معهد العبور العالي
للهندسة والتكنولوجيا
طريق مصر-إسماعيلية الصحراوى – ك 31

OBOUR HIGH INSTITUTE
for
ENGINEERING and TECHNOLOGY

اللائحة الأكاديمية (ساعات معتمدة)
لبرامج الدراسة لمرحلة البكالوريوس

The Bylaws (Credit Hours)
of Undergraduate Programs

نوفمبر 2023

November 2023

Table of Contents

	Pg. #
Part A: Introduction	4
Vision and Mission of the Obour High Institute for Engineering and Technology	4
What is new in this Curriculum?	4
Article (1): Offered Programs	4
Article (2): Institute Departments	5
جزء أ. مقدمة	7
الرؤية والرسالة لمعهد العبور العالى للهندسة والتكنولوجيا	7
ما هو الجديد في هذا المنهج؟	7
مادة (1): البرامج المقدمة	7
مادة (2): أقسام المعهد	8
Part B: Admission Regulations	10
Article (3): Enrolment Requirements	10
Article (4): Tuition Fees	10
جزء ب: قواعد القبول	11
مادة (3): متطلبات التسجيل	11
مادة (4): مصاريف الدراسة	11
Part C: Study Regulations based on Credit Hour System	12
Article (5): Programs' System	12
Article (6): Study Levels	12
Article (7): Academic Semesters and Course Registration	13
Article (8): Program Study Duration	13
Article (9): Terms of Course Registration	14
Article (10): Degree Awarding Requirements	14
Article (11): Field Training	15
Article (12): Adding and Dropping a course	15
Article (13): Withdrawal from a course	15
Article (14): Incomplete course	16
Article (15): Student Evaluation	16
Article (16): Course Grades	16
Article (17): Course Repeating	17
Article (18): Study Dismissal and Academic Probation	18
Article (19): Calculation of the Cumulative Grade Point Average (GPA)	18
Article (20): Declaration of Honor	18
Article (21): Minimum Number of Students for Course Opening	19
Article (22): Academic Advisor	19
Article (23): Appeals	19
Article (24): Student Transfer between Credit Hour System and Semester-Based System	19
Article (25): General Provisions	20

Pg. #

جزء ج: تنظيمات الدراسة المبنية على نظام الساعات المعتمدة 21
مادة (5): نظام البرامج 21
مادة (6): مستويات الدراسة 21
مادة (7): الفصول الدراسية (الاكاديمية) وتسجيل المقررات 22
مادة (8): المدة الزمنية لبرنامج دراسى 22
مادة (9): شروط تسجيل مقرر 22
مادة (10): متطلبات منح الدرجة 23
مادة (11): التدريب الميدانى 23
مادة (12): اضافة واسقاط مقرر 23
مادة (13): الانسحاب من مقرر 24
مادة (14): المقرر الذى لم يستكمل دراسته 24
مادة (15): تقييم الطالب 24
مادة (16): تقديرات المقرر 24
مادة (17): اعادة المقرر 25
مادة (18): الفصل من الدراسة والانذار الاكاديمى 25
مادة (19): حساب متوسط نقاط التقديرات التراكمى 26
مادة (20): اعلان مرتبة الشرف 26
مادة (21): الحد الادنى لعدد الطلاب لفتح مقرر 26
مادة (22): المرشد الاكاديمى 26
مادة (23): الالتماسات 27
مادة (24): نقل الطلاب بين نظام الساعات المعتمدة والنظام المعتمد على الفصل الدراسى 27
مادة (25): احكام عامة 27
Part D: Details of the Offered Programs 28
Cultural Courses Requirements 30
Institute Requirements 30
Electrical Engineering Requirements 32
Program #1: Engineering and Technology of Computers and Control Systems Program 34
Program #2: Engineering and Technology of Electronics and Communications Program 41
Program #3: Construction Engineering & technologyProgram 48
Program #4: Architectural Engineering Program 55
Part E: Course Pool 62
E1 Courses of Humanities & Social Sciences (HUM) 63
E1.1 Language 65
E1.2 Business Administration 65
E1.3 Economy & Project Planning 66
E1.4 Law & Environment 67
E1.5 Arts 69
E1.6 Literature 70
E1.7 Personal Skills Development 71
E2 Courses of Basic Sciences (BAS) 73
E2.1 Mathematics 74

Pg. #

E2.2 Physics 76
E2.3 Mechanics 78
E2.4 Chemistry 79
E2.5 Engineering Drawing 79
E2.6 Mechanical Engineering & Production 80
E3 Courses of Electrical Engineering Department (ELE) 81
E3.1 Electrical circuits & Measurements 85
E3.2 Electronics 86
E3.3 Computer Hardware 92
E3.4 Computer Software 97
E3.5 Communication and Microwave 102
E3.6 Control Systems 109
E3.7 System Engineering 112
E3.8 Power & Machines 120
E3.9 Project & selected Topics 121
E4 Courses of Construction Engineering & technology(CIV) 126
E4.1 Structure Design & Analysis 129
E4.2 Properties, Testing and Resistance of Materials 135
E4.3 Geotechnical Engineering & Foundations 137
E4.4 Construction Engineering & technology& Project management 140
E4.5 Highways 145
E4.6 Surveying & Drawing 146
E4.7 Sanitary & Environment 148
E4.8 Irrigation & Hydraulics 149
E4.9 Project & selected Topics 150
E5 Courses of Architectural Engineering (ARC) 152
E5.1 Architectural Design 155
E5.2 Building Technologies 165
E5.3 Environmental Design 171
E5.4 Urban Planning 176
E5.5 Project Management 181

Part A: Introduction

The Obour Higher Institute for Engineering and Technology is one of the oldest engineering and technology institutes in Egypt, with area of Ten feddans. The Institute was established by Ministerial Decree No. 581, date 12-05-1996, and is accredited by the Ministry of Higher Education and Engineers Syndicate.

Vision and Mission of the Obour Higher Institute for Engineering and Technology

Vision

Achievement of leadership in the engineering education field, locally and regionally, and preparing distinguished and creative engineering cadres, qualified for the strong competence in the work field, and for effective social participation, and for notching success in the different life aspects.

Mission

Design of the educational process with high professionalism, and its support using modern technology, to achieve great efficiency and outstanding quality of education in the fields of "Architecture Engineering", "Construction Engineering", "Engineering and Technology of Electronics and Communications ", "Engineering and Technology of Computer and Control Systems".

The use of distinguished and well-qualified teaching staff to graduate distinguished generations in their fields, creative and able to compete strongly locally and regionally and to participate effectively in community-based nation-building.

Promoting creative joint activities and teamwork to develop the personality in general for students and provide them with the life skills and moral values necessary to achieve success in life and constructive community communication necessary for the development of society.

Encouraging scientific research, new ideas and scholarships, which leads to the excellence of graduates and the emergence of creative people Leaders and entrepreneurs.

What is new in this Curriculum?

This curriculum emphasizes the importance of student's self-directed learning. The following concepts are the bases of the design of this curriculum:

1. Excellence demands extraordinary education; it follows that we need to:
   - Switch from Education to Learning.
   - Recognize the student as the core of the teaching process.
   - Provide students with best environment to succeed in their studies.
   - Focus on practical applications in Engineering.
2. The institute is divided into Programs and all Programs follow the Credit-Hour system.
3. Common courses have same Code/ILO/Content/Delivery methods/Assessment Criteria.
4. Tendency to reduce the number of simultaneous courses per semester to increase the student's learning process.
5. Before preparing our Programs, similar programs were reviewed in top Universities in Egypt, USA, and Europe.
6. Compliance with the European Credit Transfer System (ECTS) to facilitate student mobility with European Universities.
7. Redefine the relationship between Programs and Departments.

Article (1): Offered Programs

The Obour Higher Institute for Engineering and Technology offers a variety of Engineering Programs. Each Program is administrated by the department offering it. The programs are divided into Specialized and

Inter-Disciplinary Programs. They are carefully selected to satisfy the needs of the National Industry, as well as the needs of the Regional Industry, which recruits many graduates from Egyptian Universities. Table 1 lists the offered programs.

Engineering Programs	Specialized Programs	Electrical Engineering	Engineering and Technology of Computers and Control Systems Program
			Engineering and Technology of Electronics and Communications Program
		Construction Engineering & technologyProgram	
		Architectural Engineering Program	

Table 1 List of Undergraduate Programs El Obour Higher Institute for Engineering and Technology.

El Obour Higher Institute for Engineering and Technology awards the Bachelor of Science Degree in engineering as follows:

1. Bachelor of Science in Electrical Engineering
   - Engineering and Technology of Computers and Control Systems
   - Engineering and Technology of Electronics and Communications
2. Bachelor of Science in Construction Engineering & technology
3. Bachelor of Science in Architectural Engineering

Article (2): Institute Departments

The courses at the Obour Higher Institute for Engineering and Technology are offered by 4 different departments, listed in Table 2.

Field	#	Department	Acronym
Cultural			HUM
Basic Science	1	Basic Sciences Department	BAS
Engineering and Technology of Computers and Control Systems	2	Electrical Engineering Department	ELE
Engineering and Technology of Electronics and Communications			
Construction Engineering & technology	3	Construction Engineering & technology Department	CIV
Architectural Engineering	4	Architectural Engineering Department	ARC

Table 2 List of Departments at the Obour Higher Institute for Engineering and Technology.

An Institute Department is responsible for teaching courses to all programs, which need courses in the specialization of the department and holding the department code. The department is responsible for the scientific content of the course and the nomination of instructors to each course, either from the department, from another department, or from outside the institute. The Obour Higher Institute for Engineering and Technology council is responsible for the nomination of instructors of cultural courses. The following subjects are assigned to the relevant department to teach:

1. Basic Science Department

Mathematics, Physics, Mechanics, Chemistry, etc.

2. Electrical Engineering Department

Electrical Materials, Electronic Measurements, Electronic Engineering, Electronic Circuits, Communications, Electromagnetic Waves, Electrical Testing, Integrated Circuits, etc.

Software Engineering, Computer Networks, Digital Security, Computer Organization, Digital Circuit Design, Embedded Systems, Artificial Intelligence and Applications, Computer Applications, etc.

3. Construction Engineering & technology Department

Structural Analysis, Design of Concrete Structures, Design of Steel Structures, Properties Testing and Strength of Materials, Geotechnical and Foundation Engineering, Construction Engineering, Project Management, Traffic Engineering, Sanitary Engineering, Environmental Engineering, Irrigation and Drainage Engineering, Fluid Mechanics, Hydraulics, etc.

4. Architectural Engineering Department

Architectural Design, Theory of Architecture, History of Architecture, Computer Applications in Architecture, Working Drawings, Building Technology, Legislations and Project Management, Building Conservation, Restoration of Architectural Heritage, city planning, Landscaping, Environmental Studies, Sociology Urban Geography, Urban Economy, Housing, Geographic Information systems, etc.

جزء أ. مقدمة

معهد العبور العالي للهندسة والتكنولوجيا هو واحداً من أقدم المعاهد في مجال الهندسة والتكنولوجيا في مصر، وهو يقع على مساحة عشرة أفدنة. أنشأ المعهد بموجب القرار الوزاري رقم 581 بتاريخ 12-05-1996 وهو معتمد من وزارة التعليم العالي ونقابة المهندسين المصرية.

الرؤية والرسالة لمعهد العبور العالي للهندسة والتكنولوجيا

رؤية المعهد

تحقيق الريادة في مجال التعليم الهندسي محلياً وإقليمياً وإعداد كوادر هندسية متميزة ومبدعة مؤهلة للمنافسة بقوة فى سوق العمل وقادرة على المشاركة المجتمعية الفعالة وإحراز النجاح في مختلف نواحي الحياة.

رسالة المعهد

تصميم العملية التعليمية بإحترافية عالية وتدعيمها بالتكنولوجيا الحديثة بحيث تحقق كفاءة عظمى وجودة تعليم متميزة فى مجالات الهندسة المعمارية و هندسة وتكنولوجيا التشييد وهندسة وتكنولوجيا الإلكترونيات والإتصالات وهندسة وتكنولوجيا الحاسبات ونظم التحكم.
الإستعانة بكادر تعليمي متميز ومؤهل جيداً لتخريج أجيال متميزة في مجالاتها ومبدعة وقادرة على المنافسة بقوة محليا واقليميا وعلى المشاركة المجتمعية الفعالة لبناء الوطن.
تعزيز الأنشطة المشتركة الإبتكارية والعمل الجماعي لتطوير الشخصية بشكل عام للطلاب وإكسابهم المهارات الحياتية والقيم الأخلاقية اللازمة لتحقيق النجاح في الحياة والتواصل المجتمعي البناء واللازم لتطوير المجتمع.
تشجيع البحث العلمي والأفكار الجديدة والمنح الدراسية مما يؤدى إلى تميز الخريجين وظهور المبدعين والقادة ورجال الأعمال.

ما هو الجديد في هذا المنهج؟

يؤكد هذا المنهج على أهمية التعلم الذاتي التوجيه من الطالب، وتوضح الأفكار التالية أسس تصميم هذا المنهج:

1. التميز التعليمي الواضح وهو ما يعتمد على:
   - التحول من التعليم إلى التعلم.
   - أن يكون الطالب هو محور العملية التعليمية.
   - توفير البيئة المناسبة اللازمة لتفوق الطلاب في دراستهم.
   - التركيز على التطبيقات العملية في الهندسة.
2. ينقسم المعهد الى برامج وكلها تتبع نظام الساعات المعتمدة.
3. المقررات المشتركة لها نفس الكود/ المخرجات/ المحتوى/ وطرق التسليم / ومعايير التقييم.
4. الإتجاه إلى تقليل عدد المواد التي يتم دراستها في نفس الوقت للفصل الدراسي لزيادة الحصيلة العلمية للطلاب.
5. قبل الإعداد لبرامجنا، تمت مراجعة برامج مشابهة لجامعات القمة في مصر والولايات المتحدة الأمريكية وأوروبا.
6. الأخذ بنظام النقل المعتمد الأوربى ECTS لتسهيل تحرك الطالب مع الجامعات الأوربية .
7. إعادة تعريف العلاقة بين البرامج والاقسام.

مادة (1): البرامج المقدمة

يقدم معهد العبور العالي للهندسة والتكنولوجيا العديد من برامج الهندسة، كل برنامج يتم إدارته بالقسم الذى يقدمه. وتنقسم البرامج إلى ما هو تخصصي وما هو بيني، وهى مختارة بعناية لتلبى إحتياجات الصناعة الوطنية وكذلك إحتياجات الصناعة الإقليمية، وهي التي تعتمد على كثير من خريجي الجامعات المصرية. ويحدد الجدول التالي البرامج المقدمة:

لائحة الساعات المعتمدة لبرامج الدراسة لمرحلة البكالوريوس

برامج الهندسة	البرامج التخصصية	الهندسة الكهربية	برنامج هندسة وتكنولوجيا الحاسبات ونظم التحكم
			برنامج هندسة وتكنولوجيا الالكترونيات و الاتصالات
		برنامج هندسة وتكنولوجيا التشييد	
		برنامج الهندسة المعمارية	

يمنح معهد العبور العالى للهندسة والتكنولوجيا درجة البكالوريوس في الهندسة كالاتى:

1- بكالوريوس الهندسة الكهربية، برنامج هندسة وتكنولوجيا الحاسبات ونظم التحكم.
2- بكالوريوس الهندسة الكهربية، برنامج هندسة وتكنولوجيا الإلكترونيات والإتصالات.
3- بكالوريوس هندسة وتكنولوجيا التشييد.
4- بكالوريوس الهندسة المعمارية.

مادة (2): أقسام المعهد

تقدم المقررات الدراسية في معهد العبور العالي للهندسة والتكنولوجيا عن طريق اربع أقسام مختلفة مدونه في الجدول التالى:

المجال	#	القسم	الرمز
الثقافي			HUM
العلوم الأساسية	1	قسم العلوم الأساسية	BAS
هندسة وتكنولوجيا الحاسبات نظم التحكم	2	قسم الهندسة الكهربية	ELE
هندسة وتكنولوجيا الإلكترونيات والإتصالات			
هندسة وتكنولوجيا التشييد	3	قسم هندسة ونكنولوجيا التشييد	CIV
الهندسة المعمارية	4	قسم الهندسة المعمارية	ARC

وتكون مسئولية كل قسم بالمعهد هي تدريس المقررات لكل البرامج التي تحتاج إلى مواد التخصص في القسم وتحمل كود القسم. ويكون القسم مسئول عن المحتوى العلمي للمقرر وترشيح المدرسين لكل مقرر، إما من نفس القسم أو من قسم أخر أو من خارج المعهد. المواد الاتية مقررة للقسم المختص لتدريسها:

1. **قسم العلوم الأساسية:**
الرياضيات – الفيزياء – الميكانيكا – الكيمياء .... الخ.

2. **قسم الهندسة الكهربية:**
المواد الكهربية – القياسات الإلكترونية – الهندسة الإلكترونية – الدوائر الإلكترونية –الإتصالات والموجات الكهرومغناطيسية - الإختبار الكهربي – الدوائر المتكاملة .....إلخ.

3. **قسم هندسة ونكنولوجيا التشييد:**
تحليل الإنشاءات – تصميم الإنشاءات الخرسانية وتصميم إنشاءات الصلب – خواص وإختبار قوة المواد –هندسة الإنشاءات – إدارة المشاريع – هندسة المرور - هندسة الأعمال الصحية - هندسة البيئة – هندسة الرى والصرف -ميكانيكا السوائل – الهيدروليكا ..إلخ.

4. **قسم الهندسة المعمارية:**

التصميم المعماري– نظرية العمارة – تاريخ العمارة – تطبيقات الحاسب الآلي في العمارة – رسوم العمل وتكنولوجيا البناء – تشريعات وإدارة المشروعات والحفاظ على المباني المعمارية الأثرية – تخطيط المدن والمسح العام والدراسات البيئية وجغرافية المناطق المدنية والإجتماعية والإقتصاد المدني –الإسكان وأنظمة المعلومات الجغرافية....إلخ.

Part B: Admission Regulations

Article (3): Enrolment Requirements

- The Minister of Higher Education determines, after taking the opinion of the Supreme Council for Institutes Affairs at the end of each academic year, the number of students from the Arab Republic of Egypt or others who are admitted to the institute considering his needs in the next academic year who have obtained a high school diploma or equivalent certificates and their admission system.
- Nominating students to the institute is through the Admission Coordination Office unless the Minister of Higher Education decides otherwise.
- Student registration at the institute demands the following:
  1. He must have a high school diploma (Thanaweya Amma) or its equivalent from Arab and foreign certificates. Also, He can be a holder of industrial technical diploma (5, 3 years) or industrial technical institutes diploma.
  2. The medical examination must prove that student is free of contagious diseases and is suitable for continuing studies in accordance with the rules set by the Supreme Council for Institutes Affairs.
  3. He must be full-time studying at the institute in accordance with the provisions of the institute's internal regulations.
  4. He should be of good conduct and of good reputation.
- It is not permissible for the student to register his name in more than one institute at the same time, and he may not combine the registration in an institute that is not affiliated with the ministry or any university college. It is not permissible for the student to re-enroll in any institute to obtain a certificate previously obtained, nor may he be re-enrolled in order to obtain another degree from a similar institute.

جزء ب: قواعد القبول

مادة (3): متطلبات التسجيل

- يقرر وزير التعليم العالي بعد أخذ رأى المجلس الأعلى لشئون المعاهد بعد نهاية كل عام أكاديمي عدد الطلاب المصريين وغيرهم الذين يسمح لهم بدخول المعهد (آخذاً في الإعتبار إحتياجاته في العام الأكاديمي التالي) والذين حصلوا على دبلوم المدارس الثانوية أو الشهادات المعادلة لنظام القبول.
- ترشيح الطلاب للمعهد يتم عن طريق مكتب التنسيق إن لم يقرر وزير التعليم العالي غير ذلك.
- يتطلب تسجيل الطلاب في المعهد ما يلي:

1. يجب أن يكون الطالب حاصلاً على شهادة الثانوية العامة أو ما يعادلها من شهادات عربية أو أجنبية ويمكن للطالب أيضاً أن يكون حاصلاً على دبلوم المدارس الصناعية الفنية (3 أو 5 سنوات) أو دبلوم المعاهد الصناعية أو الفنية .
2. يجب أن يثبت الكشف الطبي أن الطالب خالياً من الأمراض المعدية ولائقاً لإستكمال الدراسة بما يتوافق مع القواعد التي وضعها المجلس الأعلى لشئون المعاهد.
3. أن يدرس الطالب كل الوقت بما يتوافق مع التنظيمات الداخلية التي أعدها المعهد.
4. يجب أن يكون الطالب حسن السير والسلوك.

- غير مسموح للطالب أن يسجل إسمه في أكثر من معهد في نفس الوقت ولا يربط تسجيله في معهد لا يتبع الوزارة أو أي كلية جامعية، وغير مسموح للطالب كذلك أن يعيد تسجيل إسمه في أي معهد ليحصل على شهادة تم الحصول عليها مسبقاً ولا أن يعاد التسجيل ليحصل على درجة أخرى من معهد مشابه.

مادة (4): مصاريف الدراسة

- مصاريف الدراسة طبقا للساعات المعتمدة، يتم تحديدها سنوياً عن طريق وزارة التعليم العالي، بناءً على معدل التضخم المعلن، وعلى مجلس المعاهد أن يعلن عن هذه المصاريف قبل بداية السنه الأكاديمية.
- تدفع مصاريف الدراسة كل فصل دراسي (الفصلين الأول والثاني الرئيسيين) بناءً على عدد الساعات المعتمدة التي سجلها الطالب بحد أدنى بما يتوافق مع الخدمات التعليمية للمصاريف (12 CH) لكل فصل دراسي، هذا إن لم يكن عدد الساعات المعتمدة الباقية لإتمام الدرجة العلمية أقل من ذلك. وفى هذه الحالة يجب أن يدفع الطالب العدد الفعلي المسجل للساعات المعتمدة.
- يتم دفع مصاريف تعادل (1 CH) في كل فصل دراسي لأنشطة المناهج الإضافية (الزائدة) دخل حرم المعهد.
- ويتم تحديد مصاريف الخدمات التعليمية للفصل الدراسي الصيفي بناءً على العدد الفعلى للساعات المعتمدة المسجلة من الطالب.

لا يكون تسجيل المقرر نهائياً إلى أن يدفع الطالب مصاريف الخدمات التعليمية للفصل الدراسي.

Part C: Study Regulations based on Credit Hour System

The articles in this Part regulates the course teaching, learning and assessment throughout the programs. These articles are based on the 2020 Terms of Reference for the design of Credit-Hour Programs for undergraduate level published by the Engineering Sector Committee, Supreme Council of Universities on 21th of March 2020.

Article (5): Programs' System

- The official teaching Language is English.
- The Programs follow the Credit-Hour (CH) system. This is a measure of the contact hours between the teachers and the student per semester. One Credit Hour is equivalent to the course Contact Hours as follows:
  - One Hour weekly lecture for a semester of 15 weeks.
  - Two to Three Hours weekly tutorial and laboratory for a semester of 15 weeks.
- One Contact Hour is divided into 50 minutes actual teaching and 10 minutes break.
- For each course and Program in this curriculum, the European Credit Transfer and Accumulation System (ECTS) is given as a numerical descriptive value of qualification expressed in terms of Student Work Load (SWL). It is defined as "the number of working hours typically required to complete the learning activities of course units in order to achieve their expected learning outcomes". This system was adopted through the Bologna declaration in 1999 at the University of Bologna in Italy to facilitate the mobility of students through Europe.
- The total SWL comprises two components:
  - The structured SWL which is the scheduled teacher-contact hours interventions.
  - The unstructured SWL (USWL) which is the time spent by students in their own self-study, completing course assignments, and preparing for all types of exams, e.g. assessment workload.
- It has been considered as an essential description of the educational qualification recommended in the European Higher Education Area as a key element of the Bologna and Europeans Framework Qualifications in terms of total SWL.
- One ECTS credit corresponds to 25 hours of total student working, and each 15-weeks academic semester should meet 30 ECTS. As an agreed requirement, 750 hours of total SWL are necessary in a full academic semester, or about 50 hours of total SWL/per week.
- Expected values for each semester:
  - 16-19 CH
  - 25-28 Contact hours per week for 15 weeks
  - 750 hours of total student work load
  - 30 ECTS

The distribution of marks is left to course designer to decide. It depends on the nature of the course. Some courses are theoretical, and therefore give more marks to the exams, and some courses are more practical and therefore give more marks to the projects, assignments, and labs.

Article (6): Study Levels

Whenever the student completes a certain percentage of the Program requirements, he will be transferred from one level to the next. Table 3 shows the student status based on the completed number of achieved Credit Hours.

Study Level	Student Status	Percentage of Achieved Credit Hours Successfully
0	Freshman	0% to less than 20%
1	Sophomore	20% to less than 40%
2	Junior	40% to less than 60%
3	Senior1	60% to less than 80%
4	Senior2	80% to 100%

Table 3 Study Levels and relation to the achieved Credit Hours.

Article (7): Academic Semesters and Course Registration

- The academic year comprises two main semesters, and one summer semester (c.f. Figure 1):
  - First main semester (Fall): Begins on Saturday of the third week of September and lasts for 15 weeks of teaching followed by 3 weeks of examinations. Course registration takes place within 3 weeks before the starting day of the semester.
  - Second main semester (Spring): Begins in February and lasts for 15 weeks followed by 3 weeks of examination. Course registration takes place within 1 week before the starting day of the semester.
  - Summer semester: Begins late June or early July and lasts for 7 weeks followed by 1 week of examination. Course registration takes place within 1 week before the starting day of the semester.

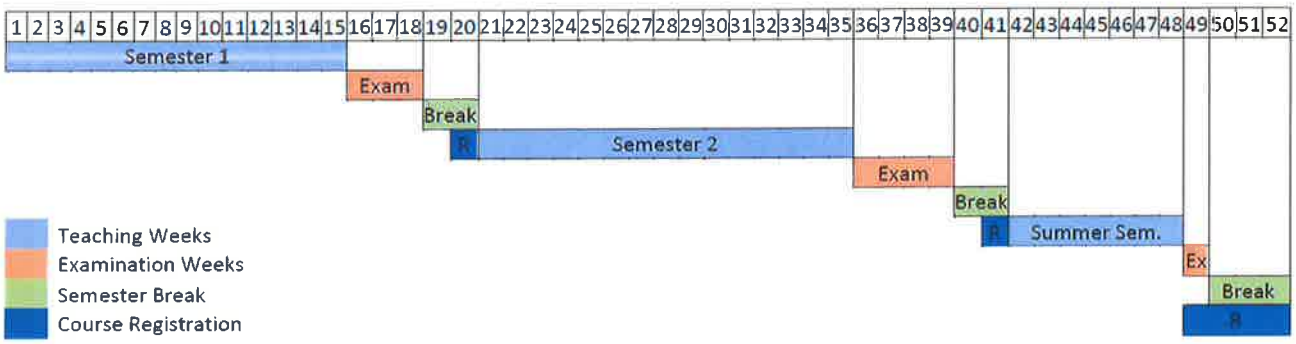


Figure 1 Academic Calendar

- Registration is not final until the full tuition fees of the semester are paid.
- Registration is not final until the approval of the student's academic advisor and the approval of the program' department.
- New students' enrolment in the programs takes place all year long, after fulfilling all the programs requirements and paying the enrolment fees, per the student status.
- Registration in the Summer semester is optional.

Article (8): Program Study Duration

- The minimum allowed study duration is nine main semesters.
- The maximum allowed study duration is twenty main semesters (ten years), which does not include frozen semesters for reasons accepted by the Obour High Institute for Engineering and Technology Council, after which the student is dismissed from the programs.

Article (9): Terms of Course Registration

- The student may register courses in the main semesters with a maximum total Credit Hours according to the following rules (after approval of the Academic Advisor):
  - Up to 21 Credit Hours for a student with a Cumulative GPA larger than or equal to 3.0
  - Up to 18 Credit Hours for a student with a Cumulative GPA larger than or equal to 2.0, but less than 3.0. Registration using this number is carried out in the first semester of the student.
  - Up to 14 Credit Hours for a student with a Cumulative GPA less than 2.0
- The student may register courses in the Summer semester in a maximum total Credit Hours according to the following rules (after approval of the Academic Advisor):
  - Up to 9 Credit Hours for a student with a Cumulative GPA larger than or equal to 3.0
  - Up to 8 Credit Hours for a student with a Cumulative GPA less than 3.0
- The student may register one additional course to the above limits if this will lead to his graduation after the approval of the academic advisor.
- Late registration is not final unless there is a vacancy in the course, and the student should pay additional administrative fees equal to 1 Credit Hour, if applicable, in accordance with the recommendations of the Education and Students Affairs Committee and approval of the Council of the Obour High Institute for Engineering and Technology regarding this issue.
- It is allowed that Non-Degree students can register courses provided that they pay the applicable regular tuition fees related to these courses. The student will be given a transcript of the courses he has joined, showing his grades as per these regulations.
- Degree and Non-Degree students can register courses as audit in some courses provided that there is a vacancy in these courses, and after paying the applicable academic service fee, which is three fourth of the course regular tuition fees. Audit students are not eligible to enter the course final exam.

Article (10): Degree Awarding Requirements

- To obtain the Bachelor of Science Degree in Engineering, the student must successfully complete the required Credit Hours in one of the programs according to the requirements stipulated in Part D, with a GPA at graduation of at least 2.0.
- The student must pass all zero-credit courses in his Program.
- A graduation project is an essential part of all the programs requirements for graduation. The graduation project may be completed over two successive semesters, as per the program requirement, and the student will not graduate unless he fulfils the project pass requirements. The student must earn at least 70% of total Credit Hours to register for the graduation project. If the project is divided along two semesters, the student must register them in their order.
- The student must perform Field Training for 6 weeks during his study duration.
- The student can study a number of courses in another University which has a cooperation agreement with Obour High Institute for Engineering and Technology regarding the transfer of Credits. This requires prior approval from the Obour High Institute for Engineering and Technology. The Credit Hours of these courses are included in the student's graduation requirements, provided that the total Credit Hours of these courses do not exceed half of the total Credit Hours.

Article (11): Field Training

- The student must perform Field Training for 6 weeks in an industrial or service facility related to the student's program and must be under the full supervision of the faculty. It is also possible to perform the training inside the faculty in a similar environment.
- The training follow-up will be handled by the academic advisor assigned by the Program Steering Committee.
- Identifying a company official contact person.
- The student must submit a technical report to his academic advisor at the end of the training period.
- The company should submit a student's training evaluation form to the academic advisor at the end of the training period.
- The training is divided into periods of 2 weeks at the end of the first, second, and third levels. (Can be in the fourth level as well – open during the semester)
- Training for a period 6 weeks is allowed for only one time during the study duration.
- The field training is evaluated on pass/fail basis and does not count in the cumulative GPA calculation.
- The student should pay the supervision fees for the field training at a rate of 2 Credit Hours, if applicable, each academic year during which he is performing Field Training.

Article (12): Adding and Dropping a course

- The student may add courses in the first week of the main semesters, or the first three days of the summer semester.
- The student can drop courses with refundable fees, if applicable, until the end of the second week of the main semesters or the end of the first week of the summer semester.
- Adding or Dropping course(s) should not violate the minimum and maximum number of Credit Hours registered per semester.

Article (13): Withdrawal from a course

- The student may withdraw from any course within the first ten weeks of the main semesters or the first five weeks for the Summer semester.
- The student does not fail the withdrawn course, provided that the withdrawal application and approval are finalized within the time limit mentioned in the previous point.
- The student gets a (W) grade for the withdrawn course and is allowed to register that course (full attendance and performing all activities including examinations) in a following semester.
- For elective courses, the student is allowed to change it in a following semester if he fails to pass it or withdraws from it. This is subject to the approval of the academic advisor and the requirements of his program.
- For non-scholarship students, the tuition fees for this course will not be refunded for withdrawn courses. The next time the student registers this course, he will have to pay its fees in full. The student, who withdraws from a whole semester without registering any course must pay the minimum tuition fees which is equivalent to 12 CH.
- For scholarship students, the Credit Hours of the withdrawn course are deducted from his scholarship. The student will be allowed to register this course one more time for free.

Article (14): Incomplete course

- If a student does not attend the final exam of the course in a semester with an excuse that is accepted by the Student Affairs Committee and approved by the Council of the Obour High Institute for Engineering and Technology, the course is considered Incomplete.
- The student will get a grade (I) in the course until the exam is carried out in that course. If the student fails to attend the final exam at the next available date, the student will get a grade (F) in that course. Grade (I) will not count in the student's cumulative GPA.
- At the next available examination date, the student takes the exam, after paying a re-examination fees equivalent to one Credit Hour, if applicable. The marks of this final exam are added to the semester-work marks to calculate the overall grade of this course.

Article (15): Student Evaluation

- The marks of each course are distributed as percentages of the total mark, divided into Course Activities, Mid-Term Exam, Practical Exam, and Final Exam.
- The student must attend at least 75% of all course contact hours to be allowed to attend the course final examination.
- For the student to pass a course, the minimum mark that must be earned in the final exam is 30% of the total exam marks, otherwise the student will fail the course irrespective of the total marks he earned in the course and he will get an F grade in this course. This clause does not apply to the courses with no final exam.
- The student fails the course if he obtains an F grade (less than 60% of the course marks) or was not allowed to attend the final examination because of exceeding the absence percentage or cheating ... etc. or did not attend the final examination without submitting a prior excuse that is accepted by the Education and Student Affairs Committee and approved by the Council of the Obour High Institute for Engineering and Technology.
- Zero-Credit courses are marked as Pass or Fail. The student gets a grade but does not contribute to the cumulative GPA. To pass the course, the student should get at least 60% of the course total marks.

Article (16): Course Grades

- The GPA of each course is calculated based on the marks a student collects during his study of this course (Student Activities – Mid Term Exam – Practical Exam – Final Exam). Table 4 shows how to calculate the GPA based on the collected marks. The student must get a minimum Grade D in order to pass the course and be considered in the calculation of the Cumulative GPA.
- The distribution of the marks among different assessment criteria is determined in the course description of this Bylaw.

Marks % Collected	Grade	Points

More than 97%	A+	4.0
93% to less than 97%	A	
89% to less than 93%	A-	3.7
84% to less than 89%	B+	3.3
80% to less than 84%	B	3.0
76% to less than 80%	B-	2.7
73% to less than 76%	C+	2.3
70% to less than 73%	C	2.0
67% to less than 70%	C-	1.7
64% to less than 67%	D+	1.3
60% to less than 64%	D	1.0
Less than 60%	F	0.0

Table 4 Course grades and equivalent GPA.

- For other courses where the student is registered as a listener (audit), or is only required to pass (zero credit courses), are not included in the cumulative GPA, the course grades will be as given in Table 5.

Grade	Explanation
AU	Listener (Audit)
P	Pass
F	Fail
W	Withdrawn
I	Incomplete

Table 5 Grades of zero credit courses.

Article (17): Course Repeating

- The student can repeat a course for improvement if his grade satisfies the minimum passing requirement, according to the following rules:
  - The student gets the higher grade of the course after repeating. This grade is the one that will be accounted for in the cumulative GPA, on condition that the improvement should be shown in the student's transcript.
  - The maximum number of times that the student can repeat for repeating is five times during his study duration, except for improving courses with the purpose of getting out of the academic probation or satisfying the graduation requirements.
  - The student should pay the full credit hours fees for the improving course.
- If the student fails a course (gets F grade), he should repeat the course (full attendance and performing all activities including examinations - the course grade is calculated from scratch), according to the following rules:
  - The maximum grade of the repeated course is B+.
  - The student gets the grade of the course after repeating. This grade is the one that will be accounted for in the cumulative GPA, on condition that the repeating should be shown in the student's transcript.

Article (18): Study Dismissal and Academic Probation

- A student gets an academic probation if his Semester GPA at any main semester is less than 2.0.
- A student will be dismissed from the Obour High Institute for Engineering and Technology if he gets Semester GPA less than 2.0 in six consecutive semesters excluding Summer Semesters. If the student's Semester GPA exceeds 2.0 in any semester, then the number of consecutive academic probation is reset.
- The student will be dismissed from the Obour High Institute for Engineering and Technology if he fails to achieve the graduation requirements during the maximum study duration, which is ten years.
- The student who is exposed to study dismissal due to his inability to raise his GPA to at least 2.0 will be offered an additional and final chance to register in 2 consecutive main semesters and a summer semester to raise his GPA to at least 2.0 and achieves the graduation requirements, provided that he has successfully completed at least 80% of the total number of credit hours required for graduation and there is a chance for the student to raise his GPA to at least 2.0.

Article (19): Calculation of the Cumulative Grade Point Average (GPA)

- Course points achieved by the student are calculated as the number of Credit Hours of this course multiplied by the course grade points according to Table 4 in Article (16).
- In any semester, the total points earned by the student are calculated as equal to the sum of the courses points the student earned in this semester.
- The Cumulative GPA at the end of any semester is calculated as the total points achieved by the student in all courses studied divided by the total number of Credit Hours of these courses, taking into consideration the rules relevant to the repeated and improved courses.

$$\text{Cummulative GPA} = \frac{\sum_{\text{Courses}} \text{Grade Points} * \text{Credit Hours}}{\sum_{\text{Courses}} \text{Credit Hours}}$$

- The Semester GPA is calculated as the total points achieved by the student in his courses of this semester divided by the total number of Credit Hours of these courses.
- The Graduation Cumulative GPA is the Cumulative GPA at Graduation, after fulfilling all the graduation requirements. The student cannot get the degree unless he achieves at least a cumulative GPA of 2.0.
- The ranking of the graduate is determined based on the Graduation Cumulative GPA. In case of equal Graduation Cumulative GPA between two or more students, the ranking will be based on their total accumulative marks, taking into consideration the rules relevant to the repeated and improved courses.
- The student's Transcript should include all registered courses during the study duration, including these he failed, withdrew from, or improved.

Article (20): Declaration of Honor

- For a student to achieve the declaration of homer, he must fulfil the following conditions:
  - Maintain a cumulative GPA of 3.3 throughout his study at the Program and any semester GPA should be higher than or equal 3.3.
  - Does not fail any course throughout his study at the Program.
  - Did not get any penalty throughout his study at the Institute.

Article (21): Minimum Number of Students for Course Opening

- The minimum number of students required to open a course is 10 students, or 75% of the number of students registered in this program level, whichever is less.
- The minimum number of students required to open an elective course is 5 students or 25% of the number of students in this program level, whichever is less.
- Course opening is subject to the availability of teaching staff and the proper allocation of facilities.
- The Obour High Institute for Engineering and Technology Council may provide exceptions to these limits if there is a necessity.

Article (22): Academic Advisor

- Every student is assigned an Academic Advisor who follows-up the student academic progress and assists him in selecting the courses each semester.
- There can be more than one Academic Advisor in the Program based on the number of students enrolled in the Program.
- The Program Academic Advisor is responsible for:
  - Helping the student to choose his academic path and helps him to select courses each semester.
  - Helping the student with the choice of the Field Training.
  - Helping the student with the choice of concentration and graduation project.
- The Academic Advisor may ask the student to repeat courses which he has already passed or ask him to register in additional courses to raise his cumulative GPA to that required for graduation.

Article (23): Appeals

- The student can submit an appeal to review his course marks within a week from grades announcement, and after paying the required fees in accordance with the Institute regulations regarding this issue.
- In case of general complaint from a course result, the concerned committee reviews the students' marks and give a decision regarding the marks of this course.

لائحة الساعات المعتمدة لبرامج الدراسة لمرحلة البكالوريوس

From Semester Based System	To Credit-Hour System	
Equivalent Percentage	**Points**	**Grade**
More than 95%	4.0	A+
90% to less than 95%		A
85% to less than 90%	3.7	A-
80% to less than 85%	3.3	B+
75% to less than 80%	3.0	B
71% to less than 75%	2.7	B-
68% to less than 71%	2.3	C+
65% to less than 68%	2.0	C
60% to less than 65%	1.7	C-
55% to less than 60%	1.3	D+
50% to less than 55%	1.0	D
Less than 50%	0.0	F

Table 6 Equivalent grades when moving from Semester Based System to Credit Hour System.

Article (25): General Provisions

- These regulations apply to the newly admitted students to the Obour High Institute for Engineering and Technology.
- Current students at the Obour High Institute for Engineering and Technology can join these Programs and an equivalence can be made for the courses they have already passed.
- For any topic not covered by these regulations, the applicable Law of Universities and its amendments are taken as a reference. If not covered by the Law, then it should be presented to the Ministry of Higher Education, Institutes Supreme Council for approval.

جزء ج: قواعد الدراسة المبنية على نظام الساعات المعتمدة

يوضح هذا الجزء من اللائحة كيفية تدريس المقررات والتعلم والتقييم فى البرامج المختلفة، والمواد الموضحة تاليه مبنية على الشروط المشار إليها في الإطار المرجعى 2020 لتصميم برامج الساعات المعتمدة لمستوى طلاب البكالوريوس فيما تم نشره للجنة القطاع الهندسي التابعة للمجلس الأعلى للجامعات في 21 مارس 2020.

مادة (5): نظام البرامج

- لغة التدريس الرسمية هي اللغة الإنجليزية.
- تتبع البرامج نظام الساعات المعتمدة (CH)، وهو قياس لساعات الإتصال بين المعلمين والطلاب خلال كل فصل دراسي. وتعادل كل ساعة معتمدة عدد ساعات إتصال كالآتى:
  - ساعة واحدة محاضرة أسبوعية للفصل الدراسي المكون من 15 أسبوع.
  - من ساعتين إلى ثلاثة ساعات أسبوعياً تمرين أو عملي للفصل الدراسي المكون من 15 أسبوع.
- تقسم ساعة الإتصال إلى 50 دقيقة من التدريس الفعلي و10 دقائق راحة.
- لكل مقرر وبرنامج في هذا المنهج، يقدم النظام الأوربي المعتمد للنقل والتراكم (ECTS) قيمة وصفية عديدة يتم التعبير عنها في إصطلاح حمل العمل للطالب (SWL) ويعرف هذا كعدد ساعات العمل المطلوبة نمطياً لإستكمال أنشطة تعليم المقرر لتحقق المخرجات التعليمية المتوقعة، وقد تم تبنى هذا النظام عن طريق إعلان بولونيا سنة 1999 في جامعة بولونيا في إيطاليا لتسهيل حركة الطلاب عبر أوروبا.
- إجمالي حمل العمل للطالب (SWL) وهذا يتكون من جزأين:
  - ساعات إتصال الطالب بالمدرس المذكورة في الجداول الدراسية.
  - الساعات غير المهيكلة من عمل الطالب (USWL) وهو الوقت الذي يقضيه الطلاب في المذاكرة الذاتيه ليكمل واجبات المنهج والإعداد لكل أنواع الإختبارات وأعباء التقييم.
- ولقد تم إعتبار أن الوصف الأساسي للمؤهل التربوي الذي يوصى به في منطقة التعليم العالي الأوربى كمفتاح رئيسي للتأهيل لإطار العمل البولونى والأوروبي في شروط ساعات عمل الطالب الإجمالية.
- تتفق الساعة المعتمدة (ECTS) مع 25 ساعة من إجمالي ساعات عمل الطالب، وكل فصل دراسى أكاديمى مكون من 15 أسبوع يجب أن يتفق مع 30 ساعه ECTS و 750 ساعة من إجمالى ساعات عمل الطالب (SWL) هي ضرورية في الفصل الأكاديمى الدراسي الكامل، أو حوالي 50 ساعه من إجمالي (SWL) في الأسبوع الواحد.
- القيم المتوقعة لكل فصل دراسي:
  - CH 19-16
  - 28-25 ساعات إتصال في الأسبوع لكل 15 أسبوع.
  - 750 ساعة للحمل الكامل لعمل الطالب.
  - ECTS 30

ويترك توزيع الدرجات لمصمم المقرر ليحدده، ويعتمد هذا على طبيعة المقرر. بعض المقررات نظرية ولهذا تعطى درجات أكثر للإختبارات وبعض المقررات عملية أكثر وتعطى درجات أكثر للمشاريع والواجبات والمعامل.

مادة (6): مستويات الدراسة

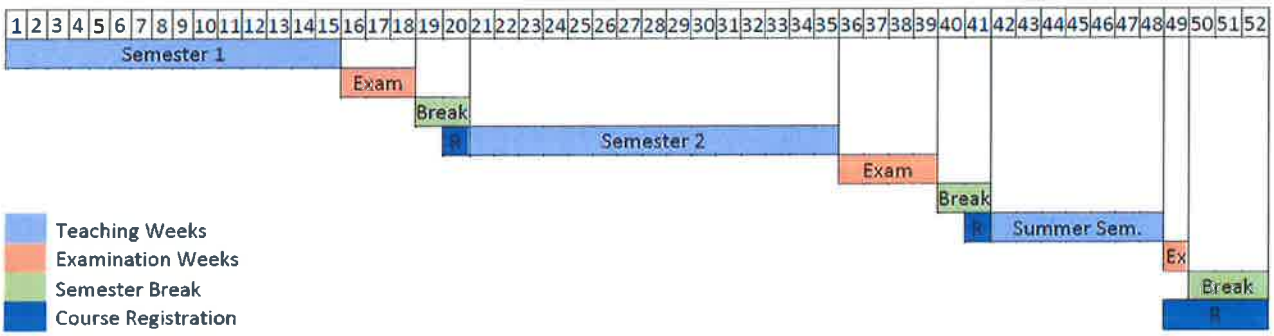
حينما يكمل الطالب نسبة معينه من متطلبات البرنامج، فإنه ينقل من مستوى إلى المستوى التالي له ويوضح الجدول التالى حالة الطالب بناءً على العدد المكتمل من الساعات المعتمدة التي تم إنجازها.

لائحة الساعات المعتمدة لبرامج الدراسة لمرحلة البكالوريوس

مستوى الدراسة	حالة الطالب	النسبة المئويه للساعات المعتمدة التي تمت بنجاح
0	Freshman	صفر % لأقل من 20%
1	Sophomore	20 % لأقل من 40 %
2	Junior	40 % لأقل من 60 %
3	Senior1	60 % لأقل من 80 %
4	Senior2	80 % حتى 100 %

مادة (7): الفصول الدراسية (الأكاديمية) وتسجيل المقررات

- تتكون السنة الأكاديمية من فصلين دراسيين رئيسيين وفصل صيفى (طبقاً للشكل التالى):
  - يبدأ الفصل الدراسي الأول الرئيسي (الخريف) بداية من الأسبوع الثالث من شهرسبتمبر ويستمر 15 أسبوع من التدريس، يتبعه 3 أسابيع إمتحانات. ويتم تسجيل المواد في خلال 3 أسابيع قبل أول يوم من بداية الفصل الدراسي.
  - يبدأ الفصل الدراسي الثانى الرئيسى (الربيع) في فبراير ويستمر 15 أسبوع من التدريس، يتبعه 3 أسابيع إمتحانات. ويتم التسجيل للمواد في خلال أسبوع واحد قبل أول يوم من بداية الفصل الدراسى.
  - فصل الصيف الدراسي: يبدأ من أواخر شهر يونيو أو بداية شهر يوليو لمدة سبعة أسابيع، يتبعها إمتحان لمدة أسبوع واحد. ويتم التسجيل للمواد في خلال أسبوع واحد قبل أول يوم من بداية هذا الفصل الدراسي.



- لا يكون التسجيل نهائياً إلى أن يتم دفع كامل المصاريف المقررة.
- لا يكون التسجيل نهائياً إلا إذاً وافق عليه المرشد الأكاديمي وأيضاً القسم المقدم للبرنامج.
- يتم إدراج أسماء الطلاب الجدد في البرنامج طوال العام بعد الإلتزام بمتطلبات البرامج ودفع مصاريف التسجيل، طبقاً لحالة الطالب.
- يكون التسجيل في الفصل الدراسي الصيفي إختيارياً.

مادة (8): المدة الزمنية للبرنامج الدراسى

- الحد الأدنى للمدة الزمنية للدراسة هي تسعة فصول دراسية.
- الحد الأقصى المسموح به للمدة الزمنية للدراسة هي عشرون فصلاً دراسياً (10 سنوات)، مما لا يشمل الفصول الدراسية التي تم تجميدها لأسباب تم قبولها من معهد العبور العالى للهندسة والتكنولوجيا، والتي بعدها يتم فصل الطالب من البرنامج.

مادة (9): شروط تسجيل مقرر

- قد يسجل الطالب المواد في الفصول الدراسية الرئيسية بإجمالى حد أقصى من عدد الساعات المعتمدة طبقاً للقواعد التالية (بعد موافقة المرشد الاكاديمي) :
  - حتى 21 ساعة معتمدة للطالب الحاصل على GPA تراكمى أكبر من أو يساوى 3.0 .

- حتى 18 ساعة معتمده للطالب الحاصل على GPA تراكمي أكبر من أو يساوي 2.0 وأقل من 3.0 ، التسجيل بهذا العدد يتم فى أول فصل دراسي للطالب.
- حتى 14 ساعة معتمدة للطالب الحاصل على GPA تراكمي أقل من 2.0.

- قد يسجل الطالب مقررات في الفصل الدراسي الصيفي بحد أقصى إجمالى ساعات معتمدة طبقا للقواعد التالية (بعد موافقة المرشد الأكاديمي).
  - حتى 9 ساعات معتمدة للطالب الحاصل على GPA تراكمي أكبر من أو يساوي 3.0 .
  - حتى 8 ساعات معتمدة للطالب الحاصل على GPA تراكمي اقل من 3.0 .
- قد يسجل الطالب مقرر إضافي للحدود المذكورة عاليه، إذا كان ذلك يؤدى به إلي التخرج، بعد موافقة المرشد الاكاديمي.
- لا يكون التسجيل المتأخر نهائياً إذا لم يكن هناك مكان شاغر في المقرر، ويجب أن يدفع الطالب مصاريف إدارية إضافية بما يعادل 1 ساعة معتمدة إذا كان ذلك ينطبق عليه، بما يتوافق مع توصيات لجنة التعليم وشئون الطلاب وموافقة مجلس معهد العبور العالى للهندسة والتكنولوجيا فيما يختص بهذا الشأن .
- ويسمح للطلاب الذين ليس لهم درجه أن يسجلوا المقررات بشرط أن يقوموا بدفع المصاريف الدراسية المعتادة لهذه المقررات وإعطاء الطالب بيان حالة، مبين به المقررات التي سجل فيها وتقديراتها.
- للطلاب الذين لهم درجات علمية وبدون درجات أن يسجلوا كمستمع في بعض المقررات، بشرط أن يكون هناك مكان شاغر في هذه المواد وبعد دفع مصاريف الخدمة الأكاديمية وتقدر بثلاثة أرباع مصاريف المقرر المعتادة، ولا يسمح للطلاب المستمعين ان يدخلوا الإختبار النهائي للمقرر.

مادة (10): متطلبات منح الدرجة

- للحصول على درجة بكالوريوس العلوم في الهندسة، يجب على الطالب أن يكمل بنجاح الساعات المعتمدة في أحد البرامج طبقاً لمتطلباته، وأن يحصل على GPA تراكمي عند التخرج لا يقل عن 2.0 .
- إن مشروع التخرج هو جزء أساسي في كل متطلبات البرامج للتخرج، وقد يكمل مشروع التخرج فى فصلين دراسيين متتاليين، حسب متطلبات البرنامج. ولن يتخرج الطالب إن لم يف بمتطلبات المشروع. يجب أن يحصل الطالب على الأقل على 70 % من إجمالي الساعات المعتمدة لكى يسجل في مشروع التخرج. إذا كان المشروع مقسماً على فصلين دراسيين، فيجب أن يسجل فيهما بالترتيب.
- يجب أن يؤدى الطالب تدريباً ميدانياً لمدة 6 أسابيع أثناء فترة دراسته.
- يمكن للطالب أن يدرس عدداً من المواد في جامعه أخرى لها إتفاق تعاون مع معهد العبور العالي للهندسة والتكنولوجيا فيما يخص نقل الإعتماد، ويتطلب ذلك موافقة مسبقة من المعهد وتكون الساعات المعتمدة لهذه المواد من متطلبات تخرج الطالب بشرط أن يكون إجمالي الساعات المعتمدة لهذه المقررات لا يتجاوز نصف إجمالى الساعات المعتمدة للبرنامج.

مادة (11): التدريب الميدانى

- يجب أن يؤدى الطالب تدريباً ميدانياً لمدة 6 أسابيع في منشأة صناعية أو خدمية تناسب برنامج الطالب ويجب أن تكون تحت إشراف كامل من المعهد، ومن الممكن أيضاً أن يؤدى التدريب داخل المعهد في بيئة مشابهه.
- يتولى المرشد الأكاديمى متابعة التدريب عن طريق لجنة إدارة البرنامج.
- تحديد شخص له إتصال رسمي مع الشركة.
- يجب أن يقدم الطالب تقييماً فنياً عن التدريب بالشركة للمرشد الأكاديمي في نهاية فترة التدريب.
- يجب أن تقدم الشركة تقييماً لتدريب الطالب إلى المرشد الأكاديمي في نهاية فترة التدريب.
- ينقسم التدريب إلى أسبوعين وبنهاية المستويات الأول والثاني والثالث (ويمكن أن يكون فى المستوى الرابع أيضاً، خلال الفصل الدراسي)
- ويسمح بالتدريب لفترة 6 أسابيع لمرة واحدة فقط أثناء فترة الدراسة.
- ويتم تقييم التدريب الميداني بدرجة إجتاز / راسب ولا يحتسب في الـ GPA التراكمى.
- يجب على الطالب أن يدفع المصاريف الإشرافية على التدريب الميدانى بما يعادل ساعتين من الساعات المعتمدة، إذا كان ذلك منطبقاً، فى كل سنة أكاديمية والتي يؤدى خلالها التدريب الميداني.

مادة (12): إضافة وإسقاط مقرر

- قد يضيف الطالب مقررات فى الأسبوع الأول من الفصول الدراسية الرئيسية أو فى أول ثلاثة أيام من الفصل الدراسي الصيفي.

- يمكن للطالب أن يسقط مقررات مع إسترداد المصروفات إذا كان ذلك ممكناً، حتى نهاية الأسبوع الثاني من الفصول الدراسية الرئيسية، أو نهاية الاسبوع الأول من الفصل الدراسي الصيفي.
- إضافة أو إسقاط مقرر لايجب أن يتعارض مع الحد الأدنى والحد الأقصى لعدد الساعات المعتمدة المسجلة لكل فصل دراسي.

مادة (13): الإنسحاب من مقرر

- قد ينسحب الطالب من أي مقرر في خلال العشرة أسابيع من الفصول الدراسية الرئيسية، أو في أول خمسة أسابيع من الفصل الدراسى الصيفى.
- لا يرسب الطالب فى المقرر الذي إنسحب منه، بشرط أن يكون تقدم بطلب الإنسحاب وتمت الموافقة علية وإنهاء ذلك فى خلال الوقت المحدد المشار إليه فى النقطة السابقة.
- يحصل الطالب على تقدير (W) عند الإنسحاب من المقرر، ويسمح له بتسجيل ذلك المقرر (بحضور تام كل الأنشطه بما يشمل الإمتحانات) فى فصل دراسي تالي.
- للمقررات الإختيارية، يسمح للطالب أن يغيرها في الفصل الدراسى التالى، إذا فشل أن ينجح فيها أو إنسحب منها. ويخضع هذا لموافقة المرشد الأكاديمى ومتطلبات برنامجه.
- للطلاب الذين ليس لهم منح دراسية، فإن المصاريف الدراسية لهذا المقرر سوف لا يتم ردها للمواد التي يتم الإنسحاب منها. وعند تسجيل الطالب لهذا المقرر مرة أخرى، عليه أن يدفع تكلفته كاملة. الطالب الذى ينسحب من كل الفصل الدراسى دون تسجيل لأى مقرر، عليه أن يدفع الحد الأدنى لمصاريف الدراسة للفصل الدراسي، بما يعادل 12 ساعة معتمدة (12 CH).
- لطلاب المنح الدراسية، تخصم الساعات المعتمدة من المقرر المنسحب منه، من منحهم الدراسية، ويسمح للطالب ان يسجل هذا المقرر مرة أخرى مجاناً.

مادة (14): المقرر الذى لم يستكمل دراسته

- إذا لم يحضر الطالب الإمتحان النهائى للمقرر في الفصل الدراسى بعذر مقبول من لجنة شئون الطلاب وأعتمد من مجلس معهد العبور العالى للهندسة والتكنولوجيا، فيعتبر المقرر غير مكتمل.
- سيحصل الطالب على درجة (I) فى المقرر إلى أن يقوم بإمتحان هذا المقرر. إذا فشل الطالب فى حضور الإمتحان النهائي فى الوقت المتاح التالى، فيحصل على درجة (F) فى ذلك المقرر. درجة (I) لا تؤخذ فى الإعتبار فى تقدير الطالب التراكمي (GPA).
- وفى الوقت المتاح التالي للإمتحان، يتقدم الطالب للإختبار بعد دفع مصاريف إعادة الإمتحان بمصاريف تعادل ساعة واحدة معتمدة، إذا كان ذلك ممكناً. تضاف درجات الإمتحان النهائي إلى درجات أعمال الفصل الدراسي، لحساب التقدير الكلى لهذا المقرر.

مادة (15): تقييم الطالب

- توزع درجات كل مقرر كنسب مئوية من الدرجة الكلية، مقسمة على أنشطة المقرر وإمتحان نصف الفصل الدراسي والإمتحان العملي والامتحان النهائي.
- يجب أن يحضر الطالب على الأقل 75% من إجمالى ساعات إتصال مقرر، لكى يتمكن من حضور إمتحانه النهائي.
- لإجتياز الطالب لمقرر، فأدنى درجة يجب الحصول عليها فى الإمتحان النهائي هى 40% من اجمالى درجة الإمتحان النهائي، وإلا سيرسب الطالب فى المقرر، بغض النظر عن إجمالي الدرجات التي حصل عليها فى هذا المقرر، ويحصل على تقدير (F). لاتنطبق هذه المادة على المقررات التي ليس لها إمتحان نهائي.
- يرسب الطالب فى المقرر إذا حصل على تقدير (F) (أقل من 60% من درجات المقرر)، أو لم يسمح له أن يحضر الإمتحان النهائي بسبب تجاوز نسبة الغياب المقررة، أو بسبب الغش، ... إلخ. أو لم يحضر الإمتحان النهائي بدون تقديم عذر مسبق مقبول من لجنة التعليم وشئون الطلاب ومعتمد من مجلس معهد العبور العالى للهندسة والتكنولوجيا. وفي حالة تقديم الطالب عذر مسبق مقبول من لجنة التعليم وشئون الطلاب ومعتمد من مجلس معهد العبور العالى للهندسة والتكنولوجيا يعتبر تقدير المقرر غير مكتمل (I) وفي هذه الحالة يسجل له المقرر الترم الدراسي الذي يليه مع الإحتفاظ بأعمال السنة ويكون له الحق حساب تقدير المقرر له بدون إنتقاص.

مادة (16): تقديرات المقرر

- يحسب متوسط نقاط التقدير GPA لكل مقرر بناء على الدرجات التى يجمعها الطالب اثناء دراسته لهذا المقرر (أعمال الطالب – إمتحان نصف الفصل الدراسى – الإمتحان العملى - الإمتحان النهائى). يوضح الجدول التالى كيفية حساب متوسط نقاط التقدير GPA بناءً على الدرجات التى تم جمعها. يجب أن يحصل الطالب على تقدير (D) كحد أدنى لكى يجتاز المقرر، ولكى يتم أخذ هذا المقرر في الإعتبار اثناء حساب متوسط نقاط التقدير GPA التراكمى.

يتم توزيع الدرجات بين معايير التقييم المختلفة داخل توصيف المقرر لهذه اللائحة.

لائحة الساعات المعتمدة لبرامج الدراسة لمرحلة البكالوريوس

% الدرجات المجمعة	التقدير	النقاط
أكثر من 97%	A+	4.0
93% الى اقل من 97%	A	
من 89% الى اقل من 93 %	A-	3.7
من 84% الى اقل من 89 %	B+	3.3
من 80% الى اقل من 84 %	B	3.0
من 76% الى اقل من 80 %	B-	2.7
من 73% الى اقل من 76 %	C+	2.3
من 70% الى اقل من 73 %	C	2.0
من 67% الى اقل من 70 %	C-	1.7
من 64% الى اقل من 67 %	D+	1.3
من 60% الى اقل من 64 %	D	1.0
اقل من 60%	F	0.0

- المقررات الأخرى حيث يسجل الطالب كمستمع، أو يكون لها صفر ساعات معتمدة (يجتازها الطالب أو يرسب فيها)، لا يتم تضمينها في حساب ال GPA التراكمى. وتقدير مثل هذه المقررا ت يكون كما مبين بالجدول التالى:

الدرجة	التفسير
AU	مستمع
P	اجتاز
F	راسب
W	منسحب
I	غير مكتمل

مادة (17): إعادة المقرر

- يمكن للطالب إعادة المقرر للتحسين، إذا كان تقديره في هذا المقرر يحقق الحد الأدنى لمتطلبات الإجتياز، طبقا للقواعد التالية:
  - يحصل الطالب على أعلى تقدير فى المقرر بعد التكرار، وهذا التقدير هو الذى سيتم إحتسابه فى الـ GPA التراكمى، بشرط أن هذا التحسين يجب أن يظهر فى بيان حالة الطالب.
  - أقصى عدد من المرات للطالب أن يكررها للتحسين في مقرر ما، هى خمس مرات أثناء فترة الدراسة، فيما عدا تحسين المواد بغرض الخروج من فترة الإنذار الأكاديمى، أو لتحقيق متطلبات التخرج.
  - يجب ان يدفع الطالب كامل مصاريف الساعات المعتمدة لتحسين مقرر.
- إذا رسب الطالب فى مقرر (حاصلاً على تقدير F) فعليه أن يعيد المقرر (بحضور كامل وأداء الأنشطة بما فيها الإمتحانات - يحسب تقدير المقرر منذ البداية) طبقا للقواعد الاتية:
  - أعلى تقدير لمقرر تم إعادته هو +B.
  - بعد إعادة المقرر، تقديره هو الذى سيتم إحتسابه فى الـ GPA التراكمى، بشرط أن هذه الإعادة يجب أن تظهر فى بيان حالة الطالب.

مادة (18): الفصل من الدراسة والإنذار الأكاديمى

- يحصل الطالب على إنذار أكاديمى إذا كان الـ GPA التراكمى الفصلي فى أى فصل دراسي أقل من 2.0.

- يتم فصل الطالب من معهد العبور العالى للهندسة والتكنولوجيا إذا حصل على GPA تراكمى فصلي أقل من 2.0 في سته فصول دراسية متتالية بخلاف الفصول الدراسية الصيفية. إذا تجاوز الـ GPA التراكمى الفصلى للطالب 2.0 في أي فصل دراسى، فيتم إلغاء الإنذارات الأكاديمية المتعاقبة.

- يتم فصل الطالب من معهد العبور العالى للهندسة والتكنووجيا إذا فشل فى تحقيق متطلبات التخرج أثناء المدة الزمنية القصوى للدراسة وهى عشر سنوات.
- الطالب الذى يتعرض للفصل من الدراسة بسبب عدم قدرته على رفع الـ GPA التراكمى إلى 2.0 على الأقل، سيمنح فرصة إضافية وأخيرة ليسجل فى فصلين دراسيين متتاليين وفصل دراسى صيفى ليرفع من GPA التراكمى الى 2.0 على الأقل، ويحقق متطلبات التخرج بشرط أن يكون قد أكمل بنجاح 80% على الأقل من العدد الإجمالى من الساعات المعتمدة المطلوبة للتخرج وهناك فرصة للطالب لرفع الـ GPA التراكمى إلى 2.0 على الأقل.

مادة (19): حساب متوسط نقاط التقديرات التراكمى

- نقاط المقرر التى حققها الطالب يتم حسابها كحاصل ضرب عدد الساعات المعتمدة لهذا المقرر، ونقاط تقدير المقرر المذكورة في مادة 16 عاليه.
- في أي فصل دراسي، فإن النقاط الإجمالية التي يحصل عليها الطالب يتم حسابها من خلال قسمة مجموع نقاط جميع مقررات الفصل الدراسى على مجموع الساعات المعتمدة لهذه المقررات.
- الـ GPA التراكمى للتخرج هو الـ GPA التراكمى عند التخرج، بعد الإيفاء بجميع متطلبات التخرج. لا يستطيع الطالب أن يحصل على درجته العلمية إلا إذا حقق GPA تراكمى على الأقل 2.0 عند التخرج.
- ترتيب الخريج يعتمد على الـ GPA التراكمى عند التخرج، وفى حالة التساوى في الـ GPA التراكمى عند التخرج بين طالبين أو أكثر، فيعتمد الترتيب على درجاتهم الإجمالية التراكمية، مع الأخذ فى الإعتبار القواعد المرتبطة بتكرار المقررات وتحسينها.
- يجب أن يشمل بيان حالة الطالب كل المواد التى سجلها أثناء فترة الدراسة بما يشمل ما قد رسب فيه أو إنسحب منه أو قام بتحسينه.

مادة (20): إعلان مرتبة الشرف

- يجب على الطالب لكى يحقق مرتبة الشرف أن يحقق الشروط التالية:
  - يحتفظ بـ GPA التراكمى بقيمة 3.3 خلال دراسته في البرنامج، وفي أى فصل دراسي يجب أن يكون الـ GPA الفصلى أعلى من أو يساوى 3.3 .
  - لا يرسب الطالب فى أي مقرر خلال دراسته في البرنامج .
  - لم يقع علية أي جزاء (عقوبة) خلال دراسته في البرنامج.

مادة (22): المرشد الأكاديمى

- يحدد لكل طالب مرشداً أكاديمياً ليتابع التقدم الأكاديمى للطالب ويساعده فى إختيار المواد فى كل فصل دراسي.
- يمكن أن يكون هناك أكثر من مرشد أكاديمي فى البرنامج بناءً على عدد الطلاب المسجلين فى البرنامج .
- يكون المرشد الأكاديمى مسئولاً عن:
  - مساعدة الطالب أن يختار الطريق الأكاديمى ومساعدته على إختيار المواد فى كل فصل دراسي.
  - مساعدة الطالب في إختيار التدريب الميداني.
  - مساعدة الطالب في إختيار المسار ومشروع التخرج .
- قد يسال المرشد الأكاديمى الطالب أن يعيد مواد قد نجح فيها أو يطلب منه أن يسجل مواد إضافية ليرفع من الـ GPA التراكمي المطلوب للتخرج.

مادة (23): الإلتماسات

- يمكن للطالب أن يقدم إلتماساً لمراجعة درجات مقرر، وذلك في غضون أسبوع من إعلان التقديرات، وذلك بعد دفع المصاريف المطلوبة بما يتفق مع قواعد المعهد فيما يخص هذا الشأن.

- فى حالة الشكوى العامة من نتيجة مقرر ، فتراجع اللجنة المختصة الدرجات وتصدر قراراً فيما يخص درجات هذا المقرر.

مادة (24): نقل الطلاب بين نظام الساعات المعتمدة والنظام المعتمد على الفصل الدراسي

- من الممكن نقل الطلاب من برنامج هندسي آخر مبني على نظام الفصل الدراسى (معهد العبور العالي للهندسة والتكنولوجيا) إلى أى من البرنامج في هذه اللائحة طبقاً لقواعد القبول في الجزء (ب) عاليه.
- مقاصة المقررات سيتم أداءها بين المواد التى إجتازها الطالب في النظام المعتمد على نظام الفصل الدراسي والمقررات المكافئة فى البرامج المقدمة هنا.
- يستخدم الجدول التالى لحساب التقديرات المكافئة عند النقل من النظام المعتمد على الفصل الدراسى ونظام الساعات المعتمدة.

من النظام المعتمد على الفصول الدراسية	إلى نظام الساعات المعتمدة	
النسبة المئوية المكافئة	النقاط	التقدير
أكثر من95%	4.0	A+
90% الى اقل من 95%		A
من 85% الى اقل من 90 %	3.7	A-
من 80% الى اقل من 85 %	3.3	B+
من 75% الى اقل من 80 %	3.0	B
من 71% الى اقل من 75 %	2.7	B-
من 68% الى اقل من 71 %	2.3	C+
من 65% الى اقل من 68 %	2.0	C
من 60% الى اقل من 65 %	1.7	C-
من 55% الى اقل من 60 %	1.3	D+
من 50% الى اقل من 55 %	1.0	D
اقل من 50%	0.0	F

مادة (25): أحكام عامة

- تسري هذه اللوائح على الطلاب المقبولين حديثًا في معهد العبور العالي للهندسة والتكنولوجيا إعتبارًا من العام الأكاديمي التالي لإعتماد هذه اللائحة.
- بالنسبة لأي موضوع لا تتناوله هذه اللوائح ، يتم إعتبار قانون الجامعات المعمول به وتعديلاته كمرجع. إذا لم يكن مشمولاً بالقانون فيجب تقديمه إلى وزارة التعليم العالي والمجلس الأعلى للمعاهد للموافقة عليه.

Part D: Details of the Offered Programs

The Obour High Institute for Engineering and Technology awards the Bachelor of Science (B.Sc.) Degree in one of the Programs listed in Table 7.

Engineering Programs	Specialized Programs	Electrical Engineering	Engineering and Technology of Computers and Control Systems Program
			Engineering and Technology of Electronics and Communications Program
		Construction Engineering & technologyProgram	
		Architectural Engineering Program	

Table 7 List of Undergraduate Programs offered by the Obour High Institute for Engineering and Technology.

According to the Supreme Council of Universities Terms of Reference for Undergraduate Engineering Programs, the courses in any program are divided into the following categories:

1. Cultural courses requirements.
2. Institute requirements.
3. Discipline requirements.
4. Program requirements.

Table 8 shows the distribution of Credit Hours among different requirements for both Specialized and Inter-Disciplinary programs.

	Cultural courses requirements	Institute requirements	Discipline requirements	Program requirements
Specialized Programs	14 CH 8.485%	37 CH 22.424%	68 CH 41.212%	46 CH 27.879%
Inter-Disciplinary Programs			114 CH 69.091%	

Table 8 Division of Credit Hours among the four requirements

Figure 2 shows the different levels of competences as published in National Academic Reference Standards (NARS-2018). These Levels of competences determine the allocation of courses in different competency level with respect to the level requirements.

NATIONAL ACADEMIC REFERENCE STANDARDS (NARS-2018)

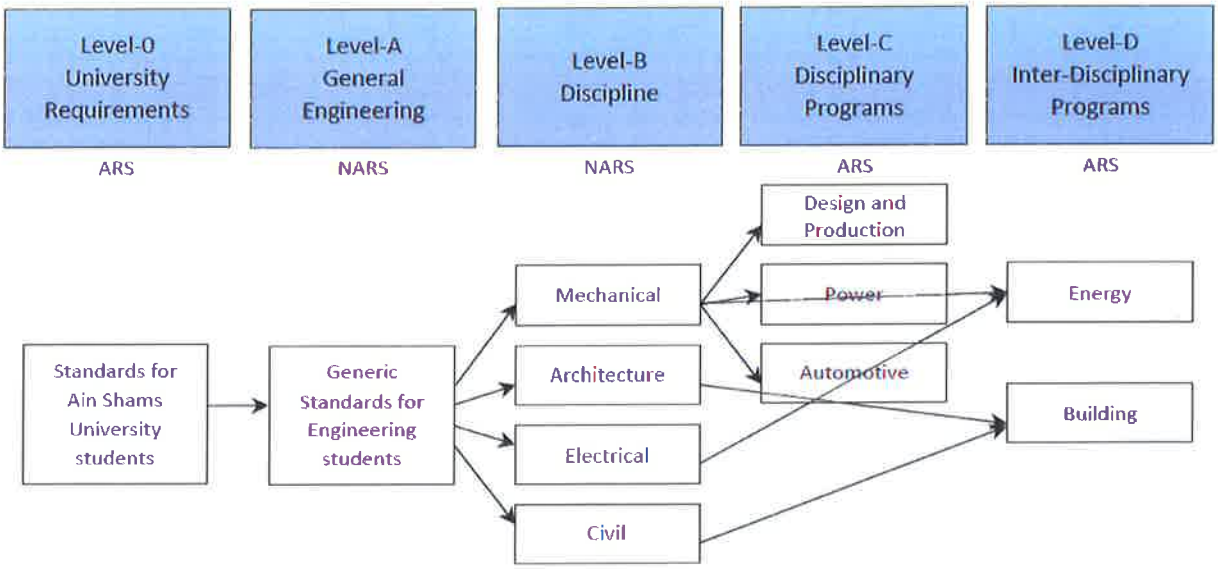


Figure 2 Different Levels of Competences as per NARS 2018, as published by NAQAAE.

Table 9 summarizes the overall data about the programs included in these bylaws. The rest of this Part D will show the list of standards for each level and the courses required to achieve these standards for each program.

#	Program	NC	Credits and SWL			Total Contact Hours				4 Requirements %				BS %
			CH	ECTS	SWL	Lec	TUt	Lab	TT	CR	IR	DR	PR	
1	Engineering and Technology of Computers and Control Systems	60	165	300	7500	136	70	35	241	8.49%	22.42%	41.21%	27.88%	18.79%
2	Engineering and Technology of Electronics and Communications	60	165	300	7500	136	70	35	241	8.49%	22.42%	41.21%	27.88%	18.79%
3	Construction & technology Engineering	60	165	300	7500	143	70	16	229	8.49%	22.42%	69.09%		18.79%
4	Architectural Engineering	60	165	300	7500	123	116	11	250	8.49%	22.42%	69.09%		18.79%

NC	Total number of Courses
CH	Credit Hour
ECTS	European Credit Transfer System
SWL	Student Work Load
Lec	Lectures
Tut	Tutorials
Lab	Laboratory
TT	Total
CR	Cultural Requirement
IR	Institute Requirement
DR	Discipline Requirement
PR	Program Requirement
BS	Basic Sciences Percentage

Table 9 List of overall data about the programs.

Cultural Courses Requirements

The Obour High Institute for engineering and technology graduate should be:

A0. Aware of national, regional, and international contemporary issues, to have an intellectual and enlightened personality and to interact effectively in the community through different communication skills.

To achieve this goal, a number of courses planned to build the student personality, develop his skills, and increase his awareness of different topics. These courses are called "Cultural Courses Requirements". These courses are listed in Table 10 as follows:

Code	Course Title	Credits and SWL			Contact Hours			
		CH	ECTS	SWL	Lec	Tut	Lab	TT
HUM 011	English Language	2	4	100	2	1	0	3
HUM 061	History of Engineering & Technology	2	4	100	2	0	0	2
HUM 181	Communications and Presentation Skills	2	4	100	2	1	0	3
HUM 172	Analysis and Research Skills	2	4	100	2	1	0	3
HUM 241	Law and Human Rights	2	4	100	2	1	0	3
	HUM Elective Course (1)	2	4	100	2	1	0	3
	HUM Elective Course (2)	2	4	100	2	1	0	3
Total		**14**	**28**	**700**	**14**	**6**	**0**	**20**
Pool of HUM Elective Course (1)								
HUM 271	First Aid Skills	2	4	100	2	1	0	3
HUM 251	Contemporary artistic directions	2	4	100	2	1	0	3
HUM 242	Principles of negotiation	2	4	100	2	1	0	3
HUM 243	Professional Ethics	2	4	100	2	1	0	3
Pool of HUM Elective Course (2)								
HUM 361	Egyptian Literature Heritage	2	4	100	2	1	0	3
HUM 351	Music Taste	2	4	100	2	1	0	3
HUM 321	Social Sharing in Modern Egypt Construction	2	4	100	2	1	0	3
HUM 341	Cases of Energy, Water, and Climate Change	2	4	100	2	1	0	3

Table 10 List of Cultural requirements courses.

Institute Requirements

All the programs offered at the Obour High Institute for engineering and technology are Engineering Programs. The graduates have the privilege of being Engineers and are automatically enrolled in the Egyptian Engineering Syndicate (EES). The graduates are also entitled to take the Fundamentals of Engineering Exam offered by the National Council of Examiners for Engineering and Surveying (NCEES), based on the agreement between EES and NCEES.

According to the National Academic Reference Standards (NARS-2018), The Engineering Graduate must be able to (A-Level):

A1. Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science, and mathematics.

A2. Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.

A3. Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global, cultural, social, economic, environmental, ethical, and other aspects as appropriate to the discipline and within the principles and contexts of sustainable design and development.

A4. Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues and risk management principles.

A5. Practice research techniques and methods of investigation as an inherent part of learning.

A6. Plan, supervise and monitor implementation of engineering projects.

A7. Function efficiently as an individual and as a member of multi-disciplinary and multi-cultural teams.

A8. Communicate effectively – graphically, verbally and in writing – with a range of audiences using contemporary tools.

A9. Use creative, innovative, and flexible thinking and acquire entrepreneurial and leadership skills to anticipate and respond to new situations.

A10. Acquire and apply new knowledge; and practice self, lifelong and other learning strategies.

To achieve these Competences, a set of courses must be completed as an Institute Requirements. These courses are divided into Basic Science Courses and Basic Engineering Courses. These courses are listed in Table 11 as follows:

Code	Course Title	Credits and SWL			Contact Hours			
		CH	ECTS	SWL	Lec	Tut	Lab	TT
BAS 011	Mathematics (1)	3	5	125	3	1	0	4
BAS 021	Physics (1)	3	5	125	2	1	1	4
BAS 051	Engineering Drawing & Projection, using the Computer	3	6	150	2	1	2	5
BAS 061	Principles of Manufacturing Engineering	3	5	125	2	2	1	5
BAS 012	Mathematics (2)	4	6	150	3	2	0	5
BAS 022	Physics (2)	3	5	125	2	2	1	5
BAS 031	Mechanics	3	5	125	2	2	0	4
BAS 041	Engineering Chemistry	3	5	125	2	2	1	5
ELE 031	Computer Technology	3	5	125	2	1	1	4
ELE 041	Computer Programming (1)	3	5	125	2	0	2	4
	BASIC Elective Course (1)	2	4	100	2	1	0	3
	BASIC Elective Course (2)	2	4	100	2	1	0	3
	BASIC Elective Course (3)	2	4	100	2	1	0	3
Total		**37**	**64**	**1600**	**28**	**17**	**9**	**54**
Pool of BASIC Elective Course (1)								
CIV 141	Architecture and Construction	2	4	100	2	1	0	3
ARC 115	Arts and Architecture	2	4	100	2	1	0	3
ELE 182	Mechanical and Electrical Engineering	2	4	100	2	1	0	3
Pool of BASIC Elective Course (2)								
HUM 131	Engineering Economics	2	4	100	2	1	0	3
HUM 173	Preparing technical reports	2	4	100	2	1	0	3
ELE 151	Numerical Analysis	2	4	100	2	1	0	3
Pool of BASIC Elective Course (3)								
BAS 211	Statistics and Probability Theory	2	4	100	2	1	0	3
HUM 231	Projects management	2	4	100	2	1	0	3

Table 11 List of Institute requirements courses.

Discipline Requirements

According to the National Academic Reference Standards (NARS-2018), each discipline graduate (Electrical), has to meet specific competences.

Electrical Engineering Requirements

In addition to the Competencies for all Engineering Programs, the Basic Electrical Engineering graduate must be able to (B-Level):

B1e. Apply general knowledge about generation, transmission, and distribution of electrical power system.

B2e. Select and analyze appropriate control techniques for electrical/electronic engineering systems.

B3e. Design and implement elements, modules, sub-systems, or systems using technological and professional tools.

B4e. Estimate and measure the performance of an electrical/electronic system and circuit under specific input excitation and evaluate its suitability for a specific application.

B5e. Identify needs, plan, and manage resources, and gather information for solving a specific electrical/electronic problem and document and communicate this solution efficiently.

To achieve these Competences, a set of courses must be completed as Basic Electrical Engineering Requirements. These courses are listed in Table 12 as follows:

Code	Course Title	Credits and SWL			Contact Hours			
		CH	ECTS	SWL	Lec	Tut	Lab	TT
BAS 111	Mathematics (3)	4	6	150	3	2	0	5
BAS 121	Physics (3)	3	5	125	2	2	1	5
BAS 122	Science of Materials	3	5	125	3	1	0	4
ELE 111	Electrical Circuits	3	6	150	2	1	2	5
ELE 122	Logic Circuits	3	6	150	2	1	2	5
ELE 121	Electronic devices	4	6	150	3	1	1	5
ELE 181	Energy Conversion	3	5	125	3	1	0	4
ELE 221	Advanced Logic Circuits	3	6	150	2	1	2	5
ELE 211	Measurements & Testing	3	5	125	2	1	2	5
ELE 251	Analog Electrical Communications	3	6	150	2	2	1	5
ELE 271	Signal Analysis	3	5	125	2	1	1	4
ELE 231	Microprocessors and their Applications	3	5	125	2	1	1	4
ELE 252	Digital Electrical Communications	3	5	125	2	2	1	5
ELE 222	Digital Integrated Circuits	3	5	125	2	1	1	4
ELE 351	Electromagnetic Fields	3	5	125	3	1	0	4
ELE 321	Power Electronics	3	5	125	2	2	1	5
ELE 333	Microcontrollers & Applications	3	6	150	2	1	2	5
ELE 141	Computer Programming (2)	3	5	125	2	0	2	4
ELE 261	Control Components & Industrial Instrumentations	3	5	125	2	1	1	4
ELE 262	Automatic Control	3	6	150	2	2	1	5
ELE 331	Computer Organization & Architecture (1)	3	6	150	3	1	0	4
ELE 332	Computer Networks	3	6	150	3	1	0	4
Total		**68**	**120**	**3000**	**51**	**27**	**22**	**100**

Table 12 List of Basic Electrical Engineering Requirements courses.

Program #1: Engineering and Technology of Computers and Control Systems Program

Program Description

The Engineering and Technology of Computers and Control Systems Program is where Engineering, Hardware, Software, and Automatic control merge together to prepare the Computer and Control Systems Engineer of the future.

Career Prospects

Computer and Control Systems Engineering is currently one of the most rapidly growing engineering disciplines worldwide. With the advances in fields such as smart systems, artificial intelligence, internet of things, computer networks and security, autonomous vehicles, deep learning, VLSI Systems, and others. Graduates from the program are in high demand from the industry, not only from companies in Egypt, but also from all over the world. Computer and Control Systems engineers are needed in many industries such as embedded and control systems, hardware design, computer networks, computer security, intelligent systems, and software development.

Program Concentrations

The program qualifies graduates to work as Computer and Control Systems engineers. The program includes the following three concentrations:

1. Computer Hardware Design and Networks
2. Computer Software
3. Control Systems and Artificial Intelligence

1. **Computer Hardware Design and Networks:** This concentration prepares the graduate to work in the field of hardware engineering, including embedded systems, digital circuit design, electronic design automation, hardware-based systems, telecommunication networks, security, and internet of things.
2. **Computer Software:** This concentration prepares the graduate to work as Software Engineer, in different disciplines and it focuses on the engineering part of software development and management.
3. **Control Systems and Artificial Intelligence:** This concentration prepares the graduate with the necessary competences to work as a control system engineer, including automation and artificial intelligence.

Program Competences

In addition to the competences for all Engineering Programs (A-Level) and the competencies for the Electrical Engineering Discipline (B-Level), the Engineering and Technology of Computers and Control Systems Program graduate must be able to (C-Level):

C1. Select and analyze appropriate control techniques for digital engineering systems.

C2. Identify needs, plan, and manage resources, and gather information for solving a specific digital problem and document and communicate this solution efficiently.

C3. Select suitable technical options for digital systems and services design while optimizing cost and quality.

C4. Carry out design, development, testing, debugging, operation, and maintenance of digital systems/services such as computer systems, circuit boards, software systems, and mixed (embedded) systems.

C5. Organize information and knowledge resources in an optimal format.

C6. Demonstrate additional abilities related to the field of the discipline within Computer and Systems Engineering as listed below.

Concentration	Graduate attributes
Computer Hardware Design and Networks	C6a. Demonstrate additional abilities to model, analyze, design, secure, and verify computer systems, networks, and distributed systems, at the level of system architecture.
Computer Software	C6b. Demonstrate additional abilities to design and integrate software solutions.
Control Systems and Artificial Intelligence	C6c. Demonstrate additional abilities to model, design and integrate computer-operated systems including analog, digital and intelligent systems.

Required Courses

In order to get a Bachelor of Science Degree in this program, and to satisfy the Program Competences, a set of courses need to be completed. These courses are listed in Table 13 as follows:

Code	Course Title	Credits and SWL			Contact Hours			
		CH	ECTS	SWL	Lec	Tut	Lab	TT
	Cultural Courses Requirements	14	28	700	14	6	0	20
	Institute Requirements	37	64	1600	28	17	9	54
	Electrical Engineering Requirements	68	120	3000	51	27	22	100
ELE 361	Digital Control Systems	3	6	150	2	2	1	5
ELE 341	Algorithms & Data Structures	2	4	100	2	1	0	3
ELE 334	Computer Organization & Architecture (2)	2	4	100	2	1	0	3
ELE 342	Software Engineering	2	4	100	2	1	0	3
ELE 461	Robot Systems	2	4	100	2	1	0	3
ELE 441	Operating Systems	2	5	125	2	1	0	3
ELE 442	Database Systems	2	5	125	2	1	0	3
ELE 443	Compiler Theory	2	5	125	2	1	0	3
ELE 462	Advanced Control Systems	2	4	100	2	1	0	3
ELE 471	Artificial Intelligence	3	5	125	3	1	0	4
	Computer and Control Level 3 Elective Course (1)	3	5	125	3	1	0	4
	Computer and Control Level 3 Elective Course (2)	3	5	125	3	1	0	4

لائحة الساعات المعتمدة لبرامج الدراسة لمرحلة البكالوريوس

Code	Course Title	Credits and SWL			Contact Hours			
		CH	ECTS	SWL	Lec	Tut	Lab	TT
	Computer and Control Level 3 Elective Course (3)	3	5	125	3	1	0	4
	Computer and Control Level 3 Elective Course (4)	3	5	125	3	1	0	4
	Computer and Control Level 3 Elective Course (5)	3	5	125	3	1	0	4
	Computer and Control Level 3 Elective Course (6)	3	5	125	3	1	0	4
ELE 491	Computer and Control Graduation Project (1)	3	6	150	2	2	1	5
ELE 492	Computer and Control Graduation Project (2)	3	6	150	2	1	2	5
Total		**165**	**300**	**7500**	**136**	**70**	**35**	**241**
Pool of Computer Hardware Design and Networks Concentration Elective Courses								
ELE 335	Digital Systems Testing and Verification	3	5	125	3	1	0	4
ELE 431	Distributed Computer Systems	3	5	125	3	1	0	4
ELE 432	Pervasive Computing and Internet of Things	3	5	125	3	1	0	4
ELE 444	Advanced Database Systems	3	5	125	3	1	0	4
ELE 496	Selected Topics in Computers	3	5	125	3	1	0	4
ELE 433	Wireless Networks	3	5	125	3	1	0	4
Pool of Computer Software Concentration Elective Courses								
ELE 343	Software Testing	3	5	125	3	1	0	4
ELE 344	Software Design Patterns	3	5	125	3	1	0	4
ELE 473	Information Security	3	5	125	3	1	0	4
ELE 476	Pattern Recognition & Image Processing Systems	3	5	125	3	1	0	4
ELE 495	Selected Topics in Computer Software	3	5	125	3	1	0	4
Pool of Control Systems and Artificial Intelligence Concentration Elective Courses								
ELE 372	Artificial Neural Networks	3	5	125	3	1	0	4
ELE 371	Real-Time Systems & Applications	3	5	125	3	1	0	4
ELE 375	Intelligent Control Systems	3	5	125	3	1	0	4
ELE 374	Modeling & Simulation of Engineering Systems	3	5	125	3	1	0	4
ELE 497	Selected Topics in Control	3	5	125	3	1	0	4
ELE 463	Industrial Control	3	5	125	3	1	0	4

Table 13 List of Engineering and Technology of Computers and Control Systems *Program Requirements courses.*

Proposed Study Plan

Code	Course Title	Credits and SWL			Contact Hours				Pre-requisites
		CH	ECTS	SWL	Lec	Tut	Lab	TT	
Semester 1									
HUM 011	English Language	2	4	100	2	1	0	3	
BAS 011	Mathematics (1)	3	5	125	3	1	0	4	
BAS 021	Physics (1)	3	5	125	2	1	1	4	
BAS 051	Engineering Drawing & Projection, using the Computer	3	6	150	2	1	2	5	
BAS 061	Principles of Manufacturing Engineering	3	5	125	2	2	1	5	
ELE 031	Computer Technology	3	5	125	2	1	1	4	
Total		**17**	**30**	**750**	**13**	**7**	**5**	**25**	
Semester 2									
HUM 061	History of Engineering & Technology	2	4	100	2	0	0	2	
BAS 012	Mathematics (2)	4	6	150	3	2	0	5	BAS 011
BAS 022	Physics (2)	3	5	125	2	2	1	5	BAS 021
BAS 031	Mechanics	3	5	125	2	2	0	4	
BAS 041	Engineering Chemistry	3	5	125	2	2	1	5	
ELE 041	Computer Programming (1)	3	5	125	2	0	2	4	ELE 031
Total		**18**	**30**	**750**	**13**	**8**	**4**	**25**	
Semester 3									
HUM 181	Communications and Presentation Skills	2	4	100	2	1	0	3	
	BASIC Elective Course (1)	2	4	100	2	1	0	3	
BAS 111	Mathematics (3)	4	6	150	3	2	0	5	BAS 012
BAS 121	Physics (3)	3	5	125	2	2	1	5	BAS 022
ELE 141	Computer Programming (2)	3	5	125	2	0	2	4	ELE 041
ELE 111	Electrical Circuits	3	6	150	2	1	2	5	
Total		**17**	**30**	**750**	**13**	**7**	**5**	**25**	
Semester 4									
HUM 172	Analysis and Research Skills	2	4	100	2	1	0	3	
	BASIC Elective Course (2)	2	4	100	2	1	0	3	
BAS 122	Science of Materials	3	5	125	3	1	0	4	BAS 121
ELE 122	Logic Circuits	3	6	150	2	1	2	5	ELE 111
ELE 121	Electronic devices	4	6	150	3	1	1	5	ELE 111
ELE 181	Energy Conversion	3	5	125	3	1	0	4	ELE 111
Total		**17**	**30**	**750**	**15**	**6**	**3**	**24**	

لائحة الساعات المعتمدة لبرامج الدراسة لمرحلة البكالوريوس

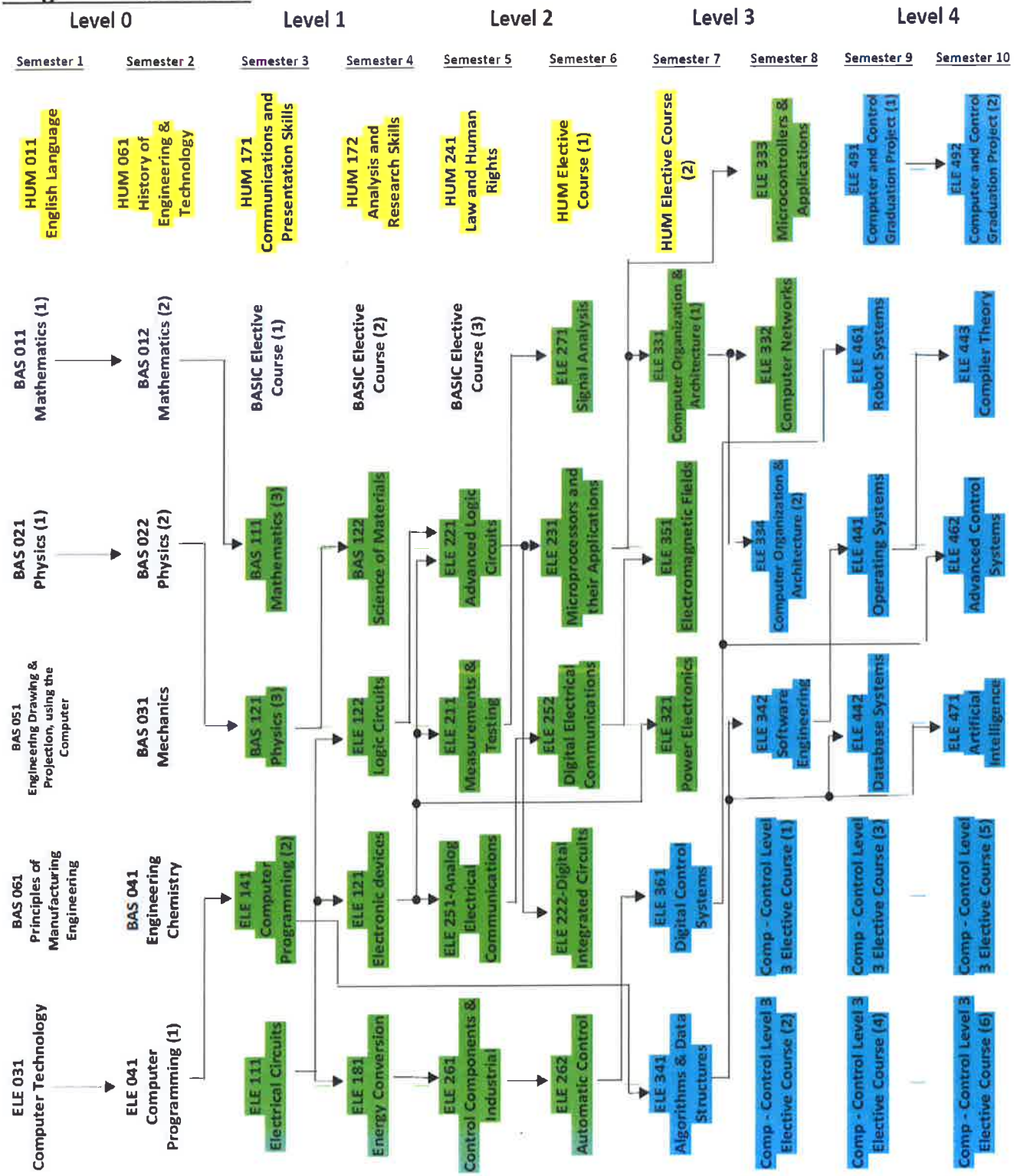
Code	Course Title	Credits and SWL			Contact Hours				Pre-requisites
		CH	ECTS	SWL	Lec	Tut	Lab	TT	
Semester 5									
HUM 241	Law and Human Rights	2	4	100	2	1	0	3	
	BASIC Elective Course (3)	2	4	100	2	1	0	3	
ELE 221	Advanced Logic Circuits	3	6	150	2	1	2	5	ELE 121, ELE 122
ELE 211	Measurements & Testing	3	5	125	2	1	2	5	ELE 121
ELE 251	Analog Electrical Communications	3	6	150	2	2	1	5	ELE 121
ELE 261	Control Components & Industrial Instrumentations	3	5	125	2	1	1	4	ELE 181
Total		**16**	**30**	**750**	**12**	**7**	**6**	**25**	
Semester 6									
HUM 2xy	HUM Elective Course (1)	2	4	100	2	1	0	3	
ELE 271	Signal Analysis	3	5	125	2	1	1	4	ELE 211
ELE 231	Microprocessors and their Applications	3	5	125	2	1	1	4	ELE 221
ELE 252	Digital Electrical Communications	3	5	125	2	2	1	5	ELE 251
ELE 222	Digital Integrated Circuits	3	5	125	2	1	1	4	ELE 221
ELE 262	Automatic Control	3	6	150	2	2	1	5	ELE 261
Total		**17**	**30**	**750**	**12**	**8**	**5**	**25**	
Semester 7									
HUM 3xy	HUM Elective Course (2)	2	4	100	2	1	0	3	
ELE 331	Computer Organization & Architecture (1)	3	6	150	3	1	0	4	ELE 231
ELE 351	Electromagnetic Fields	3	5	125	3	1	0	4	ELE 252
ELE 321	Power Electronics	3	5	125	2	2	1	5	ELE 121
ELE 361	Digital Control Systems	3	6	150	2	2	1	5	ELE 262
ELE 341	Algorithms & Data Structures	2	4	100	2	1	0	3	ELE 141
Total		**16**	**30**	**750**	**14**	**8**	**2**	**24**	
Semester 8									
ELE 333	Microcontrollers & Applications	3	6	150	2	1	2	5	ELE 231
ELE 332	Computer Networks	3	6	150	3	1	0	4	ELE 331
ELE 334	Computer Organization & Architecture (2)	2	4	100	2	1	0	3	ELE 331
ELE 342	Software Engineering	2	4	100	2	1	0	3	ELE 341
	Computer and Control Level 3 Elective Course (1)	3	5	125	3	1	0	4	
	Computer and Control Level 3 Elective Course (2)	3	5	125	3	1	0	4	
Total		**16**	**30**	**750**	**15**	**6**	**2**	**23**	

لائحة الساعات المعتمدة لبرامج الدراسة لمرحلة البكالوريوس

Code	Course Title	Credits and SWL			Contact Hours				Pre-requisites
		CH	ECTS	SWL	Lec	Tut	Lab	TT	
Semester 9									
ELE 491	Computer and Control Graduation Project (1)	3	6	150	2	2	1	5	
ELE 461	Robot Systems	2	4	100	2	1	0	3	ELE 361
ELE 441	Operating Systems	2	5	125	2	1	0	3	ELE 342
ELE 442	Database Systems	2	5	125	2	1	0	3	ELE 341
	Computer and Control Level 3 Elective Course (3)	3	5	125	3	1	0	4	
	Computer and Control Level 3 Elective Course (4)	3	5	125	3	1	0	4	
Total		**15**	**30**	**750**	**14**	**7**	**1**	**22**	
Semester 10									
ELE 492	Computer and Control Graduation Project (2)	3	6	150	2	1	2	5	ELE 491
ELE 443	Compiler Theory	2	5	125	2	1	0	3	ELE 441
ELE 462	Advanced Control Systems	2	4	100	2	1	0	3	ELE 361
ELE 471	Artificial Intelligence	3	5	125	3	1	0	4	ELE 341
	Computer and Control Level 3 Elective Course (5)	3	5	125	3	1	0	4	
	Computer and Control Level 3 Elective Course (6)	3	5	125	3	1	0	4	
Total		**16**	**30**	**750**	**15**	**6**	**2**	**23**	

Table 14 Proposed Study Plan of Engineering and Technology of Computers and Control Systems Program

Program Courses Tree



Program #2: Engineering and Technology of Electronics and Communications Program

Program Description

The Engineering and Technology of Electronics and Communications Engineering Program is where electronics, microwave and photonics, and communication engineering merge together to prepare the Electronics and Communications Engineer of the future.

Career Prospects

Students who earn their Electronics and Communications B.Sc. degree gain a profound understanding of electronics and communications engineering built on a thorough background of physical science, mathematics, and technology. Coursework prepares students for careers in government agencies, all local and international industries – from photonic and electronic integrated circuit design to traditional ICT companies -- or for future study in graduate schools.

Program Concentrations

The program qualifies graduates to work as Electronics and Communications Engineers. The graduate can be specialized in one of the following three concentrations:

1. Electronics
2. Microwave and Photonics
3. Communication Engineering

1. **Electronics:** Graduates are more specialized in the design of electronic systems. Graduates demonstrate additional abilities to model, analysis, design and build electronic circuits and systems.
2. **Microwave and Photonics:** Graduates are more specialized in the design of photonic and microwave systems. Graduates demonstrate additional abilities to model, analysis, design and build photonic and microwave components and systems.
3. **Communication Engineering:** Graduates are more specialized in the design of communication engineering systems. Graduates demonstrate additional abilities to model, analysis, design and build communication engineering systems and networks.

Program Competences

In addition to the competences for all Engineering Programs (A-Level) and the competencies for the Electrical Engineering Discipline (B-Level), the Engineering and Technology of Electronics and Communications Program graduate must be able to (C-Level):

C1. Understand the underlying physical phenomena and limitations of the performance of components and systems in Electronics and Communications Engineering.

C2. Demonstrate the ability to model and analyze components and systems in Electronics and Communication Engineering and identify the software tools required to optimize their performance.

C3. Design and compare between alternative components and systems in Electronics and Communications Engineering.

C4. Demonstrate the knowledge about measurement equipment and demonstrate the ability to use them to characterize components and systems in Electronics and Communications Engineering.

C5. Demonstrate the knowledge about state of the art of components and systems in Electronics and Communications Engineering.

C6. Demonstrate additional abilities related to the field of the concentration within Electronics and Communications Engineering as listed below.

Concentration	Graduate attributes
Electronics	C6a. Demonstrate additional abilities to model, analysis, design and, build electronic circuits and systems.
Microwave and Photonics	C6b. Demonstrate additional abilities to model, analysis, design, and build photonic and microwave components and systems.
Communication Engineering	C6c. Demonstrate additional abilities to model, analysis, design, and build communication engineering systems and networks.

Required Courses

In order to get a Bachelor of Science Degree in this program, and to satisfy the Program Competences, a set of courses need to be completed. These courses are listed in Table 15 as follows:

Code	Course Title	Credits and SWL			Contact Hours			
		CH	ECTS	SWL	Lec	Tut	Lab	TT
	Cultural Courses Requirements	14	28	700	14	6	0	20
	Institute Requirements	37	64	1600	28	17	9	54
	Electrical Engineering Requirements	68	120	3000	51	27	22	100
ELE 322	Analogue Integrated Circuits	3	6	150	2	2	1	5
ELE 373	Digital Signal Processing	2	4	100	2	0	1	3
ELE 352	Antenna	2	4	100	2	1	0	3
ELE 323	Optoelectronics	2	4	100	2	1	0	3
ELE 452	Optical Communication	2	4	100	2	1	0	3
ELE 454	Telephone Networks	2	5	125	2	1	0	3
ELE 475	IOT and Machine type Communication	2	5	125	2	1	0	3
ELE 456	Mobile Communication	2	5	125	2	1	0	3
ELE 451	Radar theory	2	4	100	2	1	0	3
ELE 458	Satellite Communication	3	5	125	3	1	0	4
	Electronics and Communication Level 3 Elective Course (1)	3	5	125	3	1	0	4
	Electronics and Communication Level 3 Elective Course (2)	3	5	125	3	1	0	4
	Electronics and Communication Level 3 Elective Course (3)	3	5	125	3	1	0	4
	Electronics and Communication Level 3 Elective Course (4)	3	5	125	3	1	0	4
	Electronics and Communication	3	5	125	3	1	0	4

Code	Course Title	Credits and SWL			Contact Hours			
		CH	ECTS	SWL	Lec	Tut	Lab	TT
	Level 3 Elective Course (5)							
	Electronics and Communication Level 3 Elective Course (6)	3	5	125	3	1	0	4
ELE 493	Electronics and Communication Graduation Project (1)	3	6	150	2	2	1	5
ELE 494	Electronics and Communication Graduation Project (2)	3	6	150	2	1	2	5
Total		**165**	**300**	**7500**	**136**	**69**	**36**	**241**
Pool of Electronics Concentration Elective Courses								
ELE 421	Nano Electronics	3	5	125	3	1	0	4
ELE 324	Advanced Semiconductor Devices	3	5	125	3	1	0	4
ELE 325	Low Power Digital Design	3	5	125	3	1	0	4
ELE 326	RF Circuit Design	3	5	125	3	1	0	4
ELE 498	Selected Topics in Electronic	3	5	125	3	1	0	4
ELE 327	MEMS Design	3	5	125	3	1	0	4
Pool of Microwave and Photonics Concentration Elective Courses								
ELE 453	Microwave electronics	3	5	125	3	1	0	4
ELE 422	Fundamentals of Photonics	3	5	125	3	1	0	4
ELE 455	Microwave Engineering	3	5	125	3	1	0	4
ELE 457	Waveguides	3	5	125	3	1	0	4
ELE 477	Integrated Optics and Optical MEMS	3	5	125	3	1	0	4
ELE 478	Micro Photonic Systems	3	5	125	3	1	0	4
Pool of Communications Concentration Elective Courses								
ELE 459	Communication Security	3	5	125	3	1	0	4
ELE 472	Information Theory and Coding	3	5	125	3	1	0	4
ELE 499	Selected Topics in Communication	3	5	125	3	1	0	4
ELE 474	Signal Processing for Multimedia	3	5	125	3	1	0	4
ELE 476	Pattern Recognition & Image Processing Systems	3	5	125	3	1	0	4
ELE 376	Speech Processing	3	5	125	3	1	0	4

Table 15 List of Engineering and Technology of Electronics and Communications Program Requirements courses

Proposed Study Plan

Code	Course Title	Credits and SWL			Contact Hours				Pre-requisites
		CH	ECTS	SWL	Lec	Tut	Lab	TT	
Semester 1									
HUM 011	English Language	2	4	100	2	1	0	3	
BAS 011	Mathematics (1)	3	5	125	3	1	0	4	
BAS 021	Physics (1)	3	5	125	2	1	1	4	
BAS 051	Engineering Drawing & Projection, using the Computer	3	6	150	2	1	2	5	
BAS 061	Principles of Manufacturing Engineering	3	5	125	2	2	1	5	
ELE 031	Computer Technology	3	5	125	2	1	1	4	
Total		**17**	**30**	**750**	**13**	**7**	**5**	**25**	
Semester 2									
HUM 061	History of Engineering & Technology	2	4	100	2	0	0	2	
BAS 012	Mathematics (2)	4	6	150	3	2	0	5	BAS 011
BAS 022	Physics (2)	3	5	125	2	2	1	5	BAS 021
BAS 031	Mechanics	3	5	125	2	2	0	4	
BAS 041	Engineering Chemistry	3	5	125	2	2	1	5	
ELE 041	Computer Programming (1)	3	5	125	2	0	2	4	ELE 031
Total		**18**	**30**	**750**	**13**	**8**	**4**	**25**	
Semester 3									
HUM 171	Communications and Presentation Skills	2	4	100	2	1	0	3	
	BASIC Elective Course (1)	2	4	100	2	1	0	3	
BAS 111	Mathematics (3)	4	6	150	3	2	0	5	BAS 012
BAS 121	Physics (3)	3	5	125	2	2	1	5	BAS 022
ELE 141	Computer Programming (2)	3	5	125	2	0	2	4	ELE 041
ELE 111	Electrical Circuits	3	6	150	2	1	2	5	
Total		**17**	**30**	**750**	**13**	**7**	**5**	**25**	
Semester 4									
HUM 172	Analysis and Research Skills	2	4	100	2	1	0	3	
	BASIC Elective Course (2)	2	4	100	2	1	0	3	
BAS 122	Science of Materials	3	5	125	3	1	0	4	BAS 121
ELE 122	Logic Circuits	3	6	150	2	1	2	5	ELE 111
ELE 121	Electronic devices	4	6	150	3	1	1	5	ELE 111
ELE 181	Energy Conversion	3	5	125	3	1	0	4	ELE 111
Total		**17**	**30**	**750**	**15**	**6**	**3**	**24**	

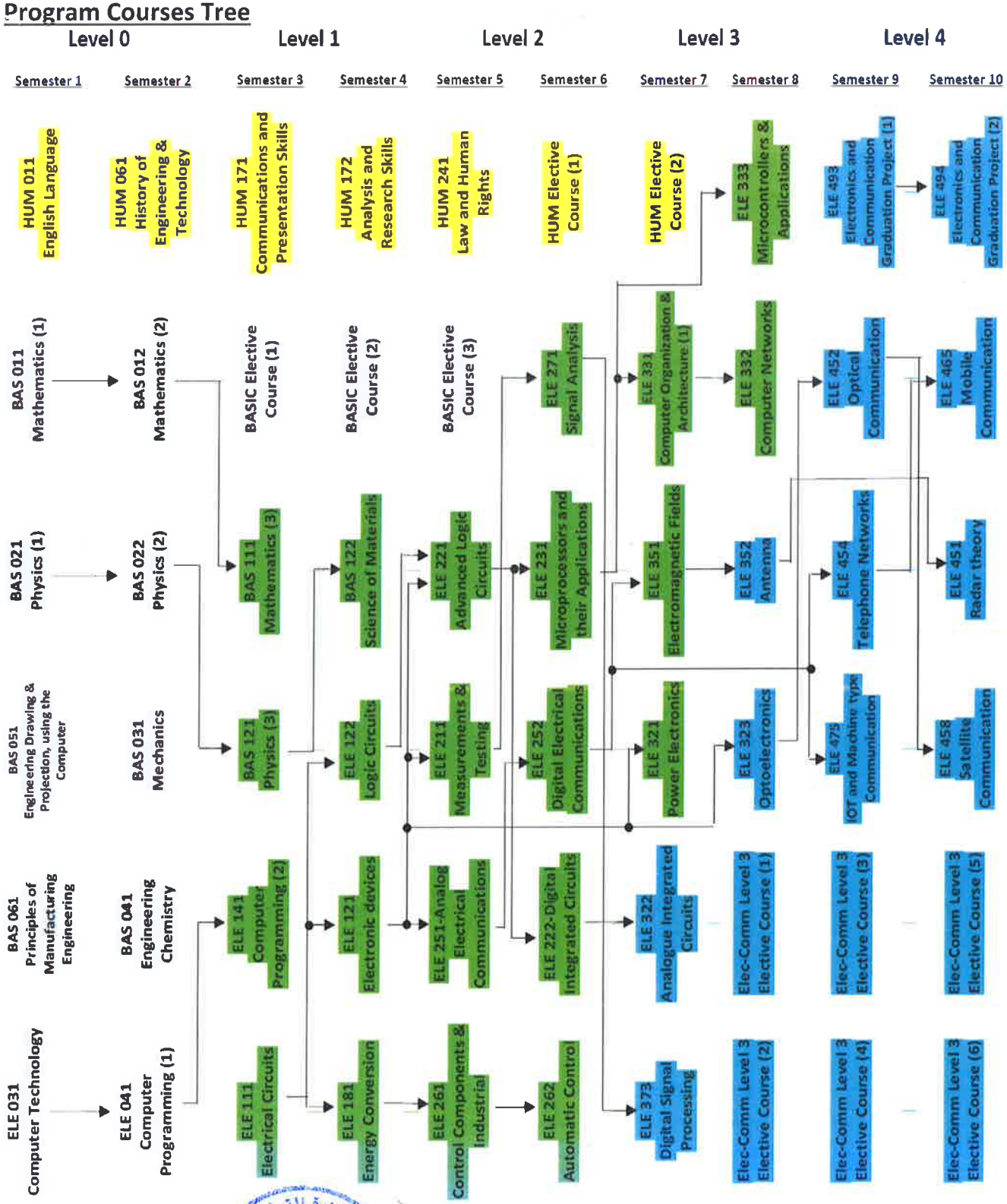
لائحة الساعات المعتمدة لبرامج الدراسة لمرحلة البكالوريوس

Code	Course Title	Credits and SWL			Contact Hours				Pre-requisites
		CH	ECTS	SWL	Lec	Tut	Lab	TT	
Semester 5									
HUM 241	Law and Human Rights	2	4	100	2	1	0	3	
	BASIC Elective Course (3)	2	4	100	2	1	0	3	
ELE 221	Advanced Logic Circuits	3	6	150	2	1	2	5	ELE 121, ELE 122
ELE 211	Measurements & Testing	3	5	125	2	1	2	5	ELE 121
ELE 251	Analog Electrical Communications	3	6	150	2	2	1	5	ELE 121
ELE 261	Control Components & Industrial Instrumentations	3	5	125	2	1	1	4	ELE 181
Total		**16**	**30**	**750**	**12**	**7**	**6**	**25**	
Semester 6									
	HUM Elective Course (1)	2	4	100	2	1	0	3	
ELE 271	Signal Analysis	3	5	125	2	1	1	4	ELE 211
ELE 231	Microprocessors and their Applications	3	5	125	2	1	1	4	ELE 221
ELE 252	Digital Electrical Communications	3	5	125	2	2	1	5	ELE 251
ELE 222	Digital Integrated Circuits	3	5	125	2	1	1	4	ELE 221
ELE 262	Automatic Control	3	6	150	2	2	1	5	ELE 261
Total		**17**	**30**	**750**	**12**	**8**	**5**	**25**	
Semester 7									
	HUM Elective Course (2)	2	4	100	2	1	0	3	
ELE 331	Computer Organization & Architecture (1)	3	6	150	3	1	0	4	ELE 231
ELE 351	Electromagnetic Fields	3	5	125	3	1	0	4	ELE 252
ELE 321	Power Electronics	3	5	125	2	2	1	5	ELE 121
ELE 322	Analogue Integrated Circuits	3	6	150	2	2	1	5	ELE 222
ELE 373	Digital Signal Processing	2	4	100	2	0	1	3	ELE 271
Total		**16**	**30**	**750**	**14**	**7**	**3**	**24**	
Semester 8									
ELE 333	Microcontrollers & Applications	3	6	150	2	1	2	5	ELE 231
ELE 332	Computer Networks	3	6	150	3	1	0	4	ELE 331
ELE 352	Antenna	2	4	100	2	1	0	3	ELE 351
ELE 323	Optoelectronics	2	4	100	2	1	0	3	ELE 121
	Electronics and Communication Level 3 Elective Course (1)	3	5	125	3	1	0	4	
	Electronics and Communication Level 3 Elective Course (2)	3	5	125	3	1	0	4	
Total		**16**	**30**	**750**	**15**	**6**	**2**	**23**	

Code	Course Title	Credits and SWL			Contact Hours				Pre-requisites
		CH	ECTS	SWL	Lec	Tut	Lab	TT	
Semester 9									
ELE 493	Electronics and Communication Graduation Project (1)	3	6	150	2	2	1	5	
ELE 452	Optical Communication	2	4	100	2	1	0	3	ELE 323
ELE 454	Telephone Networks	2	5	125	2	1	0	3	ELE 252
ELE 475	IOT and Machine type Communication	2	5	125	2	1	0	3	ELE 252
	Electronics and Communication Level 3 Elective Course (3)	3	5	125	3	1	0	4	
	Electronics and Communication Level 3 Elective Course (4)	3	5	125	3	1	0	4	
Total		**15**	**30**	**750**	**14**	**7**	**1**	**22**	
Semester 10									
ELE 494	Electronics and Communication Graduation Project (2)	3	6	150	2	1	2	5	ELE 493
ELE 456	Mobile Communication	2	5	125	2	1	0	3	ELE 454
ELE 451	Radar theory	2	4	100	2	1	0	3	ELE 352
ELE 458	Satellite Communication	3	5	125	3	1	0	4	ELE 452
	Electronics and Communication Level 3 Elective Course (5)	3	5	125	3	1	0	4	
	Electronics and Communication Level 3 Elective Course (6)	3	5	125	3	1	0	4	
Total		**16**	**30**	**750**	**15**	**6**	**2**	**23**	

Table 16 Proposed Study Plan of Engineering and Technology of Electronics and Communications Program.

Program Courses Tree



Program #3: Construction Engineering & technology program

Program Description

The Construction Engineering & technologyprogram aims to give students the skills and capabilities necessary to solve and address design, implementation and administrative problems that meet the needs of society and achieve its ambitions plans. This will be achieved through a comprehensive educational program that focuses on theoretical and applied research. The program also enhances their oral and written communication skills. There is a continues training on the use of computers and its most recent applications. The program aims to prepare graduates to work, whether in the local community or outside the country.

Career Prospects

Graduates of the Construction Engineering & technologyProgram would apply their knowledge and interpersonal skills in careers, both in private and public sectors, to conceive, plan, design, implement, operate and maintain the systems needed to support the physical infrastructure. Building, construction and maintenance will always be necessary for every country. Civil Engineers with computer skills will be particularly in demand because of the growing usage of computers in areas such as structural analysis and design, transportation system planning and construction management. Graduates will be able to pursue a variety of career options in worldwide locations due to demands for improvements to civil infrastructure that are ever-present, because of population growth and deterioration of existing systems over time.

Program Concentrations

No program concentrations

Program Competences

In addition to the competences for Engineering Programs (A-Level) and the competencies for the Construction Engineering & technologygraduate must be able to (B-Level):

B1. Select appropriate and sustainable technologies for construction of buildings, infrastructures and water structures; using either numerical techniques or physical measurements and/or testing by applying a full range of Construction Engineering & technology concepts and techniques of: Structural Analysis and Mechanics, Properties and Strength of Materials, Surveying, Soil Mechanics and Fluid Mechanics.

B2. Achieve an optimum design of Reinforced Concrete and Steel Structures, Foundations and Earth Retaining Structures; and at least three of the following Construction Engineering & technologytopics: Transportation and Traffic, Roadways and Airports, Railways, Sanitary Works, Irrigation, Water Resources and Harbors; or any other emerging field relevant to the discipline.

B3. Plan and manage construction processes; address construction defects, instability and quality issues; and maintain safety measures in construction and materials.

B4. Deal with biddings, contracts and financial issues including project insurance and guarantees; and assess environmental impacts of Construction Engineering & technology projects.

Required Courses

In order to get a Bachelor of Science Degree in this program and to satisfy the Program Competences, a set of courses need to be completed. These courses are listed in Table 19, as follows:

Code	Course Title	Credits and SWL			Contact Hours			
		CH	ECTS	SWL	Lec	Tut	Lab	TT
	Cultural Courses Requirements	14	28	700	14	6	-	20
	Institute Requirements	37	64	1600	28	17	9	54
BAS 013	Mathematics (3)	4	6	150	3	2	-	5
CIV 161	Civil Drawing	2	5	100	-	4	-	4
CIV 162	Engineering Surveying (1)	3	5	150	2	1	1	4
CIV 121	Strength of materials & Testing (1)	3	6	150	2	1	1	4
CIV 122	Strength of materials & Testing (2)	3	6	125	2	1	1	4
CIV 163	Engineering Surveying (2)	3	5	125	2	1	1	4
ARC 121	Building Construction (1)	3	6	150	2	2	-	4
CIV 111	Structural Analysis (1)	3	5	150	3	1	-	4
CIV 281	Fluid Mechanics	3	6	150	2	1	1	4
CIV 211	Design of Concrete Structures (1)	3	5	125	3	1	-	4
CIV 213	Structural Analysis (2)	3	5	125	3	1	-	4
CIV 271	Environmental Engineering	3	6	150	3	1	-	4
CIV 212	Design of Concrete Structures (2)	3	5	125	3	1	-	4
CIV 214	Structural Analysis (3)	3	5	125	3	1	-	4
CIV 282	Hydraulics	3	6	150	2	1	1	4
CIV 242	Legislation & Contracts	2	4	100	2	1	-	3
CIV 232	Geotechnical Engineering	3	6	150	2	1	1	4
CIV 313	Design of Concrete Structures (3)	3	5	125	3	1	-	4
CIV 311	Design of Steel Structures (1)	3	6	150	3	1	-	4
CIV 381	Irrigation and Drainage Engineering	2	4	100	2	1	-	3
CIV 331	Foundations Engineering (1)	3	6	150	3	1	-	4
CIV 371	Sanitary Engineering	3	5	125	3	1	-	4
CIV 312	Design of Steel Structures (2)	3	6	150	3	1	-	4
CIV 332	Foundations Engineering (2)	3	6	150	3	1	-	4
CIV 351	Highway & Traffic Engineering	2	4	100	2	1	-	3
CIV 341	Project Management	2	4	100	2	1	-	3
	CIV Level 3 Elective Course (1)	3	5	125	3	1	-	4
	CIV Level 3 Elective Course (2)	3	5	125	3	1	-	4
CIV 411	Design of Steel Bridges	3	6	150	3	1	-	4

لائحة الساعات المعتمدة لبرامج الدراسة لمرحلة البكالوريوس

Code	Course Title	Credits and SWL			Contact Hours			
		CH	ECTS	SWL	Lec	Tut	Lab	TT
CIV 422	Repair & Strengthening of Structures	2	4	100	2	1	-	3
CIV 441	Construction Engineering	2	4	100	2	1	-	3
CIV 491	Construction Graduation Project (1)	4	6	150	3	2	-	5
	CIV Level 4 Elective Course (3)	3	5	125	3	1	-	4
	CIV Level 4 Elective Course (4)	3	5	125	3	1	-	4
CIV 442	Construction Planning & Control	2	4	100	2	1	-	3
CIV 412	High Rise Buildings & R.C Towers	3	5	125	3	1	-	4
CIV 413	Electrical & Mechanical Structures in Buildings	2	5	125	2	1	-	3
CIV 492	Construction Graduation Project (2)	4	6	150	3	2	-	5
	CIV Level 4 Elective Course (5)	3	5	125	3	1	-	4
	CIV Level 4 Elective Course (6)	3	5	125	3	1	-	4
Total		**165**	**300**	**7500**	**143**	**70**	**16**	**229**
Construction Engineering & technologyElective Courses								
CIV 314	Tunnels & Underground Structures	3	5	125	3	1	-	4
CIV 333	Ground Improvement	3	5	125	3	1	-	4
CIV 342	Methods & Equipment's For Construction	3	5	125	3	1	-	4
CIV 352	Railway Engineering	3	5	125	3	1	-	4
CIV 414	Design of Wall Bearing Structures	3	5	125	3	1	-	4
CIV 431	Soil Mechanics	3	5	125	3	1	-	4
CIV 421	Inspection & Non Destructive Testing	3	5	125	3	1	-	4
CIV 443	Decision Making & Risk Analysis	3	5	125	3	1	-	4
CIV 432	In-Site Testing & Construction Technologies of Foundations	3	5	125	3	1	-	4
CIV 444	Quality Control & Assurance	3	5	125	3	1	-	4
CIV 461	Maps, GIS & Remote Sensing	3	5	125	3	1	-	4
CIV 445	Reliability & Fire Safety of R.C. Structures	3	5	125	3	1	-	4

Table 19 List of Construction Engineering & technologyProgram Requirements courses.

Proposed Study Plan

Code	Course Title	Credits and SWL			Contact Hours				Pre-requisites
		CH	ECTS	SWL	Lec	Tut	Lab	TT	
Semester 1									
HUM 011	English Language	2	4	100	2	1	-	3	
BAS 011	Mathematics (1)	3	5	125	3	1	-	4	
BAS 021	Physics (1)	3	5	125	2	1	1	4	
BAS 051	Engineering Drawing & Projection, using the Computer	3	6	150	2	1	2	5	
BAS 061	Principles of Manufacturing Engineering	3	5	125	2	2	1	5	
ELE 031	Computer Technology	3	5	125	2	1	1	4	
Total		**17**	**30**	**750**	**13**	**7**	**5**	**25**	
Semester 2									
HUM 061	History of Engineering & Technology	2	4	100	2	-	-	2	
BAS 012	Mathematics (2)	4	6	150	3	2	-	5	BAS 011
BAS 022	Physics (2)	3	5	125	2	2	1	5	BAS 021
BAS 031	Mechanics	3	5	125	2	2	-	4	
BAS 041	Engineering Chemistry	3	5	125	2	2	1	5	
ELE 041	Computer Programming (1)	3	5	125	2	0	2	4	ELE 031
Total		**18**	**30**	**750**	**13**	**8**	**4**	**25**	
Semester 3									
HUM 181	Communications and Presentation Skills	2	4	100	2	1	-	3	
	BASIC Elective Course (1)	2	4	100	2	1	-	3	
BAS 111	Mathematics (3)	4	6	150	3	2	-	5	BAS 012
CIV 161	Civil Drawing	2	5	100	-	4	-	4	
CIV 162	Engineering Surveying (1)	3	5	150	2	1	1	4	BAS 012
CIV 121	Strength of materials & Testing (1)	3	6	150	2	1	1	4	BAS 022
Total		**16**	**30**	**750**	**11**	**10**	**2**	**23**	
Semester 4									
HUM 172	Analysis and Research Skills	2	4	100	2	1	-	3	
	BASIC Elective Course (2)	2	4	100	2	1	-	3	
CIV 122	Strength of materials & Testing (2)	3	6	125	2	1	1	4	CIV 121
CIV 163	Engineering Surveying (2)	3	5	125	2	1	1	4	CIV 162
ARC 121	Building Construction (1)	3	6	150	2	2	-	4	
CIV 111	Structural Analysis (1)	3	5	150	3	1	-	4	

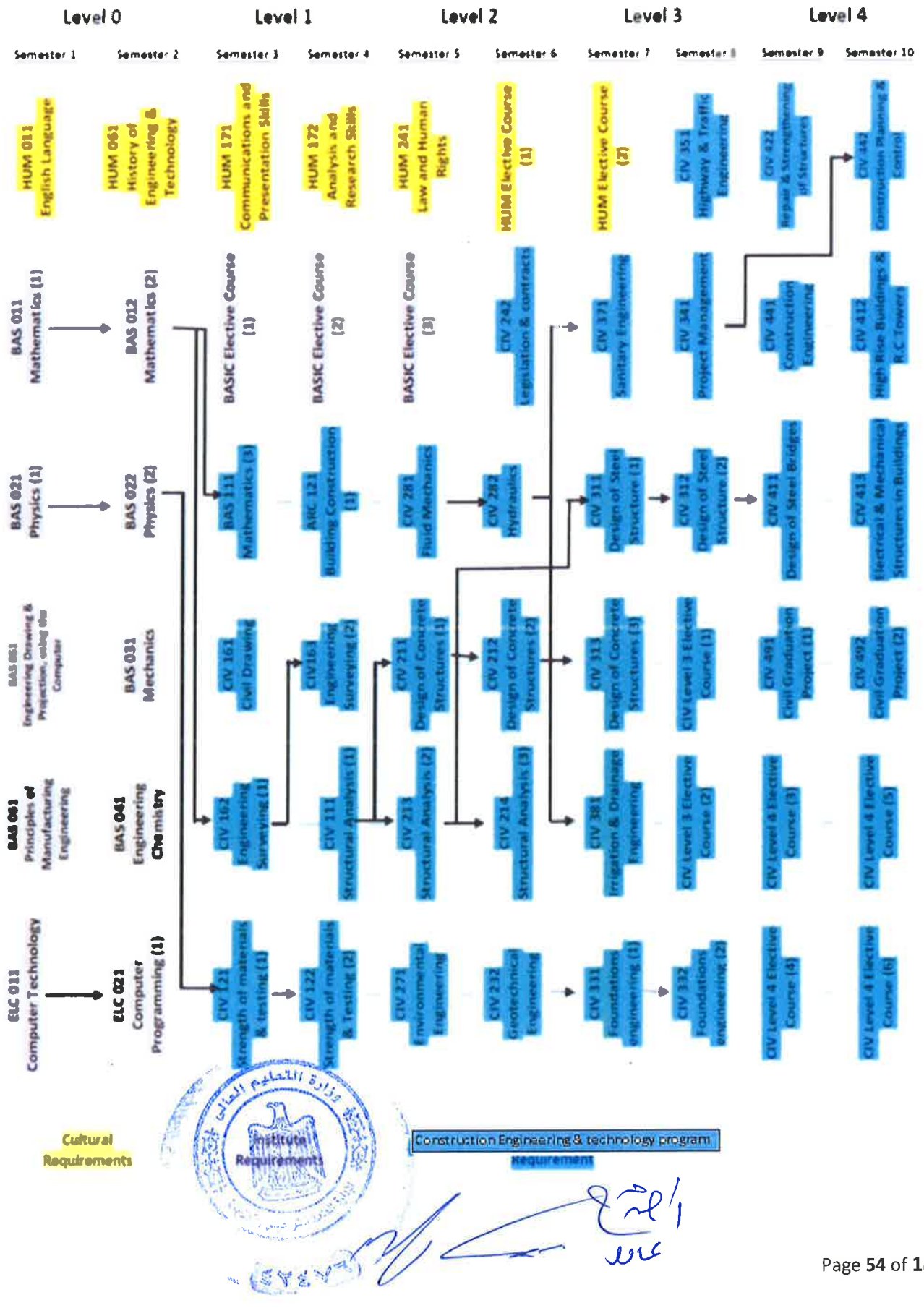
لائحة الساعات المعتمدة لبرامج الدراسة لمرحلة البكالوريوس

Code	Course Title	Credits and SWL			Contact Hours				Pre-requisites
		CH	ECTS	SWL	Lec	Tut	Lab	TT	
Total		**16**	**30**	**750**	**13**	**7**	**2**	**22**	
Semester 5									
HUM 241	Law and Human Rights	2	4	100	2	1	0	3	
	BASIC Elective Course (3)	2	4	100	2	1	-	3	
CIV 281	Fluid Mechanics	3	6	150	2	1	1	4	
CIV 211	Design of Concrete Structures (1)	3	5	125	3	1	-	4	CIV 111
CIV 213	Structural Analysis (2)	3	5	125	3	1	-	4	CIV 111
CIV 271	Environmental Engineering	3	6	150	3	1	-	4	
Total		**16**	**30**	**750**	**15**	**6**	**1**	**22**	
Semester 6									
	HUM Elective Course (1)	2	4	100	2	1	-	3	
CIV 212	Design of Concrete Structures (2)	3	5	125	3	1	-	4	CIV 211
CIV 214	Structural Analysis (3)	3	5	125	3	1	-	4	CIV 213
CIV 282	Hydraulics	3	6	150	2	1	1	4	CIV 281
CIV 242	Legislation & Contracts	2	4	100	2	1	-	3	
CIV 232	Geotechnical Engineering	3	6	150	2	1	1	4	
Total		**16**	**30**	**750**	**14**	**6**	**2**	**22**	
Semester 7									
	HUM Elective Course (2)	2	4	100	2	1	-	3	
CIV 313	Design of Concrete Structures (3)	3	5	125	3	1	-	4	CIV 212
CIV 311	Design of Steel Structures (1)	3	6	150	3	1	-	4	CIV 213
CIV 381	Irrigation and Drainage Engineering	2	4	100	2	1	-	3	CIV 282
CIV 331	Foundations Engineering (1)	3	6	150	3	1	-	4	CIV 232
CIV 371	Sanitary Engineering	3	5	125	3	1	-	4	CIV 282
Total		**16**	**30**	**750**	**16**	**6**	**-**	**22**	
Semester 8									
CIV 312	Design of Steel Structures (2)	3	6	150	3	1	-	4	CIV 311
CIV 332	Foundations Engineering (2)	3	6	150	3	1	-	4	CIV 331
CIV 351	Highway & Traffic Engineering	2	4	100	2	1	-	3	
CIV 341	Project Management	2	4	100	2	1	-	3	
	CIV Level 3 Elective Course (1)	3	5	125	3	1	-	4	
	CIV Level 3 Elective Course (2)	3	5	125	3	1	-	4	
Total		**16**	**30**	**750**	**16**	**6**	**-**	**22**	
Semester 9									
CIV 411	Design of Steel Bridges	3	6	150	3	1	-	4	CIV 312
CIV 422	Repair & Strengthening of Structures	2	4	100	2	1	-	3	
CIV 441	Construction Engineering	2	4	100	2	1	-	3	
CIV 491	Construction Graduation Project (1)	4	6	150	3	2	-	5	
	CIV Level 4 Elective Course (3)	3	5	125	3	1	-	4	
	CIV Level 4 Elective Course (4)	3	5	125	3	1	-	4	

Code	Course Title	Credits and SWL			Contact Hours				Pre-requisites
		CH	ECTS	SWL	Lec	Tut	Lab	TT	
Total		**17**	**30**	**750**	**16**	**7**	**-**	**23**	
Semester 10									
CIV 442	Construction Planning & Control	2	4	100	2	1	-	3	CIV 341
CIV 412	High Rise Buildings & R.C Towers	3	5	125	3	1	-	4	
CIV 413	Electrical & Mechanical Structures in Buildings	2	5	125	2	1	-	3	
CIV 492	Construction Graduation Project (2)	4	6	150	3	2	-	5	
	CIV Level 4 Elective Course (5)	3	5	125	3	1	-	4	
	CIV Level 4 Elective Course (6)	3	5	125	3	1	-	4	
Total		**17**	**30**	**750**	**16**	**7**	**-**	**23**	

Table 20 Proposed Study Plan of Construction Engineering & technologyProgram

Program Courses Tree



Program #4: Architectural Engineering Program

Program Description

Throughout history, architecture was witness to the most significant reflections of culture and civilization. In today's world, architects are compelled to challenge critical global issues through holding responsibility of the built environment, responding to societal needs, and conserving natural resources. The program is committed to offering well-rounded future generations of skilled professional architects through an education that is rooted in culture, sustained with theory and progressive with technologically advanced methods. This program is dedicated to sustain creativity with knowledge and practice.

Career Prospects

It is intended that graduates of the Architectural Engineering program will acquire critical thinking and enhance design creativity in order to take a leading role in the professional practice. Graduates will be eligible to work in architectural design firms; in design, tender documents, as well as urban design and detailed planning. Moreover, they will be qualified for working in construction industry, building technology, rehabilitation, conservation of buildings, urban context, and physical planning. Additionally, they can be enrolled in graduate studies in universities or research centers.

Program Concentrations

The program qualifies graduates to work as Architectural Engineers. The program includes the following two concentrations:

1. **Architecture:** This concentration prepares the graduate to demonstrate comprehensive ability to design innovative architectural projects based on the most contemporary trends and theories of architecture
2. **City Planning and Urban Design:** This concentration prepares the graduate to Demonstrate comprehensive ability to design urban projects that exist in thematic/heritage context with deep responsiveness to environmental issues and problems that face the society and built areas. This concentration also aims to provide students with necessary skills to engage in critical and creative problem – solving and to think critically in analytical ways across the different city scales, from strategic to local. This concentration allows students to explore international practices in urban development policy, planning and management that address contemporary spatial, socio-economic and political transformations in cities.

Program Competences

In addition to the competences for all Engineering Programs (A-Level) and the competencies for the Architectural Engineering graduate must be able to (B-Level):

B1. Create architectural, urban and planning designs that satisfy both aesthetic and technical requirements, using adequate knowledge of: history and theory, related fine arts, local culture and heritage, technologies and human sciences.

B2. Produce designs that meet building users' requirements through understanding the relationship between people and buildings, and between buildings and their environment; and the need to relate buildings and the spaces between them to human needs and scale.

B3. Generate ecologically responsible, environmental conservation and rehabilitation designs; through understanding of: structural design, construction, technology and engineering problems associated with building designs.

B4. Transform design concepts into buildings and integrate plans into overall planning within the constraints of: project financing, project management, cost control and methods of project delivery; while having adequate knowledge of industries, organizations, regulations and procedures involved.

B5. Prepare design project briefs and documents, and understand the context of the architect in the construction industry, including the architect's role in the processes of bidding, procurement of architectural services and building production.

Also, the Architectural Engineering Program graduate must be able to (D-Level):

D1: Apply digital architecture software to produce, render, and present in design.
D2: Demonstrate deep understanding of the advanced construction materials, methods and techniques.
D3: Recognize different design methods and approaches.
D4: Identify contemporary housing problems and apply polices, and designs.
D5: Apply advanced lighting, acoustics, and smart systems techniques in design.
D6: Demonstrate additional abilities related to the field of the concentration within Architectural Engineering as listed below:

Concentration	Graduate attributes
Architecture	D6.a Demonstrate comprehensive ability to design innovative architectural projects based on the most contemporary trends and theories of architecture
City Planning and Urban Design	D6.b Demonstrate comprehensive ability to design urban projects that exist in thematic/heritage context with deep responsiveness to environmental issues and problems that face the society and built areas.

Required Courses

In order to get a Bachelor of Science Degree in this program, and to satisfy the Program Competences, a set of courses need to be completed. These courses are listed in Table 21, as follows:

Code	Course Title	Credits and SWL			Contact Hours			
		CH	ECTS	SWL	Lec	Tut	Lab	TT
	Cultural Courses Requirements	14	28	700	14	6	0	20
	Institute Requirements	37	64	1600	28	17	9	54
ARC 111	Principles of Architecture Design Studio	5	8	200	2	7	0	9
ARC 112	Architecture Design Studio (1)	5	8	200	2	7	0	9
ARC 113	History & Theories of Architecture (1)	2	4	100	2	1	0	3
ARC 114	History & Theories of Architecture (2)	2	4	100	2	1	0	3

لائحة الساعات المعتمدة لبرامج الدراسة لمرحلة البكالوريوس

Code	Course Title	Credits and SWL			Contact Hours			
		CH	ECTS	SWL	Lec	Tut	Lab	TT
ARC 211	Architecture Design Studio (2)	5	8	200	2	7	0	9
ARC 212	Architecture Design Studio (3)	5	8	200	2	6	0	8
ARC 213	Architectural Digital Representation	2	4	100	2	1	0	3
ARC 311	Architecture Design Studio (4)	5	8	200	2	6	0	8
ARC 312	Architecture Design Studio (5)	5	8	200	2	7	0	9
ARC 313	Architectural Criticism and Project Evaluation	2	4	100	2	1	0	3
ARC 121	Building Construction (1)	2	4	100	2	1	0	3
ARC 122	Building Construction (2)	2	4	100	2	1	0	3
ARC 221	Building Construction (3)	2	5	125	2	1	0	3
ARC 222	Technical Installations	2	4	100	2	1	0	3
ARC 223	Working Design (1)	3	6	150	2	2	0	4
ARC 321	Working Design (2)	3	6	150	2	2	0	4
ARC 322	Working Design (3)	3	6	150	2	2	0	4
CIV 162	Engineering Surveying (1)	3	6	150	2	1	1	4
CIV 121	Strength of materials & Testing (1)	3	6	150	2	1	1	4
CIV 211	Design of Concrete Structures (1)	3	5	125	3	1	0	4
ARC 331	Environmental Control	2	4	100	2	1	0	3
ARC 332	Environmental Impact Assessment	2	4	100	2	1	0	3
ARC 431	Maintenance of Buildings	3	5	125	2	2	0	4
ARC 432	Green Maintenance of Buildings	3	4	100	2	2	0	4
ARC 241	Regional and Urban Planning	3	4	100	2	2	0	4
ARC 341	Smart City Planning	3	4	100	2	2	0	4
ARC 342	Urban Design	2	4	100	2	1	0	3
ARC 441	Urban Upgrading	2	5	125	2	1	0	3
ARC 451	Report Writing	2	4	100	2	1	0	3
ARC 452	Items Specifications and BOQs	2	4	100	2	1	0	3
ARC 453	Financial Resource Management	2	3	75	2	1	0	3
ARC 454	Architectural Project Management	2	3	75	2	1	0	3
ARC 455	Feasibility Studies	2	3	75	2	1	0	3
-	ARC Level 2 Elective Course (1)	2	4	100	2	1	0	3
-	ARC Level 3 Elective Course (2)	2	4	100	2	1	0	3
-	ARC Level 3 Elective Course (3)	2	4	100	2	1	0	3

Code	Course Title	Credits and SWL			Contact Hours			
		CH	ECTS	SWL	Lec	Tut	Lab	TT
-	ARC Level 4 Elective Course (4)	2	4	100	2	1	0	3
-	ARC Level 4 Elective Course (5)	2	3	75	2	1	0	3
ARC 411	Architectural Graduation Project (1)	5	8	200	2	7	0	9
ARC 412	Architectural Graduation Project (2)	5	14	350	2	7	0	9
Total		165	300	7500	123	116	11	250
Pool of Architecture Concentration Elective Courses								
ARC 224	Field Studies	2	4	100	2	1	0	3
ARC 225	Construction Technology	2	4	100	2	1	0	3
ARC 226	Site Analysis	2	4	100	2	1	0	3
ARC 314	Architectural Representation	2	4	100	2	1	0	3
ARC 315	Visual Space Information in Architecture	2	4	100	2	1	0	3
ARC 316	Ergonomics and Interior Design Principles	2	4	100	2	1	0	3
ARC 323	Advanced Technical Installation	2	4	100	2	1	0	3
ARC 324	Plumbing Engineering	2	4	100	2	1	0	3
ARC 325	Building Information Modeling (BIM)	2	4	100	2	1	0	3
ARC 413	Human Aspects in Architecture	2	4	100	2	1	0	3
ARC 433	Renewable Energy and Building	2	4	100	2	1	0	3
ARC 434	Computer Application in Environmental Engineering	2	4	100	2	1	0	3
ARC 435	Sustainable Development	2	4	100	2	1	0	3
ARC 436	Green Architecture	2	4	100	2	1	0	3
ARC 437	Daylight and Thermal Performance	2	4	100	2	1	0	3
ARC 438	Smart Technique in Architecture	2	4	100	2	1	0	3
ARC 456	Architectural Laws and Legislation	2	3	75	2	1	0	3
ARC 457	Meaning in Architecture	2	3	75	2	1	0	3
ARC 458	Land Management	2	3	75	2	1	0	3
Pool of City Planning and Urban Design Concentration Elective Courses								
ARC 442	City Planning History	2	4	100	2	1	0	3
ARC 443	Geographic Information Systems (GIS) Principles	2	3	75	2	1	0	3
ARC 444	Urban and Architecture Heritage	2	4	100	2	1	0	3
ARC 445	Housing in Smart Cities	2	3	75	2	1	0	3
ARC 446	Landscaping	2	3	75	2	1	0	3

Table 21 List of Architectural Engineering Program Requirements courses.

Proposed Study Plan

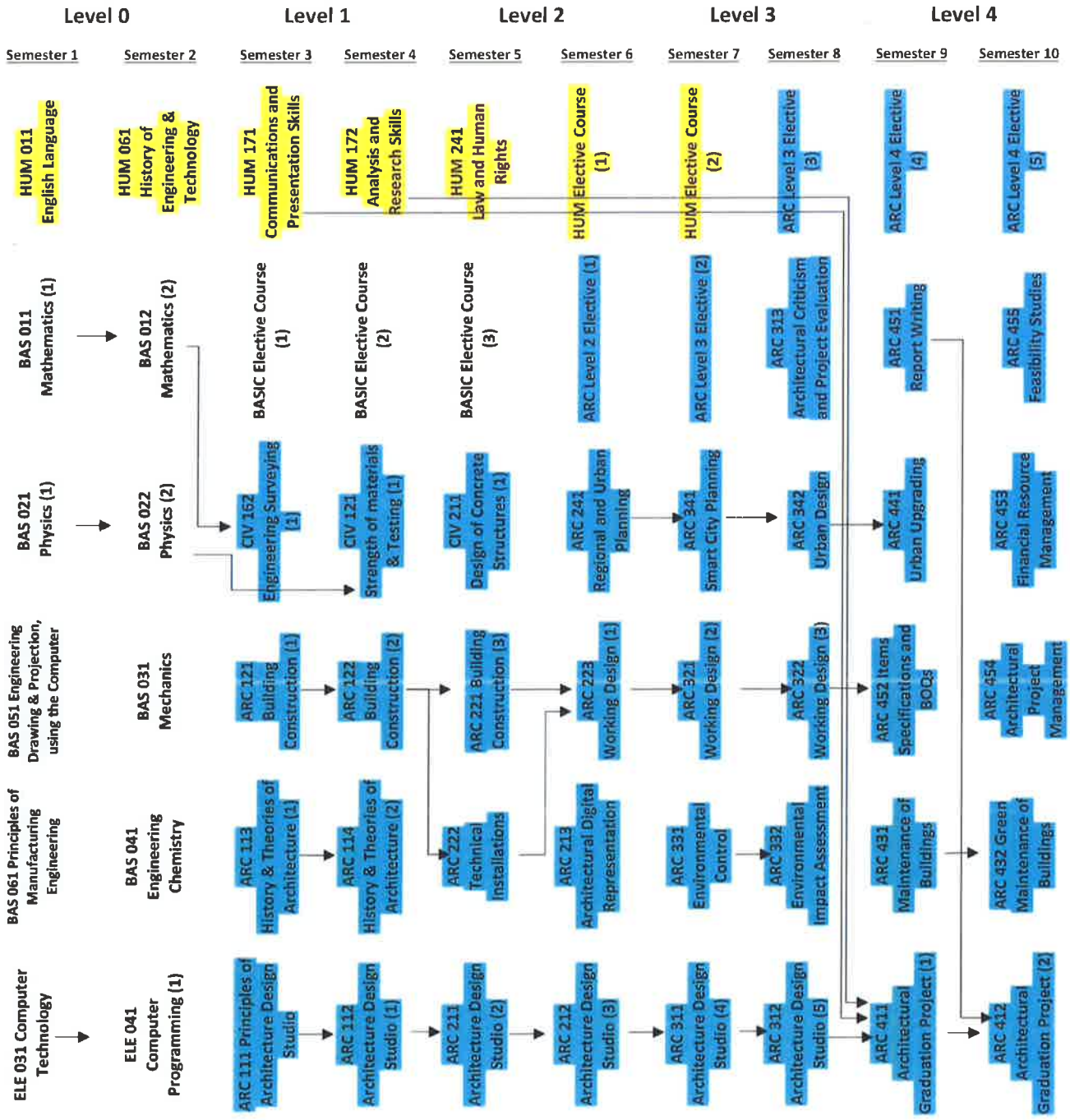
Code	Course Title	Credits and SWL			Contact Hours				Pre-requisites
		CH	ECTS	SWL	Lec	Tut	Lab	TT	
Semester 1									
HUM 011	English Language	2	4	100	2	1	0	3	
BAS 011	Mathematics (1)	3	5	125	3	1	0	4	
BAS 021	Physics (1)	3	5	125	2	1	1	4	
BAS 051	Engineering Drawing & Projection, using the Computer	3	6	150	2	1	2	5	
BAS 061	Principles of Manufacturing Engineering	3	5	125	2	2	1	5	
ELE 031	Computer Technology	3	5	125	2	1	1	4	
Total		**17**	**30**	**750**	**13**	**7**	**5**	**25**	
Semester 2									
HUM 061	History of Engineering & Technology	2	4	100	2	0	0	2	
BAS 012	Mathematics (2)	4	6	150	3	2	0	5	BAS 011
BAS 022	Physics (2)	3	5	125	2	2	1	5	BAS 021
BAS 031	Mechanics	3	5	125	2	2	0	4	
BAS 041	Engineering Chemistry	3	5	125	2	2	1	5	
ELE 041	Computer Programming (1)	3	5	125	2	0	2	4	ELE 031
Total		**18**	**30**	**750**	**13**	**8**	**4**	**25**	
Semester 3									
HUM 171	Communications and Presentation Skills	2	4	100	2	1	0	3	
	BASIC Elective Course (1)	2	4	100	2	1	0	3	
ARC 111	Principles of Architecture Design Studio	5	8	200	2	7	0	9	
ARC 113	History & Theories of Architecture (1)	2	4	100	2	1	0	3	
ARC 121	Building Construction (1)	2	4	100	2	1	0	3	
CIV 162	Engineering Surveying (1)	3	6	150	2	1	1	4	BAS 012
Total		**16**	**30**	**750**	**12**	**12**	**1**	**25**	
Semester 4									
HUM 172	Analysis and Research Skills	2	4	100	2	1	0	3	
	BASIC Elective Course (2)	2	4	100	2	1	0	3	
ARC 112	Architecture Design Studio (1)	5	8	200	2	7	0	9	ARC111
ARC 114	History & Theories of Architecture (2)	2	4	100	2	1	0	3	ARC 113
ARC 122	Building Construction (2)	2	4	100	2	1	0	3	ARC 121
CIV 121	Strength of materials & Testing (1)	3	6	150	2	1	1	4	BAS 022
Total		**16**	**30**	**750**	**12**	**12**	**1**	**25**	
Semester 5									
HUM 241	Law and Human Rights	2	4	100	2	1	0	3	
	BASIC Elective Course (3)	2	4	100	2	1	0	3	
ARC 211	Architecture Design Studio (2)	5	8	200	2	7	0	9	ARC 112
ARC 221	Building Construction (3)	2	5	125	2	1	0	3	ARC 122
ARC 222	Technical Installations	2	4	100	2	1	0	3	ARC 122
CIV 211	Design of Concrete Structures (1)	3	5	125	3	1	0	4	
Total		**16**	**30**	**750**	**13**	**12**	**0**	**25**	
Semester 6									

لائحة الساعات المعتمدة لبرامج الدراسة لمرحلة البكالوريوس

Code	Course Title	Credits and SWL			Contact Hours				Pre-requisites
		CH	ECTS	SWL	Lec	Tut	Lab	TT	
HUM 2xy	HUM Elective Course (1)	2	4	100	2	1	0	3	
ARC 212	Architecture Design Studio (3)	5	8	200	2	6	0	8	ARC 211
ARC 213	Architectural Digital Representation	2	4	100	2	1	0	3	
ARC 223	Working Design (1)	3	6	150	2	2	0	4	ARC 221 ARC 222
ARC 241	Regional and Urban Planning	3	4	100	2	2	0	4	
	ARC Level 2 Elective Course (1)	2	4	100	2	1	0	3	
Total		**17**	**30**	**750**	**12**	**13**	**0**	**25**	
Semester 7									
HUM 3xy	Hum Elective Course (2)	2	4	100	2	1	0	3	
ARC 311	Architecture Design Studio (4)	5	8	200	2	6	0	8	ARC 212
ARC 321	Working Design (2)	3	6	150	2	2	0	4	ARC 223
ARC 331	Environmental Control	2	4	100	2	1	0	3	
ARC 341	Smart City Planning	3	4	100	2	2	0	4	ARC 241
	ARC Level 3 Elective Course (2)	2	4	100	2	1	0	3	
Total		**17**	**30**	**750**	**12**	**13**	**0**	**25**	
Semester 8									
ARC 312	Architecture Design Studio (5)	5	8	200	2	7	0	9	ARC311
ARC 313	Architectural Criticism and Project Evaluation	2	4	100	2	1	0	3	
ARC 322	Working Design (3)	3	6	150	2	2	0	4	ARC 321
ARC 332	Environmental Impact Assessment	2	4	100	2	1	0	3	ARC 331
ARC 342	Urban Design	2	4	100	2	1	0	3	ARC 341
	ARC Level 3 Elective Course (3)	2	4	100	2	1	0	3	
Total		**16**	**30**	**750**	**12**	**13**	**0**	**25**	
Semester 9									
ARC 411	Architectural Graduation Project (1)	5	8	200	2	7	0	9	HUM 171 HUM 172 ARC 312
ARC 431	Maintenance of Buildings	3	5	125	2	2	0	4	
ARC 441	Urban Upgrading	2	5	125	2	1	0	3	ARC 342
ARC 451	Report Writing	2	4	100	2	1	0	3	
ARC 452	Items Specifications and BOQs	2	4	100	2	1	0	3	ARC 322
	ARC Level 4 Elective Course (4)	2	4	100	2	1	0	3	
Total		**16**	**30**	**750**	**12**	**13**	**0**	**25**	
Semester 10									
ARC 412	Architectural Graduation Project (2)	5	14	350	2	7	0	9	ARC 411 ARC 451
ARC 432	Green Maintenance of Buildings	3	4	100	2	2	0	4	ARC 431
ARC 453	Financial Resource Management	2	3	75	2	1	0	3	
ARC 454	Architectural Project Management	2	3	75	2	1	0	3	
ARC 455	Feasibility Studies	2	3	75	2	1	0	3	
	ARC Level 4 Elective Course (5)	2	3	75	2	1	0	3	
Total		**16**	**30**	**750**	**12**	**13**	**0**	**25**	

Table 22 Proposed Study Plan of Architectural Engineering Program

Program Courses Tree



Part E: Course Pool

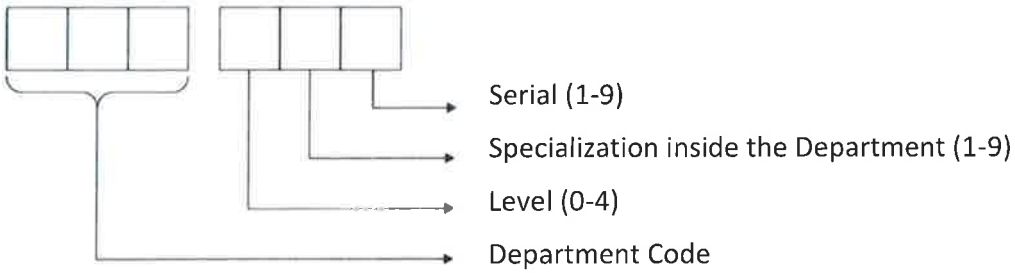
All the programs use courses from the Institute Departments. There are 4 departments at the Obour High Institute for Engineering and Technology. They are listed in the following table.

Field	#	Department	Acronym	Courses
Cultural			HUM	16
Basic Science	1	Basic Sciences Department	BAS	12
Engineering and Technology of Computers and Control Systems	2	Electrical Engineering Department	ELE	80
Engineering and Technology of Electronics and Communications				
Construction Engineering & technology	3	Construction Engineering & technologyDepartment	CIV	45
Architectural Engineering	4	Architectural Engineering Department	ARC	57
Total number of courses				**210**

Table 23 List of Departments at the Obour High Institute for Engineering and Technology.

Any given course can be used in different Programs based on the Program requirement. The course code follows the Department offering this course. The course coding is divided into two parts and follows the following convention:

- Three Letters which are the Department code listed in Table above.
- Three digits indicating the Level, the Specialization inside the department, and a counter inside the specialization.



E1. Courses of Humanities & Social Sciences (HUM)

For all the Programs, The Humanities & Social Sciences courses (HUM) are taught be members assigned by the Institute council.

#	Specialization
1	Language
2	Business Administration
3	Economy & Project Planning
4	Law & Environment
5	Arts
6	Literature
7	Personal Skills Development

Table 24 List of specializations at the Humanities & Social Sciences courses.

The following abbreviations are the legend for the courses table.

Lvl	Level
CH	Credit Hour
ECTS	European Credit Transfer System
SWL	Student Work Load
Lec	Lectures
Tut	Tutorials
Lab	Laboratory
TT	Total
CR	Cultural Requirement
IR	Institute Requirement
DR	Discipline Requirement
PR	Program Requirement
SA	Student Activities
MT	Mid-Term Exam
PE	Practical Exam
FE	Final Exam

لائحة الساعات المعتمدة لبرامج الدراسة لمرحلة البكالوريوس

#	Lvl	Code	Course Title	Credits and SWL			Contact Hours				Classification				Assessment (%)				Prereq uisites
				CH	ECTS	SWL	Lec	Tut	Lab	TT	CR	IR	DR	PR	SA	MT	PE	FE	
1. Language																			
1	0	HUM 011	English Language	2	4	100	2	1	0	3	x				30	20	-	50	
2. Business Administration																			
2	3	HUM 321	Social Sharing in Modern Egypt Construction	2	4	100	2	1	0	3	x				30	20	-	50	
3. Economy & Project Planning																			
3	1	HUM 131	Engineering Economics	2	4	100	2	1	0	3		x			30	20	-	50	
4	2	HUM 231	Projects management	2	4	100	2	1	0	3		x			30	20	-	50	
4. Law & Environment																			
5	2	HUM 241	Law and Human Rights	2	4	100	2	1	0	3	x				30	20	-	50	
6		HUM 242	Principles of negotiation	2	4	100	2	1	0	3	x				30	20	-	50	
7		HUM 243	Professional Ethics	2	4	100	2	1	0	3	x				30	20	-	50	
8	3	HUM 341	Cases of Energy, Water, and Climate Change	2	4	100	2	1	0	3	x				30	20	-	50	
5. Arts																			
9	2	HUM 251	Contemporary artistic directions	2	4	100	2	1	0	3	x				30	20	-	50	
10	3	HUM 351	Music Taste	2	4	100	2	1	0	3	x				30	20	-	50	
6. Literature																			
11	0	HUM 061	History of Engineering & Technology	2	4	100	2	0	0	2	x				50	-	-	50	
12	3	HUM 361	Egyptian Literature Heritage	2	4	100	2	1	0	3	x				30	20	-	50	
7. Personal Skills Development																			
13	1	HUM 171	Communications and Presentation Skills	2	4	100	2	1	0	3	x				30	20	-	50	
14		HUM 172	Analysis and Research Skills	2	4	100	2	1	0	3	x				30	20	-	50	
15		HUM 173	Preparing technical reports	2	4	100	2	1	0	3		x			30	20	-	50	
16	2	HUM 271	First Aid Skills	2	4	100	2	1	0	3	x				30	20	-	50	

Table 25 List of *Humanities & Social Sciences courses.*

E1.1 Language

HUM 011	English Language		2 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	0	
Required SWL	100	Equivalent ECTS	4
Course Content			
How to talk about the people in your life. How to talk about greeting customs, how to explain who people are, how to correct a misunderstanding, writing a self-introduction, how to talk about your background, how to talk about tourism, how to describe objects, how to tell an anecdote, writing an intercultural experience, how to talk about your schooldays, how to talk about your achievements, how to offer hospitality, how to talk about your education and career, writing a CV, how to say how you feel about things, how to talk about music, how to compare and discuss preference, comparing with as, how to explain what a film is about, writing a description of a film or book, how to talk about countries and governments, how to talk about rules and laws, how to talk about stories in the news, how to talk about past events, writing narrating a story, how to express strong feelings, how to tell and show interest in an anecdote, how to talk about people in your neighborhood (pronouns in reported speech), how to report what people said, writing exchanging news in a personal letter, how to say how people look, how to talk about fashion, how to talk about plans and intentions, how to express guesses, writing a letter of application, how to talk on the phone, how to talk about ability, how to report an interview, how to report a conversation, writing a report, how to make small talk, how to talk about your future, how to give advice, how to talk about unreal situations, writing an opinion, how to exchange opinion, how to talk about your shopping habits, how to talk about recent activities, how to ask about products in a shop.			
Used in Program / Level			
Program Name or requirement			Study Level
Cultural Requirement			0
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		2 Hrs

E1.2 Business Administration

HUM 321	Social Sharing in Modern Egypt Construction		2 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	0	
Required SWL	100	Equivalent ECTS	4
Course Content			
يهدف المقرر إلى تعريف الطالب بالمهارات العلمية المختلفة لكيفية الاستثمار في قدرات الشباب و تدريبهم وتأهيلهم للمشاركة الفعالة في العمل العام بصفة عامة والعمل المحلى بصفة خاصة تعليم الشباب من طلاب المعهد لمفهوم الشراكة مع منظمات المجتمع المدني، وذلك بتدريبهم على إيجاد آلية فعالة لتوعية الرأي العام المحلي بأهمية المشاركة الإيجابية في الشأن العام، بناء الروح الإيجابية لدي الفئات الشبابية نحو المشاركة الفعالة في بناء مصر الحديثة، دعم دور منظمات المجتمع المدني في تنفيذ مشروعات تمكين الشباب بالمحافظات.			
Used in Program / Level			
Program Name or requirement			Study Level
Cultural Requirement			3
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		2 Hrs

E1.3 Economy & Project Planning

HUM 131	Engineering Economics		2 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	0	
Required SWL	100	Equivalent ECTS	4
Course Content			
Introduction to Economy: Basic Concepts, Varieties of Market Structure, The Law of Supply and Demand, Elasticity, Different Types Of Economy, Accounting Income And Cash Flow, The Objectives Of The Firms, Balance Sheet (BS). Introduction To Engineering Economy: Engineering Decision Making, Break - Even Analysis, Production Function, Payback Period Method, Payback Period Method. Time Value of Money: Simple Interest Rate, Compound Interest, Discreet cash flow and Economic Equivalence, Evaluating of the Projects (Present Worth, Annual worth, and Capitalized Cost), Nominal and Effective Interest Rate. Rate - Of Return ROR Computations: Rate of Return calculations using A Present worth PW, Rate of Return Calculation by Using Annual worth EAW, Rate of Return Evaluation for Multiple Alternatives. Depreciation Models: Nature of Depreciation, Depreciation Conventional Methods, Methods Based on Asset Usage, Switching Between Depreciation Models.			
Used in Program / Level			
Program Name or requirement		Study Level	
Institute Requirement		1	
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		2 Hrs

HUM 231	Projects management		2 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	0	
Required SWL	100	Equivalent ECTS	4
Course Content			
Project management overview, organizational structures ,assessing success, planning, learning curves, network scheduling techniques, CPM analysis, precedence networking, resource allocation and constraints, cost management, risk management, project performance measurement and control.			
Used in Program / Level			
Program Name or requirement		Study Level	
Institute Requirement		2	
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		2 Hrs

E1.4 Law & Environment

HUM 241	Law and Human Rights		2 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	0	
Required SWL	100	Equivalent ECTS	4
Course Content			
الإلمام بأهمية حقوق الإنسان والنشأة التاريخية لتلك الحقوق والمدارس الفقهية لتأصيل تلك الحقوق وأحكام الاتفاقيات الدولية الخاصة بحقوق الإنسان، والمنظمات الدولية العالمية والإقليمية القائمة على حماية تلك الحقوق، وموقف الدستور المصري من حقوق الإنسان، والحماية القانونية لها على الصعيد الوطني والصعيد الدولي، بالإضافة إلى حقوق الإنسان في الشريعة الإسلامية. الأصول التاريخية الفلسفية لحقوق الإنسان ، المصادر الدولية لحقوق الإنسان (العالمية والإقليمية ، المصادر الوطنية لحقوق الإنسان ، الأجهزة العالمية القائمة على حماية حقوق لإنسان(أجهزة الأمم المتحدة) ، الحماية الوطنية لحقوق الإنسان ، حقوق الإنسان في الشريعة الإسلامية ، عرض لبعض طوائف حقوق الإنسان ، مراجعة عامة.			
Used in Program / Level			
Program Name or requirement			Study Level
Cultural Requirement			2
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		2 Hrs

HUM 242	Principles of negotiation		2 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	0	
Required SWL	100	Equivalent ECTS	4
Course Content			
This course aims to Provide the student with the latest knowledge about the concepts, dynamic nature, principles, attributes, strategies, and tactics of effective negotiations, and developing the student's abilities and skills for good preparation and practices of negotiation in the contemporary organizations. Course contents: Negotiation - concept, attributes, and principles. Dynamic nature of negotiation. Interdependence. Ethics of negotiation. Psychological and social aspects of negotiation. Cooperative and competitive negotiations. Good preparation of negotiation. Strategies and tactics of negotiation. Organizing negotiation. Using power in negotiation. Using questions and dealing with objections. Handling failures in negotiations. Best practices in negotiations (case studies).			
Used in Program / Level			
Program Name or requirement			Study Level
Cultural Requirement			2
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		2 Hrs

HUM 243	Professional Ethics		2 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	0	
Required SWL	100	Equivalent ECTS	4
Course Content			
Global Vision about Engineering Science & job of Engineer: Engineering Science is the indicator for any civilization since long time ago. Being an Engineer is one of the finest and the highest job (Engineering job based on creativity, innovation, and development from his own imagination, Serving the whole humanity and seeking for the quality in human life). Engineer`s responsibility in the national and the international scale: Vital role for the engineer according to the international engineering contracts (FIDIC), Responsibility of the engineer according to the Egyptian Laws. Job ethics and etiquette: Global vision on the Engineers Syndicate law no.66 for 1974 , Confirming.			
Used in Program / Level			
Program Name or requirement			Study Level
Cultural Requirement			2
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		2 Hrs

HUM 341	Cases of Energy, Water, and Climate Change		2 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	0	
Required SWL	100	Equivalent ECTS	4
Course Content			
Energy Principles, Energy Resources and its Relation to Wind, Classification of Energy Resources, Introduction to Wind Energy, Wind Speed Classification, Wind Data and Wind Rose, Egypt Resources Energy, Installation of Turbines for Tidal Energy, Turbines Performance Analysis with Tidal Energy, Water Renewable Energy Resources, Water Resources Management, Power Stations, Water Treatment, Water Supply and Wastewater, Climate Change, Introduction to climate change science and impacts in general, the factors responsible for climate change and the possible engineering solutions to avoid more extreme perturbations. Impacts of climate change on the hydrologic variations.			
Used in Program / Level			
Program Name or requirement			Study Level
Cultural Requirement			3
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		2 Hrs

E1.5 Arts

HUM 251	Contemporary artistic directions		2 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	0	
Required SWL	100	Equivalent ECTS	4
Course Content			
يهدف المقرر إلى: إكساب الطالب القدرة على التذوق الفني - إكساب الطالب مهارة قراءة الأعمال الفنية وذلك من خلال دراسة الفلسفات والاتجاهات والحركات الفنية والمذاهب المعاصرة الحديثة وما بعد الحداثة. ويحتوى المقرر على الموضوعات التالية :التعريف بالفنون القديمة كمدخل للفلسفات الكلاسيكية ، مدخل للفنون الكلاسيكية والأصول اليونانية، الكلاسيكية الجديدة (أهم المصورين والمثالين) ، الحداثة وحركة التأثريين الفرنسين (صالون الشباب) سيزان، مافيه، مونييه ، التكعيبية (باراك، بيكاسو) ،المستقبلية (بوتشينى) البعد الزمنى ، التجريدية (كاندنسكى – موندريان) الاتجاه التعبيري (إدوارد مونخ، فان جوخ) في ألمانيا الوحشية ماتيس التلقائية(بوال كلى خوان ميرو) الاتجاهات الحديثة والفن الحر ، الاتجاهات الحديثة في الفنون المصريه (الحركة التشكيلية المصرية المعاصرة ، الفنانين المصريين المثاليين (محمود مختار – صبحى جرجس– السجينى – الوشاحى) المصورين المصريين (محمود سعيد، بوسف كامل، راغب عباد، عبد العزيز درويش) فنانين مصريين عالميين (صلاح عبد الكريم، حامد ندا، ناجى شاكر) ، ما بعد الحداثة وأهم اتجاهاتها			
Used in Program / Level			
Program Name or requirement			Study Level
Cultural Requirement			2
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		2 Hrs

HUM 351	Music Taste		2 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	0	
Required SWL	100	Equivalent ECTS	4
Course Content			
الاستماع لمجموعات الآلات الموسيقية الأوركسترالية وهى مجموعة الآلات الوترية ، مجموعة آلات النفخ الخشبي ، مجموعة آلات النفخ النحاسي ، الآلات الإيقاعية، والتعرف عليها من خلال الصور المرفقة مع الملزمة الخاصة بالمقرر الدراسي ، الدراسة النظرية بطريقة مختصرة تشمل جوانب المعرفة الأساسية المطلوب دراستها للعصور الموسيقية المختلفة) عصر الباروك ، العصر الكلاسيكي ، العصر الرومانتيكي ، نبذة عن موسيقى الجاز ونشأتها ، نبذة عن الموسيقى العربية وألاتها المستخدمة). الأهداف العامة للمقرر: بعد دراسة هذا المقرر يكون الطالب قادراً على: التعرف بالاستماع على الآلات الموسيقية المستخدمة في الاوركسترا ، دراسة أنواع المعلومات الهامة عن موسيقى الجاز ، دراسة الموسيقى العربية وألاتها ، الإلمام الكامل بأنواع الموسيقى المختلفة - المهارات الذهنية: بعد دراسة هذا المقرر يكون الطالب قادراً على: إدراك ومعرفة أنواع الآلات الموسيقية المختلفة ، تمييز أنواع المؤلفات الموسيقية المختلفة (عالمية – عربية) ، معرفة تكوين الأوركسترا الغربي والشرقي وفرق الجاز ، المهارات العامة: بعد دراسة هذا المقرر يكون الطالب قادراً على: التواصل بفاعلية من خلال المناقشة والحوار ، توظيف المادة العلمية في خدمة الثقافة الموسيقية ، الإلمام بثقافات علمية في غير مجال التخصص ،الأساليب المستخدمة للتقويم: مناقشات وشرح خلال المحاضرة ، اختبارات شفوية وتحريرية ، اختبار نهاية الفصل الدراسي.			
Used in Program / Level			
Program Name or requirement			Study Level
Cultural Requirement			3
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		2 Hrs

E1.6 Literature

HUM 061	History of Engineering & Technology		2 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	0	0	
Required SWL	100	Equivalent ECTS	4
Course Content			
History of Civilization and Technology Development, Humanities and social sciences, Engineering Education and its Disciplines, Scientific thinking and analysis, Technology and Training, Different work methodologies and ethics, Application examples, Course Project.			
Used in Program / Level			
Program Name or requirement			Study Level
Cultural Requirement			0
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
50%			**50%**
Exam Duration [Hours]			2 Hrs

HUM 361	Egyptian Literature Heritage		2 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	0	
Required SWL	100	Equivalent ECTS	4
Course Content			
يهدف المقرر إلى تعريف الطالب بالتميز الإقليمي لمصر في العصور القديمة والوسطى والحديثة وأثر عبقرية المكان على الفكر والوعى المصري وتجلياته في التراث الأدبي شعرا ونثرا من خلال الدرس التاريخي والنصي للأدب المصري في مراحله المختلفة. محتوى المقرر: مصر وتراثها الأدبي من منظور حضاري وإبداعي، المكتبة التراثية المصرية من منظور تاريخي متجدد ، دراسة مفهوم وضعية العصور الوسطى في مصر والفرق بينها وبين العصور الوسطى في أوروبا ، التراث الجغرافي المصري وأدب الرحلة في كتابات مصرية ، التأليف الموسوعي في مصر والصياغة الأدبية في فن الموسوعات ، الظواهر الأدبية الغالبة على الأدب المصري- مناهج دراسة التراث الأدبي المصري ودلالاته ، مدارس التأليف والإبداع في تاريخ الفكر المصري ، مجالات الإبداع في الشعر المصري (الطبيعة المصرية ، أدب الحروب الموضوعات الجديدة والبيئة المصرية) ، مدارس الكتابة الفنية على المستوى الرسمي وغيرها ، تتبع التطبيق على النص والتحليل من خلال أبرز شعراء وكتاب التراث المصري من أمثال ابن نباته المصري وابن سناء الملك وصولا إلى أدوار الدكتور محمد كامل حسين والأستاذ أمين الخولى والدكتور جمال حمدان في تناول التراث الأدبي المصري بالتحليل والدراسة المنهجية حول عبقرية المكان.			
Used in Program / Level			
Program Name or requirement			Study Level
Cultural Requirement			3
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		2 Hrs

E1.7 Personal Skills Development

HUM 171	Communications and Presentation Skills		2 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	0	
Required SWL	100	Equivalent ECTS	4
Course Content			
This course aims to provide the student with the latest knowledge about the concepts, characteristics, and types of managerial and interpersonal communications, as well as the concepts and requirement of good listening and presentation, and Developing the student's abilities and skills of effective communication, and good listening, as well as how to use the interpersonal and managerial communication methods and the presentation techniques in performance and dealing with others inside and outside the organization. Course Contents: Concept and nature of communication, Communication model, Formal and informal communications, Interpersonal and managerial communications, Body language, Written communications (Reports and memos), Ten Commandments of effective communication, Good listing, Elements of effective presentation model, Preparation of good presentation, Carrying out presentations, Discussion and dealing with objections, Evaluating presentation performance.			
Used in Program / Level			
Program Name or requirement			Study Level
Cultural Requirement			1
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		2 Hrs

HUM 172	Analysis and Research Skills		2 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	0	
Required SWL	100	Equivalent ECTS	4
Course Content			
Analysis Skills: Framework for analyzing engineering problems taking into account technical, economic, environmental, and ethical issues. Phases of problem solving (Understanding the problem and formulating it, Solution plan, Implementation plan, Evaluation, and Revision). Role of creativity in the analysis. SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis for different alternatives. Detailed Cost, Benefit analysis and Risk analysis. Role of cooperation and team, work in analyzing large engineering problems. Importance of finding the relevant data, information, and knowledge. Search Skills: Basic Web search methods and how to formulate search engine queries using logical connectives (e.g. AND, OR, NOT). Phrase, title, domain, URL, and link search. Evaluating search results, choosing the appropriate search engine. Importance of evaluating the credibility of the different Web sites.			
Used in Program / Level			
Program Name or requirement			Study Level
Cultural Requirement			1
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		2 Hrs

HUM 173	Preparing technical reports		2 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	0	
Required SWL	100	Equivalent ECTS	4
Course Content			
Essential elements of a technical report: Abstract, Summary, Contents, Objectives, Details of the report including figures, images, video ...etc, - Conclusions, Recommendations, References using a standard format and the different electronic sources. Report Classification: Technical (Requirement specification, Analysis, Design, and Implementation). Administrative (Directed to different operational and management levels). Levels of confidentiality for the different reports. Report Composition: Logical presentation of the report and coordination between its components. Importance of using correct grammar and punctuation. Enhancing communication effectiveness using different media. Report Implementation: Use of the appropriate software packages including any graphics or multimedia packages.			
Used in Program / Level			
Program Name or requirement		Study Level	
Institute Requirement		1	
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		2 Hrs

HUM 271	First Aid Skills		2 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	0	
Required SWL	100	Equivalent ECTS	4
Course Content			
Training on many different skills needed to help during many emergency situations, skills and knowledge required to provide First Aid response, life support, management of casualty(s), the incident and other first aiders, in a range of situations, including in the universities, institutes, home, workplace or within the community, until the arrival of medical or other assistance.			
Used in Program / Level			
Program Name or requirement		Study Level	
Cultural Requirement		2	
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		2 Hrs

E2. Courses of Basic Sciences Department (BAS)

The Basic Sciences Department is responsible for the teaching of Basic Science courses for all Programs.

#	Specialization
1	Mathematics
2	Physics
3	Mechanics
4	Chemistry
5	Engineering Drawing
6	Mechanical Engineering & Production

Table 26 List of specializations at the Basic Science Department.

The following abbreviations are the legend for the courses table.

Lvl	Level
CH	Credit Hour
ECTS	European Credit Transfer System
SWL	Student Work Load
Lec	Lectures
Tut	Tutorials
Lab	Laboratory
TT	Total
CR	Cultural Requirement
IR	Institute Requirement
DR	Discipline Requirement
PR	Program Requirement
SA	Student Activities
MT	Mid-Term Exam
PE	Practical Exam
FE	Final Exam

لائحة الساعات المعتمدة لبرامج الدراسة لمرحلة البكالوريوس

#	Lvl	Code	Course Title	Credits and SWL			Contact Hours				Classification				Assessment (%)				Prereq uisites
				CH	ECTS	SWL	Lec	Tut	Lab	TT	CR	IR	DR	PR	SA	MT	PE	FE	
1 Mathematics																			
1	0	BAS 011	Mathematics (1)	3	5	125	3	1	0	4		x			30	20	-	50	
2		BAS 012	Mathematics (2)	4	6	150	3	2	0	5		x			30	20	-	50	BAS 011
3	1	BAS 111	Mathematics (3)	4	6	150	3	2	0	5			x		30	20	-	50	BAS 012
4	2	BAS 211	Statistics and Probability Theory	2	4	100	2	1	0	3		x			30	20	-	50	
2. Physics																			
5	0	BAS 021	Physics (1)	3	5	125	2	1	1	4		x			20	15	15	50	
6		BAS 022	Physics (2)	3	5	125	2	2	1	5		x			20	15	15	50	BAS 021
7	1	BAS 121	Physics (3)	3	5	125	2	2	1	5			x		20	15	15	50	BAS 022
8		BAS 122	Science of Materials	3	5	125	3	1	0	4			x		30	20	-	50	BAS 121
3. Mechanics																			
9	0	BAS 031	Mechanics	3	5	125	2	2	0	4		x			30	20	-	50	
4. Chemistry																			
10	0	BAS 041	Engineering Chemistry	3	5	125	2	2	1	5		x			20	15	15	50	
5. Engineering Drawing																			
11	0	BAS 051	Engineering Drawing & Projection, using the Computer	3	6	150	2	1	2	5		x			20	15	15	50	
6. Mechanical Engineering & Production																			
12	0	BAS 061	Principles of Manufacturing Engineering	3	5	125	2	2	1	5		x			20	15	15	50	

Table 27 List of Basic Science Department courses.

E2.1 Mathematics Courses

BAS 011	**Mathematics (1)**	**3 CH**
Prerequisites		
Number of weekly Contact Hours		
Lecture	Tutorial	Laboratory
3	1	0
Required SWL	125	Equivalent ECTS	5
Course Content		
Matrices, Determinants, system of algebraic equations and applications, Gauss elimination method. Functions, inverse function, Trigonometric function, inverse Trigonometric function, Hyperbolic functions, inverse Hyperbolic functions, exponential functions, logarithmic functions, Limits, Continuity, Derivatives, Applications of the derivatives, L'Hopetail rule, Talyor and Maclaurine Expansions, Approximation, Indefinite and definite Integrals with applications, Partial fractions, Techniques of integration.		
Used in Program / Level		
Program Name or requirement		Study Level
Institute Requirement		0
Assessment Criteria		
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20 %**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

BAS 012	Mathematics (2)		4 CH
Prerequisites	BAS 011- Mathematics (1)		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
3	2	0	
Required SWL	150	Equivalent ECTS	6
Course Content			
Functions of several variables and partial derivatives, Plane equation in space, vector analysis, the divergence and Stock's theorems, Conic sections, Cartesian, Cylindrical and spherical coordinates. A vector in space, Equation of sphere and surface of revolutions, Multiple Integrals and its applications, First order Differential Equations, Higher Order Differential Equations, Linear Systems of Differential Equations, Numerical Differentiation and integration, Numerical solution of algebraic equations.			
Used in Program / Level			
Program Name or requirement			Study Level
Institute Requirement			0
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30 %	**20 %**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

BAS 111	Mathematics (3)		4 CH
Prerequisites	BAS 012- Mathematics (2)		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
3	2	0	
Required SWL	150	Equivalent ECTS	6
Course Content			
Laplace Transform Methods, Infinite Series and tests of convergence, Functions of a complex variable including Cauchy, Riemann conditions, Conformal mappings, Complex series, Complex integral, Special functions, series solution of differential equations, Vector Analysis, Fourier Analysis, Vectors and Linear Algebra, Vector Spaces. Discrete and continuous random variables, Cumulative and density probability functions, Discrete probability distributions, Continuous probability distributions. Binomial and Poisson distributions, Normal distribution.			
Used in Program / Level			
Program Name or requirement			Study Level
Electrical Engineering Requirement			1
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

BAS 211	Statistics and Probability Theory		2 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	0	
Required SWL	100	Equivalent ECTS	4
Course Content			
Introduction: The birth of statistics, definition of statistics, functions of statistics, collection and organization of statistical data, presentation of statistical data. Sets and Probabilities: random experiments, sample spaces, sets operations, counting data, probability, conditional probabilities, Bayes' theorem. Tendency and Dispersion Measures: Introduction, different types of data, tendency measures, variability measures, frequency distributions. Random Variables: Discrete random variables, the Hyper - geometric distribution, Binomial distribution, the Poisson distribution, Poisson approximation Of binomial probabilities, continuous random variables. Moments: central moments, Skewness measures, kurtosis measures, moment generating function. Sampling Theory and Inferences: the concept Of a sampling distribution, sampling distribution of the mean, central limit theorem, tests of hypothesis and Confidence intervals for the mean, tests of hypothesis and confidence intervals for the difference between two means, tests of hypothesis and confidence intervals for the population proportion, tests of hypothesis and confidence intervals for the difference between two proportions, tests of hypothesis and confidence intervals of sample variance, tests of hypothesis and confidence interval for ratio of sample variances.			
Used in Program / Level			
Program Name or requirement			Study Level
Institute Requirement			2
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

E2.2 Physics Courses

BAS 021	Physics (1)		3 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	1	
Required SWL	125	Equivalent ECTS	5
Course Content			
Units, Dimensions, Vectors, Dot Products, Cross Products, Kinematics, Circular Motion, Centripetal Forces, Perceived Gravity, Newton's Laws, Hooke's Law, Springs, Pendulums, Simple Harmonic Motion, Work, Kinetic and Potential Energy, Gravitation, Conservative Forces, Potential Energy, Derive Simple Harmonic Motion using Energy, Heat, Thermal Expansion, Kinetic Gas Theory, Ideal Gas Law, Phase Transitions, Electric Charges and Forces, Coulomb's Law, Polarization, Electric Field Lines, Superposition, Inductive Charging, Induced Dipoles, Electric Flux, Gauss' Law, Electrostatic Potential, Electric Energy, Equipotential Surfaces, Electrostatic Potential, Electric Energy, Equipotential Surfaces, High-voltage Breakdown, Capacitance, Electric Field Energy, Polarization, Dielectrics, Capacitors, Electric Currents, Resistivity, Conductivity, Ohm's Law, Batteries, Power, Kirchhoff's Rules, Circuits.			
Used in Program / Level			
Program Name or requirement			Study Level
Institute Requirement			0
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
20%	**15%**	**15%**	**50%**
Exam Duration [Hours]	1 Hr	1 Hr	3 Hrs

BAS 022	Physics (2)		3 CH
Prerequisites	BAS 021- Physics (1)		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	2	1	
Required SWL	125	Equivalent ECTS	5
Course Content			
Magnetic Fields, Lorentz Force, Torques, Electric Motors (DC), Moving charges in B-fields, Cyclotrons, Mass Spectrometers, Biot-Savart, High-voltage Power Lines, Ampere's Law, Solenoids, Electromagnetic Induction, Faraday's Law, Lenz Law, Motional EMF, Dynamos, Eddy Currents, Magnetic Braking, Displacement Current, Inductance, RL Circuits, Magnetic Field Energy, Magnetic Materials, Dia- Para- & Ferromagnetism, Maxwell's Equations, Transformers, Car Coils, RC Circuits, Driven LRC Circuits, Metal Detectors, Traveling Waves, Standing Waves, Electromagnetic Waves, Speed of Light.			
Used in Program / Level			
Program Name or requirement			Study Level
Institute Requirement			0
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
20%	**15%**	**15%**	**50%**
Exam Duration [Hours]	1 Hr	1 Hr	3 Hrs

BAS 121	Physics (3)		3 CH
Prerequisites	BAS 022- Physics (2)		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	2	1	
Required SWL	125	Equivalent ECTS	5
Course Content			
Periodic Phenomena, Complex Notation, Physical Pendulum, Beats, Damped Free Oscillations, Damped Free Oscillations, Driven Oscillations With Damping, Steady State Solutions, Resonance, Forced Oscillations, Power, Resonance, Traveling Waves, Standing Waves, Longitudinal Waves, Energy in Waves, Fourier Analysis, Time Evolution of Pulses on Strings, Electromagnetic Waves, Solutions to Maxwell's Equations, Polarization, Accelerated Charges, Poynting Vector, Rayleigh Scattering, Standing EM Waves, Reflection, Transmission Lines, Wave Guides, Resonance Cavities, Index of Refraction, Reflection, Fresnel Equations, Brewster Angle, Interference, Huygen's Principle, Thin Films, Double Slit, Diffraction, Gratings, Spectral & Angular Resolution.			
Used in Program / Level			
Program Name or requirement			Study Level
Electrical Engineering Requirement			1
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
20%	**15%**	**15%**	**50%**
Exam Duration [Hours]	1 Hr	1 Hr	3 Hrs

BAS 122	Science of Materials		3 CH
Prerequisites	BAS 121- Physics (3)		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
3	1	0	
Required SWL	125	Equivalent ECTS	5
Course Content			
The Drude models, The Hall Effect, Planck's theory, Photoelectric effect, Compton effect, Wave properties of matter, Uncertainty principles, Wave function, Principles of quantum mechanics and Schrodinger equation, Quantum well and potential barrier, Band theory of solids: Periodic structures, Bloch function, Kronig-Penny model, Energy band structure of metals, insulators and semiconductors, Crystal structure of solid, Miller indices, Types of bonding. Bonding model and energy band model, Fermi-Dirac distribution, Intrinsic carrier concentration, Doped semiconductors, Work function, contact potential.			
Used in Program / Level			
Program Name or requirement			Study Level
Electrical Engineering Requirement			1
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

E2.3 Mechanics Courses

BAS 031	Mechanics		3 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	2	0	
Required SWL	125	Equivalent ECTS	5
Course Content			
Application on space vectors: Resultant of forces, Moment of forces, Equivalent of Couples, Equivalent of systems - Equation of equilibrium of rigid body, types of supports, Equilibrium of plane systems, Equilibrium of space systems of forces and couples acting on rigid body, The mass center of a system of particles, The mass moment of inertia of a system of particles. Dynamic: Displacement -velocity and acceleration of particle, Trajectory equations, Projectile particle motion on a straight path, Newton's law of motion, Simple harmonic motion of a particle, motion on circular path, work and kinetic energy, vibration of rigid body.			
Used in Program / Level			
Program Name or requirement			Study Level
Institute Requirement			0
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

E2.4 Chemistry Courses

BAS 041	Engineering Chemistry		3 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	2	1	
Required SWL	125	Equivalent ECTS	5
Course Content			
Equations of State, Introduction to Chemical Thermodynamics, Material & Energy Balance in Fuel Combustion and Chemical Processes, General Properties of Solutions, Dynamic Equilibrium in Physical and Chemical Processes, Basic Principles in Electrochemistry, Introduction to Corrosion Engineering, Selected topics in process Chemical Industries (Industry & Chemistry of Cement, Chemical Fertilizer Industries, Sugar Industry, Dyes & Dyeing Industry, Petrochemical Industries, Sulfuric acid Industry).			
Used in Program / Level			
Program Name or requirement			Study Level
Institute Requirement			0
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
20%	**15%**	**15%**	**50%**
Exam Duration [Hours]	1 Hr	1 Hr	3 Hrs

E2.5 Engineering Drawing Courses

BAS 051	Engineering Drawing & Projection, using the Computer		3 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	2	
Required SWL	150	Equivalent ECTS	6
Course Content			
Techniques and skills of engineering drawing, normal and auxiliary projections. Solid geometry. Intersections between planes and solids. Development. Sectioning. Drawing and joining steel frames. Assembly drawing of some mechanical parts, reading drawings, engineering drawing conventions for lines, symbols, dimensioning and labeling, as well as acquaint students with design and executing drawing from architectural, civil, electrical and mechanical engineering disciplines, using the AUTOCAD.			
Used in Program / Level			
Program Name or requirement			Study Level
Institute Requirement			0
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
20%	**15%**	**15%**	**50%**
Exam Duration [Hours]	1 Hr	1 Hr	3 Hrs

E2.6 Mechanical Engineering & Production Courses

BAS 061	Principles of Manufacturing Engineering		3 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	2	1	
Required SWL	125	Equivalent ECTS	5
Course Content			
Engineering Materials, Manufacturing Processes, Casting and molding processes, metal forming, forming of plastics, powder metallurgy, Material Joining processes, welding, soldering, brazing, riveting, joining by mechanical elements, Material removal processes, metal cutting and finishing processes, Practical training.			
Used in Program / Level			
Program Name or requirement			Study Level
Institute Requirement			0
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
20%	**15%**	**15%**	**50%**
Exam Duration [Hours]	1 Hr	1 Hr	3 Hrs

E3. Courses of Electrical Engineering Department (ELE)

The Electrical Engineering Department is responsible for the teaching of Electrical Engineering courses for all Programs.

#	Specialization
1	Electrical circuits & Measurements
2	Electronics
3	Computer Hardware
4	Computer Software
5	Communication and Microwave
6	Control Systems
7	System Engineering
8	Power & Machines
9	Project & selected Topics

Table 28 List of specializations at the Electrical Engineering Department.

The following abbreviations are the legend for the courses table.

Lvl	Level
CH	Credit Hour
ECTS	European Credit Transfer System
SWL	Student Work Load
Lec	Lectures
Tut	Tutorials
Lab	Laboratory
TT	Total
UR	University Requirement
FR	Faculty Requirement
DR	Discipline Requirement
PR	Program Requirement
SA	Student Activities
MT	Mid-Term Exam
PE	Practical Exam
FE	Final Exam

#	Lvl	Code	Course Title	Credits and SWL			Contact Hours				Classification				Assessment (%)				Prereq uisites
				CH	ECTS	SWL	Lec	Tut	Lab	TT	CR	IR	DR	PR	SA	MT	PE	FE	
1. Electrical circuits & Measurements																			
1	1	ELE 111	Electrical Circuits	3	6	150	2	1	2	5			x	x	20	15	15	50	
2	2	ELE 211	Measurements & Testing	3	5	125	2	1	2	5			x	x	20	15	15	50	ELE 121
2. Electronics																			
3	1	ELE 121	Electronic devices	4	6	150	3	1	1	5			x	x	20	15	15	50	ELE 111
4		ELE 122	Logic Circuits	3	6	150	2	1	2	5			x	x	20	15	15	50	ELE 111
5	2	ELE 221	Advanced Logic Circuits	3	6	150	2	1	2	5			x		20	15	15	50	ELE 121 ELE 122
6		ELE 222	Digital Integrated Circuits	3	5	125	2	1	1	4			x	x	20	15	15	50	ELE 221
7	3	ELE 321	Power Electronics	3	5	125	2	2	1	5			x	x	20	15	15	50	ELE 121
8		ELE 322	Analogue Integrated Circuits	3	6	150	2	2	1	5				x	20	15	15	50	ELE 222
9		ELE 323	Optoelectronics	2	4	100	2	1	0	3				x	30	20	-	50	ELE 121
10		ELE 324	Advanced Semiconductor Devices	3	5	125	3	1	0	4				x	30	20	-	50	
11		ELE 325	Low Power Digital Design	3	5	125	3	1	0	4				x	30	20	-	50	
12		ELE 326	RF Circuit Design	3	5	125	3	1	0	4				x	30	20	-	50	
13		ELE 327	MEMS Design	3	5	125	3	1	0	4				x	30	20	-	50	
14	4	ELE 421	Nano Electronics	3	5	125	3	1	0	4				x	30	20	-	50	
15		ELE 422	Fundamentals of Photonics	3	5	125	3	1	0	4				x	30	20	-	50	
3. Computer Hardware																			
16	0	ELE 031	Computer Technology	3	5	125	2	1	1	4		x			20	15	15	50	
17	2	ELE 231	Microprocessors and their Applications	3	5	125	2	1	1	4			x	x	20	15	15	50	ELE 221
18	3	ELE 331	Computer Organization & Architecture (1)	3	6	150	3	1	0	4		x			30	20	-	50	ELE 231
19		ELE 332	Computer Networks	3	6	150	3	1	0	4			x	x	30	20	-	50	ELE 331
20		ELE 333	Microcontrollers & Applications	3	6	150	2	1	2	5			x	x	20	15	15	50	ELE 231
21		ELE 334	Computer Organization & Architecture (2)	2	4	100	2	1	0	3				x	30	20	-	50	ELE 331
22		ELE 335	Digital Systems Testing and Verification	3	5	125	3	1	0	4				x	30	20	-	50	
23	4	ELE 431	Distributed Computer Systems	3	5	125	3	1	0	4				x	30	20	-	50	
24		ELE 432	Pervasive Computing and Internet of Things	3	5	125	3	1	0	4				x	30	20	-	50	
25		ELE 433	Wireless Networks	3	5	125	3	1	0	4				x	30	20	-	50	
4. Computer Software																			
26	0	ELE 041	Computer Programming (1)	3	5	125	2	0	2	4		x			20	15	15	50	ELE 031
27	1	ELE 141	Computer Programming (2)	3	5	125	2	0	2	4		x		x	20	15	15	50	ELE 041

لائحة الساعات المعتمدة لبرامج الدراسة لمرحلة البكالوريوس

#	Lvl	Code	Course Title	Credits and SWL			Contact Hours				Classification				Assessment (%)				Prereq uisites
				CH	ECTS	SWL	Lec	Tut	Lab	TT	CR	IR	DR	PR	SA	MT	PE	FE	
28	3	ELE 341	Algorithms & Data Structures	2	4	100	2	1	0	3				x	30	20	-	50	ELE 141
29		ELE 342	Software Engineering	2	4	100	2	1	0	3				x	30	20	-	50	ELE 341
30		ELE 343	Software Testing	3	5	125	3	1	0	4				x	30	20	-	50	
31		ELE 344	Software Design Patterns	3	5	125	3	1	0	4				x	30	20	-	50	
32	4	ELE 441	Operating Systems	2	5	125	2	1	0	3				x	30	20	-	50	ELE 342
33		ELE 442	Database Systems	2	5	125	2	1	0	3				x	30	20	-	50	ELE 341
34		ELE 443	Compiler Theory	2	5	125	2	1	0	3				x	30	20	-	50	ELE 441
35		ELE 444	Advanced Database Systems	3	5	125	3	1	0	4				x	30	20	-	50	
5. Communication and Microwave																			
36	1	ELE 151	Numerical Analysis	2	4	100	2	1	0	3		x			30	20	-	50	
37	2	ELE 251	Analog Electrical Communications	3	6	150	2	2	1	5			x		20	15	15	50	ELE 121
38		ELE 252	Digital Electrical Communications	3	5	125	2	2	1	5		x		x	20	15	15	50	ELE 251
39	3	ELE 351	Electromagnetic Fields	3	5	125	3	1	0	4		x		x	30	20	-	50	ELE 252
40		ELE 352	Antenna	2	4	100	2	1	0	3				x	30	20	-	50	ELE 351
41	4	ELE 451	Radar theory	2	4	100	2	1	0	3				x	30	20	-	50	ELE 352
42		ELE 452	Optical Communication	2	4	100	2	1	0	3				x	30	20	-	50	ELE 323
43		ELE 453	Microwave electronics	3	5	125	3	1	0	4				x	30	20	-	50	
44		ELE 454	Telephone Networks	2	5	125	2	1	0	3				x	30	20	-	50	ELE 252
45		ELE 455	Microwave Engineering	3	5	125	3	1	0	4				x	30	20	-	50	
46		ELE 456	Mobile Communication	2	5	125	2	1	0	3				x	30	20	-	50	ELE 454
47		ELE 457	Waveguides	3	5	125	3	1	0	4				x	30	20	-	50	
48		ELE 458	Satellite Communication	3	5	125	3	1	0	4				x	30	20	-	50	ELE 341
49		ELE 459	Communication Security	3	5	125	3	1	0	4				x	30	20	-	50	
6. Control Systems																			
50	2	ELE 261	Control Components & Industrial Instrumentations	3	5	125	2	1	1	4			x	x	20	15	15	50	
51		ELE 262	Automatic Control	3	6	150	2	2	1	5			x	x	20	15	15	50	ELE 261
52	3	ELE 361	Digital Control Systems	3	6	150	2	2	1	5				x	20	15	15	50	ELE 262
53	4	ELE 461	Robot Systems	2	4	100	2	1	0	3				x	30	20	-	50	ELE 361
54		ELE 462	Advanced Control Systems	2	4	100	2	1	0	3				x	30	20	-	50	ELE 361
55		ELE 463	Industrial Control	3	5	125	3	1	0	4				x	30	20	-	50	
7. System Engineering																			
56	2	ELE 271	Signal Analysis	3	5	125	2	1	1	4			x	x	20	15	15	50	ELE 211
57	3	ELE 371	Real-Time Systems & Applications	3	5	125	3	1	0	4				x	30	20	-	50	
58		ELE 372	Artificial Neural Networks	3	5	125	3	1	0	4				x	30	20	-	50	
59		ELE 373	Digital Signal Processing	2	4	100	2	0	1	3				x	20	15	15	50	ELE 271
60		ELE 374	Modeling & Simulation of Engineering Systems	3	5	125	3	1	0	4				x	30	20	-	50	
61		ELE 375	Intelligent Control Systems	3	5	125	3	1	0	4				x	30	20	-	50	
62		ELE 376	Speech Processing	3	5	125	3	1	0	4				x	30	20	-	50	

لائحة الساعات المعتمدة لبرامج الدراسة لمرحلة البكالوريوس

#	Lvl	Code	Course Title	Credits and SWL			Contact Hours				Classification				Assessment (%)				Prereq uisites
				CH	ECTS	SWL	Lec	Tut	Lab	TT	CR	IR	DR	PR	SA	MT	PE	FE	
63	4	ELE 471	Artificial Intelligence	3	5	125	3	1	0	4				x	30	20	-	50	ELE 341
64		ELE 472	Information Theory and Coding	3	5	125	3	1	0	4				x	30	20	-	50	
65		ELE 473	Information Security	3	5	125	3	1	0	4				x	30	20	-	50	
66		ELE 474	Signal Processing for Multimedia	3	5	125	3	1	0	4				x	30	20	-	50	
67		ELE 475	IOT and Machine type Communication	2	5	125	2	1	0	3				x	30	20	-	50	ELE 252
68		ELE 476	Pattern Recognition & Image Processing Systems	3	5	125	3	1	0	4				x	30	20	-	50	
69		ELE 477	Integrated Optics and Optical MEMS	3	5	125	3	1	0	4				x	30	20	-	50	
70		ELE 478	Micro Photonic Systems	3	5	125	3	1	0	4				x	30	20	-	50	
8. Power & Machines																			
71	1	ELE 181	Energy Conversion	3	5	125	3	1	0	4			x		30	20	-	50	ELE 111
		ELE 182	Mechanical and Electrical Engineering	2	4	100	2	1	0	3		x			30	20	-	50	
9. Project & selected Topics																			
72	4	ELE 491	Computer and Control Graduation Project (1)	3	6	150	2	2	1	5				x	40	-	20	40	
73		ELE 492	Computer and Control Graduation Project (2)	3	6	150	2	1	2	5				x	40	-	20	40	ELE 491
74		ELE 493	Electronics and Communication Graduation Project (1)	3	6	150	2	2	1	5				x	40	-	20	40	
75		ELE 494	Electronics and Communication Graduation Project (2)	3	6	150	2	1	2	5				x	40	-	20	40	ELE 493
76		ELE 495	Selected Topics in Computer Software	3	5	125	3	1	0	4				x	30	20	-	50	
77		ELE 496	Selected Topics in Computers	3	5	125	3	1	0	4				x	30	20	-	50	
78		ELE 497	Selected Topics in Control	3	5	125	3	1	0	4				x	30	20	-	50	
79		ELE 498	Selected Topics in Electronic	3	5	125	3	1	0	4				x	30	20	-	50	
80		ELE 499	Selected Topics in Communication	3	5	125	3	1	0	4				x	30	20	-	50	

Table 29 List of *Electrical Engineering Department courses*

E3.1 circuits & Measurements

ELE 111	Electrical Circuits		3 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	2	
Required SWL	150	Equivalent ECTS	6
Course Content			
Ohm's Law, Series and Parallel Circuit analysis, Components of Electrical Systems (Nodes, Loops, Meshes, Branches), Kirchhoff's Current Law (KCL), Kirchhoff's Voltage Law (KVL), potential divider. EMF and internal resistance, superposition theorem. Thevenin's theorem and Norton theorem. Capacitance, inductance, and mutual Inductance. Alternating current, Analysis of AC circuits using Vectors, Computation of power, Resonance Circuits, Operational Amplifier, Response of First Order Circuits, Response of Second Order Circuits, Two port Networks, Circuit Analysis using Droid Tesla Software.			
Used in Program / Level			
Program Name or requirement		Study Level	
Electrical Engineering Requirement		1	
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
20%	**15%**	**15%**	**50%**
Exam Duration [Hours]	1 Hr	1 Hr	3 Hrs

ELE 211	Measurements & Testing		3 CH
Prerequisites	ELE 121		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	2	
Required SWL	150	Equivalent ECTS	6
Course Content			
Introduction about measurements, Errors in measurements, Difference between accuracy, precision, sensitivity, Static and dynamic calibration. Analyze measurements errors including loading effect. Statistical analysis of errors in measurements. PMMC Permanent Magnet moving coil, DC bridges and their applications. Measurements of all electrical quantities (current, voltage, energy, and power) for dc and ac current, measurement of resistances and capacitors, the multi-meter, analog electronic equipment. Digital voltmeters, oscilloscopes, signal generators, and spectrum analyzers for measuring of time periods and frequency responses.			
Used in Program / Level			
Program Name or requirement		Study Level	
Electrical Engineering Requirement		2	
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
20%	**15%**	**15%**	**50%**
Exam Duration [Hours]	1 Hr	1 Hr	3 Hrs

E3.2 Electronics

ELE 121	Electronic Devices		4 CH
Prerequisites	ELE 111		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
3	1	1	
Required SWL	150	Equivalent ECTS	6
Course Content			
PN junction diodes, special diodes, diode circuits applications, rectifiers and peak detectors - Bipolar junction transistors (BJT), dc models, modes of operation, bias and stabilization, graphical analysis, small signal ac models - Junction field effect transistors (JFETs). Metal oxide semiconductor field effect transistors (MOSFETs), dc models, modes of operation, bias and stabilization, small signal ac models, MOSFET static and dynamic performance, short and narrow channel effects, scaling theory. Amplifier configurations. Logic circuits: BJT logic families, construction, properties, speed and applications.			
Used in Program / Level			
Program Name or requirement		Study Level	
Electrical Engineering Requirement		1	
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
20%	**15%**	**15%**	**50%**

ELE 122	Logic Circuits		3 CH
Prerequisites	ELE 111		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	2	
Required SWL	150	Equivalent ECTS	6
Course Content			
Number Systems. Conversion between all number Systems. Signed binary number representation. One's and 2's complement representation, subtraction. Introduction to logic Boolean algebra, switching theory representation, manipulation and realization of switching functions. Basic gates and logic functions with a discussion of the available ICs that represent these gates. Min terms and Max terms. NAND and NOR Universalities. The Standard Sum of products and product of sum forms "SOP" and "POS". Boolean expression and truth table, Converting SOP to truth table and vise verse. Logic functions simplification using Karnaugh Map. Don't care (X) condition. Combinational logic circuits, Half adder, full adder, 4- bit ripple binary carry adder, subtractors. Decoders and encoders, Multiplexers and Demultipluxers, and magnitude logic comparators.			
Used in Program / Level			
Program Name or requirement		Study Level	
Electrical Engineering Requirement		1	
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
20%	**15%**	**15%**	**50%**
Exam Duration [Hours]	1 Hr	1 Hr	3 Hrs

ELE 221	Advanced Logic Circuits		3 CH
Prerequisites	ELE 121 and ELE 122		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	2	
Required SWL	150	Equivalent ECTS	6
Course Content			
Review on combinational logic circuits, analysis of synchronous vs asynchronous circuits. Learn the fundamentals of sequential logic design, sequential adder, Memory Elements, SR Latch with NAND Gates, Clocked (Synchronous) SR Latch, The various Flip-Flops types: J-K, T and D flip-flop Operation and common applications. The method for the design of sequential circuits (state diagram, state table, state assignment, characteristic, excitation table and circuit synthesis). Counter. Shift register. Discussion of the available ICs for each system. Basic PLD architectures, Programmable logic arrays, Verilog Hardware Design Language and circuit and system modeling. Introduce the process of specifying, designing, debugging and testing sequential circuits to explore several applications. FSM, Using FPGA kit to implement many advanced logic circuits.			
Used in Program / Level			
Program Name or requirement			Study Level
Electrical Engineering Requirement			2
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
20%	**15%**	**15%**	**50%**
Exam Duration [Hours]	1 Hr	1 Hr	3 Hrs

ELE 222	Digital Integrated circuits		3 CH
Prerequisites	ELE 221		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	1	
Required SWL	125	Equivalent ECTS	4
Course Content			
The fundamental concepts of modern digital VLSI circuit design using CMOS technology with an emphasis on "hands-on" IC design using CAD tools, an overview of CMOS technology and fabrication, simple and extend circuit models for NMOS and PMOS transistors. Combinational and sequential MOS logic circuits including transistor level design of logic gates at the device and layout level. Digital CMOS IC design flow, Hardware Description Languages "VHDL", architectural aspects of a VHDL, Synthesized VHDL on physical hardware, chip level design (full custom – semi custom and standard cell). Full - custom IC design project.			
Used in Program / Level			
Program Name or requirement			Study Level
Electrical Engineering Requirement			2
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
20%	**15%**	**15%**	**50%**
Exam Duration [Hours]	1 Hr	1 Hr	3 Hrs

ELE 321	Power Electronics		3 CH
Prerequisites	ELE 121		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	2	1	
Required SWL	125	Equivalent ECTS	5
Course Content			
Power Diodes - Diode Rectifier Circuits, Thyristors (Types, Turn on, Turn off and Protection), Thyristor Commutation Techniques, GTO Thyristors, Power Transistors, Controlled Rectifier Circuits, Insulated Gate Bipolar Transistor IGBT, MOSFET, firing Circuits, AC Voltage Controllers, Choppers, Inverters, UPS, Static Switches, power electronics modules.			
Used in Program / Level			
Program Name or requirement			Study Level
Electrical Engineering Requirement			3
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
20%	**15%**	**15%**	**50%**
Exam Duration [Hours]	1 Hr	1 Hr	3 Hrs

ELE 322	Analog Integrated circuits		3 CH
Prerequisites	ELE 222		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	2	1	
Required SWL	150	Equivalent ECTS	5
Course Content			
The fundamental of analog IC design ranging from single stage amplifiers to switched-capacitor networks. The state-of-the-art applications will be discussed for various circuits. Use of IDS equations in circuit calculation; use of large signal models to calculate and design transistor biasing, use of small signal models to calculate gain – BW, transfer functions. The operation and use of analog circuit building blocks" transistor level current mirrors, voltage reference generators- current sources/ sinks, simple amplifier, differential stages-cascade/cascade multistage amplifiers-current conveyor" Basic OP-AMP design, gain and phase margin, stability, use of SPICE to simulate MOS circuits. Passive components and analog layout considerations. Analog IC design project.			
Used in Program / Level			
Program Name or requirement			Study Level
Engineering and Technology of Electronics and Communications Program			3
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
20%	**15%**	**15%**	**50%**
Exam Duration [Hours]	1 Hr	1 Hr	3 Hrs

ELE 323	Optoelectronics	2 CH

Prerequisites	ELE 121		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	0	
Required SWL	100	Equivalent ECTS	4
Course Content			
Introduction to optical sources, Absorption and Emission of radiation-Einstein relation, Population inversion, Optical feedback and LASER oscillation-Threshold condition for LASER operation-optical emission from p-n junction. Spontaneous emission, Carrier recombination, Stimulated emission and Lasing. Hetrojunctions Semiconductor, LASER efficiency, Stripe Geometry LASER, and Multi-modes injection LASER structures. Single-mode injection LASER structures (buried Hetrostructures, Transverse junction stripes, Distributed feedback). Single-mode injection LASER operation. LED efficiency and LED characteristics (output power, and Bandwidth-Reliability). Optical detectors basic criteria. Avalanche Photodiode. Optical amplifiers (Erbium-Doped Fiber Amplifier (EDFA), Raman Fiber Amplifier (RFA), and Semiconductor Optical Amplifier (SOA)).			
Used in Program / Level			
Program Name or requirement		Study Level	
Engineering and Technology of Electronics and Communications Program		3	
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

ELE 324	Advanced Semiconductor Devices		3 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
3	1	0	
Required SWL	125	Equivalent ECTS	4
Course Content			
Semiconductors review, Theory of junctions and interfaces: p-n and metal-semiconductor junctions, Oxide-semiconductor and heterojunction interfaces, Principles of bipolar transistor operation, Field effect devices: MESFET and MOSFET, Downscaling principles and Submicron devices, TFET transistors, SOI transistors, Vertical Transistors: FinFET and Surround gate FET.			
Used in Program / Level			
Program Name or requirement		Study Level	
Engineering and Technology of Electronics and Communications Program		3	
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

ELE 325	Low Power Digital Design		3 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
3	1	0	
Required SWL	125	Equivalent ECTS	4
Course Content			
Importance of low power design. Review of nanometer MOSFET models. CMOS power consumption. Energy vs power. Effect of scaling on power consumption. Energy-delay trade-off. Optimizing dynamic power at design time (multiple supplies, sizing, technology mapping). Optimizing static power at design time (sizing, multiple thresholds, stacking). Optimizing power at the architecture and system level (concurrency, pipelining, hardware accelerators). Optimizing interconnects and clock power. Optimizing power at standby (clock gating, power gating, sizing, body biasing). Optimizing power at runtime (dynamic voltage and frequency scaling, adaptive techniques). Optimizing power in memory circuits. Subthreshold circuit design. Power analysis and estimation. Using low-power techniques in standard cell flow. Unified Power Format (UPF). Low power verification. Futuristic low power design techniques.			
Used in Program / Level			
Program Name or requirement		Study Level	
Engineering and Technology of Electronics and Communications Program		3	
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

ELE 326	RF Circuit Design		3 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
3	1	0	
Required SWL	125	Equivalent ECTS	4
Course Content			
Basic concepts of radio frequency circuits and systems, RF transceivers architectures, Noise and non-linearity analysis, harmonic distortion, Impedance matching and smith chart, Basic theory of different building blocks existing in RF systems and Frequency Synthesizers: Low Noise Amplifiers, Mixers, Oscillators, phase noise, RF frequency synthesis, RF Power Amplifiers (class A, class B, class C, class AB).			
Used in Program / Level			
Program Name or requirement		Study Level	
Engineering and Technology of Electronics and Communications Program		3	
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

ELE 327	MEMS Design		3 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
3	1	0	
Required SWL	125	Equivalent ECTS	4
Course Content			
Introduction to MEMS, Review of basic fabrication processes, example of fabrication flows, System modelling, MEMS mechanical design, damping mechanisms, Actuation methods, Sensing elements, some selected applications.			
Used in Program / Level			
Program Name or requirement		Study Level	
Engineering and Technology of Electronics and Communications Program		3	
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

ELE 421	Nano Electronics		3 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
3	1	0	
Required SWL	125	Equivalent ECTS	4
Course Content			
The major goals are to provide graduate students with knowledge and understanding of physical background and applications of Nano-electronics. It will cover electrical and optical properties of materials and nanostructures, and fabrication. Nano-electronic devices including resonant-tunneling devices, transistors, as well as applications of nanotechnologies in molecular biology and medicine.			
Used in Program / Level			
Program Name or requirement		Study Level	
Engineering and Technology of Electronics and Communications Program		4	
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

ELE 422	Fundamentals of Photonics		3 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
3	1	0	
Required SWL	125	Equivalent ECTS	4
Course Content			
Two-dimensional dielectric waveguides, Effective index method, Optical couplers, Optical switches, Multimode interference couplers, Index ellipsoid, Electro-Optics, Acousti-Optics, Second-harmonic generation, Phase and intensity modulators, Multiplexers/Demultiplexers, Optical routers, CAD simulation and design tools.			
Used in Program / Level			
Program Name or requirement		Study Level	
Engineering and Technology of Electronics and Communications Program		4	
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

E3.3 Computer Hardware

ELE 031	Computer Technology		3 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	1	
Required SWL	125	Equivalent ECTS	5
Course Content			
Introduction to course modules. Inspection of computer components Basic definitions and concepts (software, hardware, input devices, program). Basic definitions and concepts (Rom, RAM, sequential storage, auxiliary storage types). Categories of software. Classification of computer from purpose, type, and capacity points of view. Computer application areas. Data, information, and knowledge. Components of an information system. Introduction to logic gates and famous types. Data types and representation, Binary number system, Binary arithmetic operations and other number systems (octal and hexadecimal). BCD code for numeric data representation. ASCII code. Serial/parallel data transfer, and error checking. Relationship between the CPU and the main memory, Program representation inside the main memory, Structure of the CPU, Types of ROM. Process management, File management and Memory management; Types of input-output devices and operation methodology of each one. Performance evaluation of a computer and of a secondary storage device. Introduction to Database systems and Computer networks.			
Used in Program / Level			
Program Name or requirement		Study Level	
Institute Requirement		0	
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
20%	**15%**	**15%**	**50%**
Exam Duration [Hours]	1 Hr	1 Hr	3 Hrs

ELE 231	Microprocessors and their Applications		3 CH
Prerequisites	ELE 221		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	1	
Required SWL	25	Equivalent ECTS	5

Course Content

Introduction and historical review about microprocessors, Computer architecture, Difference between microprocessor and microcontroller, Definition of a CPU The 8 bits CPU, Assembly language for the used processor, Different busses of the microprocessor and the function and properties of each, Addressing modes, Interfacing with memory, Interfacing with input and output ports, Developing a simple microcomputer using an 8 bit CPU the 16 bit CPU Interfacing with memory and input and output ports, Assembly language of the 8086 CPU Architecture of the 80186, 80286, 80386, 80486, an d Pentium microprocessors, Interrupts, Direct Memory Access, Cache memory, Register file.

Used in Program / Level	
Program Name or requirement	Study Level
Electrical Engineering Requirement	2

Assessment Criteria

Student Activities	Mid-Term Exam	Practical Exam	Final Exam
20%	**15%**	**15%**	**50%**
Exam Duration [Hours]	1 Hr	1 Hr	3 Hrs

ELE 331	Computer Organization & Architecture (1)		3 CH
Prerequisites	ELE 231 - Microprocessors and their Applications		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
3	1	0	
Required SWL	150	Equivalent ECTS	6

Course Content

Definition of a micro-operation. Bus system using MUXs or tri-state buffers. Memory transfer. Arithmetic micro-operation and AU design. Logic operations and LU design. Logic operation applications. Shift micro-operations and SU design. ALSU design. Stored program organization, Indirect addressing Computer registers, Common bus system, Computer instructions, Timing and control, Instruction cycle – Register, reference instructions, Memory-reference instructions, I/O instructions and Program interrupt. Complete computer description, and Complete computer design. Binary program, Hexa program and Symbolic program. Assembly language, High level language, Pseudo instructions. Program examples. Conversion from assembly program into binary program. Microprogrammed control unit organization. Microprogramming and design of a microprogrammed control unit.

Used in Program / Level	
Program Name or requirement	Study Level
Electrical Engineering Requirement	3

Assessment Criteria

Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

ELE 332	Computer Networks		3 CH
Prerequisites	ELE 331 - Computer Organization & Architecture (1)		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
3	1	0	
Required SWL	150	Equivalent ECTS	6
Course Content			
Network layers (Physical layer, Data link layer, MAC Sublayer, Network layer, Transport layer, Application layer, and Network security). TCP / IP Network protocol. Routing protocols (protocol principles- protocol verification- HDLC, and PPP). Network Design, Network Management, and Congestion. Examples of LAN's and WAN's, High Speed Networks. Other Network Protocols.			
Used in Program / Level			
Program Name or requirement			Study Level
Electrical Engineering Requirement			3
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

ELE 333	Microcontroller and Applications		3 CH
Prerequisites	ELE 231		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	2	
Required SWL	150	Equivalent ECTS	6
Course Content			
Difference between microprocessors and microcontrollers, General architecture of microcontrollers, Architecture of one of the available microcontrollers that will be used in this course, its assembly, Programming with either C or Basic, Input and output of data in this microcontroller, Timers, Counters, and Interrupts, Software and hardware applications will be assumed in each part. Dealing with A/D and D/A either internal or external.			
Used in Program / Level			
Program Name or requirement			Study Level
Electrical Engineering Requirement			3
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
20%	**15%**	**15%**	**50%**
Exam Duration [Hours]	1 Hr	1 Hr	3 Hrs

ELE 334	Computer Organization & Architecture (2)		2 CH
Prerequisites	ELE 331 - Computer Organization & Architecture (1)		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	0	
Required SWL	100	Equivalent ECTS	4
Course Content			
General register CPU organization. Stack organized computer (register and memory stacks). Reverse Polish notation. Arithmetic statement translation into assembly in the different organizations. Different addressing modes. RISC and CISC computers. Pipelining and overlapped register windows. Addition and subtraction algorithms for integer numeric data in SM and 2's complement representations and the corresponding hardware. Multiplication and division algorithms for integer numeric data in SM and 2's complement representations and the corresponding hardware. Addition and subtraction algorithms for floating point binary data and floating point BCD data and the corresponding hardware. Multiplication and division algorithms for floating point binary data and floating point BCD data and the corresponding hardware. Different I/O devices and the principles of their hardware operation. Design of an interface card. Asynchronous and synchronous communication protocols. Direct memory access, Interrupts, I/O processors, Cache memory and Associative memory.			
Used in Program / Level			
Program Name or requirement		Study Level	
Engineering and Technology of Computers and Control Systems Program		3	
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

ELE 335	Digital Systems Testing and Verification		3 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
3	1	0	
Required SWL	125	Equivalent ECTS	5
Course Content			
Cost and complexity of logic testing. Testing at different levels of abstraction. Faults, physical fault modelling, stuck-at fault models, single fault models, undetectable (masked) faults, fault equivalence/collapsing. Testability measures: controllability and observability. Combinational and sequential functional test. Exhaustive test. Sensitized path test. Test coverage evaluation. Test pattern generation, fault simulation. Design for Testability (DFT), Ad-hoc DFT. Scan design. Built-in Self-Test (BIST), linear feedback shift register (LFSR), Data compaction using LFSR, Pseudo Random Number Generation (PRNG). Boundary Scan/Joint Test Access Group (JTAG). Current test.			
Used in Program / Level			
Program Name or requirement		Study Level	
Engineering and Technology of Computers and Control Systems Program		3	
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

ELE 431	Distributed Computer Systems		3 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
3	1	0	
Required SWL	125	Equivalent ECTS	5
Course Content			
Introduction to distributed systems. Architectures of distributed systems. Network versus distributed operating systems. Communication systems, Processes, Naming, Concurrency control, Mutual exclusion and Election.			
Used in Program / Level			
Program Name or requirement			Study Level
Engineering and Technology of Computers and Control Systems Program			4
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

ELE 432	Pervasive Computing and Internet of Things		3 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
3	1	0	
Required SWL	125	Equivalent ECTS	5
Course Content			
Ubiquitous data access. Exploiting virtual machines. Resource-driven dynamic adaptation. Sensing and actuation: smart sensors and actuators, smart appliances. Mobile hardware technologies. Information access devices. Smart identification: smart cards, smart labels, smart tokens. Home networking. Entertainment systems. Pervasive computing platforms and software: Java cards, iOS, Android, Windows-based platforms. Client middleware: smart card programming, messaging components. Security and privacy in mobile and pervasive systems. Mobile internet. Web services: service discovery, location, and context awareness. Backend server infrastructure: Gateways, application servers, Internet portals, device management, synchronization. Mobile and ubiquitous services: home services, travel and business services, consumer services. Design methodologies and infrastructure. End-to-end application considerations.			
Used in Program / Level			
Program Name or requirement			Study Level
Engineering and Technology of Computers and Control Systems Program			4
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

ELE 433	Wireless Networks		3 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
3	1	0	
Required SWL	125	Equivalent ECTS	5
Course Content			
The objective of this course is to give an introduction to the fundamentals of the wireless communications systems, the wireless network architectures, protocols, and applications. Topics of study include an overview of wireless communications and mobile computing systems, signal propagation characteristics of wireless channels, wireless channel modelling, frequency reuse/cellular/microcellular concepts, spread-spectrum modulation for wireless systems, multiple access techniques, and wireless networking standards (e.g., 2.5G, 3G, 4G/LTE, IEEE 802.11, IEEE 802.15, IEEE 802.16/WiMAX). MANETS, WSNs, VANETS are typical wireless networks that are accorded focus on their characteristics and applications.			
Used in Program / Level			
Program Name or requirement		Study Level	
Engineering and Technology of Computers and Control Systems Program		4	
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

E3.4 Computer Software

ELE 041	Computer Programming (1)		3 CH
Prerequisites	ELE 031 - Computer Technology		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	0	2	
Required SWL	125	Equivalent ECTS	5
Course Content			
Review on computer architecture and the relationship between the CPU and the memory. Visual basic environment, Controls (tools) and properties, Labels, buttons, forms, and text boxes. Data types and mathematical operators. Message and input boxes. Modular programming (functions and subroutines). Making decision and looping (if, select case, for, and while statements). Error checking. Menus and Toolbars in VB, Built-in functions, Data arrays, Files, Graphics and a function drawing. List and Combo boxes. Timer control, Data control and Access database connection.			
Used in Program / Level			
Program Name or requirement		Study Level	
Institute Requirement		0	
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**	**50%**	
Exam Duration [Hours]	1 Hr	1 Hr	

ELE 141	Computer Programming (2)		3 CH
Prerequisites	ELE 041 - Computer Programming (1)		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	0	2	
Required SWL	125	Equivalent ECTS	5
Course Content			
Visual C++ environment and C++ source file creation. Structure of a C++ program, Variables, Data types and Constants. Operators in C++. Input and output in ANSI-C and in ANSI C++. Control structures (if, while, for, switch, and exit statements). Functions (examples, default values), Functions (passing parameters by value and/or by reference, prototyping, and overloading). Arrays, Strings, and Pointers. Dynamic memory, Structures & User defined data types, Files, Graphics and a function drawing. Object oriented programming. VC++ programming (Single Document Interface, Multiple Document Interface, etc.).			
Used in Program / Level			
Program Name or requirement			Study Level
Electrical Engineering Requirement			1
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**	**50%**	
Exam Duration [Hours]	1 Hr	1 Hr	

ELE 341	Algorithms & Data Structures		2 CH
Prerequisites	ELE 141- Computer Programming (2)		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	0	
Required SWL	100	Equivalent ECTS	4
Course Content			
Basic data structures and Control structures Illustrative programs. Functions, Arrays, and Pointers Illustrative programs. Structures and classes in C++ through illustrative programs. Searching algorithms and Sorting algorithms. Algorithm of numerical integration and numerical differentiation, Algorithm of roots finding for polynomials and nonlinear equations and Algorithm for linear system simulation, Linked lists and illustrative examples. Queue data structure and illustrative examples, Stack data structure and illustrative examples, Algorithm for interpolation and best curve fitting, Algorithm for linear control system simulation. Recursion and Trees.			
Used in Program / Level			
Program Name or requirement			Study Level
Engineering and Technology of Computers and Control Systems Program			3
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

ELE 342	Software Engineering		2 CH
Prerequisites	ELE 341 - Algorithms & Data Structures		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	0	
Required SWL	100	Equivalent ECTS	4
Course Content			
Introduction to software engineering. Software process models and Requirements Engineering. Requirements Analysis. System Models (data-flow models, state machine models, semantic data models and object models). Requirements definition and Specification, Formal specification, Software Design, Architectural design, Object-oriented Design, and Real-time software design. Software testing, Software cost estimation and Quality management.			
Used in Program / Level			
Program Name or requirement			Study Level
Engineering and Technology of Computers and Control Systems Program			3
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

ELE 343	Software Testing		3 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
3	1	0	
Required SWL	125	Equivalent ECTS	5
Course Content			
Testing requirements, plans, measures. Risk management. Testing lifecycle. Software quality process. Capability Maturity Model (CMM). Testing techniques. Test cases. Inspection process. Testing waterfall model: static testing of requirements, testing checklist, logical, physical, and unit design testing, static and dynamic testing of code. Non-functional testing. CASE tools in testing.			
Used in Program / Level			
Program Name or requirement			Study Level
Engineering and Technology of Computers and Control Systems Program			3
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

ELE 344	Software Design Patterns		3 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
3	1	0	
Required SWL	125	Equivalent ECTS	5
Course Content			
Importance of software reusability. Software patterns and how to detect them. Pattern-based development. The observer pattern. The template method pattern. Factory patterns. The singleton pattern. The iterator pattern. The composite pattern. The facade pattern. The state and strategy patterns. Functions and the command pattern. The adapter pattern. The proxy pattern. The decorator pattern. The chain of responsibility pattern. The visitor pattern. Software design patterns in software reengineering. Searching for patterns in existing software.			
Used in Program / Level			
Program Name or requirement			Study Level
Engineering and Technology of Computers and Control Systems Program			3
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

ELE 441	Operating Systems		2 CH
Prerequisites	ELE 342 - Software Engineering		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	0	
Required SWL	125	Equivalent ECTS	5
Course Content			
Introduction to basic operating system concepts. Processes and Threads (Inter Process Communication, scheduling). Memory Management (Swapping, virtual memory, page replacement algorithms, segmentation). File systems (file system implementation, and security). Input/output system (principle of input/output hardware and software, clock). Deadlocks (detection, prevention and avoidance). Case study: Windows, Unix and Linux.			
Used in Program / Level			
Program Name or requirement			Study Level
Engineering and Technology of Computers and Control Systems Program			4
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

ELE 442	Database Systems		2 CH
Prerequisites	ELE 341 - Algorithms & Data Structures		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	0	
Required SWL	125	Equivalent ECTS	5
Course Content			
What is a database system and DBMS. Database design using ER and ER model. Relational Data model. ER-to relational data model. SQL language. FD and normalization. Transactions management and data protection.			
Used in Program / Level			
Program Name or requirement			Study Level
Engineering and Technology of Computers and Control Systems Program			4
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

ELE 443	Compiler Theory		2 CH
Prerequisites	ELE 441 - Operating Systems		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	0	
Required SWL	125	Equivalent ECTS	5
Course Content			
A Brief History. Programs Related to Compilers. Translation Process. Compiler Major Data Structures. Language runtime environment. Error handling. TINY language. Tokens. The Scanning Process. Scanner implementation. Regular Expressions. Finite Automata (Deterministic & nondeterministic); From Regular Expressions to DFAs, Converting NFA to DFA. LEX tool. The Parsing Process. Context-Free Grammars, Context-sensitive grammars, and Chomsky hierarchy of grammars. Parse Trees and Abstract Syntax Trees. Ambiguity. Extended Notations: EBNF and Syntax Diagrams. Formal Properties of Context-Free Languages. TINY Language Syntax. Top-Down Parsing by Recursive-Descent, First and Follow Sets. A Recursive-Descent Parser for the TINY Language, Error Recovery in Top - Down Parsers. Overview of Bottom-Up Parsing. Finite Automata of LR(0) Items and LR(0) Parsing. SLR(1) Parsing. Attributes and Attribute Grammars. Algorithms for Attribute Computation and Symbol Table.			
Used in Program / Level			
Program Name or requirement			Study Level
Engineering and Technology of Computers and Control Systems Program			4
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

ELE 444	Advanced Database Systems		3 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
3	1	0	
Required SWL	125	Equivalent ECTS	5
Course Content			
Query processing and optimization. Database tuning. Transaction processing. Concurrency control. Database recovery. Object databases: standards, languages, and design. Object-relational databases. Database security. Distributed database systems: architecture, data fragmentation, distributed read/update transparency, access primitives, integrity constrains, distributed database design, queries, optimization, concurrency and reliability control. XML, semi-structured, federated, and Internet databases. Data warehousing. Introduction to data mining.			
Used in Program / Level			
Program Name or requirement			Study Level
Engineering and Technology of Computers and Control Systems Program			4
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

E3.5 Communication and Microwave

ELE 151	Numerical Analysis		2 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	0	
Required SWL	100	Equivalent ECTS	4
Course Content			
MATLAB environment. Programming in MATLAB (variables, input/output, if-for-while statements). Functions in MATLAB. GRAPHICS in MATLAB (2-D and 3-D). Dealing with polynomials in MATLAB. Matrix Definition and Matrix Operations. Special Forms of Matrices, Determinants, Minors and Cofactors. Cramer's Rule. Gaussian Elimination Method. The Adjoint of a Matrix. Singular and Non–Singular Matrices. The Inverse of a Matrix. Solution of Simultaneous Equations with Matrices. Newton's Method for Root Approximation. The Bisection Method for Root Approximation. Curve Fitting. Linear Regression and Parabolic Regression. Regression with Power Series Approximations. Integration by Numerical Methods (Trapezoidal Rule, Simpson's Rule), Solution of differential equations by Numerical Methods. Linear differential equations, Solution of differential equations by Numerical Methods. Non-linear differential equations. Ode23 MATLAB function. Interpolation. Divided Differences. Newton's Divided Difference Interpolation Method. Interpolation with MATLAB.			
Used in Program / Level			
Program Name or requirement			Study Level
Institute Requirement			1
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

ELE 251	Analog Electrical Communication		3 CH
Prerequisites	ELE 121		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	2	1	
Required SWL	150	Equivalent ECTS	6
Course Content			
Overview of optical fiber communication, Optical fibers, Ray and modal analysis, Dispersion relation of TE, TM, and hybrid modes, Weakly-guiding condition, LP modes, Modal and chromatic dispersion, Attenuation in optical fibers, Coherent and incoherent light sources, Principle of operation of FP, DFB, and DBR semiconductor laser sources, Simplified rate equations, Static, pulsed, and sinusoidal laser response, Direct and external modulation, Photon noise, Relative intensity noise, Quantum efficiency and responsivity of PIN and APD detectors, Photoelectron noise, gain noise, Optical receiver circuits noise, Signal-to-noise ratio, Receiver sensitivity, Bit-error rate, Quantum limited performance of OOK, FSK, and PSK, Optical amplifiers spontaneous emission noise, Power and rise time budgets, design of Point to point optical fiber links, Multichannel transmission systems.			
Used in Program / Level			
Program Name or requirement			Study Level
Electrical Engineering Requirement			2
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
20%	**15%**	**15%**	**50%**
Exam Duration [Hours]	1 Hr	1 Hr	3 Hrs

ELE 252	Digital Electrical Communications		3 CH
Prerequisites	ELE 251		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	2	1	
Required SWL	125	Equivalent ECTS	5
Course Content			
Sampling Process, Pulse amplitude Modulation, Quantization Process, Quantization noise, Pulse Code modulation, time division Multiplexing. Digital multiplexers, Pulse. Transmission: Line Codes, Equalizers, Filter, probability of Errors in baseband, Intersymbol Interference, Nyquist criterion for distortionless baseband transmission, Raised Cosine spectrum. M-ary Probability of error, Regenerative repeaters, Eye Pattern, Power spectrum of pulse amplitude modulation. Signal space analysis, correlation receiver. Passband data transmission, BPSK, QPSK, probability of symbol error. M-ary PSK, Hybrid Amplitude-phase modulation, Coherent Frequency shift keying, M-ary FSK, Noncoherent binary FSK. Differential phase shift Keying.			
Used in Program / Level			
Program Name or requirement			Study Level
Electrical Engineering Requirement			2
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
20%	**15%**	**15%**	**50%**
Exam Duration [Hours]	1 Hr	1 Hr	3 Hrs

ELE 351	Electromagnetic Fields		3 CH
Prerequisites	ELE 252		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
3	1	0	
Required SWL	125	Equivalent ECTS	5

Course Content

Electrostatic Fields: Coulomb's law, Electric field intensity, Electric flux density, Gauss's law, Divergence, Energy and potential, Conductors, Dielectrics, Capacitance
Magnetostatic fields: Biot- Savart law, Ampere's circuital law, Curl – Stokes' theorem, Magnetic flux, Magnetic flux density, Magnetic materials, Inductance.
Time varying fields: Faraday's law, Displacement current, Maxwell's equations, Boundary conditions.
Uniform Plane Waves: Wave propagation in free space, Wave propagation in dielectrics, Poynting vector, Wave polarization. **Transmission line theory:** Transmission line equations, Transmission line parameters, Matching, Smith chart.
Waveguides: Parallel-plate waveguide, Rectangular waveguide, Dielectric waveguide.

Used in Program / Level	
Program Name or requirement	Study Level
Electrical Engineering Requirement	3

Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

ELE 352	Antennas		2 CH
Prerequisites	ELE 351		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	0	
Required SWL	100	Equivalent ECTS	4

Course Content

Fundamental properties and figures of merit of antennas, Radiation integrals and auxiliary potential functions, Linear wire antennas, Loop antennas, Arrays: Linear, planar, and circular, Travelling wave and broadband antennas, Aperture antennas, Microstrip antennas, Smart Antennas, Antenna measurement.

Used in Program / Level	
Program Name or requirement	Study Level
Engineering and Technology of Electronics and Communications Program	3

Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

ELE 451	Radar Theory		2 CH
Prerequisites	ELE 352		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	0	
Required SWL	100	Equivalent ECTS	4
Course Content			
Radar Systems, Radar signals and signal processing, Radar power budget analysis and radar systems classification, Target tracking, Radar antennas, Synthetic aperture radar, Interference protection.			
Used in Program / Level			
Program Name or requirement		Study Level	
Engineering and Technology of Electronics and Communications Program		4	
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

ELE 452	Optical Communications		2 CH
Prerequisites	ELE 323		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	0	
Required SWL	100	Equivalent ECTS	4
Course Content			
Components of optical fiber communication systems and its features, Optical fiber cables: types of cables and transmission characteristics, Signal attenuation and link budget calculations, Dispersion over optical fiber cables and limitations of transmission rates, Optical sources: light emitting diodes and laser diodes, Optical signal detectors, Receiver analysis, noise and limitations, Optical fiber communication standards: synchronous digital hierarchy, Wavelength division multiplexing systems.			
Used in Program / Level			
Program Name or requirement		Study Level	
Engineering and Technology of Electronics and Communications Program		4	
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

ELE 453	Microwave Electronics		3 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
3	1	0	
Required SWL	125	Equivalent ECTS	5
Course Content			
Microwave transistors and tunnel diodes, Microwave field effect transistors, Transferred electron devices, Avalanche transit-time devices, Klystrons, Travelling wave tubes,Microwave crossed-field tubes.			
Used in Program / Level			
Program Name or requirement		Study Level	
Engineering and Technology of Electronics and Communications Program		4	
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

ELE 454	Telephone Networks		2CH
Prerequisites	ELE 252		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	0	
Required SWL	125	Equivalent ECTS	5
Course Content			
PSTN public switch telephone network, network topologies, switching (concentrator switching, packet switching, Multiplexing). Access networks (copper local loop-optical fiber access network, radio access network). Circuit switching systems (subscriber switching, digital telephone switching systems, PBX private branch exchange). Traffic analysis (call distribution, traffic flow, traffic routing). Signaling systems (channel associated signaling-common band signaling ss7). Basics of mobile communication (cellular network, frequency reuse, interference (adjacent cells, co-channel), handoff).			
Used in Program / Level			
Program Name or requirement		Study Level	
Engineering and Technology of Electronics and Communications Program		4	
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

ELE 455	Microwave Engineering		3 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
3	1	0	
Required SWL	125	Equivalent ECTS	4
Course Content			
Guided waves between two conducting parallel plates, TE and TM waves and their characteristics, Velocities of propagation, Attenuation and quality factor, Wave impedance, Basic closed waveguides, TE and TM waves and their characteristics in rectangular wave guides, Waves solution in cylindrical coordinates, Microstrip transmission line, Attenuation and quality factor of a waveguide, Symmetric and asymmetric dielectric planar waveguide, effective index and normalized parameters, Propagation in multimode waveguide. Equivalent circuit of waveguides, N-port circuit, Circuit description, Scattering parameters, Passive devices: Terminations, Attenuators, Phase shifters, Directional couplers, Hybrid junctions, non-reciprocal devices resonators.			
Used in Program / Level			
Program Name or requirement		Study Level	
Engineering and Technology of Electronics and Communications Program		4	
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

ELE 456	Mobile communication		2 CH
Prerequisites	ELE 454		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	0	
Required SWL	125	Equivalent ECTS	5
Course Content			
Mobile communication from 1G to 3G overview, Architecture of LTE-(UE-EUTRAN-EPC). Radio transmission and reception (QPSK, FDMA, TDMA, CDMA, FDD, TDD). Multipath and fading. Inter-symbol interference, Mobile technologies (OFDMA, SCOFDMA, MIMO), Cell identities, Voice over LTE "VOLTE", Evolving LTE to 5G, 5G architecture, 5G core network, mm-wave in 5G.			
Used in Program / Level			
Program Name or requirement		Study Level	
Engineering and Technology of Electronics and Communications Program		4	
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

ELE 457	Waveguides		3 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
3	1	0	
Required SWL	125	Equivalent ECTS	4
Course Content			
Parallel-plate waveguide, Rectangular waveguide, Circular waveguide, Grounded dielectric slab, Planar transmission lines, Microstrip line, Symmetric and asymmetric dielectric slab waveguide, multilayer waveguides, Optical fibers, Plasmonic waveguides, Mode orthogonality and completeness, guided and radiation modes, mode propagation analysis, ray picture, modal picture, Goos-Haenchen shift, Transverse resonance condition, multimode dispersion and chromatic dispersion.			
Used in Program / Level			
Program Name or requirement		Study Level	
Engineering and Technology of Electronics and Communications Program		3	
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

ELE 458	Satellite Communications		3 CH
Prerequisites	ELE 341		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
3	1	0	
Required SWL	125	Equivalent ECTS	5
Course Content			
Orbits, Uplink, down link, and overall link performance, inter satellite links, Multiple access, Satellite networks, Earth stations, The communication payload, The platform, Satellite installation and launch vehicles.			
Used in Program / Level			
Program Name or requirement		Study Level	
Engineering and Technology of Electronics and Communications Program		4	
			Assessment Criteria
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

ELE 459	Communication Security		3 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
3	1	0	
Required SWL	125	Equivalent ECTS	5
Course Content			
Principles of data security, hardware and software security techniques, software protection, computer viruses, worms, Trojans, Spy wares, networks security and firewalls. Database administration security. Access control: Authentication, password, biometrics authorization, multi-levels Protocols: simple authentication protocols and real world security protocols.			
Used in Program / Level			
Program Name or requirement			Study Level
Engineering and Technology of Electronics and Communications Program			4
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

E3.6 Control Systems

ELE 261	Control Components & Industrial Instrumentations		3 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	1	
Required SWL	125	Equivalent ECTS	5
Course Content			
Examples of industrial control loops, transducers static and dynamic specifications, position transducers, velocity transducers, Temperature transducers, level and pressure transducers, flow transducers, light, sound, force, pH, and viscosity transducers, chemical transducers, Actuators: valves, motors, heaters, I/P, etc. Op. Amp. Circuits – Analog controllers, Analog to digital conversion and vice-versa. PLC applications.			
Used in Program / Level			
Program Name or requirement			Study Level
Electrical Engineering Requirement			2
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
20%	**15%**	**15%**	**50%**
Exam Duration [Hours]	1 Hr	1 Hr	3 Hrs

ELE 262	Automatic Control		3 CH
Prerequisites	ELE 261- Control Components & Industrial Instrumentations		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	2	1	
Required SWL	150	Equivalent ECTS	6
Course Content			
Introduction to feedback control systems. Characteristics of closed loop systems, Advantages and disadvantages of feedback, Obtainment of transfer functions along with illustrative examples, Block diagram reduction, Signal flow graphs, Sensitivity to parameter variation, Performance of control systems, Standard test signals, Time response of first and second order systems and response specs, Identifications of systems from time response, Static error analysis, Classical controllers P, PI, PD, PID. Routh - Method for stability analysis, Root locus. Frequency response. Identifications of systems from frequency response, Design of PID controllers and compensators, State space representation in canonical forms, State feedback gain matrix design method. Observability & controllability analysis.			
Used in Program / Level			
Program Name or requirement		Study Level	
Electrical Engineering Requirement		2	
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
20%	**15%**	**15%**	**50%**
Exam Duration [Hours]	1 Hr	1 Hr	3 Hrs

ELE 361	Digital Control Systems		3 CH
Prerequisites	ELE 262- Automatic Control		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	2	1	
Required SWL	150	Equivalent ECTS	6
Course Content			
Introduction to computer control , Sampling theorem and reconstruction of sampled data , Time and frequency domain analysis of discrete-time systems , Open-loop discrete systems, Closed-loop systems, System time response characteristic, Stability analysis of discrete-time systems, Controllability and observability of systems, Design of digital controllers, Pole assignment, State estimation. Linear quadratic optimal control, Digital filters structures. Microprocessor implementation of digital filter.			
Used in Program / Level			
Program Name or requirement		Study Level	
Engineering and Technology of Computers and Control Systems Program		3	
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
20%	**15%**	**15%**	**50%**
Exam Duration [Hours]	1 Hr	1 Hr	3 Hrs

ELE 461	Robot Systems		2 CH
Prerequisites	ELE 361 - Digital Control Systems		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	0	
Required SWL	100	Equivalent ECTS	4
Course Content			
Introduction to control of mechanical manipulator, Description of positions, orientations, and frames, Changing description from frame to frame, Operators: translation, rotation, and transformation, Roll, Pitch, and Roll angles about fixed axes, Euler angles, Manipulator kinematics. Link description. Link connection description, Affixing frames to links, Denavit-Hartenberg, robot arm parameters, Derivation of link transformation, PUMA 560 manipulator. Algebraic and numerical methods used to solve inverse kinematics equations. Introduction to Jacobians: velocities and static forces. Path generation methods for the robot tool frame. Introduction to robot arm dynamic model and path tracking approaches.			
Used in Program / Level			
Program Name or requirement			Study Level
Engineering and Technology of Computers and Control Systems Program			4
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

ELE 462	Advanced Control Systems		2 CH
Prerequisites	ELE 361 - Digital Control Systems		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	0	
Required SWL	100	Equivalent ECTS	4
Course Content			
Review on objectives of automatic control, along with illustrative examples. SISO/MIMO, time variant/invariant, linear/non-linear systems. Exact and approximate discrete-time state space models. Optimal control framework. Performance measures. Principle of optimality and principles of dynamic programming. Computational dynamic programming, applied to control systems. Analytical dynamic programming, applied to control systems. Basics of calculus of variation. Functional of a single function. Functional of several functions. Constrained extrema, Variational approach applied to optimal control problem, Hamiltonian, Space vehicle modeling and control, Riccati equation, Pontryagin's minimum principle and state inequality.			
Used in Program / Level			
Program Name or requirement			Study Level
Engineering and Technology of Computers and Control Systems Program			4
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

ELE 463	Industrial Control		3 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
3	1	0	
Required SWL	125	Equivalent ECTS	5
Course Content			
Dynamic elements in a control loop, dead time, capacity, lag, characteristics of real processes. Non-linear elements in the loop. Analysis of some common loops (flow, pressure, level, Temperature, Composition). Linear controllers (PI, PD, PID, Complementary feedback). Non-Linear controllers (on–off, dual mode concept, non-linear PID). Cascade control. feed-forward control, interaction and decoupling.			
Used in Program / Level			
Program Name or requirement			Study Level
Engineering and Technology of Computers and Control Systems Program			4
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

E3.7 System Engineering

ELE 271	Signal Analysis		3 CH
Prerequisites	ELE 211		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	1	
Required SWL	125	Equivalent ECTS	5
Course Content			
Introduction to multimedia. Introduction to the theory and applications of 2D signal and image processing: 2D signals and systems analysis, 2D sampling and quantization, 2D signals and image transformation, 2D filter design. Image formation. Image enhancement. Image restoration. Morphological operations. Feature extraction. Basics of digital audio. Audio and Speech Acquisition, Representation and Storage. Digital Processing of Speech. LPC and Cepstrum Analysis. Speech Parameter Estimation.			
Used in Program / Level			
Program Name or requirement			Study Level
Electrical Engineering Requirement			2
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
20%	**15%**	**15%**	**50%**
Exam Duration [Hours]	1 Hr	1 Hr	3 Hrs

ELE 371	Real-Time Systems & Applications		3 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
3	1	0	
Required SWL	125	Equivalent ECTS	5
Course Content			
Interfacing techniques used in medium and large-scale real time systems, Polled and Interrupt driven Device Drivers. Control Theory applied to medium and large-scale real time systems, Real Time Requirements and Specification techniques, Real Time Design Methods, Real Time Operating Systems Real Time Languages. Testing Methods. Recent advances in Real Time Systems Development. System case studies.			
Used in Program / Level			
Program Name or requirement			Study Level
Engineering and Technology of Computers and Control Systems Program			3
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

ELE 372	Artificial Neural Networks		3 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
3	1	0	
Required SWL	125	Equivalent ECTS	5
Course Content			
Introduction, Neuron model and network architectures, An illustrative example. Perceptron. Learning rule. Background on linear algebra, Background on performance surfaces and optimization. Widrow-Hoff learning, Backpropagation, Supervised Hebbian Learning, Associative learning, Competitive networks.			
Used in Program / Level			
Program Name or requirement			Study Level
Engineering and Technology of Computers and Control Systems Program			3
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

ELE 373	Digital Signal Processing		2 CH
Prerequisites	ELE 271		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	0	1	
Required SWL	100	Equivalent ECTS	4
Course Content			
Introduction to digital signal processing, the Z-transform, the sampling theory, circular convolution, block convolution, fast Fourier transform (FFT), structures for discrete-time systems, digital filters, FIR filter design, IIR filter design. Multi-Rate processing. Applications in communication systems and audio/image processing. Image enhancement, segmentation, compression, encryption, medical image processing.			
Used in Program / Level			
Program Name or requirement			Study Level
Engineering and Technology of Electronics and Communications Program			3
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
20%	**15%**	**15%**	**50%**
Exam Duration [Hours]	1 Hr	1 Hr	3 Hrs

ELE 374	Modeling & Simulation of Engineering Systems		3 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
3	1	0	
Required SWL	125	Equivalent ECTS	5
Course Content			
Introduction to simulation of engineering systems. Continuous-time and discrete-time systems simulation. Statistical models in simulation. Overview of basic probability and statistics. Selecting input probability distribution. Random number generators. Random variate generation, Simulation of a single server queueing system, Simulation of an Inventory system, Simulation of discrete-event and hybrid systems using Petri nets, Simulation of discrete-event systems using Grafcet, Building valid and credible simulation models. Desirable features of simulation software. Some simulation software examples.			
Used in Program / Level			
Program Name or requirement			Study Level
Engineering and Technology of Computers and Control Systems Program			3
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

ELE 375	Intelligent Control Systems		3 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
3	1	0	
Required SWL	125	Equivalent ECTS	5
Course Content			
Different methods in conventional control systems - Problems of conventional control and the new needs (operator role, hybrid systems, etc.), Linearization of non-linear systems and multi-model based control, De-coupler design and implementation, Definition of intelligent control systems and their framework, Expert control systems and illustrative examples, Qualitative control systems and illustrative examples, Basics of artificial neural networks. Intelligent control based on artificial neural networks, Principles of fuzzy logic and illustrative examples, Fuzzy control framework and applications, Fuzzy control based on single input and an illustrative example, Fuzzy control based on more than one input, Fuzzy PID controller.			
Used in Program / Level			
Program Name or requirement			Study Level
Engineering and Technology of Computers and Control Systems Program			3
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

ELE 376	Speech Processing		3 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
3	1	0	
Required SWL	125	Equivalent ECTS	5
Course Content			
Basic information of Acoustics, Acoustic measurements and types of waves, Acoustic wave propagation in free space, Environmental noise and wave acoustics, Reverberation time, rooms and ear characteristics, Room Acoustic and sound absorption, Noise control and calibration of microphones, Acoustic transmitters and receivers, Speech analysis, Biomedical Applications.			
Used in Program / Level			
Program Name or requirement			Study Level
Engineering and Technology of Electronics and Communications Program			3
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

ELE 471	Artificial Intelligence		2 CH
Prerequisites	ELE 341 - Algorithms & Data Structures		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
3	1	0	
Required SWL	125	Equivalent ECTS	5
Course Content			
Overview. Introduction to AI languages (Prolog programming), Problem solving, state-space representation, production system, Uninformed search, Informed (heuristic) search, Adversarial search and game playing, Knowledge representation (semantic networks, frames, propositional logic, and predicate logic) and reasoning. Learning methodologies, Evolutionary computation, Expert systems, Intelligent agents.			
Used in Program / Level			
Program Name or requirement			Study Level
Engineering and Technology of Computers and Control Systems Program			4
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

ELE 472	Information Theory and Coding		3 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
3	1	0	
Required SWL	125	Equivalent ECTS	5
Course Content			
Uncertainty, Information, Entropy and Source-Coding Theorem. Data Compaction, Discrete Memoryless Channels, Mutual Information, Channel Capacity, Channel-Coding Theorem, Differential Entropy and Mutual Information, Shannon Capacity, Linear Block Codes, Cyclic Codes, Convolutional Codes, Maximum Likelihood Decoding of Convolutional Codes, Introduction to LDPC codes and turbo coding.			
Used in Program / Level			
Program Name or requirement			Study Level
Engineering and Technology of Electronics and Communications Program			4
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

ELE 473	Information Security		3 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
3	1	0	
Required SWL	125	Equivalent ECTS	5
Course Content			
Principles of data security, hardware and software security techniques, software protection, computer viruses, worms, Trojans, Spy wares, networks security and firewalls. Database administration security. Access control: Authentication, password, biometrics authorization, multi-levels Protocols: simple authentication protocols and real world security protocols.			
Used in Program / Level			
Program Name or requirement			Study Level
Engineering and Technology of Computers and Control Systems Program			4
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

ELE 474	Signal Processing for Multimedia		3 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
3	1	0	
Required SWL	125	Equivalent ECTS	4
Course Content			
Introduction to multimedia, Introduction to the theory and applications of 2D signal and image processing, 2D signals and systems analysis, 2D sampling and quantization, 2D signals and image transformation, 2D filter design, Image formation, Image enhancement, Image restoration, Morphological operations, Feature extraction, Basics of digital audio, Audio and Speech Acquisition, Representation and Storage, Digital Processing of Speech, LPC and Cepstrum Analysis, Speech Parameter Estimation.			
Used in Program / Level			
Program Name or requirement			Study Level
Engineering and Technology of Electronics and Communications Program			4
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

ELE 475	IoT and Machine type Communication		2 CH
Prerequisites	ELE 252		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	0	
Required SWL	150	Equivalent ECTS	6
Course Content			
Evolution from M2M to IoT, definitions and application domains of IoT, IoT architectures, the internet in IoT, the things in IoT(sensors-RFID-actuators), IoT processors and microcontrollers, IoT transport wireless network and communication technology, IoT and cloud computing			
Used in Program / Level			
Program Name or requirement			Study Level
Engineering and Technology of Electronics and Communications Program			4
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

ELE 476	Pattern Recognition & Image Processing Systems		3 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
3	1	0	
Required SWL	125	Equivalent ECTS	5
Course Content			
Introduction to pattern recognition, Statistical and structural approaches, Recognition rules, Classifiers, Supervised and unsupervised learning, Digital image properties, Image enhancement, Image segmentation, Image compression, Image transformations, and Image retrieval.			
Used in Program / Level			
Program Name or requirement			Study Level
Engineering and Technology of Computers and Control Systems Program			4
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

ELE 477	Integrated Optics and Optical MEMS		3 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
3	1	0	
Required SWL	125	Equivalent ECTS	4
Course Content			
Symmetric and asymmetric single mode dielectric waveguide, 2D waveguide and the effective index method, propagation in Multimode guide, the Multimode interference MMI structures, Integrated optics IO splitters and directional couplers, IO filters and multiplexers, MEMS technology, Micro- mirrors and micro-lenses, Optical MEMS switches, Fiber lens, Variable optical attenuators, Multilayer filter design, Tunable MEMS filters.			
Used in Program / Level			
Program Name or requirement		Study Level	
Engineering and Technology of Electronics and Communications Program		4	
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

ELE 478	Micro Photonic Systems		3 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
3	1	0	
Required SWL	125	Equivalent ECTS	4
Course Content			
Diffraction grating structures, Micro-optical resonators, Micro-optics technology, Optical MEMS technology, Micro-mirrors, Micro-lenses, Optical MEMS switches, Fiber lens, Variable optical attenuators, Multilayer filter design, Tunable MEMS filters.			
Used in Program / Level			
Program Name or requirement		Study Level	
Engineering and Technology of Electronics and Communications Program		4	
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

E3.8 Power & Machines

ELE 181	Energy conversion		3 CH
Prerequisites	ELE 111		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
3	1	0	
Required SWL	125	Equivalent ECTS	5
Course Content			
Fundamentals of Energy conversion, Photovoltaic Energy Conversion, Energy Conversion in Fuel Cells, Fuel and Combustion, Thermoelectric Power Generation, Magneto Hydrodynamic Power Generation, Thermo Ionic Power Generation, Electro Ionic Power Generation, Electro Chemical Power Generation, Electromechanical Power Generation, Nuclear Power Generation, Illumination Engineering, Electric Traction Systems, Environmental Effects of Energy Resources.			
Used in Program / Level			
Program Name or requirement			Study Level
Electrical Engineering Requirement			1
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

ELE 182	Mechanical and Electrical Engineering		3 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	0	
Required SWL	100	Equivalent ECTS	4
Course Content			
Electric Circuit Analysis: DC circuits, AC circuits, Circuits under transient conditions. Electric Power and Machines: power systems, Transformers, Synchronous and induction generators, Three - phase and single - phase motors, speed control of motors, cables, transmission lines, switching circuits, electrical installations. Measurement and Protection: Protection circuits and devices, relays and timers, measuring devices and recorders.			
Used in Program / Level			
Program Name or requirement			Study Level
Institute Requirement			1
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

E3.9 Project & selected Topics

ELE 491	Computer and Control Graduation Project (1)		3 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	2	1	
Required SWL	150	Equivalent ECTS	6
Course Content			
This course represents the first part of the graduation project, where the students work in the graduation projects under the supervision of institute members.			
Used in Program / Level			
Program Name or requirement			Study Level
Engineering and Technology of Computers and Control Systems Program			4
Assessment Criteria			
Term Work	Mid-Term Exam	Final Thesis	Final Presentation
40%		**20%**	**40%**
Exam Duration [Hours]			

ELE 492	Computer and Control Graduation Project (2)		3 CH
Prerequisites	ELE 491 - Computer and Control Graduation Project (1)		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	2	
Required SWL	150	Equivalent ECTS	6
Course Content			
As a continuation of the first part of the graduation project, the students continue work in the graduation projects under the supervision of institute members.			
Used in Program / Level			
Program Name or requirement			Study Level
Engineering and Technology of Computers and Control Systems Program			4
Assessment Criteria			
Term Work	Mid-Term Exam	Final Thesis	Final Presentation
40%		**20%**	**40%**
Exam Duration [Hours]			

ELE 493	Electronics and Communication Graduation Project (1)		3 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	2	1	
Required SWL	150	Equivalent ECTS	6
Course Content			
This course represents the first part of the graduation project, where the students work in the graduation projects under the supervision of institute members.			
Used in Program / Level			
Program Name or requirement			Study Level
Engineering and Technology of Electronics and Communications Program			4
Assessment Criteria			
Term Work	Mid-Term Exam	Final Thesis	Final Presentation
40%		**20%**	**40%**
Exam Duration [Hours]			

ELE 494	Electronics and Communication Graduation Project (2)		3 CH
Prerequisites	ELE 493 - Electronics and Communication Graduation Project (1)		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	2	
Required SWL	150	Equivalent ECTS	6
Course Content			
As a continuation of the first part of the graduation project, the students continue work in the graduation projects under the supervision of institute members.			
Used in Program / Level			
Program Name or requirement			Study Level
Engineering and Technology of Electronics and Communications Program			4
Assessment Criteria			
Term Work	Mid-Term Exam	Final Thesis	Final Presentation
40%		**20%**	**40%**
Exam Duration [Hours]			

ELE 495	Selected Topics in Computer Software		2 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	0	
Required SWL	125	Equivalent ECTS	5
Course Content			
Selected topics in recent developments in computer software will be presented in this course. Course material will reflect the needs of the graduating students.			
Used in Program / Level			
Program Name or requirement			Study Level
Engineering and Technology of Computers and Control Systems Program			4
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

ELE 496	Selected Topics in Computers		3 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
3	1	0	
Required SWL	125	Equivalent ECTS	5
Course Content			
New computer architectures, New software engineering, Object orientation, Multimedia systems, Intelligent information systems, Geographic information systems Applications, Natural language understanding, etc.			
Used in Program / Level			
Program Name or requirement			Study Level
Engineering and Technology of Computers and Control Systems Program			4
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

ELE 497	Selected Topics in Control		3 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
3	1	0	
Required SWL	125	Equivalent ECTS	5
Course Content			
New trends in modeling, Hybrid dynamical systems, Discrete event systems, Stochastic control, Stochastic optimal control. Predictive control, Off-line and On-line identification of linear and non-linear systems, Adaptive contro, Gain scheduling, Robust control, etc.			
Used in Program / Level			
Program Name or requirement			Study Level
Engineering and Technology of Computers and Control Systems Program			4
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

ELE 498	Selected Topics in Electronics		3 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
3	1	0	
Required SWL	125	Equivalent ECTS	4
Course Content			
Need for analog and mixed analog-digital circuits. Reviewing NMOS and CMOS technology. BICMOS technology, Conventional analog methods. Basic analog building blocks. Operational amps and trans-conductance amps (OTA). Phase locked loops and oscillators. Sensors, Future trends in VLSI technology, technology limitations. Basic technology modules include, crystal growth and wafer preparation, mask generation techniques, lithography, diffusion process; ion implantation, oxidation, etching techniques, wet etching and plasma etching, thin film deposition, epitaxial growth, chemical vapor deposition techniques, metallization, clean room technology, Advanced process integration for CMOS, BiCMOS and Bipolar fabrication. Introduction to MEMs. Electro-optics and nano-photonics, quantum structure for photonics devices in nano scale dimensions.			
Used in Program / Level			
Program Name or requirement			Study Level
Engineering and Technology of Electronics and Communications Program			4
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

ELE 499	Selected Topics in Communication		3 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
3	1	0	
Required SWL	125	Equivalent ECTS	5
Course Content			
Selected topics in recent directions and advances in communication systems.			
Used in Program / Level			
Program Name or requirement		Study Level	
Engineering and Technology of Electronics and Communications Program		4	
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

E4. Courses of Construction Engineering & technology Department (CIV)

The Construction Engineering & technology Department is responsible for the teaching of Construction Engineering & technologycourses for all Programs.

#	Specialization
1	Structure Design & Analysis
2	Properties, Testing and Resistance of Materials
3	Geotechnical Engineering & Foundations
4	Construction Engineering & technology& Project management
5	Highways
6	Surveying & Drawing
7	Sanitary & Environment
8	Irrigation & Hydraulics
9	Project & selected Topics

Table 32 List of specializations at the Construction Engineering & technology Department.

The following abbreviations are the legend for the courses table.

Lvl	Level
CH	Credit Hour
ECTS	European Credit Transfer System
SWL	Student Work Load
Lec	Lectures
Tut	Tutorials
Lab	Laboratory
TT	Total
CR	Cultural Requirement
IR	Institute Requirement
DR	Discipline Requirement
PR	Program Requirement
SA	Student Activities
MT	Mid-Term Exam
PE	Practical Exam
FE	Final Exam

لائحة الساعات المعتمدة لبرامج الدراسة لمرحلة البكالوريوس

#	Lvl	Code	Course Title	Credits and SWL			Contact Hours				Classification				Assessment (%)				Prerequisites
				CH	ECTS	SWL	Lec	Tut	Lab	TT	CR	IR	DR	PR	SA	MT	PE	FE	
1. Structure Design & Analysis																			
1	1	CIV 111	Structural Analysis (1)	3	5	150	3	1	-	4			x		30	20	-	50	
2	2	CIV 211	Design of Concrete Structures (1)	3	5	125	3	1	-	4			x		30	20	-	50	CIV 111
3		CIV 212	Design of Concrete Structures (2)	3	5	125	3	1	-	4			x		30	20	-	50	CIV 211
4		CIV 213	Structural Analysis (2)	3	5	125	3	1	-	4			x		30	20	-	50	CIV 111
5		CIV 214	Structural Analysis (3)	3	5	125	3	1	-	4			x		30	20	-	50	CIV 213
6	3	CIV 311	Design of Steel Structures (1)	3	6	150	3	1	-	4			x		30	20	-	50	CIV 213
7		CIV 312	Design of Steel Structures (2)	3	6	150	3	1	-	4			x		30	20	-	50	CIV 311
8		CIV 313	Design of Concrete Structures (3)	3	5	125	3	1	-	4			x		30	20	-	50	CIV 212
9		CIV 314	Tunnels & Underground Structures	3	5	125	3	1	-	4			x		30	20	-	50	
10	4	CIV 411	Design of Steel Bridges	3	6	150	3	1	-	4			x		30	20	-	50	CIV 312
11		CIV 412	High Rise Buildings & R.C Towers	3	5	125	3	1	-	4			x		30	20	-	50	
12		CIV 413	Electrical & Mechanical Structures in Buildings	2	5	125	2	1	-	3			x		30	20	-	50	
13		CIV 414	Design of Wall Bearing Structures	3	5	125	3	1	-	4			x		30	20	-	50	
2. Properties, Testing and Resistance of Materials																			
14	1	CIV 121	Strength of materials & Testing (1)	3	6	150	2	1	1	4			x		20	15	15	50	BAS 022
15		CIV 122	Strength of materials & Testing (2)	3	6	125	2	1	1	4			x		20	15	15	50	CIV 121
16	4	CIV 421	Inspection & Non Destructive Testing	3	5	125	3	1	-	4			x		30	20	-	50	
17		CIV 422	Repair & Strengthening of Structures	2	4	100	2	1	-	3			x		30	20	-	50	
3. Geotechnical Engineering & Foundations																			
18	2	CIV 232	Geotechnical Engineering	3	6	150	2	1	1	4			x		20	15	15	50	
19	3	CIV 331	Foundations Engineering (1)	3	6	150	3	1	-	4			x		30	20	-	50	CIV 232
20		CIV 332	Foundations Engineering (2)	3	6	150	3	1	-	4			x		30	20	-	50	CIV 331
21		CIV 333	Ground Improvement	3	5	125	3	1	-	4			x		30	20	-	50	
22	4	CIV 431	Soil Mechanics	3	5	125	3	1	-	4			x		30	20	-	50	
23		CIV 432	In-Site Testing & Construction Technologies of Foundations	3	5	125	3	1	-	4			x		30	20	-	50	
4. Construction Engineering & technology& Project management																			
24	1	CIV 141	Architecture and Construction	2	4	100	2	1	-	3			x		30	20	-	50	
25	2	CIV 242	Legislation & Contracts	2	4	100	2	1	-	3			x		30	20	-	50	

لائحة الساعات المعتمدة لبرامج الدراسة لمرحلة البكالوريوس

#	Lvl	Code	Course Title	Credits and SWL			Contact Hours				Classification				Assessment (%)				Prerequisites
				CH	ECTS	SWL	Lec	Tut	Lab	TT	CR	IR	DR	PR	SA	MT	PE	FE	
26	3	CIV 341	Project Management	2	4	100	2	1	-	3			x		30	20	-	50	
27		CIV 342	Methods & Equipment's For Construction	3	5	125	3	1	-	4			x		30	20	-	50	
28	4	CIV 441	Construction Engineering	2	4	100	2	1	-	3			x		30	20	-	50	
29		CIV 442	Construction Planning & Control	2	4	100	2	1	-	3			x		30	20	-	50	CIV 341
30		CIV 443	Decision Making & Risk Analysis	3	5	125	3	1	-	4			x		30	20	-	50	
31		CIV 444	Quality Control & Assurance	3	5	125	3	1	-	4			x		30	20	-	50	
32		CIV 445	Reliability & Fire Safety c Structures	3	5	125	3	1	-	4			x		30	20	-	50	
5. Highways																			
33	3	CIV 351	Highway & Traffic Engineering	2	4	100	2	1	-	3			x		30	20	-	50	
34		CIV 352	Railway Engineering	3	5	125	3	1	-	4			x		30	20	-	50	
6. Surveying & Drawing																			
35	1	CIV 161	Civil Drawing	2	5	100	-	4	-	4			x		30	20	-	50	
36		CIV 162	Engineering Surveying (1)	3	5	150	2	1	1	4			x		20	15	15	50	BAS 012
37		CIV 163	Engineering Surveying (2)	3	5	125	2	1	1	4			x		20	15	15		CIV 162
38	4	CIV 461	Maps, GIS & Remote Sensing	3	5	125	3	1	-	4			x		30	20	-	50	
7. Sanitary & Environment																			
39	2	CIV 271	Environmental Engineering	3	6	150	3	1	-	4			x		30	20	-	50	
40	3	CIV 371	Sanitary Engineering	3	5	125	3	1	-	4			x		30	20	-	50	CIV 282
8. Irrigation & Hydraulics																			
41	2	CIV 281	Fluid Mechanics	3	6	150	2	1	1	4			x		20	15	15	50	
42		CIV 282	Hydraulics	3	6	150	2	1	1	4			x		20	15	15	50	CIV 281
43	3	CIV 381	Irrigation and Drainage Engineering	2	4	100	2	1	-	3			x		30	20	-	50	CIV 282
9. Project & selected Topics																			
44	4	CIV 491	Construction Graduation Project (1)	4	6	150	3	2	-	5			x		40	20	-	40	
45		CIV 492	Construction Graduation Project (2)	4	6	150	3	2	-	5			x		40	20	-	40	

Table 33 List of *Construction Engineering & technologyDepartment courses.*

E4.1 Structure Design & Analysis

CIV 111	Structural Analysis (1)		3 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
3	1	0	
Required SWL	150	Equivalent ECTS	5
Course Content			
Introduction to structural modeling, types of loads, supports, reactions, equilibrium of statically determinant structures, internal stresses in beams frames and columns. Analyzing statically determinant trusses in plane and space. Stability for structures. Influence lines for beams and frames (statically determinant).			
Used in Program / Level			
Program Name or requirement		Study Level	
Construction Engineering & technologyProgram		1	
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

CIV 211	Design of Concrete Structures (1)		3 CH
Prerequisites	CIV 111 - Structural Analysis (1)		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
3	1	0	
Required SWL	125	Equivalent ECTS	5
Course Content			
Structural systems, design philosophy for structures using reinforced concrete and methods, Design Codes, Load path and tributary areas of floor slabs, serviceability and ultimate load combinations. Behavior and limit states design of reinforced concrete section subjected to bending moments, shear, torsion and axial forces. Reinforcement details for beams and columns. Development and curtailment of reinforcement for beams. Serviceability limits states.			
Used in Program / Level			
Program Name or requirement		Study Level	
Construction Engineering & technologyProgram		2	
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

CIV 212	Design of Concrete Structures (2)		3 CH
Prerequisites	CIV 211 - Design of Concrete Structures (1)		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
3	1	0	
Required SWL	125	Equivalent ECTS	5
Course Content			
Design of reinforced concrete slabs (Solid, Flat and Hollow-Block Slabs) and stairs. Design of sections subjected to a combination of bending and axial forces, characteristics of interaction curves and their application in design, design and reinforcement details of concrete slender columns, Reinforcement details of concrete frames.			
Used in Program / Level			
Program Name or requirement			Study Level
Construction Engineering & technologyProgram			2
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

CIV 213	Structural Analysis (2)		3 CH
Prerequisites	CIV 111 - Structural Analysis (1)		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
3	1	0	
Required SWL	125	Equivalent ECTS	5
Course Content			
Properties of area for planes, straining actions in space, stresses resulting from axial loads in homogenous bodies, axial stresses in compound and heterogeneous bodies, shear forces in rivets, threads, bolts and nails, Shear forces resulting from bending moment and torsion, Transfer of stresses, Analysis of statically indeterminate structures, applications, Power methods for analyzing structures.			
Used in Program / Level			
Program Name or requirement			Study Level
Construction Engineering & technologyProgram			2
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

CIV 214	Structural Analysis (3)		3 CH
Prerequisites	CIV 213 - Structural Analysis (2)		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
3	1	0	
Required SWL	125	Equivalent ECTS	5
Course Content			
Equilibrium equations by the deflection angles method, applications on continuous beams and frames, bending moment's distribution in beams and frames, using the bending moment method under the effect of temperature, rigidity factors in prismatic sections, using matrices for analyzing frames, meshed beams and trusses. Using computers by the rigidity matrices method.			
Used in Program / Level			
Program Name or requirement			Study Level
Construction Engineering & technologyProgram			2
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

CIV 311	Design of Steel Structures (1)		3 CH
Prerequisites	CIV 213 - Structural Analysis (2)		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
3	1	0	
Required SWL	150	Equivalent ECTS	6
Course Content			
Loads on steel structures, analysis and design concepts, steel grades and types, structural systems and general layout for multipurpose halls, local buckling and steel cross sections classifications, Design of steel elements, Tension members, struts and compression members, flexural Members, lateral torsion buckling of beams, floor beams, Purlins, Crane track girders.			
Used in Program / Level			
Program Name or requirement			Study Level
Construction Engineering & technologyProgram			3
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

CIV 312	Design of Steel Structures (2)		3 CH
Prerequisites	CIV 311 - Design of Steel Structures (1)		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
3	1	0	
Required SWL	150	Equivalent ECTS	6
Course Content			
Design of beam-columns. Introduction for connections. Design of connections: Bolts, types of bolts, design and analysis of bolted joints, Welds, types of welded joints, structural analysis of welded joints, Design of bolted connections subjected to shear, tension and shear, Design of welded connections subjected to shear and tension, and design of column bases.			
Used in Program / Level			
Program Name or requirement			Study Level
Construction Engineering & technologyProgram			3
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

CIV 313	Design of Concrete Structures (3)		3 CH
Prerequisites	CIV 212 - Design of Concrete Structures (2)		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
3	1	0	
Required SWL	125	Equivalent ECTS	5
Course Content			
Cracking limit state, Design of Water tanks, design of sections, elevated, ground and underground tanks, circular and rectangular tanks, calculation of internal forces, Design and reinforcement details of corbels and deep beams, Lateral resistance of buildings, earthquake and wind, Design and detailing of shear walls and RC cores, Introduction of Pre-stressed concrete structures.			
Used in Program / Level			
Program Name or requirement			Study Level
Construction Engineering & technologyProgram			3
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

CIV 314	Tunnels & Underground Structures		3 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
3	1	0	
Required SWL	125	Equivalent ECTS	5
Course Content			
Classification of tunnels, Tunneling and pipe, jacking, Analysis and design of tunnel lining, Ground settlement due to tunneling, Geotechnical instrumentation, Analysis and design of culverts, Subway stations and other underground structures.			
Used in Program / Level			
Program Name or requirement			Study Level
Construction Engineering & technologyProgram			3
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

CIV 411	Design of Steel Bridges		3 CH
Prerequisites	CIV 312 - Design of Steel Structures (2)		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
3	1	0	
Required SWL	150	Equivalent ECTS	6
Course Content			
Structural Systems of Railway and Roadway Bridges: Types of bridges, structural systems in longitudinal and transverse direction, material of construction, design philosophy, Design loads: Roadway loading, other loads on bridges, Design of Plate Girder (Rail- and Roadway Bridges): General design considerations, fatigue considerations, buckling of plates, actual strength of plate girder elements, flange to web weld, Stiffeners, splices, curtailment of flange plates, details, Design of Composite Bridges: General design considerations, Composite design considerations, Shear connectors design, Details, Design of Beam Grids: General design considerations, Effect of gird interaction, Effect of relative rigidity, Design of Bridge Wind Bracings.			
Used in Program / Level			
Program Name or requirement			Study Level
Construction Engineering & technologyProgram			4
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

CIV 412	High Rise Buildings & R.C Towers		3 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
3	1	0	
Required SWL	125	Equivalent ECTS	5
Course Content			
Common high rise buildings and basic structural elements, linear, surface elements, Façade envelope and core, analysis of high rise buildings, portal method and cantilever method, plane frame analysis, shear wall, frame analysis, core analysis, effect of wind and earthquake on high rise building, comparison of high rise structure systems.			
Used in Program / Level			
Program Name or requirement			Study Level
Construction Engineering & technologyProgram			4
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

CIV 413	Electrical & Mechanical Structures in Buildings		2 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	0	
Required SWL	125	Equivalent ECTS	5
Course Content			
Illumination Basic principles of light control, Lighting scheme and layout design, Artificial sources of light, Practical electrical wiring, Fire alarm systems, Air conditioning systems.			
Used in Program / Level			
Program Name or requirement			Study Level
Construction Engineering & technologyProgram			4
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

CIV 414	Design of Wall Bearing Structures		3 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
3	1	0	
Required SWL	125	Equivalent ECTS	5
Course Content			
Introduction: History of masonry, Masonry elements, Types of masonry construction, Analysis and design methods. Masonry materials: Masonry units, Mortar, Grout, Reinforcement. Masonry assemblages: Compression, Flexural, Shear in plane tensile strength. Reinforced beams and lintels: Flexural behavior and design, Shear behavior and design, Load distribution on lintel beams. Flexural walls: Load resisting mechanisms, Flexural behavior, Analysis and design of reinforced flexural walls. Load bearing walls under axial load and out of plane bending: Overview, Effects of bending on the capacity of walls, Effect of wall height, Interaction between axial load an bending, Linear elastic analysis of unreinforced and reinforced sections, Effects of slenderness, Moment magnification, Special provisions for slender reinforced walls.			
Used in Program / Level			
Program Name or requirement			Study Level
Construction Engineering & technologyProgram			4
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

E4.2 Properties, Testing and Resistance of Materials

CIV 121	Strength of materials & Testing (1)		3 CH
Prerequisites	BAS 022 - Physics (2)		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	1	
Required SWL	150	Equivalent ECTS	6
Course Content			
Scalar, vector, tensor quantities, dimensional analysis, introduction to mechanics of deformable bodies. Stress strain relations: elastic load deformation behavior of materials, elastic stress strain behavior of materials, thermal strain: strain in statically determinate problems, strain energy from normal stress, strain energy from shear stress, plastic stress, strain behavior of materials, energy theorems. Statically indeterminate stress systems: interaction of different stiffness components, restraint of thermal strain, elastic stability and buckling, analysis of stresses and deflection in simple structures under tension, compression, shear torsion, bending and impact. Testing of materials: destructive and non-destructive tests.			
Used in Program / Level			
Program Name or requirement			Study Level
Construction Engineering & technologyProgram			1
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
20%	**15%**	**15%**	**50%**
Exam Duration [Hours]	1 Hr	1 Hr	3 Hrs

CIV 122	Strength of materials & Testing (2)		3 CH
Prerequisites	CIV 121 - Strength of materials & Testing (1)		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	1	
Required SWL	125	Equivalent ECTS	6
Course Content			
The course aims to introduce the various materials used in construction and testing procedures including stone, bricks, concrete, metals, plastics, glass, rubber, paints, in addition to architectural products such as piping and fiber reinforced paneling.			
Used in Program / Level			
Program Name or requirement			Study Level
Construction Engineering & technologyProgram			1
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
20%	**15%**	**15%**	**50%**
Exam Duration [Hours]	1 Hr	1 Hr	3 Hrs

CIV 421	Inspection & Non Destructive Testing		3 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
3	1	0	
Required SWL	125	Equivalent ECTS	5
Course Content			
Basics of inspection, inspection before, during and after construction, report writing, aims of conducting harmless tests, testing surface rigidity, ultrasonic tests. Dye-penetrant test, magnetic field tests, method of electrical fields... etc.			
Used in Program / Level			
Program Name or requirement			Study Level
Construction Engineering & technologyProgram			4
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

CIV 422	Repair & Strengthening of Structures		2 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	0	
Required SWL	100	Equivalent ECTS	4
Course Content			
Causes of deterioration of concrete structures, Evaluation of concrete structures, Repair and strengthening materials (types, selection, handling), Bond between repair and strengthening materials and substrate concrete, Different repair and strengthening techniques, Protection and maintenance of concrete structures, Repair and strengthening of some concrete elements (footing, column, beam, slab... etc.), Structural analysis of repair and strengthening, Design of repair and strengthening, Case studies.			
Used in Program / Level			
Program Name or requirement			Study Level
Construction Engineering & technologyProgram			4
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

E4.3 Geotechnical Engineering & Foundations

CIV 232	Geotechnical Engineering		3 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	1	
Required SWL	150	Equivalent ECTS	6
Course Content			
Soil formation, Basic soil properties, subsurface exploration and sampling, Hydraulic soil properties, Stress distribution within soil masses, Settlement and consolidation, Shear strength of soil, Field tests.			
Used in Program / Level			
Program Name or requirement			Study Level
Construction Engineering & technologyProgram			2
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
20%	**15%**	**15%**	**50%**
Exam Duration [Hours]	1 Hr	1 Hr	3 Hrs

CIV 331	Foundation Engineering (1)		3 CH
Prerequisites	CIV 232 - Geotechnical Engineering		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
3	1	0	
Required SWL	150	Equivalent ECTS	6
Course Content			
Analysis and Design of Shallow Foundation: isolated and combined footings, Strip foundation, and Strap beams. Interaction of shallow foundations with elastic soil: Subgrade reaction model, Half-space model, Contact pressure distribution, and Settlement; Raft and Slab on grade. Deep foundations: Types, Classification of piles, bearing capacity of a single pile, settlement of a single pile, Pile load tests, design of pile caps, and laterally loaded piles.			
Used in Program / Level			
Program Name or requirement			Study Level
Construction Engineering & technologyProgram			3
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

CIV 332	Foundation Engineering (2)		3 CH
Prerequisites	CIV 331 - Foundation Engineering (1)		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
3	1	0	
Required SWL	150	Equivalent ECTS	6
Course Content			
Pile Group: bearing Capacity analysis, and settlement analysis. Micro-piles design for historical buildings. Supported Deep Excavation: Types of in-situ walls, Analysis and design of in-situ walls, Struts and tiebacks, Waling beams, and Braced supported excavation. Tunneling Construction of tunnels, Analysis of lining, and Calculation of settlement. Earth embankments: Classification, Empirical dimensioning, Analysis and Design, Construction control and In-situ measurements.			
Used in Program / Level			
Program Name or requirement			Study Level
Construction Engineering & technologyProgram			3
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

CIV 333	Ground Improvement		3 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
3	1	0	
Required SWL	125	Equivalent ECTS	5
Course Content			
Factors affecting soil improvement, mechanical stabilization (densification), drainage, grouting, soil reinforcement, ground freezing, criteria for choosing suitable technique for soil improvement.			
Used in Program / Level			
Program Name or requirement			Study Level
Construction Engineering & technologyProgram			3
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

CIV 431	Soil Mechanics		3 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
3	1	0	
Required SWL	125	Equivalent ECTS	5
Course Content			
Introduction to geotechnical engineering, earth crust, soil and rock, minerals, soil formation. Index properties and classification of soils. Weight-volume relation- ships. Soil structures. Moisture-density relation- ships. Hydraulic soil properties and permeability. Principle of total and effective stresses. Stress distribution due to external loads and analysis of total settlements. Outline of theory of consolidation. Shear strength of soil.			
Used in Program / Level			
Program Name or requirement			Study Level
Construction Engineering & technologyProgram			4
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

CIV 432	In-Site Testing & Construction Technologies of Foundations		3 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
3	1	0	
Required SWL	125	Equivalent ECTS	5
Course Content			
Geotechnical in-site test, Construction technologies of piles, Construction technologies of in-site walls, Construction of foundations for bridges, Underpinning of structures, Interaction between design and construction of foundation systems.			
Used in Program / Level			
Program Name or requirement			Study Level
Construction Engineering & technologyProgram			4
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

E4.4 Construction Engineering & technology& Project management

CIV 141	Architecture and Construction		2 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	0	
Required SWL	100	Equivalent ECTS	4
Course Content			
Full understanding of building construction process and related technologies: Study methods of building construction systems and bearing walls construction systems, skeleton construction, and different process of building. Loads on Buildings, Load Resistance, The Structural Properties of Materials, Structural systems, Thermal Properties of Materials, Fire - Related Properties, and Principles of Sustainable Construction. Materials and systems of construction: The Material Steel and Structural Steel Construction, Lime, Portland Cement and Concrete, Concrete Construction, Soils; Foundation and basement Construction, Masonry Materials, Roofing, Stairs, Floors Coverings.			
Used in Program / Level			
Program Name or requirement			Study Level
Construction Engineering & technologyProgram			1
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

CIV 242	Legislation & contracts		2 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	0	
Required SWL	100	Equivalent ECTS	4
Course Content			
The program aims to furnish legal orientations for engineers of all fields to clarify their responsibilities and rights within the triangular relation between: engineer, client and contractor, that will be fulfilled through: demonstration of laws and legislations concerning engineering works, this will be carried on theoretically and with applied examples, provision of essential references as: engineers syndicate, contractors, low of urban planning, laws of buildings legislations, street occupations, land real state divisions, agrarian land protection, river transportation, traffic (urban and outskirts), industrial safety and security, fire, lifts, new agglomerations, environmental protection against pollution, work, insurance against fire, accidents, crisis, law of investment, irrigation and river banks, relation between the owner and the tenant, job laws, industries union.			
Used in Program / Level			
Program Name or requirement			Study Level
Construction Engineering & technologyProgram			2
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

CIV 341	Project Management		2 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	0	
Required SWL	100	Equivalent ECTS	4
Course Content			
Definitions used in project management, The project life cycle, Project stages, Relationships and responsibilities of the Different project parties, Work Breakdown Structure (WBS) and Linear responsibility Chart (LRC), Project Scheduling, Network planning: Activity on arrow, Activity on node, CPM, PERT, Progress monitoring, Project crashing, Progress curves, Resource allocation and levelling. Project productivity, Quality management.			
Used in Program / Level			
Program Name or requirement			Study Level
Construction Engineering & technologyProgram			3
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

CIV 342	Methods & Equipment's for Construction		3 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
3	1	0	
Required SWL	125	Equivalent ECTS	5
Course Content			
Introduction to field operations of construction engineering. Construction methods and practice, productivity improvement, tools and equipment selection. Site layout formwork, erection of concrete and steel structures. Selection, sizing, matching and operation of construction, equipment for earthwork/ground preparation. Materials production handling and erection of structures.			
Used in Program / Level			
Program Name or requirement			Study Level
Construction Engineering & technologyProgram			3
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

CIV 441	Construction Engineering		2 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	0	
Required SWL	100	Equivalent ECTS	4
Course Content			
The major factors involved in heavy and building construction projects. The material is presented from the point of view of a field engineer with several assignments to illustrate the production planning required for construction projects. Course outline: Operational planning assignment; Project plans and specification; Earthwork fundamentals and calculations; Equipment production fundamentals; Tractors, Dozers, Rippers, Scarpers, Haulers, Loaders, Excavators; Aggregate production systems; Conveying systems; Formwork; Concrete pumps.			
Used in Program / Level			
Program Name or requirement			Study Level
Construction Engineering & technologyProgram			4
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

CIV 442	Construction Planning & Control		2 CH
Prerequisites	CIV 341 - Project Management		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	0	
Required SWL	100	Equivalent ECTS	4
Course Content			
A study of planning process and fundamental management procedures for construction projects. Special attention will be given to planning of methods and resources, use of Critical Path techniques and PERT, managing cash flow and costs, overall project administration and record keeping, plus some company level planning functions. Topic Covered: Basics of project management; Strategic Planning; Organizational planning; Construction Project Planning; I - J CPM diagramming; Float Calculations and interpretation; Schedule overlapping work item; Resource Planning for construction; Project Resource analysis; Activity Utility Curves; CPM Network Compression; PERT; Project Funds Flow Analysis; Project Cost Control.			
Used in Program / Level			
Program Name or requirement			Study Level
Construction Engineering & technologyProgram			4
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

CIV 443	Decision Making & Risk Analysis		3 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
3	1	0	
Required SWL	125	Equivalent ECTS	5
Course Content			
How to manage risks in construction and this will help them making their right decisions. Course outline: Risk definitions, Risk and Value Management, Qualitative and Quantitative Methods for Risk Analysis, Risk allocation in contracting and procurement, managing Financial Risks in major construction projects.			
Used in Program / Level			
Program Name or requirement			Study Level
Construction Engineering & technologyProgram			4
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

CIV 444	Quality Control & Assurance		3 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
3	1	0	
Required SWL	125	Equivalent ECTS	5
Course Content			
Technical inspection, steps of controlling quality, components of ensuring guarantee, Statistical control of types of concrete, application on using software in quality control.			
Used in Program / Level			
Program Name or requirement			Study Level
Construction Engineering & technologyProgram			4
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

CIV 445	Reliability & Fire Safety of R.C. Structures		3 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
3	1	0	
Required SWL	125	Equivalent ECTS	5
Course Content			
Basics of fires, Mechanism of fire and explosions, Calculating the failure of concrete structures due to the outbreak of fire. Fundamentals of fire protection design, failure mode of materials under the effect of fire, calculating the maximum strength of structural elements subjected to fire. Stresses in building after fire outbreak and methods of repairs.			
Used in Program / Level			
Program Name or requirement			Study Level
Construction Engineering & technologyProgram			4
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

E4.5 Highways

CIV 351	Highway & Traffic Engineering		2 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	0	
Required SWL	100	Equivalent ECTS	4
Course Content			
Highway functions and classifications, Traffic characteristics, Geometric design controls and criteria, Sight distances, Horizontal alignment, Vertical alignment, Cross section elements, Materials characterization, Stresses in flexible pavements, Stresses in concrete rigid pavements, Structural design of flexible pavements, Structural design of concrete rigid pavements, Structural design of industrial pavements and bridge decks.			
Used in Program / Level			
Program Name or requirement			Study Level
Construction Engineering & technologyProgram			3
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

CIV 352	Railway Engineering		3 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
3	1	0	
Required SWL	125	Equivalent ECTS	5
Course Content			
Railway dynamics: Tractive effort and resistance, Acceleration and braking, Line capacity. Railway alignment: Longitudinal and cross sections, Railway path, Vertical and horizontal curve design, Gaparite, cumulative curve. Structural design of track: Wheel rail interaction, forces acting on the rail, joined and welded rail design, sleeper and ballast design, Unballasted track and magnetic levitation train, turnouts, stations and signals, Renewal and maintenance.			
Used in Program / Level			
Program Name or requirement			Study Level
Construction Engineering & technologyProgram			3
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

E4.6 Surveying & Drawing

CIV 161	Civil Drawing			2 CH
Prerequisites				
Number of weekly Contact Hours				
Lecture	Tutorial	Laboratory		
0	4	0		
Required SWL	100	Equivalent ECTS	5	
Course Content				
Irrigation Works: Introduction to Irrigation works, Earthworks (Open Channels cross sections and projections/ changes in Bed, Berm, and Bank levels / Rotation and ends of canals), Retaining walls and abutments (types and its relationship with earth), Water structures (Crossing works, Heading up works, Canal ends works). Steel structures: Introduction to steel structures, Steel sections, Bases and columns, Beams and Girders, steel bridge connections.				
Used in Program / Level				
Program Name or requirement		Study Level		
Construction Engineering & technologyProgram		1		
Assessment Criteria				
Student Activities	Mid-Term Exam	Practical Exam	Final Exam	
30%	**20%**		**50%**	
Exam Duration [Hours]	1 Hr		3 Hrs	

CIV 162	Engineering Surveying (1)			3 CH
Prerequisites	BAS 012 - Mathematics (2)			
Number of weekly Contact Hours				
Lecture	Tutorial	Laboratory		
2	1	1		
Required SWL	150	Equivalent ECTS	5	
Course Content				
Introduction to surveying science: Historical background, definitions and branches of surveying science. Introduction to national and international mapping system, linear measurements, electronic distance measurements, angular measurements, computation of coordinates, traverse (measurements, calculations, adjustments and drawing), coordinate calculations, two dimensional coordinate transformation, area calculations (regular and irregular parcel shapes) by using analytical, mechanical and graphical methods, parcel division techniques, kinds and types of errors in surveying measurement, introduction to theory of errors.				
Used in Program / Level				
Program Name or requirement		Study Level		
Construction Engineering & technologyProgram		1		
Assessment Criteria				
Student Activities	Mid-Term Exam	Practical Exam	Final Exam	
20%	**15%**	**15%**	**50%**	
Exam Duration [Hours]	1 Hr	1 Hr	3 Hrs	

CIV 163	Engineering Surveying (2)		3 CH
Prerequisites	CIV 162 - Engineering Surveying (1)		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	1	
Required SWL	125	Equivalent ECTS	5
Course Content			
Introduction to vertical control, different methods for height difference determination, ordinary levelling, survey level and survey staff. Calculation of ordinary levelling, Precise level. Calculations of precise levelling. Indirect methods for height difference determination, Tachometry, Trigonometric levelling, Earth curvature and refraction and their effects on height differences. Applications of levelling, longitudinal levelling cross section levelling, grid levelling, contour lines, topographic maps, volume computations and earth work.			
Used in Program / Level			
Program Name or requirement		Study Level	
Construction Engineering & technologyProgram		1	
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
20%	**15%**	**15%**	**50%**
Exam Duration [Hours]	1 Hr	1 Hr	3 Hrs

CIV 461	Maps, GIS & Remote Sensing		3 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
3	1	0	
Required SWL	125	Equivalent ECTS	5
Course Content			
Principles of GIS: Maps, scale, GIS origins, the development of GIS, map decomposition, map algebra, current GIS market estimates, future market projections and trends; GIS Data, Point, line, and polygon data. Raster, vector and voxel data; Database structures, Data types, continuous, ordinal and discrete data. Integrating different data structures and data types, General Overview of GIS Capabilities and Functions. Data collection, management, manipulation, analysis, display and visualization, Components of GIS Systems, Software, operating systems, hardware, peripherals, data, people, management, infrastructure; Data Types and Data Sources, Raster, vector, point data sources. Government sources (USGS, etc.) Commercial sources, Sources of international data, remote sensing data sources, GIS Data, GIS digitizing. Digitizing paper map data. Incorporating existing database information, Incorporating GPS data, GIS Resources, Remote Sensing and GIS, Incorporation of remote sensing data into GIS, Remote sensing data types and sources, issues of incorporating and processing raster remote sensing data with vector GIS, GPS and GIS, Incorporation of GPS and other telemetry data into GIS. GPS, Golan's, Argos, and other data types and sources, issues of incorporating and processing point and time data within the GIS environment, Visualization and Simulation, The role of visualization and simulation technologies in GIS Practical Issues in successfully and productively using these technologies.			
Used in Program / Level			
Program Name or requirement		Study Level	
Construction Engineering & technologyProgram		4	
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

E4.7 Sanitary & Environment

CIV 271	Environmental Engineering		3 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
3	1	0	
Required SWL	150	Equivalent ECTS	6
Course Content			
Introduction, Mass and Energy Fundamentals, Physical Chemistry and Principles, Organic Chemistry, Microbiology & Microbial Growth, Erosion Control and Storm water Management, Water Quality, Water Treatment, Wastewater Treatment, Solid Waste, Hazardous Waste, Air Pollution, Global Events.			
Used in Program / Level			
Program Name or requirement			Study Level
Construction Engineering & technologyProgram			2
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

CIV 371	Sanitary Engineering		3 CH
Prerequisites	CIV 282 - Hydraulics		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
3	1	0	
Required SWL	125	Equivalent ECTS	5
Course Content			
Preliminary studies for water supply and sewerage projects, sources of water, water quality and standards, design flow rates, water collection, water pumping and transportation works, water storage, water distribution networks, wastewater collection networks, hydraulic design, pump stations, force mains, pipe materials, network accessories. Design of water treatment plants using conventional processes, Design of wastewater treatment plants using conventional processes, sludge treatment.			
Used in Program / Level			
Program Name or requirement			Study Level
Construction Engineering & technologyProgram			3
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

E4.8 Irrigation & Hydraulics

CIV 281	Fluid Mechanics		3 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	1	
Required SWL	150	Equivalent ECTS	6
Course Content			
Review of fluid properties: Definition, Characteristics of mass and weight, Viscosity, Vapor pressure, Surface tension, Compressibility. Fluid statics: Pressure, Pressure at a point, Pressure variation, Pressure transmission in fluids, Pressure measurements, Forces on plane and curved surfaces, Fluid masses subject to acceleration, Forced vortex, Buoyancy, and floatation. Fluid Dynamics: Fundamentals of fluid flow, Classification of fluid flow, Continuity equation, Flow of ideal fluids, Euler's equation, Bernoulli's equation, flow of real fluids, Energy equation, T.E.L. and H.G.L. Applications of Bernoulli's equation.			
Used in Program / Level			
Program Name or requirement		Study Level	
Construction Engineering & technologyProgram		2	
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
20%	**15%**	**15%**	**50%**
Exam Duration [Hours]	1 Hr	1 Hr	3 Hrs

CIV 282	Hydraulics		3 CH
Prerequisites	CIV 281 - Fluid Mechanics		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	1	
Required SWL	150	Equivalent ECTS	6
Course Content			
Pipe networks: Analysis, Design and optimal design. Water hammer in pipes: Unsteady flow equations, Rigid water hammer theory, Elastic water hammer theory, Wave celerity, Water hammer effects and control. Dimensional analysis and Similitude. Hydraulic machines: Introduction, Types of pumps, System characteristics, Pump characteristics and performance, Operation of pumps, Pump selection, Multiple pump system, Cavitation phenomena. Open channel flow: Introduction, Types of open channel flow, States of open channel flow, Geometric elements of channel sections, Velocity distribution in open channels. Equations for uniform steady flow in open channels, Factors affecting Roughness coefficient, Design of open channels sections, Energy equation in open channels, Specific energy, Specific discharge, Applications of the specific energy, Specific force, Specific force diagram, Rapidly varied flow, Gradually varied flow, Methods of computation for gradually varied flow.			
Used in Program / Level			
Program Name or requirement		Study Level	
Construction Engineering & technologyProgram		2	
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
20%	**15%**	**15%**	**50%**
Exam Duration [Hours]	1 Hr	1 Hr	3 Hrs

CIV 381	Irrigation and Drainage Engineering		2 CH
Prerequisites	CIV 282 - Hydraulics		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	0	
Required SWL	100	Equivalent ECTS	4
Course Content			
Soil-plant-water relationships. Determination of plant water consumption. Fundamentals of irrigation and drainage engineering. Planning and design of farm irrigation systems: Surface irrigation system, Pipe irrigation system, Sprinkler irrigation system, Trickle irrigation system. Flow measurements and pump selection and operation. Subsurface flow of free drainage water. Planning and design of drainage systems: Open drainage system, Tile drainage system. Functions of Irrigation and Drainage structures.			
Used in Program / Level			
Program Name or requirement			Study Level
Construction Engineering & technologyProgram			3
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
30%	**20%**		**50%**
Exam Duration [Hours]	1 Hr		3 Hrs

E4.9 Project & selected Topics

CIV 491	Construction Graduation Project (1)		4 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
3	2	0	
Required SWL	150	Equivalent ECTS	6
Course Content			
This course represents the first part of the graduation project, where the students work in the graduation projects under the supervision of institute members.			
Used in Program / Level			
Program Name or requirement			Study Level
Construction Engineering & technologyProgram			4
Assessment Criteria			
Term Work	Mid-Term Exam	Final Thesis	Final Presentation
40%		**20%**	**40%**
Exam Duration [Hours]			

CIV 492	Construction Graduation Project (2)		4 CH
Prerequisites	CIV 491 - Construction Graduation Project (1)		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
3	2	0	
Required SWL	150	Equivalent ECTS	6
Course Content			
As a continuation of the first part of the graduation project, the students continue work in the graduation projects under the supervision of institute members.			
Used in Program / Level			
Program Name or requirement			Study Level
Construction Engineering & technologyProgram			4
Assessment Criteria			
Term Work	Mid-Term Exam	Final Thesis	Final Presentation
40%		**20%**	**40%**
Exam Duration [Hours]			

E5. Courses of Architectural Engineering Department (ARC)

The Architectural Engineering Department is responsible for the teaching of Architectural Engineering courses for all Programs.

#	Specialization
1	Architectural Design
2	Building Technologies
3	Environmental Design
4	Urban Planning
5	Project Management

Table 34 List of specializations at the Architectural Engineering Department.

The following abbreviations are the legend for the courses table.

Lvl	Level
CH	Credit Hour
ECTS	European Credit Transfer System
SWL	Student Work Load
Lec	Lectures
Tut	Tutorials
Lab	Laboratory
TT	Total
CR	Cultural Requirement
IR	Institute Requirement
DR	Discipline Requirement
PR	Program Requirement
SA	Student Activities
MT	Mid-Term Exam
PE	Practical Exam
FE	Final Exam

#	Lvl	Code	Course Title	Credits and SWL			Contact Hours				Classification				Assessment (%)				Prerequis-tes
				CH	ECTS	SWL	Lec	Tut	Lab	TT	CR	IR	DR	PR	SA	MT	PE	FE	
E.6.1. Architectural Design																			
1	1	ARC111	Principles of Architecture Design Studio	5	8	200	2	7	0	9			x		50	10	0	40	
2		ARC112	Architecture Design Studio (1)	5	8	200	2	7	0	9			x		50	10	0	40	ARC111
3		ARC113	History & Theories of Architecture (1)	2	4	100	2	1	0	3			x		50	10	0	40	
4		ARC114	History & Theories of Architecture (2)	2	4	100	2	1	0	3			x		50	10	0	40	ARC 113
5		ARC115	Arts and Architecture	2	4	100	2	1	0	3	x				50	10	0	40	

#	Lvl	Code	Course Title	Credits and SWL			Contact Hours				Classification				Assessment (%)				Prerequis-tes
				CH	ECTS	SWL	Lec	Tut	Lab	TT	CR	IR	DR	PR	SA	MT	PE	FE	
6	2	ARC211	Architecture Design Studio (2)	5	8	200	2	7	0	9			x		50	10	0	40	ARC 112
7		ARC212	Architecture Design Studio (3)	5	8	200	2	6	0	8			x		50	10	0	40	ARC 211
8		ARC213	Architectural Digital Representation	2	4	100	2	1	0	3			x		50	10	0	40	
9	3	ARC311	Architecture Design Studio (4)	5	8	200	2	6	0	8			x		50	10	0	40	ARC 212
10		ARC312	Architecture Design Studio (5)	5	8	200	2	7	0	9			x		50	10	0	40	ARC311
11		ARC313	Architectural Criticism and Project Evaluation	2	4	100	2	1	0	3			x		50	10	0	40	
12		ARC314	Architectural Representation	2	4	100	2	1	0	3			x		50	10	0	40	
13		ARC315	Visual Space Information in Architecture	2	4	100	2	1	0	3			x		50	10	0	40	
14		ARC316	Ergonomics and Interior Design Principles	2	4	100	2	1	0	3			x		50	10	0	40	
15	4	ARC411	Architectural Graduation Project (1)	5	8	200	2	7	0	9			x		40	10	10	40	HUM 171 HUM 172 ARC 312
16		ARC412	Architectural Graduation Project (2)	5	14	350	2	7	0	9			x		40	10	10	40	ARC 411 ARC 451
17		ARC413	Human Aspects in Architecture	2	4	100	2	1	0	3			x		50	10	0	40	
E.6.2. Building Technologies																			
18	1	ARC121	Building Construction (1)	2	4	100	2	1	0	3			x		50	10	0	40	
19		ARC122	Building Construction (2)	2	4	100	2	1	0	3			x		50	10	0	40	ARC 121
20	2	ARC221	Building Construction (3)	2	5	125	2	1	0	3			x		50	10	0	40	ARC 122
21		ARC222	Technical Installations	2	4	100	2	1	0	3			x		50	10	0	40	ARC 122
22		ARC223	Working Design (1)	3	6	150	2	2	0	4			x		50	10	0	40	ARC 221 ARC 222
23		ARC224	Field Studies	2	4	100	2	1	0	3			x		50	10	0	40	
24		ARC225	Construction Technology	2	4	100	2	1	0	3			x		50	10	0	40	
25		ARC226	Site Analysis	2	4	100	2	1	0	3			x		50	10	0	40	
26	3	ARC321	Working Design (2)	3	6	150	2	2	0	4			x		50	10	0	40	ARC 223
27		ARC322	Working Design (3)	3	6	150	2	2	0	4			x		50	10	0	40	ARC 321
28		ARC323	Advanced Technical Installation	2	4	100	2	1	0	3			x		50	10	0	40	
29		ARC324	Plumbing Engineering	2	4	100	2	1	0	3			x		50	10	0	40	
30		ARC325	Building Information Modeling (BIM)	2	4	100	2	1	0	3			x		50	10	0	40	

لائحة الساعات المعتمدة لبرامج الدراسة لمرحلة البكالوريوس

#	Lvl	Code	Course Title	Credits and SWL			Contact Hours				Classification				Assessment (%)				Prerequis-tes
				CH	ECTS	SWL	Lec	Tut	Lab	TT	CR	IR	DR	PR	SA	MT	PE	FE	
E.6.3. Environmental Design																			
31	3	ARC331	Environmental Control	2	4	100	2	1	0	3			x		50	10	0	40	
32		ARC332	Environmental Impact Assessment	2	4	100	2	1	0	3			x		50	10	0	40	ARC 331
33	4	ARC431	Maintenance of Buildings	3	5	125	2	2	0	4			x		50	10	0	40	
34		ARC432	Green Maintenance of Buildings	3	4	100	2	2	0	4			x		50	10	0	40	ARC 431
35		ARC433	Renewable Energy and Building	2	4	100	2	1	0	3			x		50	10	0	40	
36		ARC434	Computer Application in Environmental Engineering	2	4	100	2	1	0	3			x		50	10	0	40	
37		ARC435	Sustainable Development	2	4	100	2	1	0	3			x		50	10	0	40	
38		ARC436	Green Architecture	2	4	100	2	1	0	3			x		50	10	0	40	
39		ARC437	Daylight and Thermal Performance	2	4	100	2	1	0	3			x		50	10	0	40	
40		ARC438	Smart Technique in Architecture	2	4	100	2	1	0	3			x		50	10	0	40	
E.6.4. Urban Planning																			
41	2	ARC241	Regional and Urban Planning	3	4	100	2	2	0	4			x		50	10	0	40	
42	3	ARC341	Smart City Planning	3	4	100	2	2	0	4			x		50	10	0	40	ARC 241
43		ARC342	Urban Design	2	4	100	2	1	0	3			x		50	10	0	40	ARC 341
44	4	ARC441	Urban Upgrading	2	5	125	2	1	0	3			x		50	10	0	40	ARC 342
45		ARC442	City Planning History	2	4	100	2	1	0	3			x		50	10	0	40	
46		ARC443	Geographic Information Systems (GIS) Principles	2	3	75	2	1	0	3			x		50	10	0	40	
47		ARC444	Urban and Architecture Heritage	2	4	100	2	1	0	3			x		50	10	0	40	
48		ARC445	Housing in Smart Cities	2	3	75	2	1	0	3			x		50	10	0	40	
49		ARC446	Landscaping	2	3	75	2	1	0	3			x		50	10	0	40	
E.6.5. Project Management																			
50	4	ARC451	Report Writing	2	4	100	2	1	0	3			x		50	10	0	40	ARC 322
51		ARC452	Items Specifications and BOQs	2	4	100	2	1	0	3			x		50	10	0	40	
52		ARC453	Financial Resource Management	2	3	75	2	1	0	3			x		50	10	0	40	
53		ARC454	Architectural Project Management	2	3	75	2	1	0	3			x		50	10	0	40	
54		ARC455	Feasibility Studies	2	3	75	2	1	0	3			x		50	10	0	40	
55		ARC456	Architectural Laws and Legislation	2	3	75	2	1	0	3			x		50	10	0	40	

#	Lvl	Code	Course Title	Credits and SWL			Contact Hours				Classification				Assessment (%)				Prerequis-tes
				CH	ECTS	SWL	Lec	Tut	Lab	TT	CR	IR	DR	PR	SA	MT	PE	FE	
56		ARC457	Meaning in Architecture	2	3	75	2	1	0	3			x		50	10	0	40	
57		ARC458	Land Management	2	3	75	2	1	0	3			x		50	10	0	40	

Table 35 List of Architectural Engineering *Program courses*

E5. 1. Architectural Design Courses

ARC 111	**Principles of Architecture Design Studio**		**5 CH**
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial		Laboratory
2	7		0
Required SWL	200	Equivalent ECTS	8
Course Content			
principles of graphic communication, model-making techniques, using design tool, design fundamentals, experiment and explore conceptual, formal, and spatial aspects of architecture, basic skills, ideas and techniques through simple design exercises, framework of the design process.			
Used in Program / Level			
Program Name or requirement			Study Level
Architectural Engineering Program Requirement			1
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
50%	**10%**	**0%**	**40%**
Exam Duration [Hours]	3 Hr	0 Hr	5 Hrs

ARC 112	Architecture Design Studio (1)		5 CH
Prerequisites	ARC 111		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	7		
Required SWL	200	Equivalent ECTS	8
Course Content			
Develop more skills and build confidence to be more creative, design studio, introduces perception of architectural spaces, design small scale projects with simple spatial requirements involving concepts of design, ideas and imagination, introduced basic design concerns of circulation, orientation, spatial compositions and structure, Examples of selected projects would be private residences, kinder gardens, activity centers, libraries for children, and simple service buildings in public places.			
Used in Program / Level			
Program Name or requirement			Study Level
Architectural Engineering Program Requirement			1
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
50%	**10%**	**0%**	**40%**
Exam Duration [Hours]	3 Hr	0 Hr	5 Hr

ARC 113	History & Theories of Architecture (1)		2 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	0	
Required SWL	100	Equivalent ECTS	4
Course Content			
Elaborating the relation between the architectural concept and the philosophy of design in different ages, study effects of physical, cultural, natural and constructional possibilities on the different architectural elements, study of art and architecture for different ancient eras: Ancient Egyptian, West Asiatic and Mesopotamia, Babylonian, Assyrian, Persian, Greek, Roman, the early Christian and byzantine period.			
Used in Program / Level			
Program Name or requirement			Study Level
Architectural Engineering Program Requirement			1
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
50%	**10%**	**0%**	**40%**
Exam Duration [Hours]	3 Hr	0 Hr	3 Hr

ARC 114	History & Theories of Architecture (2)		2 CH
Prerequisites	ARC113		
Number of weekly Contact Hours			
Lecture	Tutorial		Laboratory
2	1		0
Required SWL	100	Equivalent ECTS	4
Course Content			
Exploring history of arts and architecture in two different eras through two modules, First Module: investigating the meaning, principles, development of the Islamic art, architecture in a chronological order in the Islamic world in Egypt, clarifying the impact of the different political, economic, cultural, environmental factors on the architectural space, study elements through different periods and typologies. Second Module: investigating architecture in Western Europe from Romanesque architecture, in nineteenth century Neoclassical architecture, knowing concepts influencing architectural characteristics, relationship to the cultural context, including philosophical, religious, political, economic, environmental factors, focuses on a series of art movements, artists contributing to modern art evolution, A chronological study from twentieth century onwards. Knowing the movements of concepts, ideas, media, techniques, influences, social, cultural relevance.			
Used in Program / Level			
Program Name or requirement			Study Level
Architectural Engineering Program Requirement			1
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
50%	**10%**	**0%**	**40%**
Exam Duration [Hours]	3 Hr	0 Hr	3 Hr

ARC 115	Arts and Architecture		2 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial		Laboratory
3	1		0
Required SWL	100	Equivalent ECTS	4
Course Content			
Clarify the relation between the arts, architectural concept, philosophy of design in different ages. Focusing on the effects of physical, cultural, natural, constructional possibilities on the different architectural elements, Making a comparative analytical study of art and architecture for different old cultures.			
Used in Program / Level			
Program Name or requirement			Study Level
Architectural Engineering Program Requirement			4
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
50%	**10%**	**0%**	**40%**
Exam Duration [Hours]	3 Hr	0 Hr	3 Hr

ARC 211	Architecture Design Studio (2)		5 CH
Prerequisites	ARC 112		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	7		
Required SWL	200	Equivalent ECTS	8
Course Content			
Developing a public project of a cultural, recreational, or institutional building of a complex program, circulation and construction systems, applying specified codes on selected office buildings, museums, libraries, hospitals ... etc.			
Used in Program / Level			
Program Name or requirement			Study Level
Architectural Engineering Program Requirement			2
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
50%	**10%**	**0%**	**40%**
Exam Duration [Hours]	3 Hr	0 Hr	5 Hr

ARC 212	Architecture Design Studio (3)		5CH
Prerequisites	ARC 211		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	6		
Required SWL	200	Equivalent ECTS	8
Course Content			
Exercising an architectural multi story residential building situated in an urban complex, fundamentals of urban context, knowing its relationship with the built environment, design studio includind the perception of architectural spaces, design large scale projects with complex spatial requirements, involving concepts of design, ideas and imagination, introducing to multiple concerns of vertical and horizontal circulation, orientation, spatial compositions and structure, design of a residential multi story building in urban context with certain potentials and limitations.			
Used in Program / Level			
Program Name or requirement			Study Level
Architectural Engineering Program Requirement			2
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
50%	**10%**	**0%**	**40%**
Exam Duration [Hours]	3 Hr	0 Hr	5 Hr

ARC 213	Architectural Digital Representation		2 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1		
Required SWL	100	Equivalent ECTS	4
Course Content			
Computer modelling applications in architectural design, developing the concepts in two and three-dimensional drawings, using a chosen program based on the needs of the current architecture job market, using design tools for the creative development of projects and communication with clients and consultants, knowing of different disciplines in architectural practice.			
Used in Program / Level			
Program Name or requirement			Study Level
Architectural Engineering Program Requirement			2
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
50%	**10%**	**0%**	**40%**
Exam Duration [Hours]	3 Hr	0 Hr	3 Hr

ARC 311	Architecture Design Studio (4)		5 CH
Prerequisites	ARC 212		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	6	0	
Required SWL	200	Equivalent ECTS	8
Course Content			
Viewing a form of creative and comprehensive investigation, demonstrating through a rigorous process, production of architectural models and graphic documentation, informing of contextual, formal, cultural, theoretical, technological, practical and historical issues, addressing local issues related to community design, development in-terms of education, culture, work, health and residence, emphasizing the synthesis of complex, mixed-use and multi-story buildings within variety of urban contexts, developing the design brief and program based on micro and macro site studies, considering functional, administrative requirements of the community needs, availability, appropriateness and sustainable development, interpreting the context, design of a building can be inspired by the physical, environmental, cultural, and historical characteristics of its site as much as the building's functional needs.			
Used in Program / Level			
Program Name or requirement		Study Level	
Architectural Engineering Program Requirement		3	
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
50%	**10%**	**0%**	**40%**
Exam Duration [Hours]	3 Hr	0 Hr	5 Hr

ARC 312	Architecture Design Studio (5)		5 CH
Prerequisites	ARC 311		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	7	0	
Required SWL	200	Equivalent ECTS	8
Course Content			
Studio on form, space and composition, "Outside-in" approach to architecture, The architectural form and its composition, The compositional aspects of spatial design- expression, language, intent, dynamics etc, and their use as tools of concept and functional accommodation, Three-dimensional models and design development, Spatial approach to design, Meaning, message and symbolism, Work with architectural precedents through analysis of various works of architects, Contemporary design theory as a premise for design.			
Used in Program / Level			
Program Name or requirement			Study Level
Architectural Engineering Program Requirement			3
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
50%	**10%**	**0%**	**40%**
Exam Duration [Hours]	3 Hr	0 Hr	5 Hr

ARC 313	Architectural Criticism and Project Evaluation		2 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	0	
Required SWL	100	Equivalent ECTS	4
Course Content			
Emphasizing the multiplicity of architectural thinking, introducing the theoretical approaches of contemporary architectural thoughts, discussing concepts of integration and comprehensiveness in architectural solutions, Principles of architectural criticism and techniques of evaluating projects are discussed.			
Used in Program / Level			
Program Name or requirement			Study Level
Architectural Engineering Program Requirement			3
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
50%	**10%**	**0%**	**40%**
Exam Duration [Hours]	3 Hr	0 Hr	3 Hr

ARC 314	Architectural Representation		2 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	0	
Required SWL	100	Equivalent ECTS	4

Course Content

Visual perception develops tools of visual analysis and interpretation, Knowing topics ranging through three main sectors, Sector one including Freehand Sketching and Perspective, Understanding the art of perceiving different shapes and forms in environment and interpretation of proportions, Developing Free-hand sketching skills using pencils as a media, introduction to shade and shadow and perspective viewing of basic geometric forms, Sector two including Science and Theory of Color, the development of an awareness of the science of color, This theme explores the properties, composition, and interaction of colors as related to architecture, opensing up new dimensions of colors as a presentation media in art and through architectural applications. Sector three including Composition and Creativity, development of creativity, perception, drawing and composition skills to express the students' thoughts and ideas, providing artistic activities that allow the student to express his skills, thoughts and creativity freely and also to learn about art sketching, abstraction and perception in architecture.

Used in Program / Level

Program Name or requirement	Study Level
Architectural Engineering Program Requirement	3

Assessment Criteria

Student Activities	Mid-Term Exam	Practical Exam	Final Exam
50%	**10%**	**0%**	**40%**
Exam Duration [Hours]	3 Hr	0 Hr	3 Hr

ARC 315	Visual Space Information in Architecture		2 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	0	
Required SWL	100	Equivalent ECTS	4
Course Content			
Introducing key in the history of architectural visualization, variety of geographic and cultural contexts across the "long" twentieth century, with close attention paid to housing, The approach is thematic, follows a loose chronology built around concepts, problems, and practices associated with international modernism and its aftermath, observing architectural knowledge being constructed, drawings and buildings interacting, and ideas, techniques, and imagery circulating, consides a specific set of techniques within the history and theory of modern and contemporary architecture, the history of technology, and theories and practices of visualization, A limited number of drawings, models, photographs, and other visual artifacts will be analyzed in depth, Some readings situate these examples historically, while others offer conceptual orientation, a historical perspective that reframes concerns shared among different aspects of the GSAPP architecture curriculum, including the design studios, visual studies, and the technology sequence, The history of architectural visualization is also a history of globalization. Architectural discourse and techniques move constantly across a variety of national, cultural, and geographic boundaries, both historically and in the present, emphasizing problems and effects of visual translation, standardization, reproduction, interface, transformation, site, and circulation that accompany this movement			
Used in Program / Level			
Program Name or requirement			Study Level
Architectural Engineering Program Requirement			3
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
50%	**10%**	**0%**	**40%**
Exam Duration [Hours]	3 Hr	0 Hr	3 Hr

ARC 316	Ergonomics and Interior Design Principles		2 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	0	
Required SWL	100	Equivalent ECTS	4
Course Content			
Developing a detailed understanding of the profession of interior design, providing an overview of interior design principles and concepts, including perspective, colour theory, design aesthetic, and presentation methods, introducing interior space elements through project-based activities (walls, ceilings, floors, windows, doors, furniture and accessories), focusing on the stages of concept development, presentation toward the goal of creating a beginning interior design portfolio.			
Used in Program / Level			
Program Name or requirement			Study Level
Architectural Engineering Program Requirement			3
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
50%	**10%**	**0%**	**40%**
Exam Duration [Hours]	3 Hr	0 Hr	3 Hr

ARC 411	Architectural Graduation Project (1)		5 CH
Prerequisites	HUM 171, HUM 172, ARC 312		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	7	0	
Required SWL	200	Equivalent ECTS	8
Course Content			
Still working as individual group to foster team spirit and exchange of knowledge, the studio addresses themes of a local and global, physical and conceptual nature such as climatic change, densification, tacit knowledge, co-working spaces, democracy/ public participation, justice, identity. Selecting one of those themes the studio proposes variety of urban settings as well as a preliminary program that suits the proposed theme, selecting an urban setting and then investigates the implications of both the context and the theme for the design brief and the building typology, The studio explores different design approaches of contextual design including theoretical, metaphoric, and pragmatic approaches to inform the students how to infer guidelines from both, the physical and social aspects of the context, proposed theme, instruct the design in terms of program, space, form, structure, order, character, and tectonics. Providing the opportunity for students to develop appropriate conceptual and theoretical agendas and to challenge preconceptions related to the notion of building typology, encouraging developing written statements of 500-1000 word explaining their design motivation, deriving ideas, theme or topic of the project as well as their design approach and methodology.			
Used in Program / Level			
Program Name or requirement		Study Level	
Architectural Engineering Program Requirement		4	
Assessment Criteria			
Term Work	Mid-Term Exam	Final Thesis	Final Presentation
40%	**10%**	**10%**	**40%**
Exam Duration [Hours]	3 Hr	0 Hr	5 Hr

ARC 412	Architectural Graduation Project (2)		5 CH
Prerequisites	ARC 411, ARC 451		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	7	0	
Required SWL	350	Equivalent ECTS	14
Course Content			
The studio explores design solutions that address real issues facing the local and regional community driven by IDENTITY & THEPUBLIC, learning how to build upon and integrate all themes of knowledge acquired in previous design studios, developing their own philosophies, learn to transform abstract ideas and concepts to design proposals in structure space and form, Encouraging developing and writing their design statement, Projects include abroad range of project types, including individual buildings, urban districts and landscapes.			
Used in Program / Level			
Program Name or requirement		Study Level	
Architectural Engineering Program Requirement		4	
Assessment Criteria			
Student Activities	Mid-Term Exam	Final Thesis	Final Presentation
40%	**10%**	**10%**	**40%**
Exam Duration [Hours]	3 Hr	0 Hr	5 Hr

ARC 413	Human Aspects in Architecture		2 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	0	
Required SWL	100	Equivalent ECTS	4
Course Content			
Exploring the way active human use of physical settings influences or is influenced by aspects of sustainability in the built environment, including categories of human experience such territoriality, way finding, cultural expression, visual and non-visual aesthetics, and task performance, methods used in identifying and analyzing such kinds of social and cultural dimensions, ethnography, photo elicitation, agent-based modeling as a key for developing evidence based sustainable design.			
Used in Program / Level			
Program Name or requirement			Study Level
Architectural Engineering Program Requirement			4
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
50%	**10%**	**0%**	**40%**
Exam Duration [Hours]	3 Hr	0 Hr	3 Hr

E5.2 Building Technologies Courses

ARC 121	**Building Construction (1)**		**3 CH**
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial		Laboratory
2	2		
Required SWL	150	Equivalent ECTS	6
Course Content			
Introducing basic building components, introducing construction materials and methods of skeleton construction (wood, steel. Exercises include taxonomy, types, construction methods, tools, wall, openings, lintels, pergolas, floors, foundation, application requirements, in addition to wooden and steel staircases.			
Used in Program / Level			
Program Name or requirement			Study Level
Architectural Engineering Program Requirement			1
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
50%	**10%**	**0%**	**40%**
Exam Duration [Hours]	3 Hr	0 Hr	5 Hr

ARC 122	**Building Construction (2)**		**3 CH**
Prerequisites	**ARC121**		
Number of weekly Contact Hours			
Lecture	Tutorial		Laboratory
2	2		
Required SWL	150	Equivalent ECTS	6
Course Content			
Introducing basic building components as well as construction materials, methods of skeleton construction (wood, steel. Exercises include: taxonomy, types, construction methods, tools, wall, openings, lintels, pergolas, floors, foundation, application requirements, wooden and steel staircases.			
Used in Program / Level			
Program Name or requirement			Study Level
Architectural Engineering Program Requirement			1
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
50%	**10%**	**0%**	**40%**
Exam Duration [Hours]	3 Hr	0 Hr	5 Hr

ARC 221	Building Construction (3)		3 CH
Prerequisites	ARC 122		
Number of weekly Contact Hours			
Lecture	Tutorial		Laboratory
2	2		
Required SWL	150	Equivalent ECTS	6
Course Content			
understanding the building finishing process and materials, learn about the carpentry work of doors and windows, process and materials of finishing architectural internal spaces, floors, walls, and ceiling, timber Doors and Windows, floor finishing: tiles, rolls, fabric, cast in situ, and boards, wall cladding, tiles, plastering, paints, boards, paper, ceiling finishing: tiles, boards, plastering, and paints.			
Used in Program / Level			
Program Name or requirement			Study Level
Architectural Engineering Program Requirement			2
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
50%	**10%**	**0%**	**40%**
Exam Duration [Hours]	3 Hr	0 Hr	5 Hr

ARC 222	Technical Installations		2CH
Prerequisites	ARC 122		
Number of weekly Contact Hours			
Lecture	Tutorial		Laboratory
2	1		
Required SWL	100	Equivalent ECTS	4
Course Content			
Describes interactions between people and sound, indoors and outdoors, and uses this information to develop acoustical design criteria for architecture and planning. Principles of sound generation, propagation, and reception, Properties of materials for sound absorption, reflection, and transmission. Provides the tools necessary for an efficient integration of day-lighting issues in the overall design of a building, Fundamentals of day-lighting and artificial lighting are introduced: physics of light propagation and solar radiation, photometry and colorimetry (visual perception, photometric quantities, chromatic systems), sun course, physics of windows (light and heat transfer, glazing types), electric lighting (lamps and luminaries characteristics), More advanced and design-oriented topics are presented and practiced through the design project: benefits and availability of daylight, visual and thermal comfort, primary and advanced lighting design strategies, design and assessment tools for lighting management.			
Used in Program / Level			
Program Name or requirement			Study Level
Architectural Engineering Program Requirement			2
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
50%	**10%**	**0%**	**40%**
Exam Duration [Hours]	3 Hr	0 Hr	3 Hr

ARC 223	Working Design (1)		3 CH
Prerequisites	ARC 221, ARC 222		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	2	0	
Required SWL	150	Equivalent ECTS	6
Course Content			
introducing the students to The construction process, Construction contract types, Modifications and substitution procedures, Contractual relationships Rights, duties, and responsibilities, Contract provisions, Relationship and organization of construction documents, Use of construction documents, Organizational formats, Interpreting construction documents. Addresses advanced structures, exterior envelopes, and contemporary production technologies, Continues the exploration of structural elements and systems, expanding to include more complex determinate, indeterminate, long-span, and high-rise systems.			
Used in Program / Level			
Program Name or requirement		Study Level	
Architectural Engineering Program Requirement		2	
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
50%	**10%**	**0%**	**40%**
Exam Duration [Hours]	3 Hr	0 Hr	5 Hr

ARC 224	Field Studies		2 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	0	
Required SWL	100	Equivalent ECTS	4
Course Content			
Assignments rely principally on field trips and field research, while additional readings, class discussions and research will be utilized to develop a body of information and method of critique, Field research will focus on the first-hand observation, analysis, and documentation of existing buildings and their contexts so that lessons-learned can inform the design methodology applied in studio, Students will be challenged to articulate their analyses with respect to the specific urban, temporal, and cultural contexts, There will be ten assignments for each course: nine specific assignments and one assignment that students may choose the subject of himself.			
Used in Program / Level			
Program Name or requirement		Study Level	
Architectural Engineering Program Requirement		2	
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
Exam Duration [Hours]			

ARC 225	Construction Technology		2 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	0	
Required SWL	100	Equivalent ECTS	4
Course Content			
Orient the students to the crucial link between an Architectural Project and the Building Systems, Technology and Structures, An introduction to BIM, Green Construction and Construction Management is also presented, The idea of Technique/Structure as a Form Generator and Moderator is introduced through the discussion of several Architectural projects, This will be conducted through several media of lectures, drawing tutorials, forums of discussion and site visits.			
Used in Program / Level			
Program Name or requirement			Study Level
Architectural Engineering Program Requirement			2
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
50%	**10%**	**0%**	**40%**
Exam Duration [Hours]	3 Hr	0 Hr	3 Hr

ARC 226	Site Analysis		2 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	0	
Required SWL	100	Equivalent ECTS	4
Course Content			
Understanding site and it's context, Understanding General principles of site selection, Understanding Site planning standards, Understanding Site plan and Site analysis, functional, social and geo-climatic, Understanding Soil and topography, Climate & vegetation, Understanding Physical infrastructure and utilities, Understanding Master plan, context, constraints, and opportunities, Understanding Planning and building regulations, Principles of site planning, Understanding Healthiness of site.			
Used in Program / Level			
Program Name or requirement			Study Level
Architectural Engineering Program Requirement			2
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
50%	**10%**	**0%**	**40%**
Exam Duration [Hours]	3 Hr	0 Hr	3 Hr

ARC 321	Working Design (2)		3 CH
Prerequisites	ARC 223		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	2	0	
Required SWL	150	Equivalent ECTS	6
Course Content			
Introduces building construction as a computational enterprise in which rules are developed to compose and describe Construction designs and other designs, Discusses issues related to practical applications of construction managements, introduces advanced computing tools such as advanced construction modeling and CAD and CAM fabrication.			
Used in Program / Level			
Program Name or requirement		Study Level	
Architectural Engineering Program Requirement		3	
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
50%	**10%**	**0%**	**40%**
Exam Duration [Hours]	3 Hr	0 Hr	5 Hr

ARC 322	Working Design (3)		3 CH
Prerequisites	ARC 321		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	2	0	
Required SWL	150	Equivalent ECTS	6
Course Content			
Subject delivers the information, skills, and techniques necessary to create the physical products of real estate and manage the process of real estate development and urban development economics, Exposes the general skills, techniques and process associated with each of the functional areas involved in real estate development so that they may organize and lead the development process that is economically valid, create a development proposal for a particular development opportunity within a certain economic criteria.			
Used in Program / Level			
Program Name or requirement		Study Level	
Architectural Engineering Program Requirement		3	
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
50%	**10%**	**0%**	**40%**
Exam Duration [Hours]	3 Hr	0 Hr	5 Hr

ARC 323	Advanced Technical Installation		2 CH
Prerequisites	ARC 222		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	0	
Required SWL	150	Equivalent ECTS	6
Course Content			
Introduction to software engineering, Software process models and Requirements Engineering, Requirements Analysis, System Models (data-flow models, state machine models, semantic data models and object models), Requirements definition and Specification, Formal specification, Software Design, Architectural design, Object-oriented Design, Real-time software design, Software testing, Software cost estimation, Quality management.			
Used in Program / Level			
Program Name or requirement			Study Level
Architectural Engineering Program Requirement			3
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
50%	**10%**	**0%**	**40%**
Exam Duration [Hours]	3 Hr	0 Hr	3 Hr

ARC 324	Plumbing Engineering		2 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	0	
Required SWL	100	Equivalent ECTS	4
Course Content			
Understanding of fundamentals of environmental engineering-water, supply and sanitary engineering-students will learn about sources of water, water treatment, waste water treatment, solid waste management etc, Introduction, Water demand, demand forecasting, water quality, treatments and distribution of water, Waste water treatment, waste water disposal and solid waste management, basic technical knowledge regarding water demand of the community, various water treatments methods and distribution network, principles and best practices for Solid waste management in residential unit, small campus and for a large city.			
Used in Program / Level			
Program Name or requirement			Study Level
Architectural Engineering Program Requirement			3
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
50%	**10%**	**0%**	**40%**
Exam Duration [Hours]	3 Hr	0 Hr	3 Hr

ARC 325	Building information Modeling (BIM)		2 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	0	
Required SWL	100	Equivalent ECTS	4
Course Content			
Building Information Modeling (BIM) is revolutionizing design processes through the construction industry, security is no exception, Computer Aided Design (CAD) represented a sea change in how drawings are produced and shared, BIM, with its 3-D modeling capabilities, will deliver an equivalent or greater impact to the industry, presenting a basic grounding in the technology and its benefits, potential applications in security, and likely implementation issues.			
Used in Program / Level			
Program Name or requirement			Study Level
Architectural Engineering Program Requirement			3
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
50%	**10%**	**0%**	**40%**
Exam Duration [Hours]	3 Hr	0 Hr	3 Hr

E5.3 Environmental Design courses

ARC 331	Environmental Control		2 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1		
Required SWL	100	Equivalent ECTS	4
Course Content			
Providing a design-oriented study of responsive environmental control, life safety and building service systems, basic principles, applications, performance and design installations of these systems, principles of sustainable design, energy efficiency, optimization of indoor environmental quality and economic soundness, briefly addresses other sustainable design strategies and includes an overview of active systems (solar, photovoltaic panels, geothermal), water reduction and reuse, green materials, and acoustics.			
Used in Program / Level			
Program Name or requirement			Study Level
Architectural Engineering Program Requirement			3
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
50%	**10%**	**0%**	**40%**
Exam Duration [Hours]	3 Hr	0 Hr	3 Hr

ARC 332	Environmental Impact Assessment		2 CH
Prerequisites	ARC 331		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	0	
Required SWL	100	Equivalent ECTS	4
Course Content			
Enabling students to understand the various disability needs in the built environment, introduces the design for All concepts and regulations on the urban and architectural levels, recognize and learn about the architectural and urban planning role in taking the right measures towards accessible design, understanding the goals of accessible design, examining the impacts of the social and physical environment on persons with disabilities, introducing the key principles of Disability Access Certificates and Access Auditing to ensure all aspects of the built environment are accessible, learning different methodologies of auditing the level of accessibility, evaluating the effectiveness to facilitate the equality, and independence of all types of users as well as suggesting solutions for ensuring accessibility.			
Used in Program / Level			
Program Name or requirement			Study Level
Architectural Engineering Program Requirement			3
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
50%	**10%**	**0%**	**40%**
Exam Duration [Hours]	3 Hr	0 Hr	3 Hr

ARC 431	Maintenance of Buildings		3 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	2	0	
Required SWL	125	Equivalent ECTS	5
Course Content			
introducing different type of maintenance and emphasizes the durability of buildings, Life expectancy of different types of buildings, effect of environmental elements such as heat, dampness and precipitation on buildings, effect of chemical agents on building materials, effect of pollution on buildings, effect of fire on buildings, damage by biological agents, Maintenance of buildings, Reliability principles and its applications in selection of systems for routine maintenance of buildings, maintenance cost, specifications for maintenance works, Conservation and recycling, Performance of construction materials and components, rehabilitation of constructed facilities, materials and methods for conservation work, recycling of old buildings and its advantages.			
Used in Program / Level			
Program Name or requirement			Study Level
Architectural Engineering Program Requirement			4
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
50%	**10%**	**0%**	**40%**
Exam Duration [Hours]	3 Hr	0 Hr	3 Hr

ARC 432	Green Maintenance of Buildings		3 CH
Prerequisites	ARC 431		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	2	0	
Required SWL	100	Equivalent ECTS	4
Course Content			
introducing Smart Maintenance and the principles of smart maintenance and the indicators for measuring the performance of smart green maintenance quality, criteria to measure the performance of smart maintenance, green smart maintenance costs, different stages of green smart maintenance, measuring the buildings sustainability, introducing Advantage of smart green maintenance technology, Technological strategy for smart green maintenance and smart green maintenance features, smart green maintenance applications			
Used in Program / Level			
Program Name or requirement			Study Level
Architectural Engineering Program Requirement			4
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
50%	**10%**	**0%**	**40%**
Exam Duration [Hours]	3 Hr	0 Hr	3 Hr

ARC 433	Renewable Energy and Building		2 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	0	
Required SWL	100	Equivalent ECTS	4
Course Content			
introducing many relevant fields of expertise, at a global level, Sustainable building design and technology, Climate responsive and energy conscious site planning, landscape and urban design, Passive solar design, integration and simulation, New and renewable energy technologies, Novel materials and their influence on buildings and occupant thermal comfort, Advanced software applications and energy software development and programming.			
Used in Program / Level			
Program Name or requirement			Study Level
Architectural Engineering Program Requirement			4
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
50%	**10%**	**0%**	**40%**
Exam Duration [Hours]	3 Hr	0 Hr	3 Hr

ARC 434	Computer Application in Environmental Engineering		2 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	0	
Required SWL	100	Equivalent ECTS	4
Course Content			
Computer modelling principals, Energy transfer theories Comprehend the practical application of modelling to solve problems regarding environmental issues, apply numerical techniques to simulate complicated environmental assessments, Errors and deviation expected from computer applications.			
Used in Program / Level			
Program Name or requirement			Study Level
Architectural Engineering Program Requirement			4
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
50%	**10%**	**0%**	**40%**
Exam Duration [Hours]	3 Hr	0 Hr	3 Hr

ARC 435	Sustainable Development		2 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	0	
Required SWL	100	Equivalent ECTS	4
Course Content			
Introducing the rehabilitation principles with respect to conservation and energy efficiency, It enhances the students' skills of rehabilitation research, building's technical inspection and architectural management, critical analysis of rehabilitation and applying effective methods and solutions, acquainting with the evaluation and rehabilitation, methods of heritage and vernacular architecture.			
Used in Program / Level			
Program Name or requirement			Study Level
Architectural Engineering Program Requirement			4
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
50%	**10%**	**0%**	**40%**
Exam Duration [Hours]	3 Hr	0 Hr	3 Hr

ARC 436	Green Architecture		2 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	0	
Required SWL	100	Equivalent ECTS	4
Course Content			
Providing context for the green building movement, understanding the scope of this field of study, understanding of green design by examining the impact of human interactions, the built environment, and natural processes, examining the underlying principles of green design including different criteria of green architecture design, interact with the strategy of green architecture design.			
Used in Program / Level			
Program Name or requirement			Study Level
Architectural Engineering Program Requirement			4
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
50%	**10%**	**0%**	**40%**
Exam Duration [Hours]	3 Hr	0 Hr	3 Hr

ARC 437	Daylight and Thermal Performance		2 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	0	0	
Required SWL	100	Equivalent ECTS	4
Course Content			
Providing an understanding of the concept of reduction in energy consumption through low energy building design, familiarizing with the key factors that need to be considered while designing day lighting, Introducing systems and techniques to control and enhance day lighting performance, Understanding thermal exchange between the building envelope and the environment, overview of passive design features and their applicability to different building types and climatic regions, Modeling and evaluating, thermal and day lighting performance and their impact on reducing energy consumption will be investigated.			
Used in Program / Level			
Program Name or requirement			Study Level
Architectural Engineering Program Requirement			4
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
50%	**10%**	**0%**	**40%**
Exam Duration [Hours]	3 Hr	0 Hr	3 Hr

ARC 438	Smart Technique in Architecture		2 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	0	0	
Required SWL	100	Equivalent ECTS	4
Course Content			
Introducing some main issues of buildings performance, first one is the smart building information systems, introduction to modes of thought found within humanities and social sciences, second topic is building control and diagnostics, empirical evaluation of the built environment (building components and systems, interactions between building, occupants and environmental conditions) in view of multiple performance criteria (thermal, visual and acoustic performance), using of computation tools in all processes of building design, construction and operating			
Used in Program / Level			
Program Name or requirement			Study Level
Architectural Engineering Program Requirement			4
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
50%	**10%**	**0%**	**40%**
Exam Duration [Hours]	3 Hr	0 Hr	3 Hr

E5.4 Urban Planning Courses

ARC 241	Regional and Urban Planning		3 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	2		
Required SWL	100	Equivalent ECTS	4
Course Content			
review the most important theories of city planning, introducing examples of cities in which one or more of these theories, planning and the inclusion of their departments and service sectors, presenting modern applied examples in the implementation of urban plans for some new cities in Egypt, recognizing the concept of the city and its various characteristics, concept of urban planning in the modern era in general with an explanation of the most important different levels of urban planning, the vertical reciprocal relationship between, examples focus on Regional and Urban Planning and the economic, social and environmental dimensions of the process.			
Used in Program / Level			
Program Name or requirement			Study Level
Architectural Engineering Program Requirement			2
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
50%	**10%**	**0%**	**40%**
Exam Duration [Hours]	3 Hr	0 Hr	3 Hr

ARC 341	Smart City Planning		3 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	2		
Required SWL	100	Equivalent ECTS	4
Course Content			
Define smart cities, their importance, various elements, and the implications that can be added by using the smart cities, directing projects for the development of new urban communities in Egypt, linking planning concepts with the environmental and technological perspective, identifying elements and projects of smart cities, use modern techniques and technology in dealing with different urban and environmental issues, includes getting to know the successful international, regional and local experiences in this field, coming up with lessons learned that can contribute to the establishment of new smart cities in Egypt, converting a number of existing cities and urban settlements to Smart Cities concept for achieving sustainability, prosperity in Egyptian cities in general			
Used in Program / Level			
Program Name or requirement			Study Level
Architectural Engineering Program Requirement			3
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
50%	**10%**	**0%**	**40%**
Exam Duration [Hours]	3 Hr	0 Hr	3 Hr

ARC 342	Urban Design		2 CH
Prerequisites	ARC 341		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	0	
Required SWL	100	Equivalent ECTS	3
Course Content			
Understanding the basic principles of urban planning and different planning theories, the foundations of urban design and the reciprocal relationship between them, the direct relationship to the architectural design of the elements of the urban environment and the natural environment, Taking into account the environmental dimension in general, through examples from previous studies and field activities, including applying these principles in an analytical manner to selected existing projects in order to improve students applied and analytical planning skills in this field.			
Used in Program / Level			
Program Name or requirement			Study Level
Architectural Engineering Program Requirement			3
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
50%	**10%**	**0%**	**40%**
Exam Duration [Hours]	3 Hr	0 Hr	3 Hr

ARC 441	Urban Upgrading		2 CH
Prerequisites	ARC 342		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	0	
Required SWL	125	Equivalent ECTS	5
Course Content			
Introducing the reasons of the deterioration of the urban environment in Egypt, Focusing on slums and squatters in Urban Areas, Understanding the historical context for urban deterioration as well as the social and economic and environmental implications, Identifying the urban upgrading and different development policies, government efforts could use in slum areas according to different cases. Reviewing case studies on comparative analysis basis for local and international examples, applied in a project in selected deteriorated and slum area.			
Used in Program / Level			
Program Name or requirement		Study Level	
Architectural Engineering Program Requirement		4	
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
50%	**10%**	**0%**	**40%**
Exam Duration [Hours]	3 Hr	0 Hr	3 Hr

ARC 442	City Planning History		2 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	0	
Required SWL	100	Equivalent ECTS	4
Course Content			
Introduction to the emergence of cities in antiquity (the stone ages), development through time, the emergence of civilizations, dealt with the most famous of those ancient civilizations with explanation and analysis, examples of the most famous cities of those civilizations, and the impact of various spatial, climatic, political, and religious factors and others on the urban fabric of the city, entrances, fences, roads, and various uses (housing buildings, public, religious and administrative buildings, palaces, gates, schools, mosques, churches and monasteries ... etc) .. with a presentation of the most important buildings that represent historical, functional and architectural value in those civilizations and the lessons learned from those examples up to the Renaissance.			
Used in Program / Level			
Program Name or requirement		Study Level	
Architectural Engineering Program Requirement		4	
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
50%	**10%**	**0%**	**40%**
Exam Duration [Hours]	3 Hr	0 Hr	3 Hr

ARC 443	Geographic Information Systems (GIS) Principles		2 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	0	
Required SWL	75	Equivalent ECTS	3
Course Content			
Providing an introduction to the fundamental theories and concepts of Geographic Information Systems (GIS), using a commercial GIS software product (ArcGIS), cover a reasonable proficiency with that package, including the following: general ArcGIS Awareness, Coordinate System (Spatial Reference) Awareness, Managing Data, Analyzing Data, Editing Data, Visualizing Data , Geo processing , Sharing Content from ArcGIS Desktop.			
Used in Program / Level			
Program Name or requirement			Study Level
Architectural Engineering Program Requirement			4
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
50%	**10%**	**0%**	**40%**
Exam Duration [Hours]	3 Hr	0 Hr	3 Hr

ARC 444	Urban and Architecture Heritage		2 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	0	
Required SWL	100	Equivalent ECTS	4
Course Content			
Define and explain the urban and architectural heritage, the link and difference between them, the importance of preserving this heritage in terms of cultural, social and economic aspects, presenting approaches to heritage preservation in the context of urban areas, including re-planning, development, and restoration of the urban fabric, as well as those related to various types of important and valuable buildings, including development, rehabilitation, transformation, renovation, reuse, re-adaptation, modification and development, By presenting case studies that reveal principles, methods and solutions.			
Used in Program / Level			
Program Name or requirement			Study Level
Architectural Engineering Program Requirement			4
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
50%	**10%**	**0%**	**40%**
Exam Duration [Hours]	3 Hr	0 Hr	3 Hr

ARC 445	Housing in Smart Cities		2 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	0	
Required SWL	75	Equivalent ECTS	3
Course Content			
Introducing the term and definition of incremental "smart" cities, from their operational and planning functions to management and control, focusing on housing policy options and what urban planners can offer in providing appropriate smart housing at its various levels and in line with the distribution of population densities, and related public services in a smart city, present in general terms the many factors that affect the housing market, analyze public, private initiatives that affect housing provision.			
Used in Program / Level			
Program Name or requirement			Study Level
Architectural Engineering Program Requirement			4
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
50%	**10%**	**0%**	**40%**
Exam Duration [Hours]	3 Hr	0 Hr	3 Hr

ARC 446	Landscaping		2 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	0	
Required SWL	75	Equivalent ECTS	3
Course Content			
Introducing the principles of landscape design and the integration with urban environment, developing creative capacities related to the outdoor environment including the recognition of natural and artificial elements and their potentials, introducing main elements of hard-scape and soft-scape in landscape architecture such as the use of Landforms, Plant materials, Water, paths and Site structures in Landscape design, including the basics for configuring external urban spaces, their deferent levels, hierarchies, applying all in a project in selected urban area.			
Used in Program / Level			
Program Name or requirement			Study Level
Architectural Engineering Program Requirement			4
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
50%	**10%**	**0%**	**40%**
Exam Duration [Hours]	3 Hr	0 Hr	3 Hr

E5.5 Project Management

ARC 451	Report Writing		2 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	0	
Required SWL	100	Equivalent ECTS	4
Course Content			
Discovering and outlining ideas, Organizing outlines, Ways to begin the three parts of technical writing, Writing abstracts, summaries, and conclusions of long reports, The thesis statement, Forms: letters, memos, reports, scientific articles, job description, CV, references and footnotes, Selection of key words, titles, and subtitles, Editing, revising and proof-reading techniques, Electronic word processing and technical writing, vocabulary building, and basic types and patterns of argument.			
Used in Program / Level			
Program Name or requirement			Study Level
Architectural Engineering Program Requirement			4
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
50%	**10%**	**0%**	**40%**
Exam Duration [Hours]	3 Hr	0 Hr	3 Hr

ARC 452	Items Specifications and BOQs		2 CH
Prerequisites	ARC 322		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	0	
Required SWL	100	Equivalent ECTS	4
Course Content			
calculation of quantities of various business, methods of accounting for construction items, identifying how to use the inventory brochure and computer programs that help in accounting quantities, studying the specifications of business items and inventory works from the point of view of the consultant and contractor, studying the types of contracts and specifications and the advantages and disadvantages of each method.			
Used in Program / Level			
Program Name or requirement			Study Level
Architectural Engineering Program Requirement			4
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
50%	**10%**	**0%**	**40%**
Exam Duration [Hours]	3 Hr	0 Hr	3 Hr

ARC 453	Financial Resource Management		2 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	0	
Required SWL	75	Equivalent ECTS	3
Course Content			
Price and cost definition, direct and indirect cost content and added cost, factors affected by pricing related to the specifications of the business items and factors associated with the construction site, cost ratio analysis of different business items and how to control the distribution of these ratios, estimate labor costs, ores and equipment, price analysis of construction items, cost and interest ratio analysis, cost estimate and cost follow-up during implementation, change of time value of money, cash flow plan work.			
Used in Program / Level			
Program Name or requirement		Study Level	
Architectural Engineering Program Requirement		3	
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
50%	**10%**	**0%**	**40%**
Exam Duration [Hours]	3 Hr	0 Hr	3 Hr

ARC 454	Architectural Project Management		2 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	0	
Required SWL	75	Equivalent ECTS	3
Course Content			
Introducing the basics of project management and its objectives, Initial costs and running costs, Types of projects turnovers as well as he basics of planning and planning management, basic functions, feasibility studies for construction projects, determining criteria and determinants of decision-making, evaluation criteria, technical office tasks, business studies and performance rates, total quality management, improvement Continuous, risk management, project needs study, organizational structure in contracting companies and consulting firms, definition of value engineering.			
Used in Program / Level			
Program Name or requirement		Study Level	
Architectural Engineering Program Requirement		4	
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
50%	**10%**	**0%**	**40%**
Exam Duration [Hours]	3 Hr	0 Hr	3 Hr

ARC 455	Feasibility Studies		2 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	0	
Required SWL	75	Equivalent ECTS	3
Course Content			
Emphasizing the importance of feasibility studies in making design decisions, Land economics, Initial costs and running costs, Projects turnovers and marketing studies, Course also emphasizes the importance of planning and time scheduling of jobs, evaluation of programs and critical path method, Cost-time analysis.			
Used in Program / Level			
Program Name or requirement			Study Level
Architectural Engineering Program Requirement			4
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
50%	**10%**	**0%**	**40%**
Exam Duration [Hours]	3 Hr	0 Hr	3 Hr

ARC 456	Architectural Laws and Legislation		2 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	0	
Required SWL	75	Equivalent ECTS	3
Course Content			
Definition of laws, legislation and regulations that are subject to engineering work and explain them in theory and in practice, construction and construction laws, law of tenders and bids, disputes and methods of resolution, arbitration, methods of delivery of the project, definition of the requirements of international law (Vedic), definition of bodies, departments, regulations and laws that represent the reference for various construction works.			
Used in Program / Level			
Program Name or requirement			Study Level
Architectural Engineering Program Requirement			4
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
50%	**10%**	**0%**	**40%**
Exam Duration [Hours]	3 Hr	0 Hr	3 Hr

ARC 457	Meaning in Architecture		2 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	0	
Required SWL	75	Equivalent ECTS	3
Course Content			
Introducing various theories of interpretation, understanding as efforts to uncover the structures of perception, understanding, including phenomenology and Hermeneutics, presenting diverse philosophical readings.			
Used in Program / Level			
Program Name or requirement			Study Level
Architectural Engineering Program Requirement			4
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
50%	**10%**	**0%**	**40%**
Exam Duration [Hours]	3 Hr	0 Hr	3 Hr

ARC 458	Land Management		2 CH
Prerequisites			
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	1	0	
Required SWL	75	Equivalent ECTS	3
Course Content			
Introducing to the basics of land management, basic functions and tasks of land management, recognizing important land correlations with other fields of interest, understanding contemporary global trends, necessary land related services, general process of executing land management interventions.			
Used in Program / Level			
Program Name or requirement			Study Level
Architectural Engineering Program Requirement			4
Assessment Criteria			
Student Activities	Mid-Term Exam	Practical Exam	Final Exam
50%	**10%**	**0%**	**40%**
Exam Duration [Hours]	3 Hr	0 Hr	3 Hr