




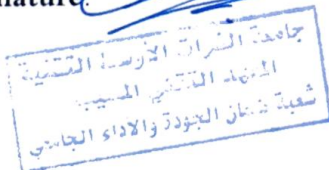
Academic Program Description Form
For the Academic year 2023–2024

University Name: AL– Furat Al–Awsat Technical University
Faculty/Institute: AL–Mussaib Technical Institute.
Scientific Department: Water Resources Technical Department.
Professional Program Name: Diploma in Water Resources Techniques.
Final Certificate Name: Diploma in Water Resources Techniques.
Academic System: Annual
Description Preparation Date: 2024–2023
File Completion Date: 16\2\2024

Signature: 
Head of Department Name:
Dr. Khalid M. Breesem
Date:

Signature: 
Scientific Associate Name:
Dr. Mohammed H. Sabry
Date:

The file is checked by:
Department of Quality Assurance and University Performance
Director of the Quality Assurance and University Performance Department:
Date: 30/3/2024
Signature: 




Approval of the Dean

1. Program Vision

The Water Resources Technology Department works, through established educational programs, to create a technical system based on the requirements of the labor market, the needs of society, and service facilities related to the specialization in a way that serves the field of specialization

2. Program Mission

Achieving the department's goals and aspirations by creating an appropriate educational environment and providing all the necessary material and human requirements to achieve this. And work to graduate groups capable of serving society

3. Program Objectives

Irrigation and drainage techniques branch:

The branch aims to graduate qualified technical personnel to survey agricultural or arable lands, calculate the quantities of earthworks for irrigation and drainage projects, monitor and organize irrigation works, determine water needs for irrigation, carry out work, maintenance and operation of irrigation and drainage projects, and install, operate and maintain sprinkler and drip irrigation systems.

4. Program Accreditation

Non

5. Other external influences

There is a close relationship with the labor market that receives our graduates.

6. Program Structure

Program Structure	Number of Courses	Credit hours	Percentage	Reviews*
Institution Requirements	20	130	100%	Annual system
College Requirements	20	130	100%	Annual system
Department Requirements	20	130	100%	Annual system
Summer Training				Fulfillment only
Other				

* This can include notes whether the course is basic or optional.

7. Program Description				
Year/Level	Course Code	Course Name	Credit Hours	
			theoretical	practical
First year		Hydraulic	2	2
		Irrigation	2	2
		Engineering Mechanics	3	0
		Mathematics	3	-
		Computer Applications(1)	1	2
		Surveying	2	3
		Engineering Drawing	-	3
		Work Shops	-	4
		Human Rights & Democracy	2	-
		English Language	2	-
Second year		Hydrology	2	2
		Irrigation Construction	1	3
		Drainage	2	2
		Modern Irrigation Techniques	1	3
		Soil Mechanics	1	2
		Construction Materials & Quantity Surveying	1	3
		Project	-	3
		Computer Application(2)	1	2
		English Language	2	0

8. Expected learning outcomes of the program
Knowledge
Graduating technical personnel qualified to survey agricultural or arable lands, calculate quantities of earthworks for irrigation and plowing projects, monitor and organize irrigation works, determine water needs for irrigation, carry out work, maintain and operate irrigation and plowing projects, and install, operate and maintain sprinkler and drip irrigation systems
Skills

The graduate acquires the following skills

- 1 - Surveying lands to determine terrain and levels for the purpose of preparing plans for irrigation and drainage projects
- 2 - Calculating quantities of earth and construction works and carrying out field investigations for irrigation and drainage projects.
- 3-Monitoring and organizing irrigation operations and controlling irrigation water quantities.
- 4 - Determine water needs and timing of irrigation water release to suit the needs of crops.
- 5- Carrying out maintenance and operation of irrigation and drainage projects.
- 6 - Installation, operation and maintenance of sprinkler and drip irrigation systems.
- 7- Using a calculator in his field of expertise.

Ethics

Benefiting from academic and field scientific material through understanding the vocabulary of academic and field subjects related to traditional and modern irrigation systems and the ability to deal with urgent developments and choose the best solution from among the available solutions and options, as well as the ability to lead and confront challenges and develop students' abilities to analyze the content of variables and skills.

9. Teaching and Learning Strategies

1. Scientific lectures
2. Discussion among students
3. Preparing scientific reports related to course materials
4. Site visits to water and waste projects and discussing implementation obstacles and the necessary solutions

10. Evaluation methods

Direct questions and daily exams stimulate students and encourage them to actively participate and discuss
Lectures, additional activities, quarterly exams, and requiring the submission of various scientific reports

11. Faculty

Faculty Members

Academic Rank	Specialization		Special Requirements/Skills (if applicable)	Number of the teaching staff	
	General	Special		Staff	Lecturer
Professor	Water resources	Water resources	Academic and field experience	1	
Professor	environmental engineering	environmental engineering		1	
Assistant Professor	civil engineering	construction Engineering		1	

Assistant Professor	civil engineering	Geotechnical engineering		1	
Teacher	Mechanical Engineering	construction Engineering		1	
Teacher	civil engineering	Water resources		1	
Teacher	Physics Science	environmental engineering		1	

Professional Development

Mentoring new faculty members

- 1- Teaching and the ability to cover different subjects efficiently.
- 2- Urging the new staff to follow up on academic and field scientific developments and review engineering specifications to enhance
- 3 -Preparing teaching materials.
- 4 -Working in a team spirit.
- 5- Feedback through the colleague-to-colleague evaluation process.

Professional development of faculty members

Urging the technical staff to follow up on conducting tests outside the laboratory and how to organize technical reports for all technical examinations

12. Acceptance Criterion

Total competitive admission is not less than (410)
 Type of branch graduated from (scientific + biology + applied). (Through general central admission)

13. The most important sources of information about the program

https://ims.atu.edu.iq/?page_id=5526

14. Program Development Plan

1. Providing the possibility of academic support in organizing field visits
2. Providing an appropriate classroom environment that enables the teacher to diversify teaching strategies
3. Providing information technology in the campus library
4. Showing additional scientific films to acquaint students with the latest tests in the world

Program Skills Outline															
				Required program Learning outcomes											
Year/Level	Course Code	Course Name	Basic or optional	Knowledge				Skills				Ethics			
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4
First year		Hydraulic		√					√						
		Irrigation		√				√				√			
		Engineering Mechanics		√					√			√			
		Mathematics				√				√			√		
		Computer Applications(1)				√				√			√		
		Surveying		√				√				√			
		Engineering Drawing		√				√				√			
		Work Shops			√						√			√	
		Human Rights & Democracy			√						√			√	
	English Language			√						√			√		
Second year		Hydrology		√				√				√			
		Irrigation Construction		√				√				√			
		Drainage		√				√				√			
		Modern Irrigation Techniques		√				√				√			
		Soil Mechanics		√				√				√			
		Construction Materials & Quantity Surveying		√				√				√			
		Project		√				√				√			
		Hydraulic			√					√					√
		Irrigation			√					√					√
<ul style="list-style-type: none"> • Please tick the boxes corresponding to the individual program learning outcomes under evaluation. 															

Course Description Form

1. Course Name: Hydraulic					
2. Course Code:.....					
3. Semester / Year: First Academic Year					
4. Description Preparation Date: 24-02-2024					
5. Available Attendance Forms: direct -mandatory					
6. Number of Credit Hours (Total) / Number of Units (Total): 180 hrs /8 units					
7. Course administrator's name (mention all, if more than one name)					
Name: Mohsin Jasim Nasir Email: inm.mohs@atu.edu.iq					
8. Course Objectives					
Course Objectives		Providing the student with skills and knowledge in hydraulics from an engineering perspective, knowledge of some laboratory tests, and enhancing the student's applied experience in hydraulics.			
9. Teaching and Learning Strategies					
Strategy		<ol style="list-style-type: none"> 1. Relying on the prescribed methodological books 2. Adding recent scientific developments 3. Adopting live lectures and using available modern display devices 4. Using E-learning and showing scientific films about the courses to enrich the practical aspect. 			
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Learn about the concept of hydraulics	Hydraulics, general definitions	Continuous guidance of students by the professor during the lecture	questions and answers
2	4	To learn about the dimensions and units used in hydraulics	Dimensions and units	Lecture and discussion	Listen and ask questions

3	4	Identify the properties of fluids	Fluid properties (density, viscosity, vapor pressure, surface tension)	Lecture and discussion	Listen and ask questions
4	4	identify the types of hydrostatic forces	hydrostatic	Lecture and discussion	Case study
5	4	Identify the types of stress	Absolute pressure, Pascal's rule, hydraulic pistons, pressure measuring devices	Dialogue and criticism	Cases study
6	4	Identify the forces exerted on flat surfaces	Forces exerted on submerged flat surfaces	Lecture and discussion	Mini-lesson discussion
7	4	Identify the forces exerted on submerged convex surfaces	Forces exerted on submerged convex surfaces	Discussion and mini-lesson	Case study
8	4	Learn about the basics of flow	Types of flow (steady, unsteady, regular, and irregular)	Lecture and discussion	Listen and ask questions
9	4	Learn about applications of the continuity equation	Continuity equation	Lecture and discussion	Listen and ask questions
10	4	Learn about applications of Bernoulli's equation without friction	Energy equation (Bernoulli) without friction	Lecture and criticism	Case Study

11. Course Evaluation

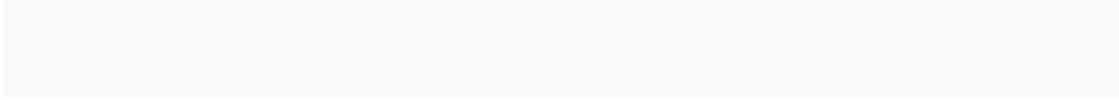
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)

Principles of Fluid Mechanics, Part One, First Edition, 1982, Dr. Jamil Al-Malaika

Main references (sources)	Fluid Mechanics , University of Technology, 1983, Dr. Nima Hamad Amara
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	Specialized websites



Course Description Form

1. Course Name: Irrigation	
2. Course Code: ---	
3. Semester / Year: annual	
4. Description Preparation Date: 24 - 02 - 2024	
5. Available Attendance Forms: direct - mandatory	
6. Number of Credit Hours (Total) / Number of Units (Total) : 120 hr. /8 units	
7. Course administrator's name (mention all, if more than one name)	
Name: D. Jawad Kazem Al-Rifai Email: :Jawad.alrifaie@atu	
8. Course Objectives	
Course Objectives	Teaching the student the basics of surveying engineering and using for civil engineering purposes and making related calculations and how to carry out various surveys and survey work and others, and enabling him to plan and supervise various civil works
9. Teaching and Learning Strategies	
Strategy	<ol style="list-style-type: none">1- Relying on the prescribed methodological books2- Adding recent scientific developments3- Adopting live lectures and using available modern display devices4- Using e-learning and adding scientific film presentations about the courses to enrich the scientific aspect.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-2	4	The science of irrigation, its definition, the benefits of irrigation, an idea about the types of irrigation	The science of irrigation, its definition, the benefits of irrigation, an idea about the types of irrigation	Lecture, laboratory application, discussion	Listening ask questions
3-4	4	Soil, physical characteristics of soil, types of water in soil, ability of soil to retain water, soil classification	Soil, physical characteristics of soil, types of water in soil, ability of soil to retain water, soil classification	Lecture, laboratory application, discussion	Listening ask questions
5-6	4	Field capacity, wilting point, saturation, available and unavailable water	Field capacity, wilting point, saturation, available and unavailable water	Lecture, laboratory application, discussion	Listening ask questions
7-8	4	Soil moisture and methods for measuring it	Soil moisture and methods for measuring it	Lecture, laboratory application, discussion	Listening ask questions
9-10	4	Water tip and seepage, soil-tip relationship, irrigation water preparation	Water tip and seepage, soil-tip relationship, irrigation water preparation	Lecture, laboratory application, discussion	Listening ask questions
11	4	Water consumption and methods for measuring it	Water consumption and methods for measuring it	Lecture, laboratory application, discussion	Listening ask questions
12	4	The science of irrigation, its definition, the benefits of irrigation, an idea about the types of irrigation	The science of irrigation, its definition, the benefits of irrigation, an idea about the types of irrigation	Lecture, laboratory application, discussion	Listening ask questions

13	4	Soil, physical characteristics of soil, types of water in soil, ability of soil to retain water, soil classification	Soil, physical characteristics of soil, types of water in soil, ability of soil to retain water, soil classification	Lecture, laboratory application, discussion	Listening ask questions
14	4	Field capacity, wilting point, saturation, available and unavailable water	Field capacity, wilting point, saturation, available and unavailable water	Lecture, laboratory application, discussion	Listening ask questions
15	4	Soil moisture and methods for measuring it	Soil moisture and methods for measuring it	Lecture, laboratory application, discussion	Listening ask questions
16-17	4	Water tip and seepage, soil-tip relationship, irrigation water preparation	Water tip and seepage, soil-tip relationship, irrigation water preparation	Lecture, laboratory application, discussion	Listening ask questions
18-19	4	The science of irrigation, its definition, the benefits of irrigation, an idea about the types of irrigation	The science of irrigation, its definition, the benefits of irrigation, an idea about the types of irrigation	Lecture, laboratory application, discussion	Listening ask questions
20-21	4	Soil, physical characteristics of soil, types of water in soil, ability of soil to retain water, soil classification	Soil, physical characteristics of soil, types of water in soil, ability of soil to retain water, soil classification	Lecture, laboratory application, discussion	Listening ask questions
22-23	4	Field capacity, wilting point, saturation, available and unavailable water	Field capacity, wilting point, saturation, available and unavailable water	Lecture, laboratory application, discussion	Listening ask questions
24-25	4	Soil moisture and methods for measuring it	Soil moisture and methods for measuring it	Lecture, laboratory application, discussion	Listening ask questions

26-28	4	Water tip and seepage, soil-tip relationship, irrigation water preparation	Water tip and seepage, soil-tip relationship, irrigation water preparation	Lecture, laboratory application, discussion	Listening ask questions
29-30	4	Water consumption and methods for measuring it	Water consumption and methods for measuring it	Lecture, laboratory application, discussion	Listening ask questions

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)

Main references (sources)

Recommended books and references (scientific journals, reports...)

- 1-Irrigation and drainage engineering / Dr. Charles Shukri, College of Engineering - University of Baghdad 1981
- 2-Fundamentals of agricultural irrigation - Dr. Fathi Ibrahim 1976, New Publications House
- 3-Irrigation Engineering - Dr. Nazih Asaad Younan 1976 - Dar Al-Kitab University in Alexandria
- 4-"Irrigation Principles and Practices", O.W. Israelsen and V.E. Hansen, John Wiley and Sons Inc., 1976.
- 5-"Irrigation Engineering", Cimmerian, John Wiley sons, Inc 1966.
- 6- Collection of Food and Agriculture Organization publications. (in English)

Electronic References, Websites

Specialized websites

Course Description Form

1. Course Name: **Engineering mechanics**

2. Course Code: First academic year

3. Semester / Year: Annual

4. Description Preparation Date: 2024

5. Available Attendance Forms: Attend a lecture

6. Number of Credit Hours (Total) / Number of Units (Total): 90/6=15

7. Course administrator's name (mention all, if more than one name)

Name: Assist. Prof. Dr. Khalid Mohammed Breesem

Email: inm.khld@atu.edu.iq

8. Course Objectives

Course Objectives

The student understands the principles of mechanics because it is one of the scientific foundations of technology.

Enabling the student to analyze the Forces and Moment

Enabling the student to analysis the Resultant

Enabling the student to find the effect of friction between different bodies.

It's essential and prominent role in building design of machines, machines, devices and to that are related to irrigation techniques.

9. Teaching and Learning Strategies

Strategy

Developing the student's abilities to solve questions accurately and quickly

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
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1	6	Forces, Analysis of forces	Definition of mechanical force: Analysis of Triangle force and parallelogram laws forces	Presenting, explaining and solving different questions related to the curriculum	Lectures presented in PowerPoint format. Written lectures Solve exercises on the board.
2	6	Moment of forces, Couple	Moment of forces, Couples	Presenting, explaining solving different questions related to the curriculum	Lectures presented in PowerPoint format. Written lectures Solve exercises on the board.
3	3	Equilibrium in concurrent forces, Equilibrium in non concurrent forces	Equilibrium	Presenting, explaining solving different questions related to the curriculum	Lectures presented in PowerPoint format. Written lectures Solve exercises on the board.
4	3	Applications	Applications: Forces, Resultant of concurrent forces, Resultant of non-concurrent forces	Presenting, explaining solving different questions related to the curriculum	Lectures presented in PowerPoint format. Written lectures Solve exercises on the board.
5	3	Friction, Laws of friction, types of friction, applications	Friction	Presenting, explaining solving different questions related to the curriculum	Lectures presented in PowerPoint format. Written lectures Solve exercises on the board.
6	3	Belts, types of belts, Applications	Applications ; Belts	Presenting, explaining solving different questions related to the curriculum	Lectures presented in PowerPoint format. Written lectures Solve exercises on the board.
7	3	Centroid and moment of inertia Centroids of simple shapes	Centroid	Presenting, explaining solving different questions related to the curriculum	Lectures presented in PowerPoint format. Written lectures Solve exercises on the board.
8	3	Centroids of complex shapes	Centroid	Presenting, explaining solving different questions related to the curriculum	Lectures presented in PowerPoint format. Written lectures Solve exercises on the board.
9-10	3	Moment of inertia Introduction, a moment of inertia of a rectangular section, a moment of inertia of a hollow rectangular section, the moment of inertia of a circular section, the moment of inertia of a hollow circular section, the moment of inertia of a composite section, the moment of inertia of a triangular section, the moment of inertia of some geometric shapes, exercises	Equilibrium in concurrent forces	Presenting, explaining solving different questions related to the curriculum	Lectures presented in PowerPoint format. Written lectures Solve exercises on the board.
11	3	Moment of inertia for the complex shapes	Equilibrium in non-concurrent forces	Presenting, explaining solving different questions related to the curriculum	Lectures presented in PowerPoint format. Written lectures Solve exercises on the board.

12	3	Applications	Types of beams and supports	Presenting, explaining solving different questions related the curriculum	Lectures presented in PowerPoint format. Written lectures Solve exercises on the board.
13	3		Analysis of trusses by method of joints	Presenting, explaining solving different questions related the curriculum	Lectures presented in PowerPoint format. Written lectures Solve exercises on the board.
14	3	Power and work and speed Relation between them	Analysis of trusses by method of sections	Presenting, explaining solving different questions related the curriculum	Lectures presented in PowerPoint format. Written lectures Solve exercises on the board.
15	3	Strength of materials ,definition of stress ,types stresses factor of safety	Friction, friction theories	Presenting, explaining solving different questions related the curriculum	Lectures presented in PowerPoint format. Written lectures Solve exercises on the board.
16	3	Strain, types of strain and application	Laws of friction, types of friction, application	Presenting, explaining solving different questions related the curriculum	Lectures presented in PowerPoint format. Written lectures Solve exercises on the board.
17		Stress-Strain diagram	Stress-Strain	Presenting, explaining solving different questions related the curriculum	Lectures presented in PowerPoint format. Written lectures Solve exercises on the board.
18		Elastic and plastic deformation	Elastic and plastic deformation	Presenting, explaining solving different questions related the curriculum	Lectures presented in PowerPoint format. Written lectures Solve exercises on the board.
19		Hooke's Law for Tension and Compression and its application	Hooke's Law	Presenting, explaining solving different questions related the curriculum	Lectures presented in PowerPoint format. Written lectures Solve exercises on the board.
20		Exercises	Application	Presenting, explaining solving different questions related the curriculum	Lectures presented in PowerPoint format. Written lectures Solve exercises on the board.
21		Shear stress, Application	Application	Presenting, explaining solving different questions related the curriculum	Lectures presented in PowerPoint format. Written lectures Solve exercises on the board.
22		Bending stress	Bending stress	Presenting, explaining solving different questions related the curriculum	Lectures presented in PowerPoint format. Written lectures Solve exercises on the board.
23		Shear and moment diagram	Shear and moment diagram	Presenting, explaining solving different questions related the curriculum	Lectures presented in PowerPoint format. Written lectures Solve exercises on the board.

24		Distributed loads	Distributed loads	Presenting, explaining solving differential questions related the curriculum	Lectures presented in PowerPoint format. Written lectures Solve exercises on the board.
25				Presenting, explaining solving differential questions related the curriculum	Lectures presented in PowerPoint format. Written lectures Solve exercises on the board.
26		Elastic Bending of Homogeneous Beams	Elastic Bending	Presenting, explaining solving differential questions related the curriculum	Lectures presented in PowerPoint format. Written lectures Solve exercises on the board.
27		Elastic Bending of NON-Homogeneous Beams	Elastic Bending	Presenting, explaining solving differential questions related the curriculum	Lectures presented in PowerPoint format. Written lectures Solve exercises on the board.
28		Applications	Applications	Presenting, explaining solving differential questions related the curriculum	Lectures presented in PowerPoint format. Written lectures Solve exercises on the board.
29		Applications	Applications	Presenting, explaining solving differential questions related the curriculum	Lectures presented in PowerPoint format. Written lectures Solve exercises on the board.

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Methodical book: Engineering Mechanics / written Elham Youssef / 1995.
Main references (sources)	1-Engineering Mechanics static's Edition 12, by Hibbler. 2-Engineering Mechanics static's Sixth edition, by J.L.Meriam & L.G.Kraige. 3- Engineering Mechanics static's D.K.Anand & P.F.Cuniff. 4- Engineering Mechanics static and Dynamic I.C.Joung & B.C.Rogers.
Recommended books and references (scientific journals, reports...)	Books, periodicals, university theses, and information derived from the Internet and personal experience in the field of civil engineering.
Electronic References, Websites	Various websites for engineers and civil engineers specializing in the subject of engineering mechanics along with browsing lecture presentations showing sites for solving various questions about engineering mechanics vocabulary and how to benefit from them

Course Description Form

1. Course Name: Mathematics					
2. Course Code: ---					
3. Semester / Year: annual					
4. Description Preparation Date: 24 - 02 - 2024					
5. Available Attendance Forms: direct					
6. Number of Credit Hours (Total) / Number of Units (Total) : 90 hr. /6 units					
7. Course administrator's name (mention all, if more than one name)					
Asmaa Salih Jasim			asmaa.jasim.ims@atu.edu.iq		
8. Course Objectives					
Course Objectives		Developing the student's ability to use mathematics in practical applications and benefiting from it in other technical lessons and teaching the student different ways of representing mathematical equations and laws in computer fields.			
9. Teaching and Learning Strategies					
Strategy		1- A- Knowledge and understanding 2- Questions and answers + daily exam			
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method

1	3	<u>Function - Definition of logarithmic, exponential, and trigonometric functions and graphing the functions</u>	Matrixes, . determinants, and their properties	a lecture	questions and answers
2	3	Limits – limits of logarithmic algebraic functions	Solving linear equations, Cray's method Applications on the specified	a lecture	questions and answers
4-3	3	Vectors – vector analysis – scalar quantities and vector quantities	I Vectors, vector equations, quantization Vectors and scalars, vector algebra	a lecture	questions and answers
(5)	3	Issues in force and moment analysis - and applications in the field of irrigation	S is the unit of orthogonal vectors, scale she . Vector, scalar product and vector	a lecture	questions and answers
(6)	3	Derivatives - their application in the field of irrigation, force analysis and surveying	Function, trigonometric functions and relations . Trigonometric, logarithmic function	a lecture	questions and answers
(7)	3	Derivatives of exponential, logarithmic and trigonometric functions	Limits, limits of algebraic and trigonometric functions Applications on purpose	a lecture	questions and answers
(8)	3	Differentiation - chain rule and location problems	Differentiation, derivative, derivative of functions, logarithms	a lecture	questions and answers

(9)	3	Implicit functions higher order – derivatives	Derivative of exponential function, derivative of hyperbolic functions	a lecture	questions and answers
(10)	3	The tangent equation, maximum and minimum limits of a function, and inflection points	Applications of the derivative, tangent equation, perpendicular, velocity, and acceleration	a lecture	questions and answers
(11)	3	Differential applications in the field of irrigation, speed and acceleration	Integration, indefinite integration, algebraic functions	a lecture	questions and answers
(12)	3	Infinite integral - for algebraic functions	Integration, indefinite integration, integration of algebraic and logarithmic functions	a lecture	questions and answers
(13)	3	Integration of logarithmic, exponential and trigonometric functions	Differentiation, derivative, derivative of functions, logarithms	a lecture	questions and answers
(14)	3	Bounded integration - its applications to various functions	Derivative of exponential function, derivative of hyperbolic functions	a lecture	questions and answers
(15)	3	Area under the curve – the area between two curves with applications in irrigation	Applications of the derivative, tangent equation, perpendicular, velocity, and acceleration	a lecture	questions and answers
(16)	3	Rotational volumes and finding the arc length with examples	Integration, indefinite integration, algebraic functions	a lecture	questions and answers

(17) (18)	3	<u>Integration methods - numerical methods in integration</u>	Integration, indefinite integration, integration of algebraic and logarithmic functions	a lecture	questions and answers
(19) (20)	3	Solve differential equations - homogeneous, inhomogeneous and linear	Polar formula, converting the polar formula to algebraic	a lecture	questions and answers

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	Specialized websites

Course Description Form

1. Course Name: computer application					
2. Course Code: non					
3. Semester / Year: first academic year					
4. Description Preparation Date:13/2/2024					
5. Available Attendance Forms: attend lecture +computer lap					
6. Number of Credit Hours (Total) / Number of Units (Total): (3*30)/6=15					
7. Course administrator's name (mention all, if more than one name)					
Name: hyder taleb shomran					
Email: had1@atu.edu.iq					
8. Course Objectives					
Course Objectives		<p>The purpose of the course: To teach the student the components of the computer, study the Windows system, its commands and windows, then enter the <u>AutoCAD</u> drawing program and become familiar with the program's interface, drawing and modification commands, and writing commands, then learn about the concept of viruses and methods of treating them.</p>			
9. Teaching and Learning Strategies					
Strategy		<p>1- Relying on the prescribed methodological books 2- Adding recent scientific developments 3- Adopting live lectures and using available modern display devices 4- Using e-learning and adding scientific film presentations about the courses to enrich the scientific aspect</p>			
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method

the week	hours	Required learning outcomes	Name of the unit or topic	Learning method	Evaluation method
2-1	3	Introduction to computers:Its generations, components (hardware and software)	Identify computer components, their types, and how they operate	Continuous guidance of students by the professor	questions and answers
3	3	Windows XP operating system:The concept of the Windows system, its advantages, basic requirements, operating the system, components of the main screen of the desktop, the concept of icons, the method of dealing with mouse activities, the importance and components of the task bar, making use of start to enter programs, the concept of loaded tasks, exiting the system And turn off the .calculator	The program's graphical application interface, dealing with computer components, both hardware and software	Lecture, laboratory application. And discussion	Asking questions
4	3	The concept of the window for any program and learning about its main components, dealing with Recycle bin, my computer, my Documents	Dealing with windows within the program	Lecture, laboratory application. And discussion	Case study
5	3	Format floppy disks, copy folders and files, make use of cut and paste and know the properties of disks, folders and files	Copying, saving and dealing with .folders	Lecture, laboratory application. And discussion	Listen and ask questions
6	3	Benefit from Control panel software:Such as the mouse icon, the display icon, how to change the library desktop background, control the screen saver, change the appearance and colors of window menus,	Provides the application's graphical interface, such as the desktop, and changes	Lecture, laboratory application. And discussion	Asking questions

		and the Remove prog icon., add in adding and deleting programs	the appearance and colors of the menus		
7	3	Take advantage of the Run option to execute programs directly and learn how to get .help and its various methods	Identify the executive orders of the program	Lecture, laboratory application. And discussion	Mini-lesson discussion
8	3	Use entertainment programs - such as Media Player Window to play movies Benefit from additional - programs (Accessories) such as the Calculator Dealing with drawing - programs to create, save, and retrieve drawings through the commands it .provides Dealing with the Notepad - and Wordpad windows to write, save, retrieve, print texts, and change their printing style and .formatting	Gain skill in dealing with audio programs. And graphics, such as the Media Player program, and how to write notes using the Notes .program	Lecture, laboratory application. And discussion	Case study
9	3	AutoCAD 2004 / getting to - know the program's working environment and ways to access commands and instructions, store and open files Auxiliary commands:Units, - drawing limits Methods of selecting and - selecting objects (Crossing, (window, pick box	An introduction to learning about the components of the user interface of AutoCAD	Lecture, laboratory application. And discussion	Listen and ask questions
10	3	POLAR/OTRAK / LWT / ORTHO / OSNAP / GRID / SNAP commands Distance command and Area command	An introduction to learning about the	Lecture, laboratory application. And discussion	Listen and ask questions

			components of the user interface of AutoCAD		
11	3	View tools: The Zoom command and its options, the Pan command and its options, how to zoom and pan at the same time .Regen command to modify fees	An introduction to learning about the components of the user interface of AutoCAD	Lecture, laboratory application. And discussion	Listen and ask questions
16-12	3	Basic drawing commands: Line, Multiline, Construction line, Polyline Polygon, Rectangle, Arc, Circle, Revcloud, Spline, Ellipse, Make block, Insert .block, Point, Hatch, Region	An introduction to learning about the components of the user interface of AutoCAD	Lecture, laboratory application. And discussion	Listen and ask questions
17	3	View tools: The Zoom command and its options, the Pan command and its options, how to zoom and pan at the same time .Regen command to modify fees	An introduction to learning about the components of the user interface of AutoCAD	Lecture, laboratory application. And discussion	Listen and ask questions
20-18	3	Modification commands . Offset, Mirror, Copy, Erase, Modify, Array, Move, Rotate, Scale, Fillet, Chamfer, Break, .Extend, Trim, Stretch, Explode	An introduction to learning about the user interface components of a program	Lecture, laboratory application. And discussion	Case study

23-21	3	<p>Text commands and modifications:Single line text, Multi line text How to create .new writing styles</p> <p>Get to know the Design Center and benefit from ready-made frames, landscape models, electrical tools, and all .engineering specialties</p>	<p>An introduction to learning about the components of the user interface of AutoCAD</p>	<p>Lecture, laboratory application. And discussion</p>	<p>Case study</p>
28-24	3	<p>Partition orders:Divide, Measure Control drawing specifications:Color, Lineweight, Linetype</p> <p>Modify the properties of graphic elements using Match, Properties, and Properties Grips</p>	<p>An introduction to learning about the components of the user interface of AutoCAD</p>	<p>Lecture, laboratory application. And discussion</p>	<p>Listen and ask questions</p>
30-28	3	<p>The concept of computer viruses:How to get infected, its types, treatment, and dealing with it through anti-virus programs available within the Windows operating system .environment</p>	<p>What is meant by viruses, their types, and ways to protect devices from them</p>	<p>Lecture, laboratory application. And discussion</p>	<p>Case study</p>

11. Course Evaluation

Distribution of a score out of 100 according to Compound 9 for female students, such as daily preparation, daily, oral, monthly, written exams, reports, etc. ((No. 20) + (No. 20) + (Year 10 work) + (Final 40 written exam) + (Actual final exam 10))

12. Learning and Teaching Resources

Required textbooks	The prescribed curriculum
Main references (sources)	The prescribed curriculum
Recommended books and references (scientific journals, reports...)	The prescribed curriculum
Electronic References, Websites	Check out websites in the field

Course Description Form

1. Course Name: Surveying	
2. Course Code: ---	
3. Semester / Year: annual	
4. Description Preparation Date: 24 - 02 - 2024	
5. Available Attendance Forms: direct - mandatory	
6. Number of Credit Hours (Total) / Number of Units (Total) : 150 hr. /10 units	
7. Course administrator's name (mention all, if more than one name)	
Name: Lecturer Alaa Ali Salman Email: inm.ala @atu.edu.iq	
8. Course Objectives	
Course Objectives	Teaching the student the basics of surveying engineering and using it for civil engineering purposes and making related calculations and how to carry out various surveys and survey work and others, and enabling him to plan and supervise various civil works
9. Teaching and Learning Strategies	
Strategy	<ul style="list-style-type: none"> 1- Relying on the prescribed methodological books 2- Adding recent scientific developments 3- Adopting live lectures and using available modern display devices 4- Using e-learning and adding scientific film presentation about the courses to enrich the scientific aspect.

10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-2	5	A visit to the surveying laboratory measuring distance by estimation and steps with tape	The basic principles of space, its divisions, uses and purposes	Lecture, laboratory application, discussion	Listening ask questions
3-4	5	Measuring distances horizontal, sloping	Measuring distances on sloping horizontal terrain how to erect columns, how to draw lines parallel to route of travel from a known point outside of it and winding, and overcoming obstacles (obstacles),	Lecture, laboratory application, discussion	Listening ask questions
5-6	5	Learn about leveling	Leveling, its methods, definitions related to it, finding ways to rise between points	Lecture, laboratory application, discussion	Listening ask questions
7-8	5	Calculating ground levels and ways	Calculating levels in two ways: the rise and fall method, and calculating levels using the device height method, types of leveling, errors and errors in leveling	Lecture, laboratory application, discussion	Listening ask questions
9-10	5	Topographic maps and contour lines, their characteristics, drawing and use	Applying contour lines used for the purpose of correct projects, calculating distances and sizes, and implementing line drawing a mathematical way	Lecture, laboratory application, discussion	Listening ask questions
11	5	Longitudinal sections	Reading plans for longitudinal sections and how to draw and implement them	Lecture, laboratory application, discussion	Listening ask questions
12	5	Cross sections	Read cross section diagrams and how to draw and implement them	Lecture, laboratory application, discussion	Listening ask questions
13	5	Getting to know the theodolite device	Learn about the theodolite device of all available types and how to check and adjust the device	Lecture, laboratory application, discussion	Listening ask questions

14	5	Measure the horizontal angles of a central angle	Measuring horizontal angle of a central angle using the iterative method.	Lecture, laboratory application, discussion	Listening ask questions
15	5	Measure the horizontal angles of a central angle	Measuring horizontal angle of a central angle using the directional method	Lecture, laboratory application, discussion	Listening ask questions
16-17	5	Measuring horizontal distances using a theodolite device	Measuring the horizontal distances of the sides of a closed polygon using a theodolite device, measuring tape, and level ruler.	Lecture, laboratory application, discussion	Listening ask questions
18-19	5	Horizontal curves	Projection of the horizontal curve using a theodolite device only.	Lecture, laboratory application, discussion	Listening ask questions
20-21	5	Applications of horizontal angles with theodolite preparation	Measuring horizontal angle with an open polygon after attaching points to it, measuring horizontal distances and directions, measuring the horizontal angle between two walls, and measuring the length to a target (building) that cannot be reached.	Lecture, laboratory application, discussion	Listening ask questions
22-23	5	. Vertical curves	How to calculate the coordinates of points along a vertical curve and how to measure vertical (perpendicular) angles	Lecture, laboratory application, discussion	Listening ask questions
24-25	5	Ribbing with ready theodolite	Measure the interior horizontal angles of a closed polygon	Lecture, laboratory application, discussion	Listening ask questions
26-28	5	directions	calculating directions, calculating horizontal and vertical components, and correcting components and coordinates.	Lecture, laboratory application, discussion	Listening ask questions
29-30	5	Triangulation	the process of selecting triangulation points, measuring the base line for triangulation, and making corrections to the tape measurement	Lecture, laboratory application, discussion	Listening ask questions

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as

daily preparation, daily oral, monthly, or written exams, reports etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	Plane space and topography, Dr.Fouad Malallah Faqli,1983
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	Specialized websites

Course Description Form

1. Course Name: Engineering drawing	
2. Course Code: ---	
3. Semester / Year: annual	
4. Description Preparation Date: 24 - 02 - 2024	
5. Available Attendance Forms: direct – computer lap	
6. Number of Credit Hours (Total) / Number of Units (Total) : 90 hr. /6 units	
7. Course administrator's name (mention all, if more than one name)	
Name :Wafa Jaleel kareem Email: wjwjwj664977@gmail.com	
8. Course Objectives	
Course Objectives	1. The student is able to draw geometric shapes, three-dimensional drawings, and sections. He is also able to read ready-made engineering drawings. 2.The student can draw geometric shapes using AutoCAD. 3.The student imagines the final form of the engineering drawing
9. Teaching and Learning Strategies	
Strategy	1. The student learns about engineering drawing tools. 2. The student learns about drawing geometric shapes (lines, circles, arcs 3. The student learns applications and exercises in verticaland stereosco projection and drawing sections.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Basic principles	Importance of engineering drawing- Applying AutoCAD in engineering drawing – Measurement of drawing sheet- Overview of AutoCAD window.	Practical lectures Group discussions	Tested +Class assignment
2	3	Basic principles	Types of lines in engineering drawing- Use of pull-down menus for lines and texts.	Practical lectures Group discussions	Tested
3	3	Basic principles	Drawing of basic objects.	Practical lectures Group discussions	+Class assignment
4	3	Basic principles	Drawing of basic objects.	Practical lectures Group discussions	Tested
5	3	Engineering operations in drawing	Modifying of drawings .	Practical lectures Group discussions	+Class assignment
6	3	Engineering operations in drawing	Use of status bar.	Practical lectures Group discussions	Tested
7	3	Engineering operations in drawing	Drawing operations.	Practical lectures Group discussions	+Class assignment
8	3	Engineering operations in drawing	Dimensioning	Practical lectures Group discussions	Tested

9	3	Engineering operations in drawing	Applications	Practical lectures Group discussions	+Class assignment
10	3	Engineering operations in drawing	Isometric drawing – Drawing a shape containing a square, rectangle, circle and triangle.	Practical lectures Group discussions	Tested
11	3	Engineering operations in drawing	Isometric drawing – Drawing a shape containing a square, rectangle, circle and triangle.	Practical lectures Group discussions	+Class assignment
12	3	Engineering operations in drawing	Isometric drawing – Drawing a shape containing a square, rectangle, circle and triangle.	Practical lectures Group discussions	Tested
13	3	Engineering operations in drawing	Isometric drawing – Drawing a shape containing a square, rectangle, circle and triangle.	Practical lectures Group discussions	+Class assignment
14	3	Engineering operations in drawing	Theory of projection –	Practical lectures Group discussions	Tested
15	3	Engineering operations in drawing	Orthographic projection for simple shapes.	Practical lectures Group discussions	+Class assignment
16	3	Engineering operations in drawing	Dimensions on isometric drawings and objects.	Practical lectures Group discussions	Tested
17	3	Sculptures	Dimensions on isometric drawings and objects.	Practical lectures Group discussions	+Class assignment

18	3	Sculptures	Drawing of third view by use of other two views.	Practical lectures Group discussions	Tested
19	3	Sculptures	Drawing of third view by use of other two views.	Practical lectures Group discussions	+Class assignment
20	3	Sculptures	Drawing of third view by use of other two views.	Practical lectures Group discussions	Tested
21	3	Sculptures	Sectioning of objects	Practical lectures Group discussions	+Class assignment
22	3	Geometric view for drawing,	Hatching – Types of hatching lines	Practical lectures Group discussions	Tested
23	3	Geometric view for drawing,	Drawing of sectioned views.	Practical lectures Group discussions	+Class assignment
24	3	Geometric view for drawing,	Drawing of sectioned views by Knowing one view.	Practical lectures Group discussions	Tested
25	3	Geometric view for drawing,	Drawing of sectioned views by Knowing one view.	Practical lectures Group discussions	+Class assignment
26	3	Geometric view for drawing,	Drawing of sectioned views by Knowing one view.	Practical lectures Group discussions	Tested
27	3	Geometric view for drawing,	Drawing of partly sectioned views.	Practical lectures Group discussions	+Class assignment

28	3	Drawing of sectioned views.	Drawing of partly sectioned views.	Practical lectures Group discussions	Tested
29	3	Drawing of sectioned views	Applications and projects.	Practical lectures Group discussions	+Class assignment
30	3	Drawing of sectioned views	Applications and projects.	Practical lectures Group discussions	Tested

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	1-Bob Macfarlane, Beginning AutoCAD 2004 , Great Britain , 2004 2 - Ellen Finkelstien , AutoCAD 2007 , Wiley publishing, Inc. ,2007 , USA. 3 - Cecil Jensen , Fundamentals of engineering drawing , McGraw-Hill, 2002, USA
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic Websites	Referenc

Course Description Form

1. Course Name: Hydrology	
2. Course Code: ---	
3. Semester / Year: Second Academic Year	
4. Description Preparation Date: 24 - 02 - 2024	
5. Available Attendance Forms: direct - mandatory	
6. Number of Credit Hours (Total) / Number of Units (Total) : 120 hr. / 8 units	
7. Course administrator's name (mention all, if more than one name)	
Name: Prof. Wisam A. Abidalla Email: inm.wsm@atu.edu.iq	
8. Course Objectives	
Course Objectives	Teaching the student the basics of surveying and using it for civil engineering purposes and making related calculations and how to carry out various surveys and survey work and others, and enabling him to plan and supervise various civil works
9. Teaching and Learning Strategies	
Strategy	Providing the student with skills and knowledge in the foundations of hydrology, methods of measuring water, drainage of streams and rivers, studying floods, tracking waves, and the procedures required to protect against them. 1- Identify the environmental and engineering balances for a sustainable world. 2- Water education is a path to achieving water security. 3- Addressing water scarcity and water quality. 4- Water and human settlements in the future. 5- Identifying groundwater, its importance and where it is found. 6- Study the impact of rain on areas and determine the extent of its impact.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Understand the hydrological cycle in nature	Identify the meaning of the hydrological cycle in nature	Continuous orientation of students by the professor during the lecture	questions and answers
2	4	Identify weather stations and measure temperature, humidity, and solar radiation	Weather forecasting, weather forecasting stations and their types, measuring temperature and solar radiation, humidity	Lecture and discussion	Ask questions
3	4	Identifying the wind, knowing its effect, and knowing the atmospheric pressure and the extent of its effect	Wind - atmospheric pressure.	Dialogue and criticisms	Listening ask questions
4	4	Learn about how satellites work and their importance in weather monitoring	Using electronic computers to monitor and measure weather information - using satellites.	Discussion and mini lesson	mini lesson discussion
5	4	Identifying precipitation and their types	Rainfall, forms of rainfall, types of rainfall, rain gauges, intensity, sustainability and frequency.	Lecture and discussion	case study

6	4	Learn about the Thiessen method	Calculating rainfall rates over areas - Thiessen method.	Discussion and mini lesson	Listening ask questions
7	4	Learn about the method of rain isolines	Rain Isolines Method - Guessing Missing Information.	Dialogue and criticism	Listening ask questions
8	4	Learn about snow and ways to measure it	Snow cover survey - snow measuring devices - snow melting.	Discussion and mini lesson	Listening ask questions
9	4	Identify the process of evaporation from bodies of water	Evaporation, evaporation from bodies of water – evaporation from the Earth's surface.	Discussion and mini lesson	Listening ask questions
10	4	Identify filtration through soil	Filtration - measuring filtration - calculating filtration rates.	Dialogue and criticism	Listening ask questions
11	4	Identify groundwater and soil formations	Groundwater, land formations, aquifers, steady flow towards wells in free and confined formations.	Discussion and mini lesson	Listening ask questions
12	4	Identifying surface runoff and methods for estimating it	Surface runoff, methods for estimating surface runoff, rational equation.	Dialogue and criticism	Listening ask questions

13	4	Learn about rivers and how they are fed	River feed basins, their identification, types, river systems.	Lecture and discussion	Ask questions
14	4	Recognizing the relationship between declension and accusative and representing it.	The curve of the relationship between discharge and level (calibration curve) is determined, modified, and extended.	Dialogue and criticisms	Listening ask questions
15	4	Learn about ways to measure water levels.	Water levels, measurement methods and types.	Discussion and mini lesson	Listening ask questions
16	4	Identify the flow of river water	Speed of water flow in rivers, discharges, measurement methods, area and slope method.	Discussion and mini lesson	Listening ask questions
17	4	Identify the current meter	Current meter, calculate charges by current meter.	Dialogue and criticism	Listening ask questions
18	4	Identify water facilities and their work	Discharge measuring facilities – submersible dams, manholes, regulating systems	Discussion and mini lesson	Listening ask questions
19	4	Identify the cumulative flow curve and know the volume of storage	Cumulative flow curve - operating tanks, calculating storage volume - calculating acceptable and variable demand.	Discussion and mini lesson	Listening ask questions
20	4	Identify the types of sediments and ways to identify them	Sediments, their types, methods of measuring them - controlling them.	Dialogue and criticism	Listening ask questions

21	4	Identify the hydrograph and its basic parts.	Water-time curve	Discussion and mini lesson	Listening ask questions
22	4	Identify the standard curve	(Hydrograph) – Isolating it into its components.	Dialogue and criticism	Listening ask questions
23	4	Identify floods, their causes and how to control them	Standard time curve, its derivation - its purpose.	Discussion and mini lesson	Listening ask questions
24	4	Learn about flood consequences and methods of calculating them	Floods, their causes - their possibilities - the period of their return.	Lecture and discussion	Ask questions
25	4	Learn about flood control methods	Flood tracking - hydrological methods of tracking - Muskingum method of tracking.	Dialogue and criticism	Listening ask questions
26	4	Learn about river drainage	Flood control measures – earth embankments and walls.	Discussion and mini lesson	Listening ask questions
27	4	Learn about river drainage	Reservoirs, dams, river refinement.	Dialogue and criticism	Listening ask questions
28	4	Identify water sources	Water sources, estimation of water sources, development of water sources.	Discussion and mini lesson	Listening ask questions
29	4	Learn about water storage projects in Iraq	Study of water systems and storage projects in Iraq.	Lecture and discussion	Ask questions

30	4	Learn about statistical forecasting	Statistical information, using computers to analyze water information, statistical forecasting, and frequency analysis.	Dialogue and criticism	Listening ask questions
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11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc.

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	<p>1- Hydrology and Principles of Irrigation Engineering, Dr. Muhammad al-Janabi, Beirut, 1986</p> <p>2- "Engineering Hydrology", K. Subramanya, McGraw Hill, 1984</p> <p>3- Hand book of applied Hydrology", V.T. chow," McGraw Hill, New York, 1964</p>
Main references (sources)	Hydrology and its applications, Dr. Baqir Kashif Al-Ghita, University of Mosul, 1982
Recommended books and references (scientific journals, reports...)	- Engineering Hydrology, Wilson, Translated by the University of Basra
Electronic References, Websites	Specialized websites

Course Description Form

1. Course Name: Irrigation structures					
2. Course Code:					
3. Semester / Year: Year					
4. Description Preparation Date:13/2/2024					
5. Available Attendance Forms: Class + drawing					
6. Number of Credit Hours (Total) / Number of Units (Total) =120/8 =15					
7. Course administrator's name (mention all, if more than one name)					
Name:		Email:			
Name: Zainab Nabeel Hameed		Email: zainab.al-saati@atu.edu.iq			
8. Course Objectives					
Course Objectives	Teaching the student and providing him with the necessary technical skills about the irrigation facilities, their functions, components, methods of implementation and drawing them by the AutoCAD system on the calculator for at least six weeks.				
9. Teaching and Learning Strategies					
Strategy	1- Depend on prescribed methodological books. 2- Adding recent scientific developments . 3- Adopting live lectures and using available modern projectors . 4- Using electronic-learning and adding scientific film presentations about courses to enrich the scientific aspect.				
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Give a preliminary idea of hydraulic installations, their types and uses.	Identify the types of hydraulic installations and the benefit of each facility separately.	Lecture by the professor with illustrative pictures.	Questions & answers
2	4	Conventions used in drawing hydraulic	Introducing students to the method of	Lecture, Application inside	Drawing evaluation

		installations - their interpretation	drawing facilities.	the drawing hall.	
3	4	Plans of irrigation and drainage networks and the facilities built on them .	Identify the plans for irrigation and drainage networks and their locations .	Lecture by the professor and discussion.	Case study
4	4	Longitudinal and transverse sections of various channels and trocars.	Clarification of longitudinal and transverse sections inside the facilities.	Lecture, application inside the drawing hall and discussion.	Drawing evaluation
5	4	The retaining walls, their functions, the forces acting on them, the sites of their construction their uses and types.	Identify the retaining walls of the facilities, the type of forces applied to them, their importance and types.	Lecture by the Professor.	Questions and answers
6	4	Brick retaining walls.	Identify the materials from which this type of retaining walls is made and its importance .	Lecture by the Professor.	Case study
7	4	Concrete retaining Walls.	Know the materials of this type of retaining walls and when to use them.	Lecture, Discussion	Case study
8	4	Regulator - types - components of the regulator - discharge during the regulator.	Knowledge of regulators and their importance within water channels.	Lecture by the professor and discussion.	Listening and asking questions.
9	4	Regulator dimensions (front length, behind length, floor thickness)	Knowing the details of the regulator during its construction.	Lecture, application inside the drawing hall and discussion.	Drawing evaluation
10	4	Intermediate props in regulators, their dimensions and specifications.	Knowing the props in the regulators and their dimensions.	Lecture, application inside the drawing hall and discussion.	Drawing evaluation
11	4	Culverts, their components, types, planning locations.	Knowledge of this type of facility and its details.	Lecture, application inside the drawing hall and discussion.	Asking questions.
12	4	Circular culverts, box culverts.	Identify the shapes and details of culverts.	Lecture, application inside the drawing hall and discussion.	Drawing evaluation
13	4	Flowing in culverts, siphons and calculation their drains.	Learn about the siphon and its design details.	Lecture by the professor and discussion.	Case study
14	4	Bridges, their components, types.	Study the details of bridges and design.	Lecture, application inside the drawing hall and discussion.	Drawing evaluation
15	4	Pedestrian bridge, car bridge	Know the types of bridge	Lecture, application inside the drawing hall and discussion.	Listening and asking questions
16	4	Spacers / Supports / Supports, Quarry for	Identify each structure and its importance.	Lecture, application inside the drawing	Drawing evaluation

		Bridges, Roof Sections Bridges.		hall and discussion.	
17-18	4	Dams and reservoirs: importance, types, planning & selection.	Identify dams and their importance in preserving water, their types and how to choose them.	Lecture, application inside the drawing hall and discussion.	Questions and answers
19-20	4	Gravitational dams (gravity) specifications	Clarify the meaning of gravitational dams and the way they are constructed.	Lecture, application inside the drawing hall and discussion.	Drawing evaluation
21-22	4	Types of waterfall and their drainage	Identify this type of facility and its details.	Lecture, application inside the drawing hall and discussion.	Drawing evaluation
23	4	Rapid downward waterfall USBR Power dispersion Sinks	Identification of energy dispersions in water origin	Lecture, application inside the drawing hall and discussion.	Questions and answers
24-25	4	Gates, types and maintenance.	Knowing this structure and how to preserve it.	Lecture by the professor	Case study
26-27	4	Refinement of cladding rivers, types of them	Knowing this structure and its importance.	Lecture by the professor and discussion.	Questions and answers
28-29	4	Locks - types – ways to fill it	Identify the lock and its types	Lecture and discussion	Case study
30	4	Hydraulic model as a solution in hydraulic constructions	Identify hydraulic models and the importance of designing them	Lecture, application inside the drawing hall and discussion.	Drawing evaluation

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports ... etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	
Recommended books and references (scientific journals, reports...)	<p>1- الحدود / أربيل ماري / منشورات عويدات / بيروت عام 1971</p> <p>2- إنشاءات الهيدروليكية – د. محمد الجنابي منشورات الراتب للأبحاث الجامعية</p> <p>3- "Design Text Book in Civil Engineering", erge Lillivssky. Vol. I.. III. Chapman and Mall 1965</p> <p>4- "Water Resources Engineering", Linsley .and Franklin, McGraw Hill ,1971</p> <p>5- "Engineering of Large Dams", By -5 Henry M. Tomas -6</p>
Electronic References, Websites	

Course Description Form

1. Course Name: Drainage

2. Course Code: ---

3. Semester / Year: Second Academic Year

4. Description Preparation Date: 28 - 02 - 2024

5. Available Attendance Forms: direct - mandatory

6. Number of Credit Hours (Total) / Number of Units (Total) : 120 hr. / 8 units

7. Course administrator's name (mention all, if more than one name)

Name: Asst. Prof. Ameer H. Hussein

Email: inm.ame@atu.edu.iq

8. Course Objectives

Course Objectives	Introducing and teaching the student to pay attention to puncture, agricultural land reclamation and field investigation work
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9. Teaching and Learning Strategies

Strate	<p>1- Reliance on prescribed methodological books</p> <p>2- Adding recent scientific developments</p> <p>3- Adopting live lectures and using available modern projectors</p> <p>4- Using e-learning and adding scientific film presentations about courses enrich the scientific aspect.</p>
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10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Identify the concept of puncture and how to benefit from such puncture projects, impact on plants, methods of treatment, control of surplus water sources	introduction, excess water, its sources and its	Continuous orientation of students by the professor during the lecture	questions and answers

2	4	Identify the types of field investigations and their benefits, field investigations of trocars, how to obtain hydrological information, piezometric	monitoring wells and how to install them in the field and their importance in puncture work	Lecture and discussion	Ask questions
3	4	Learn how to collect and analyze data extracted from monitoring wells Collecting and analyzing the readings of monitoring wells and bizometers	groundwater changing its direction and calculating its quantity, the use of laser beams in determining the movement of groundwater	Dialogue and criticisms	Listening ask questions
4	4	Identify the concept of permeability in general and its experiments Permeability,	permeability coefficient, measurement in the laboratory by fixed and variable pressure method	Discussion and mini lesson	mini lesson discussion
5	4	Identify field methods for measuring permeability Field method for measuring permeability	(cylindrical hole method, piezometer method, reverse cylindrical hole method, double perforated hole)	Lecture and discussion	case study
6	4	Identify the theories of subsurface trocars,	Darcy's theory, Forschheimer, types of subsurface trocars, cutter trocars, low trocars	Discussion and mini lesson	Listening ask questions

7	4	Identify the types of trocars	Open trocars, covered trocars, field trocars, vertical trocars	Dialogue and criticism	Listening ask questions
8	4	Recognize surface trocars and their benefits and disadvantages	Surface trocars and their calculations	Discussion and mini lesson	Listening ask questions
9	4	Learn how to calculate the distances between trocars Calculation of subsurface trocar	spacing for homogeneous soils, Calculation of trocar spacing for natural soils	Discussion and mini lesson	Listening ask questions
10	4	Identify the types of saline soils	Types of saline soils, their sources, methods of measurement	Dialogue and criticism	Listening ask questions
11	4	Identify the types of salts and how to measure them Types of salts in the soil and their distribution	the effect of salts on plants	Discussion and mini lesson	Listening ask questions
12	4	Learn about land reclamation in	general Land reclamation, introduction to soil washing	Dialogue and criticism	Listening ask questions
13	4	Identify the requirements of soil washing in general	Washing requirements, water and salt balance in the root zone	Lecture and discussion	Ask questions

14	4	Identify the washing efficiency of soils,	washing efficiency coefficient, water and salt balance in various saline lands	Dialogue and criticisms	Listening ask questions
15	4	Learn about washing processes in particular	washing operations in saline soils and soda soils	Discussion and mini lesson	Listening ask questions
16	4	Identify trocar installations and their designs Trocar facilities, puncture materials (pipes, pipe casings),	calculations for choosing pipe capacity, determining the location of defects in the covered puncture networks	Discussion and mini lesson	Listening ask questions
17	4	Identify the geometry of trocars and types of trocars	Puncture network geometry, network diagrams, longitudinal and transverse sections of covered and open trocars	Dialogue and criticism	Listening ask questions
18	4	Definition of the operation of water resources projects Operation of irrigation and drainage projects,	stages of operation, maintenance of irrigation and puncture, maintenance paragraphs	Discussion and mini lesson	Listening ask questions
19	4	An introductory lecture on puncture networks and costs, puncture networks, operation of	the puncture system, water drainage methods, maintenance of the irrigation and puncture project,	Discussion and mini lesson	Listening ask questions

			and cost and maintenance allocations		
20	4	How to maintain irrigation and drainage projects Types of maintenance of irrigation and puncture projects,	implementation of maintenance work, maintenance machinery and equipment, removal of bushes from tables and trocars	Dialogue and criticism	Listening ask questions
21	4	How to maintain the puncture system	Maintenance of the puncture system, general preventive measures, maintenance of open trocars, cleaning and maintenance of covered field trocars	Discussion and mini lesson	Listening ask questions
22	4	Explanation of the preparation of forms and schedules for periodic maintenance	How to prepare forms and schedules for periodic maintenance with scientific examples and preparation of calculator	Dialogue and criticism	Listening ask questions
23	4	Definition of puncture mechanization, modification machines, puncture mechanization,	adjustment and leveling machines, skimmers, bulldozer pullers	Discussion and mini lesson	Listening ask questions

24	4	Learn about laser system for sharp	operation and control and laser control and operation system	Lecture and discussion	Ask questions
25	4	Identification of drilling machines and their types Drilling	machines used to drill open trocars, onshore excavations, hydraulic excavations and wire excavators	Dialogue and criticism	Listening ask questions
26	4	Identification of trenches and their types	Trenches Covered puncture machines types and efficiency Amphibious excavators and dredgers	Discussion and mini lesson	Listening ask questions
27	4	Learn about the introduction to pumps,	types and types of pumps	Dialogue and criticism	Listening ask questions
28	4	Learn how pumps and their facilities are calculated	Pump and facility calculations	Discussion and mini lesson	Listening ask questions
29	4	Identifying puncture problems in Iraq	Puncture problems in Iraq	Lecture and discussion	Ask questions
30	4	Identifying land reclamation methods Land reclamation	methods in northern, central and southern Iraq	Dialogue and criticism	Listening ask questions

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc.

12. Learning and Teaching Resources

<p>Required textbooks (curricular books, if any)</p>	<p>1- Hydrology and Principles of Irrigation Engineering, Dr. Muhammad al-Janabi, Beirut, 1986</p> <p>2- "Engineering Hydrology", K. Subramanya, McGraw Hill, 1984</p> <p>3- Hand book of applied Hydrology", V.T. chow," McGraw Hill, New York, 1964</p>
<p>Main references (sources)</p>	<p>Hydrology and its applications, Dr. Baqir Kashif Al-Ghita, University of Mosul, 1982</p>
<p>Recommended books and references (scientific journals, reports...)</p>	<p>- Engineering Hydrology, Wilson, Translated by the University of Basra</p>
<p>Electronic References, Websites</p>	<p>Specialized websites</p>

Course Description Form

1. Course Name: Soil Mechanics

2. Course Code: None

3. Semester / Year: 2nd academic year

4. Description Preparation Date: 13/2/2024

5. Available Attendance Forms: Attend the lectures and laboratory tests

6. Number of Credit Hours (Total) / Number of Units (Total) :15

7. Course administrator's name (mention all, if more than one name)

Name: Dr. Majeed Rasheed Sabaa

Email: inm.mjd@atu.edu.iq

8. Course Objectives

Course Objectives

- Knowledge of soil composition, Genesis, and types,
- Classify the soil and knowledge of it's texture,
- Knowledge of the physical and geotechnical properties of soils,
- Knowledge of the site investigation of soil,
- Knowledge of the bearing capacity and the shear strength of soil

9. Teaching and Learning Strategies

Strategy

Accreditation of academic lectures, laboratory tests, field experiments and field visits.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1--2	3	Definition of soil, it's origin, composition, classification according to the nature and geometric of soil	Origin of the soil and types in the nature	Direct academic lectures	Questions discussions

3-4	6	Physical relations of volume and weight relation, porosity, void ratio, total and dry density	Physical properties relation	Direct academic lectures	Questions discussions
5	3	Specific gravity of the soil and relation with the other properties of soil	Specific gravity	Direct academic lectures lab. test	Questions discussions
6-7	6	Grain size distribution Sieve analyses, and hydrometer	Grain size distribution	Direct academic lectures lab. test	Questions discussions reports of tests
8	6	Connection of sieve analyses and the hydrometer results	Texture of soil	Direct academic lectures	Questions discussions, home work
9	6	Determine liquid and plastic limits	Atterberg limits	Direct academic lectures lab. test	Questions discussions reports of tests
10-11	6	Method of soil classification unified classification of soils ASHTTO classification	Soil classification	Direct academic lectures lab. test	Questions discussions reports of tests
12	3	Flow of water through the soil permeability of the soil	Permeability of soil	Direct academic lectures lab. test	Questions discussions reports of tests
13-14	6	Darcy law and the permeability and the flow net	Determine coefficients permeability	Direct academic lectures lab. test	Questions discussions reports of tests
15-16	6	Standard & modified Proctor test	Compaction of soil	Direct academic lectures lab. test	Questions discussions reports of tests
17	3	Methods and field equipment compaction	Compaction in the field	Direct academic lectures lab. test	Questions discussions reports of tests
18-19	6	Determine the dry density of soil in the field	Method of determine density of the soil in field	Direct academic lectures lab. test	Questions discussions reports of tests
20-21-22	6	Components of shear strength of the soil	Shear strength of the soil	Direct academic lectures lab. test	Questions discussions reports of tests
23-24	6	Preliminary and detailed investigations	Site soil investigation	Direct academic lectures and	Questions discussions reports of tests
25-26	3	Stabilize the soil by different materials (cement, asphalt, etc)	Soil stabilization	Direct academic lectures and	Questions discussions reports of tests
27	6	Consolidation and settlement of soil	Consolidation settlements of soil	Direct academic lectures lab. test	Questions discussions reports of tests

28	3	Determine the foundation of structures, types and characteristics	Type of foundations	Direct academic lectures and	Questions discussions ; reports of tes
29	3	Shallow foundation and characteristics	Shallow foundation	Direct academic lectures	Questions discussions ; reports
30	3	Deep foundations characteristics	Deep foundations	Direct academic lectures	Questions discussions ; reports

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	. هندسة التربة / حامد السعيد
Recommended books and references (scientific journals, reports...)	ميكانيك التربة / د. ممتاز حباية
Electronic References, Websites	

Course Description Form

1. Course Name: Construction materials and quantity surveying					
2. Course Code: None					
3. Semester / Year: 2 nd academic year					
4. Description Preparation Date: 13/2/2024					
5. Available Attendance Forms: Attend the lectures and laboratory tests					
6. Number of Credit Hours (Total) / Number of Units (Total) :15					
7. Course administrator's name (mention all, if more than one name)					
Name: Dr. Majeed Rasheed Sabaa					
Email: inm.mjd@atu.edu.iq					
8. Course Objectives					
Course Objectives		<ul style="list-style-type: none"> Knowledge of construction materials and properties, Knowledge of specification of materials and standard engineering specification, Knowledge of the lean and pre cast concrete, Knowledge of quantity and the cost of construction materials the project, Knowledge of the flow chart of the project, Knowledge of types of contacting 			
9. Teaching and Learning Strategies					
Strategy		Accreditation of academic lectures, laboratory tests, field experiments and field visits.			
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Important of construction mater	Properties construction materials	Direct academic lectures	Questions discussions

2	4	Construction works & construction industry	construction indus	Direct academic lectures	Questions discussions
3	4	Properties and specifications of materials	Properties specifications of materials	Direct academic lectures lab. test	Questions discussions
4	4	Rock properties s and it's uses	Rocks	Direct academic lectures lab. test	Questions discussions ; reports of tes
5	4	Clay bricks, properties and uses	Clay brick	Direct academic lectures	Questions discussions, ; home work
6	4	Sand bricks, properties and uses	Sand brick concrete block	Direct academic lectures lab. test	Questions discussions ; reports of tes
7	4	Sand, properties, source, uses.	Sand	Direct academic lectures lab. test	Questions discussions ; reports of tes
8	4	Gravels, properties, source, uses.	Gravels	Direct academic lectures lab. test	Questions discussions ; reports of tes
9-10	8	Salts, source, harmful effects	Salts	Direct academic lectures lab. test	Questions discussions ; reports of tes
11-12	8	Cement, it's properties, types, and uses	Cement	Direct academic lectures lab. test	Questions discussions ; reports of tes
13	4	Fresh concrete, its components, method pouring and curing	Fresh concrete	Direct academic lectures lab. test	Questions discussions ; reports of tes
14	4	Precast concrete, transportation processing methods	Precast concrete	Direct academic lectures lab. test	Questions discussions ; reports of tes
15	4	Reinforcements, properties, types testing	Reinforcements	Direct academic lectures lab. test	Questions discussions ; reports of tes
16	4	Bonding materials, types, cement inflorescence mortars	Bonding materials	Direct academic lectures and	Questions discussions ; reports of tes
17-18	8	Estimation, benefits and qualifications of appraiser	Estimation	Direct academic lectures and	Questions discussions ; reports of tes
19-20	8	Primary estimations, approximation calculation of quantities	Primary estimatio	Direct academic lectures lab. test	Questions discussions ; reports of tes
21-22	8	Final estimation and analysis of prices quantities	Final estimation	Direct academic lectures and	Questions discussions ; reports of tes

23-24	8	Preparing and organizing tables quantities	Preparing organizing tables quantities	Direct academic lectures	Questions discussions reports
25-26	8	Calculating and estimating earthwork and dams	Estimating earthworks	Direct academic lectures	Questions discussions reports
27	4	Calculating and estimating reinforcements and molding	Calculating estimating reinforcements molding	Direct academic lectures	Questions discussions reports
28	4	Flowcharts, estimating the proper per of the project	Flowcharts	Direct academic lectures	Questions discussions reports
29	4	General conditions and specifications contracting	General conditions and specifications for contracting	Direct academic lectures	Questions discussions reports
30	4	Types of contracting and method referral	Types of contracting	Direct academic lectures	Questions discussions reports

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	المباني والمواد البنائية / يوسف الدواف الطبعة الرابعة 1976
Main references (sources)	1- التخمين والمواصفات / مدحت فضيل فتح الله 1977 2- تكنولوجيا الخرسانة / د. مؤيد الخلف. 3- مواد البناء واختباراتها القياسية/ د. محمد علي بركات 4- التخمين والمواصفات / مدحت فضيل فتح الله 1977
Recommended books and references (scientific journals, reports...)	Scientific journal & reports
Electronic References, Websites	Internet sits

Course Description Form

1. Course Name: computer application					
2. Course Code: non					
3. Semester / Year: second academic year					
4. Description Preparation Date:13/2/2024					
5. Available Attendance Forms: attend lecture +computer lap					
6. Number of Credit Hours (Total) / Number of Units (Total): (3*30)/6=15					
7. Course administrator's name (mention all, if more than one name)					
Name: hyder taleb shomran					
Email: had1@atu.edu.iq					
8. Course Objectives					
Course Objectives		Objective of the course: To teach the student how to optimally use the computer drawing program AutoCAD, starting with studying three-dimensional objects and how to deal with them by adding, deleting, rotating, layering, and then photographing. Then the curriculum addresses studying the printing program Word			
9. Teaching and Learning Strategies					
Strategy		1- Relying on the prescribed methodological books 2- Adding recent scientific developments 3- Adopting live lectures and using available modern display devices 4- Using e-learning and adding scientific film presentations about the courses to enrich the scientific aspect			
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method

11. Course Evaluation

Distribution of a score out of 100 according to Compound 9 for female students, such as daily preparation, daily, oral, monthly, written exams, reports, etc. ((No. 20) + (No. 20) + (Year 10 work) + (Final 40 written exam) + (Actual final exam 10))

12. Learning and Teaching Resources

Required textbooks	The prescribed curriculum
Main references (sources)	The prescribed curriculum
Recommended books and references (scientific journals, reports...)	The prescribed curriculum
Electronic References, Websites	Check out websites in the field

Evaluation method	Learning method	Name of the unit or topic	Required learning outcomes	hours	the week
questions and answers	Continuous guidance of students by the professor	Identify computer components, their types, and how they operate	Introduction to computers:Its generations, components (hardware and software)	3	2-1
Asking questions	Lecture, laboratory application. And discussion	The program's graphical application interface, dealing with computer components, both hardware and software	Windows XP operating system:The concept of the Windows system, its advantages, basic requirements, operating the system, components of the main screen of the desktop, the concept of icons, the method of dealing with mouse activities, the importance and components of the task bar, making use of start to enter programs, the concept of loaded tasks, exiting the system And turn off the .calculator	3	3
Case study	Lecture, laboratory application. And discussion	Dealing with windows within the program	The concept of the window for any program and learning about its main components, dealing with Recycle bin, my computer, my Documents	3	4
Listen and ask questions	Lecture, laboratory application. And discussion	Copying, saving and dealing with .folders	Format floppy disks, copy folders and files, make use of cut and paste and know the properties of disks, folders and files	3	5
Asking questions	Lecture, laboratory application. And discussion	Provides the application's graphical interface, such as the desktop, and changes	Benefit from Control panel software:Such as the mouse icon, the display icon, how to change the library desktop background, control the screen saver, change the appearance and colors of window menus,	3	6

		the appearance and colors of the menus	and the Remove prog icon., add in adding and deleting programs		
Mini-lesson discussion	Lecture, laboratory application. And discussion	Identify the executive orders of the program	Take advantage of the Run option to execute programs directly and learn how to get .help and its various methods	3	7
Case study	Lecture, laboratory application. And discussion	Gain skill in dealing with audio programs. And graphics, such as the Media Player program, and how to write notes using the Notes program	Use entertainment programs - such as Media Player Window to play movies Benefit from additional - programs (Accessories) such as the Calculator Dealing with drawing - programs to create, save, and retrieve drawings through the commands it .provides Dealing with the Notepad - and Wordpad windows to write, save, retrieve, print texts, and change their printing style and .formatting	3	8
Listen and ask questions	Lecture, laboratory application. And discussion	An introduction to learning about the components of the user interface of AutoCAD	AutoCAD 2004 / getting to - know the program's working environment and ways to access commands and instructions, store and open files Auxiliary commands:Units, - drawing limits Methods of selecting and - selecting objects (Crossing, (window, pick box	3	9
Listen and ask questions	Lecture, laboratory application. And discussion	An introduction to learning about the	POLAR/OTRAK / LWT / ORTHO / OSNAP / GRID / SNAP commands Distance command and Area command	3	10

		components of the user interface of AutoCAD			
Listen and ask questions	Lecture, laboratory application. And discussion	An introduction to learning about the components of the user interface of AutoCAD	View tools: The Zoom command and its options, the Pan command and its options, how to zoom and pan at the same time .Regen command to modify fees	3	11
Listen and ask questions	Lecture, laboratory application. And discussion	An introduction to learning about the components of the user interface of AutoCAD	Basic drawing commands: Line, Multiline, Construction line, Polyline Polygon, Rectangle, Arc, Circle, Revcloud, Spline, Ellipse, Make block, Insert block, Point, Hatch, Region	3	16-12
Listen and ask questions	Lecture, laboratory application. And discussion	An introduction to learning about the components of the user interface of AutoCAD	View tools: The Zoom command and its options, the Pan command and its options, how to zoom and pan at the same time .Regen command to modify fees	3	17
Case study	Lecture, laboratory application. And discussion	An introduction to learning about the user interface components of a program	Modification commands . Offset, Mirror, Copy, Erase, Modify, Array, Move, Rotate, Scale, Fillet, Chamfer, Break, .Extend, Trim, Stretch, Explode	3	20-18

Case study	Lecture, laboratory application. And discussion	An introduction to learning about the components of the user interface of AutoCAD	Text commands and modifications:Single line text, Multi line text How to create .new writing styles Get to know the Design Center and benefit from ready-made frames, landscape models, electrical tools, and all .engineering specialties	3	23-21
Listen and ask questions	Lecture, laboratory application. And discussion	An introduction to learning about the components of the user interface of AutoCAD	Partition orders:Divide, Measure Control drawing specifications:Color, Lineweight, Linetype Modify the properties of graphic elements using Match, Properties, and Properties Grips	3	28-24
Case study	Lecture, laboratory application. And discussion	What is meant by viruses, their types, and ways to protect devices .from them	The concept of computer viruses:How to get infected, its types, treatment, and dealing with it through anti-virus programs available within the Windows operating system .environment	3	30-28

Course Description Form

1. **Course Name:** Modern irrigation techniques

2. **Course Code:** ---

3. **Semester / Year:** Second Academic Year

4. **Description Preparation Date:** 28 - 02 - 2024

5. **Available Attendance Forms:** direct - mandatory

6. **Number of Credit Hours (Total) / Number of Units (Total) :** 120 hr. / 8 units

7. **Course administrator's name (mention all, if more than one name)**

Name: Asst. Prof. Ameer H. Hussein

Email: inm.ame@atu.edu.iq

8. **Course Objectives**

Course
Objectives

Introducing and teaching the student how to work on sprinkler and drip irrigation systems of all kinds, operation and maintenance and the factors affecting them.

9. **Teaching and Learning Strategies**

Strate

- 1- Reliance on prescribed methodological books
- 2- Adding recent scientific developments
- 3- Adopting live lectures and using available modern projectors
- 4- Using e-learning and adding scientific film presentations about courses to enrich the scientific aspect.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Learn about the concept of sprinkler irrigation, benefits and disadvantages	Sprinkler irrigation, benefits and uses of sprinkler irrigation, disadvantages and difficulties	Continuous orientation of students by the professor during the lecture	questions and answers
2	4	Learn how the most important components of the sprinkler irrigation system	Components of the sprinkler irrigation system (pumping unit, pipe network, sprinklers)	Lecture and discussion	Ask questions
3	4	Learn about the rest of the accessories of the system Complementary	accessories to the sprinkler irrigation system (valves and gauges)	Lecture and discussion Listening	Listening ask questions
4	4	Identify the types of systems and compare	the types of sprinkler irrigation systems (fixed and mobile)	Discussion and mini lesson	mini lesson discussion
5	4	Identify the distribution of water around the water distribution	sprinkler around the sprinkler and distribution patterns	Lecture and discussion	case study
6	4	Identify fixed irrigation systems and separators between them and their arrangement, irrigation	Fixed sprinkler irrigation system, separators between sprinklers,	Discussion and mini lesson	Listening ask questions

7	4	Identify the consistency of spraying and hydraulic sprinkler	extrusion and their equations Hydraulic sprinkler extruder, spray consistency	Dialogue and criticism	Listening ask questions
8	4	Learn how to calculate the lengths of sprinkler pipes,	the number of movements of spray pipes, their lengths, numbers and the number of movements	Discussion and mini lesson	Listening ask questions
9	4	Learn how to calculate the lost charge	Calculate the lost charge by friction of pipes, pressure in pipes	Discussion and mini lesson	Listening ask questions
10	4	Learn about the methods of calculating	the diameters of spray pipes Calculating pipe diameters	Dialogue and criticism	Listening ask questions
11	4	Identify the complete system, the main and sub-pipes,	the main and branch pipe system, design requirements	Discussion and mini lesson	Listening ask questions
12	4	Identify pipe design methods	Pipe design methods (flow speed method, friction lost charge, economic analysis method)	Dialogue and criticism	Listening ask questions
13	4	Identify the procedures for operating feeder channels	Regulatory procedures for the operation of feeder channels and facilities built on them for mobile sprinkler irrigation systems and their maintenance	Lecture and discussion	Ask questions

14	4	Identify how to install the system	Installation and installation of a fixed and semi-fixed sprinkler irrigation system	Dialogue and criticisms	Listening ask questions
15	4	Learn how to operate the system and maintain	the operation of the fixed and semi-fixed sprinkler irrigation system and its maintenance	Discussion and mini lesson	Listening ask questions
16	4	Identify how to install the system	Installation and installation of the pivot sprinkler irrigation system	Discussion and mini lesson	Listening ask questions
17	4	Learn how to operate the system and maintenance	Operate the pivot sprinkler irrigation system (pumping and sprinkler system) and maintain it	Dialogue and criticism	Listening ask questions
18	4	Definition of drip irrigation	General introduction to drip irrigation	Discussion and mini lesson	Listening ask questions
19	4	An introductory lecture on drippers and how to calculate their number	Definition of drippers, types of drippers, calculation of the number of drippers	Discussion and mini lesson	Listening ask questions
20	4	How to classify drippers and find CV	Classification of drippers and find the coefficient of manufacturing difference	Dialogue and criticism	Listening ask questions
21	4	How to calculate the drainage coefficient and its equations of the main losses in the drip irrigation system	Calculation of the drainage coefficient, calculation	Discussion and mini lesson	Listening ask questions

22	4	Explanation of the thoracic system and how to calculate the pressure of the thoracic system in the drip irrigation system,	calculation of the pressure applied over the drippers	Dialogue and criticism	Listening ask questions
23	4	How to design a piping	system for drip Main pipe design, manifold pipe design	Discussion and mini lesson	Listening ask questions
24	4	Identify the profile pipe design, profile pipe design	, calculate secondary losses in drip irrigation system	Lecture and discussion	Ask questions
25	4	Learn about pump efficiency	calculations Pump efficiency calculation	Dialogue and criticism	Listening ask questions
26	4	Learn how to design the full network	Design a complete drip irrigation network	Discussion and mini lesson	Listening ask questions
27	4	Learn how to install and operate the system	Installation and operation of the drip irrigation system, self-operation	Dialogue and criticism	Listening ask questions
28	4	Learn how to operate the control device,	operate the control device, operate the pipe network by turning on the drippers and filters	Discussion and mini lesson	Listening ask questions
29	4	Identify the maintenance of drippers from sediments	Maintenance of drippers, sediment treatment (mineral and organic), cleaning of drip irrigation system	Lecture and discussion	Ask questions

30	4	Identify the operation of wells for the sprinkler and drip irrigation	organization Operation of water wells feeding sprinkler and drip irrigation systems	Dialogue and criticism	Listening ask questions
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11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc.

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	1- Hydrology and Principles of Irrigation Engineering, Dr. Muhammad al-Janabi, Beirut, 1986
Main references (sources)	Hydrology and its applications, Dr. Baqir Kashif Al-Ghita, University of Mosul, 1982
Recommended books and references (scientific journals, reports...)	- Engineering Hydrology, Wilson, Translated by the University of Basra
Electronic References, Websites	Specialized websites