0	2	0	2
2	MEC012	Engineering Drawing (2)	0	3	1	4
3	ARC117	Computer Applications (1)	1	0	3	4



4	ARC213	Computer Applications (2)	1	0	2	3
5	ARC113	Methods of Visual Expression	1	3	.	ξ
6	ARC111	History & Theories of Architecture (1)	2	2	0	4
7	ARC115	History & Theories of Architecture (2)	2	2	0	4
8	ARC211	History & Theories of Architecture (3)	2	2	0	4
9	ARC116	Building Construction (ϑ)	ϑ	ξ	.	ο
10	ARC212	Building Construction (ϒ)	ϑ	ξ	.	ο
11	ARC216	Building Construction (ϓ)	ϑ	ξ	.	ο
12	ARC313	Plumbing & Electro-Mechanical Installation in Buildings	2	3	0	5
13	ARC4xx	Specialized Elective Course list (1)	1	3	0	2
14	CIV374	Steel Structures in Architecture	2	2	0	4
15	CIV176	Structural Analysis	2	2	0	4
16	CIV273	Reinforced Concrete	2	2	0	4
17	CIV373	Soil Mechanics & Foundations	1	1	1	3
18	ARC316	Planning and Landscaping of Urban Areas	1	3	0	4
Applied Engineering and Design Subjects (14+59+0 = 73 Contact Hours)						
1	ARC110	Architectural Design (ϑ)	ϑ	5	.	6
2	ARC114	Architectural Design (ϒ)	ϑ	5	.	6
3	ARC210	Architectural Design (ϓ)	ϑ	5	.	6
4	ARC215	Architectural Design (ξ)	ϑ	5	.	6
5	ARC310	Architectural Design (ο)	ϑ	5	.	6
6	ARC314	Architectural Design (ϗ)	ϑ	5	.	6
7	ARC410	Architectural Design (ϙ)	ϑ	5	.	6
8	ARC311	Executive Design (1)	1	4	0	5
9	ARC315	Executive Design (2)	1	4	0	5
10	ARC411	Executive Design (3)	1	4	0	5
11	Arc317	Interior Design	1	3	0	4
12	ARCϓϑϒ	Urban Design	ϑ	ϓ	.	ξ
13	ARCξϑϒ	Urban Planning (1)	ϑ	ϓ	.	ξ
14	ARCξϑξ	Urban Planning (ϒ)	ϑ	ϓ	.	ξ
Projects and Field Training Subjects (10 Contact Hours)						
1	ARC100	Summer Training (1)	0	0	0	0
2	ARC200	Summer Training (2)	0	0	0	0
2	ARC300	Field Training (1)	0	0	0	0
3	AEC400	Field Training (2)	0	0	0	0
4	ARC417	Graduation Project	2	8	0	10



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STUDY PLAN



PREPARATORY YEAR

First Semester:

Code	Subject	Contact Hours				Marks				Duration of Final Examination (hours)
		Lecture	Tutorial	Laboratory	Total	Semester Work	Lab./Oral Exam.	Written Exam.	Total	
BAS010	Differential Calculus and Algebra	2	2	0	4	60	0	60	120	2
BAS011	Statics	2	1	2	5	45	30	75	150	2
BAS012	Engineering Chemistry	2	1	2	5	45	30	75	150	2
BAS013	Physics of Materials & Electricity	2	1	3	6	45	45	90	180	2
MEC010	Engineering Drawing (1) ×	0	3	0	3	25	20	45	90	2
GEN0x0	Elective - Language requirements List	2	0	0	2	30	0	20	60	2
		10	4	5	25				700	

Second Semester:

Code	Subject	Contact Hours				Marks				Duration of Final Examination (hours)
		Lecture	Tutorial	Laboratory	Total	Semester Work	Lab./Oral Exam.	Written Exam.	Total	
BAS014	Integral Calculus & Analytical Geometry	2	2	0	4	60	0	60	120	2
BAS015	Dynamics	2	1	2	5	45	30	75	150	2
BAS016	Physics of Light, Heat and Magnetism	2	1	2	5	45	30	75	150	2
MEC011	Principles of Manufacturing Engineering†	1	0	2	3	25	20	45	90	2
MEC012	Engineering Drawing (2) ×	0	3	1	4	30	30	60	120	2
GEN011	Computer Skills ×	1	0	1	2	15	15	30	60	2
GEN012	History of Engineering & Technology	2	0	0	2	30	0	30	60	2
		10	7	8	25				700	

† In workshops, students are divided into groups 15 students/each, and a faculty staff member (or an assistant) as well as a practical trainer will teach the group.

× In course MEC011, students are divided into groups 15 students/each. Two faculty staff members or their assistants will teach each group.



FIRST YEAR

First Semester:

Code	Subject	Contact Hours				Marks				Duration of Final Examination (hours)
		Lec.	Tut.	Lab.	Total	Sem. Work	Lab./Oral Exam	Written Exam	Total	
ARC110	Architectural Design (1) *	1	0	-	1	60	40	80	180	1
ARC111	History & Theories of Architecture (1)	2	2	-	4	60	-	60	120	4
ARC112	Architecture & Construction	1	4	-	5	60	30	60	150	5
ARC113	Methods of Visual Expression	1	3	-	4	40	40	40	120	2
CIV175	Material Science	1	-	1	2	20	10	30	60	2
BAS100	Statistics & Probabilities	2	2	-	4	60	-	60	120	2
		8	14	1	25				750	

Second Semester:

Code	Subject	Contact Hours				Marks				Duration of Final Examination (hours)
		Lec.	Tut.	Lab.	Total	Sem. Work	Lab./Oral Exam	Written Exam	Total	
ARC114	Architectural Design (2)	1	0	-	1	60	40	80	180	6
ARC115	History & Theories of Architecture (2)	2	2	-	4	60	-	60	120	4
ARC116	Building Construction (1)	1	4	-	5	60	30	60	150	5
ARC117	Computer Applications (1)	1	-	3	4	40	40	40	120	2
GEN90X	Elective from University Requirements list	1	1	-	2	20	10	30	60	2
CIV176	Structural Analysis	2	2	-	4	60	-	60	120	3
		8	14	3	25				750	

* Prior to registering in first year, the student should have completed 3 weeks of training (ARC100) in summer for 5 days per week. The daily training is for 5 hours, amounting to a total of 25 hours per week. A maximum grade of 20 marks is added to the 'semester work' grades of the "Architectural Design (1)" (ARC110) course of first year.



SECOND YEAR

First Semester:

Code	Subject	Contact Hours				Marks				Duration of Final Examination (hours)
		Lec.	Tut.	Lab.	Total	Sem. Work	Lab./Oral Exam	Written Exam	Total	
ARC210	Architectural Design (3) *	1	5	-	6	60	40	80	180	6
ARC211	History & Theories of Architecture (3)	2	2	-	4	60	-	60	120	4
ARC212	Building Construction (2)	1	4	-	5	60	30	60	150	5
ARC213	Computer Applications (2)	1	-	2	3	30	30	30	90	3
ARC214	Physics of Heat Transfer & Airflow	2	2	1	5	60	30	60	150	3
GEN90X	Elective from University Requirements list	1	1	-	2	20	10	20	70	2
		8	14	3	25				750	

Second Semester:

Code	Subject	Contact Hours				Marks				Duration of Final Examination (hours)
		Lec.	Tut.	Lab.	Total	Sem. Work	Lab./Oral Exam	Written Exam	Total	
ARC215	Architectural Design (4)	1	5	-	6	60	40	80	180	6
ARC216	Building Construction (3)	1	4	-	5	60	30	60	150	4
ARC217	Physics of Lighting & Acoustics	2	2	1	5	60	30	60	150	3
GEN90X	Elective from University Requirements list	1	1	-	2	20	10	20	70	2
GED231	Surveying & Measurement	1	1	1	3	30	15	45	90	3
CIV273	Reinforced Concrete	2	2	-	4	60	-	60	120	3
		8	15	2	25				750	

* Prior to registering in second year, the student should have completed 3 weeks of training (ARC200) in summer for 5 days per week. The daily training is for 5 hours, amounting to a total of 25 hours per week. A maximum grade of 20 marks is added to the 'semester work' grades of the "Architectural Design (3)" (ARC210) course of Second year.



THIRD YEAR

First Semester:

Code	Subject	Contact Hours				Marks				Duration of Final Examination (hours)
		Lec.	Tut.	Lab.	Total	Sem. Work	Lab./Oral Exam	Written Exam	Total	
ARC310	Architectural Design (5)	1	5	-	6	60	40	80	180	6
ARC311	Executive Designs (1)	1	4	-	5	60	30	60	150	5
ARC312	Urban Design	1	3	-	4	40	30	50	120	4
ARC313	Plumbing & Electro-mechanical installations in Buildings*	2	3	-	5	45	15	60	120	4
GEN90X	Elective from University Requirements list	1	1	-	2	20	10	20	50	2
CIV373	Soil Mechanics and Foundations	1	1	1	3	30	15	45	90	3
ARC300	Field Training (1) **	-	-	-	-	15	15	-	30	-
		7	17	1	25					750

Second Semester:

Code	Subject	Contact Hours				Marks				Duration of Final Examination (hours)
		Lec.	Tut.	Lab.	Total	Sem. Work	Lab./Oral Exam	Written Exam	Total	
ARC314	Architectural Design (6)	1	5	-	6	60	40	80	180	6
ARC315	Executive Designs (2)	1	4	-	5	60	30	60	150	5
ARC316	Planning & Landscaping of Urban Areas	1	3	-	4	40	30	50	120	4
ARC317	Interior Design	1	3	-	4	40	30	50	120	4
GEN90X	Elective from University Requirements list	1	1	-	2	20	10	20	50	2
CIV374	Steel Structures in Architecture	2	2	-	4	60	-	60	120	3
		7	18	-	25					750

* This course is taught jointly by the Department of Architecture, Department of Electrical Engineering, and Department of Mechanical Engineering

** After the end of the second year, the student performs field training (1) during the summer period for a period of six weeks outside the college in a company or institution in the field of specialization under the supervision of faculty members outside the quorum of the supervising member, and the field training degree is calculated as (30 marks).



FOURTH YEAR

First Semester:

Code	Subject	Contact Hours				Marks				Duration of Final Examination (hours)
		Lec.	Tut.	Lab.	Total	Sem. Work	Lab./Oral Exam	Written Exam	Total	
ARC410	Architectural Design (7)	1	5	-	6	60	40	80	180	6
ARC411	Executive Designs (3)	1	4	-	5	60	30	60	150	5
ARC412	Urban Planning (1)	1	3	-	4	40	30	50	120	4
ARC413	Specifications and Construction Management	2	2	-	4	45	-	45	90	3
ARC4xx	Specialized Elective Course from List (1)	1	3	-	4	40	40	40	120	3
GEN90X	Elective from University Requirements list	1	1	-	2	20	10	20	70	2
ARC400	Field Training (2)*	-	-	-	-	-	30	-	30	-
		7	18	-	25				750	

Second Semester:

Code	Subject	Contact Hours				Marks				Duration of Final Examination (hours)
		Lec.	Tut.	Lab.	Total	Sem. Work	Lab./Oral Exam	Written Exam	Total	
ARC414	Urban Planning (2)	1	3	-	4	40	30	50	120	4
ARC415	New Technologies in Execution	1	4	-	5	60	30	60	150	5
ARC4xx	Specialized Elective Course from List (2)	2	-	-	2	30	-	30	60	3
ARC4xx	Specialized Elective Course from List (3)	2	-	-	2	30	-	30	60	3
GEN90X	Elective from University Requirements list	1	1	-	2	20	10	20	70	2
ARC416	Graduation Project**	2	8	-	10	180	120	-	300	-
		9	16	-	25				750	

*After the end of the third year, the student performs field training (2) during the summer period for a period of six weeks outside the college in a company or institution in the field of specialization under the supervision of faculty members outside the quorum of the supervising member, and the field training degree is calculated as (30 marks).

**The study for the graduation project lasts for six weeks after the completion of the second semester exams, and the final arbitration score (160 oral degrees) for the Bachelor project is divided equally between internal and external arbitration.



LIST OF TECHNICAL LANGUAGES ELECTIVE COURSES

#	Code	Contact Hours	Contact Hrs			
			Lec.	Tut.	Lab.	Total
1	GEN010	English Language	2	0	.	۲
2	GEN020	German Language	2	0	.	۲
3	GEN030	French Language	2	0	.	۲

LIST OF ELECTIVE COURSES FROM UNIVERSITY REQUIREMENTS

#	Code	Contact Hours	Contact Hrs			
			Lec.	Tut.	Lab.	Total
1	GEN900	Communication & Presentation Skills	۱	۱	.	۲
2	GEN901	Theory of Sustainability	۱	۱	.	۲
3	GEN902	Human Rights and Combating Corruption	۱	۱	.	۲
4	GEN903	Research & Analysis Skills	۱	۱	.	۲
5	GEN904	Entrepreneurship	۱	۱	.	۲
6	GEN905	Professional Ethics	۱	۱	.	۲
7	GEN906	Critical Thinking	۱	۱	.	۲
8	GEN907	Human Resources Management	۱	۱	.	۲
9	GEN908	Contracts and Legislation	۱	۱	.	۲
10	GEN909	Method of Scientific Research and Writing	۱	۱	.	۲



LISTS OF SPECIALIZED ELECTIVE COURSES

#	Code	Contact Hours	Contact Hrs			
			Lec.	Tut.	Lab.	Total
List (1) of Specialized Elective Courses						
1	ARC420	Computational Design	1	3	-	4
2	ARC421	Computer Applications in Environmental Control	1	3	-	4
3	ARC422	GIS	1	3	-	4
4	ARC423	BIM	1	3	-	4
5	ARC424	Landscape of Parks & Open Spaces	1	3	-	4
List (2) of Specialized Elective Courses						
1	ARC425	Contemporary Architectural Trends	2	-	-	2
2	ARC426	Aesthetics and Art Criticism	2	-	-	2
3	ARC427	Vernacular Architecture	2	-	-	2
4	ARC428	Furniture Design	2	-	-	2
5	ARC429	Conservation of Heritage Buildings & Districts	2	-	-	2
List (3) of Specialized Elective Courses						
1	ARC430	Building Construction Equipment	2	-	-	2
2	ARC431	Project Management	2	-	-	2
3	ARC432	Building and Construction Insurance	2	-	-	2
4	ARC433	Integrated Architecture	2	-	-	2
5	ARC434	Environmental Impacts of Projects	2	-	-	2

ARCHITECTURAL ENGINEERING PROGRAM

	First Semester							Second Semester					
FOURTH YEAR	ARC410 Architectural Design (7) (1, 5, 0)	ARC411 Executive Designs (3) (1, 1, 0)	ARC412 Urban Planning (1) (1, 3, 0)	ARC413 Specifications & Construction Management (2, 1, 0)	ARC4xx Elective from List (1) (1, 3, 0)	GEN90x Elective from University Requirements List (1, 1, 0)	ARC400 Field Training (2) (1, 1, 0)	ARC414 Urban Planning (2) (1, 1, 0)	ARC415 New Technologies in Execution (1, 1, 0)	ARC4xx Elective from List (2) (2, 0, 0)	ARC4xx Elective from List (3) (2, 0, 0)	GEN90x Elective from University Requirements List (1, 1, 0)	ARC416 Graduation Project* (2, 8, 0)
THIRD YEAR	ARC310 Architectural Design (5) (1, 5, 0)	ARC311 Executive Designs (1) (1, 4, 0)	ARC312 Urban Design (1, 3, 0)	ARC313 Plumbing and Electro-Mechanical Installations in Buildings (2, 3, 0)	GEN90x Elective from University Requirements List (1, 1, 0)	CIV373 Soil Mechanics & Foundations (1, 1, 1)	ARC300 Field Training (1) (1, 1, 0)	ARC314 Architectural Design (6) (1, 5, 0)	ARC315 Executive Designs (2) (1, 4, 0)	ARC316 Planning and Landscaping of Urban Sites (1, 3, 0)	ARC317 Interior Design (1, 3, 0)	GEN90x Elective from University Requirements List (1, 1, 0)	CIV374 Steel Structures in Architecture (2, 2, 0)
SECOND YEAR	ARC210 Architectural Design (3) (1, 5, 0)	ARC211 History and Theories of Architecture (3) (2, 2, 0)	ARC212 Building Construction (2) (1, 4, 0)	ARC213 Computer Applications (2) (1, 0, 2)	ARC214 Physics of Heat Transfer & Airflow (2, 2, 1)	GEN90x Elective from University Requirements List (1, 1, 0)	ARC215 Architectural Design (4) (1, 5, 0)	ARC216 Building Construction (3) (1, 4, 0)	ARC217 Physics of Lighting & Acoustics (2, 2, 1)	GEN90x Elective from University Requirements List (1, 1, 0)	GED231 Surveying and Measurement (1, 1, 1)	CIV273 Reinforced Concrete (2, 2, 0)	
FIRST YEAR	ARC110 Architectural Design (1) (1, 5, 0)	ARC111 History & Theories of Architecture (1) (2, 2, 0)	ARC112 Architecture and Construction (1, 4, 0)	ARC113 Methods of Visual Expression (1, 3, 0)	CIV175 Material Science (1, 0, 1)	BAS213 Statistics & Probabilities (2, 2, 0)	ARC114 Architectural Design (2) (1, 5, 0)	ARC115 History and Theories of Architecture (2) (2, 2, 0)	ARC116 Building Construction (1) (1, 4, 0)	ARC117 Computer Applications (1) (1, 0, 3)	GEN90x Elective from University Requirements List (1, 1, 0)	CIV176 Structural Analysis (2, 2, 0)	
PRE PARATORY YEAR	BAS010 Differential Calculus and Algebra (2, 2, 0)	BAS011 Statics (2, 1, 2)	BAS012 Engineering Chemistry (2, 1, 2)	BAS013 Physics of Materials & Electricity (2, 1, 3)	MEC010 Engineering Drawing (1) × (0, 3, 0)	GEN010 Technical Language (2, 0, 0)	BAS014 Integral Calculus & Analytical Geometry (2, 2, 0)	BAS015 Dynamics (2, 1, 2)	BAS016 Physics of Light, Heat & Magnetism (2, 1, 2)	MEC011 Production Technology & Workshops† (1, 0, 2)	MEC012 Engineering Drawing (2) (0, 3, 1)	GEN011 Computer Skills (1, 0, 1)	GEN012 History of Engineering & Technology (2, 0, 0)



List of Technical Language Elective Courses

Elective Courses	GEN010	GEN020	GEN030
	English Language	German Language	French Language

List of Elective Courses from University Requirements

Elective Courses	GEN900	GEN901	GEN902	GEN903	GEN904	GEN905	GEN906	GEN907	GEN908	GEN909
	Communication & Presentation Skills	Theory of Sustainability	Human Rights and Combating Corruption	Research & Analysis Skills	Entrepreneurship	Professional Ethics	Critical Thinking	Human Resources Management	Contracts and Legislation	Method of Scientific Research and Writing

	List (1) of Specialized Elective Courses	List (2) of Specialized Elective Courses	List (3) Specialized of Elective Courses
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Elective Courses	ARC420	ARC421	ARC422	ARC423	ARC424	ARC425	ARC426	ARC427	ARC428	ARC429	ARC430	ARC431	ARC432	ARC433	ARC434
	Computational Design	Computer Applications in Environmental Control	GIS	BIM	Landscape of Parks & Open Spaces	Contemporary Architectural Trends	Aesthetics and Art Criticism	Vernacular Architecture	Furniture Design	Conservation of Heritage Buildings & Districts	Building Construction Equipment	Project Management	Building and Construction Insurance	Integrated Architecture	Environmental Impacts of Projects



Matrix relating the program courses with competencies

Course Code	Course Name	Engineering Competencies (2018)										Architectural Engineering Competencies (NARS)						
		A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	B1	B2	B3	B4	B5	B6	B7
BAS010	Differential Calculus and Algebra	√							√			√						
BAS011	Statics	√			√				√									
BAS012	Engineering Chemistry	√	√					√	√									
BAS013	Physics of Materials & Electricity	√	√					√	√									
MEC010	Engineering Drawing (1) ×	√					√		√									
GEN010	Elective from Technical Language List	√	√						√	√								
BAS014	Integral Calculus & Analytical Geometry	√							√			√						
BAS015	Dynamics	√			√	√			√									
BAS016	Physics of Light, Heat and Magnetism	√			√	√			√									
MEC011	Principles of Manufacturing Engineering†	√	√				√		√		√							
MEC012	Engineering Drawing (2) ×	√			√				√									
GEN011	Computer Skills ×	√	√						√		√							
GEN012	History of Engineering & Technology			√			√					√						
ARC110	Architectural Design (1)	√					√	√		√	√	√	√	√	√	√	√	
ARC111	History & Theories of Architecture (1)	√					√		√	√	√	√	√	√	√	√	√	√
ARC112	Architecture and Construction	√					√	√	√	√		√	√	√	√	√		



Course Code	Course Name	Engineering Competencies (2018)										Architectural Engineering Competencies (NARS)						
		A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	B1	B2	B3	B4	B5	B6	B7
ARC113	Methods of Visual Expression	√				√	√	√	√		√	√	√	√	√			√
ARC114	Architectural Design (2)	√	√	√						√		√	√	√	√			
ARC115	History & Theories of Architecture (2)					√	√		√		√	√	√	√	√	√		
ARC116	Building Construction (1)	√	√		√		√	√		√	√	√	√	√	√			
ARC117	Computer Applications (1)				√				√					√	√	√		
CIV175	Material Science	√	√	√		√	√	√	√	√		√	√			√	√	
CIV176	Structural Analysis	√	√	√	√		√	√		√	√		√	√	√	√		√
BAS213	Statistics & Probabilities				√		√	√	√			√	√	√		√		
ARC210	Architectural Design (3)	√					√	√			√	√	√	√	√			
ARC211	History & Theories of Architecture (3)	√					√		√	√	√	√	√	√	√	√	√	√
ARC212	Building Construction (2)	√					√	√			√	√	√	√	√			
ARC213	Computer Applications (2)				√				√					√	√	√		
ARC214	Physics of Heat Transfer & Airflow	√					√				√	√	√	√	√			
ARC215	Architectural Design (4)	√					√	√			√	√	√	√	√			
ARC216	Building Construction (3)	√					√	√			√	√	√	√	√			
ARC217	Physics of Lighting & Acoustics	√					√					√	√	√	√	√	√	
GED231	Surveying and Measurement						√					√	√	√	√	√		√
CIV273	Reinforced Concrete		√	√	√	√	√					√	√	√	√	√	√	
ARC300	Field Training (1)			√		√								√	√	√		



Course Code	Course Name	Engineering Competencies (2018)										Architectural Engineering Competencies (NARS)						
		A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	B1	B2	B3	B4	B5	B6	B7
ARC310	Architectural Design (5)				√	√	√	√	√	√	√	√	√	√	√	√		
ARC311	Executive Designs (1)	√	√				√	√	√	√		√	√	√	√	√		
ARC312	Urban Design						√		√	√		√	√	√	√	√		
ARC313	Plumbing and Electro-Mechanical Installations in Buildings	√	√	√	√	√	√	√		√	√	√	√	√	√	√	√	
ARC314	Architectural Design (6)	√	√	√	√		√	√	√		√	√	√	√	√	√		
ARC315	Executive Designs (2)	√	√	√			√	√	√	√		√	√	√	√	√		
ARC316	Planning and Landscaping of Urban Areas						√		√	√		√	√	√	√	√		
ARC317	Interior Design	√					√	√	√	√		√	√	√	√	√		
CIV373	Soil Mechanics & Foundations	√	√				√	√	√	√	√	√	√	√	√	√	√	
CIV374	Steel Structures in Architecture	√	√	√	√		√				√		√	√	√	√		
ARC400	Field Training (2)			√		√								√	√	√		
ARC410	Architectural Design (7)	√	√	√			√	√	√	√	√	√	√	√	√	√		
ARC411	Executive Designs (3)	√	√		√	√	√	√	√	√		√	√	√	√	√		
ARC412	Urban Planning (1)				√		√	√	√	√	√	√	√	√	√	√		
ARC413	Specifications & Construction Management	√	√	√			√	√	√	√		√	√	√	√	√		
ARC414	Urban Planning (2)		√				√		√	√		√	√	√	√	√		
ARC415	New Technologies in Execution	√	√	√		√	√	√	√	√		√	√	√	√	√	√	
ARC416	Graduation Project	√	√	√			√	√	√	√	√	√	√	√	√	√	√	√
GEN90x	Elective from University Requirements List		√			√		√				√	√			√		



BENHA UNIVERSITY

ARCHITECTURAL ENGINEERING
PROGRAM CURRICULUM
2021



FACULTY OF ENGINEERING AT SHOUBRA

Course Code	Course Name	Engineering Competencies (2018)										Architectural Engineering Competencies (NARS)						
		A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	B1	B2	B3	B4	B5	B6	B7
ARC43X	Elective Course List (1)				√				√		√				√	√	√	√
ARC33X	Elective Course List (2)				√		√	√	√			√	√	√		√		
ARC33X	Elective Course List (3)				√		√	√	√			√	√	√		√		

COURSES DESCRIPTION





FIRST YEAR

ARC100 Summer Training (1)

Prior to the beginning of the semester, students are to attend a three weeks training (five days per week/5 hours a day) for a total of 75 training hours (5 hours / 15 days). The training includes the following content: Introduction to architectural drawing (projection - Presentation) using Manual and technical drawing tools for both two and three-dimensional drawings, with practical exercises and practical applications. The grades of the course are to be added to the course of "Architectural Design (1)" ARC 110, represented by 20 grades.

References

1. Francis D.K. Ching, "Architecture: Form, Space and Order," Van Nostrand Reinhold Company, 1979.
2. MARTIN, LESLIE. Architectural Graphics 2002. Mac Milan Publishers London

ARC110 Architectural Design (1)

(1,5,0)

This course aims at developing students' design skills through addressing the fundamentals of architectural drawings. This is fulfilled through identifying in-depth methods of architectural design, scale, building material terminologies, site analysis and context. The course also aims to develop students' drawing and presentation skills through focusing on drawings fundamentals as projections and presentation techniques of the project plan, vertical sections, elevations, and layout. Students are taken progressively to understand three-dimensional drawings and models. Drawing abilities is gradually improved through the use of free-hand drawing and more advanced presentation drawing skills, to design suitable architectural projects. By the end of the semester, students will be able to present a design project of a simple unit such as (residence - villa - chalet – Guard room - bus station - or the like). The course teaching method depends on lectures, research, exercises and applied projects. Students' projects are evaluated mainly according to the quality of the drawing, projection accuracy, integration of architectural drawings, and good presentation.

References

1. Ching, Francis D.K., "Architecture: Form, Space and order" , 1979. Van Nostrand Reinhold Co., NY, USA.
2. Ernst and Peter Neufert, Architects Data, Recommended books.
3. Time Saver Standards for Architectural Design Data.
4. Alan Jefferis , David A. Madsen, "Architectural Drafting and Design", 2004 Cengage Learning.
5. Wiley, Ramsey Sleeper, (2007) , "Architectural Graphic Standards",11th Edition, American.
6. E. L. Koller Light, Shade & Shadow 2008 Dover Publications
7. MARTIN, LESLIE. Architectural Graphics. 2002Mac Milan Publishers London

Chiu-Shui Chan. 'Style and Creativity in Design' 2015

**ARC111 History and Theories of Architecture (1)****(2,2,0)**

This course is divided into two parts, the first part "History of Architecture" aims provide the students with the knowledge of the phases and development of arts and architecture during ancient civilizations and early Middle Ages, covering the periods from the prehistoric era, until Early Christian and Byzantine eras, through studying the architectural and urban characteristics of the built environment during each period, as well as understanding the impact of natural, socio-cultural and technological factors on it. The students are trained to analyze various examples to identify the aesthetical, functional and structural values of them, and then recognize the similarities, differences between different periods to draw lessons which could develop architectural practice in the future. The second part, "Theories of Architecture" aims to make the students aware of the different factors that affect the architectural design and indicate design determinants. This includes the study of human scale and its effect on the size and form of different building components. It also aims to emphasize the importance of function and principles of functionalism in architecture, through the study of relationship matrix, bubble diagrams, space organization, design module, design concept, basic structural systems and construction methods, with an application on different types of buildings, such as houses, kindergartens, cafeterias and restaurants. Moreover, understanding different design techniques and concepts, through analysis selected projects for famous architects. Teaching is based on lectures, slide shows, field trips, doing research, drawing sketches for historic buildings and analyzing their architectural features.

References

1. Fletcher.B, 1996, A History of Architecture
2. Riseberro, B. Massachusetts 2012, The Story of Western Architecture The MIT Press, Cambridge
3. Mills, E.D. 1985 planning the architects handbook
4. Neufert, E. 1980 architects data
5. Dechiara, J, 1990 , Time -saver standards for buildings types
6. Architecture: Form, Space and Order 2007 John Wiley & Son Francis D.K. Ching

٧. شكري، محمد انور، ١٩٨٦، العماره المصريه القديمه

٨. سامي، عرفان، ١٩٦٧، نظريات عمارة

٩. عبد الجواد، توفيق احمد، ٢٠٠٨، تاريخ العمارة والفنون في العصور الاولى

١٠. محمد انور شكري، ١٩٨٦ "العمارة في مصر القديمه"، الهيئة المصريه العامه للكتاب

ARC112 Architecture and Construction**(1,4,0)**

The course aims to acquire the student the ability to take advantage of the properties and capabilities of the available materials, materials and techniques to implement the various building elements. The course deals with: definition of the structural and architectural characteristics of natural and manufactured building materials / a general and comprehensive review of the characteristics of both ancient and traditional building systems / definition of modern and high-tech construction systems / familiarity with the construction characteristics of the various building elements / construction of



walls of all kinds (load-bearing walls - retaining walls - Partitions - double walls and others) / building those walls from bricks (building bonds - implementing openings in the walls - arches and lintels - sessions and thresholds - projections and recesses - building walls with concrete blocks and others - strengthening and reinforcing walls), advanced and deep foundation construction systems, including piles foundations / construction systems for the simple roofs of small seas from different materials (wooden ceilings / reinforced concrete ceilings / stone and brick ceilings, and the student performs practical training inside the studio on all areas of the course during the semester.

References

1. Osama Al Nahas , "Building construction" 2015
2. W.B. McKay, M.Sc.Tech., M.I.Struct.E. , "McKay's Building Construction, William Barr McKay ,2013"
3. Mitchel, "Building construction" 2002.
4. Medan Mehta, Scarborough , Armrest , "Building Construction " ,Prentice Hall, 2012
5. Building Design and Construction Handbook, Sixth Edition, 2001, McGraw-Hill: New York, San Francisco, Washington, D.C., Auckland, Bogotá, Caracas, Lisbon.

٦. محمد عبدالله , "الانشاء المعماري" , دار الكتب المصرية ١٩٨٠
٧. فاروق عباس حيدر , "تشبيد المباني" , دار الكتب المصرية

ARC113 Methods of Visual Expression

(1,3,0)

This course aims at introducing the basics of visual architectural design through the primary study of geometric elements such as the point, the line, the plane, as well as primary shapes. Gestalt theory for visual perception is introduced in addition to basics of form generation in the 2D and 3D. The course introduces students to visual design fundamentals such as unity, harmony, proportion, golden ratio, color, texture, light, optical illusion, formulation, composition, etc. Through the use of pencils, ink, and colors. students are required to practice freehand drawings of provided models, existed buildings and natural scenes. Students also are introduced to the principles of shade and shadow of different architectural elements, as well as the fundamentals of perspective both exterior and interior. Students work includes class assignments and exercises through manual drafting and use of computer programs which reflect the gained knowledge of architectural representation.

References

1. Ching, Francis D.K., "Architecture: Form, Space and order", Van Nostrand Reinhold Co., NY, USA, 1979
2. Linda Holtzschue , Edward Noriega , "Design Fundamentals for the Digital Age", Wiley, 1997
3. Benjamin , Wucius Wong, "Visual Design on the Computer", W. W. Norton & Company, 2001
4. Hashimoto , Clayton, "Visual Design Fundamentals", Course Technology PTR, 2009

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٦. زكية شافعي، المنظور الهندسي، كلية الهندسة، جامعة القاهرة
٧. عبد الرحمن محمد نصار، الظلال - الظل - المنظور، مكتبة الأنجلو المصرية
٨. سوسي أسكانيان، فن المنظور والاطهار المعماري، ترجمة ربيع الحرساني، دار الأيام للطباعة والنشر
٩. فواز القضاة، الظل والمنظور الهندسي، دار مجدلاوي للنشر والتوزيع

**CIV175 Material Science****(1,1,1)**

This course presents students to the various types of building materials. Students are introduced to the basics of mechanical, chemical and physical properties of construction materials. It familiarizes them with fundamentals of building materials testing, types, properties, usage and code of practice. Moreover, the course enables students to recognize the main properties of different engineering materials and to identify the testing methods to evaluate properties of different materials as stone, lime, sand, marble, wood, metals, etc. Field trips to sites, material and quality lab are to take place throughout the semester. Students are to submit technical reports based on the field trips.

References

1. Leonard Koren , William Hall "Concrete" , Phaidon Press , 2012
2. Egyptian code of practice and design of RC structures
3. Egyptian code for design aids for RC structures
4. Design of reinforced concrete structures- V1 by M. Ghoneim
5. Egyptian code for standard reinforcement detailing
6. ACI structural journal, American concrete institute
7. ACI material journal, American concrete institute

BAS213 Statistics & Probabilities**(2,1,0)**

The course aims to provide the student with basic knowledge in the following topics: Introduction to statistics, data processing and analysis, arithmetic mean and median, mode and standard deviation, computational inferences, statistical measures, measures of central tendency, measures of dispersion, probability theory, Biz theory, the random variable, and other topics that can be applied in engineering, architectural, operational and scientific research fields.

References

- 1- Joe D. Hoffman, Numerical methods for engineers and scientists, 2nd edition, Marcel Dekker, Inc. New York, 2001
John Schiller, R. Alu Srinivasanand Murray R. Spiegel, Schaum's Outline of Probability and Statistics, 4th ed., McGraw Hill 2012.

ARC114 Architectural Design (2)**(1,5,0)**

This course aims to understand design concepts and the effective factors on the architectural design, as well as functional relations between spaces within buildings, through training on data gathering, layout studies and functional program schematics for different buildings through studying functional requirements, theories and design standards. The students are trained to analyze similar projects, and preparing plans Functional relationships, then developing them into an integrated architectural design. Thus, motivate the student's imagination towards developing architectural forms and design alternatives, while taking into consideration: environmental control of spaces, the aesthetic theory of the formation and articulation of facades, structural systems and contemporary building technology. Students are asked to apply the learnt skills and techniques to small projects such as residential unit, villa, kindergarten, or post office, etc. The method of teaching depends on lectures,



research and exercises, and proposing design alternatives while presenting architectural projects through the use of free-hand drawing and more advanced presentation drawing skills, and the project is evaluated according to the functional requirements mainly, along with their compatibility with the site and their observance of the structural system which is suitable for the architectural morphology, the quality of the drawing, the accuracy of the projection and the integration of architectural drawings and good presentation.

References

1. Ching, Francis D.K., "Architecture: Form, Space and order", 1979 Van Nostrand Reinhold Co., NY, USA.
2. Joseph de Chiare and John Hancock Callender, (1990), "Time Saver Standards for Building Types".
3. Time Saver Standards for Architectural Design Data.
4. Alan Jefferis, David A. Madsen, "Architectural Drafting and Design", 2004 Cengage Learning
5. Ernst and Peter Neufert, Architects Data, Recommended books
6. MARTIN, LESLIE. Architectural Graphics 2002. Mac Milan Publishers London
Chiu-Shui Chan. 'Style and Creativity in Design' 2015

ARC115 History and Theories of Architecture (2)

(2,2,0)

This course is divided into two parts: The first part "History of Architecture" aims to understand the changes and development that occurred in architecture during Middle Ages in both Europe and Islamic world, by teaching the characteristics and features of different architectural styles that appeared at that time, and the factors that led to them. The course includes the study of Romanesque and Gothic architecture in Medieval Europe, as well as the origins and development of Islamic architecture, with special focus on Islamic architecture of Egypt during its different periods (Caliphate, Umayyad, Abbasid, Tulunid, Fatimid, Ayyubid, Mamluk and Ottoman periods).

The second part of the course "Theory of Architecture" aims to inform the students of the basics and principles of architectural design, through studying the design considerations and appropriate solutions of horizontal and vertical circulation, car movements and parking areas, in addition to design criteria of different types of buildings, such as post offices, bank branches, outpatient clinics and conference halls. Teaching is based on lectures, slide shows, field trips, doing researches, drawing sketches for historic buildings and analyzing their architectural features.

References

- 1- حسن عبد الوهاب ١٩٤٦ - تاريخ المساجد الأثرية - القاهرة
- 2- كمال الدين سامح، ١٩٩١، العمارة الإسلامية في مصر، الهيئة المصرية العامة للكتاب
- 3- حسن الباشا وآخرون، ١٩٩٩، موسوعة العمارة والآثار والفنون الإسلامية، ٤ أجزاء، أوراق شرقية للنشر
- 4- منظمة العواصم والمدن الإسلامية، أسس التصميم المعماري والتخطيط الحضري في العصور الإسلامية المختلفة بالعاصمة القاهرة، ١٩٩٠
- 5- أحمد فكري، ١٩٦٤، مساجد القاهرة ومدارسها، ٥ أجزاء، دار المعارف
- 6- محمد حسن العيدروس، ٢٠١٢، العصر الأندلسي - العمارة والفنون الأندلسية، دار الكتاب الحديث
- 7- K. A. C. Creswell, 1969., Early Muslim Architecture, 2nd edition, vol. 1, 2 parts. Oxford



- 8- Creswell K. A. C. , 1978, Muslim Architecture of Egypt
 - 9- CRESWELL K. A. C.. 1989, A Short Account of. Early Muslim Architecture.
 - 10- CRUIKSHANK, Dan, Sir Banister Fletcher's: A History of Architecture, 20th Ed., Oxford, Architectural Press Books, 1996.
 - 11- Mills, E.D. 1985 planning the architects handbook
 - 12- Neufert, E. 1980 architects data
 - 13- Dechiara, J, 1990 Time -saver standards for buildings types
- CHARLESON, Andrew, Structure as Architecture, Oxford, Architectural Press, 2005.

ARC116 Building Construction (1)

(1,4,0)

The course aims to acquire the student the ability to find technical solutions and choose the appropriate technical treatments to implement the various building elements by relying mainly on the investment of the properties and capabilities of the materials and raw materials used, and the course deals with topics: construction and refinement of the roofs of small and large seas in various situations using different construction materials such as wood, concrete and metals: Construction of reinforced concrete ceilings according to special systems and advanced technologies / frames / panel beams/ waffle slabs / construction of trusses of various kinds and from various materials, the student performs practical exercises inside the studio on all areas of the course.

References

8. Osama Al Nahas , "Building construction" 2015
9. W.B. McKay, M.Sc.Tech., M.I.Struct.E. , "McKay's Building Construction, William Barr McKay ,2013"
10. Mitchel, "Building construction" 2002.
11. Medan Mehta, Scarborough , Armrest , "Building Construction ",Prentice Hall, 2012
12. Building Design and Construction Handbook, Sixth Edition, 2001, McGraw-Hill: New York, San Francisco, Washington, D.C., Auckland, Bogotá, Caracas, Lisbon.

١٣. محمد عبدالله , "الانشاء المعماري" , دار الكتب المصرية ١٩٨٠
١٤. فاروق عباس حيدر , "تشبيد المباني" , دار الكتب المصرية ١٩٩٨

ARC117 Computer Applications (1)

(1,0,3)

The course aims to introduce students to the use of CID in Architecture. This is achieved by enabling students to use specialized computer programs in Architecture drawings, as well as presentation and coloring computer aided programs, focusing on drawings and 2D presentation. Course teaching method is a demonstration in a computer lab on how to use different, specialized, continuously updated computer programs. Each student will undergo a various set of practical exercises to obtain the necessary skills to use CID in Architecture.

References

1. Linda Holtzschue , Edward Noriega , "Design Fundamentals for the Digital Age" , Wiley, 1997 - Benjamin ,
2. Wucius Wong, "Visual Design on the Computer" , W. W. Norton & Company, 2001



3. Hashimoto , Clayton, "Visual Design Fundamentals", Course Technology PTR, 2009

CIV176 Structural Analysis

(2,2,0)

The course aims to identify the basic structural concepts for the performance of the various elements of the structure and methods of analysis and to extract the effect of external and internal forces in buildings, through the study of the theory of structures and methods of calculating the distribution of loads, reactions, shear forces, torsion and bending moments. Studio work is based on doing exercises designed to understand the analysis of structures and submitting assignments with the aid of lectures.

References

- 1- El-Dakhakhny, Structural Analysis: Part I, 8th ed., Dar-Al-Maaref, Cairo, Egypt, 2004. ISBN: 977 - 246-664-3.
- 2- Parker, H., and Ambrose, J.E., "Simplified Mechanics and Strength of Materials", 5th ed., 1992, John Wiley & Sons; ISBN 0471541702
- 3- Beer, F.P., and Johnston,E.R., Jr. , "Mechanics of Materials", McGraw Hill, 5th ed., 2001.



SECOND YEAR

ARC200 Summer Training (2)

Before joining the second year, the student attends a three-week training (five days a week for 5 hours per day) for a total of 75 training hours (5 hours / 15 days), and it aims at developing the architectural presentation skills of students, whether by manual methods (using Pencil, ink or colors of various types) or with the aid of computer applications that help in preparation and presentation of two-dimensional and three-dimensional drawings. The training also includes making of physical architectural models using different materials. The students perform practical architectural exercises and applications. The grades of the course are to be added to the course of "Architectural Design (3)" ARC 210, represented by 20 grades.

References:

- 1- Francis D.K. Ching, "Architecture: Form, Space and Order," Van Nostrand Reinhold Company, 1979.
- 2- MARTIN, LESLIE. Architectural Graphics 2002. Mac Milan Publishers London
- 3- Wucius Wong, "Visual Design on the Computer", W. W. Norton & Company, 2001

ARC210 Architectural Design (3)

(1,5,0)

This course is a continuation of the design stream, but more focused on spatial problems and comprehending space dynamics with reference to context. It develops the understanding of functional and spatial requirements as a basis for the generation of design solutions of circulation and the skill of comprehending architectural formations. The use of context is emphasized in the course through the study of site characteristics, climate, and urban and architectural context. The course focuses on buildings with moderately complex multi-functional programs. Students are asked to apply the learnt skills and techniques to multi-function projects such as schools, craft or heritage centers, laboratories, libraries, lodges, rest houses, or embassy buildings, with the selections of sites with distinctive natural, climatic or urban characteristics, such as sites overlooking sea, or heritage areas context, or sites of a desert or contour nature, or otherwise. Projects are evaluated according to their success in dealing with site characteristics mainly, as well as their fulfillment of functional, structural and aesthetic requirements, quality of drawing, projection accuracy, integration of architectural drawings and good visualization. The course comprises a combination of lectures, students' presentation of design projects, precedents' analysis, research assignments and 3D study models. Final projects are submitted using computer aided techniques.

References

- 1- Ching, Francis D.K., "Architecture: Form, Space and order", Van Nostrand Reinhold Co., NY, USA, 1979.
- 2- "Neufert, Architect's Data," Grosby Lockwood Staples", London, 1970
- 3- Donald Watson, Alan Plattus & Rebert Shibley, Time Saver Standard for Urban Design, McGraw-Hill.
- 4- Anthology of Beginning Design Projects", Van Nostrand Reinhold, 1993
- 5- White, Edward T., "A vocabulary of Architectural Forms", Architectural Media, 1975



- 6- cappelman, Owen-Jordan, Michel Jack, "Foundation in Architecture: An Annotated Anthology of Beginning Design Projects", Van Nostand Reinhold, 1993
- 7- Joseph de Chiare and John Hancock Callender,(1990) ,"Time Saver Standards for Building Types".
Time Saver Standards for Architectural Design Data.

ARC211 History and Theories of Architecture (3) (2,2,0)

This course is divided into two parts: The first part "History of Architecture" aims to understand the changes and developments that occurred in architecture from the end of middle Ages until the current era. This includes the study of Renaissance and post-Renaissance architecture, the rise and fall of Modern architecture, as well as the trends and movements of contemporary architecture, such as Post-Modernism, Late Modernism, Hi-tech architecture, Deconstructivism, green architecture, sustainable architecture and Digital architecture. The second part of the course "Theory of Architecture" aims to expand the students' knowledge of the principles of architectural design process from its functional, aesthetical and structural sides. This includes preparation of architectural program, study of space relationships, site selection, site analysis, solution techniques and design alternatives, with application on different types of buildings, such as hotels, libraries and schools. Teaching is based on lectures, slide shows, field trips, doing researches, drawing sketches for historic buildings and analyzing their architectural features.

References

- 1- MOFFETT, Marian, FAZIO Michael, WOEHOUSE, Laurence, A World History of Architecture, Laurence Publishing, London, 2003.
- 2- BENEVOLO, Leonardo, History of Modern Architecture, Cambridge, MIT Press, 1992.
- 3- CRUIKSHANK, Dan, Sir Banister Fletcher's: A History of Architecture, 20th Ed., Oxford, Architectural Press Books, 1996.
- 4- HONOUR Hugh & FLEMING John, A World History of Art, Laurence King, London 1999.
- 5- MURRAY, Peter, The Architecture of the Italian Renaissance, London, Thames & Hudson, 2007.
- 6- PICON, Antoine, French Architects and Engineering in the Age of Enlightenment, Cambridge, Cambridge University press, 1992.
- 7- ROTH, M. L., Understanding Architecture; Its Elements, History and Meaning, The Herbert Press, London, 1993.
- 8- TOMAN, Rolf, Baroque, Cologne, Ullmann & Könemann, 2007.
- 9- TOMAN, Rolf, The Art of the Italian Renaissance, Cologne, Ullmann & Könemann, 1995.
- 10- Joseph de Chiare and John Hancock Callender,(1990) ,"Time Saver Standards for Building Types",.
- 11- Wiley, Ramsey Sleeper, (2007) , "Architectural Graphic Standards",11th Edition, American.

ARC212 Building Construction (2) (1,4,0)

The course aims to complete the student's acquisition of the ability to find technical solutions and choose the appropriate technical treatments to implement the various building elements, through dealing with topics: vertical circulation elements in studying the construction of stairs and slopes of different types and materials / separations joints for each of: expansion, settlement, and construction / construction of temporary buildings including: formwork, scaffolding, reinforcement,



restoration and repair works, and prefabricated works in buildings, and the student performs practical training in all areas of the course in addition to doing field research and technical reports.

References

- ١- محمد محمود عوضيه-تطوير الفكر المعماري بالقرن العشرين-دار النهضة-بيروت١٩٨٤
 - ٢- فاروق عباس حيدر-الموسوعة الحديثة في تكنولوجيا تصميم المباني- دار النهضة-٢٠٠٣
 - ٣- م.توفيق عبد الجواد - م.محمد توفيق عبد الجواد - مواد البناء وطرق الإنشاء في المباني-دار النهضة ١٩٩٨
 - ٤- الكود المصري لميكانيكا التربة وتصميم وتنفيذ الاساسات / الجزء الثالث - الاساسات الضحلة / الجزء الرابع - الاساسات العميقة
- 5- Course notes prepared by instructor
 - 6- Barry's Advanced Construction of Buildings, 2010

ARC213 Computer Applications (2)

(1,0,2)

The course aims to extend students' understanding of the use CID in Architecture as well as the urban field. Through the course students are introduced to Virtual Reality programs in static or animated shots as an aiding tool in Architectural Design and related Fields. In addition, students are exposed to virtual simulation programs and their use in presentation. The course comprises a combination of lectures devoted to computer programs updated with practical applications on various exercises.

References

- 1- Linda Holtzschue , Edward Noriega , "Design Fundamentals for the Digital Age", Wiley, 1997-Benjamin,
- 2- Wucius Wong, "Visual Design on the Computer", W. W. Norton & Company, 2001
- 3- Hashimoto , Clayton, "Visual Design Fundamentals", Course Technology PTR, 2009

ARC214 Physics of Heat Transfer & Airflow

(2,2,1)

The course aims to provide students with the necessary knowledge and experience to understand the ways, methods, and theories of heat transfer through various materials, as well as the behavior of air movement in different spaces, in order to be applied in the design of the built environment so as to achieve the required comfort levels based on natural means. The course emphasizes on climate and its elements in different areas (indoor climate / the sun and its relationship with buildings / methods to protect buildings from solar radiation / thermal behavior of different buildings/ materials and building elements / solar radiation control and thermal insulation methods/ design of shading devices, air movement and indoor natural ventilation patterns) and natural ventilation techniques. Students assign a set of exercises to gain the talent to design a building space that meets the environmental requirements from the architectural point of view.

References

- 1- Peter F. Smith," Architecture in a Climate of Change- A guide to sustainable design "An imprint of Elsevier Linacre House, Jordan Hill, Oxford Second edition 2005.
- 2- Benoit Cushman- Roisin,"Building Ventilation in hot climates" 2017.
- 3- Norbert Lechner, "HEATING,COOLING,LIGHTING-Sustainable Design Methods for Architects" John Wiley&Sons.Inc,2015.



- 4- An Architect's Guide" Designing Spaces for Natural Ventilation " Taylor & Francis, 2015.
- 5- Peter F. Smith," Building for A Changing Climate-The Challenge for Construction, Planning and Energy" Earthscan in the UK and USA in 2010.
- 6- Hocine Bougdah and Stephen Sharpies, "Environment, Technology and Sustainability" Taylor & Francis, London and New York.2010.
- 7- Robert D. Brown, "Design with Microclimate- the Secret to Comfortable Outdoor Space" Island press, 2010 .
- 8- Peter F. Smith," Architecture in a Climate of Change- A guide to sustainable design "An imprint of Elsevier Linacre House, Jordan Hill, Oxford Second edition 2005.
- 9- Baruch Givoni, "Climatic Consideration in Building and Urban Design" Van Nostrand Reinhold, 1998.
- 10- Fuller Moore, "Environmental Control Systems – Heating, Cooling, Lighting" United States of America McGraw – Hill, Inc. 1993.
- 11- Richard L. Crowther, FAIA, "Sun/Earth- Alternative Energy Design for Architecture" Van Nostrand Reinhold Company, Australia.1989

١٢- دليل العمارة والطاقة " العمارة الخضراء والطاقة" جهاز تخطيط الطاقة – يوليو ١٩٩٨ م

١٣- د. ناهد فتحى عبد الغنى " الاسكان فى المناطق الصحراوية- دراسة نسق سريان الهواء فى الفراغات السكنية الخارجية الصحراوية فى المدن الجديدة بمصر" رسالة دكتوراة – هندسة شبرا-جامعة الزقازيق فرع بنها-١٩٩٧ م

١٤- د.م/ شفيق العوضى الوكيل، د.م/ محمد عبد الله سراج " المناخ وعمارة المناطق الحارة" القاهرة ١٩٨٩ م

ARC215 Architectural Design (4)

(1,5,0)

The course aims to develop the student's ability to the requirements of the structural system and building techniques in the architectural design in order to enhance the functional and formative solutions of the building through deepening the student's awareness of the various construction systems and building materials. Thus, motivate the student's imagination towards developing architectural forms and design alternatives, while taking into consideration: structural systems and contemporary building technology. Students are asked to apply the learnt skills and techniques to multi-function projects such as residential buildings, commercial centers, administrative buildings, youth houses, multi-storey garages, etc. The method of teaching depends on lectures, research and exercises, and proposing design alternatives while presenting architectural projects through the use of free-hand drawing and more advanced presentation drawing skills, and the project is evaluated according to the functional requirements mainly, along with their compatibility with the site and their observance of the potential of structural systems, traditional and advanced building materials and techniques, as well as their fulfillment of the functional and aesthetic requirements of the building, the quality of drawing, projection accuracy, integration of architectural drawings and good visualization. Final projects are submitted using computer aided techniques.

References

- 1- CHARLESON, Andrew, Structure as Architecture, Oxford, Architectural Press, 2005.
- 2- Ching, Francis D.K., "Architecture: Form, Space and order", Van Nostrand Reinhold Co., NY, USA, 1979.
- 3- "Neufert, Architect's Data, "Grosby Lockwood Staples", London, 1970
- 4- Anthology of Beginning Design Projects", Van Nostrand Reinhold, 1993



- 5- White, Edward T., "A vocabulary of Architectural Forms", Architectural Media, 1975
- 6- cappleman, Owen-Jordan, Michel Jack, "Foundation in Architecture: An Annotated Anthology of Beginning Design Projects", Van Nostand Reinhold, 1993
- 7- Joseph de Chiare and John Hancock Callender, (1990) , "Time Saver Standards for Building Types".
- 8- Time Saver Standards for Architectural Design Data.

ARC216 Building Construction (3)**(1,4,0)**

The course aims to complete the student's acquisition of the ability to find technical solutions and choose the appropriate technical treatments to implement the various building elements, and the course deals with topics: finishing works, interior and exterior finishing of various building elements and components / general carpentry and delicate carpentry, including: Carpentry of doors, windows and fittings, blacksmithing works, and aluminum works / plaster works of various types / cladding works / painting works / suspended and false ceiling works / construction of special elements such as curtain walls, x-ray rooms, and refrigerators, and the student performs practical training in all areas of the course in addition To do field research and technical reports.

References

- ١- محمد محمود عوضيه-تطوير الفكر المعماري بالقرن العشرين-دار النهضة-بيروت ١٩٨٤
 - ٢- فاروق عباس حيدر-الموسوعة الحديثة في تكنولوجيا تصميم المباني- دار النهضة-٢٠٠٣
 - ٣- م.توفيق عبد الجواد - م.محمد توفيق عبد الجواد - مواد البناء وطرق الإنشاء في المباني-دار النهضة ١٩٩٨
 - ٤- الكود المصري لميكانيكا التربة وتصميم وتنفيذ الاساسات / الجزء الثالث - الاساسات الضحلة / الجزء الرابع - الاساسات العميقة
- 5- Barry's Advanced Construction of Buildings, 2010

ARC217 Physics of Lighting & Acoustics**(2,2,1)**

The course aims to provide students with the necessary knowledge to understand Methods, techniques, and theories of light behavior, whether natural or artificial, as well as the behavior of sound waves in various spaces and materials, in order to be applied in the design of the built environment. The course aims to study the natural and industrial means to control lighting levels inside the building / explore techniques and methods to achieve the levels and quality of lighting required (light sources) inside the building. Students are to carry out experiments and measurements within environmental control labs and conduct indoor and outdoor lighting intensity measurements. Students study the natural and engineering methods to control the acoustic condition of the building / acoustic energy characteristics and methods. Indoor sound transmission / noise sources and methods of noise levels control within building spaces / sound insulation and absorption / sound insulation calculation methods and sound absorption capacity of the building / effect of indoor space design elements and its characteristics on acoustic state. Students will assign a set of exercises to gain the talent to design special spaces that require acoustics and lighting control such as theaters, cinema and recording studios.

References

١. م. احمد الخطيب " الصوتيات المعمارية- النظرية والتطبيق " مكتبة الانجلو المصرية ٢٠٠٣م.
٢. دليل العمارة والطاقة " التصميم الصوتي للمباني " -جهاز تخطيط الطاقة- يوليو ١٩٩٨م



٣. م/ جمال احمد عبد الحميد" الصوتيات فى المباني التعليمية (المدارس)- دراسة تحليلية لأسس تصميم المدارس بالقاهرة الكبرى) رسالة ماجستير- جامعة القاهرة- ١٩٩٨م.

4. Carl Hopkins," Sound Insulation"" Elsevier, Inc. 2007.
5. Jian Kang," Urban Sound Environment" Taylor & Francis.2007.
6. Marshall Long," Architectural Acoustics" Elsevier, Inc. 2006.
7. J.D.Quirt, T.R.T. Nightingale, F. King," Guide for Sound Insulation in Wood Frame Construction" National Research Council Canada, 2006.
8. M.W.Simons, J.R.Waters, " Sound Control in Buildings- A Guide to Part E of the Building Regulations" M.W. Simons and J.R. Waters, 2004.
9. Benz Kotzen and Colin English," Environmental Noise Barriers- A Guide to their Acoustics and Visual Design" Taylor & Francis e- Library.2001.
10. YOichi Ando, "Architectural Acoustics- Blending Sound Sources, Sound Fields, and Listeners" Springer-Verlag New York, Inc. 1998.
11. Charles W.Harris, Nicholas T, Dines." Time Saver Standards for landscape Architecture – Design & construction Data" McGraw – Hill publishing company. 1998.
12. Duncan Templeton & David Saunders. "Acoustic Design" The architecture press London, 1987.
13. Peterlord, Duncan Templeton," The Architecture of sound- Designing Places of Assembly" Peter Lord& Duncan Templeton.1986.
14. O.H Koenigsberger. T.G. Ingersole. Alan Mayhew. S.V. Szok0lay." Manual of tropical housing and building" longman group limited london, 1973.
15. Carl Hopkins," Sound Insulation"" Elsevier, Inc. 2007.
16. Jian Kang," Urban Sound Environment" Taylor & Francis.2007.
17. Marshall Long," Architectural Acoustics" Elsevier, Inc. 2006.
18. Egan, M. D. and Olgae V., Natural Lighting, McGraw-Hill Inc., (2002).
19. Egan, M. D., Concepts in Architectural Acoustics, McGraw-Hill Inc., (1983).
20. Evans, Benjamin H. AIA., Daylighting in Architecture, Architectural Record Books, McGraw-Hill Inc., (1981).
21. J.E. Moore, Friba, Design for good Acoustics, Architectural Press, London, (1967).
22. Moore, F., Concepts and Practice of Architectural Daylighting, New York: Van Nostrand Reinhold, (1991).
23. Lawrance Berkeley Laboratory, Predicting Daylight and Lighting Performance, Regents of the University of California, (1994).

GED231 Surveying and Measurement

(1,1,1)

This course aims to enhance students' knowledge and understanding of surveying and its importance for different engineering projects. Special attention is directed to distance measurements and their application to construct cadastral maps with special highlight of map scale and its representation. Angular measurements by surveying instruments conventional and modern are introduced throughout the course. Compass/ Theodolite/total station and their applications for bearing measurements and measurements of sides and angles of traverses for co-ordinates computations are also clarified. Leveling process and its application to construct maps with highlight of their importance and applications. Earth works computation of areas and volumes. The above-mentioned contents of the course are given through assignments, practical application, training on different surveying instruments (conventional and modern) with mentioning to the different computer program used in different application.

References

- 1- Course notes prepared by instructor



- 2- All surveying text books in the faculty library
- 3- Surveying NARINDER SINGH 1982
- 4- Surveying and levelling R. Agor 1984

CIV273 Reinforced Concrete

(2,2,0)

The course aims to provide the student with the methods of calculating the reinforced concrete structures, by studying the design of concrete sections for slabs and cantilevers, in addition to the analysis and design of solid slabs one-way and two-way and hollow slabs. Moreover, the course introduces students to terminology and structural drawings, as well as training students to make structural designs through submission of practical exercises and assignments.

References

- 1- Lecture notes and handouts prepared by instructor
- 2- Egyptian code of practice and design of RC structures
- 3- Egyptian code for design aids for RC structures
- 4- Design of reinforced concrete structures- V1 by M. Ghoneim
- 5- Egyptian code for standard reinforcement detailing
- 6- ACI structural journal, American concrete institute
- 7- ACI material journal, American concrete institute



THIRD YEAR

ARC300 Field Training (1) (0,0,0)

After accomplishing first-year courses, students should spend at least four weeks in practical-training. Student are to provide a report describing a complete description of the achieved training course. The report should show the technical and scientific skills acquired during the training period. Finally, the report is reviewed by an academic committee from the department for approval.

ARC310 Architectural Design (5) (1,5,0)

The course is a continuation of the design stream with more emphasis on the architectural spatial experience between and within the indoors and outdoors. The course aims to expose students to experience, visualize, perceive and learn to create different types of indoor and outdoor spaces, and to gain a deep understanding for the relationship between them. The course builds through research involving contextual and cultural analyses, data gathering techniques, precedents' analysis, and methods of concept generation. Spatial experience is emphasized through presenting students with a typology of complex, specified, and multi-functional projects Students are asked to apply the learnt skills and techniques to in the detailed design of a building or a group of buildings with complex, complex and multi-functional relationships, such as hotel buildings, administrative, commercial and residential complex, health centers, hospitals, or transportation stations, such as bus stations, and airports, etc. Projects are evaluated according to their success and creativity in meeting the conflicting and overlapping functional and construction needs of the project components in a compatible manner, in addition to effectively dealing with the characteristics of the site and its surroundings, and taking into account the functional and aesthetic requirements, quality of drawing, projection accuracy, integration of architectural drawings and good visualization.. The course comprises a combination of lectures, students' presentation of design projects, precedents' analysis, research assignments and 3D study models. Final projects are submitted using computer aided techniques.

References

- 1- Time Saver Standards for Architectural Design Data.
- 2- Time Saver Standards for Building Types,
- 3- Time Saver Standards for Landscape
- 4- Wiley, Ramsey Sleeper, "Architectural Graphic Standards"
- 5- Neufert, E., "Neufert Architect's Data", Crosby Lockwood Staples, London
- 6- Illustration Book Series
- 7- Korean Architecture Series

ARC311 Executive Designs (1) (1,4,0)

This course aims to introduce students to the basics and fundamentals of the various executive designs and their requirements for the development of the preliminary project to be transformed into executive reality. Students are encouraged to find the optimal technical solutions to building



problems. The course provides students with the skills of the execution drawings of the architectural works. Students explore the finishing materials of building facades. The course addresses the fundamentals and international codes used for execution drawings standards (symbols and terms used in each). Students produce execution drawings for a practical preliminary project at the studio that includes different plans, comprehensive elevations and sections with all dimensions, levels, labels, annotations, as well as the tables of finishing materials and openings tables. Computer could be used for drafting purposes.

References :

- 1- B.T Batsford Ltd, Derek Osbourn & Reger Greeno, Mitchell's Building Construction, 2007 .
- 2- IBC, International Building Code, AIA, 2009 .
- 3- Joseph De Chiara, Time Saver for Interior Design and Space Planning, McGraw-Hill, 1991.
- 4- IBC, International Building Code, AIA, 2012

ARC312 Urban Design**(1,3,0)**

The course aims to analyze and assimilate the physical and moral relations between humans and the urban environment and the reflection of cultural, social, environmental and economic influences on the formation of urban spaces. The course aims to study the visual structure of the city and its interrelationships through the study of urban needs / components of the space / engineering construction, visual and aesthetic of public spaces / heritage urban fabric and concepts of conservation / integration of buildings in the surrounding urban environment. The course also aims at developing student's abilities to create an urban environment that interacts and integrates with the characteristics of the urban environment by studying: components of the visual image of the space, movement in the spatial modulation, corridors network, visual and urban formation, and the local environmental dimensions and their impact on the elements of site coordination. Students design a detailed project for one of the existing urban spaces through the study and analysis of the existing situation, in order to make design proposals for an idea developed based on a set of design alternatives to these spaces. Computer aided techniques are used in final submissions.

References

1. Golany, G., (1976) New Town Planning Principles and Practice. London : John Wiley and sons,.
2. Golany, G., (1978) International Urban Growth & polices – New towns contribution, London : Wiley inter science publication
3. Joseph Dechiara, Gulius Panero, and Martin Zelnik, "Time-saver Standards for Interior Design and Spaces planning", Second Edition, by The McGraw-Hill companies, 2001.
4. City of Victoria Planning. (2006) Downtown Core Area Plan. 14-21. BC Canada: Planning Department.

ARC313 Plumbing and Electro-Mechanical Installations in Buildings**(2,3,0)**

This course aims to provide students with the required knowledge about plumbing and electro-mechanical installations in order to achieve a sound public health environment for architectural projects. Students will achieve this objective by studying the following; a) various methods,



technologies and systems related to water and drainage networks as well as liquid and solid waste disposal, b) best practices for electro-mechanical installation systems including their modern operandi, requirements and safety measures inside buildings. Students will master the above-mentioned objectives via exploring the various systems and technologies as well as their mechanical installation pre-requisites such as air-conditioning, lifts, escalators, circulation of loaders and service cranes, electric extensions, fire detection and firefighting and safety systems in buildings ...etc. At the end of this course students will be able to perform the following; a) successfully conduct applied tests in both the environmental and plumbing installations lab, b) safely conduct field research in order to evaluate the used methods and technologies, both in and out of the university, and draw lessons learned, c) efficiently produce architectural drawings in the form of coordinated working drawings for the different disciplines using the latest software in the field.

References

- ١- الكود المصري لأسس تصميم وشروط التنفيذ لهندسة التركيبات الصحية
- ٢- الكود المصري للكهرباء في أسس تصميم وشروط تنفيذ التوصيلات والتركيبات الكهربائية في المباني
- ٣- الكود المصري لأسس تصميم وشروط تنفيذ أعمال تكييف الهواء والتبريد
- ٤- الكود المصري لاسس التصميم وشروط تنفيذ المصاعد الكهربائية والهيدروليكية في المباني

CIV373 Soil Mechanics and Foundation (1,1,1)

This course aims to provide students with the basic soil properties, soil classification, soil permeability, field and laboratory compaction tests-stress distribution in soil, soil settlement, soil shear strength-lateral earth pressure, types of retaining structures, bearing capacity of soil, main types of foundation design, soil analysis and reports using soil laboratory

References :

- 1- Bowel, 1975 "Foundation Analysis and Design "
- 2- Egyptian Code of practice for soil mechanics and foundation design

ARC314 Architectural Design (6) (1,5,0)

The course is a continuation of the design stream; it extends students' understanding of the factors that affect/influence design. The course emphasizes on the socio-cultural contexts as well as the physical. The course addresses the urban fabric with all its heritage, cultural, and humanitarian elements, thus reaching the complete integrated design concept and achieving creative architectural formulations. Students are asked to apply the learnt skills and techniques to projects related to different types of human needs, such as homes for the elderly, orphanages, rehabilitation centers for people with special abilities, hospital resorts, museum buildings, art galleries, training, educational or rehabilitative centers, or social and sports clubs, With the choice of sites with distinct cultural and social contexts, such as sites located near heritage, traditional, popular or rural areas, or located in the city center or in the suburbs, or in crowded and congested areas or open and extended. Projects are evaluated according to their success and creativity in meeting the conflicting and



overlapping functional and construction needs of the project components in a compatible manner, in addition to effectively dealing with the characteristics of the site and its surroundings, and taking into account the functional and aesthetic requirements, quality of drawing, projection accuracy, integration of architectural drawings and good visualization. The course comprises a combination of lectures, students' presentation of design projects, precedents' analysis, research assignments and 3D study models. Final projects are submitted using computer aided techniques.

References :

- 1- Time Saver Standards for Architectural Design Data.
- 2- Time Saver Standards for Building Types,
- 3- Time Saver Standards for Landscape
- 4- Wiley, Ramsey Sleeper, "Architectural Graphic Standards"
- 5- Neufert, E., "Neufert Architect's Data", Crosby Lockwood Staples, London
- 6- Illustration Book Series
- 7- Korean Architecture Series

ARC315 Executive Designs (2)**(1,4,0)**

The course aims to find executive solutions to the problems of construction and finishing for the various elements of the building. Students are encouraged to select appropriate materials for internal and external finishing based on scientific guidelines. The course develops students' abilities to address complex problems and find advanced executive design solutions that relate to the environment within the buildings. Students' abilities are shown in the renewal, development and technical control of various aspects of the problems. Students conduct practical training in the studio on selected preliminary projects showing a range of special problems, such as humidity, water leakage, noise, climate temperature, etc. Moreover, students apply advanced construction systems, modern construction techniques and high-tech finishing, which require non-traditional solutions and executive treatments using computer-based tools.

References

- 1- Abd El Gawad, Tawfic, Building Material and Building Construction .
- 2- Mitchell's, "Building Construction", B.T.Batsford Ltd London
- 3- Time savor standard for building types,"Time savor standard for landscape "
- W.B. McKay, "Building Construction", Longm

ARC316 Planning and Landscaping of Urban Areas**(1,3,0)**

The course aims to study the concept of residential areas and the foundations of planning urban housing communities. The course introduces students to the development of residential areas through the study of demography and service rates/ land use and division, rates of basic services for population sizes and space distribution format - land use budget, the distribution and grading of road networks to serve residential areas/ types of housing. Students are exposed to the morphology of landscape, types of soft and hard landscape elements and the characteristics and specifications of the use of each element. Urban and landscape detailing are studied. Students prepare practical applications for a detailed plan with the application of the specific requirements for the development



of residential areas and the application of the outputs of GIS programs or the like. Moreover, students present landscape drawings to an assigned open space.

References

1. Simonds, John Ormsbee, "Landscape Architecture," MC Graw-Hill Book Company.
2. W.Reid, Grant, "Landscape Graphics," Whitney Library of Design, New York.
3. د. محمد حماد، م. محمد فتحي سالم، "التشجير المعماري، في زراعة انواع نباتات الزينة لتنسيق الحدائق"، ١٩٧١.
4. د. مصطفى بدر، "تنسيق وتجميل المدن والقرى"، منشأة المعارف، الاسكندرية، ١٩٩٢.

ARC317 Interior Design

(1,3,0)

This course aims to enhance students' basic design skills in interior design of architectural spaces. The role of colors, texture and materials is introduced. Students are required to demonstrate their knowledge in practical project(s) by solving indoor spatial problems for human activities.

References

- 1- allen tate, c. ray smith. INTERIOR DESIGN OF THE 20TH CENTURY . harper & row , 1986.
- 2- binggeli, corky. Interior Design &Interior Architecture . wiley, 2007.
- 3- Ching, Frank. interior design illustrated. john wiley &sons, 1987.
- 4- linton, harold. color in architecture . 1999.

CIV374 Steel Structures in Architecture

(2,2,0)

The course aims to provide students with methods and techniques for calculating and designing metal structures, including the study of steel elements such as columns, beams, trusses and techniques for the connecting various steel elements, taking into account the principles of selecting the appropriate structural metal systems to achieve the architectural function of space. The course also aims at understanding the requirements of the structural system to be taken into consideration in the architectural design. It also aims to identify the structural systems of the metal structures, especially halls and hangars, and to identify the high capacity of the formation to serve the design process of buildings, as well as to identify the advantages and disadvantages of metal structures. Students are trained in applications through the exercises given.

References

- 1- E. B. Machaly "Behavior, Analysis and Design of Structural Steel Elements, volume 1", 2002, ISBN 2002-2939
 - 2- E. B. Machaly "Behavior, Analysis and Design of Steelwork Connections, volume 3" 2002, ISBN 2002-2939
- Charles G. Salmon, John E. Johnson, "Steel Structures: Design and Behavior", Edition 5, ISBN-13: 9780131885561, October 2008



FOURTH YEAR

ARC400 Field Training (2)**(0,0,0)**

After completing the second-year courses, students should spend at least four weeks training in an engineering institution; each student shall prepare a report at the end of the training session describing a complete description of his training course. The report should show the technical and scientific skills acquired during the training period, finally the report is discussed and evaluated by an academic committee.

ARC410 Architectural Design (7)**(1,5,0)**

The course is a continuation of the design stream; it affirms students' comprehension of architectural approaches. The course introduces students to different philosophical approaches to design concepts. The course integrates knowledge acquired from previous design courses where more emphasis is achieved on the functional requirements, environmental issues and sustainability. The course aims to introduce students to complex design problems that need functional, structural considerations and address physical and cultural environmental attributes with a philosophical approach. This is done through training the student to deal with and study complex projects with multiple functional relationships and various uses, within a surrounding urban environment with distinctive characteristics, such as cultural, craft, developmental or scientific centers, art complex, theatres and cinemas, conference centers or Exhibitions, business centers, etc. The projects are evaluated according to the student's creativity in providing an integrated philosophical approach to the design of the project, which meets the functional, aesthetic and construction requirements of the building, and takes into account the characteristics of the sites and surroundings, the characteristics of the social, cultural and economic context, the material and moral needs of the users in a unique and distinctive way, in addition to the quality of the drawing, the accuracy of the projection and the integration of architectural drawings And good presentation. The course comprises a combination of lectures, students' presentation of design projects, precedents' analysis, research assignments and 3D study models. Final projects are submitted using computer aided techniques.

References

- 1- Watson, Donald. Time Saver Standards for Architectural Design Technical Data for Professional Practice, McGraw Hill. New York. 8th Ed. 2005.
- 2- De Chiara ,Joseph. Time-Saver Standards for Building Types, McGraw Hill. New York. 4th Ed. 2001
- 3- Harris ,Charles. Time-Saver Standards for Landscape Architecture, McGraw Hill. New York., 2nd Ed. 1998
- 4- Ramsey , Charles George. Architectural Graphic Standards, John Willy & Sons. USA. 11th Ed. 2008.
- 5- Neufert, Ernst. Neufert Architects' Data, Willy-Blackwell publishing, USA. 4th Ed. 2012.
- 6- Lawson, Bryan. How Designers Think. Architectural Press. Oxford. 2005.



7- Choi, Beatrice - Yoon, Shyann - Lee, Sung Min. Digital Diagram II (Architecture + Interior).

Archiworld Co. Ltd. Korea. 2008

8-Mortenson, M,E. Geometric Modeling. Industrial Press Inc. New York. USA. 2006

9-Tunstall, Gavin. Managing The Building Design Process, Elsevier Ltd, London, 2006

ARC411 Executive designs (3) (1,4,0)

The course aims to prepare an integrated set of detailed drawings, including plans, facades, sections, finishes, openings tables, ladders, elevators, and the preparation of an integrated set of architectural drawings and electromechanical complementary works. At the end of the course, students provide an integrated set of implementation documents for a comprehensive applied project, including the specifications and terms documents for selective items, as well as the feasibility study report of the design decisions of the project using appropriate computer software.

References

- 1- Bruce Bassler, Ncarb," Architectural Graphic Standards Student Edition", Eleventh Edition, John wiley and Sons, Hoboken, New Jersey, Published simultaneously in Canada, 2008 .
- 2- Joseph Dechiara, Gulus Panero, and Martin Zelnik, "Time-saver Standards for Interior Design and Spaces planning", Second Edition, by The McGraw-Hill companies, 2001 .
- 3- RALPH W.liebing. MIMIFORD PAUL, "Architectural Working Drawings", by John Wiley and Sons, 1983.
- 4- Francis D.K.ching, "Building Construction illustrated", fifth edition, by John Wiley and Sons, 2014.
- 5- James Am Brose, "Building Construction and design", Van Nostrand Reinhold, 1992
- ٦- فاروق عباس حيدر, عمر فاروق حيدر ، "الموسوعة الحديثة في تكنولوجيا تشييد المباني الهندسة الصحية والتركيبات الصحية" ، الطبعة الثامنة ، منشأة المعارف بالإسكندرية ، ٢٠٠٩ .
- ٧- فاروق عباس حيدر, "أساسيات بناء المباني" ، الجزء الأول, الطبعة السادسة, منشأة المعارف بالإسكندرية, ١٩٩٩ .
- ٨- فاروق عباس حيدر, "تشييد المباني الأسقف والتشطيبات وخدمات المباني ورسومات تنفيذية",
- ٩- الجزء الثاني, الطبعة السابعة, منشأة المعارف بالإسكندرية.

ARC412 Urban Planning (1) (1,3,0)

The course aims to teach the student to prepare the necessary studies of strategic planning (villages / cities), current status studies, urban and social survey (structure / patterns of centers / growth patterns), population and housing studies, land use, economics and localization of development projects. Students present practical applications on one of the existing Egyptian cities / villages and attains the necessary studies to prepare the development plan for the city / village using GIS or similar programs.

References :

- ١- غريب محمد أحمد "مجتمع القرية-دراسات وبحوث"- دار المعرفة الجامعية- الإسكندرية - ١٩٨٧ م
- ٢- ماجد، صبيح "مدخل إلى التخطيط والتنمية الاجتماعية- الشركة المتحدة للتوريد والتسويق - القاهرة- ٢٠١٤م.
- 3- Gehl.Jan –"Life Between Building –Using Public Spaces" V.N.R ,New York-1987.



- 4- Rapoport ,A- "The meaning of the built environment-" California: Sage publications, Inc- 1982.
- 5- ZUCHELLI ALBERTO: INTRODUCTION A LURBANISME OPERATIONNEL A LA COMPOSITION URBAINE VOLUME, OPU ALGERE 1983.

ARC413 Specifications and Construction Management (2,2,0)

The course aims to prepare Tender documents to the executive drawings and for explaining and describing business items and counting their quantities (BOQ) with an understanding of the measurement method used to calculate the quantities, accounting methods, price analysis, specifications of business items, general and specific conditions for implementation documents according to global and local standards and systems, preparing business index for various items. On the other hand, the course deals with understanding of the local and international contract systems, and an understanding of the nature of the parties participating in the contracts and their responsibilities.

References

- 1- IBC, 2009, "International Building Code", AIA.
- 2- Joseph De Chiara, 1991, "Time Saver for Interior Design and Space Planning", McGraw-Hill.
- 4- الكود المصري لتصميم وتنفيذ المنشآت الخرسانية , ٢٠٠١ , اللجنة الدائمة للكود المصري , دار الكتب المصرية

ARC414 Urban Planning (2) (1,2,0)

The course deals with the foundations and methods of preparing urban development plans for cities and urban development policies: analysis of the current situation, planning alternatives, studies of infrastructure elements system, service sectors and programs, and methodologies for the preparation of the strategic plan of the village / city. Students perform practical applications on one of the existing Egyptian cities / villages for the purpose of preparing the development plan for the city using the outputs of GIS or similar programs.

References

- ١- غريب محمد أحمد "مجتمع القرية-دراسات وبحوث"- دار المعرفة الجامعية- الإسكندرية - ١٩٨٧ م
- ٢- ماجد، صبيح "مدخل إلى التخطيط والتنمية الاجتماعية- الشركة المتحدة للتوريد والتسويق - القاهرة- ٢٠١٤م.
- 3- Gehl.Jan –"Life Between Building –Using Public Spaces" V.N.R ,New York-1987.
- 4- Rapoport ,A- "The meaning of the built environment-" California: Sage publications, Inc- 1982.
- 5- ZUCHELLI ALBERTO: INTRODUCTION A LURBANISME OPERATIONNEL A LA COMPOSITION URBAINE VOLUME, OPU ALGERE 1983

ARC415 New Technologies in Execution (1,4,0)

The course aims to provide students with the knowledge and experiences necessary to develop their abilities. Throughout the course students deal with the sources and products of the construction industry relying on digital technological means to identify and select modern products in the construction industry for both constructions, finishing and buildings equipment preparations. Students determine the requirements and specifications of some elements of the composition and finishing materials of projects that are under the executive design process, then gathering the data



of the appropriate products/ techniques. Students are trained to evaluate and approve the validity of the desired product and develop the designs of his project to comply with selected products. Finally, students submit detailed drawings (shop drawing) using appropriate computer software with documentation and clarification of how to use and install the product in its specific location. Students provide a technical report on the specifications of the chosen product for the requirements for its installation, operation and maintenance via its various stages.

References

- 1- Bruce Bassler, Ncarb, " Architectural Graphic Standards Student Edition", Eleventh Edition, John Wiley and Sons, Hoboken, New Jersey, Published simultaneously in Canada, 2008 .
- 2- Joseph Dechiara, Gulius Panero, and Martin Zelnik, "Time-saver Standards for Interior Design and Spaces planning", Second Edition, by The McGraw-Hill companies, 2001
- 3- RALPH W.liebing. MIMIFORD PAUL, "Architectural Working Drawings", by John Wiley and Sons, 1983.
- 4- Francis D.K.ching, "Building Construction illustrated", fifth edition, by John Wiley and Sons, 2014.
- 5- James Am Brose, "Building Construction and design", Van Nostrand Reinhold, 1992.
- ٦- فاروق عباس حيدر, عمر فاروق حيدر ، "الموسوعة الحديثة في تكنولوجيا تشييد المباني، منشأة المعارف بالإسكندرية.

ARC417 Graduation Project

(1,11,0)

This course is based on the previously prepared research thesis, which concluded a functional program for the graduation project (research and analysis skills GEN 411). The course aims to emphasize the integration of all the previously gained knowledge from the previous courses. The course addresses students' ability to solve technical and executional problems in the field of architecture with emphasis on value and distinct in architectural formulations. The submitted graduation project is to be characterized by originality and innovation. Students are encouraged to develop their own vision, concepts and skills in the preparation and presentation of the project.

References

- 1- Watson, Donald. Time Saver Standards for Architectural Design Technical Data for Professional Practice, McGraw Hill. New York. 8th Ed. 2005.
- 2- De Chiara ,Joseph. Time-Saver Standards for Building Types, McGraw Hill. New York. 4th Ed. 2001
- 3- Harris ,Charles. Time-Saver Standards for Landscape Architecture, McGraw Hill. New York., 2nd Ed. 1998
- 4- Ramsey , Charles George. Architectural Graphic Standards, John Willy & Sons. USA. 11th Ed. 2008.
- 5- Neufert, Ernst. Neufert Architects' Data, Willy-Blackwell publishing, USA. 4th Ed. 2012.
- 6- Lawson, Bryan. How Designers Think. Architectural Press. Oxford. 2005.
- 7- Choi, Beatrice - Yoon, Shyann - Lee, Sung Min. Digital Diagram II (Architecture + Interior). Archiworld Co. Ltd. Korea. 2008
- 8- Mortenson, M,E. Geometric Modeling. Industrial Press Inc. New York. USA. 2006



Specialized Elective Courses

List (1) of Specialized Elective Courses

ARC420 Computational Design (1,3,0)

The course aims to provide the student with advanced skills to use visual applications and software using the Rhino Grasshopper program in architectural drawing and design - or new programs and how to use these programs in the field of architecture and urbanism. The course comprises a combination of lectures devoted to computer programs updated with practical applications on various exercises.

References

- 1- Linda Holtzschue , Edward Noriega , "Design Fundamentals for the Digital Age", Wiley, 1997- Benjamin,
- 2- Wucius Wong, "Visual Design on the Computer", W. W. Norton & Company, 2001
- 3- Hashimoto , Clayton, "Visual Design Fundamentals", Course Technology PTR, 2009

ARC421 Computer Applications in Environmental Control (1,3,0)

The course aims to provide the student with advanced skills to use the applications of environmental control programs and to clarify how to control environmental factors as an integral part of architectural design using digital simulations of climate, weather, humidity, solar radiation, wind, heat gain and loss and air movement in and out of voids in the building, a digital study of the effect of those environmental factors on the design The course examines the means and methods of protection from climate influences and the foundations of architectural treatments (building form, orientation, natural ventilation of buildings, building materials, openings) by the digital simulation. The course comprises a combination of lectures devoted to computer programs updated with practical applications on various exercises.

References

- 1- Linda Holtzschue , Edward Noriega , "Design Fundamentals for the Digital Age", Wiley, 1997- Benjamin,
- 2- Wucius Wong, "Visual Design on the Computer", W. W. Norton & Company, 2001
- 3- Hashimoto , Clayton, "Visual Design Fundamentals", Course Technology PTR, 2009

ARC422 Geographic information systems (GIS) (1,3,0)

The course aims to provide the student with advanced skills for using software applications that are concerned with spatial descriptive databases such as geographic information systems and how to use these programs in the field of architecture and urbanism. The course comprises a combination of lectures devoted to computer programs updated with practical applications on various exercises.



References

- 1- Linda Holtzschue , Edward Noriega , "Design Fundamentals for the Digital Age", Wiley, 1997- Benjamin,
- 2- Wucius Wong, "Visual Design on the Computer", W. W. Norton & Company, 2001
- 3- Hashimoto , Clayton, "Visual Design Fundamentals", Course Technology PTR, 2009

ARC423 Building Information Modeling (BIM)

(1,3,0)

The course aims to provide the student with advanced skills to use BIM applications and software in architectural drawing and design - or any new programs, such as Autodesk Revit software. The course comprises a combination of lectures devoted to computer programs updated with practical applications on various exercises.

References

- 1- Linda Holtzschue , Edward Noriega , "Design Fundamentals for the Digital Age", Wiley, 1997- Benjamin,
- 2- Wucius Wong, "Visual Design on the Computer", W. W. Norton & Company, 2001
- 3- Hashimoto , Clayton, "Visual Design Fundamentals", Course Technology PTR, 2009

ARC424 Landscape of Parks and Open Spaces

(1,3,0)

The course aims to expand students' potentials to design gardens that interact and integrates with the surrounding urban features through garden type's studies of the following elements inside the external space:

- Mobility within the formed space, passage network studies (pedestrians/ service)
- Soft-cape and hard-cape; types, use, design principals and precautions.
- Garden coordination and aesthetic enhancement.
- Local environment aspects and plantation elements effect.

References

- 1- Austin, R. Designing with Plants, Van nostrand Reinhold Fishman, R. 19 Urban Utopias of the Twentieth Century.
- 2- Lyall, Sutherland, (1991), Designing the New Landscape, Thames and Hudson
- 3- Tate, Alan (2003), Great City Parks, Spon Press, 2nd edition
- 4- Walter Rogers, 1996, The Professionals Practice of Landscape Architecture, John Wiley & Sons.
- 5- Tim Waterman, 2015, The Fundamentals of Landscape Architecture
- 6- Steven L. Cantor, 1996, Contemporary Trends in Landscape Architecture, John Wiley & Sons



List (2) of Specialized Elective Courses

ARC425 Contemporary Architectural Trends (2,0,0)

This course aims to introduce students to different trends in contemporary Architecture. Students are encouraged to adjust the course according to their needs in favor of enhancing their architectural knowledge.

References

- 1- Bruno Zevi, (1978), The Modern Language of Architecture, University of Washington Press
- 2- Bren C. Brolin, (1976), The Failure of Modern Architecture, Van Nostrand Reinhold Co.
- 3-Charles Jencks, (1988), Architecture Today, Academy Editions, London
- 4-Christine Killory, (2007), Details in contemporary architecture as built
- 5-Paul Overy (1991), Thames and Hudson, De Stijl

ARC426 Aesthetics and Architectural Criticism (2,0,0)

This course aims at enhancing students' skills in comprehending the values of aesthetics in architecture as well as developing students' skills in architectural criticism through analysis and synthesis of its form and composition.

References

- 1- Ghoneim, Omar: philosophy of criticism and artistic taste. Nancy library, (2007)
- 2- Farraj, Afaf Ahmed, the psychology of artistic taste. Cairo: Anglo-Egyptian library. (2005)
- 3- Reid, Herbert. (1994) Modern Sculpture: A Brief History. (Translation) Khalil Fakhri. Beirut: Arab Institute for Research and Publishing
- 4- Fisher, Ernest (1989) The need art. (Translation) the happiest Halim. Egypt: Egyptian General Book.

ARC427 Vernacular Architecture (2,0,0)

The course aims to introduce the students to the folk heritage in the field of architecture that the environmental, cultural, circumstances and local building material formed, and the folk methods for environmental control through construction methods and formation that uses local skills without relying on machines and the negative energy.

The course presents the features of ancestor architecture especially the Islamic and that through lectures – seminars – practical research

References

- 1- Amos Rapoport, House Form and Culture, Foundations of Cultural Geography Series, 1969
- 2- Hassan Fathy, "Architecture for the poor", An experiment in rural Egypt, University of Chicago Press, 1973.
- 3- Paul Oliver, Dwellings - The House across the World, Phaidon Press Limited.
- 4- Willi Weber & Simos Yannas, 2013, Lessons from Vernacular Architecture, Routledge
- 5- Henry Glassie, 2000, Vernacular Architecture, Indiana University Press



ARC428 Furniture Design

(2,0,0)

The course aims to provide students with the scientific and practical principles governing the design of contemporary furniture by following the rules of "Ergonomics" / definition of the study of efficiency "Ergonomics", with the study of some distinct models of Ergonomic designs in contemporary furniture.

References

- 1- Ernst and Peter Neufert, Architects Data, Recommended books.
- 2- Time Saver Standards for Architectural Design Data.
- 3- Wiley, Ramsey Sleeper, (2007) , "Architectural Graphic Standards",11th Edition, American
- 4- Jim Postell, 2012, Furniture Design, John Wiley & Sons Inc.
- 5- Jerzy Smardzewski, 2015, Furniture Design, Springer
Marcelo Soares & Francisco Rebelo, 2014, Advances in Ergonomics In Design, Usability & Special Populations

ARC429 Conservation of Heritage Buildings and Districts

(2,0,0)

The course aims to provide students with the necessary knowledge and information to understand the importance of heritage in general and heritage buildings in particular. The course deals with the study of international charters and local legislations related to safeguard of heritage buildings, techniques of documentation, the suitable materials, treatment methods and the different degrees of intervention usually applied in heritage conservation projects.

References

- 1- Alison Henry ,(2015)"Stone Conservation: Principles and Practice Kindle", Routledge (November 30, 2015) Edition
- 2- Norman Tyler(2009)," "Historic Preservation: An Introduction to Its History, Principles, and Practice" W. W. Norton & Company; 2nd edition (Second Edition(
- ٣- مهندس عبد المعز شاهين , (٢٠٠٨) " ترميم و صيانة المباني الاثرية و التاريخي المجلس الاعلي للآثار-القاهرة
- ٤- اسامة النحاس، " معايير صيانة وترميم الآثار", بحث منشور (٢٠١٠)



List (3) of Specialized Elective Courses

ARC430 Building Construction Equipment (2,0,0)

The course aims at providing students with the basic knowledge of building equipment as well as their impact in maximizing the implementation performance. Students learn about the different equipment and implementation tools, their capacities, functions and requirements. Student also get acquainted with the technical and scientific approach to select and operate the equipment, learn about the rates of mechanical performance, consumption, operation and maintenance as well as the economics of equipment operation within the various constructions fields. Moreover, students are informed with the site construction management software.

References

- ١- محمد ماجد خلوصي " الإدارة التنفيذية لمشروعات التشييد والتحكم في التكلفة والوقت "
- ٢- توفيق عبد الجواد - م. محمد توفيق عبد الجواد - مواد البناء وطرق الإنشاء في المباني- دار النهضة ١٩٩٨
- 3- Project Management Institute, (2013), "A Guide to the Project Management Body of Knowledge", Project Management Institute; 5 edition

ARC431 Project Management (2,0,0)

This course aims to inform students with the essentials of the modern construction management techniques that rely on maximizing the performance efficiency of the various construction projects in various phases. The objective of the course is achieved by exploring the following; efficient planning and organizational framework, section analysis, coordination of implementation disciplines, methods and techniques of monitoring and evaluations, Critical Path Method (CPM). The course addressed factors to improve the execution performance of the project. The course provides students with the basic knowledge for construction management starting from the conceptual design till the actual implementation phase. Students understands various management tasks during each phase, such as planning and implementation schedules and resource management, as well as methods for follow up and supervision of cost, expenses and execution time within the framework of the basics of value engineering.

References

- 1- Harold R. Kerzner, (2013), "Project Management: A Systems Approach to Planning, Scheduling, and Controlling", Wiley; 11 edition .
- 2- Terry Schmidt, (2009), "Strategic Project Management Made Simple: Practical Tools for Leaders and Teams", Wiley; 1 edition .
- 3- Project Management Institute, (2013), "A Guide to the Project Management Body of Knowledge", Project Management Institute; 5 edition .
- 4- Meredith, R. Jack and Mantel, Jr., Samuel J., (2008), "Project Management: A Managerial Approach , "Wiley, 7th edition.
- 5- Project Management Institute, (2013), "A Guide to the Project Management Body of Knowledge", Project Management Institute; 5 edition

**ARC432 Building and Construction Insurance (2,0,0)**

The course material helps to deepen the students understanding how to secure the buildings and construction operations to reach the production to the required safety level. And that through studying the factors that effect in the building security after and through construction such as: Fire – explosions – earthquakes – material and liquid leakage – soil properties risks – structure elements – execution procedure and safety precautions – methods and safety accomplishment techniques

References

- ١- الكود المصري لأسس التصميم واشتراطات التنفيذ لحماية المنشآت من الحريق واشتراطات الدفاع المدني
- ٢- الكود المصري لحساب الاحمال والقوى في الاعمال الانشائية واعمال المباني
- 3- Bernard Klaene & Russell Sanders, 2007, Structural Firefighting: Strategy and Tactics, Jones and Bartlett Publishers
- 4- David M. McGrail, 2007, Firefighting Operations in High-Rise and Standpipe-Equipped Buildings, PenWell Corporation

ARC433 Integrated Architecture (2,0,0)

The course aims to set integrated architecture as a design style from which facilities preparation and communication and control equipment and alarm, and what is needed from design procedures and the course contains the fundamentals of using modern technology in building preparation and communication network and the ventilation of the architectural design to attend to the needs of the equipment. Taking in consideration the principles of value engineering. The teaching includes lectures – site visit – and data analysis

References

- 1- Derek Osbourn & Reger Greeno, Mitchell's Building Construction, B.T Batsford Ltd, 2007.
- 2- Joseph De Chiara, Time Saver for Interior Design and Space Planning, McGraw-Hill, 1991
- 3- Encyclopedia of Building Technology (Farouk Haider)
- 4- Ed van Hinte, 2003, Smart Architecture
- 5- James M Sinopoli, 2009, Smart Buildings Systems for Architects, Owners and Builders, Butterworth Heinemann Books

ARC434 Environmental Impacts of Projects (2,0,0)

The course teaches environment natural risks evaluation (geological – climatic), and the economic and social factors in an environmental frame, in addition to ways and methods to evaluate the environment risks, the values and types of pollution sources, the cost analysis procedure, and the environmental return of the projects, and the environment and urban harmony, the fundamental of ecological environmental planning, the environmental risks in Egypt.

References

- 1- Daniel E. Williams, 2007, Sustainable Design: Ecology, Architecture, and Planning, John Wiley & Sons, Inc.



- 2- Moore, F., Environmental control systems, Heating Cooling – Lighting, McGraw-Hill Inc., 1993 .
- 3- Olgyae V, Design with Climate – Bioclimatic Approach to Architecture Regionalism, Princeton University press, 1973
- 4- Lechner, N., Heating, Cooling, Lighting- Design Methods for Architects, John Wiley & Sons, 1991

٥- دليل العمارة والطاقة " العمارة الخضراء والطاقة" جهاز تخطيط الطاقة – يوليو ١٩٩٨ م.

٦- شفق العوضى الوكيل، د.م محمد عبد الله سراج " المناخ وعمارة المناطق الحارة" القاهرة ١٩٨٩.

٧-٤- خالد الفجال "العمارة والبيئة في المناطق الصحراوية" الدار الثقافية للنشر والتوزيع - ٢٠٠٢



LIST OF ELECTIVE COURSES FROM UNIVERSITY REQUIREMENTS**GEN900 Communication & Presentation Skills (1,1,0)**

General introduction to communication, the importance of communication, types of communication, communication barriers, listening skills, attributes and methods of reading, verbal communication: speaking and writing skills, non-verbal communication, dialogue skills and strategies of persuasion, communication in the work environment, writing CVs, reports and official letters.

References:

- 1- Gary Johns and Alan M. Saks, Organizational Behavior, Addison Wesley Longman, 2009.
- 2- Scgermerhorn, Jr., R. J., Hunt, G. J., and Osborn, N. R., Organizational Behavior, John Wiley & Sons, Inc., New York, 10th. Ed., 2008.

GEN901 Theory of Sustainability (1,1,0)

The course aims to introduce students to the concept of sustainability and its feasibility in order to develop its capabilities to reach architectural applications that contribute to achieving the goals of sustainability and its usefulness and to clarify the risks of unsustainable environment. The course deals with the components of the natural environment and the factors of preserving its components and equilibrium, the biological system, cycles and ecological chains, the presence characteristics of natural resources, energy and biological systems. Rapid development of sustainability applications and their comprehensiveness based on modern means of communication and digital technologies.

References:

- 1- Perspectives for a New Social Theory of Sustainability, Mariella Nocenzi and Alessandra Sannella, Springer Nature Switzerland 2020 .

GEN902 Human Rights and Combating Corruption (1,1,0)

Human rights: general introduction, definition of human rights, characteristics and principles of human rights, general rules of the idea of human rights, historical development of the idea of human rights, types of human rights, individual rights, collective rights (people's rights), sources of human rights, legal system of rules of protection Human rights, human rights according to the Egyptian constitution in 2014, the duties and obligations of individuals in society. Combating corruption: definition of corruption, its causes, effects and characteristics, types of corruption and its causes, the impact of corruption on human rights and development, the impact of corruption on economic rights and sustainable development, criminal confrontation of corruption.

References:

- 1- Peter Joseph , The New Human Rights Movement: Reinventing the Economy to End Oppression, Inc. Blackstone Audio: Books, 2017

**GEN903 Research and Analysis Skills (1,1,0)**

Scientific thinking and its characteristics, definition of scientific research and its characteristics, steps of scientific research (selection of the subject of research, determine the problem of research and selection factors, determine the framework of research, determine the method of research, data analysis), types of scientific studies: exploratory studies, descriptive studies, experimental studies . Methods of scientific research: descriptive approach, social survey, content study, content analysis. Data collection tools: Metrics, observation, interview, questionnaire. Data presentation and analysis methods: Descriptive methods, deductive methods.

References:

- 1- Gary Johns and Alan M. Saks, Organizational Behavior, Addison Wesley Longman, 2009.
- 2- Scgermerhorn, Jr., R. J., Hunt, G. J., and Osborn, N. R., Organizational Behavior, John Wiley & Sons, Inc., New York, 10th. Ed., 2008.

GEN904 Entrepreneurship (1,1,0)

Concepts in Entrepreneurship, Entrepreneurship and Small Enterprises, Generating Ideas for Entrepreneurial Projects, University and Entrepreneurship Opportunities and Challenges, Marketing Plan, Operational Plan, Financial Plan, Business Plan Writing, Technological Environment of Entrepreneurship, External Business Environment of Entrepreneurial Projects, Support Programs for Leading Projects Egyptian Economy, Entrepreneurial Project Presentation Skills.

References:

- 1- Entrepreneurship: An Evidence-Based Guide by Robert A Baron Edward Elgar Pub., 2012.

GEN905 Professional Ethics (1,1,0)

The course provides the background needed to discuss the core topics of engineering ethics, with a focus on the ethical issues facing engineers in the areas of engineering work in companies. The course includes the definition of the general elements of the ethics of the profession and the observance of the public interest and regulations and regulations, obligations to the community, the responsibilities of engineers, disclosure of violations, behavior, basic principles and codes of the ABET code of conduct of engineers.

References:

- 1- William Frey, Professinnal Ethics in Engineering, November, 2013, <http://cnx.org/content/col10399/1.4/>

GEN906 Critical Thinking (1,1,0)

Theoretical concepts (memory, thinking, creativity), an introduction to the thinking skills, the nature of thinking (definition, characteristics, levels), types of thinking (creative, critical, scientific), cognitive thinking skills, meta-cognitive thinking skills, thinking measurement tools, strategies Used in the development of thinking skills, programs to teach thinking skills, methods of teaching thinking skills.



References:

- 1- Critical Thinking: A Beginner's Guide to Critical Thinking, Better Decision Making and Problem Solving Paperback, by Jennifer Wilson,, Create Space Independent Publishing Platform 2017.

GEN907 Human Resources Management (1,1,0)

Historical development of human resources management, key functions of human resources management, human resources planning, access to human resources, training and development of human resources, compensation of human resources, human resource conservation.

References:

- 1- Human Resource Management, University of Minnesota Libraries Publishing, 2016

GEN908 Contracts and Legislation (1,1,0)

The course aims to provide the student with the technical and legislative knowledge related to the practice of the profession. The study of building legislation, urban planning and the laws governing the practice of the profession and the work systems (engineer / owner / contractor / ...) at the local and international levels as well as studying the methods of contracting/rules and systems for the preparation of integrated implementation documents. Tenders and methods of their examination and evaluation.

References:

- 1- Randall S. Schuler, Susan E. Jackson, Strategic Human Resoure Management , Wiley, 2nd ed., 2007.
- 2- Lewicki, J. R., Saunders, M. D., and Barry, B., Essentials of Negotiation, McGraw - Hill, 5th. Ed., 2011.