Section 7

Architectural Engineering and Technology Program (AET)

Based on Credit Hours System (CHS)

September 2016

1. INTRODUCTION

Architectural Engineering (AE) at Cairo University, is dedicated to advancing the understanding, value, and quality of visual culture and the built, natural, and social environments through excellent and distinctive teaching, research, and creative endeavors. Grounded in a unique multi-disciplinary structure, AE is a diverse, collegial learning community of faculty, students, and staff. We seek to enhance the lives of individuals and communities through endeavors that stem from intellectual curiosity, critical thinking, and broad inquiry, rooted in the inter-relatedness of theory, history, and practice linked with the engineering sciences and the global technology. AE seeks to provide a well-rounded education, not only through the university and its many offerings and opportunities, but within the various programs. We seek to develop not only future introspective practitioners, but also critical thinkers who will eventually be in significant leadership positions in the profession. Our students and faculty believe that it is extremely important to be intellectually prepared to address issues of national and international importance in a meaningful and responsible manner.

With modern technological advancements, construction is rapidly becoming one of the most difficult and complex businesses to endeavor. Statistics indicate that the man-power involved in that building industry sector represents over 11% of the total Egyptian workforce. The building construction sector is considered one of the largest industries in Egypt, and in the world as well. This can be revealed from its share in the total National Gross Income which approaches about 8%.

This new bachelor program of Architectural Engineering and Technology (AET) based on the credit hours system (CHS) will train the students in a number of streams to examine the art of architecture and the science and technology within the building construction profession to be considered a multidisciplinary field that integrates architecture, engineering, technology and management of people and physical resources. As such, AET graduates would be able to carry out successful design and to develop, construct and operate residential, commercial and public properties.

2. PROGRAM MISSION

The AET program focuses on providing a comprehensive and holistic approach to learning. Architectural Engineering at Cairo University is situated to address the critical environmental and building design issues needed in the 21st Century. We are committed to providing education in architecture science and technology that stresses exploration of critical issues in a learning environment that is conducive to meaningful inquiry and creativity.

The vision of the program is leadership in the architecture and building technology education to achieve excellence and development of sustainable community and built up environments.

The mission of the program is to pursue architecture as a humanistic and professional discipline, which synthesizes art, Engineering sciences and technology through

intellectual rigor, aesthetic judgment, and technical understanding. The program achieves its mission via teaching, scholarship, creative work, research, and service, and commits itself to the highest ideals of the profession and culture of architecture.

The value of the program can support Excellence, Open Discourse activities, Inclusiveness, Cooperation, Inter-Disciplinary Experience and Responsibility towards community.

In addition to the general attributes of an engineer, the architect/graduate of the AET must be able to:

1. Enhance the lives of individuals and communities through endeavors that stem from intellectual curiosity, critical thinking, and broad inquiry, rooted in the inter-relatedness of theory, history, and practice linked with the engineering sciences and the global technology.
2. Address issues of national and international importance in a meaningful and responsible manner, being not only future introspective practitioners, but also critical thinkers who will eventually be in significant leadership positions in the profession, who has the ability to understand, assemble, and coordinate all of the discipline to create a sustainable environment.
3. Examine the art of architecture and the science and technology within the building construction profession to be considered a multidisciplinary field that integrates architecture, engineering, technology and management of people and physical resources.
4. Carry out robust and successful design and to develop, construct and operate residential, commercial and public properties with creativity and technical mastery.
5. Demonstrate investigative skills, attention to details, and visualize/ conceptualize skills and adopt a holistic problem solving approach for complex, ambiguous, and open-ended challenges and scenarios.
6. Demonstrate knowledge of cultural diversity, differences and the impact of a building on community character and identity, and address urban issues, planning, and community needs through design work.

3. EDUCATIONAL OBJECTIVES

One of the main goals of the Faculty of Engineering, Cairo University, is to train the students with the new advances in the field of building construction industry as it is one of the most prominent fields in industry worldwide.

Architectural education in the AET program will be based upon the premise that to be an architect in today's complex and fast-changing, global society, one must have knowledge in a variety of areas beyond the profession. Recognizing the diversity of roles that are now emerging in the profession, graduates should also have a well-developed interdisciplinary knowledge in which they can initiate their career.

1- Provide the students with a solid base of knowledge and understanding of the liberal arts, Engineering sciences and technology in architecture; with an advanced professional education focusing on the field of Building Technology.

2- Develop the appropriate intellectual skills that provide the student with the detailed understanding and analytic tools to recognize the accountability for the impact of his/her actions as an architect/engineer on the environmental, social, and cultural systems.

3- Engage the student of architecture in a setting of multiple disciplines to expand his/her perspectives and enrich skills for: self-learning, research, and creative practice in this interdisciplinary experience.

4- Provide students with the practical and professional skills necessary for employment to work in a team work together with peers in shared efforts to learn, understand, interact and create and to support a culture that promotes and encourages risk-taking and challenges standards in creating, composing and presenting ideas in the field of Architecture and Building Technology.

5- Develop general and transferable skills necessary to expand the student perspective and actively encourage his/her presence and participation in a school of individuals and afterwards in the field of profession with differing backgrounds, experience, world-views and the impart professional attitudes and ethics enabling the graduates to work in multi-disciplinary teams and interact properly in the professional environment

4. PROGRAM LEARNING OUTCOMES

4.1 Knowledge and Understanding

In addition to the knowledge and understanding of engineers, the graduates of AET engineering program should demonstrate knowledge and understanding of:

1. Principles of architectural design, and the preparation and presentations of design projects in a variety of contexts, scales, types and degree of complexity.
2. Principles of building technologies, structure and construction methods, technical installations, properties of materials, and the way they may influence design decisions.
3. Fundamentals of building acquisition, operational costs, and of preparing construction documents and specifications of materials, components and systems appropriate to the building.
4. Theories and legislations of urban and regional planning.
5. The processes of special change in the built and natural environments; patterns and problems of cities; and positive and negative impacts of urbanization.
6. The significance of urban spaces and the interaction between human behavior, built environment and natural environment.
7. Theories and histories of architecture, planning, urban design, and other related disciplines.
8. Physical modeling, multi-dimensional visualization, multimedia applications, and computer-aided design.
9. The role of the architecture profession relative to the construction industry and the overlapping interests of organizations representing the built environment.

10. Various dimensions of housing problem and the range of approaches, policies, and practices that could be carried out to solve this problem.
11. Principles of sustainable design, climatic considerations, and energy consumption and efficiency in buildings and their impacts on the environment.

4.2 Intellectual Skills

In addition to the intellectual skills of engineers, the graduates of AET engineering program should be able to:

1. Integrate different forms of knowledge, ideas from other disciplines and manage information retrieval to create new solutions.
2. Think three-dimensionally and engages images of places & times with innovation and creativity in the exploration of design.
3. Predict possible consequences, by-products and assess expected performance of design alternatives.
4. Reconcile conflicting objectives and manage the broad constituency of interests to reach optimum solutions.
5. Integrate relationship of structure, building materials, and construction elements into design process.
6. Integrate community design parameters into design projects.
7. Appraise the spatial, aesthetic, technical and social qualities of a design within the scope and scale of a wider environment.
8. Discuss, search and formulate informed opinions appropriate to specific context and circumstances affecting architecture profession & practice.
9. Analyze the range of patterns and traditions that have shaped and sustained cultures and the way that they can inform design process.

4.3 Practical and Professional Skills

In addition to the practical and professional skills of engineers, the graduates of AET engineering program should be able to:

1. Produce and present architectural, urban design, and planning projects using an appropriate range of media and design-based software.
2. Produce professional workshop and technical drawing using traditional drawing and computer-aided drawings' techniques.
3. Use appropriate construction techniques and materials to specify and implement different designs.
4. Participate professionally in managing construction processes.
5. Demonstrate professional competence in developing innovative and appropriate solutions of architecture and urban problems.
6. Display imagination and creativity.
7. Respect all alternative solutions; changes in original plan of the project, difference of style, culture, experience and treat others with respect.
8. Provide leaderships and education to the client particularly with reference to sustainable design principles.

9. Respond effectively to the broad constituency of interests with consideration of social and ethical concerns.
10. Contribute positively to the aesthetic architecture and urban identity, and cultural life of the community.

4.4 General and Transferable Skills

The graduates of the engineering programs should be able to:

1. Collaborate effectively within multidisciplinary team.
2. Work in stressful environment and within constraints.
3. Communicate effectively.
4. Demonstrate efficient IT capabilities.
5. Lead and motivate individuals.
6. Effectively manage tasks, time and resources.
7. Search for information and engage life-long self-learning discipline.
8. Acquire entrepreneurial skills.
9. Refer to relevant literatures

5. PROGRAM DESCRIPTION

To achieve the above mentioned goal, a four years curriculum following the freshman year in the faculty of engineering is proposed. The curriculum is planned to qualify undergraduates over the four years to have a firm grasp of the subject upon graduation and be capable of effectively participating in almost all architectural projects and activities. To build such a necessary background, the curriculum is planned to cover the fundamental and advanced subjects in architectural design and Engineering sciences and technology.

As the curriculum is based on the credit hours system, a total of 180 credit hours should be completed by the student; about 36 credit hours of those are in the freshman year. After this first academic year, students are exposed to fundamental architectural engineering courses pertinent to history and theories of architecture, architectural design courses, design computing and to building construction and technology courses. In addition to the compulsory courses, students are allowed to choose from a number of interdisciplinary elective courses to enhance his/her interest in the specialty courses.

The AET Program accepts a maximum of 50 to 60 students per year. This number may increase in the future as the program proves itself and market demand calls for that. Hence the total number of students will probably reach 240 students by the end of the fifth year. The program will accept National, Arab and Foreign students.

5.1 Curriculum Overview

The curriculum of the AET program consists of 180 credits spread over 72 courses covering topics in Humanities and Social Sciences (HSS), Basic Sciences (BS), Engineering Sciences (ES), and Applied Engineering Sciences (AS) as required by the

Supreme Council of Universities (SCU). Sample Courses in each category are presented as follows.

5.1.1 Humanities and Social Sciences

- English Language
- Humanities and Engineering
- Communication Skills
- Seminar
- Management
- Ethics and Legislation

5.1.2 Basic Sciences

- Mathematics
- Physics
- Mechanics
- Chemistry
- Engineering Economics

5.1.3 Engineering Sciences

- Basic Architectural Design
- Mechanical & Electrical Systems
- Engineering Statistics
- Special Construction Structure
- Soil Mechanics & Foundations
- Structural Analysis
- Building Construction

5.1.4 Applied Engineering Sciences

- History and Theory of Architecture
- Architectural Design Skills
- Architectural Design
- Visual Arts
- Building Construction
- Building Technology
- Design Computing
- Energy in Buildings
- Environmental Design

5.2 University Requirements

The main purpose of a university education is not only to prepare students for successful careers but also to provide them with the knowledge and skills to develop a rational, well-rounded and successful personal identity. Moreover, Cairo University helps students to gain an appreciative understanding of the natural and cultural environments in which they live and their roles in the society and community services.

The university requirements of the CHS bachelor programs consist of 24 credits (13.3% of total 180 credits), which are satisfied by completing twelve (12) courses:

1. Nine (9) compulsory courses equivalent to 18 credits (10.0%), as listed in Table 1a.
2. Three (3) elective courses equivalent to 6 credits (13.3%), as listed in Table 1b.

Table 1a Compulsory Courses of University Requirements (18 credits, 10.0% of total 180 credits)

	Code	Course Title	Credits
1	GENN001	Humanities and Engineering	2
2	GENN002	English Language	2
3	GENN004	Computers for Engineers	2
4	GENN101	Technical Writing	2
5	GENN102	Fundamentals of Management	2
6	GENN201	Communication and Presentation Skills	2
7	GENN204	Accounting	2
8	GENN210	Risk Management and Environment	2
9	GENN221	Economics	2

Table 1b Elective Courses of University Requirements (6 credits, 3.3% of total 180 credits)

	Code	Course Title	Credits	Group
1	GENN301	Ethics and Legislation	2	E-1(1)
2	GENN310	Advanced Risk Management	2	
3	GENN311	Technical Writing in Arabic	2	
4	GENN321	Foreign Language	2	
5	GENN326	Marketing	2	
6	GENN327	Selections of Life-long Skills	2	
7	GENN331	Business Communication	2	
8	GENN332	Service Management	2	
9	GENN333	Creativity, Art & Design	2	Compulsory for AET
10	GENN380	Thesis Writing for GP	2	Compulsory for AET

Remarks:

(1) Student selects at least three (3) courses equivalent to 6 credits

5.3 College Requirements

College requirements provide students with the knowledge and skills that are essential to develop a successful engineer. A college core that is common to all credit hours programs is implemented. This unified college core contains two categories of courses. The first category of college core courses includes courses of basic knowledge essential to all engineering graduates such as Mathematics, Physics, Mechanics, Graphics and Design, Manufacturing, and Chemistry. The second category includes courses that all students are required to undertake in order to develop certain intended learning outcomes common to all engineering graduates, such as Seminar, Industrial Training, and Graduation Project courses.

The college requirements of the CHS bachelor programs consist of 45 credits (25.0% of total 180 credits), which are satisfied by completing nineteen (19) compulsory courses, as listed in Table 2.

Table 2 Compulsory Courses of College Requirements (45 credits, 25.0% of total 180 credits)

	Code	Course Title	Credits
1	CHEN001	Chemistry	3
2	GENN003	Basic Engineering Design	2
3	MDPN001	Engineering Graphics	3
4	MDPN002	Fundamentals of Manufacturing Engineering	3
5	MECN001	Mechanics-1	2
6	MECN002	Mechanics-2	2
7	MTHN001	Introduction to Linear Algebra and Analytic Geometry	3
8	MTHN002	Calculus I	3
9	MTHN003	Calculus II	3
10	MTHN102	Multivariable Calculus and Linear Algebra	3
11	MTHN203	Probability and Statistics	3
12	PHYN001	Mechanics, Oscillations, Waves and Thermodynamics	3
13	PHYN002	Electricity and Magnetism	3
14	AETN280	Seminar-1	1
15	AETN281	Industrial Training-1	1
16	AETN380	Seminar-2	1
17	AETN381	Industrial Training-2	2
18	AETN480	Graduation Project-1	1
19	AETN481	Graduation Project-2	3

5.4 Discipline Requirements

The AET is a program under the umbrella of Architectural Engineering Department with its five specialties; architectural studies, building technology, environmental planning and design, urban design and city planning. It contains other college core courses that are common with some other – but not all – credit hour programs. For example, there is a specific commonality between the CEM and STE programs and the AET program.

The discipline requirements of the AET bachelor program consist of 67 credits (37.2% of total 180 credits), which are satisfied by completing twenty-four (24) courses in the core of architectural engineering art and sciences, as listed in Table 3. All the discipline core courses are compulsory.

Table 3 Compulsory Courses of Discipline Requirements: Architectural Engineering (67 credits, 37.2% of total 180 credits)

	Code	Course Title	Credits
1	ARCN101	Introduction to the History and Theory of Architecture	2
2	ARCN102	History of Structure in Architecture	2
3	ARCN103	Architecture and Humanities	2
4	ARCN104	Architectural Design-1	3
5	ARCN105	Introduction to Building Construction and Technology	2
6	ARCN106	Introduction to CAD Systems	2
7	ARCN107	Architectural Design-2	3
8	ARCN108	Visual Perception and Art	2
9	ARCN109	Introduction to Design Computing	2
10	ARCN202	Building Construction-1	2
11	ARCN203	Urban Design and Landscape	2
12	ARCN205	Building Technologies-1	3
13	ARCN206	Architectural Design-3	3
14	ARCN207	Architectural Design-4	3
15	ARCN208	Site Planning and Development	2
16	ARCN209	Building Technologies-2	2
17	ARCN301	Architectural Design-5	4
18	ARCN302	Building Construction-2	3
19	ARCN303	Smart Building Information Systems	3
20	ARCN305	Building Construction	4
21	ARCN307	Architectural Design-6	4
22	ARCN402	Building Construction-4	4
23	ARCN405	Building Construction-5	4
24	ARCN406	Architectural Design-7	4

5.5 Major Requirements

The AET program offers a major specialty in Building Science and Technology that focuses on areas of Building Technology, Smart Buildings, Environmental Design, Automation of Building Industry, and Digital Design. Additionally, the AET program requires that students complete a number of interdisciplinary engineering courses which serve the specialty of Architectural Engineering and Building Technology by focusing on areas of Building Structures, Building Construction and Civil Engineering.

A student who wishes to complete the specialty of Architectural Engineering and Technology must complete the minimum major requirements of 44 credits (24.5% of total 180 credits), which are satisfied by completing seventeen (17) courses as follows:

1. Eleven (11) compulsory courses equivalent to 29 credits (16.1%), as listed in Table 4. Eight (8) of these courses cover other engineering disciplines (coded by INT, PBW, STR) and are equivalent to 21 credits (11.7%).
2. Six (6) elective courses equivalent to 15 credits (8.3%), as listed in Table 5.

Table 4 Compulsory Courses of Major Requirements: Architectural Engineering and Technology (29 credits, 16.1% of total 180 credits)

	Code	Course Title	Credits
1	ARCN204	Thermal and Aerodynamics in Buildings	2
2	ARCN304	Fundamentals of Energy in Buildings	3
3	ARCN308	Architectural Acoustics and Day-lighting	3
4	INTN127	Electro Mechanical Systems	2
5	STRN101	Structural Analysis-1	3
6	STRN103	Engineering Materials	3
7	STRN104	Mechanics of Materials	3
8	STRN211	Reinforced Concrete Structures	2
9	STRN312	Steel Structures	2
10	CVEN301	Structural Systems & Design	3
11	CVEN302	Surveying & Foundation Design	3

Table 5 Elective Courses of Major Requirements: Architectural Engineering and Technology (15 credits, 8.3% of total 180 credits)

	Code	Course Title	Credits	Group
S1	ARCN230	Contemporary Architecture: 20th Century and Beyond	2	E-2(1)
S2	ARCN231	History of Islamic Architecture	2	
3	*ARCN332*	*Special Problems in Building Construction [dormant]*	*2*	
S4	ARCN333	Building Technologies-3: Energy in Building Design	2	
S5	ARCN335	Community & Social Development	2	
S6	ARCN336	Architecture, Culture & Heritage	2	
F7	ARCN431	Structuring Housing Projects in Developing Countries	2	
F8	ARCN440	Landscape Architecture	2	
S9	ARCN436	Independent Studies for GP: Global Trends in Urban Planning	2	
F10	ARCN330	Ecologies of Construction	3	
F11	ARCN331	Knowledge Based Systems	3	
F12	ARCN334	Selected Topics in Architecture & Urban Design	3	
F13	ARCN430	Interior Design and Modern Art	3	
S14	ARCN432	Geometric Modeling	3	
15	ARCN433	Introduction to Shape Grammars *[dormant]*	*3*	
16	ARCN434	Independent Studies: Smart Building Information Systems *[dormant]*	3	
17	ARCN435	Independent Studies: Advanced Building Systems Integration *[dormant]*	3	
S18	ARCN481	GP Independent Studies	3	

Remarks:

(1) Student selects at least six (6) courses from group E-2 equivalent to 15 credits, such that three of courses are 2-credits each, and three of courses are 3-credits each

(2) ARCN481 is <u>Compulsory for students registering AETN481.</u>

5.6 Conformity to SCU Requirements

Classification and categorization of courses offered by the Architectural Engineering and Technology program follow the guidelines provided by the Supreme Council of Universities (SCU), as shown in Table 6. The classification is based on the “Sample Study Plan and Course Sequence” described in Section 6. The categorization is given for the following five student levels according to the regulations of the credit hours system of education at the Faculty of Engineering, Cairo University:

- **Freshman**: a student who completed less than 36 credits
- **Sophomore**: a student who completed more than 35 credits but less than 72 credits
- **Junior**: a student who completed more than 71 credits but less than 108 credits

- **Senior-1**: a student who completed more than 107 credits but less than 144 credits
- **Senior-2**: a student who completed more than 143 credits

Table 6 Conformity to Supreme Council Criterion

Category	Freshman	Sophomore	Junior	Senior-1	Senior-2	Total Credits	%
Humanities and Social Sciences	4	8	7	1	6	26	14.4
Basic Sciences	24	3	3	0	0	30	16.7
Engineering Sciences	8	18	10	12	0	48	26.7
Applied Engineering Sciences	0	8	18	26	24	76	42.2
Total	36	37	38	39	30	180	100
University Requirements	6	6	6	0	6	24	13.3
College Requirements	30	3	5	3	4	45	25.0
Discipline Requirements	0	20	17	18	12	67	37.2
Major Requirements	0	8	10	18	8	44	24.5
Total	36	37	38	39	30	180	100

The Architectural Engineering and Technology program consists of 72 courses: 63 compulsory courses (159 credits) and 9 elective courses (21 credits). The total 180 credits of the AET program are distributed between lectures (LEC) and tutorials (TUT), where a tutorial is classified as a problem solving session (PSS) and/or a practical work/laboratory session (PLS). The one credit of a tutorial corresponds to 2-3 hours to provide sufficient practical training for the students. Thus, the total contact hours of learning are around 300 hrs.

6. SAMPLE STUDY PLAN and COURSE SEQUENCE

A sample study plan for the AET program is presented as one recommended sequence to complete the graduation requirements over 10 main semesters, the Fall and Spring semesters per academic year. Since the program is based on the credit hours system of education, the student does not have to take the courses during the semester indicated in the study plan as long as the course prerequisites are satisfied.

The AET curriculum gives the student the opportunity to select several courses. The students in the AET program are encouraged to participate in research through independent study projects. Moreover, the curriculum gives students the opportunity to interact with architectural, urban sector and government agencies through two industrial training courses. Also, students will be exposed to large architectural projects in the practical training and graduation projects.

Freshman Year Course Schedule

	Semester-1: Fall		Semester-2: Spring	
	Course Code	CR	Course Code	CR
1.	MECN001	2	MECN002	2(1)
2.	MTHN002	3	MTHN003	3(2)
3.	PHYN001	3	PHYN002	3
4.	MTHN001	3	CHEN001	3
5.	MDPN001 OR MDPN002	3 OR 3	MDPN002 OR MDPN001	3 OR 3
6.	GENN001 OR GENN002	2 OR 2	GENN002 OR GENN001	2 OR 2
7.	GENN004 OR GENN003	2 OR 2	GENN003 OR GENN004	2 OR 2
Semester Credit Hrs		18		18

Remarks:

(1) Course MECN002 has a prerequisite course MECN001

(2) Course MTHN003 has a prerequisite course MTHN002

QUALIFYING FRESHMAN COURSES FOR AET

GENN003	Basic Engineering Design
MDPN001	Engineering Graphics
GENN001	Humanities and Engineering

AET NEW PROPOSED STUDY PLAN- Fall 2016

	Sophomore				Junior			
	Semester-3: Fall		Semester-4: Spring		Semester-5: Fall		Semester-6: Spring	
	Course Code	CR	Course Code	CR	Course Code	CR	Course Code	CR
1.	ARCN101	2	ARCN102	2	ARCN202	2	ARCN203	2
2.	ARCN104	3	ARCN103	2	ARCN205	3	ARCN204	2
3.	ARCN105	2	ARCN107	3	ARCN206	3	ARCN207	3
4.	ARCN106	2	ARCN108	2	ARCN208	2	ARCN209	2
5.	STRN101	3	ARCN109	2	AETN280	1	GENN333(1)	2
6.	STRN103	3	INTN127	2	STRN104	3	STRN211	2
7.	GENN101	2	MTHN102	3	GENN204	2	MTHN203	3
8.	GENN102	2	GENN201	2	GENN210	2	ARCN2XX(2)	2
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Sems. Credit Hrs		18		19		18		18+1(0)

	Senior 1				Senior 2			
	Semester-7: Fall		Semester-8: Spring		Semester-9: Fall		Semester-10: Spring	
	Course Code	CR	Course Code	CR	Course Code	CR	Course Code	CR
1.	ARCN301	4	ARCN303	3	ARCN402	4	ARCN405	4
2.	ARCN302	3	ARCN305	4	ARCN406	4	GENN3XX(1)	2
3.	ARCN308	3	ARCN307	4	AETN480	1	AETN481	3
4.	ARCN304	3	CVEN301	3	GENN380(1)	2	ARCN481(1)	3
5.	STRN312	2	CVEN302	3	GENN221	2	ARCN4XX(2)	2/3
6.	AETN380	1	ARCN3XX(2)	2	ARCN4XX(2)	2/3		
7.	ARCN3XX(3)	3	AETN381(0)	2				
Sems. Credit Hrs		19		19+2(0)		15/16		14/15

(0) Industrial training courses to be completed in the summer sessions

(1) General elective course (group E-1, 2 credits per course): GENN301, GENN310, GENN311, GENN321, GENN326, GENN327, GENN331, GENN332, & -GENN333 & GENN380- [Compulsory for AET]

(2) Major elective course (group E-2, 2 credits per course): ARCN230, ARCN231, ARCN332, ARCN333, ARCN335, ARCN336, ARCN431, ARCN436, ARCN440

(3) Major elective course (group E-2, 3 credits per course): ARCN330, ARCN331, ARCN334, ARCN430, ARCN432, ARCN433, ARCN434, ARCN435, & ARCN481 [Compulsory for Registering AETN481]

7. COURSE CONTENTS

7.1 University-Core Courses

GENN001	**Humanities and Engineering** **Compulsory, Credits: 2 (2+0+0)** **Prerequisite(s): none** History of Technology: Engineering and technology in a cultural, social, and historical context. Development of technology as a key to history of civilization in a comparative perspective - Exploring Humanities: Modes of thought found within humanities and social sciences. Humanities for Engineers: Humanities themes of increased complexity - Different work methodologies - Critical analysis of information & choice of argumentation - Work methodologies and pedagogical interest.
GENN002	**English Language** **Compulsory, Credits: 2 (1+1+0)** **Prerequisite(s): none** Writing clear topic sentences, well-developed supporting sentences, and concluding sentences. Editing paragraphs for punctuation & writing errors. Extracting meaning of words from reading texts. Making logical inferences from texts. Discussing opinions and thoughts about daily life topics. Planning, implementing and delivering group presentations. Skimming through and scanning text for details. Developing critical thinking skills.
GENN004	**Computers for Engineers** **Compulsory, Credits: 2 (1+0+2)** **Prerequisite(s): none** Developing basic concepts of algorithmic thinking to solve problems of relevance in engineering practice and implementing these algorithms using high-level computer language. Using data types, input/output commands, loops, control structures, functions, arrays, and other programming language constructs in a computer program. Evaluating and interpreting the results of programming work.
GENN101	**Technical Writing** **Compulsory, Credits: 2 (1+1+0)** **Prerequisite(s): GENN002 + 28 credits** Discovering and outlining ideas. Organizing outlines. Ways to begin the three parts of technical writing. Writing abstracts, summaries, and conclusions of long reports. The thesis statement. Forms: letters, memos, reports, scientific articles, job description, CV, references and footnotes. Selection of key words, titles, and subtitles. Editing, revising and proof-reading techniques. Electronic word processing and technical writing, vocabulary building, and basic types and patterns of argument. + PORTFOLIO MAKING
GENN102	**Fundamentals of Management** **Compulsory, Credits: 2 (1+1+0)** **Prerequisite(s): 28 credits** Introduction to management, Historical view and evolution of concepts.

	Basic Managerial Functions: Planning, Strategies, Objectives, MBO; Organizing, Departmentation, Job Description; Elements of Human Resource Management: Staffing, Directing, Controlling. Total Quality Management, Continuous Improvement. Engineering Applications.
GENN201	**Communication and Presentation Skills** **Compulsory, Credits: 2 (1+1+0)** **Prerequisite(s): GENN101** Analyzing the audience. Selecting presentation topics and objectives. Recognizing different types of speeches and presentations. Overcoming nervousness and developing confidence while addressing an audience. Researching and generating information for informative presentations. Chucking presentation content. Designing effective visual aids. Using explicit and effective transitions throughout a presentation. Creating benefit statements for persuasive presentations. Using persuasive devices such as pathos and logos in speeches. Planning and delivering informative, persuasive, entertaining and inspiring presentations. Handling question and answer sessions effectively.
GENN204	**Accounting** **Compulsory, Credits: 2 (1+1+0)** **Prerequisite(s): 42 credits** Basic accounting concepts: Accounting terms and assumptions. Accounting Methodology: balance sheet, income statement, cash flow statement. Income Determination: Cash Effects, Basis of Accounting. Accounting ratio – measuring the performance – cost concepts – cost accumulation – cost allocation – cost/volume/profit analysis – budgets – forecasting. Cost Accounting.
GENN210	**Risk Management and Environment** **Compulsory, Credits: 2 (1+1+0)** **Prerequisite(s): GENN102** Risk Management: Introduction. Risk Definition. Basic Axioms Behind Risk Management. Systemic Approach to Handling Risk . Principle of Risk Management: Identification of Risks. Preliminary Risk Analysis (PRA). Risk Assessment. Risk Evaluation. Risk Control. Hierarchies of Control. Monitoring and Reviewing. Documentation. Study of a practical problem in which the student applies Basic Risk Management Environment: Environmental Systems: Local, Regional and Global. Influence of Air Pollutants on the, Environment, Water Pollutants, Industrial Waste, Hazardous Wastes, Management of Pollutant Releases, Pollution Prevention, Recycling of Waste Materials, Waste Treatment Technologies, Ultimate Disposal of Wastes, Water Treatment Technologies. Control of Air Pollution, Contaminated Land and Its Reclamation, Principals and Uses of the Environmental Risk Assessment, Environmental Risk Assessment Methodology, Environmental Impact Assessment Environmental Health Risk Assessment. National and International regulations**.**

GEN N221	**Economics** **Compulsory, Credits: 2 (1+1+0)** **Prerequisite(s): 42 credits** Economics as a Discipline: Economics as a Social Science, Micro-economics and Macroeconomics, Theories in Economics, Barriers to Clear Thinking in Economics. The Economic Problem: Scarcity, Resources and Production, Production Possibility Boundaries, Choices and Opportunity Costs, Resource Use (Fundamental Choices). Demand and Supply: The Mechanics of a Market. Demand and Supply, Consumers Behavior (Demand, Individual Demand and Market Demand), Properties of Demand Curves, Demand versus Quantity Demanded, Producers Behavior: Supply, Individual Supply and Market Supply, Properties of Supply Curves, Supply versus Quantity Supplied, Equilibrium of Demand and Supply, Adjustment in Market Equilibrium. Supply and Demand Analysis: Economic Analysis, Demand Shifts: Substitutes and Complements, Demand Shifts: Superior and Inferior Goods, Price Ceilings, Price Floor, Excise Taxes. Price Elasticity of Demand: Price Sensitivity, Price Elasticity of Demand, Measuring Price Elasticity of Demand with the Arc Formula, Price Elasticity of Demand and Slope, Price Elasticity of Demand and Total Revenue, Determinants of Price elasticity of Demand, Other Elasticities. Perfect Competition and Monopoly Production and Input Use: Production, Production Functions, Short-Run Functions, Long-Run Production, Choices of Inputs. Economic Costs: Economic Costs, Short-Run Costs, Short-Run Cost Curves, Long-Run Costs and Long-Run Cost Curves. Profits, Interests, and Rent. Interest Rates, Time Value of Money. Feasibility Studies. Project Economic Analysis. Depreciation. Factor Markets: Perfect and Imperfect Competition.
	GEN. ELECTIVES
GENN301	**Ethics and Legislation** **Elective (group E-1), Credits: 2 (1+1+0)** **Prerequisite(s): 80 credits** Engineering profession: Ethical issues in engineering practice. Conflicts between business demands and professional ideals. Social and ethical Responsibilities of Technologists. Codes of professional ethics. Case studies. Value Crisis in contemporary society. Nature of values: Psychological values, Societal values, Aesthetic values, Moral and ethical values. Work ethics and professional ethics. The legal rule: Mandatory and complementary. Sources of Law. Formal sources: Statutory Law, Custom, the Principles of natural Law and rules of justice. Informal sources: Jurisprudence, Doctrine. Application of Law. Holders of right; Natural persons, Juristic persons. Theory of Obligation; definition, forms. Sources of Obligations. Labor Law. Safety and Vocational Laws. The contract; Parties, Formation, Validity, Effect, Interpretation, Responsibilities, Dissolution, and compensation of Damage. Contracts.

GENN310	**Advanced Risk Management** **Elective (group E-1), Credits: 2 (1+1+0)** **Prerequisite(s): GENN210 + MTHN203** Review of the Basic Risk Axioms and Concepts. Evolution of Risk Concepts and Terminology. Financial and Industrial Risk: Comparison and Contrast. Probabilistic Nature of Risk.. System Decomposition. Legal and Regulatory Risks. Tools for Risk Assessment: Probability and Consequences: Event Tree, Fault Tree, FMECA, FEMEA, MOSAR (The French Approach), Simulation, Optimization and Operations Research. HACCP: principles and applications. HAZOP.Qualitative and Quantitative Risk Assessments (QRA). Quantitative Risk Assessment: Qualitative Aspects of System Analysis (Quantification of Basic Events. Confidence Interval. Quantitative Aspects of System Analysis. System Quantification for Dependent Events. Human Reliability. Uncertainty Quantification). Operational Risk. Reporting Risk Operations. Sectoral Risk Management. Specific Risk Topics: Risk Specific to Confined Spaces. The Special Case of BLEVE and Explosive Mixtures. Social and Psychological Risk. Social Risk Management and Social Protection. Disaster Risk Management and Vulnerability Reduction. Can Risk be a Management Style?
GENN311	**Technical Writing in Arabic** **Elective (group E-1), Credits: 2 (1+1+0)** **Prerequisite(s): GENN101 + 80 credits** Review of the Basics of Arabic Grammar and Mechanics. Writing Effective Sentences and Paragraphs Using Arabic Language. Discovering and Outlining Ideas. Writing Abstracts, Summaries, and Conclusions of Long Reports. The thesis Statement. Writing Technical Forms Using Arabic Language: Letters, Memos, Reports, Scientific Articles, Job Description, CV. Writing References and Footnotes. Selection of Key Words, Titles and Subtitles. Editing, Revising and Proofreading Techniques. Electronic Word Processing and Technical Writing. Integrating Graphs, Tables and Charts in Technical Documents. Vocabulary Building. Basic Types and Patterns of Argument: Terminology, Building Sub-Arguments of Fact and Policy. مراجعة أسس القواعد النحوية و ميكانيكيات اللغة العربية - الأخطاء الشائعة فى استخدامات اللغة العربية - كتابة جمل وفقرات صحيحة وفعالة باستخدام اللغة العربية - خلق الأفكار (التفاكر) - كتابة مقدمات، ملخصات و خاتمات التقارير - كتابة الأبحاث - أشكال الكتابة باللغة العربية: الرسائل، المذكرات، التقارير، المقالات العلمية، الوصف الوظيفي، كتابة السيرة الذاتية وتوثيق المراجع - اختيار الكلمات المفتاحية و كذلك العناوين الرئيسية والفرعية - التعرف على تقنيات التحرير و المراجعة و القراءة الاحترافية - إمكانية معالجة النصوص والكتابة الإليكترونية - الرسوم و الجداول و المخططات البيانية في الوثائق الفنية - بناء حصيلة لغوية من الكلمات والمفردات - تعلم الانماط و الأساليب الأساسية والمبدئية للنقاش من حيث المنهجية والبناء.
GENN321	**Foreign Language** **Elective (group E-1), Credits: 2 (1+1+0)** **Prerequisite(s): GENN201** Emphasizing the development of student's communicative skills to speak, listen, read and write in languages other than Arabic and English, such as

	French, German, Spanish, Italian, Japanese, Chinese, etc, and to study cultural characteristics of such foreign languages from historical, geographical, literature, economic, and social viewpoints. Topics include, but not limited to, the basics of language grammar and mechanics, writing effective sentences and paragraphs, vocabulary building, writing technical engineering documents and writing technical forms: letters, memos, reports, scientific articles, job description, resumes and curriculum vitas.
GENN326	**Marketing** **Elective (group E-1), Credits: 2 (1+1+0)** **Prerequisite(s): GENN102 + 80 credits** Introduction. The Field of Sales; Strategic Sales Force Management. The Personal Selling Process and Sales Force Organization. Profiling and Recruiting Salespeople; Selecting and Hiring Applicants, Developing the Sales Program, Sales Force Motivation, Sales Force Compensation, Expenses and Transportation; Leadership of a Sales Force, Forecasting Sales and Developing Budgets; Sales Territories, Analysis of Sales Volume, Marketing Cost & Profitability Analysis, Performance Evaluation; Ethical and Legal Responsibilities tender writing.
GENN327	**Selections of Life-Long Skills** **Elective (group E-1), Credits: 2 (1+1+0)** **Prerequisite(s): GENN201** Communicating Clearly - Managing Time and Resources - Making Decisions - Delegating Successfully - Motivating People - Managing Teams - Negotiating Successfully - Minimizing Stress - Getting Organized - Managing Changes - Interviewing People - Managing Your Career - Balancing Work and Life - Thinking Creativity and Innovation - Influencing People – Systems Thinking – Interpersonal Management Skills – Entrepreneurial Skills.
GENN331	**Business Communication** **Elective (group E-1), Credits: 2 (1+1+0)** **Prerequisite(s): GENN201** Skills for effective communication in the workplace; constructing and delivering persuasive business presentations; theoretical and experiential knowledge of argumentation and debate for informal and formal presentations; style, layout, and convention of business writing; writing business proposals, progress reports, and feasibility reports; common areas of miscommunication.
GENN332	**Service Management** **Elective (group E-1), Credits: 2 (1+1+0)** **Prerequisite(s): GENN102 + 80 credits** Role of services in the economy, The nature of services, Service quality, Service Strategy, Developing new services, The role of technology in supporting service delivery, Design of services, Capacity planning and managing queues, Quantitative methods for service management.

GENN333	**Creativity, Art & Design** **Elective (group E-1), Credits: 2 (1+0+3)-Compulsory for AET** **Prerequisite(s): ARCN108** This course will provide entry level visualization, communication and design skills for a wide variety of fields including: mechanical engineering, architecture, interior and furniture design, graphic design, package design, marketing, visual arts, …etc. It will help produce innovative creative and artistic projects. To develop basic thinking, visualizing and problem-solving skills , in order to apply these skills to a realistic simple creative project ex. exhibit design, landscape design, furniture design, … etc
GENN380	**Thesis Writing for GP** **Elective (group E-1), Credits: 2 (2+2+0) Compulsory for AET** **Prerequisite(s): GENN101, AA Approval [registering in GP1]** The thesis writing course is a capstone project, presenting a well-argued piece of research on a precise architectural/engineering theme or topic independently selected by the student. The student acquires the main scientific writing skills of typical dissertations through the course to finally submit a scientific paper of 10,000 words. The student goes through the formulation of the different phases of writing starting from having an argument, writing an abstract, developing methodologies and then going through literature review, together with critical analysis of information and relevant case studies to end with developing empirical/ applied studies.

7.2 College-Core Courses

CHEN001	**Chemistry** **Compulsory, Credits: 3 (2+2+1)** **Prerequisite(s): none** Gases; Applications to gaseous law; Mass balance and heat balance in combustion processes of fuels; Solutions & separation techniques; Applications to electrochemistry; Corrosion; Water treatment; Building materials; Environmental Engineering; Selected chemical industries: fertilizers, dyes, polymers, sugar, petro-chemicals, semi-conductors, oil and fats, industrial systems; Chemical Vapor deposition.
GENN003	**Basic Engineering Design** **Compulsory, Credits: 2 (1+1+0)** **Prerequisite(s): none** Introduction to Design: Problem description and Introduction to Internet communication - Project Management: Project Management Application, Problem Solving Techniques: Problem Definition, Design Constraints - Creative Thinking and Problem Solving: Introduction to critical and creative thinking, nature of design problems - Brainstorming seminar, list of possible and impossible solutions and generating Ideas - Creative Thinking and Decision making: Product life cycles , Selection of idea (s), Final decision matrix, Justify decision - The Design Matrix: Context, purpose and requirements of engineering design - Analyze selected

	solution/preliminary design - Automated Design & the Positive Attitudes for Creativity - Systematic generation and evaluation of ideas.
MDPN001	**Engineering Graphics** **Compulsory, Credits: 3 (1+0+5)** **Prerequisite(s): none** Techniques and skills of engineering drawing, normal and auxiliary projections. Solid geometry. Intersections between planes and solids. Development, sectioning. Drawing and joining of steel frames. Assembly drawing of some mechanical parts.
MDPN002	**Fundamentals of Manufacturing Engineering** **Compulsory, Credits: 3 (2+1+2)** **Prerequisite(s): none** Engineering Materials - Elements of Manufacturing Processes, material flow, energy flow and information flow - Forming in the liquid state, Casting and molding processes - Forming in the solid state, metal forming, forming of plastics and powder metallurgy - Material Joining processes, welding, soldering and brazing, riveting, joining by mechanical elements, assembly processes - Material removal processes, metal cutting and finishing processes - Computer applications in manufacturing - Term mini-project.
MECN001	**Mechanics-1 (Statics)** **Compulsory, Credits: 2 (1+3+0)** **Prerequisite(s): none** Statics of particles, forces in three-dimensions, vector algebra; equivalent systems of forces, resultant of a group of forces, moments of forces, moment of a couple, reduction of a system of forces, wrench; equilibrium of rigid bodies in two dimensions, reactions at supports and connections for a 2D structure, 2D trusses, equilibrium of rigid bodies in three dimensions, reactions at supports and connections for a three dimensional structure; centroids and centers of gravity, center of gravity of 2D bodies, centroids of areas and lines, first moments of areas and lines, composite plates and wires; moments of inertia, moments of inertia of areas, second moment, or moment of inertia of an area, polar moment of inertia, radius of gyration of an area, parallel-axis theorem, moments of inertia of composite areas, product of inertia, principal axes and principal moments of inertia, moments of inertia of masses, moment of inertia of a mass, parallel axis theorem, moments of inertia of thin plates, moments of inertia of composite bodies, mass product of inertia, principal axes and principal moments of inertia.

MECN002	**Mechanics-2 (Dynamics)** **Compulsory, Credits: 2 (1+2+1)** **Prerequisite(s): MECN001** Kinematics of particles: rectilinear motion of particles, position, velocity and acceleration, uniform rectilinear motion, uniformly accelerated rectilinear motion, curvilinear motion, derivatives of vector functions, rectangular components of velocity and acceleration, relative motion, tangential and normal components of acceleration, motion of a particle in a circular path, velocity and acceleration of a particle in polar coordinates. Kinetics of particles: Newton's second law, linear momentum of a particle, equations of motion with applications in Cartesian coordinates, tangential and normal directions, polar coordinates, free vibrations of particles, simple harmonic motion; energy & momentum methods, work of a force, kinetic energy of a particle, principle of work and energy, applications, power and efficiency, potential energy, conservation of energy, principle of impulse and momentum, impulsive motion, impact, direct central impact and coefficient of restitution, oblique central impact.
MTHN001	**Introduction to Linear Algebra and Analytic Geometry** **Compulsory, Credits: 3 (2+3+0)** **Prerequisite(s): none** Matrix algebra, determinants, inverse of a matrix, row equivalence, elementary matrices, solutions of linear systems of equations; parabola, ellipse and hyperbola, eccentricity and conic sections; quadratic equations; solid geometry, line, plane, quadratic surfaces.
MTHN002	**Calculus I** **Compulsory, Credits: 3 (2+3+0)** **Prerequisite(s): none** Functions, graphing of functions, combining functions, trigonometric functions; limits and continuity; differentiation; inverse functions; exponential and logarithmic functions; inverse trigonometric functions; hyperbolic and inverse hyperbolic functions; indeterminate forms and L'Hopital's rule; Taylor and Maclaurin expansions.
MTHN003	**Calculus II** **Compulsory, Credits: 3 (2+3+0)** **Prerequisite(s): MTHN002** Anti-derivatives; indefinite integrals; techniques of integration; definite integrals, applications of definite integrals; functions of several variables; partial derivatives, applications for partial derivatives.
MTHN102	**Multivariable Calculus and Linear Algebra** **Compulsory, Credits: 3 (2+3+0)** **Prerequisite(s): MTHN001 + MTHN003** Double integrals, double integrals in polar coordinates; triple integrals, triple integrals in spherical and cylindrical coordinates; applications of double and triple integrals; line and surface integrals; vector analysis, gradient of a scalar function, divergence of a vector, curl of a vector, divergence and Stokes' theorems, vector identities; LU-factorization;

	vector spaces; inner product spaces; eigenvalues and eigenvectors; diagonalization of matrices; functions of matrices.
MTHN203	**Probability and Statistics** **Compulsory, Credits: 3 (2+3+0)** **Prerequisite(s): MTHN102** Probability axioms; probability laws; conditional probability; random variables; discrete and continuous distributions; joint distribution; computer simulation; sampling; measures of location and variability; parameter estimation, testing of hypothesis.
PHYN001	**Mechanics, Oscillations, Waves and Thermodynamics** **Compulsory, Credits: 3 (2+2+1) Prerequisite(s): none** Physics and measurements; elastic properties of solids; universal gravitation and motion of planets; fluid mechanics (statics and dynamics); oscillatory motion; wave motion, sound waves; thermo-dynamics, temperature, heat and the first law of thermodynamics, the kinetic theory of gases, heat engines, entropy and the second law of thermodynamics. Laboratory experiments on course topics.
PHYN002	**Electricity and Magnetism** **Compulsory, Credits: 3 (2+2+1)** **Prerequisite(s): none** Electric field; Gauss' law; electrostatic potential; capacitance and dielectrics; current and resistance; direct current circuits; magnetic fields, sources of magnetic field; Faraday's law; Maxwell's equations; inductances; magnetic properties of matter. Laboratory experiments on the course topics.
AETN280	**Seminar-1** **Compulsory, Credits: 1 (2+0+0)** **Prerequisite(s): 72 credits + AA Approval** Talks and presentations are invited from industrial establishments relevant to the program. The guest speaker should discuss the organization, management, and recent technologies implemented in his/her industrial establishment. Students exercise writing brief technical reports on the guest presentation and deliver their own presentation about the topic. *The course is graded as Pass/Fail grade-system.*
AETN380	**Seminar-2** **Compulsory, Credits: 1 (2+0+0)** **Prerequisite(s): AETN280** Students will be required to present seminars on a subject assigned to (or chosen by) them about the latest technology and theory relevant to the program. The grade depends on organization, quality, and content of both the presentation and the report prepared by the student. *The course is graded as Pass/Fail grade-system.*

AETN281	**Industrial Training-1** **Compulsory, Credits: 1 (0+0+3)** **Prerequisite(s): 72 credits + AA Approval** Training on industrial establishments relevant to the program. Training lasts for total of 90 hours, during a period about three weeks. The program training advisor schedules at least one follow up visit to the training venue and formally report on performance of trainee(s). A Mentor in the industrial establishment provides a formal report on the student's performance during training. The student submits a formal report and presentation to be evaluated by a panel of three members with one member being an external examiner appointed from industry or other colleges of engineering. *The course is graded as Pass/Fail grade-system.*
AETN381	**Industrial Training-2** **Compulsory, Credits: 2 (0+0+6)** **Prerequisite(s): AETN281 + AA Approval** Training on industrial establishments relevant to the program. Training lasts for total of 180 hours, during a minimum period of six weeks. The program training advisor schedules at least two follow-up visits to the training venue and formally report on performance of trainee(s). A Mentor in the industrial establishment provides a formal report on the student's performance during training. The student submits a formal report and presentation to be evaluated by a panel of three members with one member being an external examiner appointed from industry or other colleges of engineering. *The course is graded as Pass/Fail grade-system.*
AETN480	**Graduation Project-1** **Compulsory, Credits: 1 (0+0+3)** **Prerequisite(s): 130 credits +ARCN305 +ARCN307+ AA Approval [registering in GENN380] Full completion of Level 100 courses and should finish all the freshman courses before registration. No registration if GPA is less than 1.9, if GPA=1.95-2, registration is done after Coordinator's approval. If GPA= 1.9-1.95, registration is done after Executive Committee's approval.** Students undertake a major project as part of the program. The aim of the project is to provide the students, who work in groups, with an opportunity to implement appropriate concepts and techniques to a particular design. Students are required to select and research the expected project to be designed and implemented in the following course Graduation Project-2. The student should give an oral presentation to be approved. *The course is graded as Pass/Fail grade-system.*
AETN481	**Graduation Project-2** **Compulsory, Credits: 3 (1+0+6)** **Prerequisite(s): AETN480 + AA Approval [registering in ARCN481]** All students undertake a major project as part of the program. The aim of the project is to provide the students, who work in groups, with an opportunity to implement the appropriate concepts and techniques to a particular design. A dissertation on the project is submitted on which the student is examined orally.

7.3 Discipline Courses

ARCN101	**Introduction to the History and Theory of Architecture** **Compulsory, Credits: 2 (1+0+3)** **Prerequisite(s): none** Provides an outline of the history and theory of architecture and urbanism from Ancient Egypt to the 19th century. Analyzes buildings as the products of culture and in relation to the special problems of architectural design.
ARCN102	**History of Structures in Architecture** **Compulsory, Credits: 2 (1+0+3)** **Prerequisite(s): ARCN101** Technical and historical study of structures in architecture and engineering. Focuses on the design and assessment of historic structures in masonry, timber, concrete, and metal. An emphasis on the impact of the 20th century and beyond; modern technology is also introduced.
ARCN103	**Architecture and Humanities** **Compulsory, Credits: 2 (1+0+3)** **Prerequisite(s): GENN001** Course introduces architectural thought and practice from the Egyptians to the present. Content includes philosophical and practical problems of providing habitable spaces for human beings. Art and architecture reflect culture and technology, and represent significant career possibilities. Through readings, guest lectures, and field trips, students will explore outstanding examples in architecture, make critical reports, and develop skills for success in Architectural Technology.
ARCN106	**Introduction to CAD Systems** **Compulsory, Credits: 2 (1+0+3)** **Prerequisite(s): GENN004 + MDPN001** The aim of this course is to explore current CAD technologies and develop skills in the use of specialist CAD software to produce 2D and 3D design specifications, to transform CAD drawings into photo realistic virtual products and to gain an awareness of CAD data and how such information can be transformed to engineering drawings. At the end of the course, the students will understand a variety of terms and terminology as applied to CAD technology; demonstrate the use of an industry standard operating system to create standard CAD packages for 2D and 3D design drawings.
ARCN108	**Visual Perception and Art** **Compulsory, Credits: 2 (1+0+3)** **Prerequisite(s): ARCN104** Visual perception develops tools of visual analysis and interpretation. Students examine topics ranging through three main sectors. Sector 1: Freehand Sketching & Perspective: Understanding the art of perceiving different shapes & forms in environment and interpretation of proportions. Developing Free-hand sketching skills using pencils as a media and introduction to shade and shadow and perspective viewing of basic geometric forms. Sector 2: Science & Theory of Color: The development of an awareness of the science

	of color. This theme explores the properties, composition, and interaction of colors as related to architecture. It also opens up new dimensions of colors as a presentation media in art and through architectural applications. Sector 3: Composition & Creativity: The development of creativity, perception, drawing and composition skills to express the students' thoughts and ideas. This is achieved by providing artistic activities that allow the student to express his skills, thoughts and creativity freely and also to learn about art sketching, abstraction and perception in architecture.
ARCN109	**Introduction to Design Computing** **Compulsory, Credits: 2 (1+0+3)** **Prerequisite(s): ARCN104 + ARCN106** Introduces students to architectural design and computation through the use of computer modeling, rendering, and digital fabrication. Focus on the exploration of space- and place- making through the use of computer rendering and design construction through CAD/CAM fabrication. Students design a small building using computer models leading to a full package of physical and virtual materials, from computer generated drawings.
ARCN203	**Urban Design and Landscape** **Compulsory, Credits: 2 (1+0+3)** **Prerequisite(s): ARCN206 + ARCN208** A design studio. Introduces skills needed to build within contemporary cities, extending from the historical center to expanding edges. Students analyze an existing environment and design a built structure that fosters relationships between its intended activities and the larger urban territory and redefines the urban environment. The course also Introduces skills needed to build within a landscape establishing continuities between the built and natural world. Students learn to build appropriately through analysis of landscape and climate for a chosen site and conceptualize design decisions through drawings and models.
ARCN208	**Site Planning and Development** **Compulsory, Credits: 2 (1+0+3)** **Prerequisite(s): ARCN104** This course aims for planning studies to apply technical knowledge to social problems: the problems of cities of the developing world; problems of the environment and the design of spaces. The purpose of the course is to develop the knowledge and skills to make one capable of analyzing and planning a site, or a group of urban sites, for design intervention and development. The course will discuss the theoretical and practical matters involved in planning sites within the context of natural systems
ARCN303	**Smart Building Information Systems** **Compulsory, Credits: 3 (2+0+3)** **Prerequisite(s): INTN127 + ARCN204** This course introduces some main issues of buildings performance. It focuses on two main topics. The first one is the smart building information systems. It aims to Exploring the Humanities: Introduction to modes of thought found within humanities and social sciences. The second topic is

	about building control and diagnostics. It concentrates on the empirical evaluation of the built environment (building components and systems, interactions between building, occupants and environmental conditions) in view of multiple performance criteria (thermal, visual and acoustic performance). All this will be achieved through the use of computation tools in all processes of building design, construction and operating.
	ARCH. DESIGN STUDIOS
ARCN104	**Architectural Design-1** **Compulsory, Credits: 3 (2+0+3)** **Prerequisite(s): MDPN001 + GENN003** Introductory course for sophomore students to understand the fundamentals of Architectural Design as well as the scope and vocabulary of architecture. Also the course presents the career range of architects and the role of the architect in the community. It aims to prepare students with all the basic knowledge & skills they need to be able to deal with the design process. The course introduces the generic issues that influence and shape architectural design, and aims at developing the skills to address them. The studio focuses on such elements as tectonics, design method and representation, human scale, space, form and light, function, place and time. Design is understood as a method of inquiry, through hands-on exercises which enhance architectural skills and thinking by 2- dimensional and 3-dimensional weekly assignments. The studio concludes by a design assignment for a simple functional building placed in a selected context where students conclude all behavioral, contextual and analytical design tools they learn during the studio in a process-based project. **Topic: BASIC ARCHITECTURAL SKILLS** **Key Words: Drafting, architectural drawing, scale, dimensions, space, proportion, patterns, form & expression**
ARCN107	**Architectural Design-2** **Compulsory, Credits: 3 (2+0+3)** **Prerequisite(s): ARCN104** This course is meant to direct the students throughout the process of design starting from deriving the concept and reaching to fully developed multi-layered design allowing students understand the different aspects incorporated with the design process covering Utilitarian, Structural, Socio-cultural, Environmental and Economic aspects. Also the course aims to train the students to effectively use various illustration media to express their work and express themselves including manual, digital, and mixed media as well as the written word. Those skills are introduced through a dwelling project, where students are required to express verbally their dream home, write a script for the scenario of using this home, and fulfilling this scenario in an architectural form. Following that, a secondary project is given, which is a small scale public-use project to acquire the conceptual and technical skills for dealing with a public building.

	INTRODUCTION TO ARCHITECTURAL DESIGN **Dwelling design, conceptual approach, human-based design, self-critique.**
ARCN206	**Architectural Design-3** **Compulsory, Credits: 3 (2+0+3)** **Prerequisite(s): ARCN107 + ARCN108 +ARCN102** Junior level (design 3 and 4) has two broad aims; first to emphasize the role of building construction, technology and environment in designing a wider range of building types with more complex functional and technical requirements. Second, to explore the role of the qualitative aspects of the form/environment relationship in stimulating senses and promoting aesthetics attributes of space, form and tectonics. Design 3 focuses on the ways in which the nature of the structural system, method of construction and building materials affect and inform the process of design and the final form. By means of experimental physical models, students should be able to select building materials and methods of appropriate physical/formal characteristics to create an iconic building. **STRUCTURE AS A FORM GIVER** **Conceptual design, building within context, structure, technology & building sciences.**
ARCN207	**Architectural Design-4** **Compulsory, Credits: 3 (2+0+3)** **Prerequisite(s): ARCN206** Design-4 explores solutions primarily based upon environmental considerations taking into account physical and qualitative attributes of the environment. Integrate environmental and climatic concerns, structure and constructional parameters. Emphasis on sustainability, energy efficiency, environmental system integration, building envelope design, form and tectonics. **ARCHITECTURAL RESPONSE TO ENVIRONMENT** **Conceptual & contextual design, structure, technology, environment & building sciences.**
ARCN301	**Architectural Design-5** **Compulsory, Credits: 4 (2+0+4)** **Prerequisite(s): ARCN207** The senior level (design 5, 6) allows students to expand on functional, structural and environmental issues developed in earlier design studios within a socio/cultural and contextual frame of reference. Projects should provide the opportunity to develop appropriate conceptual and theoretical agendas and to challenge preconceptions related to the notion of building typology and analysis of real-life situations requiring program research. Design-5 utilizes projects at intermediate level of complexity to explore design solutions primarily based upon social context and user requirements to create cultural awareness. Students should learn how to develop the design program from users' requirements and behavioral patterns, and how to plan for socio/cultural, environmental and

	economical sustainability. **FORM & CONTEXT** **Socio-cultural context, human behavior- observation, design program formulation, sustainability**
ARCN307	**Architectural Design-6** **Compulsory, Credits: 4 (2+0+4)** **Prerequisite(s): ARCN203 + ARCN301** Emphasizes setting of architectural work as part of an organized community in projects having to do with built-up areas, as well as those on new sites. Utilizing projects of intermediate size but with increasing level of complexity, students should learn how to analyze real sites and contexts and how to infer guidelines that instruct space, form, order, character and identity. They should also know how to integrate environmental and climatic concerns, structure and constructional parameters. Emphasis on the broad meaning of contextual and sustainable design. **CONTEXTUAL DESIGN** **Physical context, behavioral & social patterns, contextual design, sustainability, complex structural problem.**
ARCN406	**Architectural Design-7** **Compulsory, Credits: 4 (2+0+4)** **Prerequisite(s): ARCN307+ ARCN305** The studio explores design solutions that address real issues facing the local/regional community. Students should learn how to build upon and integrate all themes of knowledge acquired in previous design studios and how to develop their own philosophies/approaches and learn to transform abstract ideas and concepts to design proposals instructing space and form. Students are encouraged to develop and write their design statement. Projects include a broad range of project types, including individual buildings, urban districts and landscapes. **IDENTITY & THE PUBLIC** **Assimilation of design studios-excellence & complexity:** **Identity, community related public buildings.**
	BC & BT STUDIOS
ARCN105	**Introduction to Building Construction and Technology** **Compulsory, Credits: 2 (1+0+3)** **Prerequisite(s): none** The course builds on the fundamentals of surveying and building construction; and also the environmental control systems dealing specifically with building heating, cooling, lighting, water, waste, and acoustics. This course places an emphasis on the integration of spatial, visual, and environmental performance aspects of buildings. Innovative environmental solutions will be illustrated throughout the course.
INTN127	***Building Technology & Systems***

ARCN202	**Building Construction-1** **Compulsory, Credits: 2 (1+0+3)** **Prerequisite(s): ARCN105** The course provides a comprehensive overview on how an architect writes, interprets, enforces, or manages construction documents. Project architects, contractors, contract administrators, material suppliers, and manufacturers' representatives are all realizing the advantages of being Construction Documents Technologists.
ARCN205	**Building Technologies-1** **Compulsory, Credits: 3 (2+0+3)** **Prerequisite(s): ARCN105** Introduction to the elements of architectural structures. Topics in mechanical static are addressed as they relate to major contemporary structural systems. The study of forces and the achievement of equilibrium is the framework in which structural morphologies are studied and structural design is used as a primary determinant of building form. A variety of methods for discovering structural form and calculating limit capacities are introduced and used to complete several structural design projects.
ARCN209	**Building Technologies-2** **Compulsory, Credits: 2 (1+0+3)** **Prerequisite(s): ARCN205** Introduction to the elements of architectural structures. Topics in mechanical statistics are addressed as they relate to major contemporary structural systems. The study of forces and the achievement of equilibrium is the framework in which structural morphologies are studied and structural design is used as a primary determinant of building form. A variety of methods for discovering structural form and calculating limit capacities are introduced and used to complete.
ARCN302	**Building Construction-2** **Compulsory, Credits: 3 (2+0+3)** **Prerequisite(s): ARCN209+ ARCN202** The major areas of study will be: 1) exterior and interior finishing materials and specifications, 2) common exterior and interior finishing materials and specifications, 3) basic carpentry mathematics related to exterior and interior finishing, 4) insulation installation and specifications, 5) drywall installation and finishing, 6) interior doors and running trim installation. Credits will be awarded upon competency completion.
ARCN305	**Building Construction-3** **Compulsory, Credits: 4 (2+0+4)** **Prerequisite(s): ARCN302** The course goal is to introduce the students to The construction process , Construction contract types, Modifications and substitution procedures, Contractual relationships Rights, duties, and responsibilities, Contract provisions, Relationship and organization of construction documents, Use of construction documents, Organizational formats , Interpreting

	construction documents. Addresses advanced structures, exterior envelopes, and contemporary production technologies. Continues the exploration of structural elements and systems, expanding to include more complex determinate, indeterminate, long-span, and high-rise systems.
ARCN402	**Building Construction-4** **Compulsory, Credits: 4 (2+0+4)** **Prerequisite(s): ARCN305** Introduces building construction as a computational enterprise in which rules are developed to compose and describe Construction designs and other designs. Discusses issues related to practical applications of construction managements. This course introduces advanced computing tools such as advanced construction modeling and CAD/CAM fabrication
ARCN405	**Building Construction-5** **Compulsory, Credits: 4 (2+0+4)** **Prerequisite(s): ARCN402** Course subject delivers the information, skills, and techniques necessary to create the physical products of real estate and manage the process of real estate development and urban development economics. Exposes students to the general skills, techniques and process associated with each of the functional areas involved in real estate development so that they may organize and lead the development process that is economically valid. Students work in teams to create a development proposal for a particular development opportunity within a certain economical criteria.

7.4 Major Courses: AET

ARCN204	**Thermal and Aerodynamics in Buildings** **Compulsory, Credits: 2 (1+0+3)** **Prerequisite(s): MECN002 + ARCN105** Application of heat transfer and air dynamics to airflows within buildings. Analytic models of coupled flow and heat transfer for wind- and buoyancy-controlled natural ventilation. Stability of multiple equilibrium solutions. Analysis of displacement ventilation, jet flows and diffusers. Multi-node and multi-zone models, and computational air dynamics. Use of similitude in laboratory scale models. Measurement techniques within real buildings.
ARCN304	**Fundamentals of Energy in Buildings** **Compulsory, Credits: 3 (2+0+3),** **Prerequisite(s): ARCN204** Introduction to energy fundamentals important to buildings. Conservation of energy. Air-water vapor mixtures. Thermal comfort. Solar energy and refrigeration cycles, limiting thermodynamic performance. Heat transfer within buildings and major components. Several creative design projects are assigned.

ARCN308	**Architectural Acoustics and Day-lighting** **Compulsory, Credits: 3 (2+0+3)** **Prerequisite(s): ARCN204 + INTN127** Describes interactions between people and sound, indoors and outdoors, and uses this information to develop acoustical design criteria for architecture and planning. Principles of sound generation, propagation, and reception. Properties of materials for sound absorption, reflection, and transmission. Provides the tools necessary for an efficient integration of day-lighting issues in the overall design of a building. Fundamentals of day-lighting and artificial lighting are introduced: physics of light propagation and solar radiation, photometry and colorimetry (visual perception, photometric quantities, chromatic systems), sun course, physics of windows (light and heat transfer, glazing types), electric lighting (lamps and luminaries characteristics). More advanced and design-oriented topics are presented and practiced through the design project: benefits and availability of daylight, visual and thermal comfort, primary and advanced lighting design strategies, design and assessment tools for lighting management.
INTN127	**Building Technology & Systems** **Compulsory, Credits: 2 (1+0+3)** **Prerequisite(s): ARCN105** This is an introductory course to orient the students to the crucial link between an Architectural Project and the Building Systems, Technology and Structures. An introduction to BIM, Green Construction and Construction Management is also presented. The idea of Technique/Structure as a Form Generator and Moderator is introduced through the discussion of several Architectural projects. This will be conducted through several media of lectures, drawing tutorials, forums of discussion and site visits.
STRN101	**Structural Analysis-1** **Compulsory, Credits: 3 (2+3+0)** **Prerequisite(s): MECN001** Types of structures; Loads; Supports and Reactions; Internal Forces; Analysis of Beams, Frames, and Trusses. Influence lines of Statically Determinate Structures, Moving Loads.
STRN103	**Engineering Materials** **Compulsory, Credits: 3 (2+1+2)** **Prerequisite(s): PHYN001 + MECN001** Classification of types of materials - Concrete and asphalt concrete; constituent materials and their properties, mix design, manufacture, properties, and standard and quality control testing - Steel, Building stones - Bricks - Timber - Heat insulating and acoustic materials. Laboratory: Testing for QC.

STRN104	**Mechanics of Materials** **Compulsory, Credits: 3 (2+3+0)** **Prerequisite(s): STRN103** Analysis of stress, strain, and deformation of sections subjected to tension, compression, bending, shear, and torsion - Buckling - Theories of failure - Laboratory: Lab Testing of materials for strength evaluation; the definition of the mechanical properties (elasticity - plasticity - stiffness - strength - ductility - brittleness - resilience - toughness) and their determination in different loading cases. The load and deformation diagram is to be plotted. The different properties are to be determined.
STRN211	**Concrete Structures** **Compulsory, Credits: 2 (1+3+0)** **Prerequisite(s): STRN104** Methods of design; Codes; Structural systems and load distribution; Design using limit states method; Section subjected to bending moments; Section subjected to shear and torsion; Reinforcement details for beams; Limit state of deflection, Working stress design method.
STRN312	**Steel Structures** **Compulsory, Credits: 2 (1 +3+0)** **Prerequisite(s): STRN104** Introduction to structural steel design – Design criteria (materials, loads, and systems) – General layout – Design of tension members – Design of compression members – Design of beams – Design of beam-columns.
CVEN302	**Surveying & Foundation Design** **Compulsory, Credits: 3 (2+2+1)** **Prerequisite(s): STR N104** -Introduction to surveying, Leveling, Heights, datum and benchmarks, calculating reduced levels (rise and fall) and (HPC method), Leveling Applications, Angles and Bearings, Electronic Distance Measurement, Using Total station & Introduction to GPS - Introduction to Soil prosperities; Soil classification, Field compaction, Compressibility, Bearing capacity & Footings.
CVEN301	**Structural systems & Design** **Compulsory, Credits: 3 (2+2+1)** **Prerequisite(s): STR N211+ STR N312** - Introduction to Load distribution & design methods; Slabs: solid slabs, hollow block slabs, Flat slabs. Columns: Short and long columns, large span systems: design & detailing of Frames - Introduction to structural steel, general layout and steel systems; Design of connections (welded and bolted) & Steel details.

	MAJOR ELECTIVE COURSES
	FIRST: 2 HOURS ELECTIVE
ARCN230	**Contemporary Architecture: 20th Century and Beyond** **Elective (group E-2), Credits: 2 (1+0+3)** **Prerequisite(s): ARCN102** Provides an outline of the history and theory of architecture and urbanism of the Contemporary Architecture: 20th Century Architecture & Beyond. Analyzes buildings as the products of culture and in relation to the special problems of architectural design and design thinking.
ARCN231	**History of Islamic Architecture** **Elective (group E-2), Credits: 2 (1+0+3)** **Prerequisite(s): ARCN101** Critical review of literature on Islamic architecture and analyzes its historical and theoretical frameworks. Challenges the tacit assumptions and biases of standard studies of Islamic architecture and addresses historiographic and critical questions concerning how knowledge of a field is defined, produced and reproduced.
ARCN332	**Special Problems in Building Construction** **Elective (group E-2), Credits: 2 (1+0+3)** **Prerequisite(s): ARCN205** Supplementary work on individual or group basis on special problems in building construction and the life cycle of the building to gain a sustainable Architecture.
ARCN333	**Building Technologies-3: Energy in Building Design** **Elective (group E-2), Credits: 2 (1+0+3)** **Prerequisite(s): ARCN204** Explores aspects of climate relevant to building design, and applies concepts & methods to energy-efficient and environmentally responsible building design. Topics include climate and comfort parameters, energy systems, and environmental implications of buildings. Emphasizes practical applications for environmental and structural design.
ARCN335	**Community & Social Development** **Elective (group E-2), Credits: 2 (1+0+3)** **Prerequisite(s): ARCN103 + ARCN301** This elective course introduces the student to community development concepts, and techniques, providing students an opportunity to obtain "a theoretical and practical field" experience. This is done through: ·In depth exploration of social aspects of various urban contexts. ·Debating the various roles and responsibilities of the architect in the design/planning process ·Conducting and utilizing social research in designing/ planning. ·Acquiring basic skills in facilitating between different stakeholders and their various needs.

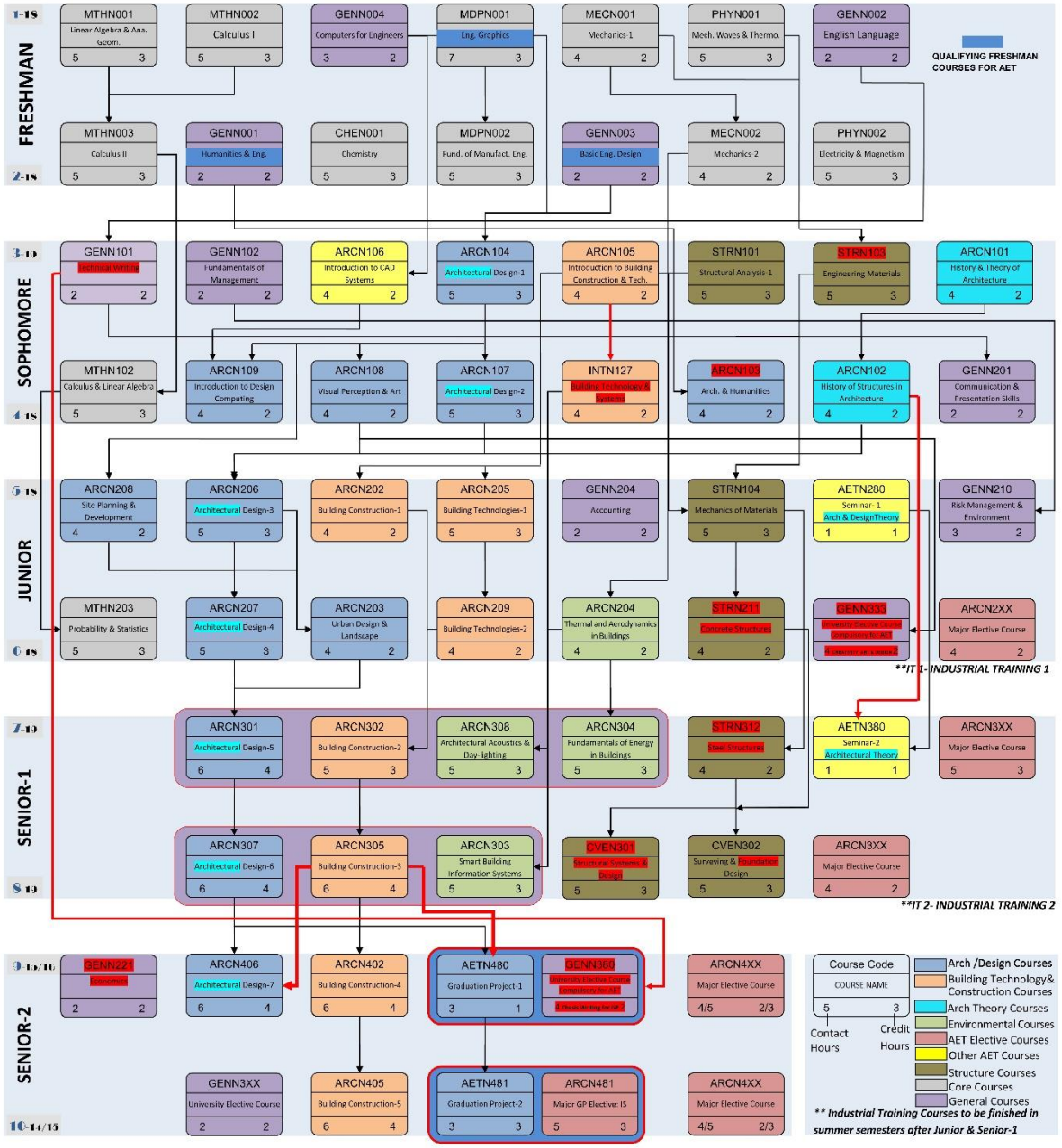
ARCN336	**Architecture, Culture & Heritage** **Elective (group E-2), Credits: 2 (1+0+3)** **Prerequisite(s): ARCN103 + ARCN203** The course introduces students to the importance of culture and heritage in architectural design and development process. It develops students' analytical and descriptive skills in order to understand the meaning and significance of Human Heritage as a product of Culture and Civilization, with special reference to Egyptian Architectural Heritage. It also enhances the students design skills to deploy the layers of conceptions, beliefs, values and architectural products in the different Egyptian historic periods while addressing contemporary Architectural and Urban Design problems.
ARCN431	**Structuring Housing Projects in Developing Countries** **Elective (group E-2), Credits: 2 (1+0+3)** **Prerequisite(s): ARCN208** Examines dynamic relationship among key actors: beneficiaries, government, and funder. Emphasis on cost recovery, affordability, replicability, user selection, and project administration. Extensive case examples provide basis for comparisons.
ARCN440	**Landscape Architecture** **Elective (group E-2), Credits: 2 (1+0+3)** **Prerequisite(s): ARCN203** This course introduces the principles of LANDSCAPE architecture. It aims to establish knowledge and skills about site investigation, functional concepts, preliminary design and master planning. It covers both hardscape and softscape components of landscape projects. In addition, it should apply the basics of Environmental design and building technologies in the field of landscape design.
ARCN436	**Independent Studies: Global Trends in Urban Planning** **Elective (group E-2), Credits: 2 (1+0+3)** **Prerequisite(s): ARCN208** This course introduces some new global issues in urban planning including the emergence of the strategic planning and all its related concepts. In addition, the course will be dealing with some vital issues including: understanding the diversity of urban contexts, the institutional and regulatory framework for planning, planning in relation to participation and politics, planning and informality, planning in relation to spatial structure of cities and provision of infrastructure, the monitoring and evaluation of urban plans, etc.

	SECOND: 3 HOURS ELECTIVE
ARCN330	**Ecologies of Construction** **Elective (group E-2), Credits: 3 (2+0+3)** **Prerequisite(s): ARCN105 + ARCN204** Examines the material and energy networks currently utilized to transfer resources from the natural world to the built environment. Theories and tools of industrial ecology are used to reveal opportunities for creating ecologies of construction; that is, mutually beneficial relationships between distinct components of the industry of construction that may be made to act symbiotically. Both the production and consumption of the architectural artifact is reviewed using tools of analysis that physically account for the flow of materials into and out of various spatial and temporal scales and boundaries.
ARCN331	**Knowledge Based Systems** **Elective (group E-2), Credits: 3 (2+0+3)** **Prerequisite(s): ARCN109** This course has two subjects to focus on. The first one is the application of knowledge-based expert system methodology in CAE. Topics include: knowledge-based programming methodologies, knowledge-based engineering techniques, expert system development environments and representative expert system applications in CAE. Each student develops a prototype expert system for an application of his/her choice. The second subject discusses issues related to practical applications of shape grammars: shapes, shape arithmetic, symmetry, spatial relations & shape computations. The study focuses on issues related to practical applications of shape grammars as a computational enterprise.
ARCN334	**Selected Topics in Architecture & Urban Design** **Elective (group E-2), Credits: 3 (2+0+3)** **Prerequisite(s): ARCN203 + ARCN207** A studio-based course that focuses on different topics in architecture and urban design through project-based learning. These topics include the study and analysis of relationships between place and space, and urban realms. The course discusses how architecture, landscape architecture, and urban design have explored those issues and how the Design process relates to architecture through hands-on projects involving interactive design process.

ARCN430	**Interior Design and Modern Art** **Elective (group E-2), Credits: 3 (2+0+3)** **Prerequisite(s): ARCN108 + ARCN307** Introduction to modern art and theories of modernism and postmodernism. Focuses on the way artists use the tension between fine art and mass culture to mobilize a critique of both. Examines objects of visual art, including painting, sculpture, architecture, photography, and video. The course will focus also on the concept of designing public space environments that are compatible with the architecture envelope, context and structure of the building as well as accommodating human needs. Graduate-level requirements include producing individual projects for assignments and the responsibility for broader solutions to the assigned projects.
ARCN432	**Geometric Modeling** **Elective (group E-2), Credits: 3 (2+0+3)** **Prerequisite(s): ARCN109 + ARCN303** Introduces the theories of three-dimensional geometric modeling and associated computer-aided design as well as visualization applications in architecture, urban design, and computer graphics production. Provides a theoretical foundation to a selection of current h ware and software tools. Extensive opportunities to develop practical skills through lab sessions and regular practical exercises. Background in computational skills is an advantage, but not required. The students acquire the skills necessary to undertake independent CAD projects in the design studios or other professional settings.
ARCN433	**Introduction to Shape Grammars** **Elective (group E-2), Credits: 3 (2+0+3)** **Prerequisite(s): ARCN109** An advanced examination of the shape grammar formalism and its relationship to some key issues in a variety of other fields, including art and design, philosophy, history and philosophy of science, linguistics and psychology, literature and literary studies, logic and mathematics, and artificial intelligence.
ARCN434	**Independent Studies: Smart Building Information Systems** **Elective (group E-2), Credits: 3 (2+0+3)** **Prerequisite(s): ARCN303** This course focuses on different work methodologies. Critical analysis of information and choice of argumentation in smart buildings. Work methodologies and pedagogical interest.

ARCN435	**Independent Studies: Advanced Building Systems Integration** **Elective (group E-2), Credits: 3 (2+0+3)** **Prerequisite(s): ARCN303 + ARCN308** This course introduces the state-of-the-art and major innovations in building technologies and structural, enclosure, telecommunications, mechanical, lighting, and interior systems. The course continues the mandate for Total Building Performance, clarifying the full range of building performance mandates required in today's architecture, including building integrity, thermal quality, acoustic quality, visual quality, air quality, and spatial quality. The course proceeds to explore the relationships, opportunities and conflicts of these mandates and the comprehension and integration of building systems necessary to achieve performance in all areas. It focuses on different work methodologies. Critical analysis of information and choice of argumentation in smart buildings Given a thorough introduction in advanced building technologies, graduates of the department should bring leadership to multi-disciplinary design processes, tow s sustainable environmental performance, and the long term integrity of integrated systems.
ARCN481	**GP Independent Studies** **Elective (group E-2), Credits: 3 (2+0+3)** **Prerequisite(s): AET480, AA Compulsory for students registering AETN481** A continuation of GP1 & thesis writing course, offering a comprehensive individual architectural design demonstrating an understanding of the different conceptual and technical aspects of architecture. In depth analysis and design study for specific aspects of the graduation project.

AET NEW COURSE MAP-F 2016-[Applied on ALL LEVELS-UIA Recommendation]



AET2016

NEW STUDY MAP

AS PER THE RECOMMENDATIONS OF THE

FULL REPORT GROUP VISIT OF THE UNESCO-UIA VALIDATION