Tuning

Middle East and North Africa

Reference Points for the Design and Delivery of Degree Programmes in Architecture

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Reference Points for the Design and Delivery of Degree Programmes in Architecture

Reference Points are non-prescriptive indicators and general recommendations that aim to support the design, delivery and articulation of degree programmes in Architecture. Subject area group including experts from Middle East, North Africa and Europe has developed this document in consultation with different stakeholders (academics, employers, students and graduates). This publication has been prepared within Tuning Middle East and North Africa project 543948-TEMPUS-1-2013-1-ES-TEMPUS-JPCR.

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Content

General Introduction

The convergence of national educational systems within the EU is an important milestone in the global development of modern higher education in the 21st century. The day when the Bologna Declaration was signed (19 June 1999), is considered the official starting point of the harmonization process of higher education systems within Europe, a process whose end aim consists in the creation of the European Higher Education Area (EHEA).

Signing the Bologna Declaration has led to a series of reforms in the educational systems of the majority of European countries. For higher education institutions (HEIs) these reforms consist in tuning basic teaching programmes in terms of both the structure and the outcomes of degrees. A prominent role should be given to the graduate and degree profiles so that they meet the needs of both the labour market and society, as well as to the specific tasks an academic community has to solve. Therefore, it is particularly important to express all the various educational levels in terms of competences and learning outcomes.

The contribution of universities to the Bologna Process and Tuning

Tuning started as a project in 2000, initiated by higher education institutions and their academics, and strongly supported morally and financially by the European Commission. Over time Tuning has moved beyond the EU and gradually transformed itself into a global methodological system covering educational sectors in many regions of the world.

It is well known that the Tuning Project has been developed within the broader context of continuous reforms of European higher education systems, when society at large has been undergoing rapid changes. The name Tuning was chosen for the project to reflect the idea that universities do not look for uniformity in their degree programmes or any sort of unified, prescriptive or definitive European curricula but simply for points of reference, convergence and common understanding. The protection of the rich diversity of European education has been paramount in the Tuning Project from the very start and the project in no way seeks to restrict the independence of academic and subject specialists, or undermine local and national academic authority.

Tuning project to link the political objectives of the Bologna Process and at a later stage the Lisbon Strategy to the higher educational sector. Over time, Tuning has developed into a Process, an approach to (re-) design, develop, implement, evaluate and enhance quality first, second and third cycle degree programmes. The Tuning Project and its methodology constitute one of the academic tools for creating the EHEA. The need for compatible, comparable and competitive higher education in Europe reflects the students' requirements. The more student mobility, the more demand for reliable and objective information on the degrees offered by different HEIs. Apart from this, employers both within and outside Europe require reliable information on qualifications awarded and on what these qualifications mean in practice and in the labour market context. Therefore, the process of creating national qualification frameworks is inseparable from the EHEA development process.

Tuning aims to meet the needs of educational institutions and structures and to offer a concrete methodology to implement the competence based approach at the level of higher education institutions and subject areas. Tuning proposes a methodology to (re-) design, develop, implement and evaluate study programmes for each of the higher education cycles. Furthermore, Tuning serves as a platform for developing reference points at subject area level. These are relevant to making study programmes comparable, compatible and transparent. The agreed-upon reference points for subject areas and their degree programmes are expressed in terms of competences and learning outcomes.

Tuning in general has emerged from the understanding that the Bologna Process is about universities, their students, academic and

non-academic staff. It is they, with all their knowledge and experience, who should be deciding upon higher education innovation strategies. Tuning is a university-driven project and movement, which came into being as a reaction of HEIs to new challenges and new opportunities that emerged within the process of European integration and the creation of the EHEA.

Tuning in Middle East and North Africa

The Tuning methodology as a universal tool for modernizing curricula in the context of achieving professional competences has gone beyond the borders of the EU and has acquired international significance. Universities in different countries and continents in expanding cooperation have increasingly resorted to using it to build joint programmes involving academic mobility, integrated education, introduction of a credit system, the exchange of educational modules and the mutual recognition of qualifications.

Middle East and North Africa Universities are also mastering the principles of the Tuning methodology through incorporating generic and subject specific competence descriptions into educational planning at the level of full degrees and individual degree components.

The Tuning Middle East and North Africa (T-MEDA) project has been designed as an independent university-driven project with contributions of university staff members from different countries. The T-MEDA project reflects the idea that universities do not look for the harmonisation of their degree programmes or any sort of unified, prescriptive or definitive curricula; but, simply for points of convergence and common understanding. The protection of the rich diversity of education has been paramount in the Tuning project from the very start and the

Tuning Middle East and North Africa project in no way seeks to restrict the independence of academic and subject specialists, or damage local and national academic authorities. The objectives are completely different. Tuning looks for common reference points. The Reference points are non-prescriptive indicators that aim to support the articulation of degree programmes.

The Tuning Middle East and North Africa project (TEMPUS, 2013-2016) has brought together:

8 EU universities:

University of Deusto, the project coordinator (Spain), University of Groningen (Netherlands), London School of Economics and Political Sciences (United Kingdom), Aristotle University of Thessaloniki (Greece), University of Angers (France), University of Padova (Italy), University of Malta (Malta), University of Cyprus (Cyprus);

22 Universities from Middle East and North Africa:

Mouloud Mammeri University of Tizi-Ouzou and University of Algiers (Algeria), University Mohammed First and University Moulay Ismail (Morocco), Cairo University and Suez Canal University (Egypt), Palestine Ahliyeh University College and Islamic University of Gaza (Occupied Palestinian Territory), International University for Science and Technology and Arab International University (Syria), Yarmouk University, Jordan University of Science and Technology and Hashemite University (Jordan), University of Monastir, University of Jendouba and University of Tunis (Tunisia), Modern University for Business and Science, Holy Spirit University of Kaslik, University of Balamand, and Beirut Arab Universtity (Lebanon), Libyan International Medical University and Omar Al-Mukhtar University (Libya).

Project also includes three social partners: Association of Arab Universities, the project co-coordinator (Jordan), Directorate General of Higher Education (Lebanon), and The Syrian Consulting Bureau for Development and Investment (Syria).

The project tries to institutionalise the use of the Tuning methodology in the practice of higher education institutions in Middle East and North Africa through building of a framework of comparable, compatible and transparent programmes of studies. Its aim is to apply the Tuning methodology in universities and develop reference points in four subject areas - Architecture, Law, Nursing and Tourism. The development, implementation, monitor and improvement of degree programmes for the first cycle in mentioned areas are among the main results of the project. The project is specially designed to promote regional and international cooperation between Middle East, North Africa and EU universities.

This book contains the key general findings of the Subject Area Group within the Tuning Middle East and North Africa project. These reflect in synthesis the consensus reached by the group members and international experts on the subject area. We hope and believe that the material contained in this book will be very useful for all higher education institutions wishing to implement the competence based approach, and that it will help them to find and use the most suitable tools for adapting or creating higher education programmes in order to respond to the needs of today's society.

The publication of the Reference Points became a reality due to collective work of Subject Area Group and project teams at participating European, Middle East and North Africa universities, their academic and administrative personnel to whom we would like to express our sincere gratitude. We stress our deep appreciation to all European, Middle East and North Africa experts who have made a significant contribution to the development of reference points for the design and delivery of degree programmes in various subject areas.

We hope that readers will find this book both useful and interesting.

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1

Introduction

a) Idea of Tuning

One way of insuring continuous development and improvement of university level educational programs is to periodically undertake evaluation procedures in order to pinpoint areas of strength and weakness. Such procedures open the way for well planned improvement strategies of educational programs. This fact is one reason why accreditation became a crucial and useful development tool of higher education institutions.

Tuning is a research project whose objective is to provide means of improvement and development for university educational programs. In this respect, Tuning does not aim to provide accreditation mechanism by which programs are evaluated; this is not the aim of the project. This fact makes one point of difference with typical accreditation systems. The second unique point to Tuning is that it does not bring to the table a set of standardized items by which a particular program is evaluated. Rather, issues of evaluation are developed and agreed upon by concerned programs. Tuning is based on the notion that each region may have its unique characteristics and specifications out of which issues of evaluation should evolve. Issues of evaluation are areas in which students should have acceptable level of knowledge or expertise; in Tuning project, they are referred to as competences.

This is why Tuning has gone through a number of experimentations in different regions of the world including China, Latin America, and Europe. Tuning Middle East and North Africa is the latest of Tuning's

experimentations and focuses on four specialties: architecture, law, nursing, and tourism.

Tuning experimentation for architectural programs, to be referred to henceforth as architecture Tuning-Meta, as well as the other three involved groups of the Middle East and North Africa (Meta) benefited from earlier work in more than one way. Firstly, it follows the same ideology and methodology of Tuning developed in earlier experimentations. Secondly, it profited from the presence of experts who participated in earlier works of Tuning. These experts helped explaining the concept of Tuning and led discussions of the first meeting conducted in Jordan (Professor Constantin Spiridonidis from Aristotle University of Thessaloniki worked with the architectural group). Thirdly, architecture Tuning-Meta used reports of earlier projects to develop its own set of competences which were used in later stages to come up with the architectural Meta-Profile; the final set of competences were employed to evaluate different architectural programs.

b) Work Process

Since Tuning as a concept does not rely on a set of given points of reference for evaluating student's performance or level of knowledge (here called competences), these competences were to be agreed upon by the experts of the particular concerned region. Therefore, Tuning evolves around a step by step development of its base of evaluation through constant discussions and deliberations.

Hence, the Project was built around five main meetings in which its stages were worked out and developed. Individuals involved in the meetings were delegates chosen by interested universities in the Middle East and North Africa region. The Project was planned around a number of tasks which were done individually and/or collectively during the five meetings and in between. Each task was developed, evaluated, and documented.

Each of the four areas of study followed the same procedure of work, but went through it individually. By the end of each meeting, results of the four groups were typically presented and discussed. This final general meeting was useful to validate results, fine tune them, and examine other potentials. This document presents the whole process and its results in connection with the field of architecture.

c) Definitions

T-MEDA	Tuning Middle East and North Africa.
The Project	Tuning project for the Middle East and North Africa.
SAG	Subject Area Group which were four in T-MEDA, architecture, law, nursing, and tourism.
Architectural SAG	Architectural subject area group which consisted of all delegates from participating universities and worked on the Project in the area of architecture.
Competence	What graduates will know, understand and be able to do by the time they have successfully completed their program of study.
Generic Competences	Competences which every university graduate should acquire.
Specific Competences	Competences related to the specialty of the student and should be acquired.
Meta-Profile list	The agreed upon comprehensive list of competences which a graduate of a field of study should acquire; the list is a compilation and amalgamation of the general and specific competences.
Meta-Profile	A group´s representation of the structure and combination of competences which gives identity to a thematic area.

2

Participating Countries and Delegates

Table 1 presents all countries and their delegates who participated in the project. Due to different circumstances, not all members were able to participate in all meetings; however, all participating universities were fully aware of the Project's development by sharing all information and stages of work via email.

Table 1

List of countries, universities, and delegates participating in the Project

Country	University	Delegate
Algeria	Universite Mouloud Mammeri de Tizi Ouzou	Mohand Hamizi
Cyprus	University of Cyprus	Marios C. Phocas
Egypt	Cairo University	Emad Alyeldin Abdelshafi El Sherbiny
Egypt	Suez Canal University	Ahmed Mohamed Amin Ahmed
Greece	Aristotle University of Thessaloniki	Constantin Spiridonidis
Jordan	Hashemite University	Alhusban Ahmad Abidrabbu Al-Sa'ed
Jordan	Jordan University of Science and Technology	Hussain Alzoubi
Lebanon	Beirut Arab University	Hesham Elarnaouty
Libya	University of Omar Almukhtar	Omer R. El Zaroug
Morocco	University Mohammed First	Abderrahime Bouali
Palestine	Islamic University of Gaza	Ahmed S. Muhaisen
Syria	Arab International University	Tamer Alhajeh
Syria	International University for Science and Technology	Rafee Hakky

3

Nature of Architectural Programs of Participating Universities

The early discussions of the Architectural SAG shed a light on a rather important issue that had a clear bearing on the development of competences and the Meta-Profile. This issue was the different views about what an architectural program should teach. In more specific words, what is the main objective of architectural programs? Three main directions were found:

a) Providing architectural education concentrating on the creativity aspect of architecture.

b) Providing architectural education striking a balance between the creativity and engineering aspects of architecture.

c) Providing architectural engineering education concentrating on the practical aspect of the building industry.

More or less, it was possible to categorize the participating architectural programs in one of these three directions. However, discussions led to an understanding that the second direction mentioned above would be the sought after architectural program which would theoretically provide appropriate knowledge to students. The delegates agreed that a graduate from an architectural school should be able to do two main tasks. Firstly, he or she should be able to provide appropriate architectural solutions through proper understanding of the problem

which leads to proper design that respects human needs and the environment. Secondly, the student should be able to provide sufficient information about how his or her design can be actually built using suitable construction techniques and materials.

This general agreement kept all differences found in the actual architectural programs of the participating universities aside, leaving the floor for fresh and objective discussions about an "ideal" program of study that could be developed based on the competences to be agreed upon. Another benefit of reaching the general agreement was the elimination of the personal educational background of the delegates as an influencing factor in the development of the list of competences. Participating delegates were of one of two main backgrounds: architectural or engineering. While delegates with architectural background led the discussions, delegates with engineering background provided throughout the process full understanding, support, and advice. Having the two backgrounds working together was of great benefit to the process, for it enriched the discussions and increased its objectivity.

4

Introduction to the Participating Programs

a) Mouloud Mammeri University of Tizi-Ouzou, Algeria

The Architectural Department of Construction Engineering Faculty of Mouloud Mameri University (Tizi-Ouzou) provides training in academic license (3 years) and Academic Master (2 years). Th number of students is 1,040 students spread over five years, with 360 registerd in Master M1 and M2 and 680 in License Degree (L1, L2, L3). The academic staff consists of 68 permanent teachers and 25 temporary teachers. Degree of training is 3 years of the License and 2 years of the Master.

b) Cairo University, Egypt

The Department of Architecture (Architectural Engineering) in Cairo University is most probably the oldest department of Architecture in Egypt and the Region (the Arab World, the Middle East and Africa). It's foundation and early stages of development date back to the Nineteenth Century.

The architectural Department passed through several thresholds of development in the past two decades. First the educational program changed from an academic year system to adopt a two semester system in the year. Student graduates after the completion of 30hours/ semester for 5 years: the first year is dedicated to general engineering studies and the four academic years or eight semesters cover the specialized engineering field.

The Architecture Department adopts a strategy of continuous processes of review and self-updating to the courses' structure and content. Many courses such as those related to sustainable design, community based research and design; heritage conservation, urban renewal, architectural criticism, interior design, are among the continually developing topics that reflect the local needs and the international development in architecture and its related fields.

Since 2003, the program was further enhanced by introducing electives that expanded into 5 well defined streams namely: Architecture, Building Science and Technology, Environmental Design, Urban Design and Community Development, and Urban Planning. Electives provide the opportunity to experiment with more creative, non-conventional topics; and more exposure of students to areas directly and indirectly related to the field of architecture. Elective courses also support work related to graduation project.

c) Suez Canal University, Egypt

Section is divided into two divisions: Division of Architecture and Planning Division and taught a student architectural design and construction and architectural theories of architecture and urban planning for cities and the history and architecture and configurations population and urban systems of modern architecture and contemporary, as student studies in this section materials such as soil mechanics and foundations, concrete, sanitary engineering buildings, and space and metal structures and resist materials and their properties and tests, and building technology.[1]

d) Hashemite University, Jordan

This department offers a B.Sc. degree in Architectural Engineering. The program is designed to qualify professionals who are competent in the methods and techniques appropriate for architectural design, restoration, supervision, and project management. Besides taking courses on Architectural Design, students are trained on applications of the latest scientific approaches in different areas such as:

[1] http://eng.scuegypt.edu.eg/?page=pages&page_id=149

Architectural Rendering and Communication, Construction Techniques, History and Theory of Architecture, Urban Design and Planning, Landscape Architecture, Physics of Architecture, Environmental Control and Cultural Heritage Protection and Restoration. Graduates of this program will be qualified to hold positions in the architectural engineering field as architects, project managers and supervisors in both the public and private sectors.[2]

e) Beirut Arab University, Lebanon

The Faculty of Architectural Engineering is committed to foster a challenging learning environment and to continually compete as well as lead advances in architectural education, in order to prepare innovative, critical and industrious graduates able to improve, through their future careers, the quality of the built environment. The student must meet the following requirements: The completion of 170 credit hours within a minimum period of 5 years (10 Semesters) and not exceeding 10 years. Within the 170 credit hours, students must fulfill: 136 credit hours for Mandatory Courses; 22 credit hours for Elective Courses; 12 credit hours for University Courses. Student must also fulfill the university requirements by earning the ICDL certificate within the first four semesters of his/her study.[3]

f) University Mohammed First, Morocco

Architects conceptualize, plan and develop designs for the construction and renovation of commercial, institutional and residential buildings. The studies will be based in the studio for design work, tutorials and critiques. The student will attend lectures, computer aided design tutorials, has essays to write, site visits to go on and visits to buildings and places of interest and work in internships. The candidates have to follow training course (traineeship 3 × 1 month) that exposes them to architect work. These traineeships provide opportunities for hands-on building projects; others offer specialist areas of study or have developed strengths in particular disciplines such as: sustainability,

[2] http://hu.edu.jo/fac/dept/charmen_message.aspx

[3] http://www.bau.edu.lb/Undergraduate-Studies1

town planning, technology, or management. Skills in problem solving and team working are also developed through internship program. In order to receive the "Diploma of architecture" the candidate must prepare a final project during one year. Then, He must present his project to a jury composed of practicing architects and lecturers.

g) Islamic University of Gaza, Palestine

Islamic University of Gaza (IUG) was founded in 1978, as an independent academic institution supervised by the Palestinian Ministry of Higher Education. It includes 11 faculties, in addition to many other research and community centers. The Engineering Faculty at IUG was established in 1992, with the aim of developing the engineering expertise of the Palestinian community and building tight relations with local and regional entities working in the various fields of engineering. As part of the Engineering Faculty, the Architecture Department, seeks to develop the built environments and be part of the active institutions working for a better life. The department offers BSc and MSc degrees in Architecture, and considered the best in the Gaza strip.

h) Arab International University, Syria

The mission of the Faculty of Architecture at the AIU is to prepare future architects capable of creative action and critical thinking. The Faculty's graduates are skillful designers who are equipped with a high level of environmental awareness and a deep sense of social responsibility.

They are professionally trained to understand architecture in its traditional and modern settings as well as its global and local conditions. Their historical and theoretical knowledge orient them to be sensitive to the architectural and urban identity of the environment in which they operate, and to have a profound sense of belonging that enable them to comprehend the human aspect of architectural production in all of its beauty, complexity and challenges.[4]

[4] http://www.aiu.edu.sy/en/College24

i) International University for Science and Technology, Syria

The Architectural Engineering program is intended to develop students' understanding of the essential interaction between the environment, heritage and human factors, and to relate them to design practices and processes. In addition, the program will enable students to develop an appreciation of global and local architecture, as well as urban planning and design. It also deepens their social awareness and environmental consciousness for the utilization and conservation of natural resources.

Graduates of the program will acquire knowledge, practice and design capabilities in the following areas: architectural design, structures, construction engineering and management, and environmental control systems. In addition, graduates will have an understanding of global and local architecture, as well as urban planning and design.[5]

[5] http://iust.edu.sy/Arch_vision.aspx

5

Work Plan

The Project went through a number of stages that can be summarized as follows:

a) First Meeting, May 2-5, 2014, Dead Sea, Jordan:

1. Delegates of the four subject area groups (SAG) (architecture, law, nursing, and tourism) were introduced to the project, its goals, and its methodology.

2. The four subject area groups (SAG) met individually and formulated two sets of competences; general and specific competences.

3. Coordinators of the four groups developed one set of general competences.

b) In-term Period:

1. Competences were evaluated through a questionnaire administered in all participating universities.

2. Results of questionnaires were analyzed by the International Tuning Academy in Bilbao.

c) Second Meeting, September 27-October 2, 2014, Bilbao, Spain:

1. Results of the questionnaires were presented and discussed.

2. Each of the four subject groups developed its own Meta-Profile.

d) In-term Period:

1. Meta-Profile was compared with actual program of study for participating universities.

2. A draft of subject area report was formulated.

e) Third Meeting, February 14-19, 2015, Larnaca, Cyprus:

1. Results of comparing programs with the Meta-Profile were discussed.

2. One program of study (the architectural program of the International University for Science and Technology) was chosen to be developed to better respond to the Meta-Profile.

f) In-term Period:

1. A second draft of the Subject Area Report was written.

2. Programs of study were further developed to better match the Meta-Profile.

g) Fourth Meeting, September 26-October 1, 2015, Malta:

1. Discussion of proposed programs in light of the Arch. Meta-Profile.

2. Discussion of student work load.

h) In-term Period

1. Implementation of student work load questionnaire.

2. Analysis of student work load questionnaire results.

3. Finalization of reports.

i) Fifth Meeting, May 21-27, 2016, Bilbao:

1. Development of quality assessment study for developed programs.

2. Finalizing the Architectural report (Reference Points).

6

Development of Competences

The first main task to be achieved by the delegates was the development of a list of competences that every graduate of an architecture program should attain. A competence according to Tuning "is a broad concept that represents a dynamic combination of:

a) Knowledge and understanding at different levels.

b) Skills and abilities.

c) Attitudes and values"[6].

Students acquire competences related to their field of study through the different courses offered in their program. A particular competence can be acquired in different courses, in like manner; courses can offer a number of competences.

According to instructions provided by the organization of the Project, Every subject area group was asked to develop two lists of competences. The first was called the generic list of competences which are competences that should be obtained by every university graduate, and the second was called the specific list of competences;

[6] Pablo Beneitone, "From consulting to profiling: some examples of Meta-Profiles", Tuning Middle East and North Africa T-MEDA Second General Meeting, Bilbao, 29th September 2014.

these are competences related to the particular field of study. Students are expected to acquire all these competences in order to achieve acceptable proficiency in their field of study.

In order to come up with a meaningful list of competences, Architectural SAG based its work on different lists of competences developed in earlier Tuning projects. Available competences were discussed, modified, grouped, and reformulated in order to reach two special lists of competences geared towards educational objectives suitable for Middle Eastern and North African architectural programs. One list was for generic competences and the other for the specific ones.

a) Generic Competences

Generic competences list was then compared, contrasted, and amalgamated with three more generic competences lists developed by the other three SAG's, law, nursing, and tourism. The resulted list was approved by all delegates and considered final. This list is presented in table 2:

Table 2
List of generic competences

Graduate should have the ability to	
1.	manage time effectively
2.	communicate orally and in writing with different audiences
3.	maintain continuous education
4.	have critical thinking, analysis and synthesis
5.	identify and resolve problems
6.	make logical decisions
7.	work in an interdisciplinary team
8.	lead effectively
9.	work autonomously
10.	maintain quality of work

11.	act ethically with social responsibility
12.	apply knowledge in practical situations
13.	communicate in a second language
14.	be innovative and creative
15.	be flexible and adapt to different situations.
16.	empower others
17.	search for information from a variety a sources
Graduate should be committed to	
18.	the protection and preservation of the environment
19.	human rights
20.	health and safety procedures
21.	the preservation of cultural heritage and values
Graduate should have	
22.	organizational skills
23.	sense of dedication
24.	respect for diversity and multiculturalism
25.	skills in the use of information and communication technologies
Graduate should be	
26.	initiator
27.	self-motivated
28.	assertive

It is worth mentioning that the four participating groups (architecture, law, nursing, and tourism) had in general relatively similar lists of generic competences. This could be because all were relatively based on, or benefited strongly from earlier generic lists of competences shared by all groups. Furthermore and as mentioned earlier, the process through which the generic competences were reached was as follows: first, separate discussions of each group took place in three sessions for one and a half day. During these sessions, the body of the list was formulated, discussed, and modified. Second, a special meeting among the four coordinators of the groups was held in which the four

lists generated by the groups were worked out together formulating one list that was agreed upon by the four coordinators and included all competences deemed necessary by all for a good college education. Subsequently, the list was presented in front of delegates of all four groups for discussion or suggestions. This led to reaching the final list of generic competences.

This lengthy process benefited the development of the list in a number of ways:

1. It aided the process, validated the results, and saved time through the utilization of earlier lists of competences developed in earlier Tuning projects.

2. It insured that listed competences were appropriate to Middle Eastern and North African college education through the different opportunities of discussion and modification.

3. It insured that listed competences were appropriate at least for the four involved areas of study (architecture, law, nursing, and tourism), again due to the number of reviews and discussions administered by the coordinators and members of all groups.

4. Since this list of generic competences was formulated by academicians of very different backgrounds looking for general qualities and capabilities of a university graduate, it could be suggested that the list would be acceptable in other fields.

b) Specific Competencies

Delegates developed a set of specific competences related to the field of architecture that covers its major areas. A balance between the creative design aspect on one side and the engineering aspect on the other was consciously observed to allow students to obtain appropriate knowledge in the two main areas of the profession. Supporting areas that were included were history and theory, communication in all its aspects, and environmental and social concerns.

Discussions emphasized a number of issues to be of high importance. These included environmental issues; new technologies, construction

techniques, and materials; accommodation of individuals with varying physical abilities; local architectural heritage and construction techniques; and contemporary architectural thought.

The final list, therefore, came out to be well balanced in a number of ways such as, firstly being general enough to include all participating programs, yet specific to the conditions of the region. Secondly, it considered contemporary trends of architectural practice in terms of theory and construction, at the same time it respected the history and heritage of the region. Thirdly, the list balanced the technical and artistic aspects of architecture; and fourthly, it emphasized two important concerns of present architectural practice; namely, social issues and sustainability. The list of specific competences is presented in table 3.

Table 3
List of specific competences

1.	Appreciation of the social and cultural role of Architecture.
2.	Ability to design buildings and/or urban development projects that blend with the surrounding environment and fully satisfy local human, social and cultural requirements at different levels and complexity.
3.	Skill in formulating creative and innovative ideas and transforming them into architectural creations and urban planning.
4.	Knowledge of history and theory of Architecture and related human sciences and engineering.
5.	Awareness of current architectural ideas and practices at local and global levels.
6.	Understanding of the ethical issues involved in architectural design and practice.
7.	Awareness that investigation and research are essential components of architectural creations.
8.	Awareness of the continuous changes of architectural ideas and practices.
9.	Ability to think, perceive and conceive spaces three dimensionally in different scales.
10.	Skill in reconciling all the factors involved in architectural design and urban development.

11.	Mastery of the media and tools used for communicating verbally, in writing and/or volumetrically architectural and urban development ideas and designs.
12.	Ability to evaluate, enhance and preserve architectural and urban local heritage and recognize the importance of its relation with current architectural developments.
13.	Ability to work within, or lead constructively interdisciplinary teams.
14.	Knowledge of aesthetics and arts, and understanding their role as key factors in the quality of architectural thinking and design.
15.	Capacity to design projects assuring environmental, social, cultural and economic sustainability.
16.	Ability to conceive and integrate structural, construction, environmental and installation systems to architectural designs.
17.	Ability to design buildings to accommodate individuals with varying physical abilities.
18.	Knowledge and ability to apply legal framework, safety regulations and technical codes controlling activities of the profession.
19.	Capacity to produce comprehensive construction documents.
20.	Capacity for planning, programming, budgeting and managing architectural projects.
21.	Awareness of methods of execution practiced in architectural projects.
22.	Ability to develop site plans and landscape designs.
23.	Understanding the importance of, and ability to incorporate new and renewable energy sources in building design.
24.	Understanding of the basic principles and appropriate application of construction materials including local ones.
25.	Awareness of the importance of client's role in the design process.
26.	Ability to analyze and incorporate relevant precedents into architectural design projects.

7

Evaluation of Competences (Consultation with Stakeholders)

The two lists of competences were developed by a very small group of academicians who were not more than fifteen. In order to validate the two lists, a number of concerned individuals, to be referred to as stakeholders, were asked to evaluate the importance of every item on the two lists. At the same time, they were asked to evaluate the level of achieving that particular competence in their own institution. They were also asked to rank the five most important competences to them.

Analyzing the data collected was useful to provide information about the rating of each competence, which is found by calculating the means for each competence on a scale chosen to be from 1 to 4. Getting a high score (meaning 3 and above) in importance means that the competence is considered very important. While getting a high score in achievement means the competence is well achieved by the academic program. Rating was done in terms of importance and achievement. Ranking was done on a scale from 1 to 5, where 5 is given to a competence that was ranked as first and 1 to a competence that was ranked fifth. A competence which was not ranked among the first five is given the value 0. Hence, theoretically, a competence which got 5 points would be one that was chosen as the first competence by all participants. On the other hand, if a competence were never chosen by any one of the participants, it would get a zero score.

Stakeholders who were consulted were presented with the two lists in a questionnaire format by which they were able to rank importance and achievement in a prepared table, and then were asked to list the

five most important competences for ranking. Stakeholders for the Project belonged to four groups: academicians, employers, students, and recent graduates.

Each university of the four different Subject Area Groups was asked to question 30 individuals from each of the above mentioned four groups. Total respondents of the architecture group who answered the generic competences were 694 respondents, while those who answered the specific competences were 562 respondents. Difference in numbers was most probably due to the fact that the two lists were sent separately to participants; some of them answered one and ignored the second. Table 4 presents the details of respondents for both generic and specific competences.

Table 4
Number of respondents of the four groups of stakeholders

Competences	Academicians	Employers	Students	Graduates	Total
Generic	172	124	237	161	694
Specific	137	112	190	123	562

Table 5 summarizes the distribution of participants according to country. Although there are clear differences in the number of participants in some countries, it is possible to say that there is a sort of balance among the main two areas studied: the Middle East and North Africa. In the case of generic competencies, Middle Eastern countries (Jordan, Lebanon, Palestine, and Syria) have 359 participants, while North African countries (Algeria, Egypt, Libya, and Tunisia) have 335 participants. As for the specific competencies, the Middle Eastern countries have 258 participants and the North African countries 304 participants. Thus, the results can be assumed to be representative of both areas.

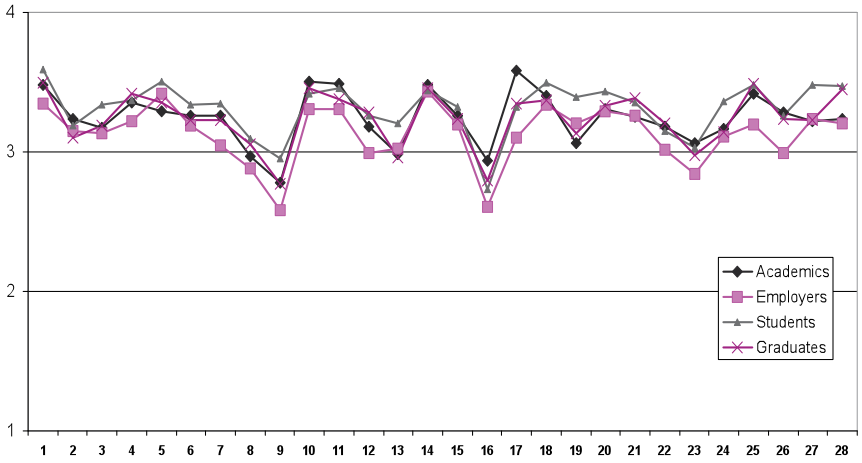
Table 5
Distribution of participants according to country

Competences	Algeria	Egypt	Jordan	Lebanon	Libya	Syria	Palestine	Total
Generic	119	96	53	38	120	200	68	694
Specific	119	63	46	16	122	180	16	562

a) Evaluation of Generic Competences

Graph 1 shows results in connection with the importance of the proposed generic competences as seen by the four architectural groups. A number of points can be observed. Firstly, the graph exhibits clearly that most competences are rated over 3; this is a strong indication that competences generated by the architecture SAG were appropriate.

Only four competences out of 28 ones got a score lower than 3 points; these were: (8) lead effectively; (9) work autonomously; (16) empower others; and (23) sense of dedication. Out of the four, two have lower score than 3 by all four groups: (9) lead effectively, and (16) empower others. Moreover, all four competences are related to personality; (9) and (16) are more in the area of leadership. Hence, it might be a cultural thing that personal issues and in particular issues related to leadership are not of great value to the working force. This may tell something about the culture more than about the validity of the competences developed by the Architecture SAG.



Graph 1
Rating of importance of generic competences by the Four Groups

Another worth mentioning observation is the fact that employers have the lowest rating of the four groups. This is surprising in a way because one would have imagined employers would require higher standards

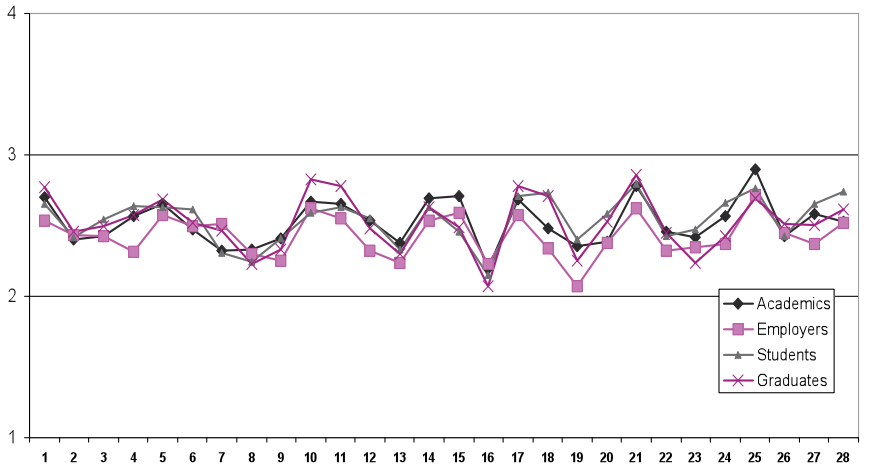
than other groups. It is comforting, however, to see that employers rated competences related to creativity, time management, quality of work, and protection of the environment the highest.

Finally, correlation among the four groups is very high. Table 6 shows that the lowest correlation is between academicians and students at 0.7434, which is relatively high. Interestingly enough, correlation reaches 0.9211 between students and employers. This high correlation among the four groups emphasizes the validity of the developed list of competences.

Table 6

Correlations among groups in terms of generic competences' importance

	Academics	Employers	Students	Graduates
Academics	1.0000			
Employers	0.7816	1.0000		
Students	0.7434	0.9211	1.0000	
Graduates	0.8864	0.8585	0.8723	1.0000



Graph 2

Rating of achievement of generic competences by the Four Groups

As for achievement, all four groups rated all competences between 2 and 3. In other words, achievement was seen by all as not satisfactory enough (graph 2). Nevertheless, rating results are not alarming since they are not very low, but fall in a middle range. Here too employers have the lowest ratings.

Correlation among all groups is also very high; but differences are higher here if compared with those found in rating of importance (table 7). It is worth mentioning here that the strong correlation between students and employers which was evident in terms of importance does not exist here. In fact correlation between these two groups in connection with achievement is the lowest among all other groups. This can be explained by the fact that students' expectations would be much less than employers since the former is new to the profession while the latter values quality very highly.

Table 7
Correlations among groups in terms of generic competences' achievement

	Academics	Employers	Students	Graduates
Academics	1.0000			
Employers	0.7743	1.0000		
Students	0.7860	0.5801	1.0000	
Graduates	0.8013	0.7819	0.8205	1.0000

Ranking of the generic competences also shows consistency among the four groups of stakeholders. In the first five ranks, only seven competences can be seen. This indicates repetition of the same competences in all groups, a fact which strengthens the validity of the ranking itself through the high correlation among all groups. The seven competences found in the first five ranks are listed in table 8 from the highest rank to the lowest.

The highest ranking competences were (1) manage time effectively, (4) have critical thinking, analysis and synthesis, and (5) identify and resolve problems. In a bit lower ranking came: (14) be innovative and creative, (3) maintain continuous education, (10) maintain quality of work, and (6) make logical decisions. These competences reflect a

Table 8
The five highest ranking generic competences

Rank	Academics	Employers	Students	Graduates
1	1	1	1	1
2	14	4	4	4
3	4	5	5	5
4	5	6	14	14
5	10	3	3	10

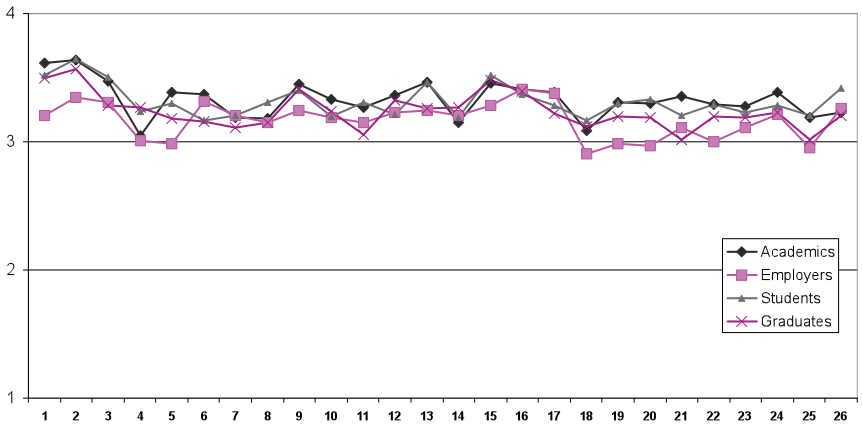
number of important issues: firstly, stakeholders are in agreement on the importance of time, hard work, and critical and creative thinking as qualities to be present in any architect. Secondly, emphasizing these points in particular is a cultural statement; although they might be relatively missing, and that was why stakeholders were pushing them, but the society, represented in the stakeholders here, is aware of the importance of these particular qualities and demands them. Architectural program should take these qualities very seriously even though they are not related to a specific trade or particular area in the field of architecture.

b) Evaluation of Specific Competences

Graph 3 presents similar points to those observed in the generic competences. All competences were considered of high importance. Except for five; all competences obtained a value of three or above. The five competences which were rated just below three were: (19) capacity to produce comprehensive construction documents, (5) awareness of current architectural ideas and practices at local and global levels, (20) capacity for planning, programming, budgeting and managing architectural projects, (25) awareness of the importance of client's role in the design process, and (18) knowledge and ability to apply legal framework, safety regulations and technical codes controlling activities of the profession.

Firstly, it is noticed that these five competences were rated below 3 only by employers. The other three groups rated them above 3; in fact, competences (5), (19), and (20) were rated relatively high

by the three other groups putting them with the lowest correlation between the three groups and employers. Secondly, the ratings given by employers for these competences were just below 3; they all ranged between 2.98 and 2.91. This makes the difference not of true importance. And thirdly, also noticeable is that all five competences were related to very high professional areas in the practice of architecture: development of construction documents, awareness of current practices, planning and budgeting of projects, client's role, and legal and safety regulations.



Graph 3
Rating of importance of specific competences by the Four Groups

This can be seen as an indication of a realistic view on the part of the professionals in connection with what architectural education can and cannot offer. It is obvious that these advanced professional activities can be learned only in practice and not in school. Looking at the five highest rated competences by employers confirm this point. Employers saw the ability to conceptually integrate design with different technical and structural systems as the most valuable trade. This is followed by the ability to design for individuals with special needs, the ability to work with the social and environmental conditions of the project, respect of ethical issues related to the profession, and being creative in finding solutions and transforming them to architectural forms. All five competences are related to conceptual thinking and professional sensitivity; they do not address issues directly related to professional practice.

Correlation among the four groups is not as high as it is in the case of the generic competences; the gap here is much clearer. As mentioned earlier the main difference exists between the employers and the other three groups; employers' ratings are always lower than those of the other groups. Perhaps the main reason for such a gap is the professional belief that architecture can only be learned in practice. Therefore, professionals' expectations from education are much lower. Correlations among the other three groups are higher averaging about 0.7; a relatively high level of correlation, especially when one realizes that architecture is one of the professional fields which do not have clear cut definition or agreed upon dimensions. Hence, opinions about architecture and its systems of education can be very diverse.

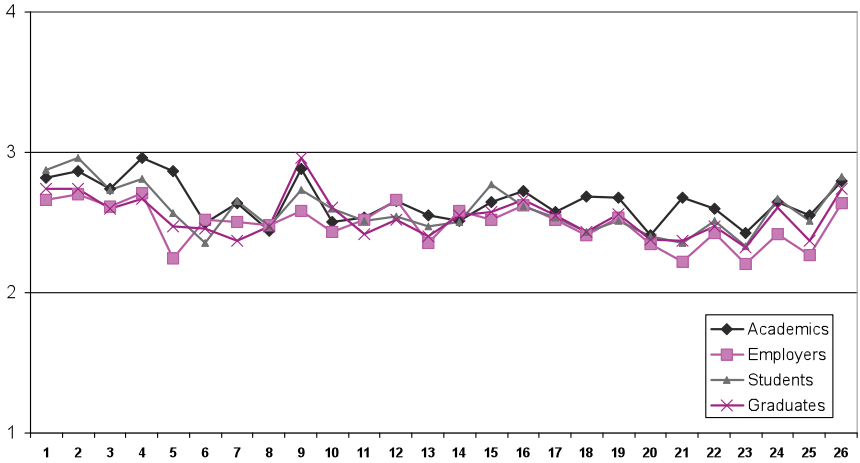
Table 9

Correlations among groups in terms of specific competences' importance

	Academics	Employers	Students	Graduates
Academics	1.0000			
Employers	0.5697	1.0000		
Students	0.7420	0.4530	1.0000	
Graduates	0.6658	0.5446	0.7408	1.0000

All four groups agreed that achievement of the competences is much lower than their importance. Yet, they all seemed to locate achievement still above average; between values 2 and 3 (graph 4). It is interesting to note that the gap between importance and achievement is smallest in four competences which are (4) Knowledge of history and theory of Architecture and related human sciences and engineering, (5) awareness of current architectural ideas and practices at local and global levels, (7) awareness that investigation and research are essential components of architectural creations, and (18) knowledge and ability to apply legal framework, safety regulations and technical codes controlling activities of the profession.

The small gap between importance and achievement is actually a result of the fact that these four competences were ranked low in importance. The average rating of knowledge of history was 3.14, awareness of current architectural trends was 3.21, importance of



Graph 4
Rating of achievement of specific competences by the Four Groups

research was 3.18, and ability to work with legal and safety regulations was 3.07. But more importantly, basically three of these competences deal with theoretical issues; the fourth can be seen as a limited item of the professional practice. They are not seen as very important competences and thus whatever is offered by the educational program is seen relatively adequate.

Correlations among groups in relation to achievement of the specific competences are not very strong in comparison with those found in achievement of the generic competences. The highest correlation

Table 10
Correlations among groups in terms of specific competences' achievement

	Academics	Employers	Students	Graduates
Academics	1.0000			
Employers	0.4826	1.0000		
Students	0.7417	0.6957	1.0000	
Graduates	0.6848	0.7094	0.7768	1.0000

happens between students and graduates. This seems logical since graduates can almost be considered students being just freshly graduated from school.

Employers and academics show the lowest level of correlation. This is to say that they have relatively very different opinions when it comes to achievement of the specific competences. Being the party which provides education, academics naturally believe they are providing sufficient education that is allowing students to reach a high level of competency in many areas of the profession. On the other hand, typically professionals feel that freshly graduating architects did not acquire enough to be ready for practice.

Ranking of the competences by the stakeholders shows clear consistency in opinions. Three of the five highest competences were selected by all groups: (1) appreciation of the social and cultural role of architecture, (3) skill in formulating creative and innovative ideas and transforming them into architectural creations and urban planning, and (4) knowledge of history and theory of architecture and related human sciences and engineering. As for rating, there is one competence shared by all four: (2) ability to design buildings and/or urban development projects that blend with the surrounding environment and fully satisfy local human, social and cultural requirements at different levels and complexity.

It is remarkable to see that the four most emphasized competences deal with the current critical issues of architectural practice: social and cultural issues, history and current theory of architecture, environment concerns, and current technical and engineering capabilities. Such agreement on the above mentioned issues indicates a high level of awareness by those involved in the practice of architecture in the region. This is a promising step towards future improvement in these areas even though architecture practice lacks them today.

Other highly rated competences emphasize the same ideas in one way or another. They include issues related to ethics, ability to reconcile all factors involved in the practice for the benefit of the work of architecture, knowledge of arts and aesthetics, and integrating structural and technical issues.

It appears that generic and specific competences which are ranked the highest complement each other. The highest generic competences

Table 11
The five highest ranking specific competences

Rank	Academics	Employers	Students	Graduates
1	1	1	1	1
2	3	3	3	3
3	4	4	4	6
4	14	16	2	10
5	2	10	5	4

emphasize good practice habits, logical and critical thinking, and working on identifying and resolving problems. These qualities will help graduates think about architecture in objective and logical ways leading them to deal with issues of concern to today's practice such as social and cultural issues, sustainability, and new technologies. The fact that stakeholders focused on two sets of important competences that complement each other is indicative of a clear current professional orientation that is backed up with an understanding of the personal qualities needed for it.

8

Development of a Meta-Profile

According to Tuning Academy, a meta-profile "is a group's representation of the structure and combination of competences which gives identity to a thematic area."[7] A meta-profile is formed through a process of combining the generic and specific competences to form a new set that represents all the competences needed to produce a well qualified graduate in a particular field. A main difference between a set of competences and a meta-profile is that although the meta-profile is based on the basic lists of competences, it is categorized under main headings that formulate the main areas or orientations needed for the profession.

In order to formulate the architectural meta-profile, the following procedure was followed:

a) Putting competences in groups to formulate a base for the main structure of the meta-profile.

b) Combining, modifying, and eliminating competences based on in depth evaluation of the competences to eliminate repetitions and reach more coherent representation of the competences.

c) Merging competences from both generic and specific lists to reach one coherent and focused new list that is catered for architectural education.

[7] Pablo Beneitone, "From consulting to profiling: some examples of Meta-Profiles," Tuning Middle East and North Africa T-MEDA, Second General Meeting, Bilbao, 29th September 2014.

d) Evaluating competences based on results of the questionnaire. This evaluation was the base for taking decision related to point b.

e) Reaching a final structure of grouping that includes all agreed upon competences.

Evaluation of the questionnaire's results led to a number of points that can be summarized here:

a) Results of all four groups were relatively close as presented in the previous discussion of the generic and specific lists of competences.

b) Almost all competences were considered of high importance; all competences were rated over 3. Therefore, eliminating competences was not an easy task. Instead, combining competences was the strategy to go with.

c) Achievement was considerably below importance, but this was not taken to mean that competences were not important. It simply meant that more effort should be exerted to achieve the competences.

d) Ranking was helpful to eliminate a limited number of competences which were found to have very low ranking.

In order to produce the meta-profile, the following steps were adopted:

a) Formulating main groups of competences: Related competences from both lists, generic and specific, were combined in groups and given titles. The groups reflect the main issues or schemes to be emphasized in architectural education. These groups are closely tied with the main concerns of today's practice related to proper design that is based on sensitivity to socio-cultural and environmental issues, proper utilization of contemporary construction technology and materials, and refined professional practice. Five groups were reached:

    1. Design abilities.

2. Construction and Technological Abilities.

3. Theoretical Background and Socio-cultural Values.

4. Professional Practice and Work Ethics.

5. Personal Characteristics.

b) Distributing competences in the matching group. This step meant regrouping and at times renaming of the groups until the final groups were reached.

c) Testing and reevaluating the grouping: After the first distribution of competences, an overall view of the results led to some modifications in terms of grouping and competences included in every group.

d) Finalizing first draft: At this step, some competences were eliminated based on the results of the questionnaire in terms of importance and ranking.

e) Matching and combining competences: Competences from both lists were combined forming the meta-profile. The meta-profile consisted of the five groups; each group includes a number of competences which combine all relevant competences from both lists, generic and specific (table 12).

The final list of competences forms the Architectural META-Profile. It embodies all the concepts, ideas, skills, and abilities which a graduate of an architectural program in the Middle East is supposed to capture or master.

Table 12
The Architectural Meta-Profile

	Meta-Profile	Specific Competencies	Generic Competencies
Design Abilities			
1	Ability to design buildings, sites, and/or urban development projects in a sustainable manner (socially, culturally, economically, environmentally)	2. Ability to design buildings and/or urban development projects that blend with the surrounding environment and fully satisfy local human, social...	
		15. Capacity to design projects assuring environmental, social, cultural and economic sustainability.	
		22. Ability to develop site plans and landscape designs.	
		25. Awareness of the importance of client's role in the design process.	
2	Ability to think, perceive and conceive spaces three dimensionally and communicate verbally, in writing, graphically, and/or volumetrically.	9. Ability to think, perceive and conceive spaces three dimensionally in different scales.	2. Communicate orally and in writing with different audiences
		11. Mastery of the media and tools used for communicating verbally, in writing and/or volumetrically...	25. Skills in the use of information and communication technologies
3	Skill in formulating creative and innovative ideas and transforming them into architectural creations and urban planning.	3. Skill in formulating creative and innovative ideas and transforming them into architectural creations and urban planning.	14. Be innovative and creative
		10. Skill in reconciling all the factors involved in architectural design and urban development.	

	Meta-Profile	Specific Competencies	Generic Competencies
4	Ability to design buildings to accommodate individuals with varying physical abilities.	17. Ability to design buildings to accommodate individuals with varying physical abilities.	
5	Ability to analyze and incorporate relevant precedents into architectural design projects.	26. Ability to analyze and incorporate relevant precedents into architectural design projects.	17. Search for information from a variety a sources
Construction and Technological Abilities			
1	Ability to conceive and integrate structural, construction, renewable energy systems, and environmental and installation systems to architectural designs.	16. Ability to conceive and integrate structural, construction, environmental and installation systems to architectural designs.	
		23. Understanding the importance of, and ability to incorporate new and renewable energy sources in building design.	
2	Capacity to produce comprehensive construction documents.	19. Capacity to produce comprehensive construction documents.	
3	Awareness of methods of execution practiced in architectural projects.	21. Awareness of methods of execution practiced in architectural projects.	
4	Understanding of the basic principles and appropriate application of construction materials including local ones.	24. Understanding of the basic principles and appropriate application of construction materials including local ones.	
Theoretical Background and Socio-Cultural Values			
1	Appreciation of the social and cultural role of Architecture.	1. Appreciation of the social and cultural role of Architecture.	

	Meta-Profile	Specific Competencies	Generic Competencies
2	Knowledge of history and theory of Architecture and related human sciences and engineering.	4. Knowledge of history and theory of Architecture and related human sciences and engineering.	
3	Awareness of current architectural ideas and practices at local and global levels.	5. Awareness of current architectural ideas and practices at local and global levels.	
		8. Awareness of the continuous changes of architectural ideas and practices.	
4	Ability to conduct investigation and research in the process of architectural innovation.	7. Awareness that investigation and research are essential components of architectural creations.	12. Apply knowledge in practical situations
5	Have critical thinking, analysis and synthesis		4. Have critical thinking, analysis and synthesis
			5. Identify and resolve problems
			6. Make logical decisions
6	Ability to evaluate, enhance and preserve architectural and urban local heritage and recognize the importance of its relation with current architectural developments.	12. Ability to evaluate, enhance and preserve architectural and urban local heritage and recognize the importance of its relation with current architectural developments.	21. The preservation of cultural heritage and values
7	Knowledge of aesthetics and arts, and understanding their role as key factors in the quality of architectural thinking and design.	14. Knowledge of aesthetics and arts, and understanding their role as key factors in the quality of architectural thinking and design.	
Professional Practice and Work Ethics			
1	Act ethically pertaining issues related to architectural design and practice.	6. Understanding of the ethical issues involved in architectural design and practice.	11. Act ethically with social responsibility

	Meta-Profile	Specific Competencies	Generic Competencies
2	Knowledge and ability to apply legal framework, safety regulations and technical codes controlling activities of the profession.	18. Knowledge and ability to apply legal framework, safety regulations and technical codes controlling activities of the profession.	20. Health and safety procedures
3	Capacity for planning, programming, budgeting and managing architectural projects.	20. Capacity for planning, programming, budgeting and managing architectural projects.	
4	Maintain quality of work		10. Maintain quality of work
5	The protection and preservation of the environment		18. The protection and preservation of the environment
6	Respect for diversity and multiculturalism		19. Human rights
			24. Respect for diversity and multiculturalism
7	Maintain continuous education		3. Maintain continuous education
Personal Characteristics			
1	Ability to work within, or lead constructively interdisciplinary teams.	13. Ability to work within, or lead constructively interdisciplinary teams.	7. Work in an interdisciplinary team
			8. Lead effectively
			16. Empower others
2	Communicate in a second language	13. Communicate in a second language	
3	Demonstrate organizational skills		18. Demonstrate organizational skills
			1. Manage time effectively
4	Possess a high level of interpersonal skills		15. Be flexible and adapt to different situations.
			9. Work autonomously
			23. Have a sense of dedication
			26. Can take initiatives
			27. Self-motivated
			28. Assertive

The Architectural META-Profile is summarized in the following diagram where the overall concept of the profile is based on the premise that architecture is to be ethically based to observe social, cultural, and environmental concerns while developing structurally and aesthetically appropriate buildings benefiting from contemporary technologies, materials, and thought.

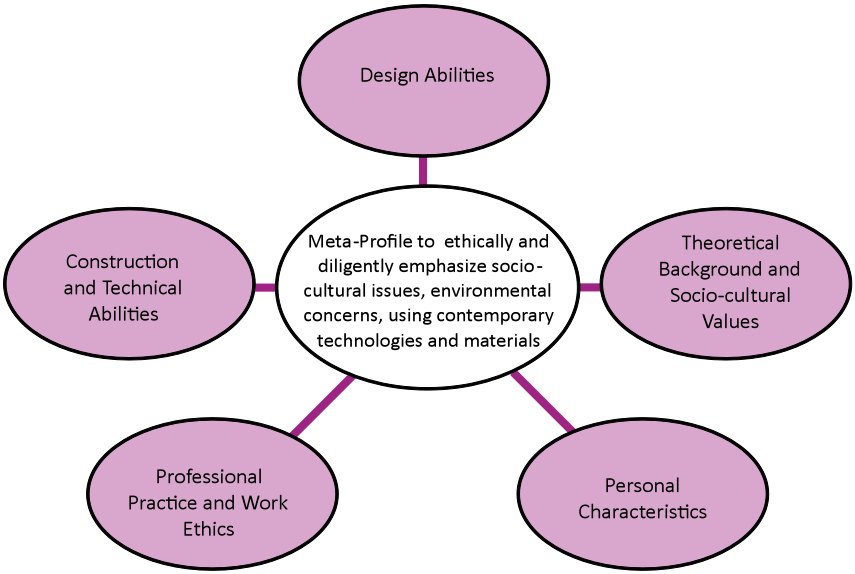


Fig. 1
Tuning's Architectural Meta-Profile

9

Compatibility between Tuning's Architectural META-Profile and the participating architectural programs

As mentioned earlier, the META-Profile was developed based on views and opinions of fours groups of stakeholders: students, graduates, academicians, and professionals. This Profile reflects an ideal view of what architectural education should offer. The important following step was to evaluate the degree of compatibility between this Profile and the existing architectural programs. This comparison allowed each university the chance to observe the points of similarities and points of differences between its architectural program and the Profile; and accordingly, it could develop its program to match the Profile, come close to it, or just benefit from it in certain regards.

Hence, the participating members of the Architectural group evaluated their programs against the Architectural META-Profile. Individual reports of each program can be found in the appendices. Discussion of the programs in relation to the Profile took different shapes. Some universities based their evaluations on the specific and generic competencies, others looked at the final list of competencies which formed the META-Profile, and some gave general statements summarizing their views about the issue at hand. A summary of each program's findings is provided here.

It was found that a high level of compatibility exists between the META-Profile and the program since it covers the majority of competencies. However, some competencies were not covered. Of the specific competencies, the Program did not sufficiently address the following:

a) Awareness of the importance of client's role in the design process (comp. 25).

b) Mastery of the media and tools used for communicating verbally, in writing and/or volumetrically (comp. 11).

c) Knowledge and ability to apply legal framework, safety regulations and technical codes controlling activities of the profession (comp. 18).

d) Knowledge of aesthetics and arts, and understanding their role as key factors in the quality of architectural thinking and design (comp. 14).

e) Understanding the importance of, and ability to incorporate new and renewable energy sources in building design (comp. 23).

As for the generic competencies, the program identified the following ones to be needed:

a) The preservation of cultural heritage and values (comp. 21).

b) Health and safety procedures (comp. 20).

c) Act ethically with social responsibility (comp. 11).

d) Self-motivated (comp. 27).

e) Human rights (comp. 19).

Cairo University

The Program at Cairo University seems to cover very well competencies related to Design Abilities and Construction and Technological Abilities. It covers the other three groups of competencies to a lesser degree.

More specifically, the following competencies of the Profile are not addressed:

a) Ability to design buildings to accommodate individuals with varying physical abilities (design comp. 4).

b) Appreciation of the social and cultural role of architecture (theory comp. 1).

c) Ability to conduct investigation and research in the process of architectural innovation (theory comp. 4).

d) Capacity for planning, programming, budgeting and managing architectural projects (professional comp. 3).

e) Respect for diversity and multiculturalism (professional comp. 6).

f) Maintain continuous education (professional comp. 7).

g) Communicate in a second language (personal comp. 2).

While the following competencies are not well addressed:

a) Awareness of current architectural ideas and practices at local and global levels (theory comp. 3).

b) Have critical thinking, analysis and synthesis (theory comp. 5).

c) Act ethically pertaining issues related to architectural design and practice (professional comp. 1).

d) Knowledge and ability to apply legal framework, safety regulations and technical codes controlling activities of the profession (professional comp. 2).

e) The protection and preservation of the environment (professional comp. 5).

f) Possess a high level of interpersonal skills (personal comp. 4).

Suez Canal University

The Program at Suez Canal University seems to sufficiently address all competencies of the Profile except two:

a) Maintain continuous education (professional comp. 7).

b) Possess a high level of interpersonal skills (personal comp. 4).

Hashemite University

All competencies of the Profile are addressed in the courses of the Program at the Hashemite University.

Beirut Arab University

All competencies of the Profile are addressed in the courses of the Program at the Beirut Arab University.

University Mohammed First

An overall evaluation of the Program at University Mohammed First showed that competencies of the Profile are addressed since the Program tackles all five groups of competencies. Nevertheless, because of the nature of the Program which is more practical and engineering oriented, it seemed that even though competencies are included but they are not sufficiently addressed. The University is working on developing a new architectural program which better addresses the META-Profile competencies.

Islamic University of Gaza

The divergence between the META-Profile and the architectural program at the Islamic University of Gaza does not exceed 20 to 30%; compatibility may reach 80%. Lack of some competencies may be a result of the difficult circumstances under which the University and its Program operate. Main competencies which are not well addressed in the program are:

a) The integration of renewable and environmental systems into buildings (construction comp. 1).

b) Producing comprehensive construction documents (construction comp. 2).

c) The capacity for planning, programming, budgeting and managing architectural projects.

d) Communicating in a second language (personal comp. 2).

e) Appreciating the role of aesthetic and arts in the quality of design (theory comp. 7).

Arab International University

The Program at the Arab International University meets most of the competencies with a few exceptions. Two of the specific competencies are not included:

a) The understanding of the ethical issues involved in architectural design and practice (comp. 6).

b) The awareness of the importance of the clients' role in the design process (comp. 25)

As for the generic competencies, nine of them seem to be missing in this Program:

a) Maintaining continuous education (comp. 3).

b) Leading effectively (comp. 8).

c) Acting ethically with social responsibility (comp. 11).

d) Empowering others (comp. 16).

e) Human rights (comp. 19).

f) Health and safety procedures (comp. 20).

g) Respect for diversity and multiculturalism (comp. 24).

h) Self motivation (comp. 27).

International University for Science and Technology

The architectural program at IUST addresses a good number of the META-Profile competencies. However, there are a number of competencies that are not clearly addressed in the curriculum and others that are not well presented in it. The following is the competencies that are not clearly addressed in the curriculum:

a) Ability to analyze and incorporate relevant precedents into architectural design projects (design comp. 5).

b) Act ethically pertaining issues related to architectural design and practice (professional comp. 1).

c) Knowledge and ability to apply legal framework, safety regulations and technical codes controlling activities of the profession (professional comp. 2).

d) Ability to work within, or lead constructively interdisciplinary teams (personal comp. 1).

e) Demonstrate organizational skills (personal comp. 3).

A good number of competencies can be seen in the curriculum but are not well addressed:

a) Awareness of current architectural ideas and practices at local and global levels (theory comp. 3).

b) Ability to conduct investigation and research in the process of architectural innovation (theory comp. 4).

c) Have critical thinking, analysis and synthesis (theory comp. 5).

d) Ability to evaluate, enhance and preserve architectural and urban local heritage and recognize the importance of its relation with current architectural developments (theory comp. 6).

e) Ability to think, perceive and conceive spaces three dimensionally and communicate verbally, in writing, graphically, and/or volumetrically (design comp. 2).

f) Capacity for planning, programming, budgeting and managing architectural projects (professional comp. 3).

g) The protection and preservation of the environment (professional comp. 5).

h) Respect for diversity and multiculturalism (professional 6).

i) Maintain continuous education (professional comp. 7).

j) Communicate in a second language (personal comp. 2).

It can be seen from the above summary of participating schools that three areas are well addressed in all programs; namely, Design Abilities, Construction and Technological Abilities, Theoretical Background and Socio-Cultural Values. This is understandable since all architectural programs revolve around these three pillars: design, construction, and theory. These three areas can be well introduced in schools since they can be well worked out within the studio or classroom. Moreover, academicians are typically well equipped to address these areas while they are in the comfort of their campuses (table 13).

This is not true when it comes to the fourth group of competencies, Professional Practice and Work Ethics. This is because this group of competencies relies more on the actual practice of the profession

which is not feasible in the classroom. This fact is apparent in the case of the studied programs. Accommodating this group is not as satisfactory as in the case of the first three groups. It seems imperative that more creative teaching is needed to make sure that this important component of architectural education is well addressed.

Table 13

Summary of Compatibility of Participating Architectural Programs with the Architectural META-Profile. Fully shaded cells mean competencies are well addressed; partially shaded cells indicate competencies which are not well addressed, while clear cells are designated for competencies that are not addressed

		Mouloud	Cairo	Suez	Hashemite	BAU	Mohammad 1	Gaza	AIU	IUST
Design Abilities										
1	Ability to design buildings, sites, and/or urban development projects in a sustainable manner									
2	Ability to think, perceive and conceive spaces three dimensionally and communicate verbally, …									
3	Skill in formulating creative and innovative ideas and transforming them into architectural creations …									
4	Ability to design buildings to accommodate individuals with varying physical abilities.									
5	Ability to analyze and incorporate relevant precedents into architectural design projects.									
Construction and Technological Abilities										
1	Ability to conceive and integrate structural, construction, renewable energy systems…									

		Mouloud	Cairo	Suez	Hashemite	BAU	Mohammad 1	Gaza	AIU	IUST
2	Capacity to produce comprehensive construction documents									
3	Awareness of methods of execution practiced in architectural projects...									
4	Understanding of the basic principles and appropriate application of construction materials …									
Theoretical Background and Socio-Cultural Values										
1	Appreciation of the social and cultural role of Architecture.									
2	Knowledge of history and theory of Architecture and related human sciences and engineering.									
3	Awareness of current architectural ideas and practices at local and global levels									
4	Ability to conduct investigation and research in the process of architectural innovation.									
5	Have critical thinking, analysis and synthesis									
6	Ability to evaluate, enhance and preserve architectural and urban local heritage...									
7	Knowledge of aesthetics and arts, and understanding their role as key factors…									

		Mouloud	Cairo	Suez	Hashemite	BAU	Mohammad 1	Gaza	AIU	IUST
Professional Practice and Work Ethics										
1	Act ethically pertaining issues related to architectural design and practice.									
2	Knowledge and ability to apply legal framework, safety regulations and technical codes …									
3	Capacity for planning, programming, budgeting and managing architectural projects									
4	Maintain quality of work									
5	The protection and preservation of the environment									
6	Respect for diversity and multiculturalism									
7	Maintain continuous education									
Personal Characteristics										
1	Ability to work within, or lead constructively interdisciplinary teams									
2	Communicate in a second language									
3	Demonstrate organizational skills									
4	Possess a high level of interpersonal skills									

The Personal Characteristic group shows some weakness also. This is partly because issues related to personality and attitudes are very difficult to handle. These issues cannot be lectured; they have to be practiced and observed for the instructors to evaluate and improve. They cannot be taught in one course either; students will develop their personalities as architects while working their way through college. In this case also, academicians should take creative measures in order to enhance student personal skills and characteristics.

10

Modification of the Meta-Profile

Discussions during the Third meeting in Cyprus led to a development of the shape of the Architectural META-Profile diagram. It was agreed that the Design Abilities are the core of the Profile of any architectural program of study while the other three groups: Construction and Technical Abilities, Theoretical Background and Socio-cultural Values, and Professional Practice and Work Ethics support and feed into the Design Abilities in order to reach learned and well executed designs at all technical, environmental, and human levels. Personal Characteristics were considered attributes that should be present in every aspect of the design and its preparatory stages. Thus, they were seen as a background that embraces and directs the whole architectural profession and its educational system. Accordingly, personal characteristics were included under the Professional Practice and Work Ethics as additional competences. Based on this argument, the Architectural META-Profile took the shape presented in Figure 2.

This view of the Personal Characteristics should not mean dealing with them using a few comments in a number of courses. It is critical and imperative that they are clearly and methodologically addressed in specific courses providing theoretical background while practically applied in all design and technical courses.

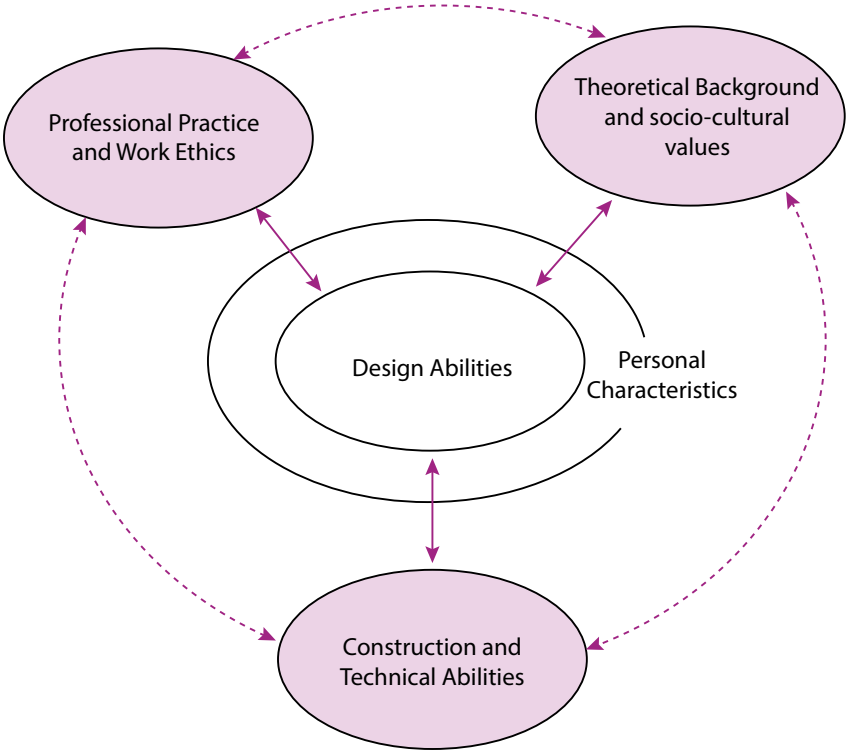


Fig. 2
Final form of the Architectural META-Profile

Table 14
Final list of architectural competences

DESIGN ABILITIES

1. Ability to design buildings, sites, and/or urban development projects in a sustainable manner (socially, culturally, economically, environmentally).
2. Ability to think, perceive and conceive spaces three dimensionally and communicate verbally in writing, graphically, and/or volumetrically.
3. Skill in formulating creative and innovative ideas and transforming them into architectural creations and urban planning.
4. Ability to design buildings to accommodate individuals with varying physical abilities.
5. Ability to analyze and incorporate relevant precedents into architectural design projects.

CONSTRUCTION AND TECHNOLOGICAL ABILITIES

1. Ability to conceive and integrate structural, construction, renewable energy systems, and environmental and installation systems to architectural designs.
2. Capacity to produce comprehensive construction documents.
3. Awareness of methods of execution practiced in architectural projects.
4. Understanding of the basic principles and appropriate application of construction materials including local ones.

THEORETICAL BACKGROUND AND SOCIO-CULTURAL VALUES

1. Appreciation of the social and cultural role of Architecture.
2. Knowledge of history and theory of Architecture and related human sciences and engineering.
3. Awareness of current architectural ideas and practices at local and global levels.
4. Ability to conduct investigation and research in the process of architectural innovation.

5. Have critical thinking, analysis and synthesis.
6. Ability to evaluate, enhance and preserve architectural and urban local heritage and recognize the importance of its relation with current architectural developments.
7. Knowledge of aesthetics and arts, and understanding their role as key factors in the quality of architectural thinking and design.

PROFESSIONAL PRACTICE AND WORK ETHICS

1. Act ethically pertaining issues related to architectural design and practice.
2. Knowledge and ability to apply legal framework, safety regulations and technical codes controlling activities of the profession.
3. Capacity for planning, programming, budgeting and managing architectural projects.
4. Maintain quality of work.
5. The protection and preservation of the environment.
6. Respect for diversity and multiculturalism.
7. Maintain continuous education.
8. Ability to work within, or lead constructively interdisciplinary teams.
9. Communicate in a second language.
10. Demonstrate organizational skills.
11. Possess a high level of interpersonal skills.

11

Assessment of students' workload

Credit system used in American universities, and later on adopted by European ones (as ECTS points), is based on a number of issues among which is the expected number of hours a student spends to fulfill the requirements of a course. According to the American system, a credit hour is seen as one contact hour (in class where students and instructor are in direct contact) plus two hours of out of class independent work a student need to spend to cover the requirements of the course. Thus, a credit hour requires three actual hours of work, in and outside class.

Knowing that a full time student registers for 18 credits per semester, his or her weekly studying hours will then be 18 × 3 = 54 hours. Europeans prefer a smaller number of hours per week; they suggest that a student should not put more than 45 hours of studying per week.

Furthermore, a student should be aware of the activities he or she is expected to perform in order to pass a course successfully. This awareness comes from a proper introduction of the course by the instructor as early as the first day of class. Accordingly, a student can plan his or her out of class time to fulfill these requirements based on the weight of each activity as introduced by the instructor.

Thus, it is assumed that the syllabus of any course provides enough details so as a student can be clear about all time commitments he/she needs to make. Such a detailed syllabus will clearly state the course's learning outcomes and methods and time required to achieve them. A comprehensive syllabus, thus, acts as a detailed guide for students'

activities as envisioned by the instructor. Such a detailed guide is assumed to be planned in accordance with the expected time allocated to the course (for both contact and independent work) as per its number of credits.

In order for Tuning's suggested META Profile to work as planned, it was agreed that student's workload should be carefully evaluated. Such evaluation was to be done in comparison with the expected workload suggested by the American or European systems. Therefore, a questionnaire was developed to sense faculty and students' assumptions of actual workload students put to successfully complete their courses.

The architecture group agreed on examining workload of all courses of one particular semester; namely first semester of the third year in the program (which was the first semester of the academic year 2015-2016). All participating universities administered a questionnaire on all faculty and students of this particular semester. On average, four courses were examined. In each course, the instructor participated in the questionnaire along with at least 10 students. Hence, around four faculty members and over forty students participated from each university.

Two sets of questionnaires were developed, one for faculty and the other for students. The two were basically the same; the main difference is that faculty members were asked whether they plan for workload, while students were asked whether they were aware of workload and whether instructors explicitly explained it. The questionnaire also asked both faculty and students to estimate number of hours spent on a number of activities related to meeting the requirements of each course.

Results of the questionnaires revealed important findings. The main question related to number of hours spent during the semester shows that faculty members estimated that students spend 352.25 hours (37.35% of total workload) as contact hours, and spend 590.75 hours (62.65% of total workload) as independent working hours out of class. Students estimated that they spend 301.10 contact hours per semester (33.81% of total workload) and 589.49 independent hours (65.92% of total workload. A number of important points are worth mentioning here.

Table 15
Estimated hours spent in class and out of class by faculty and students

	Contact hours	Out of class activities
Faculty	352.25	590.75
Students	301.10	589.49

Firstly, estimations are not very different between the two groups. In fact, number of independent hours is almost the same for both groups. The difference was in the number of contact hours; a huge difference in fact: 50 hours of difference. This is much unexpected since this number is fixed and, thus, it should have been almost the same for both parties. Such a discrepancy may question the validity of the questionnaire.

Secondly, and more importantly, is that when adding contact hours to independent work hours, the result will be the total workload hours per semester which are as follows:

- Total workload per semester according to faculty: 352.25 + 590.75 = 943.00
- Total workload per semester according to students: 301.10 + 589.49 = 890.59

If total workload in divided over 15, which is the general number of weeks per semester, the result will be the number of workload hours per week. This is called here calculated workload, and it will be as follows:

- Calculated total workload per week according to faculty: 943 / 15 = 62.8 hours.
- Calculated total workload per week according to students: 890.59 / 15 = 59.3 hours.

The total number of hours per semester of independent work was the sum of estimated hours per semester for a number of activities (Table 2).

Thirdly, the questionnaire asked faculty and students to estimate number of hours spent per week for all workload. The results are interesting to be compared with the early findings:

- Total work load per week estimated by faculty: 67.63.
- Total work load per week estimated by students: 89.76.

As demonstrated earlier, faculty's estimation of workload per week is higher than that estimated by students based on the total workload per semester. However, the difference was not severe; about three hours only. The surprising result though is the great difference in the two estimations provided by students which reached 30 hours. Such a huge discrepancy is most probably because of a very strong perception by architecture students that they are always over worked. If the estimated number of hours per week is actually 89.76, this means students put almost 13 hours of workload every day of the week. Such a number is much exaggerated. On the other hand, students' calculated estimate of weekly workload (59.3 hours per week) means that they put about eight (8) hours of work every day of the week; a number which is more logical but still high.

Fourthly, there is no consistency in estimates when it comes to comparing faculty and students' estimates. Faculty gave higher estimates in relation to total contact hours per semester, and almost same estimate of total workload per semester. On the other hand, students gave higher estimate in relation to total workload per week.

Table 16
Detailed listing of out of class activities

	Reading texts or literature	Field work (site visits, etc. not super-vised)	Laboratory work (not super-vised)	Preparation and execution/ presentation of written work	Working with internet sources	Preparing for interim assessment, final exam	Other	Total
Faculty	89.63	46.00	35.00	234.50	68.38	117.25	0.00	590.75
Students	92.32	34.92	71.24	158.92	95.52	129.22	7.25	589.49

This inconsistency in estimation appears again when looking at the detailed list of different types of activities done in classes. Faculty estimated long hours for field work, preparation of presentations and written work, while students estimated more hours spent on reading texts, laboratory work, internet search, and semester assignments and finals. However, differences are not very significant except in the case of preparation of presentations. There are 76 hours of difference between faculty and students' estimates.

This difference is most probably due to the fact that "preparation of presentations" is understood as studio work which occupies most of any architectural student's time. In fact, there has been a strong movement among academicians in the field of architecture for at least the last ten years which advocates healthier "studio culture" (which is the life of students in the design studio). A point which is highly discussed is the reduction of hours spent in studio by students. Advocates of this issue think that architecture students should have a rich social and cultural life in order to support and enrich their academic life.

A more careful planning of studio work will definitely result in reduction of hours spent in the studio. This can only be done through better and clearer identification of courses' learning outcomes. If this is done, then the high number of hours related to workload will, with time, be brought down to a more acceptable figure closer to those advocated by the American and European schools.

Table 17
Student's awareness of planned timing for out of class activities

	Percentage of academics who said yes to the following questions:		Percentage of students who said yes to the following questions:	
	Planning the workload for a course should include hours for independent work	Students' expectations and evaluation are taken into consideration when planning workload	They were aware of the number of hours planned for independent work	Professors guide them at the beginning of semester on the necessary workload for each part of the independent work
Faculty	97.56%	97.56%		
Students			60.19%	70.09%

Finally, the questionnaire found out that most faculty (97.56%) think they do take into consideration necessary independent working hours when planning their courses. Most of them also agreed (97.56%) that they take into consideration when planning their courses students' expectations and evaluation. However, students do not share the same level of confidence; only 60% think that they were aware of the number of hours planned for independent work before hand. Similarly, 70% stated that their instructors guided them at the beginning of the course in relation to the workload needed for each task of the course. These findings can mean that there is planning but there is no sufficient communication among students and faculty. In fact, the culture of introducing course content in details is not strongly rooted in the region. It is only recently that such a culture or practice is penetrating through academia, and thus it will take some time until it establishes itself as a regular practice.

In conclusion, workload in architecture schools is in general over estimated by both faculty and students. This over estimation may be the result of the general and hidden belief that students of architecture work continuously and without breaks. This belief is changing though to another view of students' lives where they should have a balanced schedule between their academic lives and their social and cultural ones.

12

Development of Architectural Programs Based on the Architectural Meta-Profile

Three participating schools decided to develop their programs to be more in tune with the developed Architectural META-Profile: Mohammed 1st University (UMP), Morocco; The Hashemite University, Jordan; and the International University for Science and Technology, Syria. Both Mohammed 1st University and The Hashemite University developed a comprehensive new program while IUST made amendments and changes to its existing program. The three proposals are presented in the indices.

A)

The Architectural Program at The Hashemite University

The following is an example of a comparison of one architectural program, the architectural engineering program at the Hashemite University (HU), with the developed Meta-Profile. A comprehensive evaluation of the participating architectural programs follows.

a) Comparing HU's Architectural Engineering Program with T-MEDA Architectural Meta-Profile

The Architectural Program at HU states five objectives as follows

Architectural Engineering Program Objectives:

1. To provide students with a rich and rigorous foundation in the fields of architectural design, technology, urban design, structure, history and theory, and landscape architecture,

2. To develop and foster students' abilities in analytical, critical, creative, and interpretative thinking skills.

3. To prepare our students for the actual architectural engineering profession to function as architectural engineers in a global society,

4. To improve the quality of the built environment through architecture,

5. To continuously develop the program to meet the resent advancement and the market diverse needs of the local national and international.

6. To develop the students' ability to communicate effectively by using oral, written and graphic forms, the ability to analyze and interpret data and provide the results necessary to design buildings.

7. To develop the students' ability to lead and communicate effectively with colleagues, clients and the local community.

The following table is a comparison between the current curriculum of the Architectural Engineering Program at the Hashemite University with the agreed upon META-Profile as developed in Tuning's last two meetings in Jordan and Spain.

The table consists of four columns. The first column states the competencies of the META-Profile categorized in the five agreed upon areas. The second column relates the particular competency with the Program's objectives if any; it also evaluates the level of overlapping these objectives have with the competencies. The third column lists the courses which deal with each one of the competencies. And finally, the fourth column evaluates the degree each competency is actually emphasized in the program through its courses.

Table 18
Comparing META-Profile with HU's Architectural Engineering Program

The Meta-Profile Competency	The Competency in the HU Architectural Engineering Program Objectives	The Competency in the HU Architectural Program Courses	Evaluation of the Competency
Design Abilities			
Ability to design buildings, sites, and/or urban development projects in a sustainable manner (socially, culturally, economically, environmentally)	1,2,4 Objectives satisfy the competency.	• All design studios • Housing • Landscape Design • Urban Planning • Theory of Urban Design	• Courses offered and their contents should be sufficient to cover this competency.

The Meta-Profile Competency	The Competency in the HU Architectural Engineering Program Objectives	The Competency in the HU Architectural Program Courses	Evaluation of the Competency
Ability to think, perceive and conceive spaces three dimensionally and communicate verbally, in writing, graphically, and/or volumetrically.	1,2,6, Objectives satisfy the competency.	• Architectural Drawing • Free hand Drawing • Architectural Communication and Presentation (1) • Architectural Communication & Presentation (2) • Computer Applications In Architectural Design (1) • Computer Applications In Architectural Design (1)	• Students can think of spaces three dimensionally. • But they lack good communication skills in all media.
Skill in formulating creative and innovative ideas and transforming them into architectural creations and urban planning.	1,2,3,4, Objective satisfactory	• All design courses • Housing • Landscape Design • Urban Planning • Theory of Urban Design	• Courses offered and their contents should be sufficient to cover this competency.
Ability to design buildings to accommodate individuals with varying physical abilities.	1,5 Objective needs development	• Some design courses	• Emphasis on this point is growing and becoming mandatory in most designs.
Ability to analyze and incorporate relevant precedents into architectural design projects.	1,2 Objective satisfactory	• all design courses	• All design courses deal with the case studies and design precedents.
Construction and Technological Abilities			
Ability to conceive and integrate structural, construction, renewable energy systems, and environmental and installation systems to architectural designs.	1,2,3,4, • Not clearly stated • Objective needs development	• All design course • Building Materials • Architectural structural systems • Building finishing • Working Drawings • Lighting & Acoustics • Ancient Building Technologies • Building and Energy	• Courses offered and their contents should be sufficient to cover this competency.

The Meta-Profile Competency	The Competency in the HU Architectural Engineering Program Objectives	The Competency in the HU Architectural Program Courses	Evaluation of the Competency
Capacity to produce comprehensive construction documents.	3, Not clearly stated	• Building Materials • Architectural structural systems • Building finishing • Working Drawings	• Courses offered and their contents should be sufficient to cover this competency.
Awareness of methods of execution practiced in architectural projects.	3, Objective satisfactory	• Building Materials • Architectural structural systems • Building finishing • Working Drawings	• Courses offered and their contents should be sufficient to cover this competency.
Understanding of the basic principles and appropriate application of construction materials including local ones.	3,4, Not clearly stated	• Building Materials • Architectural structural systems • Building finishing	• Courses offered and their contents should be sufficient to cover this competency.
Theoretical Background and Socio-Cultural Values			
Appreciation of the social and cultural role of Architecture.	1, Not clearly stated	• History & Theory of Architecture (1) • History & Theory of Architecture (2) • Contemporary Arch. • Islamic Architecture • Theory of Modern Architecture • Theory & Methods of Architectural Design	• Courses offered and their contents should be sufficient to cover this competency.
Knowledge of history and theory of Architecture and related human sciences and engineering.	1, Not clearly stated	• History & Theory of Architecture (1) • History & Theory of Architecture (2) • Local Contemporary Architecture • Islamic Architecture • Theory of Modern Architecture • Theory & Methods of Architectural Design	• Courses offered and their contents should be sufficient to cover this competency.
Awareness of current architectural ideas and practices at local and global levels.	1, Objective satisfactory	• Local Contemporary Architecture • Islamic Architecture • Theory of Modern Architecture • Theory & Methods of Architectural Design	• Not sufficiently introduced

The Meta-Profile Competency	The Competency in the HU Architectural Engineering Program Objectives	The Competency in the HU Architectural Program Courses	Evaluation of the Competency
Ability to conduct investigation and research in the process of architectural innovation.	1,2, Objective satisfactory	• Graduation Project (1)	• Not sufficiently introduced
Have critical thinking, analysis and synthesis	2, Not clearly stated	• All design courses	• Not sufficiently introduced
Ability to evaluate, enhance and preserve architectural and urban local heritage and recognize the importance of its relation with current architectural developments.	Not clearly stated	• Islamic Architecture • Local Contemporary Architecture • Conservation of Architectural Heritage • Restoration & Rehabilitation of Historic Buildings	• Not sufficiently introduced
Knowledge of aesthetics and arts, and understanding their role as key factors in the quality of architectural thinking and design.	Not clearly stated	• All design courses, especially Basic Design 1, 2	• Courses offered and their contents should be sufficient to cover this competency.
Professional Practice and Work Ethics			
Act ethically pertaining issues related to architectural design and practice.	6,7 Not Cleary stated	• Ethics and communication skills • Professional practice • Implicitly stated in design courses	• Courses offered and their contents should be sufficient to cover this competency.
Knowledge and ability to apply legal framework, safety regulations and technical codes controlling activities of the profession.	1,3,4, Not clearly stated	• Implicitly stated in design and construction courses	• Competency is not structured in any particular course and is not taken as an issue in the department
Capacity for planning, programming, budgeting and managing architectural projects.	Not stated	• Quantities and Specifications	• Not sufficiently introduced
Maintain quality of work	Not stated	• Implicitly emphasized in all courses	• Strongly emphasized in all courses

The Meta-Profile Competency	The Competency in the HU Architectural Engineering Program Objectives	The Competency in the HU Architectural Program Courses	Evaluation of the Competency
The protection and preservation of the environment	4, Objective satisfactory	• Landscape Design • Environmental Control	• Not sufficiently introduced
Respect for diversity and multiculturalism	Not stated	• Local Contemporary Architecture • Conservation of Architectural Heritage	• Not sufficiently introduced
Maintain continuous education	5, Objective satisfactory	• Implicitly emphasized in some courses	• Not sufficiently introduced
Personal Characteristics			
Ability to work within, or lead constructively interdisciplinary teams.	7, Objective satisfactory	• Partly emphasized in design courses	• Competency is not structured in any particular course and is not taken as an issue in the department
Communicate in a second language	Not stated	• English Skills (1) • English Skills (2) • Technical English	• Not sufficiently introduced
Demonstrate organizational skills	2,7, Not clearly stated	• Graduation Project (1)	• Competency is not structured in any particular course and is not taken as an issue in the department
Possess a high level of interpersonal skills	6,7, Not clearly stated	• Partly emphasized in design courses	• Competency is not structured in any particular course and is not taken as an issue in the department

According to the above table, the following can be concluded:

In connection with the objectives of the Architectural Engineering Program at HU:

1. Current objectives of the Program are **all addressed** in the META-Profile.

2. Objectives of the Program **does not seem to address** the following points stated in the META-Profile: varying physical abilities of users, local heritage, ethics, programming and management of projects, quality of work, respect of diversity, teamwork, and knowledge of second language.

3. Objectives of the Program **needs to clarify** the following points to become more in tune with the META-Profile: integration of engineering systems to architectural design, social and cultural role of architecture, critical thinking, and bridge the gap between theory and practice.

In connection with the courses of the Architectural Engineering Program at HU:

1. A good number of them fulfill the META-Profile competencies.

2. Nevertheless, the following competencies are **not addressed** in courses:

   - Knowledge and ability to apply legal framework, safety regulations and technical codes controlling activities of the profession.
   - Ability to work within, or lead constructively interdisciplinary teams.
   - Demonstrate organizational skills.
   - Possess a high level of interpersonal skills.

- Capacity for planning, programming, budgeting and managing architectural projects.
- Maintain quality of work.

3. The following competencies are **not well addressed:**
   - Ability to conduct investigation and research in the process of architectural innovation.
   - The protection and preservation of the environment.
   - Respect for diversity and multiculturalism.
   - Maintain continuous education.
   - Communicate in a second language.

In conclusion, Competencies related to DESIGN ABILITIES as well as CONSTRUCTION AND TECHNOLOGICAL ABILITIES are all almost well covered in the Program's courses.

Competencies of THEORETICAL BACKGROUND AND SOCIO-CULTURAL VALUES, PROFESSIONAL PRACTICE AND WORK ETHICS, and PERSONAL CHARACTERISTICS are either not introduced or not sufficiently addressed in the Program's courses.

T-MEDA Architecture Pilot Program to be implemented

Name: architectural engineering degree program.

Educational Prerequisites: A General Secondary Education Certificate, Scientific Brach with GPA above 80% is required for admission.

Level: Bachelor of Architectural Engineering program.

Length: The Bachelor of Architectural Engineering program is a 5-year program that prepares graduates for entry-level work as architects. The curriculum prepares students for the challenges and demands of architectural professional practice.

Architectural Engineering Program Mission

The architectural engineering program *provides students* with a rich and rigorous foundation in the fields of design principles, communication and representation systems, architectural design, construction material and technology, computer-aided design, urban design, structural systems and behaviors, history and theory, landscape architecture, and city planning. The program thus balances the intensity of a theory with creative, productive, and innovative architectural design with responsible practice. It integrates other disciplines such as Computer Science, and human science into design. Students will learn to Contextualize ideas in theoretical frame. Then communicate through illustrations, models and, drawing. Although one of our goals is to raise the awareness of the local and regional architectural identity; we are fully committed to prepare our students for the actual architectural engineering profession to function as architectural engineers in a global society.

Vision Statement

The Department of Architectural engineering is a research- led and student- centered. *It aims* at engaging in exemplary architectural teaching, research, scholarship, creative endeavor, and service on international, regional and national level. The program is structured to establish connections with other distinguished national / international foundations, visitors and scholars. The department aims to improve the quality of the built environment through architecture.

Architectural Engineering Program Objectives

The objectives of the Department of architectural engineering at the Hashemite University reflect the view that architecture is an intellectual and interdisciplinary discipline, both an art and a professional science. The program, therefore, is based on the following intentions:

1. Architectural Engineering Program Objective is to develop and foster students' abilities in analytical, critical, creative, and interpretative thinking skills. It is to prepare architecture students for professional and technical roles wherein they need to solve architectural design problems in creative ways. Our design teaching method focuses on

how the students acquire, organize, and apply design knowledge based on the instructor's knowledge, teaching style, personal experience, and ability to build a conceptual understanding of the design knowledge domain. Therefore, our architectural design program has three objectives: to teach new skills, to teach new languages, and to teach students how to think in architectural terms.

1) The ability to effectively communicate using oral, written and graphic forms, the ability to analyze and interpret data and provide the results necessary to design buildings.

2) To provide students with adequate knowledge of design principles, communication and representation systems, architectural design, construction material and technology, computer-aided design, urban design, structural systems and behaviors, history and theory, landscape architecture, and city planning.

3) The capacity to apply Knowledge of science, and engineering architectural design.

4) The Knowledge of contemporary issues, in architecture, which allows them to appreciate the impact of architectural solutions on humankind in general and local community in particular,

5) To provide students with knowledge, skills and proficiency to meet the growing demands of future profession in dealing with the dynamic, fluid and progressive trend of architecture. The curriculum is crafted to enhance and foster students' as well as instructors' abilities to face the global competition and to work in different environments.

6) To develop continuously the program to meet the recent advancement and the market diverse needs of the local national and international.

7) To provide architectural students with knowledge of engineering and the practical aspect of the building industry.

8) To draw knowledge from humanities, the social and physical sciences, technology, environmental science, the creative arts, and the liberal arts.

9) To provide students with knowledge of the means of achieving ecologically sustainable design and environmental conservation and rehabilitation.

10) Training in research techniques as an inherent part of architectural learning, for both students and teachers.

11) To prepare the future architects for professional practice role in design, theories, and construction technological systems. Additionally to prepare them to communicate effectively with other engineering disciplines.

12) The ability to lead and effectively communicate with colleagues, clients and the local community.

What is design?

Design is one of the most sophisticated human intellectual processes; it involves how the designers see and think consequently in order to generate new, valuable, and/or desirable solutions. Design is a systematic operation that everyone uses every day, but some people have better developed design ability than others. Additionally, design is rhetorical, persuasive, exploratory, discovery-oriented, emergent, opportunistic, reflective, ambiguous, and risky.

Design depends on the accumulation of knowledge, experience, training, cognitive strategies, creative thinking skills, tacit and implicit knowledge, and chain of design decisions. It involves transformation of the knowledge and structuring search.

Design can be considered as a problem solving activity. Each design task deals with a large number of aspects to generate design ideas or concepts. The complexity and ambiguity of design requires creative thinking, non-routine thinking, and various other skills. Architectural design comes from the designer's ability to create and execute a designing form, space, light, materials, and technologies to achieve the functional and aesthetic objectives.

The design Studio

The design studio is a cornerstone and a center of most design disciplines curricula. It is a working space, where students practice design projects under the supervision of design instructor professors. The students work on semester-length projects; they respond to complex and open-ended assignments. In the architectural design studio, students are meant to "learn by doing" in a "design-critique-redesign cycle". This critique cycle takes two shapes; formal discussion as in review or before juries, and informal discussion as in instructor-student critique or one-on-one critique.

The design studio is a place for multidisciplinary teaching and learning because of the diversity of design issues that are considered in design studio courses. In the architectural design studio, students are encouraged to design from a holistic view, introduce multiple design perspectives, create new design concepts and ideas, present and define their design ideas, and learn new design techniques and skills.

The design studio is more than a place to study and teach; it is a place for engaging in social interactions, building relationships, and exchanging design knowledge, ideas, and views. Different design stages require different design knowledge. The communication inside the design studio develops shared meaning, memories, knowledge, and information, and aids in planning activities, tasks, and methodologies.

In the architectural design studio, students are required to submit an educational design proposal for the same design program, including visual media such as sketches, technical drawings, perspectives, and models to illustrate the educational design project.

Education in the design studio values leadership skills, individual creativity, and the understanding of problems and the ability to solve them as presented in the practice of architecture. The architectural engineering department's mandate is for each student to understand architecture as a creative, productive, innovative, and responsible practice.

Program Meta-profile

In addition to the design studios, courses in design and visualization, building construction and technological aspects, history and theory,

urbanism and landscape, and professional practice and work ethics serve as a basis for developing a comprehensive approach to architectural design.

The architectural education in our department involves the acquisition of the following capabilities:

Design Ability

The area of design and visualization encompasses required studios, option studios, electives that concentrate on design logic and skills, and courses that support design thinking and representation. The design studio develops the students':

1. Ability to design buildings, sites, and/or urban development projects in a sustainable manner (socially, culturally, economically, environmentally),
2. Ability to think, perceive and conceive spaces three dimensionally and communicate verbally, in writing, graphically, and/or volumetrically.
3. Skills in formulating creative and innovative ideas and transforming them into architectural creations and urban planning,
4. Ability to design buildings to accommodate individuals with varying physical abilities,
5. Ability to analyze and incorporate relevant precedents into architectural design projects.

Construction and technological ability

Construction and technological aspects courses explore, as an integral part of the architectural design process, the physical context; the properties of natural forces; and building structural systems. These courses will develop the students':

1. Ability to conceive and integrate structural, construction, renewable energy systems, and environmental and installation systems to architectural design.

2. Capacity to produce comprehensive construction documents.

3. Awareness of methods of execution practiced in architectural projects.

4. Understanding of the basic principles and appropriate application of construction materials including local ones.

The theoretical background and socio cultural values

Courses in history(contemporary) and theory examine attitude concerning the design of building, landscape, and cities that may contribute to a design process responsive to its broadest social and cultural context.

Courses in urbanism and landscape address the study of aesthetic, economic, political, and social issues that influence large-scale environments.

These courses will develop the students':

1. Appreciation of the social and cultural role of architecture,

2. Knowledge of history and theory of architecture and related human sciences and engineering,

3. Awareness of current architectural ideas and practices at the local and global levels,

4. Ability to conduct investigation and research in the process of architectural innovation,

5. Critical thinking, analysis and synthesis,

6. Ability to evaluate, enhance, and preserve architectural and urban local heritage and recognize the importance of its relation with current architectural developments,

7. Knowledge of aesthetics and arts, and understanding their role as key factors in the quality of architectural thinking and design.

Professional practice and work ethics:

In the area of practice, courses are concerned with issues related to the professional context of architecture and its practice and, in particular, with the architect's responsibility for the built environment. Courses in working drawing, contracts and specifications, quantity surveying, professional practice, and training will develop the students':

1. Ability to act ethically pertaining issues related to architectural design and practice,
2. Knowledge and ability to apply legal framework, safety regulation and technical codes controlling activities of profession,
3. Capacity for planning, programming, budgeting and managing architectural projects,
4. Ability to maintain quality of work,
5. Ability to protect and preserve of the environment,
6. Respect for diversity and multiculturalism,
7. Ability to maintain continuous education.

The diversity of courses offerings in the department of architectural engineering at the Hashemite University, therefore, represents a concern for architectual engineering design that ranges in scale form the individual building to the urban design landscape. Students are also ecnouraged to take courses in other departments in the university.

Studies and research in architecture and urbanism are supported throughout the curriculum by course work and design studio.

Lectures and design studio courses provide the foundation of our program. Students are required to complete core courses in the design studio, which provide students with an opportunity to gain practical experience in designing.

Architectural courses would require a mix of research and design. Design work is crucial to our program so that students can apply the skills and concepts they learned in their theoretical courses to create drawings and models of their design.

The architectural engineering department at the Hashemite University does not seek to impose any single design philosophy and/or method, but rather it encourages in each students the development and discernment of an individual approach to design.

THE HASHEMITE UNIVERSITY

Faculty of Engineering

Department of Architectural Engineering
2015

T MEDA architecture pilot program to be implemented – Study Plan

The requirements for conferring of the Bachelor's degree in the department of Architectural Engineering are:

- Minimum total Credit Hours (CH) of (172) according to the following study plan.
- The detailed distribution of the minimum credit hours required is shown below:

	Credit Hours
University Requirements	27
a) Compulsory	12
b) Electives	15
College Requirements	27
a) Compulsory	27
b) Electives	0
Department Requirements	118
a) Compulsory	103
b) Electives	15
Total	172

The indications of the course subject's digits

Field Title	Field No.
General Courses	0
Architectural Drawings and Communication Courses	1
Architectural Design Courses	2
Architectural Construction Courses	3
History and Theory of Architecture Courses	4
Legislations, Specifications and Practice Courses	5
Urban Studies	6
Engineering Systems	7

Example

Architectural Design (1)						0407221	
15	0	4	0	7	2	2	1
Year	College		Department		Level	Field	Sequence No.

University requirements (27 credit hours)

1. **Compulsory:** (12) credit hours, as follows:

Course Number	Course Title	Credit Hours	Weekly Credit Hour		Prerequisite
			Lecture	Practical	
0107106	Military Sciences	3	3	—	—
2107108	Citizenship Education	3	3	—	—
2110100	Arabic Language	3	3	—	Level Test in Arabic Language or 2110099
2120100	English Language	3	3	—	Level Test in English Language or 2120099

2. **Efective:** (15) credit hours. The student is allowed to choose only from the following groups:

a) Fields of Human Sciences.

b) Fields of Social and Economic Sciences.

c) Fields of Sciences, Technology, Agriculture, and Health.

Fields of Human Sciences: From three (3) to six (6) credit hours

Course Number	Course Title	Credit Hours	Weekly Credit Hour		Prerequisite
			Lecture	Practical	
0107100	Human Civilization	3	3	—	—
0107101	Islamic Thought	3	3	—	—
0107102	Jordan History and Civilization	3	3	—	—
0107103	Theory of Knowledge	3	3	—	—
0107109	Jerusalem: History and Civilization	3	3	—	—
0107112	Islam and Contemporary Issues	3	3	—	—

Fields of Social and Economic Sciences: From three (3) to six (6) credit hours

Course Number	Course Title	Credit Hours	Weekly Credit Hour		Prerequisite
			Lecture	Practical	
0107105	Science of Sociology	3	3	—	—
0202150	Law and the Ordering of Our Life	3	3	—	—
0302100	Educational Culture	3	3	—	—
0303101	Family Violence	3	3	—	—
0306100	Fine Arts	3	3	—	—
1102122	Fundamentals of Sign Language	3	3	—	—

Course Number	Course Title	Credit Hours	Weekly Credit Hour		Prerequisite
			Lecture	Practical	
2201100	Economic Science	3	3	—	—
2303100	Study skills	3	3	—	—
2303121	Psychology	3	3	—	—
3901100	Archeology and Tourism Science	3	3	—	—

Fields of Sciences, Technology, Agriculture, and Health: From three (3) to six (6) credit hours

Course Number	Course Title	Credit Hours	Weekly Credit Hour		Prerequisite
			Lecture	Practical	
0401105	Architectural Arts	3	3	—	—
0401160	Traffic Safety	3	3	—	—
0502100	Principles of Nutrition	3	3	—	—
0503100	Skin Care Science	3	3	—	—
0701100	First Aids	3	3	—	—
0701101	Health Education	3	3	—	—
1201100	Principles of Astronomy	3	3	—	—
1202100	Garden Landscape	3	3	—	—
1202101	Water Resources	3	3	—	—
1203100	Principles of Environmental Science	3	3	—	—
1601100	Sports and Health	3	3	—	—

Second: College Requirements: (24 credits)

Twenty-Four Credit Hours as shown in the following table:

Course No.	Course Title	Detailed Distribution of Credit Hours		Credit Hours	Prerequisite or Co-requisite*
		Lecture	Practical		
110108101	Calculus (1)	3	—	3	—
110102101	General Physics	3	—	3	—
110102103	General Physics Laboratory (1)	—	3	1	110102101*
150407103	Engineering Geology	3	—	3	—
150407104	Engineering Geology laboratory	—	3	1	0103107*
110400101	Engineering Workshop	1/2	2	1	—
110400203	Professional Practice and Technical Writing	3	—	3	111405110
150407101	Architectural Drawing	1	6	3	—
150407102	Computer Applications in Architectural Design (1)	—	6	2	1104071220*
150407111	Free Hand Drawing	—	6	2	150407101*
150407112	Architectural Communication and Presentation (1)	—	6	2	150407111
110108112	C++ Programming Language	—	3	3	110108099 or computer skills test

Third: Department Requirements: (118) Hundred and eighteen Credit Hours as Follows:

a) *Compulsory Requirements:* (103) Hundred and three Credit Hours as shown in the following table:

Course No.	Course Title	Detailed Distribution of Credit Hours		Credit Hours	Prerequisite or Co-requisite*
		Lecture	Practical		
150401214	Engineering Mechanics	3	—	3	150102101 and 150108101
150401313	Structural Analysis for Architectural Students	3	—	3	150401214
150401324	Concrete and Steel Structures for Architectural Students	3	—	3	150407335 and 150401313
150407121	Basic Design (1)	1	6	3	150407101*
150407122	Basic Design (2)	1	6	3	150407121
150407211	Computer Applications in Architectural Design (2)	—	6	2	150407102
150407212	Architectural Communication and Presentation (2)	—	3	1	150407112
150407221	Architectural Design (1)	1	9	4	150407122 and 150407112
110401369	Surveying and Building Documentation	1	6	3	150407222
110402450	Electro-Mechanical Systems for Architectural Students	3	—	3	150407423*
150407222	Architectural Design (2)	1	9	4	150407221
150407232	Building Material	2	3	3	110103107
150407241	History and Theory of Architecture (1)	3	—	3	150407111
150407321	Architectural Design (3)	1	9	4	150407222

Course No.	Course Title	Detailed Distribution of Credit Hours		Credit Hours	Prerequisite or Co-requisite*
		Lecture	Practical		
150407322	Architectural Design (4)	1	9	4	150407321
150407233	Building System	2	3	3	150407232
150407336	Finishing	2	3	3	150407233
150407241	History and Theory of Architecture (2)	3	—	3	150407241
150407342	Islamic Architecture	3	—	3	150407241
150407343	Theory of Modern Architecture	3	—	3	150407342*
150407345	Theory and Method of Architectural Design	1	—	1	150407321*
150407361	Landscape Design	1	3	2	150407321
150407421	Architectural Design (5)	1	12	5	150407322
150407422	Architectural Design (6)	1	12	5	150407421
150407423	Working Drawings	—	6	3	150407336
150407463	Urban Design and Planning	3	—	3	150407421
150407451	Specifications and Contracts	2	—	2	110402450
150407552	Quantity Surveying	2	—	2	150407451*
150407361	Housing	2	—	2	150407463*
150407465	Conservation of Architectural Heritage	2	—	2	150407421*
150407453	Field Practice**	—	—	3	110400203, student should successfully finish 112 credit hours at least
150407471	Lighting and Acoustics	2	3	3	150407322

Course No.	Course Title	Detailed Distribution of Credit Hours		Credit Hours	Prerequisite or Co-requisite*
		Lecture	Practical		
150407522	Graduation Project (1)	1	3	2	student should successfully finish 120 credit hours at least include 150407422, 150407343, 150407423
150407523	Graduation Project Design	1	12	5	150407521
150407551	Professional Practice	2	—	2	150407552

* or Concurrent.
** Training for (8) continuous weeks inside or outside Jordan.

b) *Efectove Requirements:* (15) Fifteen Credit Hours selected from the following table:

Course No.	Course Title	Detailed Distribution of Credit Hours		Credit Hours	Prerequisite or Co-requisite*
		Lecture	Practical		
150407424	Interior Design	1	6	3	150407321
150407432	Ancient Building Technologies	3	—	3	150407241
150407444	Local Contemporary Architecture	3	—	3	150407343
150407561	Restoration and Rehabilitation of Historic Buildings	3	—	3	150407465
150407472	Desert Habitation	3	—	3	150407463
150407523	Special Topics in Architecture	3	—	3	150407542*
110401566	GIS	1	6	3	110401369 or 110401365
150407571	Green Architecture	3	—	3	150407422
150407562	Architecture & Identity	3	—	3	150407465*

Course No.	Course Title	Detailed Distribution of Credit Hours		Credit Hours	Prerequisite or Co-requisite*
		Lecture	Practical		
150407524	Methodologies of Architectural Design	3	—	3	150407422*
150407473	Building and Energy	3	—	3	150407471*
150407541	Human Behavior in Architecture	3	—	3	150417422*

Course	Credit Hours	Course	Credit Hours
First Year First semester		First Year Second semester	
Arabic Language	3	English Language	3
Calculus (1)	3	Military Sciences	3
General Physics (1)	3	Engineering Geology	3
General Physics Laboratory (1)	1	Engineering Geology Laboratory	1
Basic Design (1)	3	Basic Design (2)	3
Free Hand Drawing	2	Architectural Communication Presentation (1)	2
Architectural Drawing	3	Computer Applications in Architectural Design (1)	2
Total	18	Total	17
Second Year First semester		Second Year Second semester	
Engineering Workshop	1	Citizenship Education	3
Ethics and Communicational skills	3	Architectural Design (2)	4
Architectural Design (1)	4	History & Theory of Architecture (2)	3
History & Theory of Architecture (1)	3	Building Systems	3
Building Material	3	Computer Applications in Architectural Design (1)	2
Architectural Communication & Presentation (2)	1	Structural Analysis for Architectural Students	3
Engineering Mechanics	3		
Total	18	Total	18

Course	Credit Hours	Course	Credit Hours
Third Year First semester		Third Year Second semester	
C++ Programming Language	3	Department elective	3
Architectural Design (3)	4	Architectural Design (4)	4
Islamic Architecture	3	Theory of Modern Architecture	3
Building Finishing	3	Theory & Methods of Architectural Design	1
Surveying and Building Documentation	3	Concrete and Steel Structures for Architectural Students	3
Housing	2	Landscape Design	3
Total	18	Total	16
Forth Year First semester		Forth Year second semester	
Department elective	3	University elective	3
Architectural Design (5)	5	Practical Training	3
Urban Planning & Design	3	Electro-Mechanical Systems	3
Working Drawings	3	Architectural Design (6)	5
Lighting and Acoustics	3	Specifications and Contracts	2
		Conservation of Architectural Heritage	2
Total	17	Total	18
Fifth Year First semester		Fifth Year second semester	
University elective	3	University elective	3
University elective	3	University elective	3
Department elective	3	Department elective	3
Department elective	3	Graduation project(2)	5
Quantity Surveying	2	Professional Practice	2
Graduation Project (1)	2		
Total	16	Total	16

150407101 Architectural Drawing
3 Credit hours, (1+6)

Course Description

This course seeks to teach the students the different terms used in architecture and its history. Focusing on developing the basic drawing skills used in designing and presenting the architectural work, which is done, through a series of theoretical lectures and practical exercises. The different ways and methods used in drawing lines, plains and forms. Basic principles used in architectural expression (plans, elevations, sections and 3D drawings).

Course Learning Outcomes

The objectives of this course are that students will:

1. Be able to apply the fundamentals, science, architecture and engineering as well as aesthetic principles to the conceptualization, design and realization of buildings.
2. Be able to identify, formulate and solve architectural problems.
3. Establish knowledge and understanding of basic architectural technical drawings and related conventions.
4. Understand basic principles of orthogonal, oblique, isometric projections and related skills.
5. Properly use of architectural symbols and other drawing conventions related to plans, elevations, and sections.
6. Demonstrate efficient techniques for drawing presentation and expressing design ideas.

Grading

1. Assignments.
2. Home works.
3. Mid exam + Quizzes.
4. Final exam (project).

1504070111 Free Hand Drawing
2 Credit hours, (0+6) Prerequisites: 150407101 or concurrent

Course Description

This course seeks to teach the students the different free hand drawing techniques focusing on training the students to acquire the basic free-hand drawing skills used in presentation. Developing the artistic sense when dealing with lines, plains, solids and voids, and the perception of different environments, forms and shapes. Providing students with some basic training on drawing plants, figures, perspectives, casting shades and shadows, and the presentation of 2D and 3D drawings using pencils and charcoal.

Course Learning Outcomes

Introducing the students to the basic sketching materials.

1. Discovering and enhancing the student's natural talent.
2. Developing the student's individual skills in communicating architectural as well as imaginative thinking into effective visualized drawings.
3. Encouraging the students towards the continual exploration of innovative techniques in architectural communication.

Grading

1. Studio work.
2. Home works.
3. Sketch book.
4. Final project.

150407112 Architectural Communication and Presentation (1)
2 Credit hours, (0+6), Prerequisites: 150407111

Course Description

This course seeks to teach the students the different architectural expression methods and techniques used in presentations. Training on how to draw different perspectives (one- point perspective, two-points perspective, external and internal perspectives), and casting shades and shadows on the different architectural drawings (plans, elevations, sections and site plans).

Course Learning Outcomes

The main aim of this course is to introduce students to basic knowledge required to present and communicate architectural drawings.

By the end of this course, student will.

1. Understand the way our eyes perceive and recognize the three dimensional world (lines, surfaces, and masses).
2. Gain a comprehensive overview of the various techniques of drawing interior and exterior perspectives.
3. Know the elements of the perspective drawing.
4. Analyze and contract perspective drawings (1VP, 2VPs) using different techniques.
5. Understanding the nature of light (nature & artificial) and its effect on surfaces and masses: shades & shadows.
6. Construct and plot shades & shadows into different types of architectural drawings (plans, elevations, site plans, isometric, and perspective).

Grading

Home works (1 VP, 2 VP, Shades & Shadows).
In-Class works: Perspective Drawing: 1 VP.
In-Class works: Perspective Drawing: 2 VP.
In-Class works: Shades & Shadows.
Mid term exam.
Final project.
Final Exam.

150407212 Architectural Communication and Presentation 2
(1 credit hour, (0+3), Prerequisites: 150407112

Course Description

This course deals with graphic and visual presentation techniques for architectural students by using different rendering techniques such as pencil, ink, collage, photography, water color, markers, zip-a-tone, air brush modeling and airbrush techniques.

Course Learning Outcomes

The primary goal of this class is to develop student's ability to use rendering techniques. Students who complete this course will have a basic competence in practical skills that can be immediately applied in studio and other courses.

Grading

1.	Pencil	10%
2.	Colored pencil (Prisma)	10%
3.	Ink	10%
4.	Magic marker	20%
5.	Water color	20%
6.	Final project (Collage\multimedia)	30%

150407121 Basic Design 1
3 Credit hours, (1+6), Prerequisites: 150407101 or Concurrent

Course Description

This course seeks to introduce the architectural design principles, methods, form creation and artistic and architectural sense. This is done through designing and analyzing 2D and 3D forms and compositions. The students express their main concepts through abstract geometric forms by means of models and then converting it to architectural drawings, and vice versa. The exercises presented to the students aim at developing their abilities to connect any concepts to the actual practical functions through drawings that deal with the designed forms and the related architectural plains.

Course Learning Outcomes

1. Attaining an ability to apply the aesthetic principles of conceptualizing, designing and realization buildings.
2. Exploring the abstract qualities and the basic visual characteristics of architecture
3. Breaking down the grammar of architecture into elements, themes, and principles.
4. Designing strategies to present an engaging introduction to elements, principles and concepts in architectural design.
5. Developing the freshman students' abilities for architectural design**.**

Grading

Attendance and participation.
Projects' final submission.
Development and progress during studio.

150407122 Basic Design 2
3 Credit hours, (1+6), Prerequisites: 150407121

Course Description

This course deals with more complicated design problems. Discussing the concepts of inclusion, composition, spatial relations, measurements, and construction. Focusing on the relation between the abstract geometric forms, which represent the concept and the actual architectural forms, spaces and functions. The student will learn the different methodologies used in the design process and for expressing their concepts and the symbolism or message intended by the design.

Course Learning Objective

1. Increase student's visual perception and develop student's sensitivities to spatial relationships.
2. Help the students to develop natural understanding of visual concepts.
3. Introduce students to the principles and processes of sequencing of exercises emphasizing development of basic skills, ideas, and techniques used in the design of simplified architectural projects.
4. Applying basic design principles.
5. Using basic 2D elements (lines and planes) for formulating 3D forms and architecture.
6. Learning "control over the space" because architectural design produces a variety of spaces.
7. Stimulating ideas in the mind of students to use the spaces for various architectural uses.
8. Understanding geometrical forms and their use as space creator.
9. Understanding what it means to apply the term "sculptural" to architecture.
10. Introducing concepts of "Sculpturizing architecture" and "architecturalization of sculptures".
11. Making decision about appropriate media for delivering architectural ideas and concepts.

Grading

Minor Project.
Major Project.

150407102 Computer Applications in Architectural Design (1)
2 Credit Hours (0+6), Prerequisites 1104071220 or concurrent

Course Description

This course is an introduction to the computer aided drafting program (AutoCAD) & preparation of 2D architectural drawings. Principally, the course presents how to operate the program in general. It provides instruction on producing drawings utilizing a computer. This course will cover the geometric constructions, editing tools, drawing organization, multi-view drawings, dimensioning techniques, plotting, and blocks.

Course Learning Objective

To provide the student with an appreciation of the capabilities and limitations of the AutoCAD program, course topics include basic AutoCAD commands and functions as well as practical applications.

The student will……

1. Demonstrate understanding of basic AutoCAD terminology, and tools, focusing primarily on the drawing and modifying commands.
2. Demonstrate skilled use of AutoCAD software through assignments, and drawing projects.
3. Create, display and present complex drawings of professional quality.
4. Complete Basic CAD drawings, with borders, text and dimensions.
5. Enable to create basic 2D architectural drawings in AutoCAD.

Grading

In-class Assignments:
Quizzes:
Mid –Term Exam:
Final project:

150407211 Computer Applications in Architectural design (2)
2 Credit Hours (0+6), Prerequisites 150407102 or concurrent

Course Description

The course structure focuses on 3D modeling, composition and rendering with AutoCAD 2010. The course will explore the use of computer-aided design and drafting software for the documentation of building designs. It will provide the students with the opportunity to develop their skills in producing architectural construction documents, and creating three-dimensional models using the CAD system.

Course Learning Objective

1. Become comfortable with the necessary tools and expand 3D modeling approaches with AutoCAD focusing on solids, surfaces and mesh objects.

2. Become familiar navigating, configuring and utilizing AutoCAD materials.

3. Understand environmental factors such as sun and sky and translate the model into several rendered images.

Grading

In class assignments.
Quizzes.
Mid exam.
Final project.

Course Description

This course capitalizes on the basic architectural elements and principles taught during the first year in order to analyze and design architectural spaces and forms as complete architectural projects with actual functions. It aims at training the students to develop their architectural sense and to use specific methodology that leads to design evolvement and development. This methodology can be summarized as following: Case-study analysis; program design; site analysis; conceptual thinking (2D and 3D); design development and design drawings.

Course Learning Objective

1. To know how to transform the knowledge gained in the first year of architectural elements and principles into tools that can help you to design architectural space and form with specific functions. This can be achieved through

2. Developing your sense of scale and dimension(you should be able to know what 4m*4m*3m space feels like);

3. Developing your sense of architectural composition and proportion to create useable and enjoyable architecture;

4. Developing your sense of space and place (what a room means, what a corridor means; what a meeting hall means in architectural terms);

5. Developing your architectural vocabulary and related terminology (speak like an architect!) to describe the spaces and volumes you analyze and design.

6. Creating and developing your perception of the site and its influence on your design;

7. Developing your sense of in-door and out-door spaces, and the relationship between them.

Grading

Design phase 1: The formation of knowledge base contains understanding the nature of project and design theories, Site analysis, 3 case studies analysis, programming, functional requirements, and spatial relationships (Read carefully, interpret, analyze, and evaluate).

Design phase 2: conceptual thinking and design synthesis.
Sketch design 1.
Design phase 3: Design development 1.
Sketch design 2.
Design phase 4: Design development 2.
Final design phase: final Design submission.

Course Description

The basic architectural principles used in designing and analyzing the building as a complete architectural product with actual functions. It aims at training the students to develop their architectural designing sense and to use a methodology as a reference in the design process and to know how to implement the use of geometric shapes and free forms in the design.

Course Learning Objective

Students will focus on the metaphoric and conceptual aspects of architectural product as well a synthesis of the many dimensions of architectural environments.

1. Developing your sense of architectural composition and proportion to create useable and enjoyable architecture;
2. Creating and developing your perception of the site and its influence on your design;
3. Developing your sense of in-door and out-door spaces, and the relationship between them.

Grading

Design phase 1: The formation of knowledge base contains understanding the nature of project and design theories, Site analysis, 3 case studies analysis, programming, functional requirements, and spatial relationships (Read carefully, interpret, analyze, and evaluate).

Design phase 2: conceptual thinking and design synthesis.
Sketch design 1.
Design phase 3: Design development 1.
Sketch design 2.
Design phase 4: Design development 2.
Final design phase: final Design submission.

Course Description

This course focuses on design buildings on a complex scale of functions and site using the comprehensive logical design method to integrate different functions taking into consideration, environmental, economical, behavioral and structural factors. Expression and language of design will be in terms of values, images, patterns, systems of circulation and space flow through two major projects.

Course Learning Objective

This course focuses on design buildings on a complex scale of functions and site using the comprehensive logical design method to integrate different functions taking into consideration, environmental, economical, behavioral and structural factors. Expression and language of design will be in terms of values, images, patterns, systems of circulation and space flow through two major projects.

1. Research Skills – Ability to employ basic methods of data collection and analysis to inform all aspects of the programming and design process.
2. Critical Thinking Skills –Capacity to define strategies for problem solving, conceptual development and poetic expression at all levels of the design process of a building complex.
3. Design Skills.
4. Ability to apply basic organizational, spatial, structural, and constructional principles to the conception and development of interior and exterior spaces, building elements, and components.
    a) Capacity to develop structured arguments about design intentions and the means to communicate them effectively, especially with regard to materials and construction.
    b) Capacity to solve different circulation systems (Vehicles, users circulation - indoor and outdoor)
    c) Capacity to deal with internal designs
    d) Capacity to deal with Indoor/outdoor spatial composition

5. **Graphic Skills** – Ability to employ appropriate representational media, including computer technology, to convey essential formal elements at each stage of the programming and design process.

Grading

Design phase 1: The formation of knowledge base contains understanding the nature of project and design theories, Site analysis, 3 case studies analysis, programming, functional requirements, and spatial relationships (Read carefully, interpret, analyze, and evaluate).

Design phase 2: conceptual thinking and design synthesis.
Sketch design 1.
Design phase 3: Design development 1.
Sketch design 2.
Design phase 4: Design development 2.
Final design phase: final Design submission.

150407322 Architectural Design (4)
4 Credit hours, (1+9), Prerequisites: 150407321

Course Description

This course seeks to teach the students design buildings on broader scale of philosophical and intellectual bases. The aim is mainly to understand how contemporary schools of thinking influenced the formation of forms and the built environment through two projects.

Course Learning Objective

1. Research Skills – Ability to employ basic methods of data collection and analysis to inform all aspects of the programming and design process.

2. Critical Thinking Skills –Capacity to define strategies for problem solving, conceptual development and poetic expression at all levels of the design process of a building complex.

3. Design Skills.

4. Ability to apply basic organizational, spatial, structural, and constructional principles to the conception and development of interior and exterior spaces, building elements, and components.

5. Capacity to develop structured arguments about design intentions and the means to communicate them effectively, especially with regard to materials and construction.

6. Capacity to solve different circulation systems (Vehicles, users circulation - indoor and outdoor).

7. Capacity to deal with internal designs.

8. Capacity to deal with Indoor/outdoor spatial composition.

9. Graphic Skills – Ability to employ appropriate representational media, including computer technology, to convey essential formal elements at each stage of the programming and design process.

Grading

Design phase 1: The formation of knowledge base contains understanding the nature of project and design theories, Site analysis, 3 case studies analysis, programming, functional requirements, and spatial relationships (Read carefully, interpret, analyze, and evaluate).

Design phase 2: conceptual thinking and design synthesis.
Sketch design 1.
Design phase 3: Design development 1.
Sketch design 2.
Design phase 4: Design development 2.
Final design phase: final Design submission.

150407421 Architectural Design (5)
5 Credit hours, (1+12), Prerequisites: 150407322

Course Description

This course seeks to teach the students the design of complex group of buildings within an urban context of a related urban fabric such as locations in central urban areas or in other locations where an urban design practice is needed prior to the design of individual buildings. The course employ a professional approach where the brief and requirements of the project are formulated by the students as a result of existing architectural and socio-economic analysis of the study area.

Course Learning Objective

Provide students an understanding of the requirements, factors, regulation roles, and issues that influence the architectural mixed use and high-rise hotel building design project in a complex urban context in Jordan.

1. Present students' topics related to mixed-use and high-rise hotel building design developments projects to acquire experience by dealing with urban context: documentation, analyzing, and understanding its evolution.

2. Encourage students to freely converse, question and analyze the topics of the mixed-use and high-rise building design project.

3. Develop students' ability to use different ways of design thinking confidently as a generator of architectural design program, spatial concepts, schematic design, design development, final and detailed design product.

4. Apply the environmental considerations into their design projects; for example, material selection, life cycle impacts, energy needs, orientation, local specific environmental concerns (if any).

5. Engage students in critical thinking design process by using inductive, deductive and abductive (process of inference to the best explanation) reasoning; and using analysis synthesis design cycle to structure the design knowledge.

6. Enhance the students' ability in selecting, describing, interpreting, and evaluating design precedents.

7. Develop the students' skills and enhance their abilities to recognize, analyze and reinforce spatial structure in an urban context.

8. Enhance the students' intellectual skills by developing the design concept that addresses issues and opportunities at the urban scale, and critically synthesis urban site conditions toward the development of innovative spatial experience.

9. Develop the students' graphical thinking and communication skills in interpreting the design concept into spatial experience as it relates to urban design.

10. Develop the students' skills to evolve the conceptual drawings into mature technical documentation.

Grading

Design phase 1: The formation of knowledge base contains understanding the nature of project and design theories, Site analysis, 3 case studies analysis, programming, functional requirements, and spatial relationships (Read carefully, interpret, analyze, and evaluate).

Design phase 2: conceptual thinking and design synthesis.
Sketch design 1.
Design phase 3: Design development 1.
Sketch design 2.
Design phase 4: Design development 2.
Final design phase: final Design submission.

150407422 Architectural Design (6)
5 Credit hours, (1+12), Prerequisites: 150407421

Course Description

This course seeks to teach the students advanced design of buildings with problems of complex function, structures, acoustics, heating and ventilation. Students are expected to apply knowledge acquired in related subjects; (building construction and environmental physics), to the design process. The project could include the re-developing of urban or historic areas into the whole master plan.

Course Learning Objective

1. Provide students an understanding of the elements, requirements, factors, regulation roles, and issues that influence the architectural urban design housing project in Jordan.

2. Present students' topics related to architectural urban design housing developments to acquire experience by dealing with urban context: documentation, analyzing, and understanding its evolution.

3. Encourage students to freely converse, question and analyze the topics of the architectural urban design housing project.

4. Develop students' ability to use different ways of design thinking confidently as a generator of architectural design program, spatial concepts, schematic design, design development, final and detailed urban design housing product.

5. Engage students in critical thinking design process by using inductive, deductive and abductive (process of inference to the best explanation) reasoning; and using analysis synthesis design cycle to structure the urban design knowledge.

6. Enhance the students' ability in selecting, describing, interpreting, and evaluating design precedents.

7. Develop the students' skills and enhance their abilities to recognize, analyze and reinforce spatial structure in an urban context.

8. Enhance the students' intellectual skills by developing the design concept that addresses issues and opportunities at the urban scale, and critically synthesis urban site conditions toward the development of innovative spatial experience.

9. Develop the students' graphical thinking and communication skills in interpreting the design concept into spatial experience as it relates to urban design.

10. Develop the students' skills to evolve the conceptual drawings into mature technical documentation.

Grading

Design phase 1: The formation of knowledge base contains understanding the nature of project and design theories, Site analysis, 3 case studies analysis, programming, functional requirements, and spatial relationships (Read carefully, interpret, analyze, and evaluate).

Design phase 2: conceptual thinking and design synthesis.
Sketch design 1.
Design phase 3: Design development 1.
Sketch design 2.
Design phase 4: Design development 2.
Final design phase: final Design submission.

Course Description

This course is divided into two parts: theoretical and practical. The theoretical part contains an overview of the various materials used in construction. The students will learn about material and their physical, chemical and mechanical properties in addition to the product manufacturing techniques and how they relate to the properties of the various materials. Furthermore, material applications in structural and non-structural building components are explored. The practical part will include lab tests to know the different tests that can be conducted on the building materials in order to gauge their properties. The students will undertake task, and field trips to enhance their actual ability to take on real construction projects. Resulting from this course, students will gain a comparative knowledge of material properties and possible applications in construction and architecture.

Course Learning Objective

At the end of this semester, student should be able to:

1. Understand the construction terminology and major construction stages and it's relation to Architecture.
2. Understand the language of building materials.
3. Recognize major types of construction materials, their properties including their environmental impact and reuse.
4. Understand the typical and potential applications of these materials and appropriate application and performance.
5. Recognize the importance of experimental verification of material properties.
6. Appreciate the importance and interrelationships between materials and methods and the relevant national building codes.
7. Understand the principles of sustainability in making building construction decisions that conserve natural and built resources, including materials selection.

Grading

Assignments and quizzes.
Midterm exam.
Final exam (presentation + written exam).

150407233 Architectural Structural System
3 Credit hours, (2+3), Prerequisites: 150407232

Course Description

This course seeks to teach the students the skeleton construction systems from foundations to roofs, their materials, mechanisms, options, major and minor elements. It will focus also on major components of partitions, staircases, and elevators, windows and doors, insulation works.

Course Learning Objective

1. Understand the meaning of the Building Construction and it's relation to Architecture.
2. The true value of this course to teaching construction to be gauged by the way that students apply the knowledge to their own designs in studio.
3. Understand the different architectural structural systems, reinforced concrete systems (all types), bearing walls, steel, wood, folded plates, domes, tensile structure,
4. Link Building Construction materials with architectural design.
5. Know the types of the building materials and their properties.
6. Deal with construction terminology and major construction stages.
7. Deal with types of footings, tie beams, columns, slabs.
8. Prepare students for the realities of working practice in accordance with the skills that the 'real' world of commerce or industry require of them, or should they be fostered to take a more personal line of development.

Grading

Drawing for full details of all construction parts and types.

- Creating structural models to understand the drawing.
- Mid exam.
- Final Exam.

150407336 Building Finishing (3)
3 Credit hours, (2+3), Prerequisites: 150407233

Course Description

This course seeks to teach the students about building finishes and its related detailing. Major finishes of floors, roofs, walls and partitions by using modern materials in paintings, metal works. It contains the finishes of building services; kitchens, bathrooms, finishes for special functions, laboratories, auditoriums.

Course Learning Objective

1. The purpose of this course is to give the student a basic understanding of the design, materials, and methods of finishing systems used in the building construction industry. At the completion of the course the student will be able to:

2. Manage interior decoration projects profitably.

3. Deliver quality workmanship through proper supervision and co-ordination.

4. Describe the procedures related to finishing works and identify the finishing materials.

5. Learn about windows and doors and other interior finishing details in buildings.

6. Classify, describe, prepare and apply the materials and fasteners used in conventional and modern interior and exterior finish of structures such as: roofs, doors, windows, insulation, wall and ceilings, trim, stairs and railings, decks and fences, siding and floor coverings.

7. Locate building codes and explain how they relate to finish systems. Apply exterior and interior finish to parts of a structure according to applicable codes, specifications and acceptable industry standards and practices.

8. Develop basic knowledge and skills in construction estimating, supervision, fixtures and fittings, mechanical and electrical services in architectural projects, project management and construction scheduling.

Grading

Presentation for one major type of finishing (Definitions, historical background, Sequence of construction, mechanical components, types, advantages, accessories, construction place, Jordanian code, dimensions, technical drawings, and pictures…).

Drawing for full details of all major finishing types.
Creating models to understand the finishing layers.
Mid exam.
Final Exam.

Course Description

Course Learning Objective

At the end of this semester, student should be able to:

1. Understand the role buildings play on energy consumption and their impact on the environment.
2. Recognize the thermo dynamic principles of building.
3. Identify the main factors that affect human thermal comfort in the built environment.
4. Understand the green energy resources
5. Identify the main techniques to achieve energy efficient buildings.
6. Know the Jordan National Building Codes & Guides that promote conserving energy in buildings.

Grading

150407472 Desert Habitation
3 Credit hours, (3+0), Prerequisites: 150407463

Course Description

This course reviews and analyzes the ecological impact on architectural in a desert context. Traditional and vernacular design and construction influences should be reviewed at the architectural, environmental, landscape and urban planning levels. Understanding of the local and national needs is emphasized through the case studies and fieldwork.

Course Learning Objective

1. The course aims to increase students understanding of the impact of the environmental aspects on the building's design, thus equip the student with the knowledge needed to design environmental friendly buildings in the desert region. By the end of this course the students will:
2. Know the environmental characteristics of the desert region.
3. Understand the impact of the different environmental factors on the humans' thermal comfort.
4. Identify the impact of the desert environmental factors on the urban planning of the region.
5. Recognize the characteristics of the desert region's landscaping.
6. Be acquainted with the different design elements for the buildings at the desert regions.
7. Explore the passive cooling techniques.

Grading

Assignments and quizzes.
First exam.
Second exam.
Final exam (presentation + written exam).

Course Description
3 Credit hours, (1+6)), Prerequisites: Dep. Approval

This course seeks to teach the students the relation between the design of the architectural interior environment and human satisfaction and his perception to the space. Focusing on the compatibility between the different factors of the space such as color, style, texture, shade and shadow and selection of proper materials for roofs, floors and walls.

Course Learning Objective

1. The course aims to introduce the main principles of interior design to the students to enhance their design skills within interior spaces, and understand the impact of their design decisions of the interior spaces on the human comfort and perception of the interior spaces. By the end of this course the students will:
2. Understand the principles and elements of interior design
3. Know the human factors and social responsibility related to different interior spaces
4. Study the history of interior design
5. Realize the impact of colour and light on human perception of interior spaces
6. Identify the variety of finishing materials used in the interior spaces.
7. Design a variety of interior spaces applying the acquired knowledge.

Grading

Assignments.
Final exam.

150407241 History and Theory of Architecture (1)
3 Credit hours, (3+0), Prerequisites: 150407111

Course Description

This course seeks to teach the students the evolution of early architecture during prehistoric periods. Analysis of Ancient Architecture (Mesopotamian, Egyptian, Persian, Canaanite, Phoenician, and Hittite) in Ancient Middle East. Study of the civilizations and architecture of classical periods: Greek (preceded by Aegean), and Roman (precedent by Etruscan). Theoretical discussions upon the relevance and proper use of Ancient and Classical architecture in the design of buildings and sites today.

Course Learning Objective

At the end of this semester, student should be able to:

1. Understand the meaning of the Architectural History and it's relation to Architecture.
2. Deal with architectural history vocabulary. (Terminology).
3. Understanding of the historical periods to develop student's analytical skills, in order to understand architecture as physical response to human need at certain time and place. (Space- time theory)
4. Understanding of the influences of Orient; Mesopotamian and Egyptian Architecture on Western Architecture; Greek and Roman. (Transmission of style and technology).
5. Integrate architectural history with students approach to develop the students' knowledge of conservation sciences and architectural heritage.
6. The true value of this course to teaching history of architecture to be gauged by the way that students apply the knowledge gained to their own designs in studio.

Grading

First exam.
Second exam.
Participation.
Final Exam and project.

150407341 History and Theory of Architecture (2)
3 Credit hours, (3+0), Prerequisites: 150407241

Course Description

This course seeks to teach the students about the analytical study and development of the Religious architecture from the end of the Roman Empire through Early Christian and Byzantine periods. The Medieval period (Romanesque and Gothic) in Social, religious, historical and cultural contexts. Influences on the development of structure and space. Analytical study of the Renaissance period. Social, cultural, scientific and economic dimensions and influences on buildings and cityscapes. The study of Renaissance architecture as a Classical representation (Classical Revival). Ornate architecture of the Baroque and Rococo periods in Europe.

Course Learning Objective

1. The course aims to introduce a range of theoretical issues and approaches that has been developed throughout the history of architecture From the Early Christian ages through the middle Ages, the Renaissance and Neo Classicism ages.
2. To recognize stages and periods in the evolution of architecture from the Early Christian ages to the neoclassical ages.
3. To identify different architectural styles and their salient features in the above mentioned periods.
4. To recognize the structures and materials of architectural styles of the periods discussed.
5. To identify the development of these styles in response to social, political, cultural, and aesthetic changes.

Grading

First Exam.
Second Exam.
Final exam+ Project.

Course Description

This course seeks to teach the students about analysis of building techniques and the materials used in ancient building construction. Its origin and development and the factors that affected its development. The intention is to find out the sources of the materials and to consider what the ancient craftsmen used them for and why. This will include the study of the construction techniques used in prehistoric until the modern architecture. Field trips to a historic building are important in order to analyze the structural, architectural, and functional elements.

Course Learning Objective

1. At the end of this semester, student should be able to:
2. Deal with the techniques of setting together the fabric of ancient buildings.
3. Learn the factors affect the craft in its particular location, with certain materials and product requirements. (Gifts of Geology-Carving tools).
4. Examine the stone carving tools and techniques and to distinguish the main categories.
5. Determine and analyze the lifting techniques used to construct the ancient monumental buildings.
6. Understand the meaning of the Building Construction Techniques and it's relation to space organization.
7. Know the types of the ancient building materials and their properties.
8. Deal with ancient construction terminology and major construction stages.
9. Utilize the technical findings of this course in the erection of modern buildings.

10. Prepare students for the realities of working practice in architectural conservation and to formulate legal measures which ensure sustainable management of important sites (The true value of the course).

Grading

Mid. exam
Final Exam and project
field trip reports
homeworks
activities, and (Project/Paper).

150407465 Conservation of the Architectural Heritage
2 Credit hours, (2+0) Prerequisites: 150407421 or concurrent

Course Description

This course seeks to review the definition of the architectural heritage and the history of evolution for its conservation. It reviews the international efforts and organizations that are concerned about the protection of the architectural heritage on international and local level. It reviews the main principles in conservation projects.

Course Learning Objective

After successful completion of this course, students will be able to

1. Understand the definitions, terminology and concepts of architectural heritage conservation.

2. Understand architectural heritage by examining different categories of heritage values, and the contexts within which heritage exist, particularly in Jordan.

3. Master the process of documenting the architectural heritage using manual and digital techniques.

4. Explain the significance of the architectural heritage and the need to document, conserve, protect, and manage it.

Grading

Mid-term Exam.
Follow-up on your project.
Final Submission.

150407361 Landscape Design
2 Credit hours, (1+3), Prerequisites: 150407321

Course Description

This course seeks to teach the students about the relation between human beings and the environment around, and how they are integrated to each other. Study of the Jordanian environment and plants. The evolution of modern landscape. Design and planning of site with consideration to sites influences on the forms of buildings ordering systems, aspects of perception and spatial development are bases for project design.

Course Learning Objective

By the end of this course the students will be able to:

1. Identify and use landscape elements and principles to plan and design outdoor spaces using landscape graphics;
2. Approach landscape as part of a complex built and natural environment;
3. Understand, identify and evaluate the different dimensions of landscape in order to design a community-related, environment-based, sustainable landscape project. The dimensions of landscape are:

    - The morphological dimension;
    - The perceptual dimension;
    - The social dimension;
    - The visual dimension;
    - The functional dimension;
    - The temporal dimension.

Grading

Attendance and group work efficiency.
Project follow-up.
Final submission and exam.

150407444 Local Contemporary Architecture
3 Credit hours, (3+0), Prerequisites: 150407343

Course Description

This course seeks to teach the students about the evolution of architecture from the industrial revolution up to the present. Analysis covers the impact of political, social, economic, and cultural changes on architecture. Influences and ideologies of architectural schools and certain pioneers on architecture. Cultural, technical, and territorial transformations during the 19th and the first quarter of the 20th centuries.

Course Learning Objective

1. To develop the students' knowledge of the history and evolution of the contemporary architecture in Jordan.
2. Student are expected to be familiar of how the changes in worldview that have altered the course of Western Architecture as well as the works of international practitioners, theorists and themes influenced the course of evolution of local contemporary architecture.
3. To develop and refine the students' skills in critical thinking, reading, and discussion.
4. To develop the students' research skills and their ability to synthesis and synchronize ideas.
5. To develop the students' skills in visual analysis, oral and written communication.

Grading

First Exam:
Second Exam:
Paper/ Project:
Final Exam:

150407342 Islamic Architecture
3 Credit hours, (3+0), Prerequisites: 150407241

Course Description

This course seeks to teach the students about the development of Architecture in the Islamic world from the dawn of Islam till recently. Analysis of elements, methods and functions of Islamic architecture including contemporary development in various Islamic regions. Emphasis on recent experiments which intend to achieve the continuity of Islamic architecture.

Course Learning Objective

1. Understand the evolvement and development of Islamic architecture;.
2. Appreciate the importance of context (cultural, religious, environmental, economic, etc) in the evolution and development of Islamic architectural style.
3. Examine the influence of the context on architecture.
4. Gain an ability to analyze the development of architectural space and form, and effects of historical and geographical factors on it.
5. Gain knowledge of the special characteristics of the Islamic City.
6. Comprehend the effects of cultural context on the formation of architecture.
7. Elevate architecture from the physical level to a spiritual one through investigating the meanings behind the different forms; either in architecture or internal design of the buildings.
8. Critically analyze architecture, and to use the solutions that were established in historical buildings in their own designs.
9. To develop the students' research skills and their ability to synthesis and synchronize ideas.

Grading

First Exam:
Second Exam:
Paper/ Project:
Final Exam:

Course Description

This course seeks to provide the students about basic theories, principles and skills involved in planning the physical environment. Its main objective is to provide students with a basic understanding of physical planning, its concepts and its impacts on the socio-economic issues of people. The course is partly theoretical and partly taught in a studio format in which the students learn by undertaking real or applied problems.

Course Learning Objective

1. To understand what is planning, the difference between planning and non planning, and the central questions of planning.
2. Understand the different types of planning, the authority and expertise, the planning scope and limits.
3. To understand the history of urban planning by studying the evolution of the city and the process of urbanization.
4. Comprehend the planning process, tools of planning and the different fields of planning.
5. To understand what is urban design and the different elements, theories and principles related to it.
6. Develop a comprehensive overview of the discipline that started with the user and included the current trends.
7. Apply the urban planning and design theories, roles, concepts, and models to create a physical design.
8. To develop and refine the students' skills in critical thinking, reading, and discussion.
9. To develop the students' research skills and their ability to synthesis and synchronize ideas.
10. Develop the students' skills in visual analysis, oral and written communication.

Grading

First Exam:
Second Exam:
Paper/ Project:
Final Exam:

150407361 Housing
2 Credit hours, (2+0), Prerequisites

Course Description

Housing is a fundamental aspect of human life. It is a key factor in delivering healthy and attractive communities as it serves to define the life space of individuals. Without appropriate shelter, people cannot meet their basic needs and participate adequately in society.

This course intends to introduce the subject of housing in a holistic view that provides architectural students with the basic knowledge they might need about the subject. It investigates the various concepts, theories and practices related to housing and residential use to help students comprehend this vital field of architectural research and practice.

Course Learning Objective

1. To understand the concept of Housing from different perspectives and point of views, particularly architectural.
2. To understand the different housing typologies.
3. To recognise different housing aspects related to design, behaviour, socio-cultural, planning, and environment.
4. Comprehend alternative housing theories, as well as principles of residential layout.
5. Develop a comprehensive overview of the housing discipline.
6. To develop and refine the students' skills in critical thinking, reading, and discussion.
7. To develop the students' research skills and their ability to synthesis and synchronize ideas.

Grading

Midterm Exam.
Project.
Quizzes, and exercises.
Final Exam.

Visual Perception of Architectural Form 0407442
3 Credit hours, (3+0) , Prerequisites: Dep. Approval

Course Description

The course covers human perception of form (2-dimensional and 3-dimensional) Focuses on visual Perception of architectural form including objects, spaces and surfaces. It also includes sensory, format and symbolic aspects of architectural form.

Course Learning Objective

1. To develop the students' knowledge of the basics of visual perception and the different theories that explain it.

2. Student are expected to become familiar of issues related to perceptual organization and principles of visual thinking and capable of applying this type of knowledge in the field of architecture.

3. To develop and refine the students' skills in critical thinking, reading, and discussion.

4. To develop the students' research skills and their ability to synthesis and synchronize ideas.

5. To develop the students' skills in visual analysis, oral and written communication.

Grading

First exam.
Second exam.
Paper / Project + Participation.
Final exam.

110401369 Surveying and Building Documentation
3 Credit hours, (1+6), prerequisite 150407112

Course Description

This course seeks to teach the students about the basic concepts of surveying and architectural documentation and their different methods and techniques. Presenting the different archiving systems according the existing international standards. Explaining the role of new technologies in surveying and documentation, through introducing the development and evolution of the different surveying and architectural documentation methods and techniques. Through a series of exercises, the students will be able to perform practical applications using surveying and documentation instruments, methods and techniques and field studies. This also includes the process of preparing the different architectural and engineering documentation drawings.

Course Learning Objective

By the end of this course the student must be able to:

1. Use modern surveying instruments and collect field notes;
2. Classify errors in surveying measurements based on their sources. Determine their magnitude and apply procedures for balancing the measurements;
3. Design and execute the course of leveling and determine the correct elevations of intermediate points;
4. Design the course of a traverse, calculate the bearings and azimuths of the sides and calculate the adjusted coordinates of the stations.

Grading

Mid Term Exam.
Report.
Final Exam.

150401313 Reinforced Concrete and Steel Structures for Architectural Student

3 Credit hours, (3+0) , Prerequisites: 150407335 & 150401313

Course Description

Design of reinforced concrete members subjected to moment, shear, and axial forces. Design of continuous beams, and one-way slabs. Short columns, single and wall footings, Load cases, analysis and design of tension and compression steel members**.**

Course Learning Objective

By the end of this course, students will be able to:

1. Analyze and design reinforced concrete beams, columns and slabs for flexure, shear and axial load in accordance with the provisions of ACI 318.
2. Analysis and design of single footings.
3. Analysis and design of tension and compression steel members.

Grading

First Exam.
Second Exam.
Final Exam.
Other.

150401214 Engineering Mechanics
3 Credit hours, (3+0) , Prerequisites: 150102101 & 150108101

Course Description

Vectors, force systems 2D, equilibrium of particles and rigid bodies , structures (trusses and frames), distributed forces (centroids and centers of mass), internal forces , stresses, strains, bars with axial loads, shafts in torsion.

Course Learning Objective

Structural Mechanics is a foundational course in engineering mechanics and involves the application of mathematical and physical principles to solve engineering problems. The primary objectives of the course are to

1. Develop a basic understanding of forces and the effects they produce on particles and rigid bodies that are at rest.

2. Evaluate and satisfy conditions of static equilibrium. Course topics include vectors, forces, moments, free-body diagrams, equilibrium, simple structures (trusses/frames), distributed forces, beams (internal forces), centroids and centers of gravity, and moments of inertia, determine the stresses, strains, and displacements in structures and components due to the loads acting on them. An understanding of these topics is essential for the safe design of all types of structures such as: buildings, bridges, electric-power transmission towers, cables, machines, airplanes, ships, trains, chains, etc.

Grading

First Exam.
Second Exam.
Final Exam.

150401313 Structural Analysis for Architectural students
3 Credit hours, (3+0) , Prerequisites: 150401214

Course Description

Structural forms, types of supports and determinacy, reactions, determinate structures, plane trusses, shear and moment diagrams for beams and frames, deflections.

Course Learning Objective

1. Understand basic structural engineering concepts.
2. Determine magnitude of different types of loads in accordance to the related codes.
3. Idealization of structures and loads in relation with real structures.
4. Determine forces in truss structures using various methods.
5. Determine the internal forces for beams, frames and arches.
6. Formulate the related equations and draw the shear force and bending moment diagrams for beams and frames.
7. Determine deflection using moment area theorems and conjugate beams.
8. Analysis of slab.

Grading

First Exam.
Second Exam.
Final Exam.
Other.

150407471 Lighting and Acoustics
3 Credit hours, (2+3) Prerequisites: 150407322

Course Description

The course concentrates on the physical characteristics of sound waves, propagation of sound, intensity, sound power units and measurement equipment's, standing wave, reverberation time, sound absorption materials, speech privacy, noise and vibration, applications in architecture. The lighting part concentrates on effect of light on architecture, color and light, the functional requirements of lighting, measurements and calculation of day lighting and artificial lighting, lighting sources and energy conservation, and application in architectural.

150407471 Graduation Project Report
2 Credit hours, (1+3) Prerequisites: 150407422, 150407343, 150407423, student should successfully finish 130 hours at least

Course Description

This course seeks to stimulate the students towards various practical approaches in choosing project topics. Orientation of student to adapt and conduct a total methodology in programming project requirements, goals and objectives, the analysis and synthesis aesthetics, and the continuous evaluation of various factors of aesthetics form, philosophy of project, upgrading of students ability of technical writing.

150407523 Graduation Project Design
6 Credit hours, (0+18) Prerequisites: 150407522

Course Description

This course seeks to teach the students about the presentation of final Design sheets and requirements for graduation project. The adaptation and development of design concept the final development in coordination with student supervisor, and submission the course includes various stages with Jury evaluation format, the project require concentration on architectural, structural, and environmental integrated solutions. Presentation of complete set of projects drawings including three-dimensional presentation and model building.

Course Learning Objectives

1. To develop the students' intellectual skills of integrating knowledge acquired through the different previous courses to inform the different phases of the design.

2. To develop the students' skills in representing their design ideas in a professional design project.

Grading

Phase One.
Phase Two.
Phase Three.
Phase Four.

150407423 Working Drawings
3 Credit hours, (0+6), Prerequisites: 150407336

Course Description

This course seeks to teach the students about the production of complete set of working drawings sheets in order to expose students to actual and practical projects, and facilitates understanding of architectural details by contractors during the construction stage. Individual and group works experience will be enhanced through some projects on studio.

Course Learning Objective

The purpose of this course is to give the student a basic understanding of the working drawing. By the end of this course the student will be able to:

1. Produce architectural working drawings for obtaining construction permits.
2. Prepare complete set of architectural drawings manually and by using the Auto CAD.
3. Know the standards for working drawings.
4. Draw the architectural details for the different components of the projects.
5. Know the different layers of the working drawings.

Grading

Draw complete set of working drawing for 2 different projects (cover page, titles, contents, site plan, areas, deck slope, ground floor plan, second floor plan, furniture plans, 4 elevations, 2 sections, axis columns layout, staircase details, 2 wall sections details, and schedules).

150407345 Theory and Methods of Architectural Design
1 Credit hour, Prerequisites: 150407321 or concurrent

Course Description

Architecture is a thoughtful art that involves knowledge of space and form. It has a complex theoretical framework. This theoretical framework is based on the ideology of the architect, often differing from one architect to another. Design theory continually changes as ideas evolve and respond to previous architectural movements and the rest of the world.

Architects often employ design methods to help them find more creative forms. These methods make it possible to break free of the traditional forms and established paradigms. At the same time it is necessary to allow for a functional and systematic design concept to take shape. This course focuses in depth on the design theories and methods that have decisively shaped current architectural practice.

Course Learning Objective

1. Provide students with necessary knowledge and understanding of design theory at various levels and present architectural design methods.
2. Provide a brief introduction to design theories and methods, and illustrate how design theory is applied.
3. Describe how the students use different types of design methods to create unique outcomes in the architectural design process.
4. Describe how the students develop and apply conceptual tools to assist in the design process (idea generation techniques).
5. Define New architectural design terminology.
6. Introduce the most recent forms of architectural styles and theories like modernism, structuralism, post-modernism, de-constructivism structuralism and phenomenology as philosophical directions influencing architecture.

Grading

First exam.
Poster presentation.
Second exam.
Final exam.

150407552 Quantity Surveying
2 Credit hour (2,0), Prerequisites: 150407451 or concurrent

Course Description

Course Learning Objective

At the end of this course, the student will

1. understand the principles of cost estimating; the quantity Take off and how to determine the quantity of materials needed to complete a construction project; and how to put costs to the estimate.
2. Understand the role and the importance of estimating to the performance of General Contractors and Construction Managers.
3. Demonstrate an understanding of the professional requirements of a good estimator.
4. Be able to understand how the overall construction budget is generated;
5. Demonstrate an understanding of an appropriate estimating technique. Several techniques will be discussed in class will be:
6. Estimate volume of cut and fill necessary to reach proper elevation.
7. Determine the volume of soil that must be excavated.
8. Determine quantities of other materials used in foundation systems (leveling and compacting, polythene sheets under PCC footings, PCC footings, RCC footings), Neck of columns, RCC tie-beams and beams, Isolation Underground work, Backfilling, RCC Flooring, Rcc columns, RCC slabs, Masonry works, Building Finishing works.
9. Understand and practice how to tap into the power of computer spreadsheets and how the spreadsheets can be used to automate estimating functions.

Grading

Quantity surveying for 2 real projects.
Mid Exam.
Final exam.

150407451 Specification and Contracts
2 Credit hours, (2+0) Prerequisites: 110402450

Course Description

This course seeks to teach the students about legal status of building contracts among other building construction documents such as construction drawings, specifications and quantities tables, focus of relations between clients and contractors and engineer and responsibilities of each. Study working and labor laws and related governmental and private institutes.

Course Learning Objective

At the completion of this course, the student will:

1. Understand legal elements of a construction contract; describe the relationships between the owner, contractor, and architect, as well as their roles, duties, and responsibilities.
2. Define and describe the various types of contracts and specification methods.
3. Understand the purpose of specifications, their role and need.
4. Outline the principles of specification writing, write simple specification, and explain the use of computerized specifications.
5. List the 16 major construction divisions and write their general specifications.
6. Outline the contents and relationship between the documents, which make up the Construction Documents.
7. Understand the contract terminology.
8. Understand the rights and responsibilities for each contract party.
9. Study how to recognize the possibilities of construction disputes.
10. Understand potential possibilities of construction disputes and how to resolve them according to the contract.
11. Demonstrate the ability to review and make construction contracts and specifications.

12. Learn contract administration such as claims and disputes, change orders and progress payments.
13. Understand how to administrate the contract.

Grading

Report about writing full specification for 2 major construction finishing.

First Exam.
Second exam.
Final Exam.

B)

Elaboration of a Degree Profile and Program: Mohammed 1st University

NB: Preparation of such a degree profile and program was based on the national teaching program of the architecture school of Casablanca for the academic year 2014-2015, since there is no degree program of architecture at Mohammed 1st University (UMP).

1. Elaboration of a Degree Profile

1.1. *General Description*

Architects conceptualize, plan and develop designs for the construction and renovation of commercial, institutional and residential buildings. The studies will be based on the studio for design work, tutorials and critiques. The student will attend lectures and computer aided design tutorials, has essays to write, site visits to go on and visits to buildings and places of interest and work on an internships.

The candidates have to follow training course (traineeship 3 × 1 month) that exposes them to architect work. These traineeships provide opportunities for hands-on building projects; others offer specialist areas of study or have developed strengths in particular disciplines such as: sustainability, town planning, technology, or management. Skills in problem solving and team working are also developed through internship program.

In order to receive the "Diploma of architecture" the candidate must prepare a final project during one year. Then, He must present his project to a jury composed of architect experts and lecturers.

Vision

The program intends to provide training in professions linked to architecture and urban planning at the national and international level.

Missions

- Training of architect.
- Research and development.
- Expertise and advice.
- Cultural and scientific exchange.
- Continues training and profession resources.

General Objectives

- Providing effective teaching with respect to national training curricula of architecture.
- Disseminating knowledge and promote quality architectural and urban production.
- Providing continuous training.

The training in architecture is characterised by the teaching of the theory of architectural and urban projects practices. The main objective of this course is to train architects capable of exerting diverse professional practices and ready to fulfill new missions in order to meet sociological and ecological complexities of the world around them.

1.2. *Learning outcomes set out in the Curriculum*

The student graduated from the school of architecture must:

- Have conceptual ability and creative potential.
- Be innovative and aware of technological knowledge and skills.
- Be able to analyse and capable of mastering contextual elements.
- Be operational, competitive and show management skills of the profession.
- Have critical faculties and abilities (skills) in providing appropriate solutions.
- Be equipped with communication skills to interact with multidisciplinary teams.
- Internalize the rules of ethics and professional practice. (Internalize ethical and deontology rules needed for his professional practice.)

1.3. *The diagram of the study process*

Architecture is a wide ranging discipline based upon a large body of design, technical, cultural, and professional knowledge, in which candidates develop a high level of skill. Learning to master the architectural process, through successive projects, is a lengthy process. The route to qualifying as an architect in Morocco is a combination of academic studies at a university and practical experience. It involves five year university training and a minimum of one year experience before final qualification. This includes three parts of study.

This proposed degree profile is to be a base for a B.A. degree and Master degree of architecture and it comes in 12 semesters: 3 years + 2 years +1 year. It is designed to prepare students for careers in architecture.

Part 1 (Cycle 1): The first part of three year undergraduate degree enables the student to acquire the fundamental theory of architectural practices and to develop a broad range of

skills and architectural understanding. The candidate also gains further qualifications in specialized related fields such as planning, urban design, or conservation.

Part 2 (Cycle 2): + 2 year University degree: Master Degree of Architecture

These two full-time years enhance architectural knowledge and project complexity. There will be opportunities for students to carry out specialist study and research, possibly abroad.

These two parts lead the final year work by covering a range of skills and themes.

Part 3: The final qualifying examination in professional practice and management will be obtained following 12 months of practical experience in which the student has to present a personal work (final project).

The candidate begins the final year by exploring architectural ideas in a real world. This year allows the student to synthesize and apply knowledge gained throughout the last five years, to develop his personal areas of interest, to prepare his professional live and to cultivate potential ideas and research which aims to enable him to position himself relative to the wider culture and debates at an advanced level in the discipline of architecture. The candidates will be assessed on the following elements: 12 months of practical experience, Professional C.V. and career evaluation, Case study and final oral examination.

Having gained the parts 1, 2 and 3 qualifications the graduate will have the ability to practice liberal profession of architecture and He can register as an architect with the Architects Registration Board (Conseil de l'Ordre des Architects: COA).

1.4. *Occupations and the potential fields / sectors for employment of graduates*

The architect tasks are multiple; it goes from the design and construction of buildings to assistance in project management and interventions in the city and the territory. He must master the

representation in space, be able to design an architectural project and to carry out its implementation.

Demand for architectural services

Depending on the task, an architect will work with engineers, landscapers, town planners, economists, sociologists and artists.

The architects remain predominantly liberal and a group of professional societies is becoming increasingly frequent. He can be contracted by small firms, by individuals, business leaders, institutional owners such as insurance companies as well as by real estate professionals and housing associations.

The architect could also work in the public sector as an employee for the State or local authorities, or working as a private employee for architectural offices, urban planning, interior architecture, design, engineering design offices, building firms and public works and development companies.

In the construction industry, we have to keep in mind that demand for architects depends largely on the trends that affect this field and the demand for architectural services. We believe that over the next few years, the economic growth is expected to boost employment in most construction sectors. Employment in this industry is expected to increase during the period (2015-2020).

The main reason for this growth in demand for architectural services will be the expansion in the range of services provided by architects, such as urban design, preliminary studies, management and project co-ordination consulting, feasibility studies and facilities planning. Consequently, architects have assumed an increasingly important role in understanding the impact of the environment on individuals, the improvement of building performance and the design of special environments.

2. Elaboration of a Program

2.1. *Description of the courses/units (plan of studies), length*

According to Moroccan Higher Educational System for Architecture, this will be a 6-year program of 50 modules.

The first cycle of three years (cycle Licence: Semesters S1 to S6)

The courses allow the acquisition of:

- Fundamental knowledge of cultural, scientific and technical architectural, work the awakening of the sense of observation and creativity.
- Major concepts and methods of spatial analysis.
- Project design process at different situations level, uses, techniques and temporality.

The second cycle (Master: semesters S7 to S10)

Students will develop a high level of skill. This prepares students to make sound professional judgements in difficult, often pressurised situations. The candidate turns knowledge into ability. The student will be confronted to critical thinking related to design of architectural and urban project. He will deepen technical, managerial and scientific knowledge and master of methods and knowledge required for the practice of project. Therefore, the student will be prepared for different modes of the professional practices.

The graduation year (semesters S11 to S12)

To obtain the qualification of architect, the student has to follow one extra year in which he has to present a personal work (final project). As consequence the graduate will have the ability to practice liberal profession of architect.

This final year is dedicated to exploring architectural ideas in a real world. This year allows the student to synthesize and apply knowledge gained throughout the previous five years of study to come up with a solution to a specified architectural problem, to develop his personal areas of interest, to prepare his professional life and to cultivate potential ideas and research which aims to enable him to position himself relative to the wider culture and debates at an advanced level in the discipline of architecture.

University curricula

The architecture curricula spread over six academic years, two cycles of 5 years and one extra year for graduation. The academic year is composed of two semesters running from mid September to mid January and February to late June and the courses are organised in Modules. Depending on the year, the week includes around 24 hours of teaching. The number of hours during the semester varies from 300 to 400 hours (**30-35 credits**), depending on semesters and the nature of the module.

- 2,600 hours for part 1 (+2 months of placement)
- 1,400 hours for the Master degree (+1 month of placement).
- 360 Hours of mentoring of coaching for the final project.

NB: The number of Specific or generic Competence correspond to the number given in the Meta-profile (please see references below)

Courses	Teach. hours	Learning Outcomes	Sem.	Specific Competence	Generic Competence
Core Cluster: **Design Abilities**					
Architectural and urban project Workshop	224	Spatial analysis	S1, 2	9	14
	112	Design approaches (form-structure-function)	S3	15	
	112	Architectural project initiation (Small public facility)	S4	2	
	112	Urban public project (civility- territoriality)	S5	22	
	112	Project of the first cycle: collective housing	S6	2	
	112	Project in the metropolitan area	S7	22	
	112	Social housing Project	S8	2, 17	
	112	Workshop: architecture, city and territory	S9, 10	22, 326	
	224	Specialized studio space: urban building, eco-construction, construction and new technology, city, territory and landscapes	S7, 8, 9, 10	2, 15, 22, 3, 17, 26	

Courses	Teach. hours	Learning Outcomes	Sem.	Specific Competence	Generic Competence
Arts and plastic expressions	112	Observation and drawing	S1, 2	6, 3, 22, 9	14
	56	Shapes, light and colour effects	S3	10, 9, 15	14
	56	Abstraction-stylisation	S4	9	
	56	plastic experimentation	S5	15	14
	56	Techniques for rendering	S6	9	
	56	Public art and city	S7	2, 22, 3,	17
	56	Urban design workshop	S8	2, 22, 10	
Graphic representations and technology	28	Perspective/descriptive	S1	9	
	28	The basic graphical representation	S2	9, 3, 26	
	28	Technical details of construction	S3	9, 3, 26	
	28	project Representation	S4	9, 3, 26	14
Science and computer graphics	28	Initiation to digital environment	S1	11, 9	
	28	Photography studio and image processing technology	S2	11	14
	168	Specialized programs (Computer-aided drafting (CAD), synthetic images, modelling and virtual architecture and video animation)	S3, 4, 5, 6, 7, 8	11, 2, 3	25
Urbanism and sciences of the city	28	Urban governance	S6	1	
	28	Problems of the contemporary city: metropolisation	S7	5	
	28	Urban planning : processes and components	S8	5, 14	

Courses	Teach. hours	Learning Outcomes	Sem.	Specific Competence	Generic Competence
Communication skill technologies (French as teaching language)	28	Various forms of communication and public speaking	S1	11 (13)	2
	28	Oral presentation techniques and audiovisual	S2	11 (13)	2
	28	Communication and group dynamic	S3	11 (13)	25
	28	Writing workshop	S4	3 (13)	2
Internship program		**Please see** Professional Practice and Work Ethics			

Courses	Level	Learning Outcomes	Sem.	Specific Competence	Generic Competence
Core Cluster: **Construction and Technological Abilities**					
Materials science	28	Static	S1	16, 24	
	28	Mechanics of materials	S1	16	
	28	Knowledge of construction materials	S2	16	
	28	Soil mechanics / introduction to reinforced concrete	S2	16, 19, 24	
Structures and building technologies	56	Structures	S3, 4	16	
	56	General construction process	S3, S4	16	

Courses	Level	Learning Outcomes	Sem.	Specific Competence	Generic Competence
Sciences of comfort and ambiance	28	Thermal/acoustics insulation	S5	19	
	28	Lighting and sunlight	S5	23, 16	
	28	Building envelope systems	S6	23	
	28	Construction and sustainable development	S6	23	
Internship program		**Please see** Professional Practice and Work Ethics			
Core Cluster: **Theoretical Background and Socio-cultural values**					
Architectural Doctrines and theory	28	Visual learning	S1	1	4
	28	Architectural vocabulary	S2	4	
	28	Modern architectural concepts	S3	8, 7, 12	4
	28	Contemporary architecture problematic	S4	8, 7, 12	4
	28	Urban typo-morphology	S5	1, 4	4
	28	Introduction to landscape	S6	1, 4	4
History of art and architecture	28	Medieval age (Romanesque and Gothic architecture)	S3	4, 7,	4, 21
	28	Renaissance and Baroque	S4	4, 7	4, 21
	28	18th and 19th centuries	S5	4, 7	4, 21
	28	Modern and contemporary art (20th century)	S6	5, 8, 7, 12,	4, 21
	28	From prehistory to antiquity	S1	4, 8	4, 21
	28	Art and architecture : Byzantine, Islamic and Maghreb periods	S2	4, 7	4, 21
	56	Philosophy and architecture	S5, 6	1, 7,	4, 21

Courses	Level	Learning Outcomes	Sem.	Specific Competence	Generic Competence
Human and social sciences	28	Urban sociology	S1	1, 5, 14	4
	28	The Anthropology of Space	S2	1, 5, 14	4
	28	Urban geography	S3		
	28	Urban economy	S4	12	
	28	Cities history and urban doctrines	S5	1, 4, 8	21
Core Cluster: **Professional Practice and Work Ethics**					
Standards, public regulation and construction sites	28	Construct with steel	S7	19, 16, 24	20, 10
	28	Special structures	S7	19	
	28	Technical specifications, standards and regulation	S8	19.21	20, 1018, 19, 24
	28	Project management / quality management	S8	19.21	
Architectural Practice and Deontological ethics	28	Practical aspect of architecture and Project direction of architectural projects	S9	20	10, 20, 11, 18
	28	Deontology, responsibility and ethics	S6	6	11, 20, 19

Courses	Level	Learning Outcomes	Sem.	Specific Competence	Generic Competence
Internship program		Completing some work experience or an industrial placement will help to develop an understanding of architectural practices. As well as generating contacts, it will build confidence in the candidate as well as his skills. It will also demonstrate to potential employers that the trainee is highly qualified, reliable and motivated. This practical experience is monitored by professors from the University, and an employment mentor from their practice. The student gains experience either under the supervision of an architect, or another qualified construction industry professional.			
	1 month	Worker internship: building site, company and factory	S4	All	All
	1 month	Practical internship 1 : in a private architectural company	S6	All	All
	1 month	Practical internship 1 : in a planning establishment	S 10	All	All
Final project: graduating academic project	360	Practical experience – minimum of 12 month experience in total is required to sit the final examination. The work should be undertaken in real word, under the direct supervision of an architect.	S11, 12	All	All
Seminars	112	4 Seminars (1 : professional practices, 2 : heritage, 3 : methodology)	S9, 10		

Courses	Level	Learning Outcomes	Sem.	Specific Competence	Generic Competence
Core Cluster: **Personal Characteristics**					
English as a second foreign language	84	General English course	S1, 2, 3	13	
	84	Business English Skills; English for architects; Oral communication,	S4, 5, 6	13	
	56	Preparation to English TOEFL	S7, 8	13	
Communication skill technologies (French as teaching language)	28	Various forms of communication and public speaking	S1	13	
	28	Oral presentation technologies and audiovisual	S2	13	
	28	Communication and group dynamic	S3	13	
	28	Writing workshop	S4	13	
Seminars	112	4 Seminars (1 : professional practices, 2 : heritage, 3 : methodology)	S9, 10	13	7
Internship program		**Please see** Professional Practice and Work Ethics			

References

1. High school of architecture – Casablanca: teaching program of 2014 - 2015.
2. ARCHITECTURE - META-PROFILE

Meta-profile	Specific competencies	Generic competencies
Design Abilities		
Ability to design buildings, sites, and/or urban development projects in a sustainable manner (socially, culturally, economically, environmentally)	2. Ability to design buildings and/or urban development projects that blend with the surrounding environment and fully satisfy local human, social...	
	15. Capacity to design projects assuring environmental, social, cultural and economic sustainability.	
	22. Ability to develop site plans and landscape designs.	
	25. Awareness of the importance of client's role in the design process.	
Ability to think, perceive and conceive spaces three dimensionally and communicate verbally, in writing, graphically, and/or volumatrically.	9. Ability to think, perceive and conceive spaces three dimensionally in different scales.	2. Communicate orally and in writing with different audiences
	11. Mastery of the media and tools used for communicating verbally, in writing and/or volumetrical...	25. Skills in the use of information and communication technologies

Meta-profile	Specific competencies	Generic competencies
Skill in formulating creative and innovative ideas and transforming them into architectural creations and urban planning.	3. Skill in formulating creative and innovative ideas and transforming them into architectural creations and urban planning.	14. Be innovative and creative
	10. Skill in reconciling all the factors involved in architectural design and urban development.	
Ability to design buildings to accommodate individuals with varying physical abilities.	17. Ability to design buildings to accommodate individuals with varying physical abilities.	
Ability to analyze and incorporate relevant precedents into architectural design projects.	26. Ability to analyze and incorporate relevant precedents into architectural design projects.	17. Search for information from a variety a sources
Construction and Technological Abilities		
Ability to conceive and integrate structural, construction, renewable energy systems, and environmental and installation systems to architectural designs.	16. Ability to conceive and integrate structural, construction, environmental and installation systems to architectural designs.	
	23. Understanding the importance of, and ability to incorporate new and renewable energy sources in building design.	
Capacity to produce comprehensive construction documents.	19. Capacity to produce comprehensive construction documents.	

Meta-profile	Specific competencies	Generic competencies
Awareness of methods of execution practiced in architectural projects.	21. Awareness of methods of execution practiced in architectural projects.	
Understanding of the basic principles and appropriate application of construction materials including local ones.	24. Understanding of the basic principles and appropriate application of construction materials including local ones.	
Theoretical Background and Socio-Cultural Values		
Appreciation of the social and cultural role of Architecture.	1. Appreciation of the social and cultural role of Architecture.	
Knowledge of history and theory of Architecture and related human sciences and engineering.	4. Knowledge of history and theory of Architecture and related human sciences and engineering.	
Awareness of current architectural ideas and practices at local and global levels.	5. Awareness of current architectural ideas and practices at local and global levels.	
	8. Awareness of the continuous changes of architectural ideas and practices.	
Ability to conduct investigation and research in the process of architectural inovation.	7. Awareness that investigation and research are essential components of architectural creations.	12. Apply knowledge in practical situations
Have critical thinking, analysis and synthesis		4. Have critical thinking, analysis and synthesis
		5. Identify and resolve problems
		6. Make logical decisions

Meta-profile	Specific competencies	Generic competencies
Ability to evaluate, enhance and preserve architectural and urban local heritage and recognize the importance of its relation with current architectural developments.	12. Ability to evaluate, enhance and preserve architectural and urban local heritage and recognize the importance of its relation with current architectural developments.	21. The preservation of cultural heritage and values
Knowledge of aesthetics and arts, and understanding their role as key factors in the quality of architectural thinking and design.	14. Knowledge of aesthetics and arts, and understanding their role as key factors in the quality of architectural thinking and design.	
Professional Practice and Work Ethics		
Act ethically pertaining issues related to architectural design and practice.	6. Understanding of the ethical issues involved in architectural design and practice.	11. Act ethically with social responsibility
Knowledge and ability to apply legal framework, safety regulations and technical codes controlling activities of the profession.	18. Knowledge and ability to apply legal framework, safety regulations and technical codes controlling activities of the profession.	20. Health and safety procedures
Capacity for planning, programming, budgeting and managing architectural projects.	20. Capacity for planning, programming, budgeting and managing architectural projects.	
Maintain quality of work		10. Maintain quality of work
The protection and preservation of the environment		18. The protection and preservation of the environment

Meta-profile	Specific competencies	Generic competencies
Respect for diversity and multiculturalism		19. Human rights
		24. Respect for diversity and multiculturalism
Maintain continuous education		3. Maintain continuous education
Personal Characteristics		
Ability to work within, or lead constructively interdisciplinary teams.	13. Ability to work within, or lead constructively interdisciplinary teams.	7. Work in an interdisciplinary team
		8. Lead effectively
		16. Empower others
Communicate in a second language	13. Communicate in a second language	
Demonstrate organizational skills		22. Demonstrate organizational skills
		1. Manage time effectively
		15. Be flexible and adapt to different situations.
Possess a high level of interpersonal skills		9. Work autonomously
		23. Have a sense of dedication
		26. Can take initiatives
		27. Self-motivated
		28. Assertive

C)

The Architectural Engineering Program at IUST Revisited: A Proposal for Improvement Based on Tuning META-Profile

Because the Architectural Engineering Program is relatively newly established (started in 2005), the University feels that it is adequate to revisit it and look into modifications and developments to make it more in tune with present day needs and aspirations of the Syrian society. Development of a new program is not seen as a possible option at the moment. Thus, it was decided to work with the existing curriculum in accordance with the following steps:

1. Evaluation of the existing curriculum:
    a) IUST Architectural Program and META-Profile.
    b) Evaluation of the Architectural Engineering Program by Architectural SAG of Tuning META.
    c) IUST Architectural Program Faculty Assessment.
2. Developing a new degree profile:
    a) Establishing directions for the Program.
    b) A Degree Profile for IUST's Architectural Engineering Program.

c) A vision for the Architectural Engineering Program.

d) A mission for the Architectural Engineering Program.

e) Development of new set of Program's objectives.

3. Modification of the existing curriculum to accommodate necessary changes:

a) Gaining credit hours.

b) Competencies to be emphasized.

c) Identification of appropriate courses for each competency.

d) The new curriculum.

e) Examples of courses' learning outcomes.

1. Evaluation of the existing curriculum

In order to develop the existing architectural program at the International University for Science and Technology in Syria, it was first evaluated in three ways: the Program was evaluated in terms of its compatibility with the META-Profile; it was also evaluated by the members of the Architectural Subject Area Group based on the individual experience of each member; and finally, the faculty of the Program conducted an assessment for it.

1.1. *IUST Architectural Program and META-Profile*

The Program at IUST was evaluated based on the META-Profile developed by the Architectural Subject Area Group. Table 1 shows the existing curriculum as distributed through ten semesters. Courses were marked individually in terms of the competencies which they offer. Based on Table 1, the curriculum was evaluated in Table 2 where courses which were seen of no support to the competencies of the META-Profile were marked in red, competencies which were found not clearly addressed were marked in yellow, and those which were not well addressed in

orange (shown here in lighter tones while competences which were met in darker tone). The evaluation showed the following points:[8]

In connection with the objectives of the Architectural Engineering Program at IUST:

1. Current objectives of the Program are **all addressed** in the META-Profile.
2. Objectives of the Program **does not seem to address** the following points stated in the META-Profile: varying physical abilities of users, production of construction documents, local heritage, ethics, programming and management of projects, quality of work, respect of diversity, teamwork, and knowledge of second language.
3. Objectives of the Program **needs to clarify** the following points to become more in tune with the META-Profile: incorporating architectural precedents, integration of engineering systems to architectural design, understanding of construction materials, social and cultural role of architecture, history and theory of architecture, critical thinking, and legal framework of the profession.

In connection with the courses of the Architectural Engineering Program at IUST:

A good number of them fulfill the META-Profile competencies.

Nevertheless, the following competencies are **not addressed** in courses:

- Ability to analyze and incorporate relevant precedents into architectural design projects (design comp. 5).
- Act ethically pertaining issues related to architectural design and practice (professional comp. 1).
- Knowledge and ability to apply legal framework, safety regulations and technical codes controlling activities of the profession (professional comp. 2).

[8] "Tuning Middle East and North Africa," Third General Meeting, Nicosia, 15-19 February, 2015, pp. 61-67.

- Ability to work within, or lead constructively interdisciplinary teams (personal comp. 1).
- Demonstrate organizational skills (personal comp. 3).

The following competencies are **not well addressed:**

k) Awareness of current architectural ideas and practices at local and global levels (theory comp. 3).

l) Ability to conduct investigation and research in the process of architectural innovation (theory comp. 4).

m) Have critical thinking, analysis and synthesis (theory comp. 5).

n) Ability to evaluate, enhance and preserve architectural and urban local heritage and recognize the importance of its relation with current architectural developments (theory comp. 6).

o) Ability to think, perceive and conceive spaces three dimensionally and communicate verbally, in writing, graphically, and/or volumetrically (design comp. 2).

p) Capacity for planning, programming, budgeting and managing architectural projects (professional comp. 3).

q) The protection and preservation of the environment (professional comp. 5).

r) Respect for diversity and multiculturalism (professional 6).

s) Maintain continuous education (professional comp. 7).

t) Communicate in a second language (personal comp. 2).

In conclusion, Competencies related to DESIGN ABILITIES as well as CONSTRUCTION AND TECHNOLOGICAL ABILITIES are all almost well covered in the Program's courses.

Competencies of THEORETICAL BACKGROUND AND SOCIO-CULTURAL VALUES, PROFESSIONAL PRACTICE AND WORK ETHICS, and PERSONAL CHARACTERISTICS are either not introduced or not sufficiently addressed in the Program's courses.

It is to be stated that the Program has a strong structural component that the META-Profile does not emphasize as much.

Table 1

IUST Architectural Program curriculum with META-Profile competencies related to individual courses

	Course Title	cr	Design Abilities					Theory							Construction				Professional Practice							Per. Charac.			
			1	2	3	4	5	1	2	3	4	5	6	7	1	2	3	4	1	2	3	4	5	6	7	1	2	3	4
Semester 1	Introduction to Engineering	1																											
	Architectural Drawing	2		■																									
	Basic Design (1)	3		■	■																								
	Computer Skills (1)	3																											
	Calculus (1)	3																											
	General Physics (1)	3																											
	English Skills (1)	3																									■		
Semester 2	Architectural Communication (1)	2		■																									
	Basic Design (2)	3		■	■																								
	Calculus (2)	3																											
	General Physics (2)	3																											
	General Physics Lab. (1)	1																											
	Arabic Skills (1)	3																									■		
	English Skills (2)	3																									■		
Semester 3	Construction Mechanics	2													■		■												
	Architectural Communication (2)	3		■	■		■																						
	Architectural Design (1)	5	■	■	■	■	■																						
	Building Construction (1)	3															■	■											
	History of Architecture (1)	3					■	■	■		■	■	■	■															
	General Physics Lab. (2)	1																											

	Course Title	cr	Design Abilities					Theory							Construction				Professional Practice							Per. Charc.			
			1	2	3	4	5	1	2	3	4	5	6	7	1	2	3	4	1	2	3	4	5	6	7	1	2	3	4
Semester 4	Technical English	2																											
	Structural Analysis	2																											
	Architectural Design (2)	5																											
	History of Architecture (2)	3																											
	Building Construction (2)	3																											
	Computer Skills (2)	3																											
Semester 5	Surveying (1)	2																											
	Surveying (1) Lab	1																											
	Workshop (1)	1																											
	Computer Aided Design	3																											
	Architectural Design (3)	5																											
	Building Construction (3)	3																											
	Contemporary Architecture	3																											
Semester 6	Reinforced Concrete	2																											
	Steel Design	2																											
	Workshop (2)	1																											
	Architectural Design (4)	5																											
	Urban Planning	3																											
	Structural Systems	2																											
	Islamic Architecture	3																											

	Course Title	cr	Design Abilities					Theory							Construction				Professional Practice							Per. Charac.			
			1	2	3	4	5	1	2	3	4	5	6	7	1	2	3	4	1	2	3	4	5	6	7	1	2	3	4
Semester 7	Architectural Design (5)	5																											
	Housing	3																											
	Theory of Urban Design	3																											
	Landscape Design	2																											
	Behavioral Architecture	3																											
	Environmental Control	2																											
Semester 8	Architecture Design (6)	5																											
	Working Drawing	3																											
	Mechanical Systems	2																											
	Illumination & Acoustics	3																											
	University Elective	3																											
Semester 9	Local Architecture and & Conservation	3																											
	Specification & Quantities	2																											
	Training	3																											
	Graduation Project (1)	2																											
	Department Elective	2																											
	Free Elective	3																											
Semester 10	Graduation Project (2)	5																											
	Department Elective	2																											
	Department Elective	2																											
	Department Elective	2																											

Table 2

IUST Architectural Program curriculum: green cells: competencies met by courses; red cells: courses providing no competency; yellow cells: competencies not clearly addressed by any course, orange cells: competencies not well addressed

	Course Title	cr	Design Abilities					Theory							Construction				Professional Practice							Per. Charac.			
			1	2	3	4	5	1	2	3	4	5	6	7	1	2	3	4	1	2	3	4	5	6	7	1	2	3	4
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	Computer Skills (1)	3																											
	Calculus (1)	3																											
	General Physics (1)	3																											
	English Skills (1)	3																											
Semester 2	Architectural Communication (1)	2																											
	Basic Design (2)	3																											
	Calculus (2)	3																											
	General Physics (2)	3																											
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	Architectural Design (2)	5																											
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	Building Construction (2)	3																											
	Computer Skills (2)	3																											
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	Surveying (1) Lab	1																											
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	Department Elective	2																											
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	Department Elective	2																											

1.2. *Evaluation of the Architectural Engineering Program by Architectural SAG of Tuning META*

Members of the Architectural SAG of Tuning META evaluated the architectural curriculum at IUST during the Third General Meeting of Tuning META in Nicosia (15-19 February 2015). Conclusions of the discussion are summarized here:

a) The Program in general seems to match what can be described as a generic architectural program. No clear direction or emphasis is evident.

b) Architectural design as a main emphasis in the program is not clearly evident; in other words, more design courses are needed.

c) May need to increase credit hours of design studios and graduation project.

d) Graphics and communication skills need to be either more emphasized or better presented: freehand, perspective, color and presentation techniques.

e) Need to better benefit from computer classes to the benefit of architectural graphics.

f) History and Theory of Architecture sequence needs three courses instead of two to emphasis theory.

g) Better to have two Working Drawings courses for the importance of the subject.

h) Basic Design courses to have more credits.

i) Structure courses to be better distributed in the curriculum (concrete and steel in two different semesters instead of one.)

j) Two courses are needed: Professional Practice and Ethics, and Project Management.

k) Ways to increase available credit hours for curriculum improvement:
   - Minimize number of University and College courses and credits.
   - Reduce hours of surveying to 2 credits: 1 hour lecture, 2 hours lab.
   - Reduce credits of training or make it zero credit.
   - Move workshops from required courses to electives.

1.3. *IUST Architectural Program Faculty Assessment*

Faculty of the Department of Architectural Engineering at IUST conducted a number of formal and informal meetings regarding the issue of assessing and developing the existing curriculum. The process will continue throughout the modification process. Members of the Faculty approve the evaluation of the curriculum based on the Architectural META-Profile and the Architectural Subject Area Group. They added some specific notes to be considered in the development of the revised curriculum. The following is a summary of their concerns:

a) Design courses should have a theoretical component in them; thus the five credits of any studio could be (1) credit of lecture and (4) credit of studio totaling (9) contact hours.

b) A seventh studio is needed in Semester (9) to give students more chances of design experiences.

c) Housing and Residential Design to be better represented in the curriculum through two courses.

d) Perspective to be taught with emphasis on sketching.

e) Architectural drawings course to have 3 credits instead of 2.

f) Building Construction courses to emphasize the following areas:

- Construction 1: Basic construction materials and architectural detailing (present Construction 1 and Construction 2 combined).
- Construction 2: Architectural finishes (present Construction 3).
- Construction 3: Contemporary and sustainable techniques, detailing, and materials.

g) Acoustics and Lighting to be in two courses.

h) A need for project management course emphasizing legal aspects of the profession.

i) Sequence of technical courses should be as follows: Acoustics and Lighting – Mechanical Systems – Specifications and Quantities – Environmental Design.

j) Environmental Design can be Physics of Buildings.

2. Developing a new degree profile:

It was imperative to revisit the profile of the degree in order to orient it in accordance with the new vision of the Program that is based on the previous evaluation. Clearer directions were established for the Program which guided the rewriting of the Programs objectives.

2.1. *Establishing directions for the Program (a degree profile)*

According to Tuning, a degree profile is based on four factors: Tuning Profile (in this case META-Profile), future trends, University strengths, and professional and social needs.[9] This profile would be the base for any program.

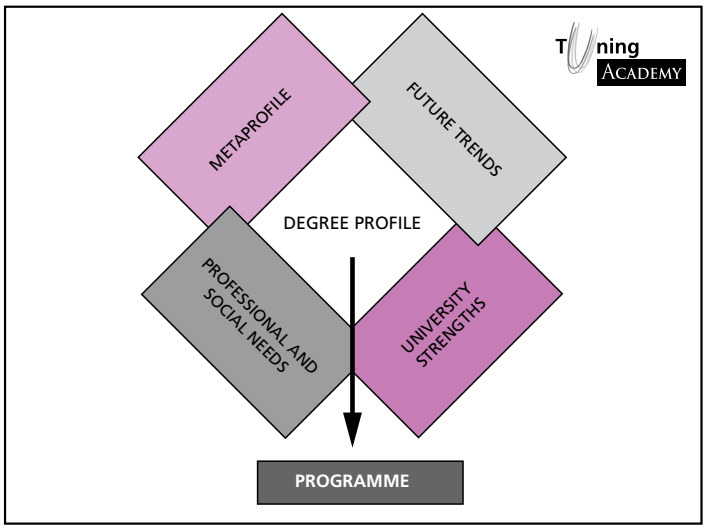


Figure 1
Elements of a program

As for **Tuning Profile,** the previous section summarized the points which should be emphasized to make the curriculum at IUST more in

[9] Pablo Beneitone, "Tasks planned for next months," Tuning Middle East and North Africa, T-MEDA, Second General Meeting, Bilbao, 1st October 2014.

tune with the developed profile. The new profile should look into the following points:

a) Users with varying abilities.

b) Production of construction documents.

c) Local heritage.

d) Project management.

e) Ethics and quality of work.

f) Personal characteristics of an architect (respect of diversity, teamwork, knowledge of second language, etc.).

The profile should clarify its emphasis on:

a) Architectural precedents.

b) Integration of engineering systems to architectural design.

c) Understanding of construction materials.

d) Social and cultural role of architecture.

e) History and theory of architecture.

f) Critical thinking.

g) Legal framework of the profession.

The Profile which will be translated in words through the Program's objectives will not address all the previous points; nevertheless, it should reflect them in general terms. These general terms can be translated in to specific competencies and learning outcomes that cover all needed issues.

Thus, it can be concluded here that the Program's profile should carefully address the following:

a) History and theory of architecture including local heritage and present trends.

b) Execution of buildings through the integration of design, construction, management, and legal perspectives.

c) Development of student's critical thinking abilities to address design issues related to different situations and users.

d) Personal characteristics of students of architecture which foster sensitive practice and design.

Addressing these points would be under the umbrella of a Tuning profile that is summarized as follows: **"Meta-Profile to ethically and diligently emphasize socio-cultural issues and environmental concerns, using contemporary technologies and materials."**

Future trends in architecture are affected by global factors. Globalization versus localization, environmental issues, sustainability, modern technologies, and stronger emphasis on the user are the main concerns of contemporary architectural discourse. The Program at IUST should address these issues in its future curriculum.

The International University for Science and Technology is a young university; one of almost twenty private universities established during the last ten years in Syria. **The strength of the University** is in its emphasis on quality through personal relationships among faculty and students; a typical strength in small private schools. The Architectural Engineering Department in particular has been lucky in this regard thanks to the special overall positive chemistry among faculty members on one hand, and among students and faculty on the other. The Department has a very good reputation in the country mainly because of the continuous effort to maintain **friendly and fatherly relationships among all parties involved in the academic experience.**

Pedagogically, members of the faculty in the Department emphasis the **socio-cultural dimension of design** although this is not well documented in the Programs literature. **Critical thinking and conceptual development** can also be considered points of strength in practice while not eloquently presented.

Professional and social needs in Syria are in direct connection with the present situation. The five year war left the country with extreme destruction that will need decades of rebuilding. The Architectural Program at IUST should put the participation in rebuilding the country as its only main mission for the coming twenty or thirty years. This mission will have to be reflected on the vision of the Department, its profile, and its educational objectives.

2.2. *A Degree Profile for IUST's Architectural Engineering Program*

From the above collection of influencing factors, a degree profile for IUST's Architectural Engineering Program is developed as shown in Figure 2 and summarized here in bullet points:

a) **The Architectural Meta-Profile** ethically and diligently emphasizes socio-cultural issues and environmental concerns, using contemporary technologies and materials.

b) **Future Trends** in architecture are mainly globalization versus localization, environmental issues, sustainability, modern technologies, and stronger emphasis on the user.

c) **University Strengths:** strong ties with students, socio-cultural emphasis, critical thinking, conceptual development.

d) **Professional and Social Needs:** the main issue for the coming couple of decades is rebuilding the country.

These four factors are used as base for developing the objectives of the program.

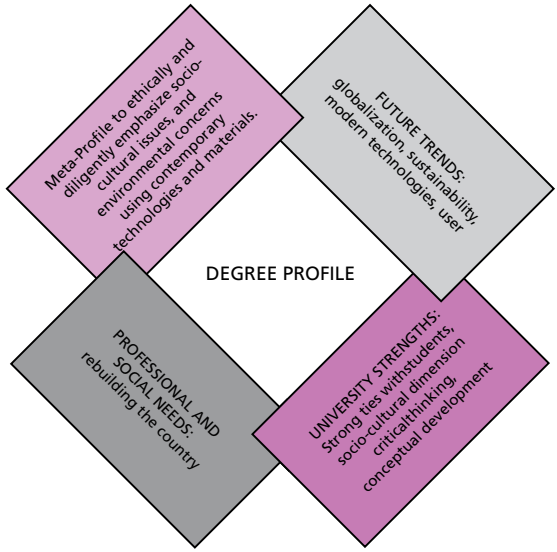


Figure 2
A degree profile for the Architectural Program at IUST

2.3. *A Vision for the Architectural Engineering Program at IUST*

As part of its efforts to be a useful program in the coming era of Syria's history, the Program's vision is:

"To be part of the positive efforts in rebuilding Syria through sensitive, functional, and pleasing built environment."

2.4. *A Mission for the Architectural Engineering Program at IUST*

Based on the evaluations and considerations presented earlier, the Architectural Engineering Program at IUST has the following mission:

> *"To graduate architects who can successfully support all rebuilding efforts in Syria through a built environment that respects nature and all types of users, and accommodates their physical and non-physical needs, benefiting from contemporary technologies."*

2.5. *A new set of Program's Objectives*

In accordance with the above degree profile and the new vision and mission, the Program of Architectural Engineering at IUST has the following main objectives:

a) To provide students with design abilities that qualify them to produce environment that is sustainable in all aspects, creative, sensitive, functional, and pleasing for all types of users, using all available state-of-the-arts verbal and graphic media.

b) To educate students in all aspects of the history and theory of architecture including contemporary trends of architecture thought to be able to critically analyze works of architecture for the benefit of their design work.

c) To provide students with sufficient technical abilities to be able to conceive all structural and technical solutions for their architectural work and present them via comprehensive written and graphic documentations.

d) To train students in areas of professional practice related to ethical, legal, and managerial aspects of the profession.

e) To help students develop personal characteristics that value continuing education, team work, ethical practice, and high level interpersonal and organizational skills.

f) To foster in students strong feeling of belonging and responsibility to use all acquired knowledge and skills for the main objective of rebuilding their country properly functionally, socially, environmentally, aesthetically, and ethically.

2.6. *Employment and job opportunities:*

Based on the existing conditions of the country, graduates will have a chance to work in regular architectural fields as well as new fields related to the reconstruction of the country. The following placements of work are main ones.

a) Private architectural firms: graduates will start as trained architect who may work on different types of architectural areas such as: graphics, rendering, data collection, specifications, and construction drawings. In small firms, a graduate may have a chance to design faster than in larger ones.

b) Private business: a graduate may opt to start his/her own small business as soon as he/she finishes his/her two year training period. Work may involve small scale projects in the beginning along with participation in local and international competitions. In many cases, a number of colleagues may start such a venture together.

c) Governmental agencies: such as ministries or other agencies involved in design or construction work. A graduate may get involved either in office type of work which would be in a way similar to working in private office, or may get to work in the field in construction sites.

Type of work will always differ also, and it will depend on the graduate's capabilities and level of creativity and imagination. It includes:

a) Small scale architectural work: housing in particular and small lots of commercial nature or mixed use.

b) Large scale architectural projects such as design of institutions, educational, health, cultural facilities, etc. This type of work requires experience and collaboration with other engineering specialties.

c) Urban design projects: this type of projects also requires interdisciplinary offices and/or governmental agencies.

d) Urban planning projects: this type of work takes place in ministries and public agencies.

e) Restoration projects of old buildings or urban fabric. Architects involved in such projects may concentrate on studies of documentation or actual physical restoration.

f) Encroachment on other design fields such as landscape design and interior design. This is very possible in the Arab world since design professions do not have legal protection, and thus anybody can do

anything almost. Architects' training does not provide them with enough knowledge to practice in such areas, but they do relying on accumulated experience.

g) Dealership of construction and finishing materials and accessories: Many architects find it very rewarding to be part of the marketing business of construction and finishing materials. Their experience as architects can be very helpful in advising clients.

h) Education: some graduates continue their education to the Ph.D. level to return as faculty in architectural schools.

3. Modification of the existing curriculum to accommodate necessary changes

In order to modify the curriculum, it was imperative to eliminate some courses because they do not fit in the scheme of the new vision, mission, and objectives of the new program, and there is a crucial need for extra credit hours to accommodate the new directions the Program is acquiring. When knowing the number of hours available to make changes, competencies to be emphasized were identified along with appropriate courses for them. The following step was to formulate the new curriculum. Finally, learning outcomes for each course were stated.

3.1. *Gaining credit hours*

Table 3 shows introduced changes to eliminate courses which do not fit the new objectives of the Program.

Table 3
Changes and eliminations applied to the original curriculum

	Course	Action	Number of credits gained
1	Computer Skills (1)	Eliminated; students are requested to present an ICDL certificate to graduate	3
2	Computer Skills (2)	Changed to Auto-CAD, Sketchup, Archicad	
3	Calculus (1)	Changed to Descriptive Geometry	
4	Calculus (2)	Eliminated	3
5	General Physics (1)	Changed to Buildings Physics	
6	General Physics (2)	Eliminated	3
7	General Physics Lab (1)	Eliminated	1
8	General Physics Lab (2)	Eliminated	1
9	Construction Mechanics	Eliminated	3
10	Structural Analysis	Eliminated	2
11	Reinforced Concrete	Reinforced Concrete and Steel Design are joined together in one (3) credit course	1
12	Steel Design		
13	Surveying (1)	Surveying (1) and Surveying (1) Lab are joined together in one (2) credit course: (1) lecture hour, (2) lab hours	1
	Surveying (1) Lab		
14	Training	credit hours Reduced to (1)	2
15	Free Elective	Eliminated	3
16	Dept. Electives	Three instead of four electives	2
Total number of eliminated courses: 10; total credits gained: 25 credits			

Thus, total hours gained because of the elimination of courses is (25) credits; and the number of courses eliminated is (10) courses. This allowed the following amendments to the existing curriculum. Changes included adding (5) new courses, and increasing the credit hours for (6) courses. Basic Design (2) was substituted with Architectural Design (1) to have (8) design studios after adding another studio in the first semester of the fifth year.

It is to be noted that the changes applied are reflections of the evaluation of the META-Profile, Architectural SAG, and the faculty of the Department as shown in Table 5. Added courses and increased credit hours answer directly to some of the missing competencies or short coming of the original curriculum. Other competencies will be addressed through modifications to the learning outcomes of existing courses.

Table 4
Added courses and changes applied to the original curriculum

	Course	Hours	Action	Number of credits used
1	Freehand Drawing	1 credit; 2 lab	Added	1
2	Working Drawing (2)	3 cr.; 6 lab.	Added	3
3	History and Theory (3)	3 cr.; 3 lec.	Added	3
4	Architectural Design (8)	5 cr.; 10 lab.	Added	5
5	Project Management	2 cr., 2 lec.	Added	2
6	Professional Practice and Ethics	2 cr.; 2 lec.	Added	2
7	Mechanical Systems	3 cr., 3 lec.	Increased credits by (1)	1
8	Architectural Communication (1)	3 cr.; 6 lab.	Increased credits by (1)	1
9	Basic Design (1)	5 cr.; 10 lab.	Increased credits by (2)	2
10	Basic Design (2)	5 cr.; 10 lab.	Increased credits by (2) and changed to Architectural Design 1	2
11	All other courses		Shifted one notch down	
12	Graduation Project (2)	8 cr.; 4 lec., 8 lab.	Increased credits by (3)	3
Total number of added courses: 6; total credits used: 25 credits				

Although the total number of credits is the same, number of courses was reduced by four (4) courses. The reduction of number of courses will ease up the scheduling of the curriculum.

Table 5
Source of changes in the curriculum

	The Course	Source of Change		
		Meta-Profile	SAG	Faculty
1	Freehand Drawing			
2	Working Drawing (2)			
3	History and Theory (3)			
4	Architectural Design (8)			
5	Project Management			
6	Professional Practice and Ethics			
7	Mechanical Systems			
8	Architectural Communication (1)			
9	Basic Design (1)			
10	Basic Design (2)			
11	Graduation Project (2)			

It is obvious that although the Mega-Profile had its influence on the changes, SAG and faculty of the Department have also greatly contributed to it. The following section will exhibit the relationship between courses, whether new, modified, or old, and the competencies to be stressed.

3.2. *Identification of appropriate courses for competencies to be stressed*

As mentioned earlier, competencies that need to be stressed will be addressed either by new courses or by modifications on the learning outcomes of existing courses. The main motivation for the suggested changes was to reduce the number of courses which are of relatively no relation with the mainstream of the work of an architect in order to gain more hours for the core of any architectural curriculum; namely, design and graphics courses. It is assumed that these courses shall be able to accommodate, in general, most competencies related to architectural education within a practical setting.

Table 6 shows each competency that was not, or poorly, addressed in the original curriculum along with the course(s) that would accommodate it in the proposed curriculum. The table indicates whether the course is new (added), its credits are increased (increased credits), or whether it exists in the original curriculum but its learning outcomes would be modified to include the competency (learning outcomes). It is to be noted that the table shows the main courses that will be carrying the needed competencies. Other courses, not necessarily mentioned here, would also share the responsibility of the competencies. A more detailed study of the curriculum in a second round of studies would draw the total picture.

Table 6

Courses accommodating missing competencies in the proposed curriculum

	Required Competency	Course to Accommodate the Competency	Type of Course
1	Ability to analyze and incorporate relevant precedents into architectural design projects (design comp. 5)	Design Courses History and Theory Courses	Added Learning outcomes
2	Act ethically pertaining issues related to architectural design and practice (professional comp. 1)	Professional Practice and Ethics	Added
3	Knowledge and ability to apply legal framework, safety regulations and technical codes controlling activities of the profession (professional comp. 2)	Professional Practice and Ethics	Added
4	Ability to work within, or lead constructively interdisciplinary teams (personal comp. 1)	Design Courses	Added Learning outcomes
5	Demonstrate organizational skills (personal comp. 3)	Design Courses	Added Learning outcomes
6	Awareness of current architectural ideas and practices at local and global levels (theory comp. 3)	History and Theory Courses	Added Learning outcomes
7	Ability to conduct investigation and research in the process of architectural innovation (theory comp. 4)	History and Theory Courses	Added Learning outcomes

	Required Competency	Course to Accommodate the Competency	Type of Course
8	Have critical thinking, analysis and synthesis (theory comp. 5)	History and Theory Courses	Added Learning outcomes
9	Ability to evaluate, enhance and preserve architectural and urban local heritage and recognize the importance of its relation with current architectural developments (theory comp. 6)	Local Architecture and Conservation of Heritage Islamic Architecture History and Theory courses	Learning outcomes
10	Ability to think, perceive and conceive spaces three dimensionally and communicate verbally, in writing, graphically, and/or volumetrically (design comp. 2)	Freehand Drawing Arch. Communication 1 Design courses and graphic courses	Added Increased credits Added and learning outcomes
11	Capacity for planning, programming, budgeting and managing architectural projects (professional comp. 3)	Project Management Working Drawing (2)	Added
12	The protection and preservation of the environment (professional comp. 5)	Professional Practice and Ethics Landscape Design Environmental Control	Added Learning outcomes Learning outcomes
13	Respect for diversity and multiculturalism (professional 6)	Professional Practice and Ethics Behavioral Architecture	Added Learning outcomes
14	Maintain continuous education (professional comp. 7)	Professional Practice and Ethics History and Theory courses	Added Learning outcomes
15	Communicate in a second language (personal comp. 2	All courses	Learning outcomes

Table 6 presented matching the Architectural META-Profile requirements with the modified curriculum through added or modified courses. Table 7 and Table 8 show the courses which accommodated the suggested modifications addressed by both SAG and the Department's faculty respectively.

Table 7

Actions accommodating suggested changes by the Architectural SAG

	Required Change	Action to Accommodate Change	Type of Course
1	The Program in general seems to match what can be described as a generic architectural program. No clear direction or emphasis is evident	Vision and Mission of Program have been changed with a clear emphasis on rebuilding Syria.	New vision, mission, and objectives are reflected on all courses' learning outcomes
2	Architectural design as a main emphasis in the program is not clearly evident; in other words, more design courses are needed	Increased credits for Basic Design (1) and (2) and GP (2) (BD2 became AD 1) Added AD (8)	Added Increased credits
3	May need to increase credit hours of design studios and graduation project	Done as in (2)	Added Increased credits
4	Graphics and communication skills need to be either more emphasized or better presented: freehand, perspective, color and presentation techniques	Increased credits for Arch. Com. (1) Added Freehand Drawing course	Added Increased credits
5	Need to better benefit from computer classes to the benefit of architectural graphics	Changed courses content	Learning outcomes
6	History and Theory of Architecture sequence needs three courses instead of two to emphasis theory	History and Theory (3) is added	Added
7	Better to have two Working Drawings courses for the importance of the subject	Working Drawing (2) added	Added
8	Basic Design courses to have more credits	(4) credits were added with change of name for BD2	Increased credits
9	Structure courses to be better distributed in the curriculum	Accommodated in the new curriculum	
10	Two courses are needed: Professional Practice and Ethics, and Project Management	Both courses are added	Added

All modifications or suggestions advanced by the Architectural SAG were accommodated in support of the META-Profile. Table 8 shows that suggestions of the faculty were also met.

Table 8
Actions accommodating suggested changes by the Architectural Engineering Faculty at IUST

	Required Change	Action to Accommodate Change	Type of Course
1	Design courses should have a theoretical component in them; thus the five credits of any studio could be (1) credit of lecture and (4) credit of studio totaling (9) contact hours	Design Courses to have 5 credits (1 lec. + 8 studio)	
2	A seventh studio is needed in Semester (9) to give students more chances of design experiences	Design 8 is added	Added
3	Housing and Residential Design to be better represented in the curriculum through two courses	Housing, Urban Planning, and Theory of Urban Design should all accommodate this point	Learning outcomes
4	Perspective to be taught with emphasis on sketching	Freehand course added Credits for Gr. Com. 1 are increased	Added Increased credits Learning outcomes
5	Architectural drawings course to have 3 credits instead of 2	Done	Increased credits
6	Building Construction courses to emphasize the following areas: Construction 1: Basic construction materials and architectural detailing (present Construction 1 and Construction 2 combined) Construction 2: Architectural finishes (present Construction 3) Construction 3: Contemporary and sustainable techniques, detailing, and materials	To be done in the detailed study of courses	Learning outcomes

	Required Change	Action to Accommodate Change	Type of Course
7	Acoustics and Lighting to be in two courses	Cannot be accommodated	
8	A need for project management course emphasizing legal aspects of the profession	Project Management course is added	Added
9	Sequence of technical courses should be as follows: Acoustics and Lighting – Mechanical Systems – Specifications and Quantities – Environmental Design	To be done in the detailed study of courses	Learning outcomes
10	Environmental Design can be Physics of Buildings	General Physics (1) is changed to Building Physics Environmental Design can be an advanced practical course	Added Learning outcomes

3.3. *The new Curriculum*

Changes to the original curriculum are not major. It was intended to make these changes as few as possible in order to have better chances to obtain approval from the University and the Ministry of Higher Education.

Changes will be more evident in course descriptions, objectives, and learning outcomes. It is through these detailed changes that the Architectural Engineering Program at IUST will be mostly altered and redirected to meet the aspired development.

The modified curriculum is based on the original one taking into consideration a number of points:

a) Minimum change to be made.

b) Recognition of available openings after the elimination of some courses.

c) Better sequence of certain courses, especially construction ones.

d) Equal distribution of courses and credits.

e) Level of difficulty of courses.

Table 9 shows the existing curriculum added to it notes related to omitted, modified, or combined courses. The table helps understand the original curriculum which was the base on which to apply the modifications.

Table 10 presents the modified curriculum. Similarity between the original and modified is very evident, an end result which is very expected since the strategy of the work was to apply as little changes as possible to the original curriculum.

Table 9
Original Curriculum of the Architectural Engineering Program at IUST

First Year

First Term				Second Term			
Course No.	Course Title	Cr. Hr.	Prerequisite or *Corequisite	Course No.	Course Title	Cr. Hr.	Prerequisite or *Corequisite
301101	Introduction to Engineering	1	—	305102	Architectural Communication (1)	~~2~~ 3	305101
305101	Architectural Drawing	2	—	305112	~~Basic Design (2)~~ AD (1)	~~3~~ 5	305111
305111	Basic Design (1)	~~3~~ 5	—	601102	Calculus (2)	~~3~~	601101
401101	Computer Skills (1)	~~3~~	—	601104	General Physics (2)	3	601103
601101	~~Calculus (1)~~ Desc. Geom.	3	—	601107	General Physics Lab. (1)	~~1~~	601103*
601103	~~Physics (1)~~ Bld. Phys	3	—	603101	Arabic Skills (1)	3	—
604101	English Skills (1)	3	—	604102	English Skills (2)	3	604101
	Total	18			Total	18	

Second Year

First Term				Second Term			
Course No.	Course Title	Cr. hr.	Prerequisite or *Corequisite	Course No.	Course Title	Cr. hr.	Prerequisite or *Corequisite
303201	Construction Mechanics	~~3~~	601103	301203	Technical English	2	604102
305201	Architectural Communication (2)	3	305102	303212	Structural Analysis	2	303201
305211	Architectural Design ~~(1)~~ (2)	5	305112	305212	Architectural Design ~~(2)~~ (3)	5	305211
305231	Building Construction (1)	3	—	305242	History of Architecture (2)	3	305241
305241	History of Architecture (1)	3	—	305232	Building Construction (2)	3	305231
601108	General Physics Lab. (2)	1	601104*	401201	~~Computer Skills (2)~~ CAD 1	3	401101
	Total	18			Total	18	

Third Year

First Term				Second Term			
Course No.	Course Title	Cr. hr.	Prerequisite or *Corequisite	Course No.	Course Title	Cr. hr.	Prerequisite or *Corequisite
303341	~~Surveying (1)~~	2	601101	303332	Reinforced Concrete	~~2~~	305231 & 303212
303347	Surveying (1) Lab	~~1~~	303241*	303334	Concrete & Steel Design	~~2~~ 3	305231 & 303212
304111	Workshop (1)	1	—	304211	Workshop (2)	1	304111
305301	Computer Aided Design 2	3	305101 & 401101	305312	Architectural Design ~~(4)~~ (5)	5	305311
305311	Architectural Design ~~(3)~~ (4)	5	305212	305322	Urban Planning	3	305341
305331	Building Construction (3)	3	305232	305332	Structural Systems	2	303231
305341	Contemporary Architecture	3	305242	305342	Islamic Architecture	3	305341
	Total	18			Total	18	

Fourth Year

First Term				Second Term			
Course No.	**Course Title**	**Cr. hr.**	**Prerequisite**	**Course No.**	**Course Title**	**Cr. hr.**	**Prerequisite**
305411	Architectural Design (~~5~~) (6)	5	305312	305412	Architecture Design (~~6~~) (7)	5	305411
305421	Housing	3	305322	305432	Working Drawing	3	305331
305423	Theory of Urban Design	3	305322	304442	Mechanical Systems	~~2~~ 3	305331 & 305471
305425	Landscape Design	2	305322	305472	Illumination & Acoustics	3	305331 & 601104
305461	Behavioural Architecture	3	305341		University Elective	3	
305471	Environmental Control	2	601104				
	Total	18			Total	16	

Fifth Year

First Term				Second Term			
Course No.	**Course Title**	**Cr. hr.**	**Prerequisite or *Corequisite**	**Course No.**	**Course Title**	**Cr. hr.**	**Prerequisite or *Corequisite**
305541	Local Architecture and & Conservation of Heritage	3	305423	305592	Graduation Project (2)	~~5~~ 8	305591
305551	Specification & Quantities	2	305331		Department Elective	2	
305581	Training	~~3~~ 1	5th Year Level		Department Elective	2	
305591	Graduation Project (1)	2	305412		Department Elective	~~2~~	
	Department Elective	2					
	Free Elective	~~3~~					
	Total	15			Total	11	

Courses to be added:

1. Freehand Drawings.
2. Architectural Design 8.
3. Working Drawing 2.
4. History and Theory 3.
5. Project Management.
6. Professional Practice and Ethics.

Table 10
Proposed Curriculum of the Architectural Engineering Program at IUST

First Year

First Term				Second Term			
Course No.	Course Title	Cr. Hr.	Prerequisite or *Corequisite	Course No.	Course Title	Cr. Hr.	Prerequisite or *Corequisite
	Introduction to Engineering	1			Architectural Communication (1)	3	
	Architectural Drawing	2			Architectural Design (1)	5	
	Basic Design	5			Building Physics	3	
	Surveying	2			Building Construction (1)	3	
	Descriptive Geometry	3			Freehand Drawings	1	
	Arabic Skills	3			English Skills (1)	3	
	English Levels	0					
	Total	16			Total	18	

Second Year

First Term				Second Term			
Course No.	Course Title	Cr. hr.	Prerequisite or *Corequisite	Course No.	Course Title	Cr. hr.	Prerequisite or *Corequisite
	Architectural Communication (2)	3			Technical English	2	
	Architectural Design (2)	5			Structural Systems	2	
	Building Construction (2)	3			Architectural Design (3)	5	
	History of Architecture (1)	3			History of Architecture (2)	3	
	Workshop (1)	1			Building Construction (3)	3	
	English Skills (2)	3			CAD (1)	3	
	Total	18			Total	18	

Third Year

First Term				Second Term			
Course No.	Course Title	Cr. hr.	Prerequisite or *Corequisite	Course No.	Course Title	Cr. hr.	Prerequisite or *Corequisite
	Architectural Design (4)	5			Architectural Design (4) (5)	5	
	CAD (2)	3			Illumination & Acoustics	3	
	Working Drawings (1)	3			History and Theory (3)	3	
	Concrete and Steel Design	3			Housing	3	
	Islamic Architecture	3			Behavioral Architecture	3	
	Workshop (2)	1					
	Total	18			Total	17	

Fourth Year

First Term				Second Term			
Course No.	Course Title	Cr. hr.	Prerequisite	Course No.	Course Title	Cr. hr.	Prerequisite
	Architectural Design (6)	5			Architecture Design (7)	5	
	Contemporary Architecture	3			Working Drawing (2)	3	
	Theory of Urban Design	3			Specifications & Quantities	2	
	Landscape Design	2			Urban Planning	3	
	Mechanical Systems	3			University Elective	3	
	Environmental Control	2					
	Total	18			Total	16	

Summer of Forth Year

First Term				Second Term			
Course No.	Course Title	Cr. hr.	Prerequisite or *Corequisite	Course No.	Course Title	Cr. hr.	Prerequisite or *Corequisite
	Training	1					
	Total	1					

Fifth Year

First Term				Second Term			
Course No.	Course Title	Cr. hr.	Prerequisite or *Corequisite	Course No.	Course Title	Cr. hr.	Prerequisite or *Corequisite
	Architectural Design (8)	5			Graduation Project (2)	8	
	Graduation Project (1)	2			Project Management	2	
	Professional Practice and Ethics	2			Department Elective	2	
	Local Architecture and & Conservation of Heritage	3			Department Elective	2	
	Department Elective	2					
	Total	14			Total	14	

3.4. *Examples of courses' learning outcomes: The Design Studio courses*

As experimentation in developing comprehensive and well connected learning outcomes, design courses are studied here. The revised program proposes eight design studios in addition to one basic design course and a graduation project course, totaling ten design courses. It is expected that students will learn a number of issues throughout these courses that can be summarized as follows:

1. **Principles of composition:** Composing with surfaces and masses depending on design elements and design principles.

2. **Spatial composition:** Composing spaces using composition principles, scale, visual studies, and spatial relations.

3. **Design as a response to need and circumstances:** Developing design solutions based on a study and comprehension of users' needs, functional requirements, site conditions, types of project, and building regulations.

4. **Formal and symbolic dimensions in architectural design:** Formal dimension is the study of architectural schools, directions, styles and theory of composition. Symbolic dimension is understanding architecture as a tool to convey a message.

5. **Social and behavioral issues:** looking into architecture as influenced and influencing container of social and behavioral dimensions.

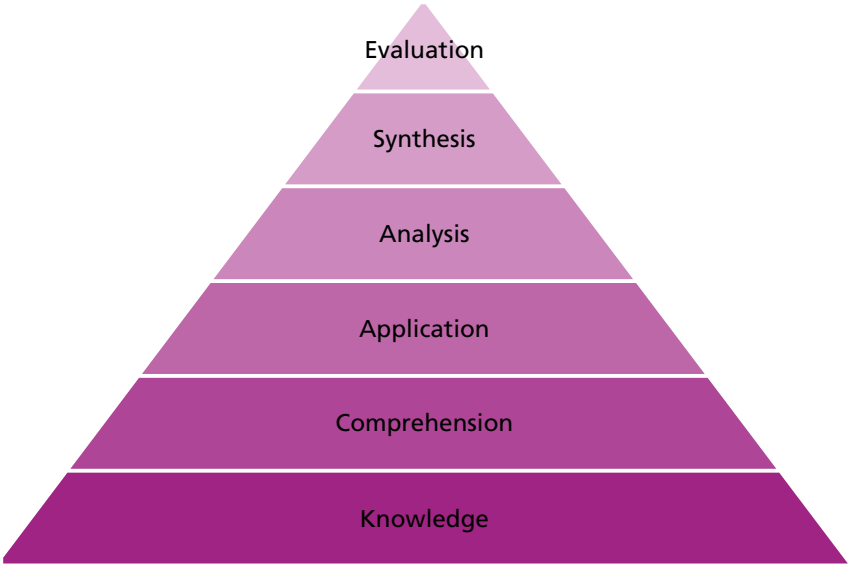
6. **Technical and environmental consideration in architectural design:** Needed studies that guarantee a successful building from a technical perspective including mechanical and electric systems. These issues are to be discussed within ecological and sustainable perspectives.

7. **Development of architectural concepts:** methods and means to reach the architectural concept for projects which respond to the project's needs, conditions, and possibilities.

8. **Construction and materials:** construction methods and material selection in accordance with site conditions and project capabilities and needs.

9. **Comprehensive architectural design:** a design that covers all above areas comprehensively and meaningfully.

In order to define three levels of learning, Bloom's Pyramid of Knowledge is used. Architectural design requires the six levels specified by Bloom; a designer needs to acquire a certain amount of information (knowledge) that he/she needs to grasp and understand (comprehension). He/she applies this comprehended knowledge in his/her design (application).



Bloom's Pyramid of Knowledge

But this application of knowledge depends on a high level of study of details and conditions related to site, users, project's requirement, and the environment among other issues (analysis). This study of elements and factors are used to compose appropriate solutions (synthesis). These proposed solutions are compared among each other and against developed criteria from previous experiences in order to conclude with a final proposal (evaluation).

Thus, learning outcomes of architectural design studios can be summarized in the following table. The Basic Design studio and the Graduation Project Studio are not included as the first covers basic formal compositions only and the Graduation Project should be comprehensive and cover all issues in depth.

Learning Outcomes of the Main Eight Architectural Design Studios at IUST

Design studio	Bloom's Taxonomy																																										
	Know-ledge								Comprehension								Application								Analysis								Synthesis								Evaluation							
	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
Issue to be covered																																														
Principles of composition																																															
Spatial composition																																														
Design as a response to need and circumstances																																														
Formal and symbolic dimensions in architectural design																																														
Social and behavioral issues																																														
Technical and environmental consideration in architectural design																																														
Development of architectural concepts																																														
Construction and materials																																														
Comprehen-sive architectural design																																														

The six levels of Bloom's Pyramid are divided into three classes in order to respond to the three levels of learning outcomes:

1. Level One: knowledge and comprehension.

2. Level Two: application and analysis.

3. Level Three: synthesis and evaluation.

Accordingly, each issue in the table can be clearly classified in accordance with the three levels of learning outcomes based on the semester in which it is taught. Similarly, learning outcomes for each design course can be identified from the table.

As an example, Design Studio One will have the following learning outcomes:

1. To acquire knowledge of, comprehension of, and ability to apply principles of composition.

2. To acquire knowledge of, comprehension of, and ability to work with spatial composition.

3. To acquire knowledge of, comprehension of, and ability to apply to design as a response to need and circumstances.

While, Design Studio Four will have the following learning outcomes:

1. To be able to analyze and synthesis principles of composition while developing design.

2. To be able to analyze and synthesis spatial composition while developing design.

3. To be able to analyze and synthesis issues related to design as a response to need and circumstances.

4. To acquire knowledge of, comprehension of, and ability to apply formal and symbolic dimensions in architectural design.

5. To acquire knowledge of, comprehension of, and ability to develop architectural concepts.

6. knowledge of, comprehension of, and ability to work with construction issues and materials.

Similarly, Design Studio Eight will have the following learning outcomes:

1. To be able to evaluate the use of principles of composition.

2. To be able to evaluate the use of spatial compositions.

3. To be able to evaluate design as a response to need and circumstances.

4. To be able to evaluate formal and symbolic dimensions in architectural design.

5. To be able to evaluate issues pertaining to social and behavioral dimensions in design.

6. To be able to evaluate technical and environmental considerations in design.

7. To be able to evaluate architectural concepts.

8. To be able to evaluate methods of construction and material use.

9. To be able to evaluate comprehensive architectural design.

Evaluation comes as a culmination of all levels of learning outcomes practiced in the studio: knowledge, comprehension, application, analysis, and synthesis.

Based on the same logic, the following stage of developing the modified program will focus on identifying all learning outcomes so as in the final outcome the Program will cover all competences.

13

Self-Developed Quality Assessment Report for the Three Developed Programs

a) Quality Assessment

The idea of quality assessment is to formulate a value for a subject or an issue. This value is decided against a given scale. In the context of the developed programs, the scale is the META Profile which was developed by the Architectural Subject Area Group.

b) Objective of Quality Assessment Report

The objective of developing this quality assessment report is to measure the success of any architectural program, which was developed or modified in accordance with the Architectural META Profile, in meeting the Profile's structure. In other words, the report assesses the degree of compatibility between any program and the Architectural META Profile.

In doing so, programs compared with the META Profile can somehow be compared among each other.

c) Reviewed Programs

Reviewed programs are those which were developed or modified in accordance with the META Profile. As noted earlier, three universities

advanced proposals: The Hashemite University (HU) in Jordan developed a whole new comprehensive and detailed program, Mohammed 1st University (UMP) in Morocco also came up with a new program but it is not fully developed. The International University for Science and Technology (IUST) in Syria modified its own program to benefit from the Architectural META Profile; however, it also stopped short of developing comprehensive courses' learning outcomes. Thus, the review will cover the three universities.

d) The Review

Reviewing the programs was based on a number of issues related to the basic qualities of the program such as its length, to some specifics such as the presence of sufficient learning outcomes for each course. A general table is used for the review of each program.

The Hashemite University

Name of Program: Architectural Engineering Program.

Name of Degree: Bachelor of Architectural Engineering.

Length of Degree: Five years.

Number of Credits: 172 credits.

Type of Courses: University requirements – College requirements – Department requirements (each consists of compulsory and elective courses).

Assessment of Program against the Architectural META Profile

Aspect for review		Assessment	Recommendation
1	Future fields of employment of graduates	The report clearly states thirteen employments and job possibilities for a graduate of the Program	• Some employment possibilities may benefit from some detailing such as: working for a public authority. • Some possible employments are encroaching on other specialties such as interior design and landscape architecture.
2	Vision of Program in relation to the META Profile	The stated Vision stems from the Architectural META Profile.	• It is possible to word the vision in such a way that it is more directly connected to the META Profile
3	Missions of Program	The stated missions stem from the META Profile spirit.	• It is possible to word the missions in such a way that it is more directly connected to the META Profile
4	Objectives of the Program	The stated objectives stem from the META Profile.	
5	Link of competences with the agreed meta-profile	The Program adopted the competences of the META Profile in total.	• It would be advisable to clearly state any competences that are added to the META Profile to give the Program its uniqueness.
6	Definition of the level and length of the program	Name and length of Program are clearly stated	• Insert a statement in the degree profile explaining the potential progression to master's degree.
7	Presence of key Competences of the META Profile	The competences are clearly mentioned in their totality in the description of the Program.	• An explanation of how these competences will be applied or utilized in the Program may be beneficial.
8	Definition of the competences	The proposed program benefited from the competences greatly. They are included in all course descriptions.	

Aspect for review		Assessment	Recommendation
9	Learning outcomes	• Learning outcomes are clearly stated for every course. • Learning outcomes are related to competences of the META Profile. They are stated under the four heading of the META Profile: Design abilities, Construction and technological abilities, Theoretical background and socio-cultural abilities, and Professional practice and work ethics. • Wording of outcomes is in general correct. • Most learning outcomes are measurable. • Learning outcomes usually cover the intended competences.	• Some rewording is needed to make all learning outcomes follow the typical wording starting with a verb. • How learning outcomes will be measured is an issue that can be discussed in more detail.
10	Specifying courses	The program lists the courses and demonstrates the study progression from one semester to the next very clearly.	
11	Overall consistency of the programme	• The proposed program is consistent with the competences and learning outcomes. • The competences and learning outcomes are covered in the courses of the program. • Key competences are covered in several courses, allowing for progression in developing these competences.	• Develop a detailed study plan that shows each course's activities leading to the relevant learning outcomes.

Aspect for review		Assessment	Recommendation
12	Overall view of developed Program	• Program is well developed • Program presents all main and needed components of a comprehensive program including mission, vision, objectives, course description, competences, and learning outcomes. • Program is well written and easy to read.	• Some explanations and connecting statements with the META Profile would be helpful. • Areas of change from the old program to the proposed one would be beneficial. • Degree of change in the old program leading to the new program would also be beneficial. • Areas of change based on the META Profile to be also defined and clarified.

Mohammed 1st University

Name of Program: Architecture Program.

Name of Degree: Diploma of Architecture.

Length of Degree: Three years + 2 (Master Degree of Architecture) + 1 (Practical Experience).

Number of Credits: 50 modules.

Assessment of Program against the Architectural META Profile

Aspect for review		Assessment	Recommendation
1	Future fields of employment of graduates	The report clearly states a number of possible jobs a graduate can seek.	• More details of possible job opportunities may be beneficial. • Some employment possibilities may benefit from some detailing such as: working for a public authority.
2	Vision of Program in relation to the META Profile	The stated vision stems from the Architectural META Profile in very general terms.	• It is possible to word the vision in such a way that it is more directly connected with the META Profile
3	Missions of Program	The stated missions stem from the Architectural META Profile in very general terms.	• It is possible to word the missions in such a way that it is more directly connected with the META Profile
4	Objectives of the Program	The stated objectives in general stem from the META Profile.	• Objectives can be developed to clearly reflect connection with the META Profile.
5	Link of competences with the agreed meta-profile	The Program adopted the overall four areas of the META Profile.	• Clearer connection between specific competences and courses is needed. • It would be advisable to clearly state any competences that are added to the META Profile to give the Program its uniqueness.

Aspect for review		Assessment	Recommendation
6	Definition of the level and length of the program	Name and length of Program are stated	• A clear item related to length of program and its name is needed. • Explanation of Master's degree after five years is needed as way of comparing the program with other typical 5 years programs.
7	Presence of key Competences of the META Profile	Competences are not clearly stated. Only general areas are defined under which courses not competences are classified.	• A stage of the program development is needed where competences are stated in relation to courses of each of the four areas of the META Profile.
8	Definition of the competences	Competences are not clearly stated.	See note in point 7.
9	Learning outcomes	• Learning outcomes are clearly stated for every course. • Learning outcomes are not related to competences of the META Profile. • They are stated under the four heading of the META Profile: Design abilities, Construction and technological abilities, Theoretical background and socio-cultural abilities, and Professional practice and work ethics in relation to every course. • Wording of outcomes is not correct since it does not show enough detailing and it does not start with a verb. In some cases it is not even a statement, but just a word. • It is difficult to see if learning outcomes are measurable. • Learning outcomes do not show if they cover the intended competences since competences are not clearly stated.	• Learning outcomes should be clearly related to competences. • Rewording is needed to all learning outcomes in order to better explain them and to put them in the right format. • How learning outcomes will be measured is an issue that needs to be discussed in detail. • After competences are clearly stated, it will be possible to evaluate whether learning outcomes correspond to them and cover them completely and adequately.

Aspect for review		Assessment	Recommendation
10	Specifying courses	• The program lists the courses • It does not demonstrate the study progression from one semester to the next very clearly.	• A study program explaining the progression in the curriculum is needed.
11	Overall consistency of the program	• The proposed program is consistent with the META Profile in general. • It is not clear whether competences are covered in the Program.	• Need clear listing of competences showing consistency between the vision, missions, and objectives of the program and the competences and learning outcomes. • Develop a detailed study plan that shows each course's activities leading to the relevant learning outcomes.
12	Overall view of developed Program	• Program is in its early stages of development and requires basic additions as stated above. • Existing segments of the Program are easy to read in general.	• Some explanations and connecting statements with the META Profile would be helpful. • Program needs some rethinking about its order and structure in order to read better.

The International University for Science and Technology

Name of Program: Architectural Engineering Program.

Name of Degree: Bachelor of Architectural Engineering.

Length of Degree: Five years.

Number of Credits: 168 credits.

Type of Courses: University requirements – College requirements – Department requirements (each consists of compulsory and elective courses).

Assessment of Program against the Architectural META Profile

Aspect for review		Assessment	Recommendation
1	Future fields of employment of graduates	The report clearly states areas of employment and type of work a graduate can do.	
2	Vision of Program in relation with the META Profile	The stated vision stems from the Architectural META Profile along with the other three factors creating a degree profile; namely, future trends, university strength and local professional and social needs.	
3	Missions of Program	The stated mission stem from the META Profile spirit along with the needs of the country.	
4	Objectives of the Program	The stated objectives stem directly from the META Profile.	
5	Link of competences with the agreed meta-profile	The report shows detailed study of how it adopted the competences of the META Profile in specific courses.	• It would be advisable to clearly state any competences that are added to the META Profile to give the Program its uniqueness. • Similar detailed study of competences for each course or group of courses should be done.

Aspect for review		Assessment	Recommendation
6	Definition of the level and length of the program	Name and length of Program are clearly stated.	
7	Presence of key Competences of the META Profile	The competences are clearly mentioned in their totality in the description of the Program.	
8	Definition of the competences	The proposed program benefited from the competences greatly. They are included in all courses.	• Course description is not included. When included, it must show competences achieved.
9	Learning outcomes	• Learning outcomes are not clearly stated for all courses. • Learning outcomes are provided in general terms for design courses only. • Wording of outcomes is still general and not written as specific outcomes. • Most learning outcomes can be measurable when stated in detail. • Learning outcomes cover the intended competences as per the provide example (design courses).	• Detailed learning outcomes should be clearly written for each course or group of courses in a similar way to the given example of design courses. • Existing areas of learning outcomes should be stated as clear outcomes with proper composition.
10	Specifying courses	The program lists the courses and demonstrates the study progression from one semester to the next very clearly.	
11	Overall consistency of the program	• The proposed program is consistent with the competences. • The competences are covered in the courses of the program. • Key competences are covered in several courses, allowing for progression in developing these competences.	• Need to develop comprehensive learning outcomes for all courses to emphasize and check consistency and comprehensiveness in covering all required competences.

Aspect for review		Assessment	Recommendation
12	Overall view of modified Program	• Program is modified very carefully to meet the vision of the four areas of the degree profile. • Program presents all main and needed components of a comprehensive program including mission, vision, objectives, and course description, but not fully addressing competences, and learning outcomes. • Program is well written and easy to read. • Degree of change in the old program leading to the new program is clear • Areas of change based on the META Profile are also well defined and clarified.	• Main concern of the modified program is its lack of the last important segment which is the development of the learning outcomes for all courses in logic similar to that used in developing the base for the learning outcomes of the design courses.

e) Final remarks

It is clear that each of the three evaluated programs is unique and different. Whether the program is developed from scratch as it was in the first two programs or modified as in the third one, they were very careful in benefiting from the concept and details of the META Profile. They adhered to it very carefully although they adopted it differently. All three programs require a certain amount of modification and additions; nonetheless, they all can very easily reach a high level of compatibility with the META Profile.

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