Al-Furat Al –Awsat Technical University-
جامعة الفرات الأوسط التقنية

Bachelor of Science Honours (B.Sc. Honours) –
Building & Construction engineering
Technologies بكالوريوس علوم – هندسةتقنيات البناء والأنشاءات

Table of Contents

1. Overview

This catalogue is about the courses (modules) given by the program of building&construction Engineering technologies to gain the Bachelor of Science degree. The program delivers (xx) Modules with (6000) total student workload hours and 240 total ECTS. The module delivery is based on the Bologna Process.

نظره عامه

يتناول هذا الدليل المواد الدراسية التي يقدمها برنامج هندسة تقنيات البناء والأنشاءات للحصول على درجة بكالوريوس العلوم. يقدم البرنامج (43) مادة دراسية مع (6000) إجمالي ساعات حمل الطالب و 240 إجمالي وحدات أوروبية. يعتمد تقديم المواد الدراسية على عملية بولونيا.

2. Undergraduate Courses 2023-2024

1-

Code	Course/Module Title	ECTS	Semester
ATU22011	Engineering mechanics	10	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USSWL (hr/sem)**
4	2	93	157
Description			
After successful completion of this course the student will be able to understand: 1-the manner of dealing with forces acting on bodies. 2-the relation between the force and its components. 3- the principle of moments & couples. 4- Another purpose was to help the student to develop the logical , orderly			

processes of thinking which characterizes the engineer .

2-

Code	Course/Module Title	ECTS	Semester
ATU22012	Engineering drawing1	4	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USSWL (hr/sem)**
2	3	78	22
Description			
Introducing the fundamentals of engineering drawing to the student so that he can be qualified to express his thoughts, draw & execute the projects related to civil engineering; As well as aims to: 1- Assisting requester in experimenting and creating their design ideas in the two-dimensional environment of architectural drawing and design programs with the help of a computer. 2-Take advantage of the technologies provided by AutoCAD to complete many graphic operations quickly and with greater accuracy and present them in a professional manner. 3-Teaching the requester how to use the devices associated with the regular drawing programs, and training students to import and export drawings to other compatible programs and how to integrate them with other information for engineering projects.			

3-

Code	Course/Module Title	ECTS	Semester
ATU22013	Mathematics	8	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USSWL (hr/sem)**
4	2	93	107
Description			
1/Develop the ability of student in using mathematics in engineering applications			

2/After successful completion of this course the student will be able to understand:
a/ Matrices.
b/ Applications of indefinite integration and finite integration.
c/ Application of derivatives in mechanics.
d/ Trigonometric functions.
e/ Logarithmic and exponential functions.
f/ Integration.
g/ Limits.
h/ Slope of the straight line , Slope of the curve.

4-

Code	**Course/Module Title**	**ECTS**	**Semester**
ATU22014	**Engineering physics**	4	**1**
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USSWL (hr/sem)**
2	2	63	37
Description			

5-

Code	**Course/Module Title**	**ECTS**	**Semester**
ATU22015	Human rights & democracy	2	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USSWL (hr/sem)**
1	0	18	32
Description			
الهدف من المادة زيادة معرفة الطالب بالجانب المفاهيمي النظري والتطور التاريخي لمادة حقوق الانسان والديمقراطيةمن خلال قدرته على ان			

1- يفهم معنى حقوق الانسان وأشكالها
2- يعرف المواثيق والعهود الدولية لحقوق الانسان
3- يعرف مفهوم الحريات وتصنيفها
4- اهم مبادئ وتطبيقات نظم الديمقراطية

-6

Code	Course/Module Title	ECTS	Semester
ATU22016	Advanced English skills	2	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USSWL (hr/sem)**
3	0	48	2
Description			
1-The aim of this course is to provide English learners with integrated language skills such as reading, listening and writing resulting in a level of basic language knowledge. 2-This course will focus on grammar rules, basic word knowledge and usage, reading comprehension, reading out of the lesson, and Paragraph writing. 3- A student may be able to listen to native speakers and speak English Language. 4- A student may be able to write and have creativity in his writing.			

7-

Code	Course/Module Title	ECTS	Semester
ATU22021	Construction material	9	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USSWL (hr/sem)**
4	4	123	102
Description			
After successful completion of this course the student will be able to understand: 1. Student informing with the properties of materials such as brick 2. Student informing with physical, chemical properties and specification of building materials such as metals , plastic 3. Student learning how to test the materials such as metals , bricks Student training to doing materials tests such as timber.compression members.			

8-

Code	Course/Module Title	ECTS	Semester
ATU22022	**Plane Surveying**	9	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USSWL (hr/sem)**
4	4	123	102
Description			
A graduate of this major should be able to: **1. General basics of surveying,foundemetals of surveying, units of measurements, plotting scale .** **2. Explain the difference between plane and geodetic surveying .**			

3. **Linear measurements ,mean for measuring distances ,direct method of horizontal distance measurements .**
4. **Explain the principles of Electronic distance measurements.**
5. **Errors in surveying , types of errors ,Accuracy and precision, Principles of errors scattering theory.**
6. **Obstacles to measuring.**
7. **Leveling. Types of leveling , Leveling instrumentation , Leveling by taping, Trigonometric leveling , Sources of errors in leveling (vertical, horizontal).**
8. **Skills of using Level Instrument efficiently**
9. **The students should be able to make a levelling Survey and calculate the results relative to some chosen datum.**
10. **The students should be able to make a levelling survey along a predetermined line set out on the ground. Process the data and draw longitudinal sections and cross sections from the results.**
11. **The students should be able to select the most appropriate method of measuring horizontal and vertical angles.**
12. **Vertical sections , Longitudinal sections ,Calculation of cut and fill.**
13. **The students should be able to compute the quantities of cut and fill in any kind of sections for Roads**
14. **Contour lines: Method of drawing and construction.**
15. **Areas and volumes: Volume computation from cross-section , Volume from topographic maps and grid net , Volume computation from contour maps.**

9-

Code	Course/Module Title	ECTS	Semester
ATU22023	**Engineering Geology**	3	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USSWL (hr/sem)**
2	0	33	**42**
Description			
1- The study aims to know the earth's crust and its mineral and physical properties. **2. Classification of sedimentary and metamorphic rock species.** **3. Stabilization of rocky slopes and their impact on buildings.** **4. The effect of weathering on structures and the factors affecting them.** **5. Soil formation factors and their engineering properties** **6- Geological structure of the characteristics of rock strata** **7- The study aims to know surface and groundwater and its impact on the work site** **8- Dams, tunnels and loads above them**.			

10-

Code	Course/Module Title	ECTS	Semester
ATU22024	**Descriptive Geometry**	4	**2**
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USSWL (hr/sem)**
2	1	48	37
Description			

Introducing the fundamentals of engineering drawing to the student so that he can be qualified to express his thoughts, draw & execute the projects related to civil engineering; As well as aims to:

1. **Explain the principle of projection and sectioning**
2. **Understand the intersection, development of surface of body and enclosure**

Learning the main idea from assembly and detail drawing

3. **Student basic knowledge of technical drawings professions and means of communications to others.**
4. **Ability to draw three dimension objects on the paper**.
5. **Develop student's imagination and ability to represent the shape size and specifications of physical objects**
6. **Students will become familiar with office practice and standards.**
7. **Students will become familiar with Auto Cad two dimensional drawings.**

Students will develop good communication skills and team work..

11-

Code	**Course/Module Title**	**ECTS**	**Semester**
ATU22025	**Computer principles**	3	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USSWL (hr/sem)**
1	2	48	**27**
Description			
After successful completion of this course the student will be able to understand: 1. **The student's knowledge of all hardware parts of the computer.**			

2. **Know the operation of each part of the computer**.
3. **Knowing the icons on the desktop and executing commands on them**.
4. **Access to all computer contents**.
5. **Work on paint program**.
6. **Knowledge of Microsoft Word and making reports and research using it.**
7. **Knowledge of Excel and making tables with it**.
8. **How to access the Internet, and how to create an email**.

12-

Code	**Course/Module Title**	**ECTS**	**Semester**
ATU22026	**ARABIC LANGUAGE**	**2**	**2**
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USSWL (hr/sem)**
1	**0**	**18**	**32**
Description			
1- تعميق معرفة الطالب بقواعد اللغة والاملاء التي تعلمها سابقا؛ ليتحاشى الوقوع في الأخطاء الغوية والاملائية، وليسهل عليه كتابة التقارير وجميع الأعمال الكتابية بصورة صحيحة نحويا ولغويا. 2- توسيع نطاق الوعي اللغوي والأدبي ليشمل جميع الطلبة والمجتمع المحلي من خلال المحاضرات والندوات والدورات التدريبية المختلفة، والأخذ بيد المبدعين من اصحاب المواهب.			

13-

Code	Course/Module Title	ECTS	Semester
ATU22031	**Concrete Technology**	6	**3**
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USSWL (hr/sem)**
2	2	63	**87**

Description

After successful completion of this course the student will be able to understand:

1. **Student informing with the cement compounds and their effects on its properties.**
2. **Student informing with some types of cement and a description on each of them.**
3. **Student informing with the properties of aggregate and their effects on concrete.**
4. **Student informing with the properties of fresh concrete.**
5. **Student training to doing cement and aggregate tests.**
6. **Student training to doing fresh concrete tests.**

14-

Code	Course/Module Title	ECTS	Semester
ATU22032	**Strength of Materials (1)**	6	3
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USSWL (hr/sem)**
2	**2**	63	**87**

Description and compute
After successful completion of this course the student will be able to understand: **the relations between externally applied loads and their internal effects on bodies (Strains, Deformations , and Stresses).** **1- The student will be able to define the different types of stresses** **2- The student will be able to define and compute the different types of strains** **3- The student will be able to draw the shear force and bending moment diagrams to any beam** **4- The student will be able The student will be able to compute bending stresses and shear stresses in beams** **5- The student will be able to compute beams deflection** **6- The student will be able to define and compute buckling of columns**

1**5-**

Code	Course/Module Title	ECTS	Semester
ATU22033	**Fluid mechanics(1)**	**5**	**3**
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USSWL (hr/sem)**
2	**2**	**63**	**62**
Description			
After successful completion of this course, the student will be able to understand: **1-Develop the fundamental principles underlying the subject.** **2.Knowledge of fluid properties and terminology of this subject.** **3. Knowledge of fluid mechanics tests.** **4. Knowledge of fluid flow kinematics.** **5. Knowledge of fluid flow types and how to distinguish between them in the lab.** **6- Demonstrate the design of the pipe network.**			

7- Knowledge of dimensional analysis.

16-

Code	Course/Module Title	ECTS	Semester
ATU22034	**Applied Surveying**	**5**	3
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USSWL (hr/sem)**
2	**3**	**78**	**47**

Description

The student will be able to:

1. **Measuring angles :**

a. **Select the most appropriate method of measuring horizontal and vertical angles.**

b. **Measuring and record these angles and determine their most probable values.**

c. **Understand the errors that affect angle measurement and minimize their effects.**

d. **Measuring directions ,whole circle bearing ,reduce bearing.**

e. **Measuring corrected coordinates of points and setting out of different lands.**

2. **Skills of using theodolite efficiently**
3. **Traversing : types of traversing (closed and open traverse)**
4. **Tacheometry , stadia tacheometry , Inclined sights**
5. **Electromagnetic distance measurement(EDM), basic concept, systems.**

17-

Code	Course/Module Title	ECTS	Semester
ATU22035	Probability & Statistics	4	3
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USSWL (hr/sem)**
2	2	63	37
Description			
After successful completion of this course, the student will be able to understand: 1-To be familiar with the probability, statistics, and linear programming ideas that are used in engineering applications 2-To investigate the faults in any engineering products To examine the quality of the project-related components that were purchased to research optimization methods for various issues to research the issues with transportation.			

18-

Code	Course/Module Title	ECTS	Semester
ATU22036	Advanced mathematics	4	3
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USSWL (hr/sem)**
2	2	63	37
Description			

After successful completion of this course the student will be able to understand:

1. **the behavior the multiple integration using rectangular, cylindrical and spherical coordinates.**
2. **Analysis series to develop the student's mental abilities and benefit from their applications in the field of specialization.**
3. **complex numbers**
4. **vector calculus: vector functions.**
5. **Matrix**
6. **Partial derivatives**
7. **Greens and Stokes theorems.**
8. **Sequences, convergence test and Taylor series, power series.**

19-

Code	Course/Module Title	ECTS	Semester
ATU22041	Strength of Materials (2)	6	4
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USSWL (hr/sem)**
2	2	63	87

Description

1. To understand effect of forces and loads on materials.

2. To understand how materials deforms due to external forces

3. to understand the safest way in using material in engineering applications and construction purposes

4. to understand how beams deforms due to loads and what type of stresses occur

5. to understand composite material and its behavior and deformation

6. to realize the meaning of compound stresses on material and to compute it.

20-

Code	Course/Module Title	ECTS	Semester
ATU22042	Applied surveying	5	4
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USSWL (hr/sem)**
2	2	63	62

Description

upon completion of this course the students will:

1. **To apply the knowledge of horizontal and vertical curves.**
2. **Types Horizontal curves , Kinds (simple ,compound reverse and transition curve), Computations**
3. **Vertical Curves , Kinds , Computations**
4. **Tunnel surveying .**
5. **Setting out of horizontal curves**
6. **Skills of using Total Station Instrument efficiently**
7. **Setting out constructions, small &large building .**
8. **Arial photogrammetric surveying**
9. **Photogrammetric traditional surveying**
10. **Photogrammetric Instruments &Flight design**

11. Global Positioning System (GPS)

Geographic Information system (GIS)

21-

Code	Course/Module Title	ECTS	Semester
ATU22043	Building Construction	10	4
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USSWL (hr/sem)**
4	4	123	127
Description			
In this subject the student will learn: 1. soil investigation and soil bearing capacity. 2. Foundation types. 3. Building of walls by many masonry types (brick, stone, block, ….). 4. Forms types and scaffoldings. 5. Beams and columns. 6. Roofs and floor constructions. 7. Thermal and acoustical isolations. 8. Damp proofing. 9. finishing works.			

22-

Code	Course/Module Title	ECTS	Semester
ATU22044	English Language	2	4
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USSWL (hr/sem)**
2	0	33	17
Description			

After successful completion of this course, the student will be able to understand:

Present continuous, comparative and superlative adjective, vocabulary.

Time clauses, this and that, vocabulary and comprehension.

If clauses, vocabulary and comprehension.

This and that, expletive there, prepositions.

Past perfect, past perfect continuous , vocabulary and comprehension.

Relative pronouns, relative clauses.

Past perfect, Past perfect continuous, vocabulary and recension.

Used to, Infinitives, passive voice.

Passive voice, coordinating conjunctions, subordinating conjunction.

Future perfect, future perfect continuous, vocabulary and comprehension.

Writing a composition, comprehension

23-

Code	**Course/Module Title**	**ECTS**	**Semester**
ATU22045	**Computer Application**	**3**	**4**
Lectures (hr/w)	**Lab./Prac./Tutor.**	**SSWL (hr/sem)**	**USSWL (hr/w)**
1	**2**	**48**	**27**

Description

After successfully completing this module, the student will be able to recognize:

1- complete all steps of creating the project plan
2- setting the Primavera program and creating new projects
3- defining the calendar system, creating activity codes, adding and organizing
4- activities, adding logic to activities, Creating and supporting resources, Evaluating the projects with resources and printing the records.
5- use the engineering software programs related to its rules and theories has been taught to student previously

24- Arabic language

25-

Code	Course/Module Title	ECTS	Semester
ATU22047	The crimes of the extinct Baath Party	2	4
Lectures (hr/w)	**Lab./Prac./Tutor.**	**SSWL (hr/sem)**	**USSWL (hr/w)**
2	0	33	17
Description			
After successfully completing this module, the student will be able to recognize: إن الجرائم الشنيعة التي اقترفها نظام البعث في العراق لا تكاد تحصى ولو ان اقلام الباحثين تعقبتها بالتوثيق والتحليل والدراسة لما اتت على حقيقة ما جرى في بلدنا الجريح لذا كان الهدف من هذا المنهاج تبصرة الشباب الجامعي بحقيقة نظام البعث ومنهجه المحاط بمختلف الجرائم الانسانية لكل لا يضللوا بالاكاذيب الاعلامية			

26-

Code	Course/Module Title	ECTS	Semester

ATU22051	Reinforced Concrete (1)	5	5
Lectures (hr/w)	**Lab./Prac./Tutor.**	**SSWL (hr/sem)**	**USSWL (hr/sem)**
2	2	63	62

Description

After successful completion of this course the student will be able to understand:

1- To calculate loads and apply it on structures.
2- To analysis and design of different types of reinforced concrete members.
3- To understand bond, anchorage, development length, and serviceability.
4- Recognize the design philosophy of reinforced concrete structures.
5- Understand the difference between the structural behavior of different reinforced concrete structural elements through demonstration experiments and data analysis.
6- Be able to design different elements of reinforced concrete structural systems subjected to gr
7- Be able to analyze and design a complete structural system through a comprehensive design project.
8- Be able to produce a complete project document and present in a concise and complete manner to include structural drawings and structural calculations.
9- Summaries the fundamental mechanics of reinforced concrete and the empirical assumptions made for analysis.
10- Design basic structural elements (beams, columns and slabs) according to the design approach.
11- Apply fundamental mechanics to the design of reinforced concrete beams and slabs at the serviceability limit state including determination of short and long term deflection and crack widths.

27-

Code	Course/Module Title	ECTS	Semester
ATU22051	Structural analysis theory (1)	5	5
Lectures (hr/w)	**Lab./Prac./Tutor.**	**SSWL (hr/sem)**	**USSWL (hr/sem)**
2	1	48	77

Description

After successful completion of this course the student will be able to understand:

1. **define all types of structures and their stability.**
2. **define the methods of determination of the structure deformation under the load.**
3. **study the methods of analysis and internal forces determination of determinate and indeterminate structures .**
4. **study the methods used for analysis of structural elements due to moving loads using the influence lines.**

28-

Code	Course/Module Title	ECTS	Semester
ATU22053	Soil mechanics1	5	5
Lectures (hr/w)	**Lab./Prac./Tutor.**	**SSWL (hr/sem)**	**USSWL (hr/sem)**
2	2	63	62

Description
upon completion of this course the students will: **1- To apply the knowledge of soil nature and its formation.** **2- To identify soil classification for different types of soil.** **3- To learn the method of soil compaction in the field and lab and to compare with standard.** **4- To investigate the effective stresses without seepage, with seepage and under the different external loads** **5- To estimate settlement under different types of loading.** **6- Identify the mechanism of soil formation.** **7- Order the formation of different soil formation mechanisms.** **8- Explain the factors affecting the formation mechanic** **9- Explain factors affecting the grain structure of soil properties .** **10- Explain the physical and index properties of soil.** **11- Change the shape of the specified plane to the other under the effect of the stresses.** **12- Interpret the ground-water relations.**

29-

Code	Course/Module Title	ECTS	Semester
ATU22054	**Computer Application of structural**	**3**	**5**
Lectures (hr/w)	**Lab./Prac./Tutor.**	**SSWL (hr/sem)**	**USSWL (hr/sem)**
1	**3**	**63**	**12**
Description			
After successful completion of this course, the student will be able to understand: **1- Instilling Primavera Software, open a previous project, adding a new project, Describing the program screen, Adding activities to a project, Logic relationship, activity codes, Creation and Deleting Codes dictionaries, Creating and Deleting Activity and Default Activity code** **2-** DEFINING CALENDARS: Daily Calendar, Daily Base Calendar, adding colander to activities, Activity Types			

3- Adding the Logic: Adding Relationship to the activities, Auto Link, Deleting Relationship, PERT View, Formatting your PERT View

Scheduling the project and layouts

4-Creating & Using Resources : Resources definition, Creating Resource, Assigning Resources to Activities, Resources dialog block, Costs dialog block, Assign Resources Against Multiple Activities, Summary Percent Calculation, Editing Resources Calendar,

6- Editing a Resource Calendar, Resource Histogram, Resources Table, Printing tables and Layouts.

7- **Introduction to CSI software[Etabs, Sap and Safe]**

30-

Code	Course/Module Title	ECTS	Semester
ATU22055	**Pavement Engineering**	**4**	**5**
Lectures (hr/w)	**Lab./Prac./Tutor.**	**SSWL (hr/sem)**	**USSWL (hr/sem)**
2	**2**	**63**	**37**

Description

After successful completion of this course, the student will be able to understand:

1- To apply the knowledge of horizontal and vertical curves.
2- To identify sight distance for different types of curves.
3- To learn superelevation on horizontal curve.
4- To learn the method of design the rigid and flexible pavement.
5- To identify AADT, ADT and DHV
6- Perform road pavement design and analysis classifies mass movements, describe factors causing mass movements and propose.
7- Analyze and design various earth retaining structures for internal and external stability.
8- Identify the reason for real field slope and retaining wall failures and propose measures to mitigate such failures in the future.

9- To learn about drainage systems, culverts, siphon, ditches and filters.
10- To learn about highway furniture and control devices .

31-

Code	Course/Module Title	ECTS	Semester
ATU22056	**Advanced Concrete Technology**	**8**	**5**
Lectures (hr/w)	**Lab./Prac./Tutor.**	**SSWL (hr/sem)**	**USSWL (hr/w)**
4	**2**	**93**	**107**

Description

After successful completion of this course the student will be able to:

1- Discuss the concrete ingredients and its influence at gaining strength.
2- Design of concrete mix and grade as per IS codes.
3- Summaries the concepts of conventional concrete and its differences with other concretes like no fines, light weight etc.
4- Describe the application and use of fiber reinforced concrete.
5- Design and develop the self compacting and high performance concrete.
6- Explain the properties of the constituent materials of concrete.
7- Describe the physical & mechanical properties of aggregates.
8- Study the behavior of concrete at its fresh and hardened state, describe and carry out tests relevant to the use of concrete on site.
9- Explain factors affecting strength of concrete.
10- Understand the factors influencing concrete mix & know the BIS method of mix design.
11- Define special concretes, their application for practice.
12- Concrete mix design, Properties of hardened concrete

32-

Code	Course/Module Title	ECTS	Semester
ATU22061	**Reinforced Concrete (2)**	**5**	**6**
Lectures (hr/w)	**Lab./Prac./Tutor.**	**SSWL (hr/sem)**	**USSWL (hr/sem)**
2	**2**	**63**	**62**

Description

upon completion of this course the students will:

1. Learn the concept of analysis and design of concrete members,
2. Understand contemporary structural design concepts, critically evaluate design options and perform ACI code calculations.
3. Learn the concept of analysis and design of concrete members,
4. Understand contemporary structural design concepts, critically
5. Design RC Columns with due consideration of slenderness and biaxial effects
6. Design RC two-way slab systems using Direct Design Method
7. Design combined RC footings and retaining walls
8. Design Deep beams and Corbels
9. Identify the necessity of deflection and crack control in satisfying serviceability
10. Apply relevant ACI Code provisions to ensure safety and serviceability of structural elements.
11. Identify and compute the main mechanical properties of concrete and steel.
12. Apply the strength method to design R.C. structural Members.
13. Analyze and design R.C. beams for flexure and shear. Analyze and design short and slender R.C. columns. 6. Analyze and design R.C. slabs.
14. Utilize advanced computer software packages (SAP2000
1. and/or ETABS) for the analysis and design of steel structures.

33-

Code	Course/Module Title	ECTS	Semester
ATU22062	**Soil Mechanics (2)**	**5**	**6**
Lectures (hr/w)	**Lab./Prac./Tutor.**	**SSWL (hr/sem)**	**USSWL (hr/sem)**
2	**2**	**63**	**62**
Description			
After successful completion of this course, the student will be able: 1- To apply the knowledge of soil nature and its formation. 2- To identify soil classification for different types of soil. 3- To learn the method of soil compaction in the field and lab and to compare with standard. 4- To investigate the effective stresses without seepage, with seepage and under the different external loads 5- To estimate settlement under different types of loading. 6- Identify the mechanism of soil formation. 7- Order the formation of different soil formation mechanisms. 8- Explain the factors affecting the formation mechanic 9- Explain factors affecting the grain structure of soil properties . 10- Explain the physical and index properties of soil. 11- Change the shape of the specified plane to the other under the effect of the stresses. 12- Interpret the ground-water relations.			

34-

Code	Course/Module Title	ECTS	Semester
ATU22063	**Construction management**	**7**	**6**
Lectures (hr/w)	**Lab./Prac./Tutor.**	**SSWL (hr/sem)**	**USSWL (hr/sem)**
4	**2**	**93**	**82**
Description			

After successful completion of this course the student will be able to understand:

1- To apply the knowledge of management, science and engineering fundamentals to model the tasks and activities of projects.
2- To identify what is Project Management concepts.
3- To instill upon to Important of construction schedules.
4- To investigate the effectiveness of critical path methods and which one is more suitable for a specific project.
5- To appreciate concepts learn in Construction laws of construction management.
6- To communicate effectively the concepts of cash flow of the projects.
7- The broad education necessary to understand the impact of technical and business solutions in a global economic, environmental, ethical and societal context.
8- A recognition of the need for, and an ability to engage in life-long learning.
9- A knowledge of contemporary issues.
10- An ability to communicate effectively both verbally and in writing.
11- An ability to use the techniques, skills, and modern engineering tools necessary to solve technical and business problems.

35-

Code	Course/Module Title	ECTS	Semester
ATU22064	**Engineering& numerical analysis**	**4**	**6**
Lectures (hr/w)	**Lab./Prac./Tutor.**	**SSWL (hr/sem)**	**USSWL (hr/sem)**
2	**2**	**63**	**37**
Description			
Upon completion of this course the students will: **1- be able to apply knowledge of mathematics, science, and engineering** **2- Have the ability to identify, formulate, and solve engineering problems** **3- Construct rigorous mathematical arguments and proofs in engineering context.**			

4- Know how to use differentiation and integration in the context of engineering analysis and solving practical engineering problems.
5- Comprehend translations of common realistic engineering contexts into mathematics.
6- Think logically and mathematically for solving practical problems such as
mechanical vibrations, fluid flow problems, heat transfer problems.
7- Practice modeling and be able to translate engineering and physical situations into a mathematical model
8- To gain experience and further mastery of complete problem, solving fluency
based on Fourier Series and Partial Differential Equations.
9- Use proper assumptions to describe the complex behavior of practical problems and able to read and interpret problem objectives.
10- Realize modelling with partial differential equations and Fourier analysis for solving various practical applications.
11- Demonstrate IT skills.

36-

Code	Course/Module Title	ECTS	Semester
ATU22065	Transportation Engineering	4	6
Lectures (hr/w)	**Lab./Prac./Tutor.**	**SSWL (hr/sem)**	**USSWL (hr/w)**
2	2	63	37
Description			

After successful completion of this course, the student will be able to understand:

1- To apply the knowledge of asphalt materials and their tests.
2- To identify methods of hot mixture asphalt design.
3- To classify subgrade materials by AASHTO, USCS.
4- To examine the specification of Asphalt mixture
5- Selecting the appropriate materials for use in different road layers.
6- To evaluate the quality and performance of unbound and bound road materials.
7- Perform road pavement design and analysis classify mass movements, describe factors causing mass movements and propose.

8- Analyze and design various earth retaining structures for internal and external stability.
9- Identify the reason for real field slope and retaining wall failures and propose measures to mitigate such failures in the future.
10-To learn about railway and airport engineering.

37-

Code	Course/Module Title	ECTS	Semester
ATU22066	**Structural analysis theory**	**5**	**6**
Lectures (hr/w)	**Lab./Prac./Tutor.**	**SSWL (hr/sem)**	**USSWL (hr/sem)**
2	**1**	**48**	**77**

Description

After successful completion of this course the student will be able to understand:

1- **define all types of structures and their stability.**
2- **define the methods of determination of the structure deformation under the load.**
3- **study the methods of analysis and internal forces determination of determinate and indeterminate structures .**
4- **study the methods used for analysis of structural elements due to moving loads using the influence lines.**

38-

Code	Course/Module Title	ECTS	Semester
ATU22071	**Design of Reinforced Concrete buildings (1)**	**5**	**7**
Lectures (hr/w)	**Lab./Prac./Tutor.**	**SSWL (hr/sem)**	**USSWL (hr/w)**

2	**2**	**63**	**62**
Description			
upon completion of this course the students will: **1. Learn the concept of analysis and design of concrete members,** **2. Understand contemporary structural design concepts, critically evaluate design options and perform ACI code calculations.** **3. Learn the concept of analysis and design of concrete members,** **4. Understand contemporary structural design concepts, critically** **5. Design RC Columns with due consideration of slenderness and biaxial effects** **6. Design RC two-way slab systems using Direct Design Method** **7. Design combined RC footings and retaining walls** **8. Design Deep beams and Corbels** **9. Identify the necessity of deflection and crack control in satisfying serviceability** **10. Apply relevant ACI Code provisions to ensure safety and serviceability of structural elements.** **11. Identify and compute the main mechanical properties of concrete and steel.** **12. Apply the strength method to design R.C. structural Members.** **13. Analyze and design R.C. beams for flexure and shear. Analyze and design short and slender R.C. columns. 6. Analyze and design R.C. slabs.** **14. Utilize advanced computer software packages (SAP2000 and/or ETABS) for the analysis and design of steel structures.**			

39-

Code	Course/Module Title	ECTS	Semester
ATU22072	**Foundation Engineering1**	**6**	**7**
Lectures (hr/w)	**Lab./Prac./Tutor.**	**SSWL (hr/sem)**	**USSWL (hr/sem)**
2	**2**	**63**	**87**
Description			
When you complete this course you will be able to: 1- Basic engineering knowledge and understanding. 2- Cognitive skills. 3- Practical engineering and professional skills.			

4- Basic Mathematical skills.
5- Enhanced English language skills.
6- Interested in finding out more about a foundation route in engineering.
7- Determine the aims of the ground Investigation.
8- Reveal the theories of drilling locations, numbers, and depths and explain the methods of drilling. Interpret the Soil investigation report
9- Explain foundation types, and determine the type of foundation,
10- Calculations bearing capacity and settlement of shallow foundation using various methods.
11- Design of shallow foundations.

40-

Code	Course/Module Title	ECTS	Semester
ATU22073	**ETHIC**	**2**	**7**
Lectures (hr/w)	**Lab./Prac./Tutor.**	**SSWL (hr/sem)**	**USSWL (hr/w)**
2		**33**	**17**
Description			

المعرفة والفهم والتطبيق

* شرح مبادىء التحليل الاخلاقي والتفكير في مختلف المواقف المهنية.

* تنمية فرص الحوار والمناقشة حول المفاهيم الاخلاقية.

* حل المشكلات الاخلاقية التي تواجه الخريج في العمل.

* تنمية مهارة الحكم الاخلاقي للطلبة واستعدادهم للالتزام الاخلاقي بعد التخرج.

* الارتقاء بمستوى وعي الطلبة ليتمكنوا من إدراك كافة الابعاد الاخلاقية المحيطة بممارسة مهنهم المستقبلية.

* تقديم المعرفة العلمية والعملية.

*اعداد خريجين مؤهلين مهنياً واخلاقياً وتمكينهم من القيام بمهام المهنة العملية بعد التخرج بجودة عالية

41-

Code	Course/Module Title	ECTS	Semester
ATU22074	**Computer Aided design of structure**	**3**	**7**
Lectures (hr/w)	**Lab./Prac./Tutor.**	**SSWL (hr/sem)**	**USSWL (hr/sem)**
1	**2**	**48**	**27**

Description

Upon completion of the course. Student should be able to:

1. Describe the types of computer software in structural engineering and its usefulness range.
2. Explain the basic theories of computer software for structural analysis.
3. Use the software in structural engineering in accordance with the requirements.
4. Solve structural problems using sophisticated software
5. Graduates apply the knowledge of mathematical and physical sciences to solve problems in structural engineering.
6. construction engineering management, geotechnical engineering, water resources engineering, environmental engineering and transportation engineering.
7. Graduates are capable of handling and applying modern engineering tools, software, Remote Sensing and GIS for solving civil engineering related problems.
8. Graduates are capable of working in teams in laboratory and industrial environment and carrying out major design projects
9. Modeling of multistory building, analysis and design of the building components.
10. making details for civil drawing and documentation of the results.
11. Produce a presentation on information and communication technology as used within the civil engineering industry

42-

Code	Course/Module Title	ECTS	Semester
ATU22075	**Design of steel structures(1)**	**5**	**7**
Lectures (hr/w)	**Lab./Prac./Tutor.**	**SSWL (hr/sem)**	**USSWL (hr/w)**
2	**2**	**63**	**62**

Description

After successful completion of this course the student will be able to understand:

1- To understanding basic of the AISC specifications for design of steel structures.
2- To Knowledge of the design of steel members including connections.
3- To Knowledge of serviceability issues in design.
4- The students will gain an experience in the implementation of Design of Steel Structures on engineering concepts which are applied in field Structural Engineering.
5- The students will get a diverse knowledge of Design of Steel engineering practices applied to real life problems.
6- The students will learn to understand the theoretical and practical aspects of Design of Steel Structure along with the planning and design aspects.
7- Identify and compute the design loads on a typical steel building
8- Identify the different failure modes of steel tension and compression members and beams, and compute their design strengths.
9- Design bolted and welded connections for tension and comp. members and beams.
10- Apply relevant AISC provisions to ensure safety and serviceability of structural steel

43-

Code	Course/Module Title	ECTS	Semester
ATU22076	**Sanitary Engineering**	**9**	**7**

Lectures (hr/w)	Lab./Prac./Tutor.	SSWL (hr/sem)	USSWL (hr/sem)
4	4	123	102

Description

The student will be able to analyze, design, and implement the following:

1- Water Quality: Sampling, Physical, Chemical and Bacteriological characteristics

2- Water Supply: Ground and Surface Water Supplies, Water Transmission.

3- Water Treatment: primary, secondary, and tertiary stages.

4-Water supply and distribution networks in cities, and internal networks for buildings.

44-

Code	Course/Module Title	ECTS	Semester
ATU22081	Design of Reinforced Concrete buildings (2)	5	8
Lectures (hr/w)	**Lab./Prac./Tutor.**	**SSWL (hr/sem)**	**USSWL (hr/w)**
2	2	63	62

Description

On successful completion of the course, the student is expected to:

- Have knowledge of the prestressing steel material properties
- Have knowledge of the structural effect of prestressing, and practical performance
- Have knowledge of design of prestressed concrete structures in the service and ultimate limit states
- Have knowledge of general performance of concrete element structures
- Have knowledge of distribution of horizontal loads to bracing systems

- Have knowledge of design of horizontal and vertical composed concrete element plates
- Have knowledge of design and performance of different types of precast concrete elements
- Be able to design and verify that different types of prestressed concrete structures have sufficient capacity
- Be able to design bracing systems for precast concrete buildings
- Be able to design the most common types of precast concrete elements and the connections between them
- Understand how prestressed reinforcement work in different structures
- Understand the design basis of prestressed concrete and precast concrete elements

45-

Code	Course/Module Title	ECTS	Semester
ATU22082	**Quantity surveying & Estimation**	**7**	**8**
Lectures (hr/w)	**Lab./Prac./Tutor.**	**SSWL (hr/sem)**	**USSWL (hr/w)**
4	**3**	**108**	**67**

Description

Upon completion of the course. Student should be able to:

1- To make approximate and detailed estimates of buildings.
2- To specify the proper method of measurement.
3- To perform the rate analysis for different items of works.
4- To write the technical specification for various civil engineering works.
5- To provide the student adequate knowledge to prepare the Estimate and find the cost of overall project of works.
6- Ascertain the quantity of materials required for Civil engineering works as per specifications.
7- Prepare cost estimate and valuation of civil engineering works.
8- Prepare tenders & contract documents. Evaluate contracts and tenders in construction practice.

9- Determine direct job overhead applicable to a construction project.
10- Use computer applications to compile and organize a construction estimate

46-

Code	Course/Module Title	ECTS	Semester
ATU22083	**Design of steel structures(2)**	**5**	**8**
Lectures (hr/w)	**Lab./Prac./Tutor.**	**SSWL (hr/sem)**	**USSWL (hr/w)**
2	**2**	**63**	**62**

Description

After successful completion of this course the student will be able to understand:

1- To understanding basic of the AISC specifications for design of steel structures.
2- To Knowledge of the design of steel members including connections.
3- To Knowledge of serviceability issues in design.
4- The students will gain an experience in the implementation of Design of Steel Structures on engineering concepts which are applied in field Structural Engineering.
5- The students will get a diverse knowledge of Design of Steel engineering practices applied to real life problems.
6- The students will learn to understand the theoretical and practical aspects of Design of Steel Structure along with the planning and design aspects.
7- Identify and compute the design loads on a typical steel building
8- Identify the different failure modes of steel tension and compression members and beams, and compute their design strengths.
9- Design bolted and welded connections for tension and comp. members and beams.
10- Apply relevant AISC provisions to ensure safety and serviceability of structural steel

47-

Code	Course/Module Title	ECTS	Semester
ATU22084	**Foundation Engineering2**	**6**	**8**
Lectures (hr/w)	**Lab./Prac./Tutor.**	**SSWL (hr/sem)**	**USSWL (hr/sem)**
2	**1**	**48**	**102**

Description

Upon completion of this course, the students will acquire:

1- Basic engineering knowledge and understanding.
2- Cognitive skills.
3- Practical engineering and professional skills.
4- Basic Mathematical skills.
5- Enhanced English language skills.
6- Calculations Bearing capacity and Settlement of piles of single and group pile(s) in cohesive and granular soils.
7- Design of concrete retaining walls.
8- Methods of Slope stability analysis for clays & sand.
9- Methods of Soil improvement techniques.
10- Using Plaxis 2D and 3 D in simulations the soil and structures.

48-

Code	Course/Module Title	ECTS	Semester
ATU22085	**Construction drawing**	**3**	**8**
Lectures (hr/w)	**Lab./Prac./Tutor.**	**SSWL (hr/sem)**	**USSWL (hr/w)**
1	**2**	**48**	**27**

Description

After successful completion of this course the student will be able to understand:

1- Drawings are identified in terms of type and application for a construction process.

2- Key functions of the drawing are explained in terms of the finished product.
3- Key users of the drawing are identified in terms of work responsibilities.
4- Specifications and notes are explained in terms of work requirements.
5- Symbols and abbreviations are interpreted in terms of their functions and meanings.
6- The layout is interpreted in terms of the different views shown.
7- The purpose of each view is explained in terms of the result of the end product.
8- Apply the building bye laws and principles of planning for residential and public buildings.
9- Prepare detail drawings for residential and public buildings.
10- Explain the design and drawing of economical buildings

49-

Code	Course/Module Title	ECTS	Semester
ATU22086	**Innovative project**	**4**	**8**
Lectures (hr/w)	**Lab./Prac./Tutor.**	**SSWL (hr/sem)**	**USSWL (hr/w)**
	4	**63**	**37**

Description

In general, upon completion of the GP, students are expected to:
1- Ability to collect and analyze data, and finally draw conclusions through experimentation and simulation.
2- Ability to identify, formulate and solve engineering problems
3- Ability to design a system, component or process with defined constraints.
4- Ability to implement designed solutions
5- Ability to conduct literature review in the project domain.
6- Ability to communicate effectively through written reports and oral presentations.

7- Ability to function in multidisciplinary teams.
8- 8learn the skilled needed by a System Analyst to be, professional and a successful.
9- Learn Positive thinking.
10- Use current techniques, skills, and tools necessary for computing Practices.