



Ministry of Higher Education and Scientific Research
Scientific Supervision and Evaluation Authority
Quality Assurance and Academic Accreditation Department
Accreditation Department

Academic Program and Course

2024



Introduction:

The educational program is a coordinated and organized package of courses that include procedures and experiences organized in the form of study vocabulary, the main purpose of which is to build and refine the skills of graduates, making them qualified to meet the requirements of the labour market. It is reviewed and evaluated annually through internal or external audit procedures and programs, such as the external examiner program .

The academic program description provides a brief summary of the main features of the program and its courses, indicating the skills that students are working to acquire based on the objectives of the academic program. The importance of this description is evident because it represents the cornerstone in obtaining program accreditation, and the teaching staff participates in writing it under the supervision of the scientific committees in the scientific departments.

This guide, in its second version, includes a description of the academic program after updating the vocabulary and paragraphs of the previous guide in light of the developments and changes in the educational system in Iraq, which included a description of the academic program in its traditional form (annual, semester) in addition to adopting the description of the academic program circulated under the letter of the Department of Studies TM 3/2906 dated 5/3/2023 regarding programs that adopt the Bologna process as a basis for their work. In this regard, we cannot but emphasize the importance of writing a description of academic programs and curricula to ensure the smooth running of the educational process.



Concepts and terms:

Academic Program Description: The academic program description provides a brief summary of its vision, mission and objectives, including an accurate description of the targeted learning outcomes according to specific learning strategies.

Course Description: Provides a brief summary of the most important characteristics of the course and the learning outcomes expected from the student to achieve, demonstrating whether he has made the most of the available learning opportunities. It is derived from the program description.

Program Vision: An ambitious picture of the future of the academic program to be an advanced, inspiring, motivating, realistic and applicable program.

Program Mission: Clarifies the goals and activities necessary to achieve them concisely, and identifies the program's development paths and directions.

Program Objectives: These are statements that describe what the academic program intends to achieve within a specific period and are measurable and observable.

Curriculum Structure: All courses/subjects included in the academic program according to the approved learning system (semester, annual, Bologna track) whether they are required (ministry, university, college and scientific department) with the number of academic units.

Learning outcomes: A consistent set of knowledge, skills and values acquired by the student after successfully completing the academic program. The learning outcomes for each course must be determined in a way that achieves the program objectives. Teaching and learning strategies: These are the strategies used by the faculty member to develop the student's teaching and learning. They are plans that are followed to achieve the learning objectives. That is, they describe all classroom and extracurricular activities to achieve the learning outcomes of the program.



Ministry of Higher Education and Scientific Research
Scientific Supervision and Evaluation Agency
Department of Quality Assurance and Academic Accreditation

Academic program description form for colleges and institutes

University: Al-Furat Al-Awsat Technical University

College/ Institute: Technical Institute Samawa

Scientific Department: Building and Construction

Date of filling out the file: 4/1/2024

The signature: 


Name of Department Head: Assist. Prof. Baydaa Abdel Hassan Khalaf

Date: 4/1/2024

The signature: 


Name of scientific assistant: - M. Alaa Abdel Ali

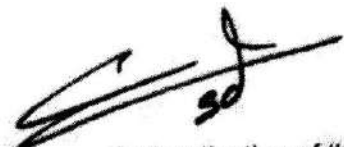
Date: 4/4/2024

The file was checked by M. M. Ahmed Abdel Mohsen Abdel Sahib 

Division of Quality Assurance and University Performance

Name of the Director of the Quality Assurance and University Performance
Division: Ahmed Abdel Mohsen

Date: Signing 4 / 04/2024 



Authentication of the Dean

4 / 04/2024

Academic Program Description

It is concerned with developing technical education at the governorate level in particular and at the level of the Middle Euphrates in general through a distinguished and renewed program and provides a high-quality technical and educational environment and services that enrich the profession, advance society, and provide a highly qualified intermediate technical cadre in the field of construction and building to build and serve their country.

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| 1- Educational institution | Middle Euphrates University |
| 2- Section scientific/ Center | Building and Construction Department |
| 3- Academic Program Name Or professional | Construction and Building Program |
| 4- Certificate Name | Technical Diploma |
| 5- Academic system: Annual / Courses / Other | annual |
| 6- Accreditation Program Certified | The beginning ABET |
| 7- Other external influences | There is a close relationship with the labor market that receives graduates. |
| 8- Description preparation date | 1/4/2024 |
| 9- Academic Program Objectives | |
| 1- Providing the student with contemporary scientific and technical experiences that enrich his skills so that he can excel in his academic life after graduation or upon completing his undergraduate or graduate studies. | |
| 2- Providing study materials within established and prepared curricula, including graduation projects that develop his skills in the fields of construction .And constructions Different. | |
| 3- Providing the student with skills that develop him Ethics Work, spirit of cooperation, communication and love of the profession | |
| 4- Developing the student's scientific and technical capabilities And creativity To be a factor in his distinction among his colleagues at work or at completion His study Primary Or the highest. | |
| 5- Continuous participation of the department in ongoing evaluation processes to ensure quality in the quality of education. | |

6- Providing a pioneering environment based on the distinguished engineering expertise of faculty members and technicians And administrators In order to meet all the needs of students.

1- Outputs of the program Required teaching, learning and assessment methods

A- Cognitive objectives -إ

A1- Preparing tables of quantities and estimating prices.

A2-Mapping buildings.

A3-Conducting laboratory tests for construction materials.

A4-Calculating areas and dividing lands.

A5-Conducting field surveys.

A6- Comparing the results with the applicable specifications.

B-Skill objectives Special for program

B1-Construction materials inspection skill.

B2-Skill in diagnosing the suitability of construction materials for use.

B3 -Area calculation skill.

B4- Skill in using different surveying devices.

B5- Skill in preparing the arm for projects.

Teaching and learning methods

1- Lectures using modern and traditional methods + laboratories (weekly reports on the experiments carried out) + field visits + summer training.

2- Asking the student to visit the library and the Internet to gain additional knowledge of the study materials.

3- Follow-up of practical laboratories by the subject teacher and the technical staff in the department.

4- Involving students in discussions through which some practical problems are solved.

Evaluation methods

- Evaluate students individually by giving them the opportunity to participate in the class by answering questions.
- Evaluating students collectively through daily exams with practical and theoretical questions.
- Evaluating students collectively by giving extracurricular assignments such as writing special reports or those related to practical experiments in the

laboratory.

- First and second semester final exams and final exams for the first and second semesters.

C- Emotional and value goals.

A1-External questions and bringing theoretical and practical material closer to practical reality.

A2-Practical skills in laboratories.

A3-Theoretical lectures.

G4- Field visits.

Teaching and learning methods

- Using modern means to present the theoretical and practical aspects, such as various electronic display devices, to attract attention and engage students so that the idea reaches the student in a better way.
- Giving students extracurricular assignments that require self-skills and interpretations in experiential ways.
- Questioning students through discussion groups by asking intellectual questions (how, why, when, where, which) on specific topics.
- Using brainstorming and feedback to activate students' accumulated experiences by linking the subjects they have learned in previous academic stages and linking them to the new ones.
- Providing students with practical skills by conducting practical experiments on laboratory equipment.

Evaluation methods

Evaluation is based on:

- 1- First semester exam (usually 10% practical + 10% theoretical)
- 2- Second semester exam (usually 10% practical + 10% theoretical)
- 3- Work of the year (10%) Participation, attendance and student activity are taken into consideration.
- 4- Final exam (10% practical + 40% theoretical).

D-General skills and Qualification Movable(Skills Other related to employability and development(Personal)).

D1-Enabling the student to prepare reports on structural inspections.

D2-Enabling the student to conduct tests on construction materials and provide results.

D3-Enabling the student to prepare construction maps.

D4-Enabling the student to measure areas and fully understand surveying devices.

Teaching and learning methods

- Lectures + Labs + Summer Training
- Preparing and implementing research and projects by students
- Develop and update the vocabulary of the materials to keep pace with developments.

Evaluation methods

- Midterm exams + final exams + daily assessment.
- Discussion of research and projects by scientific committees in the department.

1. Program structure

| Credit hours | | Course name | Course code | Academic stage |
|--------------|-------------|-----------------------------|-------------|----------------|
| practical | theoretical | | | |
| 2 | 2 | Materials Construction | | First |
| 1 | 2 | Engineering Mechanics | | First |
| 2 | 2 | Area (1) | | First |
| 2 | 1 | Concrete materials | | First |
| - | 3 | mathematics | | First |
| 2 | 1 | Calculator Applications (1) | | First |
| 6 | - | Engineering | | First |

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|---|---|------------------------------------|--|--------|
| | | drawing | | |
| 3 | - | Laboratories | | First |
| - | 2 | Human Rights and Democracy | | First |
| - | 1 | English language | | First |
| 2 | 2 | Concrete Technology | | Second |
| 2 | 2 | Soil mechanics | | Second |
| 2 | 1 | Area (2) | | Second |
| 2 | 1 | Computer Applications (2) | | Second |
| - | 3 | Quantity survey | | Second |
| 5 | 1 | Civil drawing | | Second |
| - | 2 | Construction machinery | | Second |
| - | 2 | Buildings and construction factory | | Second |
| 4 | - | Construction techniques | | Second |
| 2 | - | The project | | Second |

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| 2. Planning for personal development |
| Obtaining a technical diploma in the field of building and construction technologies. |
| 3. Acceptance Criteria(situation Regulations relating to college admission orThe Institute |
| 1- Science graduate. 2- According to central acceptance / i.e. acceptance rate not less than 60% |
| 4. The most important sources of information about the program |
| 1- Follow the latest releases on websites, public libraries and the institute's library. 2- View the latest devices and technologies in the field of work |

Curriculum Skills Chart

Please tick the boxes corresponding to the individual learning outcomes of the programme being assessed.

| Required learning outcomes of the program | | | | | | | | | | | | | | | | essential Or optional | Course name | Course code | Year/Level |
|--|----|----|----|------------------------------|----|----|----|-----------------------------|----|----|----|-------------------------|--------|--------|--------|--------------------------|-----------------------------------|----------------|------------|
| General skills And rehabilitation Movable(Other skills related to employability and personal development) | | | | Emotional and value goals | | | | Program Skill Objectives | | | | Cognitive objectives | | | | | | | |
| D4 | D3 | D2 | D1 | A4 | A3 | A2 | A1 | B4 | B3 | B2 | B1 | A 4 | A 3 | A 2 | A 1 | | | | |
| * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | My specialty | Construction materials | | The first |
| | | * | * | | | * | * | | * | * | * | | * | * | * | My specialty | Engineering mechanics | | |
| * | * | * | * | * | * | * | * | | * | * | * | * | * | * | * | My specialty | Area | | |
| * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | My specialty | Concrete materials | | |
| | | | * | | | * | * | | * | * | * | | * | * | * | My specialty | mathematics | | |
| | * | * | * | | * | * | * | | * | * | * | | * | * | * | help | Calculator Applications (1) | | |
| | * | * | * | | * | * | * | | * | * | * | | * | * | * | My specialty | Engineering drawing | | |
| | * | * | * | | * | * | * | | | * | * | | * | * | * | help | Laboratories | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|--------------------|------------------------------------|---------------|
| | | * | * | | | * | * | | * | * | * | | * | * | * | General | Human Rights and Democracy | |
| | | * | * | | | * | * | | | | * | | | * | * | help | English language | |
| * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | Specialized | Concrete Technology | Second |
| * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | Specialized | Soil mechanics | |
| * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | Specialized | Area (2) | |
| | * | * | * | | * | * | * | | * | * | * | * | * | * | * | Specialized | Computer Applications (2) | |
| | * | * | * | | * | * | * | * | * | * | * | * | * | * | * | Specialized | Quantity survey | |
| * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | Specialized | Civil drawing | |
| | * | * | * | | * | * | * | | | * | * | | * | * | * | Specialized | Construction machinery | |
| * | * | * | * | | | * | * | * | * | * | * | * | * | * | * | Specialized | Buildings and construction factory | |
| | * | * | * | | | * | * | | * | * | * | * | * | * | * | Specialized | Construction techniques | |
| * | * | * | * | | | * | * | * | * | * | * | * | * | * | * | Specialized | The project | |

Technical Institute / Samawa

Department : Building & Construction

Subject: Construction materials

Class : First Year

Hours : (2 hour) Theoretical , (2hours) Practical

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Objectives :

Introducing the student to the properties of construction materials and methods of production, introducing the student to the modern alternatives currently available and modern methods of production, and then qualifying the student to perform standard tests to determine the extent to which construction materials conform to specifications and determine the possibility of using them in construction, which ensures strength, safety, and economy.

| week | Syllabus |
|-------------|--|
| 1 | A general description of the physical properties and standard specifications of building materials and their uses in buildings. But practically. Getting to know the laboratory, its basic equipment, and the balances |
| 2 - 4 | Clay bricks and methods of making them. Properties, uses and specifications of clay bricks. Tests for clay bricks. Brick tests - density, specific gravity Absorption test, 1/2 hour, 24 hours, Efflorescence Resistance to compression and dissolved salts |
| 5 | Limestone bricks, glass bricks, properties and manufacturing methods. Tests of glass bricks and limestone bricks, density, absorption and compressive strength |
| 6 | Concrete blocks (properties and manufacturing method, explaining the difference between the two). Tests of concrete blocks, absorption density, dissolved salts |
| 7 | Thermostone, its properties, and methods of manufacturing. Thermostone tests, density, absorption, and compressive strength |
| 8 | Discussion of the visit to the brick factory. A visit to the brick factory |
| 9 & 10 | Building stone - its classification and types. Uses of building stone according to its types. Standard tests for binders (epoxy). Tests of bonding materials that are not resistant to moisture, plaster, textures |
| 11 to 13 | Bonding materials and their types. Materials that resist moisture (cement mortar, cement mortar - calcium hydroxide), calcium hydroxide, method of |

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| | making, properties, hardening time, test the tensile strength of the plaster Smoothness test of gypsum and plaster products |
| 14 | Gypsum products - their types and properties, secondary ceiling materials and their types , test the durability of the plaster |
| 15 & 16 | Finishing materials for floors, tiles and their types . Manufacturing methods - how to work floors - joints. Standard tests for tiles. Standard tests for tiles and sidewalks, including salts and absorption. |
| 17 to 19 | Testing pressure and fracture standards for tiles and concrete tiles Moisture-preventing materials, their types and reasons for use. Materials that prevent high humidity, their types, manufacturing methods and uses. Semi-flexible and flexible moisture-repellent materials, their types, uses, manufacturing methods, and liquid moisture-repellent materials. Standard specifications for test moisture-proof materials . Test the vertical and parallel pressure of the wood fibers |
| 20 | Epoxy, its definition, properties, types, and uses. Wood splitting and bending inspection |
| 21 & 22 | Wood - its origin, types used, and methods of using it. Wood drying methods and wood defects. Tensile test of iron . Standard specifications for test heat insulating materials |
| 23 | Metals (steel and non-steel materials) and their uses in buildings. Standard specifications for test soundproof materials |
| 24 | Iron: methods of making it, its types and uses. Standard specifications for testing materials for dyes |
| 25 | Thermal insulation materials. Testing of ductility by combustion method for asphalt_cement |
| 26 | Sound insulation materials. Testing ductility using the Ring and Ball Test method |
| 27 | Dyes. Ductility test for asphalt |
| 28 | The glass . Checking the degree of burning using the Flash Point method |
| 29 | Asphalt, properties of asphalt materials, checking the degree of homogeneity using the Spot Test method |
| 30 | Types of asphalt and its uses in construction works Standard inspections of glass |

Technical Institute / Samawa

Department : Building & Construction

Subject: Engineering mechanics

Class : First Year

Hours : (2 hour) Theoretical , (1hours) Discussion

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Objectives :

Analyzing structures and finding the forces and stresses in their parts as a result of external loads and their relationship to the dimensions of the various parts in engineering facilities so that they can withstand the stresses placed on them safely and economically.

| week | Syllabus |
|-------------|---|
| 1 | Definition of mechanics, general review of physics topics related to the subject, trigonometric ratios of angles, vector and non-vector quantities. |
| 2 & 3 | Analysis and synthesis of forces, the law of the force triangle and the force polygon. |
| 4 | Moment . |
| 5 | Couples . |
| 6 & 7 | The resultant of convergent, non-convergent, and parallel forces. |
| 8 | Spread loads. |
| 9 & 10 | Equilibrium, drawing a free body diagram, equilibrium equations, equilibrium in the case of convergent, non-convergent, and parallel forces. |
| 11 | Types of Beams, types of supports, balance in the Beams. |
| 12 & 13 | Trusses, analysis of trusses using joints and sections. |
| 14 & 15 | Friction, nature of friction, theory of friction, laws of friction, types of friction, general applications. |
| 16 & 17 | Centers of gravity of simple and complex geometric shapes and their applications. |

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| 18 & 19 | Moment of inertia of simple and complex geometric shapes and their applications |
| 20 | Introduction to the resistance of materials, definition of stresses and their types, safety factor. |
| 21 | Applications to stress. |
| 22 | Strain, Hooke's law, the relationship of strain to stress. |
| 23 | Lateral strain, Poisson's ratio, applications to strain and stress. |
| 24 | Shear and bending moment diagrams for Beams, how to form equations for changing shear and bending moments. |
| 25 | Applications to drawing shear and bending moment equations for beams |
| 26 & 27 | Bending stress of beams and their applications. |
| 28 | Shear stress of beams and their applications. |
| 29 & 30 | Beams made of two different materials and their applications. |

Technical Institute / Samawa

Department : Building & Construction

Subject: Surveying

Class : First Year

Hours : (2 hour) Theoretical , (2hours) Practical

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Objectives :

Qualifying the student to use various surveying devices for civil engineering work and implementing maps for projects, and enabling him to plan, supervise and implement these projects

| weak | Syllabus |
|-------------|---|
| 1 | Definition of Surveying - its areas - divisions - uses - units of measurement .Getting to know the surveying equipment in the surveying laboratory and teaching the student to read all types of tape, pins ,Range poles , method of using the devices and the process of receiving and returning the devices, the field notebook, and how to write a report. |
| 2 | Measuring horizontal distances on flat terrain (orientation method) - measuring horizontal distance on irregularly sloping terrain. Measuring horizontal distance using approximate methods (Steps) With a tape, measure a horizontal distance On an irregularly sloping terrain. |
| 3 | Measuring horizontal distances on sloping land (regular slope) (if the height difference is known, if the degree of slope of the land is known, if the angle of slope of the land is known). Drawing/numerical scale - longitudinal and grid - with solving exercises on different drawing scales |
| 4 | Erecting and dropping lines (erection methods and dropping methods), overcoming obstacles that hinder measuring horizontal distances. An exercise on erecting and dropping columns (erection methods, projection methods) and giving an exercise on a centering plan for a simple building and dropping it on the ground. |
| 5 | Tape surveying. An exercise in measuring an zone with tape and preparing a map at a specific scale. |
| 6 | Plane plate - its parts - methods of lifting the plane plate (Arrows method). Raising a polygon using a flat plate using the m Arrows method. |

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| 7 | <p>Front cross-lift method, rotation method - (close error and how to correct it) - advantages and disadvantages of scanning with a flat plate.</p> <p>An exercise on raising points using the forward intersection method and raising a polygon using the rotation method.</p> |
| 8 | <p>Leveling - definitions related to it - its purposes.</p> <p>Leveling device - its types - how to setting up the device – leveling staffs - their types and how to read on them.</p> |
| 9 | <p>How to calculate point levels using the H.I method and solve examples.</p> <p>Conduct a longitudinal leveling and calculate its levels by H.I</p> |
| 10 | <p>How to calculate point levels using the rise and fall method and solve examples.</p> <p>Solve applied examples of calculating levels using the two methods (scale surface, rise and fall).</p> |
| 11 | <p>Double leveling - the effect of the sphericity of the earth and light refractions on leveling work.</p> <p>Conduct a double adjustment process and calculate the adjusted levels</p> |
| 12 | <p>Inverted settlement - mutual settlement (Inverse) with solving examples.</p> <p>Performing an inverted reconciliation process. Performing a reciprocal reconciliation process.</p> |
| 13 | <p>Sources of errors in leveling work - degree of accuracy - amount of permissible error.</p> <p>Solving examples of obstacles in leveling work (inverted leveling), solving examples of the degree of accuracy, the amount of permissible error, correcting the error.</p> |
| 14 | <p>Longitudinal sections - drawing the longitudinal section - solving examples.</p> <p>Performing a longitudinal settlement (making a longitudinal section) while drawing the longitudinal section, choosing a line to establish levels and calculating its slope(s).</p> |
| 15 | <p>Cross sections - finding the levels of the cross-section points - drawing the cross-section.</p> <p>Making a longitudinal section and cross sections - drawing the longitudinal section and cross sections and clarifying the construction lines on them.</p> |
| 16 | <p>Construction line - Calculating the slope of the construction line - Finding the levels of the construction line points if the slope is known - (Drawing the proposed line for a project).</p> <p>Practical exercises on drawing the longitudinal section and determining the construction line for multiple projects.</p> |
| 17 | <p>Calculating land areas and cross sections using demarcation methods, mathematical laws, and coordinates.</p> <p>Practical exercises on calculating land areas and cross sections using demarcation methods, mathematical laws, and coordinates.</p> |
| 18 | <p>Calculating areas using a planometer.</p> <p>Giving a general and comprehensive example of leveling work, calculating levels, drawing the longitudinal section and cross sections, determining the construction line, then calculating the amounts of soil for excavation and backfilling.</p> |

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| 19 | Calculating the sizes of soil quantities for excavation and backfilling. Conduct an exercise on checking and adjusting the leveling device (Tow leg test and solving related examples). |
| 20 | Checking and adjusting the leveling device - balancing the leveling lines (leveling balance). Determine contour lines directly in the field. |
| 21 | Contour lines - their properties - the contour interval - factors on which the contour interval depends - the contour span - determining contour lines (direct method). Setting contour lines in the field using squares (grid leveling). |
| 22 | Methods of determining contour lines (indirect methods), the method of sections, the method of control points, the method of squares (grid leveling). Practical exercises on drawing contour lines by calculation and dividing the difference. |
| 23 | Drawing contour lines (calculation method and method of dividing the difference). A project to make a topographical map and draw contour lines on it. |
| 24 | Slopes -calculating the volumes of tanks (Cisterns) - Drawing sections from contour lines. Identify the planometer and calculate the areas of irregular shapes. |
| 25 | Deviations - circular deflection. The compass, its parts, deflection, measuring directions, deviations, and extracting the interior angles of the closed polygon. |
| 26 | Surveying using a compass and practical exercises on how to calculate surveying using a compass. Raising a closed polygon using a compass, correcting deviations, and calculating the interior angles of the closed polygon after drawing the polygon. |
| 27 | Curves - horizontal curves - their types (Circular and graduated) - elements of a simple circular curve - and a drawing of each type. How to draw simple horizontal curves using only tape. |
| 28 | Designing the simple circular curve (equations for this) - Drawing the simple circular curve. Solve applied examples of designing and drawing a simple circular curve. |
| 29 | Vertical curves - vertical curve design. An exercise on how to calculate the levels of a vertical curve and how to project it to the ground. |
| 30 | General Review. |

Technical Institute / Samawa

Department : Building & Construction

Subject : concrete material

Class : First year

Hours :1 hrs (Theoretical) and 2hr (Practical)

Objectives :

introduce the student to the material that make the concrete and know the chemical ,physical and mechanical test for that material and how effect in the concrete .

| Week | Syllabus |
|-------------|---|
| 1&2 | General principle of concrete (define .composition ,properties (train the student to the right use for all type of the weights , how to write the laboratory report and discuses . test the standard texture of the white and ordinary Portland cement . |
| 3-5 | Portland cement : manufacture, chemical composition , types ,test of initial and final setting time of the cement ,test of the compression and tensile strength for the cement mortar ,fineness test of cement by using (sieve analysis) |
| 6 | Other types of cement (normal cement , expanding cement , aluminous cement , and properties of all type .stability test of cement |
| 7&8 | Properties of cement : fineness ,stability of cement , loss weight by heating , hardened heat , . How can get standard samples of the coarse and fine aggregate . moisture content test for the coarse and fine aggregate . |
| 9&10 | Continue the properties of cement : initial and final setting time , compression strength , tensile strength . Compacted and un compacted density test for the coarse and fine aggregate . Corrosion test for coarse aggregate .inflation test for fine aggregate . |

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| 11 | Aggregate : classification of aggregate, sample taking ways .particle shape ,surface texture of particle ,durability of aggregate .sieve analysis of aggregate. |
| 12-16 | Mechanical characteristic of aggregate :specific gravity ,compacted and un compacted unit weight ,porosity ,energy observation ,corrosion , sand inflation ,gradation , Sieve analysis of sand . specific gravity test and absorption test for coarse aggregate . specific gravity and absorption test for fine aggregate . suspended and clay material test for fine and coarse aggregate . salts percent test for fine aggregate ,corrosion test for coarse aggregate. |
| 17&18 | Salt and clay material percent for the aggregate special sand ,interaction with alkaline substances ,determine the organic material for the aggregate, sieve analysis for the fine and coarse and mix aggregate . |
| 19&20 | Light and heavy aggregate :type of light weight aggregate(natural and artificial aggregate . Advantage and disadvantage of light weight aggregate compare with normal aggregate .porosity and observation test for light aggregate. |
| 21&22 | Properties of light aggregate using in the structure concrete. properties of light weight aggregate using in isolated concrete . properties of light weight aggregate using in production of block concrete. Mix water test (organic material ,chlorides , sulfate), durability test for different type of aggregate. |
| 23 | Silica using, silica fume and fly ash in the concrete production from the side of specification and effect . |
| 24 | The using water in the production of concrete :mixing water , curing water ,specification of each type ,physical test for different type from the fibers that using in fibers concrete with focus in the tensile test . |
| 25 | Fibers using in the concrete : (types , specification) Fly ash test (salt, carbon). |

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| 26&27 | <p>Types of admixture : (water reducing admixture ,accelerated admixture , late admixture , operation improvement admixture ,antifreeze admixture ,</p> <p>Specific gravity and density test for the material adding to the concrete,</p> <p>Fineness test for the adding solid material , viscosity test for the liquid material adding to the concrete .</p> |
| 28&29 | <p>Chemical composition for the admixture material : specific gravity test for the admixture .sediment test for the solid admixture by drying , sediment test for the liquid admixture by drying ,</p> <p>homogeneity test .</p> |
| 30 | <p>Physical required for the concrete admixture :the allowed time for the delayed consolidation time .the allowed time for the accelerated for the accelerated material , admixture effect test on the initial and final setting time .</p> |

Technical Institute / Samawa

Department : Building & Construction

Subject: Mathematics

Class : First Year

Hours : (3 hour) Theoretical

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Objectives :

The student learned the different ways of representing equations, mathematical laws, and various data by forming curves in a graph and using different types of diagrams that suit the purpose of drawing them.

| week | Syllabus |
|-------------|---|
| 1 | Matrices, determinants, and their properties. |
| 2 | Solving linear equations, Cramer's method, applications to determinants, solving force analysis equations. |
| 3 | Vectors, vector analysis, vector and scalar quantities, vector algebra, arithmetic operations for vectors in space. |
| 4 | Unit of orthogonal vectors, vector scaling, scalar and cross multiplication, applications of vectors, calculation of moment applications, work. |
| 5 | Function, trigonometric functions and trigonometric relationships, logarithmic function |
| 6 | Exponential function, hyperbolic functions, their applications. |
| 7 | Limits , the Limit of algebraic and trigonometric functions, applications to the limit |
| 8 | Arithmetic progression. |
| 9 | Differentiation, derivative, derivative of algebraic functions, chain rule. |
| 10 | Curvilinear functions, standard derivative function of higher order. |
| 11 | Derivative of trigonometric functions, derivative of logarithmic functions. |

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| 12 | Derivative of exponential function, derivative of hyperbolic functions. |
| 13 | Applications of the derivative, the tangent and perpendicular equation, speed, acceleration, and magnification. |
| 14 | Exponents and logarithms. |
| 15 | General physical and engineering applications, drawing functions. |
| 16 | Integration, indefinite integration, integration of algebraic and logarithmic functions. |
| 17 | Integration of exponential and trigonometric functions. |
| 18 | Definite integration, applications of definite integration, area under the curve, area between two curves. |
| 19 | Rotational volumes, arc length. |
| 20 | Physical and engineering applications (work, moment, momentum, moment of inertia). |
| 21 & 22 | General methods of integration, including substitution and division. |
| 23 | Use partial, exponential, and logarithmic fractions. |
| 24 | Numerical methods in integration, the trapezoid rule, the rule (calculating the volume of soil quantities and the area of longitudinal sections). |
| 25 | Solving differential equation , homogeneous, and linear differential equations with their various applications within the field of specialization. |
| 26 | Finding the highest or lowest point of a vertical curve. |
| 27 | Complex numbers, plus , minus, multiplication, division. |
| 28 | Polar formula, converting the polar formula to algebraic and vice versa, powers and roots, representing roots graphically. |
| 29 & 30 | Statistical operations, frequency distributions, histogram, frequency curve, arithmetic mean, range, standard deviation, variance and proportion. |

Technical Institute / Samawa

Department : Building & Construction

Subject : computer application

Class : First year

Hours : 3 hrs (Theoretical) and (Practical)

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Objectives :

The student must know how to deal with the operating system and know how to use Microsoft program (word and excel) and to print The file, also the student will introduce to the drawing program (AutoCAD).

| Week | Syllabus |
|-------------|--|
| 1 | Operating system (windows):understand the operating , computer desk top component , mouse application ,task bar component , use the start to entre to the program how to close the program and shutdown the computer . |
| 2 | How to deal with the desktop icons like (my documents; recycle Bin) |
| 3 | Know the my computer from the point of folder file and know how to copy the folder and the file use the cut and copy ,learn the properties of the folder and file ,deal with recycle Bin. delete the file and recovery from the recycle Bin. |
| 4 | AutoCAD program: know the program .program important and component of the program ,how to make new file and save . |
| 5 | AutoCAD orders use ways. |
| 6 | Toolbars in AutoCAD, how to hide and show them, and customize a special interface for the program. |
| 7 &8 | Use (Grid ,ortho.snap) bar. |
| 9&10 | how to use help order (Limit drawing , unit , zoom). |

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| 11-15 | Basic drawing order from draw list. |
| 16-20 | Modify order list. |
| 21&22 | Text order and dimension order |
| 23-26 | Microsoft word : how to use and how to print and change the type of text and modify the paper and use the table |
| 27-30 | Microsoft excel :how to use and how to put the numbers in the column and safe , add new column or new rows ,apply some of equation like sum or different type of calculation. |

Technical Institute / Samawa

Department : Building & Construction .

Subject : Engineering drawing

Class : First year

Hours :6 hrs (Practical)

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Objectives :

Introducing the student to drawing and reading engineering maps, with knowledge of the architectural and construction terms that are used in maps.

| Week | Syllabus |
|-------------|---|
| 1 | Basics of engineering drawing, tools used, installing the board, types of fonts, writing in engineering calligraphy. |
| 2 | Geometric operations, bisecting a line segment, bisecting an angle, connecting a straight line with a circle with an arc, connecting two straight lines with an arc, drawing an equilateral triangle, pentagon, hexagon, a straight line tangent to two circles from the inside and outside, an arc tangent to the two circles from the inside and outside. |
| 3 | To ellipse, apply drawing geometric shapes using basic geometric operations |
| 4 | Principles of projection, method of placing dimensions on a drawing, exercises on projection. |
| 5 | Isometric perspective drawing. |
| 6 | Isometric perspective drawing Finding the missing location by drawing the isometric perspective. |
| 7 | Clips. |
| 8 | AutoCAD applications, redefining the relationship between the AutoCAD program and its use in creating two-dimensional (2D) and three-dimensional (3D) drawings, opening a new page in the program, specifying the drawing field (Limits), drawing a panel frame and a data table, with the application of writing inside the data table. (Text) |

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| 9 | Identify the types of lines and how to obtain and use them in AutoCAD by placing them in multiple layers, different colors, and different thicknesses (Line weight). |
| 10 | Drawing basic geometric shapes, triangle, pentagon, hexagon and polygons in general, ellipse, connecting two lines with a circle sector Connecting two circles with an arc by instructing (circle Ttr) to connect a straight line with a circle with an arc in the same way. |
| 11& 12 | Drawing complex geometric shapes and mechanical parts (applications to engineering processes). |
| 13 & 14 | Draw projections of three-dimensional shapes and add dimensions to them using multiple layers |
| 15 | Draw projections of three-dimensional shapes using different line colors and thicknesses by changing the properties. |
| 16 | Find the missing projection and continue drawing the projections. |
| 17 | Adding additions to graphics (Hatch & gradient), and how to add additional patterns to the program from external sources. |
| 18&19 | Drawing a solid shape using the Isometric Snap method |
| 20 | Draw sections in the same way (Isometric snap). |
| 21 | How to repeat shapes using the command (Polar array& array Rectangular). |
| 22 | How to make a block to repeat geometric shapes and how to store and recall them. |
| 23&24 | Drawing an integrated drawing that contains the types of drawings (2D) and (3D) and contains a data table and an explanation of the drawings. |
| 25 | How to display shapes in different views on one screen using the command (view ports). |
| 26 | How to transfer graphics between files and how to open more than one file using the window command. |
| 27 | Identify geometric shapes (cube, prism, pyramid). |
| 28 | Individualizing geometric shapes (truncated pyramid, cone). |
| 29 | Dealing with the drawing scale and printing method using the plot command. |
| 30 | How to export drawings from (dwg) to (pdf) and (psd) format by creating virtual printers |

Technical Institute / Samawa

Department : Building & Construction

Subject: Workshops

Class : First Year

Hours : (3 hour) Practical

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Objectives :

Acquiring the manual skill in using hand tools, measuring tools, and operating machines necessary to prepare the student as a technician in the building and construction specialization.

| week | Syllabus |
|--------------|---|
| 1 | Industrial safety workshops: general rules for accident prevention, health care equipment and methods of using them. |
| 2 & 3 | Carpentry: The basic principles of carpentry models and the use of hand tools (cut-off saw, jigsaw, hammer, planer, drill, file). |
| 4 & 5 | Using the band saw machine, disc machine, planer machine, and press machine. |
| 6 & 7 | Filing: Training students on filing work and using measuring tools, files, automatic sawing devices, hooks, and drills. |
| 8 & 9 | Lathe: Using different lathes, lathe operations (plane, internal draw, different Threader work). |
| 10 | Plumbing: industrial safety in casting, molds, mold formation, and plumbing work steps. |
| 11 & 12 & 13 | Welding: A. Occupational safety and safety precautions. B. Tools used and industrial safety equipment. C. Types of welding (gas, ultrasonic, pressure welding, electric arc welding). |
| 14 | Metal cutting and bending: Devices and machines used in cutting and bending metal sheets and reinforcing steel bars. |
| 15 | Plumbing: Training the student on the rolling mill machine and the process of planning on plates. |
| 16 | Measurement processes and tools used (tape, vernier, micrometer). |
| 17 & 18 & 19 | Practical applications for carpentry works for civil constructions, including: Work: Wooden doors (press doors, packing doors). Work: wooden molds. |

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| 20 & 21 | Applications on reinforcing steel, making roof, bridge and column reinforcement (cutting iron, bending iron and welding pieces). |
| 22 & 23 | Exercises on cutting and joining structural steel using rivets, screws, and welding. |
| 24 & 25 | Stone and plastering works: cutting, sawing, smoothing, perforation. |
| 26 & 27 & 28 | Connecting pipes to water installations, threading (use of mechanization), types of accessories for pipes and methods of connecting them, sanitary sewer installations, methods of connecting. |
| 29 & 30 | Different types of pipes and their accessories, an exercise in making a water and sewage network for a residential house |

Technical Institute / Samawa

Department : Building & Construction

Subject: English

Class : First year

Hours :1 hrs (theoretical)

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Objectives :

The student reviews the simplified basic rules of the English language that he had previously studied in the previous stages, but at length, as well as gradually introducing the student to the atmosphere of technical terminology related to civil specialization in its various branches.

| week | Syllabus |
|-------------|---|
| 1&2 | What is your name ? What is this in English ? Translation Every day English Plurals |
| 3&4 | Countries Pronunciation Cities and countries Where are you from ? reading listening Tran station |
| 5&6 | Jobs ,negatives Address , trans pronunciation , listening , reading. |
| 7&8 | The family possessive s listening vocabulary pronunciation translation. |
| 9 &10 | Sports present simple translation vocabulary and pronunciation. |
| 11&12 | The time present simple negative translation vocabulary listening writing. |
| 13&14 | Object pronouns listening vocabulary translation reading. |

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| 15&16 | Furniture pronunciation prepositions reading and writing translation directions. |
| 17&18 | Saying yes writing past simple irregular verbs translation vocabulary word groups. |
| 19 &20 | Past simple regular verbs pronunciation irregular verbs listening translation vocabulary reading everyday English. |
| 21&22 | Activities listening pronunciation requests and offers translation vocabulary everyday English. |
| 23&24 | Translation reading writing pronunciation every day English. |
| 25& 26 | Colors present continuous present simple and present continuous translation reading vocabulary everyday English. |
| 27-30 | Present continuous for future listing pronunciation translation vocabulary reading and listening everyday English. |

Technical Institute / Samawa

Department : Building & Construction

Subject: Human rights and democracy

Class : First Year

Hours : (2 hour) Theoretical

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Objectives :

Introducing the student to human rights, their goals and development in different eras, and the role of international organizations and public opinion in respecting and protecting human rights.

| week | Syllabus |
|-------------|---|
| 1 | Human rights, their definition, and goals |
| 2 | The roots of human rights and their development in human history: human rights in ancient and medieval times |
| 3 | Human rights in ancient civilizations, especially the Mesopotamian civilization |
| 4 | Human rights in divine laws, with a focus on human rights in Islam |
| 5 | Human rights in the Middle Ages: Human rights in doctrines, schools, and political theories. Human rights in companies and their declarations, revolutions, and constitutions (English documents: the American Revolution - the French Revolution - the Russian Revolution) |
| 6 | Human rights in contemporary and modern history. International recognition of human rights since World War I and the League/United Nations |
| 7 | Regional recognition of human rights: European Convention on Human Rights 1950, American Convention on Human Rights 1969, African Charter on Human Rights 1981, Arab Charter on Human Rights 1994. |
| 8 | NGOs and human rights (International Committee of the Red Cross, Amnesty International, Human Rights Watch) |
| 9 | National human rights organizations |
| 10 | Human rights in Iraqi constitutions between theory and reality. |
| 11 & 12 | The relationship between human rights and public freedoms 1- In the Universal Declaration of Human Rights |

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| | 2- In regional charters and national constitutions |
| 13 | Necessary human rights and collective human rights |
| 14 | Economic, social and cultural human rights, civil human rights and politics |
| 15 | Modern human rights: facts in development, the right to a clean environment, the right to solidarity, the right to religion |
| 16 | Guarantees of respect and protection of human rights at the national level, guarantees in the constitution and laws, guarantees in the principle of the rule of law. |
| 17 | Guarantees in constitutional oversight, guarantees in freedom of the press and public opinion, the role of non-governmental organizations in respecting and protecting human rights. |
| 18 | Guarantees, respect and protection of human rights at the international level: - The role of the United Nations and its specialized agencies in providing guarantees |
| 19 | - The role of regional organizations (the Arab League, the European Union, the African Union, the Organization of American States, the ASEAN Organization) - The role of international, regional, non-governmental organizations and public opinion in respecting and protecting human rights |
| 20 | - The general theory of freedoms: the origin of rights and freedoms, the project's position on declared rights and freedoms, the use of the term general freedoms. |
| 21 | The functional nature of the concept of public freedoms: philosophical considerations of the functional right, structural considerations of the positive right, economic considerations and public freedoms. |
| 22 & 23 | The legal rule of the state of law |
| 24 | Regulation of public freedoms by public authorities |
| 25 | Litigation or non-judicial injustice |
| 26 | Judicial appeal, determining the state's responsibility for its legitimate actions |
| 27 | - The impact of double judiciary on public freedoms - Public freedoms under administrative jurisprudence |
| 28 | Equality: the historical development of the administrative concept |
| 29 | The modern development of the idea of equality |
| 30 | - gender equality - Equality between individuals according to their beliefs and race |

Technical Institute/ AL-Samawa

Department : Building & Construction

Subject : Concrete technology

Class :second year

Hours : 2 hrs (Theoretical) , 2 hrs (Practical)

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Objectives:

Teaching the student the basic principles of concrete components and their composition, the different methods of pouring and producing concrete on construction sites, the types of modern concrete, and the practical details of concrete works.

| Week | Syllabus |
|-------------|--|
| 1 | A general review of materials used in concrete. Definitions: Regular concrete, reinforced concrete, cast-in-place concrete, premixed concrete, precast concrete, prestressed concrete. A general review of special examinations for cement and aggregates. |
| 2 | Production and mixing of concrete, types of mixing, types of mixers, mixing time Slump test for fresh concrete. |
| 3&4 | Properties of fresh concrete: workability and consistency Tests for fresh concrete: fluidity test, penetration test, precipitation test, compaction factor test, reshaping test with vibration and reciprocating vibration, and study of factors affecting workability Checking the compaction factor for fresh concrete Testing of re-shaping by reciprocating vibration of fresh concrete. |
| 5&6 | Properties of fresh concrete: bleeding, separation, plastic shrinkage, and unit weight in fresh concrete. Reconstruction examination by reciprocating vibration of fresh concrete Flow test for fresh concrete. |
| 7&8 | The effect of air voids and methods of measuring them, calculating unit weight, yield, cement agent in fresh concrete, density equation and absolute volume equation to calculate concrete components. Penetration test / on site / for fresh concrete. Experiment on the effect of water/cement on the bearing strength of hardened concrete. |
| 9 | Transporting, pouring and placing regular concrete Experimenting with the effect of mixing ratio (cement content) on the bearing resistance of hardened concrete. |

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| 10 | Curing (curing) concrete, pouring in hot and cold climates The effect of curing methods on the bearing strength of hardened concrete |
| 11 | Pumping concrete, properties of concrete during pumping, devices used in pumping. The effect of compaction method (manual and mechanical) on the bearing resistance of hardened concrete. |
| 12 | Ready-mixed concrete: its definition, benefits and production methods, mixer trucks and vibrating trucks. The effect of form shape and size on the bearing strength of hardened concrete. |
| 13 | Resistance of hardened concrete, nature of concrete resistance, types of resistance. Experiment on the effect of age on the bearing strength of hardened concrete. |
| 14 | Concrete strength tests: compressive strength test, tensile strength test, (bending tensile test and splitting tensile test. Indirect Splitting Tensile Test (for hardened concrete. |
| 15 | Factors affecting the strength of hardened concrete. Factors affecting the results of strength tests of hardened concrete. Experiment to find fracture (bending) criteria for hardened concrete using models in the form of unreinforced concrete bridges. |
| 16 | Concrete shrinkage: drying shrinkage, differential shrinkage, carbonation shrinkage. Examining the effect of using additives on the workability of fresh concrete. |
| 17 | Concrete additives: their definition, their benefits and uses, the main materials involved in their composition, and the notes that must be taken when using them. Examining the effect of additives on the strength of hardened concrete (compressive strength, splitting tensile strength, bending tensile strength). |
| 18 | Types of additives: accelerators, retarders, plasticizers, air voids makers, silica dust, bubble, moisture inhibitors, weight reducers...etc. Examining the effect of additives on the strength of hardened concrete (compressive strength, splitting tensile strength, bending tensile strength). |
| 19 | Design of concrete mixes: A- The American method. Schmidt hammer inspection |
| 20 | Concrete mix design: B- The British method. Ultrasound examination |
| 21 | Applied issues for designing ordinary mixtures Examining the effect of fibers on the workability of fresh concrete. |
| 22 | Applied issues for designing mixtures containing additives. Examining the effect of fibers on the strength of hardened concrete (compressive strength, splitting tensile strength, bending tensile strength). |
| 23 | Non-destructive tests for concrete: radiation methods, hardness methods, pulse methods and resonance methods Workability examination of lightweight concrete. |

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| 24 | The use of fibers in concrete, such as fibers (plastic, glass, iron, wood). Testing the compressive strength of lightweight concrete. |
| 25 | The use of polymers in concrete, polymeric concrete. Strength tests for high-strength concrete (compressive strength, splitting tensile strength, bending tensile strength). |
| 26 | Special types of concrete: block, lightweight, heavy concrete, underwater concrete, pre-placed aggregate concrete (PAC). Strength tests for high-performance concrete (compressive strength, splitting tensile strength, bending tensile strength). |
| 27&28 | Special types of concrete: High Performance Concrete (HPC), High Strength Concrete (HSC), Self Compacting Concrete (SCC), Reactive Powder Concrete (RPC), Reinforced Concrete (RCC). Testing the workability of self-compacting concrete Testing the resistance of self-compacting concrete (compressive strength, splitting tensile strength, bending tensile strength). |
| 29&30 | Repairing, maintaining and treating concrete in buildings using some modern materials such as epoxy and carbon fibres Concrete mix design project, making trial mixes (Job Mix). following the American and British method, including all tests for cement, aggregates, and soft and hardened concrete. |

Technical Institute/ AL-Samawa

Department : Building & Construction

Subject : Construction techniques

Class :second year

Hours : 4 hrs (Practical)

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Objective:

Providing the student with manual skills and qualifying him to carry out construction and building works so that he will be qualified upon graduation to efficiently supervise the work.

| Week | Syllabus |
|-------------|---|
| 1 | Foundation planning, using surveying equipment. |
| 2 | Excavations, and supporting the sides of the excavation. |
| 3 | Making and reinforcing the foundation for a wall or support. |
| 4 | Showing a scientific film about pile works, types, how they work, and the machines used for that. |
| 5&6 | Brick construction work, English bonding, German bonding, other types of bonding. |
| 7 | (Block construction (block, thermestone). |
| 8&9 | Wooden template work, training on making a wooden template for a column, bridge, stairs and roofs. |
| 10 | Mixing normal and reinforced concrete and using manual mixing, as well as training on automatic mixing. |
| 11 | A scientific visit to the site of making a wooden mold and pouring concrete. |
| 12&13 | Reinforcing works, rebar, the correct way to use it, making reinforcement models for a column, roof, and bridge. |
| 14 | Steel works, Steel structural sections and aluminum sections, and when they are not available, a scientific film is shown for that. |

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| 15 | Application with cashier and sticker. |
| 16&17 | Moisture-preventing works, training on the use of some moisture-repellent materials and how to use them optimally, such as asphalt felt, bituminous materials, according to what is available. |
| 18 | Showing a scientific film about thermal insulation materials: their types, how to use them, and their benefits. |
| 19 | Bleaching works, Bleaching of a wall using plaster. |
| 20&21 | Works of ficus and prose: 1- Using cement mortar. 2- Using cement mortar - Noura. |
| 22 | Packaging works with Al-Furfouri Kashi. |
| 23 | Wall covering works, covering a wall using solutions. |
| 24 | Secondary roofs (Moroccan), making a model of a Moroccan roof, training on how to install them. |
| 25 | Painting works (training on how to use it and how to adapt each type to the (dyed surface). |
| 26 | Sanitary works: Training the student on how to lay sewage pipes, clear water pipes, and the locations of sinks, bathtubs, toilets, etc. |
| 27 | Electrical works: Training the student on making the rails and the correct finishing around them and how to install some electric lamps (establishing a light point and blocks). |
| 28 | Mechanical works: making ventilation ducts (i.e. making a duct for a refrigerator). |
| 29&30 | Road works: Foundation work and under the foundation for a road (as a model). |

Technical Institute/ AL-Samawa

Department : Building & Construction

Subject : Soil Mechanics

Class :2 Hours : 2 hrs (Theoretical) , 2 hrs (Practical)

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Objectives:

The student should understand the nature of soil , its formation , classification and engineering properties . The student should also know the behavior of soil under stresses , the effect of water flowing inside the soil , the using of soil as a construction material . The different methods used for testing the soil in laboratory and field should also be given to the student.

| Week | Syllabus |
|-------------|---|
| 1 | Definition of soil, a geological introduction to the types of rocks, how soil is formed from rocks. Getting to know the soil laboratory, how to write the laboratory report |
| 2 | Soil components, soil physical properties (moisture content, porosity, void ratio, wet and dry density, saturated and submerged density, specific gravity).Checking the moisture content of the soil. |
| 3&4 | Granular soil analysis (sieve method and hydrometer method). Examination of the percentage of organic matter in the soil (Organic Content). Checking the specific gravity of soil particles. |
| 5 | Plastic properties of the soil (liquidity limit, plasticity limit, shrinkage limit). Checking the gradation using sieves (Sieve Analysis). |
| 6&7 | Soil classification, using the Unified Classification System. Checking the gradient using a hydrometer |
| 8&9 | Soil permeability, coarse soil permeability, fine soil permeability, methods for measuring it in the field and laboratory. Checking the liquid limit and plastic limit. Permeability test using the constant column method (Constant Head Permeability Test). Theoretical lectures + written work + practical |
| 10 | Types of stresses in soil: total stress and effective stress. Checking permeability using the variable column method (Variable Head |

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| | Permeability Test). Theoretical lectures + written work + practical |
| 11 | Lateral Earth Pressure with an explanation of the types of filters. Standard Compaction Test: Theoretical lectures + written work + practical |
| 12 | Improving soil properties (soil stabilization), mechanical method (compaction). Modified Compaction Test: Theoretical lectures + written work + practical |
| 13 | Types of laboratory compaction tests, field compaction methods. Measuring the site density of soil using the sand displacement method |
| 14&15 | Other methods for improving soil properties and stabilizing it (stabilization with cement, stabilization with asphalt, stabilization with soil). Measurement of in situ density using the balloon and cylinder method. California endurance rating test (CBR Test). Theoretical lectures + written work + practical |
| 16&17 | Modern methods of soil stabilization (soil reinforcement, types of materials used in it and how to use them) (Reinforced Earth) Consolidation test in the soil. |
| 18 | California Bearing Ratio (CBR) and its importance in road implementation. Unconfined Compression Test |
| 19&20 | Consolidation in the soil and its relationship to settlement. Direct shear test of all types |
| 21 | The phenomenon of swelling and collapsing. Triaxial stress testing of all types (theoretical lectures + written + practical lectures). |
| 22 | Definition of soil shear strength (Shear Strength) and its importance in calculating the bearing capacity of the soil. Field shear test |
| 23 | Unconfined compression test. Cone Penetration Test. |
| 24 | Direct shear test Method of taking field models (rafted and non-rafted). |
| 25&26 | Triaxial compression test. How to determine the locations of test drilling holes in the field and how to determine their depths. |

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| 27 | Field shear tests (In Site Shear Test). |
| 28 | Types of foundations and their relationship to soil bearing capacity. |
| 29 | Shallow foundations and deep foundations, such as piles. |
| 30 | A simple introduction to soil investigation work, the types of models, the method of taking them, and the preparation and depths of test pits that must be carried out on site. |

Department : Building & Construction

Subject : Civil Drawing

Class :second year

Hours : 1 hrs (Theoretical) , 5 hrs (Practical)

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Objective:

Teaching the student the construction details and details of all construction works to be qualified to understand executive maps and transfer their information to the work site and workers to implement them. The student also learns the principles used in preparing sets of executive maps.

| Week | Syllabus |
|-------------|--|
| 1 | Introduction to structural drawing, architectural and terminological symbols, lines in maps, drawing models for building and construction materials, drawing scale, executive maps, and types of brick and block construction. |
| 2 | Drawing the horizontal plan of a residential house or small building, the plan of the first floor, and determining the longitudinal and cross-sections and the facades. |
| 3 | Drawing longitudinal and cross-sections and detailed sections of the finishing layers for floors, ceilings, and surfacing. |
| 4 | Introduction to sanitary drawing and structures for water and sanitary establishments and sanitary furniture, and then drawing the network of water and sanitary establishments for the previous horizontal plans. |
| 5 | Drawing the structural details of the inspection basins and linking them to the health facilities network. |
| 6 | Drawing the structural details of the septic tanks and storage (drains) attached to the house plan. |
| 7 | Introduction to concrete and construction principles. Concrete bearing various types of stresses, the necessary reinforcement steel and its types, and draw symbols used in maps and construction details. |
| 8 | Concrete slabs, their types, the transmission of loads through them and the necessary reinforcement for them, along with drawing the structural details of solid, unidirectional slabs. |

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| 9 | Drawing the structural details of two-way solid slabs. |
| 10 | Drawing the structural details of one- and two-way polygonal slabs. |
| 11 | Introduction/Types of concrete joists and drawing the structural details of simple support joists with sections. |
| 12 | Drawing structural details for continuous Beams and sections. |
| 13 | Drawing the structural details of single Beams and their sections. |
| 14 | Introduction with structural detail drawing of precast prestressed Beams. |
| 15 | Draw a horizontal plan (key) for the Beams of a structural building and establish tables and details of the joists. |
| 16 | Drawing the structural details of the types of concrete columns, drawing the longitudinal and cross-sections, and showing the reinforcement of the columns. |
| 17 | Drawing structural details and vertical sections to illustrate the bonding of reinforcing steel for columns of successive floors. |
| 18 | Introduction to foundations / their types and their working principle, and drawing the structural details of the single foundation, the combined foundation, and wall foundations. |
| 19 | Drawing the structural details of continuous foundations and raft foundations. |
| 20 | Drawing the structural details of the pile foundations and their types with the hat. |
| 21 | Identifying concrete stairs and their types, a straight staircase, a half-straight staircase, a spiral staircase, and drawing their structural details. |
| 22 | Drawing structural details of joints in buildings, expansion joints, structural joints. |
| 23 | Drawing the structural details of the reinforced walls of elevators and basement walls. |
| 24 | Introduction to manufactured and prefabricated construction and drawing the structural details for connecting walls with prefabricated ceilings. |
| 25 | Introduction to steel structures, their sections, tables, and how to obtain specifications and details of the sections from them. |
| 26 | Drawing the structural details of the connection of steel parts according to their load bearing. |
| 27 | Bonding of steel foundations and bases, bonding of steel columns, bonding of beams to each other. |
| 28 | Details of the steel truss drawing and the connection of its ribs. |
| 29&30 | Using the computer and its applications in structural drawing of reinforced concrete structures. |

Technical Institute/ AL-Samawa

Department : Building & Construction

Subject : surveye

Class : second stage

Hours : 1 hrs (Theoretical) , 2 hrs (Practical)

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Objectives:

Teaching the student how to use advanced surveying equipment, use it for civil engineering purposes, and perform related calculations.

| Week | Syllabus |
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| 1 | Identifying the theodolite device/its parts, uses, types, installing the device, reading the horizontal and vertical directions of the various types. Learn about the types of theodolite devices (T1, T2, T16) and how to set up the device and take horizontal and vertical readings. |
| 2 | Checking and adjusting the theodolite device for all types of vertical and horizontal examinations, then finding the device's constant Checking and adjusting the theodolite device and finding the device constant. |
| 3 | Methods for measuring horizontal angles with a theodolite device. Measuring horizontal angles with the theodolite device in several ways (repetition, directions, single angle). |
| 4 | Polygons, types of polygons, their purposes, and uses. Create a closed polygon by taking the readings with two faces (Tiamen and Tiyasar). |
| 5 | Measure and correct the interior horizontal angles of a closed polygon. Create a closed polygon and measure and correct the interior angles of the polygon. |
| 6 | Methods of measuring the horizontal distances of the sides of a polygon. Measuring the horizontal distances of the sides of a closed polygon using a theodolite, leveling ruler, and horizontal ruler. |
| 7 | Drawing closed and open polygons Draw the closed polygon and the beams drawn on the ground. |

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| 8 | Raising beams for polygons using a theodolite device and tape. Surveying an area and raising beams and landmarks using a theodolite device and tape. |
| 9 | Calculating the horizontal components and vertical components of the sides of a polygon and calculating the coordinates. A practical exercise in calculating horizontal and vertical components and directions. Theoretical lectures + written work + practical |
| 10 | Calculating the horizontal components, vertical components, and coordinates of an open polygon. A practical exercise on calculating the horizontal and vertical components and coordinates of an open polygon. |
| 11 | Methods for measuring vertical angles with a theodolite device. Measuring vertical angles with theodolite in different ways. |
| 12 | Finding the height of a building (target) that can be reached using the theodolite device A practical exercise on finding the height of a building whose base can be reached. |
| 13 | Finding the height of a building (target) that cannot be reached using a theodolite device A practical exercise on finding the height of a building whose base cannot be reached. |
| 14 | Finding the height of a building (target) by measuring three angles of elevation or depression using a theodolite device. A practical exercise on finding the height of a building by measuring three angles of elevation and depression. |
| 15 | Measuring the length of an inaccessible building - measuring the horizontal angle between two walls. How to plot a horizontal curve with just a bar. |
| 16 | Curves/types How to project a simple circular curve using a theodolite and a tape. |
| 17 | Horizontal curves (elements of a simple circular curve) and equations used in designing a simple circular curve. A practical exercise on drawing a road with its horizontal curves and multiple directions. |
| 18 | Methods of projecting horizontal curves / method of columns based on tangents (Baker method) - method of columns located on the chord (offsets) - method of dividing the chords - method of deviation angles A practical exercise on finding the levels of the points of a vertical curve. |
| 19 | Projecting curves using two theodolite devices. Projecting the vertical curve onto the ground. |
| 20 | Drawing a road with its horizontal curves. A practical exercise on how to choose triangulation points and make triangulation |

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| 21 | The main convex and concave curves/their elements/calculating the length of the vertical curve. A practical exercise on how to measure the base line for triangulation. |
| 22 | Calculations related to the vertical curve. A practical exercise on measuring the horizontal angles of a triangulation grid. |
| 23 | Triangulation, its purposes, use, choosing triangulation points, triangulation networks. Calculating angles, lengths, directions, and coordinates for triangulation points. |
| 24 | Measure the base line for triangulation and make fortifications for measuring with tape. |
| 25 | Measuring the horizontal angles of the triangulation network, making calculations and making the necessary fortifications. Creating a polygon, raising beams, leveling, and correcting the horizontal locations and levels of points using an LED telescope. |
| 26 | Tachymetric survey, types of tachymeter devices. Identifying tachymeter devices and reading arcs in different types of devices. |
| 27 | Learn about modern electronic measuring devices and how to use them to measure horizontal and vertical distances. Creating a polygon, raising beams, and correcting the horizontal locations and levels of points using a tachometer and its own ruler. |
| 28 | A general project about constructing a road or drainage channel, calculating the dirt needed to complete the project along with its horizontal and vertical curves. Learn about the total station device and how to use it to measure the side lengths of a polygon, interior angles, and coordinates |
| 29&30 | Introduction to the comprehensive station device. Using the total station device to measure the lengths of the sides of a polygon, interior angles, and coordinates. A practical exercise on measuring horizontal and vertical distances using modern electronic devices. |

Technical Institute/ AL-Samawa

Department : Building & Construction

Subject : Buildings and plant construction

Class :second year

Hours : 2hrs (Theoretical)

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Objective:

Providing the student with the necessary information about the stages of implementation of traditional and manufactured buildings, the works that fall within each stage, and the appropriate construction machines for each work.

| Week | Syllabus |
|-------------|--|
| 1 | Introduction to the methods of implementing construction projects and the relevant parties. The tasks of each member of the construction project team, especially the technicians. |
| 2 | Organizing and planning the work site and the factors that affect it, along with preparing a plan for the work site for a specific project. |
| 3 | Earthen excavations, methods of supporting the sides of excavations, excavation of basements. |
| 4 | Techniques used to withdraw groundwater during construction. |
| 5 | Dictations of dirt and the correct methods for making them, layers of roads and methods of implementing them. |
| 6 | Moisture-preventing layers for both basements and walls, flatness. |
| 7 | Construction of walls with bricks, types of bricks, methods of joining, seams. |
| 8 | Building walls with stone (types of stone preparation, types of connection, joints). |
| 9 | Building walls with construction blocks (types of blocks and their specifications). |
| 10 | All types of interior wall finishing techniques. |

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| 11 | Techniques for finishing external walls of all kinds. |
| 12 | Methods of finishing floors for the ground floor, other floors and ceilings. |
| 13 | Thermal insulation techniques. |
| 14 | Concrete formwork (types, requirements, components). |
| 15 | Lifting molds, causes of mold collapse, sliding molds and related techniques. |
| 16 | Scaffolding (types, components, safety factors). |
| 17 | Secondary ceilings (types and methods of installing them) and installing air ducts. |
| 18 | Sanitary installations (pure water, sewage), types of pipes used for each, and methods of connection and installation. |
| 19 | Doors and windows (types, requirements, components). |
| 20 | Joints in buildings (structural joints, expansion joints), details of each type and methods of implementation. |
| 21&22 | Low-cost construction and ways to rationalize costs (goals, requirements, construction methods). |
| 23 | Factory construction (properties, supplies). |
| 24 | The different types of factory construction and the characteristics of each type. |
| 25 | Components of the factory construction plant and production method. |
| 26&27 | Details of structural members in manufactured construction and methods of installing them. |
| 28 | Joints in manufactured construction (types, components and methods of implementation). |
| 29 | Methods of transportation in buildings, stairs, elevators (types, components, construction methods). |
| 30 | Fire resistance of buildings and fire control systems. |

Technical Institute/ AL-Samawa

Department : Building & Construction

Subject : computer Application 2

Class :second year

Hours : 1 hrs (Theoretical) , 2 hrs (Practical)

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Objective:

Introducing the student to drawing engineering maps and how to use ready-made systems and their applications in completing civil drawings.

| Week | Syllabus |
|-------------|---|
| 1 | A general review of AutoCAD. |
| 2 | A review of Draw, Modify, Osnap menu applications. |
| 3 | Supplement Dimensions, Writing, and Outlining View. |
| 4 | Principles of drawing in three dimensions Surface trigram menu. |
| 5 | 3D drawing menu. |
| 6 | Applications to the commands Extrad, Revolve , Slice. |
| 7 | Solid editing graphic revisions. |
| 8 | Applications about Union, Subtract orders. |
| 9 | Complete Solid editing commands. |
| 10 | Create a simple building in three dimensions. |
| 11 | Complete the previous building. |
| 12 | Making a model of a horizontal section in a building (residential house) and furnishing it. |
| 13 | Complete the previous form. |

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| 14&15 | Making a longitudinal section model of a building (residential house) with furnishing. |
| 16 | Rendering design principles. |
| 17 | Add lighting to the scene. |
| 18 | Adding materials to surfaces. |
| 19 | Manufacture of display materials. |
| 20 | Other effects in the scene: night lighting, backgrounds. |
| 21-29 | A project to create a model of a multi-storey building with the addition of other accessories: trees, cars, people... A simple introduction to the parallel programs for AutoCAD (3DMax). |
| 30 | Using additional processors for the completed image - AutoCAD using the Photo Shop program. |

Technical Institute/ AL-Samawa

Department : Building & Construction

Subject : Construction machines

Class : second stage

Hours : 2 hrs (Theoretical)

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Objectives:

Determine the productivity of machines and their operating costs and supervise their proper completion of work.

| Week | Syllabus |
|-------------|--|
| 1 | Construction equipment, the importance of machines, ways to obtain them, and the advantages and disadvantages of owning or renting machines, with a scientific film shown. |
| 2 | Calculating the costs of owning machines (costs of obsolescence, investment, maintenance and repair). |
| 3 | Completing the calculation of the costs of owning machines, operating costs (fuel costs, oil costs, explaining an integrated accounting question about calculating all costs). |
| 4 | Special machines, standard machines, and the comparison between them, along with showing a scientific film. |
| 5 | Engineering foundations for engineering machinery work, including (resistance to movement and the effect of tilt). |
| 6 | Complementing the engineering foundations of engineering machinery work (the effect of height, swelling and contraction of soil on volume calculations). |
| 7 | The quarry (dozer, including: description of the machine, its types, productivity calculation) with a scientific film shown. |
| 8 | Loading shovel (shovel), which includes (its types, differences between them, productivity calculation, raking work cycle, work coordination) with the presentation of two scientific films. Editorial theoretical lectures. |
| 9 | A scientific visit to one of the business sites that has different machines. |
| 10 | Drilling machines, total drilling rigs, face drilling rigs with scientific film showing. |

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| 11 | Drilling machines (back shovel, waterwheel shovel, oyster shovel) with a scientific film shown. |
| 12 | Transport unit machines, paved and unpaved road trucks, classification of trucks according to multiple factors, tippers, productivity calculation with a scientific film showing. |
| 13 | Balancing the number of tippers with the size of drilling machines, lorries, locomotives and trailers, and railway trucks. |
| 14 | The stands include (their types and benefits, along with productivity calculations) and a scientific film is shown. |
| 15 | Types of skimmers, their benefits, and productivity calculations, with a scientific film shown. |
| 16 | Sipper productivity: Use the scraper performance chart to calculate productivity. |
| 17 | A scientific visit to a business site with a scientific film showing. |
| 18 | Soil compaction machines, their importance includes their types and places of use, along with showing a scientific film. |
| 19 | Complementing the forging machines and calculating productivity, pressure bulb theory for distributing weights. |
| 20 | Complementing the ironing machines with vibrating rollers, calculating the productivity of the rollers. |
| 21 | Material mixing equipment for concrete works with a scientific film showing. |
| 22 | Concrete compacting and polishing transportation equipment. Editorial theoretical lectures. |
| 23 | Asphalt production plants, their types and specifications. |
| 24 | Specifications of asphalt spreaders, speed of spreaders, types of spreaders, with a scientific film shown. |
| 25 | Scientific visit to asphalt production plants. |
| 26 | Trench types, calculating production rates, and showing a scientific film. |
| 27 | Tunnels, their importance and types, with a scientific film shown. |
| 28 | Digging tunnels with mechanical excavators, ventilating the tunnels and showing a scientific film. |
| 29 | Conveyor belts, calculation of transportation costs with conveyor belts, parts of conveyor belts. |

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| 30 | The use of modern control systems in construction machines, with the presentation of a special scientific film about them. |
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Technical Institute/ AL-Samawa

Department : Building & Construction

Subject : Quantity surveying

Class :second year

Hours : 1 hrs (Theoretical) , 2 hrs (Practical)

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Objective:

Introducing the student to how to calculate the quantity of construction work items involved in the implementation of facilities and buildings, as well as beams, and analyzing those quantities into their primary resources with the principles of calculating prices and costs, as well as contracting work, specifications, and engineering project management.

| Week | Syllabus |
|------|---|
| 1 | Definitions of estimation, its purpose, the foundations upon which estimation is based, and the expected benefits from the estimation process. |
| 2 | Types of estimation, units of measurement used for all construction paragraphs, table of quantities. |
| 3&4 | Calculating the quantity of earthworks for the foundations of facilities (buildings) (various types of foundations) and explaining their schedule of quantities, mentioning the unified standard guide for these works, their specifications, and price analysis. |
| 5&6 | Calculating the quantity of structural sections under the moisture barrier (squares, foundation concrete, cubes), mentioning the unified standard guide for these works, their specifications, and their table of quantities. |

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| 7&8 | Calculating the quantity of structural parts above the moisture barrier (badlo), including moisture barrier concrete, building above the moisture barrier (bricks and concrete blocks), and mentioning the unified standard guide for their height, specifications, and its table of quantities. |
| 9&10 | Calculating the quantity of concrete, rebar, and wooden formwork for foundations (structural buildings with wall foundations and pillar foundations), and mentioning the unified standard guide for their height and specifications. |
| 11&12 | Calculating the quantity of concrete, reinforcing steel, and wooden molds for connecting bridges in structural buildings below the level of the basement and bridges over the openings, analyzing the prices, and mentioning the unified standard guide for the scope of these works. |
| 13 | Calculating the quantity of concrete, steel reinforcement, and wooden molds for columns of all types, analyzing their prices and mentioning the unified standard guide and their specifications. |
| 14 | Calculating the quantity of concrete, rebar, and wooden molds for various concrete works in special shapes, such as domes and arches. |
| 15&16 | Calculating the quantity of concrete, rebar, and wooden molds for one-way and two-way slabs, analyzing their prices and mentioning the unified standard guide for their specifications and their table of quantities. |
| 17 | Calculating the quantity of concrete, wooden molds, and reinforcing steel for all types of stairs, analyzing prices, and mentioning the unified standard guide for their height and specifications. |
| 18 | Calculating the quantity of secondary roofing works of all kinds, and flattening works for all its sections (gear, paddocks, and stayers), and mentioning the unified standard guide for their height and specifications. |
| 19&20 | Calculating the quantity of finishing works (finished, whitewashing, spreading, and dyeing) and the furfural casing, analyzing the prices, mentioning the unified standard guide for their type, specifications, and the table of quantities. |
| 21 | Calculating the quantity of flooring, casing, casing and covering the facades with alabaster and plaster, mentioning the unified standard guide, its specifications, and the table of quantities. |
| 22 | Calculating the quantity of electrical and mechanical foundation works and mentioning the unified standard guide for its scope, specifications, and schedule of quantities. |
| 23 | Calculating the quantity of water and sanitary foundation works, analyzing and mentioning the unified standard guide for its size, specifications, and schedule of quantities. |

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| 24 | Calculating the quantity of construction works for prefabricated buildings (walls and ceilings) and explaining their specifications, the table of quantities, and the unified standard guide for that. |
| 25 | Calculating the quantity of works and some items of steel structures and analyzing their prices, dimensions and schedule of quantities. |
| 26 | Contracts, contracting and contract organization, application books, tender form and instructions for contractors, maintenance period and advances and how to calculate them. |
| 27 | Definitions of management, relationships between individuals and organization, responsibilities of staff, organization in projects, site planning and control, and engineering management of projects. |
| 28&29 | Project scheduling: work progress schedule, arrow wire diagrams, and critical path. |
| 30 | Some applications for calculating the quantities of construction paragraphs using the computer. |

Technical Institute / Samawa

Department : Building & Construction

Subject: English

Class : second year

Hours :1 hrs (theoretical)

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Objectives :

The student reviews the simplified basic rules of the English language that he had previously studied in the previous stages, but at length, as well as gradually introducing the student to the atmosphere of technical terminology related to civil specialization in its various branches.

| week | Syllabus |
|-------------|---|
| 1&2 | What is your name ? What is this in English ? Translation Every day English Plurals |
| 3&4 | Countries Pronunciation Cities and countries Where are you from ? reading listening Tran station |
| 5&6 | Jobs ,negatives Address , trans pronunciation , listening , reading. |
| 7&8 | The family possessive s listening vocabulary pronunciation translation. |
| 9 &10 | Sports present simple translation vocabulary and pronunciation. |
| 11&12 | The time present simple negative translation vocabulary listening writing. |
| 13&14 | Object pronouns listening vocabulary translation reading. |

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| 15&16 | Furniture pronunciation prepositions reading and writing translation directions. |
| 17&18 | Saying yes writing past simple irregular verbs translation vocabulary word groups. |
| 19 &20 | Past simple regular verbs pronunciation irregular verbs listening translation vocabulary reading everyday English. |
| 21&22 | Activities listening pronunciation requests and offers translation vocabulary everyday English. |
| 23&24 | Translation reading writing pronunciation every day English. |
| 25& 26 | Colors present continuous present simple and present continuous translation reading vocabulary everyday English. |
| 27-30 | Present continuous for future listing pronunciation translation vocabulary reading and listening everyday English. |

Technical Institute/ AL-Samawa

Department : Building & Construction

Subject : The project

Class :second year

Hours 2 hrs

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Objective :

Teaching the student how to conduct research and practical and applied projects in various fields of work.

| Week | Syllabus |
|-------------|---------------------------------|
| | According to the project topic. |