Academic Program Description Form

University Name: Al Furat Al–Awsat Technical University
Faculty/Institute: Al–Mussaib Technical Institute
Scientific Department: Power Mechanics Techniques
Academic or Professional Program Name: Technical diploma
Final Certificate Name: Technical diploma in Power Mechanics
Academic System: Yearly
Description Preparation Date: 20/2/2024
File Completion Date: 21/2/2024

Signature:
Head of Department Name:
Hadi Reheem Ibrahim
Date:25/2/2024

Signature:
Scientific Associate Name:
D. Muhammad Hadi Sabry
Date:25/2/2024

The file is checked by: Aws Mahmoud Karit
Department of Quality Assurance and University Performance
Director of the Quality Assurance and University Performance Department:
Date: 29/2/2024
Signature:

Approval of the Dean
Prof. D. Jabbar Abbas Jaber

1. Program Vision

The vision of the Department of Power Mechanics Technologies aims to be one of the best technological departments in the institute and university, through upgrading and improving the teaching and technical staff and building workshops and laboratories to keep pace with scientific and technical development in the field of automobile technology and modern refrigeration and air conditioning technology.

2. Program Mission

The mission of the Department of Power Mechanics Technologies is an extension of the mission of the institute and the university to graduate Middle staff at a high level of education and technical training, be qualified and able to absorb modern technologies in automotive technology and modern refrigeration and air conditioning technology to be an effective element in the labor market and community movement.

3. Program Objectives

Automotive Branch aims to prepare qualified technical staff to work in maintenance workshops of(Automotive , Refrigeration and air conditioning) , community and governmental companies and able to keep up with developments occur continuously according to modern technologies.

4. Program Accreditation

Does the program have program accreditation? And from which agency? No

5. Other external influences

Is there a sponsor for the program?No

6. Program Structure

Program Structure	Number of Courses	Credit hours	Percentage	Reviews*
Institution Requirements				
College Requirements				
Department Requirements	20	126	–	–
Summer Training				
Other				

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

7. Program Description :

A. Automotive Branch

Year/Level	Course Code	Course Name	Credit Hours	
			theoretical	practical
1st year		Automobile Maintenance	2	3
		Automobile Electricity	1	2
		Geometry Mechanics	2	1
		Mathematics	2	0
		Fluid mechanics and thermodynamic	2	1
		Engineering Drawing	0	3
		Computer Applications	1	2
		Human Rights & Democratics	2	0
		English language	1	0
		Workshops	0	4
2nd year		Automobile Maintenance	2	6
		Automobile Electricity	1	2
		Automobile Mechanics	2	0
		Automobile Bodies	2	1
		Internal Combustion Engines	2	2
		Industrial Drawing	0	3
		Computer Applications	1	2

		Management of Service Plants	**2**	**0**
		Modern Automotive Technology	**1**	**2**
		English language	**1**	**0**
		Project	**0**	**2**

7-Program Description :

B. Refrigeration and air conditioning

Year/Level	Course Code	Course Name	Credit Hours	
			theoretical	practical
1st year		Principles of Refrigeration and air conditioning	**2**	**2**
		Electrical Technology	**2**	**2**
		Geometry Mechanics	**2**	**1**
		Mathematics	**2**	**0**
		Thermodynamic	**2**	**1**
		Engineering Drawing	**0**	**3**
		Computer Applications	**1**	**2**
		Human Rights & Democratics	**2**	**0**
		English language	**1**	**0**
		Workshops	**0**	**6**
2nd year		Air Conditioning	**2**	**2**
		Refrigeration System	**2**	**2**
		Heat Transfer	**2**	**1**
		Control System	**2**	**1**
		Refrigeration and air conditioning Equipment Maintenance	**3**	**3**
		Drawing of Refrigeration and air conditioning System	**0**	**3**
		Computer Applications	**1**	**2**
		Management and Occupational Safety	**2**	**0**
		English language	**1**	**0**
		Project	**0**	**2**

8. Expected learning outcomes of the program	
Knowledge	
Learning Outcomes 1	– To be able to understand the principles of operation of engines refrigeration and air conditioning , – To be able to deal with modern cars, refrigeration , air conditioning and types of testing devices of electrical circuits and sensors in cars or in refrigeration and air conditioning.. – To be able to understand the principles of professional safety and avoid various hazards. – To be able to use Windows software, Auto CAD software 2D and 3D in engineering and mechanical drawing.
Skills	
Learning Outcomes 2	–To be able to participate in the maintenance of car engines and refrigeration and air conditioning. – To be able to use the detectors of electrical and electronic and mechanical malfunctions in cars. – To be able to use the computer and perform the mechanical drawings
Ethics	
Learning Outcomes 4	–To love subjects taught at the Institute. – Persuading to his technical position being the link between the engineer and the worker. – Realizing the importance of cooperation between him and the rest of the students. –. Be aware of the challenges facing him in the labor market.

9. Teaching and Learning Strategies
Lecture , solving examples, workshop, laboratory, graduation project, summer training

10. Evaluation methods
Oral tests, editing tests, practical tests, laboratory reports, quarterly exams, Final Exams, and daily evaluation.

11. Faculty

Faculty Members						
Academic Rank	Specialization		Special Requirements/Skills (if applicable)		Number of the teaching staff	
	General	Special			Staff	Lecturer
Ass. Prof	3	2			✓	
Lecturer	1	1			✓	
Ass. Lecturer	1	2			✓	

Professional Development
Mentoring new faculty members
- Developing social sense and involvement in society outside the university walls and directing them to participate in various training courses and engage in workshops.
Professional development of faculty members
- Participation in training courses related to modern teaching and learning methods, participation in specialized courses, participation in seminars and workshops related to professional development.

12. Acceptance Criterion

- **Be within the central acceptance planning approved by the Ministry of Higher Education and Scientific Research**.

13. The most important sources of information about the program

- Research sites on the Internet.
- Corresponding programs in Iraqi and international universities.

14. Program Development Plan

- Developing teaching staff, developing and updating curricula in line with the global development in the specialty, developing laboratories and workshops and providing them with modern devices and equipment

Program Skills Outline															
Automotive branch															
				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
1st year		Automobile Maintenance	Core	√	√	√	√	√	√	√	√	√	√	√	√
		Automobile Electricity	Core	√	√	√		√	√	√	√		√	√	√
		Engineering Drawing	Core	√	√	√		√				√			√
		Geometry Mechanics	Core	√	√	√	√	√	√	√	√	√	√		√
		Fluid mechanics and thermodynamic	Core	√	√	√	√		√	√	√	√	√	√	√
		Workshops	Core	√	√	√	√		√	√	√	√	√	√	√
		Mathematics	Core	√	√	√	√	√	√	√		√		√	√
		Computer Applications	Core	√	√	√	√	√	√	√	√	√		√	√
		English language	Core	√	√	√			√	√	√	√			√
		Human Rights & Democratics	Core	√	√	√	√	√		√	√		√	√	√
2nd year		Automobile Maintenance	Core	√	√	√	√	√	√	√	√	√	√	√	√
		Automobile Electricity	Core	√	√	√	√	√	√	√	√		√	√	√
		Automobile Bodies	Core	√	√	√	√	√	√	√	√		√		√
		Automobile Mechanics	Core	√	√	√	√	√	√	√	√	√	√	√	√
		Internal Combustion Engines	Core	√	√	√		√	√	√	√	√	√	√	√
		Industrial Drawing	Core	√	√	√		√	√	√	√	√	√		√
		Management of Service Plants	Core	√	√	√	√				√		√	√	√
		Computer Applications	Core	√	√	√	√	√	√	√	√	√		√	√
		English language	Core	√	√	√			√	√	√	√	√	√	√
		Modern Automotive Technology	Core	√	√			√	√	√	√	√	√	√	√
		Project	Core	√	√	√	√	√	√	√	√	√	√	√	√

- **Please tick the boxes corresponding to the individual program learning outcomes under evaluation.**

Refrigeration and Air Conditioning branch															
				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
1st year		Principles of Refrigeration and air conditioning	Core	√	√	√	√	√	√	√	√	√	√	√	√
		Electrical Technology	Core	√	√	√	√	√	√	√	√		√	√	√
		Engineering Drawing	Core	√	√	√		√				√			√
		Geometry Mechanics	Core	√	√	√	√	√	√	√	√	√	√		√
		Fluid mechanics and thermodynamic	Core	√	√	√	√		√	√	√	√	√	√	√
		Workshops	Core	√	√	√	√		√	√	√	√	√	√	√
		Mathematics	Core	√	√	√	√	√	√	√		√		√	√
		Computer Applications	Core	√	√	√	√	√	√	√	√	√	√	√	√
		English language	Core	√	√	√	√		√	√	√	√		√	√
		Human Rights & Democratics	Core	√	√	√	√	√		√	√		√	√	√
2nd year		Air Conditioning	Core	√	√	√	√	√	√	√	√	√	√	√	√
		Refrigeration System	Core	√	√	√	√	√	√	√	√		√	√	√
		Heat Transfer	Core	√	√	√	√	√	√	√	√		√		√
		Control System	Core	√	√	√	√	√	√	√	√	√	√	√	√
		Refrigeration and air conditioning Equipment Maintenance	Core	√	√	√		√	√	√	√	√	√	√	√
		Drawing of Refrigeration and air conditioning System	Core	√	√	√	√	√	√	√	√	√	√		√
		Computer Applications	Core	√	√	√			√		√		√	√	√
		Management and Occupational Safety	Core	√	√	√	√	√	√	√	√	√		√	√
		English language	Core	√	√	√			√	√	√	√	√	√	√
		Project	Core	√	√	√	√	√	√	√	√	√	√	√	√

Please tick the boxes corresponding to the individual program learning outcomes under evaluation.

Course Description Form

1. Course Name:
Industrial Drawing by Computer
2. Course Code:
3. Semester / Year:
First semester/2024
4. Description Preparation Date:
20/2/2024
5. Available Attendance Forms:
Presence in classroom
6. Number of Credit Hours (Total) / Number of Units (Total)
90 Credit Hours /6 Units
7. Course administrator's name (mention all, if more than one name)
Name: Maher Ali Hussein Email: inm.maher@atu.edu.iq
8. Course Objectives

Course Objectives	**Introduce students to the knowledge of Industrial Drawing Fundamental and knowledge of scientific and practical details.** **How to operate and maintain the production equipment and the study of the practical applications of production lines and assembly systems and to identify the parts of the programmed machines and how to read their programs……**
9. Teaching and Learning Strategies	
Strategy	• **Lecture Method.** • **Skill Education.** • **Using of modern learning techniques and computer programs.** • **Using of videos and documentaries for teaching skill**

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1+2	6	The student can learn basics of Engineering Drawing	Engineering drawing review	Lecture & Lab	Daily exams Reporting Homework
3+4	6	The student can learn basics of Bolts and Nuts connections	Bolts and Nuts connections	Lecture & Lab	Daily exams Reporting Homework

5+6	6	The student can learn The basic of Keys	KEYS	Lecture & Lab	Daily exams Reporting Homework
7+8	6	The student can learn the basic of Welding connections	Welding connections	Lecture & Lab	Daily exams Reporting Homework
9+10	6	The student can learn the basic of the rivets connections	Rivets connections	Lecture & Lab	Daily exams Reporting Homework
11	3	The student can learn basic details and assembly drawing	Details and Assembly drawing	Lecture & Lab	Daily exams Reporting Homework
12+13	6	The student can learn Classification of the springs and drawing the exact valve	springs	Lecture & Lab	Daily exams Reporting Homework
14	3	The student can learn the shafts connections	The Shafts connections	Lecture & Lab	Daily exams Reporting Homework
15-17	9	The student can learn the Bearings and clutch	Bearing and Clutch	Lecture & Lab	Daily exams Reporting Homework
18-19	6	The student can learn Motion transferring by pulley's	Pulleys and Belts	Lecture & Lab	Daily exams Reporting Homework
20	3	The student can learn Motion transfer by Gears	Spur and Helical gears	Lecture & Lab	Daily exams Reporting Homework
21-22	6	The student can learn Autodesk Inventor	Autodesk Inventor	Lecture & Lab	Daily exams Reporting Homework
23	3	The student can learn 2D – Environment	Autodesk Inventor	Lecture & Lab	Daily exams Reporting Homework
24-25	6	The student can learn Assembly Environment	Autodesk Inventor	Lecture & Lab	Daily exams Reporting Homework
26-27	6	The student can learn Dynamic analysis and movement	Autodesk Inventor	Lecture & Lab	Daily exams Reporting Homework
28	3	The student can learn Feature and Enhancement	Autodesk Inventor	Lecture & Lab	Daily exams Reporting Homework
29-30	6	Practical Project	Autodesk Inventor	Lecture & Lab	Daily exams Reporting Homework

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)	Industrial Drawing by Yusef Alradi 2005

Main references (sources)	- Technical Graphic Communication : Gary R. Bertoline, 2003 - Auto Cad Mechanical 2011 User Gide , 2011 - Autodesk Inventor Professional User Guide , 2011 - Auto Desk Inventor, Stress Analysis And Simulation Guide , 2011
Recommended books and references (scientific journals, reports…)	- Geometrical and technical drawing , book3 , H.A.Freebury , 1974
Electronic References, Websites	

Course Description Form

1-Course Name:
Mathematics
2-Course Code:
3-Semester / Year:
First semester/2024
4-Description Preparation Date:
20/2/2024
5-Available Attendance Forms:
Presence in classroom
6-Number of Credit Hours (Total) / Number of Units (Total)
60 Credit Hours /4 Units
7- Course administrator's name (mention all, if more than one name)
Name: Maher Ali Hussein Email: inm.maher@atu.edu.iq
8–Course Objectives

Course Objectives	**Introduce students to use math in other scientific subjects and increase the ability to think logically When solving exercises, as well as increase the ability and how to link the data with his information to get the issue resolved**
9–Teaching and Learning Strategies	
Strategy	• **Lecture Method.** • **Skill Education.** • **Using of modern learning techniques and computer programs.** • **Using of videos and documentaries for teaching skill**

10–Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	1. defines the concept of matrices and determinants 2. distinguish between matrices and determinants	Matrices, determinants, properties	Lecture + solving questions	Exams daily, quarterly and final
2	2	solving linear equations by using Kramre method	Kramer method in solving linear equations	Lecture + solving questions	Exams daily, quarterly and final
3	2	Learn how to deal with vectors and vector calculations in	Vector, Vector types, calculations in Vector	Lecture + solving questions	Exams daily, quarterly and final

4	2	solving exercises Vector	Dote and cross product,applic ationof vecteros	Lecture + solving questions	Exams daily, quarterly and final
5	2	It recognizes the concept of logarithm and laws and solving equations logarithmic	Logarithm, logarithm definition, laws, solving equations logarithmic	Lecture + solving questions	Exams daily, quarterly and final
6	2	Trigonometric ratios The definition of the function	Trigonometric ratios and the relationship between them, some of Laws in trigonometric ratios, the function	Lecture + solving questions	Exams daily, quarterly and final
7	2	Types of functions and limites	Functions, types of functions (the function explicit and implicit), and limites	Lecture + solving questions	Exams daily, quarterly and final
8	2	Recognizes the derivatives algebraic functions and implicit functions and applications	derivatives of algebraic functions	Lecture + solving questions	Exams daily, quarterly and final
9	2	Recognizes derivatives with mattresses and exponential and logarithmic functions and applications	Derivatives with higher echelons, derivatives of exponential and logarithmic functions	Lecture + solving questions	Exams daily, quarterly and final
10	2	Recognizes the derivatives of trigonometric funcction	Derivatives trigonometric functions	Lecture + solving questions	Exams daily, quarterly and final
11	2	It recognizes the partial differentiation and solving his training	Partial Differential	Lecture + solving questions	Exams daily, quarterly and final
12	2	Learn to solve exercises for derivative applications (slope, column, velocity and acceleration)	Applications on derivative	Lecture + solving questions	Exams daily, quarterly and final
13	2	Recognizes the increasing and decreasing of functions and endings maximum and minimum points and the coup	Drawing functions	Lecture + solving questions	Exams daily, quarterly and final
14+15	4	It defines the concept of integration and types, Learn to solve exercises for the integration of exponential and logarithmic	integration	Lecture + solving questions	Exams daily, quarterly and final

16+17	4	Learn to solve exercises for the integration of trigonometric functions, Learn to solve exercises for determin integration And applications	integration	Lecture + solving questions	Exams daily, quarterly and final
18	2	The area	Applications of integreation	Lecture + solving questions	Exams daily, quarterly and final
19	2	Learn how to calculate the sizes and the length of the curved	Sizes and rotational arc length of the curve	Lecture + solving questions	Exams daily, quarterly and final
20	2	Recognizes the rounding	Rounding integration	Lecture + solving questions	Exams daily, quarterly and final
21+22+23	6	It recognizes the retail integration and solving exercises, It recognizes the integration method for compensation and solving exercises, It recognizes the integration method of partial fractions and solving exercises	Methods of integration	Lecture + solving questions	Exams daily, quarterly and final
24+25	4	dentifies ways to solve calculus exercises of the first rank and first class, discrete, homogeneous, Identifies ways of solution of linear differential equations and their applications exercises,	differential equations	Lecture + solving questions	Exams daily, quarterly and final
26+27	4	Recognizes the complex numbers and mathematical operations four	Complex numbers	Lecture + solving questions	Exams daily, quarterly and final
28	2	Recognizes the statistical distributions of iterative processes and histogram	Statistical Process	Lecture + solving questions	Exams daily, quarterly and final
29	2	Recognizes the mean, range and standard deviation	Arithmetic mean	Lecture + solving questions	Exams daily, quarterly and final
30	2	Recognizes the probability theory	The probability	Lecture + solving questions	Exams daily, quarterly and final

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	

Course Description Form

1-Course Name:
Management and Occupational Safety and service stations
2-Course Code:
3-Semester / Year:
First semester/2024
4- Description Preparation Date:
20/2/2024
5- Available Attendance Forms:
Presence in classroom
6- Number of Credit Hours (Total) / Number of Units (Total)
60 Credit Hours /4 Units
7- Course administrator's name (mention all, if more than one name)
Name: Ameer Hassen Hamza Email: Ameer@atu.edu.iq
8- Course Objectives

Course Objectives	**1. Introduce students the principles and functions of management levels and types of service stations for cars.** **2. Introduce students the principles of occupational safety and health.** **3. Study the types of service stations for cars and the importance of maintenance and its impact on the environment.**
9- Teaching and Learning Strategies	
Strategy	• **Lecture Method.** • **Skill Education.** • **Using of modern learning techniques and computer programs.** • **Using of videos and documentaries for teaching skill**

10- Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	The student can identify a brief history of industrial security and its rules and its impact on production efficiency.	A brief history of industrial security	Lecture	Theoretical exams daily, quarterly and final
2	2	The student can identify the basic elements of industrial security - how to prevent and minimize the accidents - Engineering control of	Industrial security elements	Lecture	Theoretical exams daily, quarterly and final

		the factory			
3		The student can identify the general rules and regulations for the prevention of accidents - Prevention of mechanical workshops for tools	Accident prevention	Lecture	Theoretical exams daily, quarterly and final
4		The student can identify the personal protective equipment - fire, combat and methods of control	The Fire	Lecture	Theoretical exams daily, quarterly and final
5		The student can identify the management - management concepts	Management concepts	Lecture	Theoretical exams daily, quarterly and final
6		The student can identify the administrative functions - wages and kinds	Jobs and salaries	Lecture	Theoretical exams daily, quarterly and final
7		The student can identify the levels of management - Organizational Structure Industrial Corporation	Administrative levels	Lecture	Theoretical exams daily, quarterly and final
8		The student can identify the study of the movement - (Worker & Machine chart) - A study measuring the time	Motion study and measurement of time	Lecture	Theoretical exams daily, quarterly and final
9		The student can identify the control of the materials - purchases - purchases steps	Control of materials	Lecture	Theoretical exams daily, quarterly and final
10		The student can identify the stores - kinds - Survey stores - control over inventories	The Stores	Lecture	Theoretical exams daily, quarterly and final
11		The student can recognize the leadership and efficient manager - types of managers - signs of good governance - characteristics and qualities of directors	Administrative leadership	Lecture	Theoretical exams daily, quarterly and final
12		The student can identify the Industrial Relations - PR - Jobs and general industrial relations	Industrial Relations	Lecture	Theoretical exams daily, quarterly and final
13		The student can recognize the concept of general maintenance - Maintenance of the plant - the impact of maintenance on the economic aspects	Maintenance and economy	Lecture	Theoretical exams daily, quarterly and final
14		The student can identify the types of maintenance - maintenance costs - planning maintenance operations	A maintenance operations	Lecture	Theoretical exams daily, quarterly and

					final
15		The student can identify the targets kinds of maintenance in terms of location and work	Maintenance targets	Lecture	Theoretical exams daily, quarterly and final
16		The student can define the station - types of stations and a detailed explanation of the stations	Service stations	Lecture	Theoretical exams daily, quarterly and final
17		The student can identify a visit to a typical station Car Maintenance	A visit to a typical station Car Maintenance	Lecture	Theoretical exams daily, quarterly and final
18		The student can identify the different sections in the service maintenance and repair cars Station (real service	Service Station Sections	Lecture	Theoretical exams daily, quarterly and final
19		The student can identify the sections of heavy electrical service, business and business structures and dyeing and polishing etc ..	Heavy sections Service	Lecture	Theoretical exams daily, quarterly and final
20		The student can identify the area of calculation management and parking showroom and warehouse	Space station Account	Lecture	Theoretical exams daily, quarterly and final
21		The student can identify the labor expense and the expense of the needs of each department to workers and the calculation of the total number of workers	Account employment numbers for the station	Lecture	Theoretical exams daily, quarterly and final
22		The student can recognize a full explanation of the meaning of the direct and indirect costs	The Costs	Lecture	Theoretical exams daily, quarterly and final
23		The student can recognize a full explanation for the estimate and the basis on which they depend for extracting any assay	The foundations of the assay	Lecture	Theoretical exams daily, quarterly and final
24		The student can learn how to calculate the assay for overnight car at the station	Assay for overnight car at the station Account	Lecture	Theoretical exams daily, quarterly and final
25		The student can identify the assay car repair	Assay repairs	Lecture	Theoretical exams daily, quarterly and final
26		The student can identify to calculate the assay for the transfer of passengers by car	Assay transfer	Lecture	Theoretical exams daily, quarterly and final

27		The student can learn how to put pricing to sell a used car	Used car pricing	Lecture	Theoretical exams daily, quarterly and final
28		The student can explain and discuss the report or research assigned to him	To discuss the reports and student research	Lecture	Theoretical exams daily, quarterly and final
29		The student can learn how to design modern workshops	Scientific films	Lecture	Theoretical exams daily, quarterly and final
30		The student can identify the typical sketch workshops, service stations, relying on modern scientific bases for it	Drawing stations	Lecture	Theoretical exams daily, quarterly and final

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	

Course Description Form

1-Course Name:
Fluid Mechanics & Thermodynamics
2-Course Code:
3-Semester / Year:
First semester/2024
4-Description Preparation Date:
20/2/2024
5-Available Attendance Forms:
Presence in classroom
6-Number of Credit Hours (Total) / Number of Units (Total)
90Credit Hours /6 Units
7- Course administrator's name (mention all, if more than one name)
Name: Faris Mohamed Hussein Email: inm.faris@atu.edu.iq

8–Course Objectives	
Course Objectives	**–Introducing the students, kinds of fluid flow specially liquids, and studying behavior of flow and the parameters affecting it, also studying energy transformation of fluid flow.** **–Studying theoretical processes and cycles of thermodynamics. The students have to know how it used in heat transmission and power station plants can. Also Theoretical study of different types of Heat transfer .**

9–Teaching and Learning Strategies	
Strategy	• **Lecture Method.** • **Skill Education.** • **Using of modern learning techniques and computer programs.** • **Using of videos and documentaries for teaching skill**

10–Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	The student can learn Types of unit systems, density, specific volume, pressure, temperature (Celsius and absolute),Properties of fluids : difference between fluids and solid metals, difference between liquids and gases	unit systems	Lecture & Lab	Theoretical exams daily, quarterly and final

2	3	The student can learn Definition of density, relative density, specific weight, specific volume, ideal fluid, real fluid, examples	Density,	Lecture & Lab	Theoretical exams daily, quarterly and final
3	3	The student can learn Shear stress, dynamics of fluid flow, Newton's Law of viscosity, dynamic viscosity, kinematic viscosity , surface tension.- Capillarity, liquid vapour pressure	Viscosity	Lecture & Lab	Theoretical exams daily, quarterly and final
4	3	Pressure, liquid pressure head, Pascal law of pressure, variation of liquid pressure heat with respect to gravity, pressure at a datum for stationary liquid	Pressure	Lecture & Lab	Theoretical exams daily, quarterly and final
5	3	The student can learn Absolute pressure, gage pressure, barometer, pressure gage equipment	pressure	Lecture & Lab	Theoretical exams daily, quarterly and final
6	3	The student can learn Bourdon gage, Piezometer, U tube manometer, comparative gage	Bourdon gage	Lecture & Lab	Theoretical exams daily, quarterly and final
7	3	The student can learn Fluid motion, fluid flow, pressure of fluid flow, laminar flow, turbulent flow, velocity profile of flow, Reynold's number	Fluid flow	Lecture & Lab	Theoretical exams daily, quarterly and final
8	3	The student can learn Flow rate, volumetric flow rate, mass flow rate, - Continuity equation, problems on continuity equation for uncompressibil fluids	Flow rate	Lecture & Lab	Theoretical exams daily, quarterly and final
9+10	6	The student can learn Bernoulli equation and application	Bernoulli equation	Lecture & Lab	Theoretical exams daily, quarterly and final
11+12	6	The student can learn First law of thermodynamics, kinds of energy, (dynamic energy, potential mechanical energy, internal energy, heat , work), work of a system represented on pressure – volumle diagram, energy of flow, enthalpy, energy – conservation equation of first law of thermodynamics	First law of thermodynamics	Lecture & Lab	Theoretical exams daily, quarterly and final
13+14	6	The student can learn Classifications of systems, application of first law of thermodynamics on closed systems, energy equation for steady flow, some application on first law for steady state open systems, application on first law for steady	First law of thermodynamics	Lecture & Lab	Theoretical exams daily, quarterly and final

		state open systems, application on (nozzle, diffuser, through, condenser, boiler, turbine, compressor, heat exchanger, open plane), representation of work for open systems for steady flow on pressure volume diagram, examples			
15	3	The student can learn Second law of thermodynamics : Reversible process, entropy, temperature-entropy diagram, coordinates place on T-S diagram, cycles, work of cycle, thermal efficiency of cycle, examples. State of second law for heat engine, and for heat pump	Second law of thermodynamics	Lecture & Lab	Theoretical exams daily, quarterly and final
16+17+18+19	12	The student can learn Ideal Gas : Specific heat at constant volume, specific heat at constant pressure, equation of ideal gas state, gas constant, universal gas constant, Constant volume process, constant pressure process, constant temperature process, studying of process on P – V diagram and T – S diagram, examples,	Ideal Gas	Lecture & Lab	Theoretical exams daily, quarterly and final
20	3	The student can learn :Adiabatic process, isentropic process, studying of process on P -V diagram and T-S diagram , examples	Adiabatic process, isentropic process	Lecture & Lab	Theoretical exams daily, quarterly and final
21	3	The student can learn :Standard air cycles : Carnot cycle, reversed carnot cycle, studying of cycle on P – V diagram and T – S diagram, examples.	Standard air cycles	Lecture & Lab	Theoretical exams daily, quarterly and final
22	3	The student can learn: Auto cycle, dessel cycle, studying of cycle on P – V diagram and T – S diagram, calculating heat changed, work and efficiency of each cycle	Standard air cycles	Lecture & Lab	Theoretical exams daily, quarterly and final
23+24	6	The student can learn: Combined cycle, studying of cycle on P – V diagram and T – S diagram, finding heat changed, work , efficiency , parameters affecting on standard air cycle efficiency, comparision between, Autto, dessel, dual cycles), examples	Standard air cycles	Lecture & Lab	Theoretical exams daily, quarterly and final
25	3	Heat transfer by conduction : Steady state heat conduction, conduction through homogenous plane wall, conduction through composite wall, thermal resistance,	Heat transfer	Lecture & Lab	Theoretical exams daily, quarterly and final

		heat conduction through homogenous cylindrical wall, heat conduction through mult layers cylindrical wall, examples.			
26+27	6	The student can learn: Heat transfer by convection : free &forced-thermal resistance, Heat transfer by radiation, definition of thermal radiation, emissivity of black body, Stefan – Boltzmann law for radiation, emissivity	Heat transfer	Lecture & Lab	Theoretical exams daily, quarterly and final
28	3	The student can learn: Heat transfer by radiation, definition of thermal radiation, emissivity of black body, Stefan – Boltzmann law for radiation, emissivity	Heat transfer	Lecture & Lab	Theoretical exams daily, quarterly and final
29+30	6	The student can learn: Heat exchangers and their types, logarithmic mean temperature difference, calculations of heat exchangers, effectiveness of heat exchangers, examples	Heat transfer	Lecture & Lab	Theoretical exams daily, quarterly and final

12-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	

Course Description Form

1-Course Name:
Computer applications 1
2-Course Code:
3-Semester / Year:
First semester/2024
4-Description Preparation Date:
20/2/2024
5-Available Attendance Forms:
Presence in classroom
6-Number of Credit Hours (Total) / Number of Units (Total)
90Credit Hours /6 Units
7- Course administrator's name (mention all, if more than one name)
Name: Ameer Hasan Email: Ameer@atu.edu.iq
8–Course Objectives

Course Objectives	**–Teach some salbuse for digital culture of the computer and the Internet IC3 and adopted in all developed countries Which includes about the computer and its components and operating systems used in most hardware and some software (Microsoft Office**
9–Teaching and Learning Strategies	
Strategy	• **Lecture Method.** • **Skill Education.** • **Using of modern learning techniques and computer programs.** • **Using of videos and documentaries for teaching skill**

10–Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1+2	3	The student can learn: Definition of the computer system – Hardware, A general introduction to the concept of operating systems, types, versions, privileges . - system Running MS-DOS: its history, its importance, its structure, and levels of evidence and files	Computer system	Lecture & lab.	Theoretical exams daily, quarterly and final

3+4+5+6	12	The student can learn: system Operating Windows: concept, features, basic requirements The study of all divisions and orders the Start menu	System Operating	Lecture & lab.	Theoretical exams daily, quarterly and final
7	3	The student can learn: Desktop properties	Desktop properties	Lecture & lab.	Theoretical exams daily, quarterly and final
8+9	6	The student can learn: Review the contents of the disk using My computer, files and folders and how to handle them	Contents of the disk	Lecture & lab.	Theoretical exams daily, quarterly and final
10+11+12+13	12	The student can learn: Identify the most important Microsoft Office programs	Microsoft Office programs	Lecture & lab.	Theoretical exams daily, quarterly and final
14+15+16	9	The student can learn: Presentation Power Point program	Power Point program	Lecture & lab.	Theoretical exams daily, quarterly and final
17+18+19	9	The student can learn: Introduction to Mat lab program	Mat lab program	Lecture & lab.	Theoretical exams daily, quarterly and final
20+21+22	9	The student can learn: International Network	International Network	Lecture & lab.	Theoretical exams daily, quarterly and final
23+24	6	The student can learn: Internet Explorer	Internet Explorer	Lecture & lab.	Theoretical exams daily, quarterly and final
25+26	6	The student can learn: Search through the Internet	Internet	Lecture & lab.	Theoretical exams daily, quarterly and final
27+28+29	9	The student can learn: A study of some basic browsing skills	basic browsing	Lecture & lab.	Theoretical exams daily, quarterly and final
30	3	The student can learn: Computer Viruses and Anti-viruses	Anti-viruses	Lecture & lab.	Theoretical exams daily, quarterly and final

13-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	

Course Description Form

1-Course Name:
Human Right
2-Course Code:
3-Semester / Year:
First semester/2024
4-Description Preparation Date:
20/2/2024
5-Available Attendance Forms:
Presence in classroom
6-Number of Credit Hours (Total) / Number of Units (Total)
60Credit Hours /4 Units
7- Course administrator's name (mention all, if more than one name)
Name: Mohaned Kareem Najem Email Mohaned @atu.edu.iq

8–Course Objectives	
Course Objectives	**1–Respect for human rights.** **2–Equality of rights the foundation of freedom, justice and peace in the world** **3–Confession of the inherent dignity of all members of the human family**

9–Teaching and Learning Strategies	
Strategy	• **Lecture Method.** • **Skill Education.** • **Using of modern learning techniques and computer programs.** • **Using of videos and documentaries for teaching skill**

10–Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	The student can learn: Human Rights, definition, goals	Human Rights	Lecture	Theoretical exams daily, quarterly and final
2	2	The student can learn: The roots of human rights and development in human history: Human Rights in the ancient and medieval	Human Rights	Lecture	Theoretical exams daily, quarterly and final
3	2	The student can learn: Human Rights in ancient	Human Rights	Lecture	Theoretical exams daily,

		civilizations, especially the civilization of Mesopotamia			quarterly and final
4	2	The student can learn: Human Rights in the heavenly religions with a focus on human rights in Islam	Human Rights	Lecture	Theoretical exams daily, quarterly and final
5	2	The student can learn: Human Rights in the Middle Ages: Human rights in their doctrines, schools and political theories	Human Rights	Lecture	Theoretical exams daily, quarterly and final
6	2	The student can learn: Human rights in the contemporary and modern history:	Human Rights	Lecture	Theoretical exams daily, quarterly and final
7	2	The student can learn: Regional recognition of human rights: the European Convention on Human Rights in 1950	Human Rights	Lecture	Theoretical exams daily, quarterly and final
8+9	4	The student can learn: Non-governmental organizations and human rights	Human Rights	Lecture	Theoretical exams daily, quarterly and final
10	2	The student can learn: Human Rights in Iraqi constitutions between theory and reality	Human Rights	Lecture	Theoretical exams daily, quarterly and final
11+12	4	The student can learn: The relationship between human rights and public freedoms	Human Rights	Lecture	Theoretical exams daily, quarterly and final
13	2	The student can learn: Human rights and the necessary collective human rights	Human Rights	Lecture	Theoretical exams daily, quarterly and final
14	2	The student can learn: Human rights and economic, social and cultural	Human Rights	Lecture	Theoretical exams daily, quarterly and final
15	2	The student can learn: Modern human rights	Human Rights	Lecture	Theoretical exams daily, quarterly and final
16+17	4	The student can learn: Guarantees the respect and protection of human rights at the national level	Human Rights	Lecture	Theoretical exams daily, quarterly and final
18+19	4	The student can learn: Guarantees and respect for and protection of human rights at the international level	Human Rights	Lecture	Theoretical exams daily, quarterly and final

20	2	The student can learn: The general theory of freedoms	Human Rights	Lecture	Theoretical exams daily, quarterly and final
21	2	Functional nature of the concept of public freedoms	Human Rights	Lecture	Theoretical exams daily, quarterly and final
22+23	4	The student can learn: Legal basis for the rule of law	Human Rights	Lecture	Theoretical exams daily, quarterly and final
24	2	The student can learn: The regulation of public freedoms by the public authorities	Human Rights	Lecture	Theoretical exams daily, quarterly and final
25	2	The student can learn: Litigation or non-judicial remedies	Human Rights	Lecture	Theoretical exams daily, quarterly and final
26	2	The student can learn: Judicial appeal, determine the responsibility of the state for its legitimacy	Human Rights	Lecture	Theoretical exams daily, quarterly and final
27	2	The student can learn: The impact of the elimination of duplication of public freedoms.	Human Rights	Lecture	Theoretical exams daily, quarterly and final
28	2	The student can learn: Equality: the historical evolution of the concept of equality	Human Rights	Lecture	Theoretical exams daily, quarterly and final
29	2	The student can learn: The modern evolution of the idea of equality	Human Rights	Lecture	Theoretical exams daily, quarterly and final
30	2	The student can learn: gender equality equality between individuals according to their beliefs and their race	Human Rights	Lecture	Theoretical exams daily, quarterly and final

14-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	

Course Description Form

1-Course Name:
Engineering Drawing
2-Course Code:
3-Semester / Year:
First semester/2024
4-Description Preparation Date:
20/2/2024
5-Available Attendance Forms:
Presence in classroom
6-Number of Credit Hours (Total) / Number of Units (Total)
90Credit Hours /6 Units
7- Course administrator's name (mention all, if more than one name)
Name: Twfeeq Naji Hussein Email: inm. Twfeeq @atu.edu.iq
8–Course Objectives

Course Objectives	- The subject aims to make the student apple to deals with international drawing language and concepts and to execute the drawing as needs. - Students need to acquire skill in the use of computers in AUTOCAD program to draw mechanical engineering operations and geometric shapes.

9–Teaching and Learning Strategies

Strategy	• **Lecture Method.** • **Skill Education.** • **Using of modern learning techniques and computer programs.** • **Using of videos and documentaries for teaching skill**

10–Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	The student can learn: Introduction to importance of engineering drawing by computer – limits and dimension of drawing palate by auto cad - highlight of AutoCAD history	Engineering drawing by computer	Lecture & lab.	Theoretical exams daily, quarterly and final
2	3	The student can learn: Type of line in auto cad – using the menu and tool bar for line and texts	Type of line	Lecture & lab.	Theoretical exams daily, quarterly and final

3-6	12	The student can learn: Basic shapes by AutoCAD	AutoCAD	Lecture & lab.	Theoretical exams daily, quarterly and final
7-9	9	The student can learn: Drawing modifications by auto cad – drawing assistance by auto cad	Drawing modifications	Lecture & lab.	Theoretical exams daily, quarterly and final
10-13	12	The student can learn: Engineering operation by auto cad – dimension – application on previous concepts	AutoCAD tool	Lecture & lab.	Theoretical exams daily, quarterly and final
14-15	6	The student can learn: Drawing perspective – drawing perspective contain circle , rectangle, triangle , polygon	Drawing by AutoCAD	Lecture & lab.	Theoretical exams daily, quarterly and final
16-17	6	The student can learn: Projection theory – drawing simple projection	Drawing by AutoCAD	Lecture & lab.	Theoretical exams daily, quarterly and final
18-20	9	The student can learn: But dimension on 3-D shapes and on projection drawing	Drawing by AutoCAD	Lecture & lab.	Theoretical exams daily, quarterly and final
21-23	9	The student can learn: Investigate the third projection from previous two projection	Drawing by AutoCAD	Lecture & lab.	Theoretical exams daily, quarterly and final
24-26	9	The student can learn: Cutting theory – type of cutting lines according to the material-practice	Drawing by AutoCAD	Lecture & lab.	Theoretical exams daily, quarterly and final
27-28	6	The student can learn: Practice on cutting projection from specific projection	Drawing by AutoCAD	Lecture & lab.	Theoretical exams daily, quarterly and final
29-30	6	The student can learn: Practice on Partially cut projection - Application and project	Drawing by AutoCAD	Lecture & lab.	Theoretical exams daily, quarterly and final

15-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)	Engineering drawing by Abd Al-Rasul Al-khfaf.
Main references (sources)	Introduction to AutoCAD 20112D and 3D Design , Alf Yarwood, 2010

Recommended books and references (scientific journals, reports…)	-
Electronic References, Websites	

Course Description Form

1-Course Name:
Auto Maintenance 1
2-Course Code:
3-Semester / Year:
First semester/2024
4-Description Preparation Date:
20/2/2024
5-Available Attendance Forms:
Presence in classroom
6-Number of Credit Hours (Total) / Number of Units (Total)
150Credit Hours /10 Units
7- Course administrator's name (mention all, if more than one name)
Name: Hadi Reheem Ibrahim Email: inm.maher@atu.edu.iq
8–Course Objectives

Course Objectives	–**The student learns about the types of cars** –**The student learns about the importance of maintenance in cars** – **The student learns the methods of maintenance and repair of car malfunctions.**

9–Teaching and Learning Strategies

Strategy	• **Lecture Method.** • **Skill Education.** • **Using of modern learning techniques and computer programs.** • **Using of videos and documentaries for teaching skill**

10–Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	5	The student can learn: History about the stages of development of cars , Explain of tools and equipment used in cars maintenance , General idea of basic components of cars (frame, Clutch, Transmission system, Garden shaft, Front and rear axle, Suspension system, Steering system, Brake system).	Basic components of cars	Lecture & lab.	Theoretical exams daily, quarterly and final

2	5	The student can learn: Engine Types , General idea about reciprocating Engines , Rotary Engines , Turbine Engines , How it works and where are used.	Engine Types	Lecture & lab.	Theoretical exams daily, quarterly and final
3-4	10	The student can learn: Reciprocating Engines Types (Diesel, gasoline), Explain of 4-Strok and 2-Strok gasoline Engines, Basic different between 4-Strok and 2-Strok engines.	Engine Types	Lecture & lab.	Theoretical exams daily, quarterly and final
5	5	The student can learn: Diesel Engines , Explain of diesel engines (2-strok, 4-strok engines), Basic different between Diesel and Gasoline engines.	Diesel Engines	Lecture & lab.	Theoretical exams daily, quarterly and final
6	5	The student can learn: Basic components of engine , cylinder bore (Cast iron, Aluminum alloy) , shapes (Arrangement of cylinders) , Types of cylinders (Dry, Wet) , Cleaning the cylinders and cylinders block , Detection of damage and cracks , Engine cylinders erosion.	Basic components of engine	Lecture & lab.	Theoretical exams daily, quarterly and final
7	5	The student can learn: Devices , measuring tools and equipment that used to cylinders lathing , General idea about cylinders lathing and using devices , Vertical grinding , Horizontal grinding, Measuring devices of cylinder diameter and consumption (Internal micrometer, Dial gauge), General idea about of polishing engine cylinders and stones used for that.	Devices , measuring tools and equipment	Lecture & lab.	Theoretical exams daily, quarterly and final
8	5	The student can learn: Crankshaft case , Crankshaft main bearings (bearings, functions of bearings , maintenance of bearings and diagnosing of bearings failure , Crankshaft, Components of crankshaft (main bearings journals , rod bearings journals , Stroke length (circle diameter of rod bearings	Crankshaft case	Lecture & lab.	Theoretical exams daily, quarterly and final

		journal) , Crankshaft lubrication , Required pressure of oil			
9	5	The student can learn: Crankshaft sizes , Measuring the straightness and consumption of crankshaft by using dial gauge and external micrometer , Check the lateral movement of the crankshaft collapse of the crankshaft bearings , General idea about of crankshaft turning.	Crankshaft case	Lecture & lab.	Theoretical exams daily, quarterly and final
10	5	The student can learn: Connecting rod , Connecting rod maintenance , Connecting rod straightness , Interlayer space between big end bearings of connecting rod and crank pin journals , The connect methods between the pistons and connecting rods.	Connecting rod	Lecture & lab.	Theoretical exams daily, quarterly and final
11	5	The student can learn: The piston , Piston functions , Piston parts , Piston rings , Piston rings types , Check the pistons (Check ring slots, check the interlayer space between the piston and cylinder wall) , Pistons Pins , Pins sizes , check the correspond of pin with small end of connecting rod.	The Piston	Lecture & lab.	Theoretical exams daily, quarterly and final
12	5	The student can learn: Valves , Valves parts , Valves types , Valves seats , Valve guide , Mechanism of open and close the valves (check the valves) , Engine valves failure , Turning of face valve (grind) , maintenance of face valve (Clean the seat valve and maintenance of valve stem seal(seat seal) , Maintenance of valve guide (clean the guide, replace the guide) , Installing of valves , interlayer between the valve and the valve guide.	The Valves	Lecture & lab.	Theoretical exams daily, quarterly and final
13	5	The student can learn: Cam shaft , set of valve operation (direct, indirect) , valves clearance , valves timing.	Cam shaft	Lecture & lab.	Theoretical exams daily, quarterly and final

14	5	Systems , Cooling system by using liquid (close, open) , Components of cooling system using liquid , Radiator maintenance , Radiator cap , Radiator fan (electrical, mechanical) , Fan belt , Function of cooling solution , Thermostat , thermostat types , Antifreeze solution , Test the antifreeze material , Rust resistant in cooling system , Cleaners of cooling system , Air cooling system (how is cooling by using air), system components , system maintenance.	Cooling system	Lecture & lab.	Theoretical exams daily, quarterly and final
15	5	The student can learn: Lubrication system and its functions , Lubrication system types (continues spraying, force-feed and continues spraying, Full force-feed), oil pumps , Oil pumps types , Oil filters(superficial filters and deep filters), System filtering of oil (partial and full), oil pressure (oil pressure regulating valves) , reasons of low oil pressure in the engine , oil coolers , Measuring devices of oil pressure (oil pressure switch), Lubrication system troubles (check the pump , check the oil filter , check the oil pollution	Lubrication system	Lecture & lab.	Theoretical exams daily, quarterly and final
16	5	The student can learn: Battery ignition system , Battery ignition system parts , Working principles of battery ignition system , adjusting of ignition timing , Ignition system troubles , Ignition system maintenance , Spark advance mechanism (vacuum unit, centrifuge unit).	Battery ignition system	Lecture & lab.	Theoretical exams daily, quarterly and final
17-18	10	The student can learn: Electronic ignition system , Electronic ignition system types , 1- Electronic ignition system without contact points , 2-Full electronic ignition system , 3-Electronic ignition by hall system	Electronic ignition system	Lecture & lab.	Theoretical exams daily, quarterly and final

		with spark distributor- without spark distributor , Working idea, Check ignition system and maintenance it.			
19-20-21-22	20	The student can learn: Mechanical fuel system , mechanical fuel system parts , working idea of mechanical fuel system , Electronic fuel injection system , electronic injection systems, electronic injection systems parts , sensors , sensors types , sensors locations , sensors work , sensors composition , sensors checking , micro-computer unit (input unit, center processing unit and its parts, output unit) , outputs (direct, indirect), injectors, injectors type , injectors composition , injectors working mechanism , check the injectors and maintenance It , the using device to check injection system and electronic ignition system,.	Mechanical fuel system	Lecture & lab.	Theoretical exams daily, quarterly and final
23		The student can learn: Evaporative Emission Control System (EVAP) , Exhaust Gas Recirculation (EGR) , Variable Valve Timing- Intelligent (V.V.Ti), VVTi types.	Evaporative Emission Control System	Lecture & lab.	Theoretical exams daily, quarterly and final
24-25	5	The student can learn: Diesel fuel injection (functions of diesel fuel injection- main parts of system) , Diesel fuel injection system types (collecting system, fast inject system) , Modern injection pumps (straight pump, rotary pumps, injectors (injectors types, how it works injector, check of injectors)	Diesel fuel injection	Lecture & lab.	Theoretical exams daily, quarterly and final
26-27	10	The student can learn: General rules that must be observed when the engine assembly , arrangement of a tighten bolts of main journals of crankshaft to the limit torque , check the lateral movement of crankshaft , assembly the connecting rods with a pistons , assembly the pistons to the	The engine assembly	Lecture & lab.	Theoretical exams daily, quarterly and final

		cylinders and arrangement tighten a big ends of connecting rods with crankshaft to set limit torque , assembly the cylinder cover with cylinder block and tighten arrangement nuts or bolts set of valves clearance, set of engine timing.			
28	20	The student can learn: Methods to diagnosis the engine troubles , the main reasons that cause to consumption engine , oil consumption , the reasons for the side puffing of the engine.	Methods to diagnosis the engine troubles	Lecture & lab.	Theoretical exams daily, quarterly and final
29	5	The student can learn: The effect of the engine hotter , knocking, the difficultly of the operating of the engine , drop of engine power.	The effect of the engine hotter	Lecture & lab.	Theoretical exams daily, quarterly and final
30	10	The student can learn: Disorder of ignition at the free high speeds, adjust of engine performance, analysis of exhaust gases.	Analysis of exhaust gases	Lecture & lab.	Theoretical exams daily, quarterly and final

16-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	

Course Description Form

1-Course Name:
Modern Car Technology
2-Course Code:
3-Semester / Year:
First semester/2024
4-Description Preparation Date:
20/2/2024
5-Available Attendance Forms:
Presence in classroom
6-Number of Credit Hours (Total) / Number of Units (Total)
90Credit Hours /6 Units
7- Course administrator's name (mention all, if more than one name)
Name: Hadi Reheem Ibrahim Email: inm.hadi@atu.edu.iq
8–Course Objectives

Course Objectives	**1. Introducing the student to the car testing devices** **2. Introducing the student to the types of car testing devices** **3. Introduce the student to the electronic systems used in the automotive industry** **4. Introduce the student to the method of controlling automobile systems.**

9–Teaching and Learning Strategies

Strategy	• **Lecture Method.** • **Skill Education.** • **Using of modern learning techniques and computer programs.** • **Using of videos and documentaries for teaching skill**

10–Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	That the student can identify Modern car systems inspection devices	car inspection devices	Lecture & lab.	Theoretical exams daily, quarterly and final
2	3	That the student can identify Examination methods	car inspection devices	Lecture & lab.	Theoretical exams daily, quarterly and final
3+4	6	That the student can identify Electronic control system for opening and closing engine	electronic control systems	Lecture & lab.	Theoretical exams daily, quarterly and

		valves			final
5	3	That the student can identify Electronic control system for opening and closing engine valves	electronic control systems	Lecture & lab.	Theoretical exams daily, quarterly and final
7+6	6	That the student can identify Electronic transmission control system	electronic control systems	Lecture & lab.	Theoretical exams daily, quarterly and final
8+9	6	That the student can identify Electronic control system for the anti-skid brake system	electronic control systems	Lecture & lab.	Theoretical exams daily, quarterly and final
10	3	That the student can identify Collision prevention system - brake pad damage sensing system	electronic control systems	Lecture & lab.	Theoretical exams daily, quarterly and final
11	3	That the student can identify Vehicle traction control system	electronic control systems	Lecture & lab.	Theoretical exams daily, quarterly and final
12+13	6	That the student can identify Vehicle stability control system	electronic control systems	Lecture & lab.	Theoretical exams daily, quarterly and final
14	3	That the student can identify automatic speed lock system	electronic control systems	Lecture & lab.	Theoretical exams daily, quarterly and final
15	3	That the student can identify Electronic power steering system	electronic control systems	Lecture & lab.	Theoretical exams daily, quarterly and final
16	3	That the student can identify smart suspension system	electronic control systems	Lecture & lab.	Theoretical exams daily, quarterly and final
17	3	That the student can identify smart suspension system	electronic control systems	Lecture & lab.	Theoretical exams daily, quarterly and final
18	3	That the student can identify car navigation system	electronic control systems	Lecture & lab.	Theoretical exams daily, quarterly and final
19	3	That the student can identify car central control system	electronic control systems	Lecture & lab.	Theoretical exams daily, quarterly and final

20	3	That the student can identify airbag system	electronic control systems	Lecture & lab.	Theoretical exams daily, quarterly and final
21+22	6	That the student can identify Modern exhaust systems and catalytic technology	electronic control systems	Lecture & lab.	Theoretical exams daily, quarterly and final
23+24+25	9	That the student can identify Hybrid car technology and fuel cell uses	electronic control systems	Lecture & lab.	Theoretical exams daily, quarterly and final
26	3	That the student can identify Smart lamp systems - tire pressure measurement system	electronic control systems	Lecture & lab.	Theoretical exams daily, quarterly and final
27	3	That the student can identify Various sensor systems (dead corner - wrong overtaking - etc.	electronic control systems	Lecture & lab.	Theoretical exams daily, quarterly and final
28	3	That the student can identify Automatic parking system	electronic control systems	Lecture & lab.	Theoretical exams daily, quarterly and final
29+30	6	That the student can identify A review of what modern automobile technology has achieved	electronic control systems	Lecture & lab.	Theoretical exams daily, quarterly and final

17-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	

Course Description Form

1-Course Name:
Mechanical Workshops
2-Course Code:
3-Semester / Year:
First semester/2024
4-Description Preparation Date:
20/2/2024
5-Available Attendance Forms:
Presence in classroom
6-Number of Credit Hours (Total) / Number of Units (Total)
120Credit Hours /4 Units
7- Course administrator's name (mention all, if more than one name)
Name: Maher Ali Hussein Email: inm.maher@atu.edu.iq

8–Course Objectives	
Course Objectives	**Earn manual dexterity, craft student when performing work and manufacturing using a different number and tools.**

9–Teaching and Learning Strategies	
Strategy	• **Lecture Method.** • **Skill Education.** • **Using of modern learning techniques and computer programs.** • **Using of videos and documentaries for teaching skill**

10–Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1+2	8	The student can learn: Filings	Filings	Workshop	Rating daily
3+4	8	The student can learn: Rasps	Rasps	Workshop	Rating daily
5+6	8	The student can learn: Cutting Chainsaw - Chainsaw manual - Saw weapon - a weapon install Saw.	Cutting	Workshop	Rating daily
7+8	8	The student can learn: process Thrones: Alajnat types, the age of the embryos and maintenance - the types of hammers hand heads - how to	process Thrones	Workshop	Rating daily

		install the head hammers - an exercise in the process of Thrones .hole and granulation process: the types of drills - Prime types - types Albraimrat - how to make the hole process - the exercise of the hole operations manual and mechanical and granulation.			
9	4	The student can learn: Screw, screw types - internal and external agenda dental training to conduct different operations bolts	Screw	Workshop	Rating daily
10	4	The student can learn: Training on how to take out the broken spirals and correct places	Broken spirals	Workshop	Rating daily
11+12+13	12	The student can learn: Welding: Occupational Safety and precautions Security - gas welding - equipment used and how to be installed and tuned - gases used and their specifications - the safety of welding types and measurements - other auxiliary materials Welding Equipment types of flame and a way to ignite and adjust the flame is required - goldsmiths: Rinse and clean desired welded areas - practical exercises: welding opposite surfaces - orthogonal surfaces - pitched roofs - welding department	Welding	Workshop	Rating daily
14+15	8	The student can learn: Cutting gas operations - the equipment used and the precautions that should be available - the exercise of longitudinally cut and casual - a circle cut - cut irregular forms	Welding	Workshop	Rating daily
16+17	4	The student can learn: Electric arc welding	Welding	Workshop	Rating daily
18	4	The student can learn: Welding using gas Alarcon	Welding	Workshop	Rating daily
19	4	The student can learn: Exercises using various cutting and welding	Welding	Workshop	Rating daily
21+21	8	The student can learn: Turning: Turning and specifications, uses, accessories, ways installed	Turning	Workshop	Rating daily

22-27	24	The student can learn: Turning operations	Turning	Workshop	Rating daily
28+29+30	12	The student can learn: 1-machines, grinding: cylindrical internal and external, decentralized grinding, grinding superficial. 2-stones, grinding: forms, types, specifications, use all of them, preparation, grinding stones for operation (balancing - stones settlement) . 3-surface-polishing machine: Explanation of the machine parts and function of each of them, methods of operation and adjust their path, feeding speed, methods of installation	Machines,	Workshop	Rating daily

18-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	

Course Description Form

1-Course Name:
Engineering Mechanics
2-Course Code:
3-Semester / Year:
First semester/2024
4-Description Preparation Date:
20/2/2024
5-Available Attendance Forms:
Presence in classroom
6-Number of Credit Hours (Total) / Number of Units (Total)
90Credit Hours /6 Units
7- Course administrator's name (mention all, if more than one name)
Name: Abbas Allawi Abbas Email: inm.abs@atu.edu.iq

8−Course Objectives	
Course Objectives	the students will be able to understand the mechanics science because it represent one of the scientifically basic, the universal and special technique and it has the improvements the solution of technical problems. Beside on the basic role extended in the design of structural mechanics, equipment and tools

9−Teaching and Learning Strategies	
Strategy	• **Lecture Method, Resolve examples.** • **Skill Education.** • **Using of modern learning techniques and computer programs.** • **Using of videos and documentaries for teaching skill**

10−Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Introduction &topics of mechanics, Definition of mechanics science & the branches basic quantities & units, Applications by using mechanics in the life.	Introduction &topics of mechanics science	Theory lecture+ solving questions +practical laboratory	Daily exams and Rating, Homework questions, quarterly and final exams
2-3	6	Force, resolution and resultant 1-vectors 2-analytic + applications	Force, resolution and resultant	Theory lecture+ solving questions	Daily exams and Rating, Homework questions,

				+practical laboratory	quarterly and final exams
4-5-6-7	12	Moment of the force & applications Couples, applications		Theory lecture+ solving questions +practical laboratory	Daily exams and Rating, Homework questions, quarterly and final exams
8-9	6	Equilibrium, definition & the conditions and applications	Moment of the force	Theory lecture+ solving questions +practical laboratory	Daily exams and Rating, Homework questions, quarterly and final exams
10	3	Free body diagram, procedure of the drawing "F.B.D"	Equilibrium	Theory lecture+ solving questions +practical laboratory	Daily exams and Rating, Homework questions, quarterly and final exams
11-12	6	Friction, theory and applications types of the friction, Coefficient of friction, angle of friction		Theory lecture+ solving questions +practical laboratory	Daily exams and Rating, Homework questions, quarterly and final exams
13	3	Center of gravity & centroid applications, lines	Free body diagram	Theory lecture+ solving questions +practical laboratory	Daily exams and Rating, Homework questions, quarterly and final exams
14	3	Center of gravity & centroid, application, single area	The friction, theory and applications	Theory lecture+ solving questions +practical laboratory	Daily exams and Rating, Homework questions, quarterly and final exams
15-16	6	Moment of inertia, definition, single area		Theory lecture+ solving questions +practical laboratory	Daily exams and Rating, Homework questions, quarterly and final exams
17-18	6	Moment of inertia, application 1-prallel axis theory 2-transfer of axis	Center of gravity & centroid	Theory lecture+ solving questions +practical laboratory	Daily exams and Rating, Homework questions, quarterly and final exams

19	3	Dynamics science definition the Newton's second law and application	Center of gravity & centroid	Theory lecture+ solving questions +practical laboratory	Daily exams and Rating, Homework questions, quarterly and final exams
20	3	Rectilinear motion definition and application	Moment of inertia	Theory lecture+ solving questions +practical laboratory	Daily exams and Rating, Homework questions, quarterly and final exams
21	3	Free fall laws & application	Moment of inertia	Theory lecture+ solving questions +practical laboratory	Daily exams and Rating, Homework questions, quarterly and final exams
22	3	Curvilinear motion low's and application		Theory lecture+ solving questions +practical laboratory	Daily exams and Rating, Homework questions, quarterly and final exams
23	3	Rotational motion about the fixed axis	Dynamics science	Theory lecture+ solving questions +practical laboratory	Daily exams and Rating, Homework questions, quarterly and final exams
24	3	Strength of material, sort of the strain	Dynamics science	Theory lecture+ solving questions +practical laboratory	Daily exams and Rating, Homework questions, quarterly and final exams
25	3	Strength of material, sort of the stress	Dynamics science	Theory lecture+ solving questions +practical laboratory	Daily exams and Rating, Homework questions, quarterly and final exams
26	3	Drawing the curvature of the stress force	Dynamics science	Theory lecture+ solving questions +practical laboratory	Daily exams and Rating, Homework questions, quarterly and final exams
27	3	Torsion and compresses	Dynamics science	Theory lecture+ solving questions	Daily exams and Rating, Homework questions,

				+practical laboratory	quarterly and final exams
28	3	Shearing force, definition and application	Strength of material	Theory lecture+ solving questions +practical laboratory	Daily exams and Rating, Homework questions, quarterly and final exams
29	3	Pascal & Archimedes theory and lows, application	Strength of material	Theory lecture+ solving questions +practical laboratory	Daily exams and Rating, Homework questions, quarterly and final exams
30	3	Bernoulli formula, applications	Strength of material	Theory lecture+ solving questions +practical laboratory	Daily exams and Rating, Homework questions, quarterly and final exams

19-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)	Engineering mechanics, Institute library references
Main references (sources)	1-Engineering Mechanics Static & dynamics Bed ford & fowler $\underline{u^{th}}$ ed 2005. 4 2-Higdon & Stiles Engineering Machine 3 th ed 1968 3-Singh , Sadhu Strength of Martial 4 th ed 2007 9 th 4- Engineering Mechanics by singer . 5-Mechanic engineering Applications , E.John Finnemore & B.Franzini , Tenth Edition
Recommended books and references (scientific journals, reports…)	-
Electronic References, Websites	

Course Description Form

1-Course Name:	
Auto Electrical and Electronic Systems\1	
2-Course Code:	
3-Semester / Year:	
First semester/2024	
4-Description Preparation Date:	
20/2/2024	
5-Available Attendance Forms:	
Presence in classroom	
6-Number of Credit Hours (Total) / Number of Units (Total)	
90 Credit Hours /6 Units	
7- Course administrator's name (mention all, if more than one name)	
Name: Abbas Allawi Abbas Email: inm.abs@atu.edu.iq	
8–Course Objectives	
Course Objectives	1. Knows the general meaning of cars electricity and the type of electrical supply, the main electrical sources of the automobile. 2. Understanding the Kirchhoff's first and second laws and how solve the mathematical problems. 3. recognize and understanding the electrical circuits of automobile (for example, ignition circuit, charging circuit, starting circuit, with knows its functions of car systems 4. Using with right scientific form the checking and testing device to diagnose the problems of electrical and circuits of car. 5. Implement the checking processes and periodic maintenance of electrical and systems of car.
9–Teaching and Learning Strategies	
Strategy	• **Lecture Method.** • **Skill Education.** • **Using of modern learning techniques and computer programs.** • **Using of videos and documentaries for teaching skill**

10–Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	The student can recognize the general principles of automobile electrical, the type of electrical	Introduction to the general principles of	Theoretical lectures +practical	Daily Rating, Oral and practical

		supply, the main electrical sources of the automobile, the type of electricity used in the automobile, as well as an introduction to the magnetic theory.	automobile electrical	lab	tests quarterly and final exams
2	3	The student can recognize the feeding system in the automobile, closed circuit, Ohm's law, electric power, mathematical problems.	Introduction to the general principles of automobile electrical	Theoretical lectures +practical lab	Daily Rating, Oral and practical tests quarterly and final exams
3	3	The student can recognize Kirchhoff's first and second laws, mathematical problems, set of definitions.	Introduction to the general principles of automobile electrical	Theoretical lectures +practical lab	Daily Rating, Oral and practical tests quarterly and final exams
4	3	The student can recognize the types of electrical circuits (to connect resistors), series, parallel, mixed, mathematical problems.	Introduction to the general principles of automobile electrical	Theoretical lectures +practical lab	Daily Rating, Oral and practical tests quarterly and final exams
5	3	The student can recognize the energy sources in the automobile include (battery, types of batteries, components of batteries, charging methods of all types.	Energy sources in the automobile	Theoretical lectures +practical lab	Daily Rating, Oral and practical tests quarterly and final exams
6	3	The student can recognize use for the three types of batteries, methods of chemical reactions, devices used for testing, maintenance methods, measuring the density.	The battery	Theoretical lectures +practical lab	Daily Rating, Oral and practical tests quarterly and final exams
7	3	The student can recognize Connecting energy sources (batteries) to the electrical circuit of three types, connecting the sources in series, parallel, and mixed, the characteristics of the	The battery	Theoretical lectures +practical lab	Daily Rating, Oral and practical tests quarterly

		connection for each case.			and final exams
8	3	The student can recognize, Mathematical problems to calculate the value of the final result of the power source in an electrical circuit**.**	Electricity and Magnetism	Theoretical lectures +practical lab	Daily Rating, Oral and practical tests quarterly and final exams
9	3	The student can recognize the general idea of alternating current, definitions of alternating current and inference in which part works in the automobile.	Electricity and Magnetism	Theoretical lectures +practical lab	Daily Rating, Oral and practical tests quarterly and final exams
10-11	6	The student can recognize the magnetism, general properties of magnetism, definitions of types of magnets, lines of magnetic force. Magnetic flux density B , magnetic field strength $\hat{H}$, magnetic flux ø , magnetic flux conductivity θ	Electricity and Magnetism	Theoretical lectures +practical lab	Daily Rating, Oral and practical tests quarterly and final exams
12	3	The student can recognize, The relationship between electric energy and magnetic energy, how to convert between the two energies, Oersted's phenomenon, Faraday's law, Lenz's law. Electromagnetic induction, types of induction, self-induction, mutual induction, kinetic induction	Electricity and Magnetism	Theoretical lectures +practical lab	Daily Rating, Oral and practical tests quarterly and final exams
13-14	6	The student can recognize the charging circuit in the automobile, general idea of the DC generator, its parts, components, currency principle, general scheme of the electrical circuit of the generator	The charging circuit	Theoretical lectures +practical lab	Daily Rating, Oral and practical tests quarterly and final exams
15-16	6	The student can recognize The charging circuit of the alternating current (AC) generator, its parts, components, working principle, the general diagram of the electrical circuit of the generator	The charging circuit	Theoretical lectures +practical lab	Daily Rating, Oral and practical tests quarterly and final

					exams
17-18	6	The student can recognize engine starter (predecessor), its parts, components, working principle, general scheme of the electric circuit of the engine	engine starter	Theoretical lectures +practical lab	Daily Rating, Oral and practical tests quarterly and final exams
19-20	6	The student can recognize the Ignition system first generation (normal), parts, working principle, general scheme of the electrical circuit of the system	Ignition system	Theoretical lectures +practical lab	Daily Rating, Oral and practical tests quarterly and final exams
21	3	The student can recognize spark plugs, parts, working principle, maintenance and inspection, general diagram of the electric circuit of the Spark.	Ignition system	Theoretical lectures +practical lab	Daily Rating, Oral and practical tests quarterly and final exams
22-23	6	The student can recognize the main, side and interior lighting system, components, working principle, general scheme of the systems	lighting system	Theoretical lectures +practical lab	Daily Rating, Oral and practical tests quarterly and final exams
24-25	6	The student can recognize the auxiliary devices in the automobile (fuel gauge, oil pressure gauge, charging current gauge, temperature gauge)	Auxiliary devices	Theoretical lectures +practical lab	Daily Rating, Oral and practical tests quarterly and final exams
26	3	The student can recognize the electrical circuit to control the doors and windows of the automobile (opening and closing)	Auxiliary devices	Theoretical lectures +practical lab	Daily Rating, Oral and practical tests quarterly and final exams
27	3	The student can recognize the air conditioning device in the automobile and heating devices (electrical system)	Auxiliary devices	Theoretical lectures +practical lab	Daily Rating, Oral and practical tests quarterly and final

					exams
28	3	The student can recognize the windshield wiper device (electrical circuit), fuel pump device (electrical circuit)	Auxiliary devices	Theoretical lectures +practical lab	Daily Rating, Oral and practical tests quarterly and final exams
29-30	6	The student can recognize the electrical circuit for audio and video, the early warning system against theft, the electrical circuit	Auxiliary devices	Theoretical lectures +practical lab	Daily Rating, Oral and practical tests quarterly and final exams

20-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)	Electric cars
Main references (sources)	1-AUTO ELECTRICAL&ELECTRONIC SYSTEM. 2-MODERN AUTOMOTIVE ELECTRICITY
Recommended books and references (scientific journals, reports…)	- ADVAANCED AUTOMOTIVE TECHNOLO
Electronic References, Websites	

Course Description Form

1-Course Name:					
Automotive Electrical and Electronic Systems\2					
2-Course Code:					
3-Semester / Year:					
First semester/2024					
4-Description Preparation Date:					
20/2/2024					
5-Available Attendance Forms:					
Presence in classroom					
6-Number of Credit Hours (Total) / Number of Units (Total)					
90Credit Hours /6 Units					
7- Course administrator's name (mention all, if more than one name)					
Name: Abbas Allawi Abbas Email: inm.abs@atu.edu.iq					
8–Course Objectives					
Course Objectives	1. Knows the general meaning of cars electricity 2. Understanding the principles and working method of electrical and electronic systems of car. 3. Knowing the symbols, terms, diagrams, and the electrical and electronic elements with knows its functions of car systems 4. Using with right scientific form the checking and testing devise to diagnose the problems of electrical and electronic systems of cars 5. Implement the checking processes and periodic maintenance of electrical and electronic systems of car 6. Check all the electrical and electronic elements to know workability				
9–Teaching and Learning Strategies					
Strategy	• **Lecture Method.** • **Skill Education.** • **Using of modern learning techniques and computer programs.** • **Using of videos and documentaries for teaching skill**				
10–Course Structure					
Week	**Hours**	**Required Learning Outcomes**	**Unit or subject name**	**Learning method**	**Evaluation method**

1+2	6	The student can recognize, Semiconductors, Diodes, Equivalent circuit of diode, Rectifying the half-wave using the diode, half-wave rectifying efficiency, Rectifying the full-wave using two diodes(single-phase full-wave controlled rectifier), Rectifying full-wave using bridge diode, rectifying efficiency using bridge diode, Zener diode, Equivalent circuit of Zener diode, use the Zener diode as voltage stabilizer.	Semiconductors	Theoretical lectures +view teaching videos +practical laboratory	daily exams and Rating, Oral and practical tests quarterly and final exams
3	3	The student can recognize, Transistor, (P.N.P) type & (N.P.N) type, theorem of transistor operation, transistor components, transistor characteristics, comparison between the other kinds, transistor symbols, the transistor operating as an amplifier of three kinds of circuits (Common Base CB, Common Emitter (CE) Common Collector (CC).	Transistors	Theoretical lectures +view teaching videos +practical laboratory	daily exams and Rating, Oral and practical tests quarterly and final exams
4-5	6	The student can recognize, Kinds of transistor (FET) that divide in to (JFET) & (MOSFET), working principle of (JFET) transistor, properties & applications, working principle of (MOSFET) transistor, The Silicon Controlled Rectifier Thyristor (SCR), Equivalent circuit of (SCR) transistor, applications of (SCR) transistor.	Transistors	Theoretical lectures +view teaching videos +practical laboratory	daily exams and Rating, Oral and practical tests quarterly and final exams
6-7	6	The student can recognize, Transformers & measuring device, energy transformers, general specifications, classification of active and passive energy transformers, voltage transformers, measure of loading, linear variable differential transformers (LVDT), inductive power transformers, temperature transformers, thermistor, pyrometers.	Transformers & measuring device	Theoretical lectures +view teaching videos +practical laboratory	daily exams and Rating, Oral and practical tests quarterly and final exams
8	3	The student can recognize, Integrated Circuits (IC), how integrated circuits made,	Integrated Circuits (IC)	Theoretical lectures +view	daily exams and Rating,

		operational amplifier functions		teaching videos +practical laboratory	Oral and practical tests quarterly and final exams
9-10	6	The student can recognize Basic functions of Electronic Control Unit (ECU), Digital signal, Analog signal, Components of ECU (voltage regulator, Amplifiers, microprocessors, memory, power transistors, sensors, and actuators), functions, input signals from the sensors to the ECU and output signals from ECU to the actuators, open loop & closed loop-control circuits.	Electronic Control Unit (ECU)	Theoretical lectures +view teaching videos +practical laboratory	daily exams and Rating, Oral and practical tests quarterly and final exams
11+12+13	9	The student can recognize, Definition & functions of sensors, types of sensors (Manifold Absolute Pressure Sensor (MAP), Mass Air Flow Sensor (MAF), Intake Air Temperature Sensor (IAT), Coolant Temperature Sensor (CTS), Throttle Position Sensor (TPS), Engine Speed Sensor, Knock Sensor, Oxygen Sensor.	sensors	Theoretical lectures +view teaching videos +practical laboratory	daily exams and Rating, Oral and practical tests quarterly and final exams
14+15	6	The student can recognize, Actuator definition, types of actuators (fuel injectors, unload speed system, Engine Gas Recirculation(EGR), Positive Crankcase Ventilation (PCV) Valve, fuel pump, control of forced air charging system (turbo charging , super charging.	Actuators	Theoretical lectures +view teaching videos +practical laboratory	daily exams and Rating, Oral and practical tests quarterly and final exams
16	3	The student can recognize, Electronic Ignition System, components, how it's operating electrically, (static angle, spark advance angle) & its relationship with the other components of ECU.	Electronic Ignition System	Theoretical lectures +view teaching videos +practical laboratory	daily exams and Rating, Oral and practical tests quarterly and final exams
17-18-19	9	The student can recognize, Electrical circuits of different components of control systems (cold operating, control of unload speed, control of enrich mixture,	Electronic Ignition System	Theoretical lectures +view teaching videos	daily exams and Rating, Oral and practical

		fuel cut system at high speeds		+practical laboratory	tests quarterly and final exams
20-21-22	9	The student can recognize, Electrical circuits of different electronic operating systems of engine- MOTRONIC System, MONO-MOTRONIC System, maps of load and engine speed with inject angle, PFI injection system, can study other kinds of systems.	Electrical & Electronic Systems	Theoretical lectures +view teaching videos +practical laboratory	daily exams and Rating, Oral and practical tests quarterly and final exams
23	3	The student can recognize, of electrical circuits & dashboard components.	Electrical& Electronic Systems	Theoretical lectures +view teaching videos +practical laboratory	daily exams and Rating, Oral and practical tests quarterly and final exams
24	3	The student can recognize connect method and working of backup warning sensors.	Electrical& Electronic Systems	Theoretical lectures +view teaching videos +practical laboratory	daily exams and Rating, Oral and practical tests quarterly and final exams
25	3	The student can recognize & reading the integral electrical circuits for some models of vehicles.	Electrical & Electronic Systems	Theoretical lectures +view teaching videos +practical laboratory	daily exams and Rating, Oral and practical tests quarterly and final exams
26	3	The student can recognize, Control of exhaust gases, Engine Gas Recirculation system (EGR system), catalytic converter system.	Electrical & Electronic Systems	Theoretical lectures +view teaching videos +practical laboratory	daily exams and Rating, Oral and practical tests quarterly and final exams
27	3	The student can recognize, Fuel cell technology, how its work & its applications in modern	Electrical & Electronic Systems	Theoretical lectures +view	daily exams and

		vehicles.		teaching videos +practical laboratory	Rating, Oral and practical tests quarterly and final exams
28-29-30	9	The student can recognize, Reading the malfunctions using codes system & repair the problems & clean the memory from codes that storage one it.	Electrical & Electronic Systems	Theoretical lectures +view teaching videos +practical laboratory	daily exams and Rating, Oral and practical tests quarterly and final exams

21- 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)	Electric cars
Main references (sources)	1-AUTO ELECTRICAL&ELECTRONIC SYSTEM. 2-MODERN AUTOMOTIVE ELECTRICITY
Recommended books and references (scientific journals, reports...)	- ADVAANCED AUTOMOTIVE TECHNOLO
Electronic References, Websites	

Course Description Form

1-Course Name:	
Auto Maintenance\2	
2-Course Code:	
3-Semester / Year:	
First semester/2024	
4-Description Preparation Date:	
20/2/2024	
5-Available Attendance Forms:	
Presence in classroom	
6-Number of Credit Hours (Total) / Number of Units (Total)	
240 Credit Hours /16 Units	
7- Course administrator's name (mention all, if more than one name)	
Name: Abbas Allawi Abbas Email: inm.abs@atu.edu.iq	
8–Course Objectives	
Course Objectives	1. Knows the general meaning of maintenance 2. Understanding the principles and working method of mechanical systems of car. 3. Using with correct scientific form the checking and testing devise to diagnose the problems of mechanical systems as general of cars 4.Knows the main parts of mechanical systems in car and what is the function of each part and the method of diagnosing the malfunction and repairing or replacing it 5. Implement the checking processes and periodic maintenance of mechanical systems of car such as suspension system, steering system, transmission system….etc.
9–Teaching and Learning Strategies	
Strategy	• **Lecture Method.** • **Skill Education.** • **Using of modern learning techniques and computer programs.** • **Using of videos and documentaries for teaching skill**

10–Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method

1	8	The student can recognize, Clutch, Types of Clutches, Explain of Dry Frictional single-plate and multi-plate Clutch, components of dry frictional single-plate clutch(pressure plate – friction disk – release bearing),	clutch	Theoretical lectures +view teaching videos +practical laboratory	daily exams and Rating, Oral and practical tests quarterly and final exams
2	8	The student can recognize, Clutch troubles and how diagnosing and maintenance, Mechanism transmission motion to the clutch and it's types (Hydraulically, Cable, Mechanical, Aerobic, Mutual), Detect the troubles and maintenance it.	clutch	Theoretical lectures +view teaching videos +practical laboratory	daily exams and Rating, Oral and practical tests quarterly and final exams
3	8	The student can recognize, Importance of transmission system, Parts of transmission system	Transmission System	Theoretical lectures +view teaching videos +practical laboratory	daily exams and Rating, Oral and practical tests quarterly and final exams
4	8	The student can recognize, How it works sliding transmission system, Types of synchronizer transmission system	Transmission System	Theoretical lectures +view teaching videos +practical laboratory	daily exams and Rating, Oral and practical tests quarterly and final exams
5	8	The student can recognize, The types of synchronizers, How it works synchronizes transmission, Discovering the troubles and maintenance it	Transmission System	Theoretical lectures +view teaching videos +practical laboratory	daily exams and Rating, Oral and practical tests quarterly and final exams
6	8	The student can recognize, How it works hydraulic transmission, Torque convertor, torque convertor parts, How it works torque convertor, Torque convertor with hydraulic clutch(TCC), check the Hydraulic	Auto Transmission System	Theoretical lectures +view teaching videos +practical laboratory	daily exams and Rating, Oral and practical tests quarterly

		oil color, check oil pump			and final exams
7	8	The student can recognize, Automatic Transmission System, How it works planetary gears, Parts of automatic transmission system, How it works automatic transmission	Auto Transmission System	Theoretical lectures +view teaching videos +practical laboratory	daily exams and Rating, Oral and practical tests quarterly and final exams
8	8	The student can recognize, Control system of automatic transmission system and its types (Hydraulically, Electrical), Transmission system problems, How diagnosing and repair it.	Auto Transmission System	Theoretical lectures +view teaching videos +practical laboratory	daily exams and Rating, Oral and practical tests quarterly and final exams
9-10	16	The student can recognize, Gardan Shaft (Drive shaft) (hollow and rigid), Universal joint shafts and its types, Gardan shaft problems, Diagnosing and repair it.	Gardan Shaft (Drive shaft)	Theoretical lectures +view teaching videos +practical laboratory	daily exams and Rating, Oral and practical tests quarterly and final exams
11	8	The student can recognize, Rear Axle, Explain of Rear Axle Parts, How it works Rear Axle, Rear Axle Problems, Diagnosing and repair it, Differential gears	Rear Axle	Theoretical lectures +view teaching videos +practical laboratory	daily exams and Rating, Oral and practical tests quarterly and final exams
12	8	The student can recognize How it works differential gears with electrical and electronic control, Types of movement system (2 wheel drive, 4 wheel drive)	Rear Axles	Theoretical lectures +view teaching videos +practical laboratory	daily exams and Rating, Oral and practical tests quarterly and final exams
13	8	Identifying the principle of the hydraulic system in general, identifying the types of hydraulic systems in the car, identifying the	Introduction of hydraulic system	Theoretical lectures +view teaching	daily exams and Rating, Oral and

		drawings and symbols of the mechanical parts used in hydraulic systems		videos +practical laboratory	practical tests quarterly and final exams
14	8	The student can recognize, Methods to control the hydraulic pressures within these systems and preserve them from damage, identifying the pneumatic systems and comparing them with the hydraulic systems	Introduction of hydraulic system	Theoretical lectures +view teaching videos +practical laboratory	daily exams and Rating, Oral and practical tests quarterly and final exams
15	8	The student can recognize, Suspension System, Suspension System Types (Mutual, Independent), Hydraulic Suspension System with electronic control	Suspension System	Theoretical lectures +view teaching videos +practical laboratory	daily exams and Rating, Oral and practical tests quarterly and final exams
16-17	16	The student can recognize, Spring Types in Suspension system (coil, leaf, torsion bars, pneumatic), Shocks Absorbers Types, Spring problems and how diagnosing and maintenance it	Suspension System	Theoretical lectures +view teaching videos +practical laboratory	daily exams and Rating, Oral and practical tests quarterly and final exams
18-19	16	The student can recognize, Steering System, Steering System Components, Steering box Types, Hydraulic Steering system (Types, how it works hydraulic steering system), Steering system problems, diagnosing and repair it.	Steering System	Theoretical lectures +view teaching videos +practical laboratory	daily exams and Rating, Oral and practical tests quarterly and final exams
20	8	The student can recognize, Wheels Angles, Devices used to adjust the angles of wheels and alignment of tyres.	Wheels Alignment	Theoretical lectures +view teaching videos +practical laboratory	daily exams and Rating, Oral and practical tests quarterly and final exams

21	8	The student can recognize, Brakes, Brakes Types (Disc, Drum, Hydraulic, Pneumatic), Assist system of brakes,	Brakes	Theoretical lectures +view teaching videos +practical laboratory	daily exams and Rating, Oral and practical tests quarterly and final exams
22	8	The student can recognize, Anti-lock braking system (ABS), Automatic slip control(ASR), Hand Brakes, Hydraulic brake parts, Brake with a vacuum assistor, it's parts and how it works,	Brakes	Theoretical lectures +view teaching videos +practical laboratory	daily exams and Rating, Oral and practical tests quarterly and final exams
23-24	16	The student can recognize, Brake adjust, How to bleed air out of hydraulic system, Brakes problems, diagnosing and repair it.	Brakes	Theoretical lectures +view teaching videos +practical laboratory	daily exams and Rating, Oral and practical tests quarterly and final exams
25	8	The student can recognize, Rubber Tyres, Types and sizes of rubber tyres, Effect of air pressure on tyres, Metal rim types, properties, maintenance it, How repair the rubber tyres	Tires and rim	Theoretical lectures +view teaching videos +practical laboratory	daily exams and Rating, Oral and practical tests quarterly and final exams
26	8	Identifying the types of pumps used in the diesel fuel injection system and the working principle of each type, and knowing the four strokes of the diesel engine and electronic injection control and how the fuel atomized by the pump pressure and the sprayer nozzle.	Diesel Engine	Theoretical lectures +view teaching videos +practical laboratory	daily exams and Rating, Oral and practical tests quarterly and final exams
27-28	16	The student can recognize Electrical and Solar Energy Cars (Environmentally Friendly Cars).	Hybrid cars	Theoretical lectures +view teaching videos +practical laboratory	daily exams and Rating, Oral and practical tests quarterly and final exams
29-30	16	The student can recognize, Air Conditioner, Components and how it works, Air Conditioner problems and how maintenance and repair it.	Air Conditioner	Theoretical lectures +view teaching videos +practical laboratory	daily exams and Rating, Oral and practical tests quarterly and final exams

22-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)	Auto maintenance book.
Main references (sources)	1-Automotive Technology Curriculum 2- Automotive Mechanics
Recommended books and references (scientific journals, reports…)	- ADVAANCED AUTOMOTIVE TECHNOLO - And all the scientific books on car maintenance
Electronic References, Websites	

Course Description Form

1-Course Name:	
Internal Combustion Engines	
2-Course Code:	
3-Semester / Year:	
First semester/2024	
4-Description Preparation Date:	
20/2/2024	
5-Available Attendance Forms:	
Presence in classroom	
6-Number of Credit Hours (Total) / Number of Units (Total)	
120 Credit Hours /8 Units	
7- Course administrator's name (mention all, if more than one name)	
Name: Dr. Zuhair Mohammed Obaid Email:	
8–Course Objectives	
Course Objectives	1. Prepare the student and learning him the kinds of internal combustion engines and the foundations of their work. 2. Study the performance parameters of internal combustion engines and relationship to each other for all types of internal combustion diesel and gasoline engines
9–Teaching and Learning Strategies	
Strategy	• **Lecture Method.** • **Skill Education.** • **Using of modern learning techniques and computer programs.** • **Using of videos and documentaries for teaching skill**

10–Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	It recognizes the components and terms and related activities internal combustion engine and how to classify	Basic engine nomenclature	Theoretical lectures + +practical lab	daily Assessment, quarterly and final exams
2	4	How to recognize a operating engines gasoline and diesel four-stroke	Four – stroke cycle spark – ignition engine, four – stroke cycle	Theoretical lectures + +practical lab	daily Assessment, quarterly

			compression ignition engine.		and final exams
3	4	Recognize the importance of and how valve timing for a four-stroke engine	Valves timing for 4 – stroke engine.	Theoretical lectures + +practical lab	daily Assessment, quarterly and final exams
4	4	Recognizes the two-stroke engine and how the timing of the exhaust and suction ports with the piston movement and comparing it with the four-stroke engine	Two – stroke engine, comparison of two stroke and four stroke engines, valves timing for 2- stroke engine.	Theoretical lectures + +practical lab	daily Assessment, quarterly and final exams
5	4	Recognizes the scavenging systems of exhaust gases in two-stroke engine and comparing among these	Scavenging systems for 2 – stroke engines	Theoretical lectures + +practical lab	daily Assessment, quarterly and final exams
6-7-8	12	Recognizes the performance factors of the 4 – stroke and 2 – stroke engines and how to calculate their values as well as to identify the measuring devices these parameters	Engine performance and testing , performance parameters for 4-stroke engine and 2- stroke engine, basic measurements indicators.	Theoretical lectures + +practical lab	daily Assessment, quarterly and final exams
9-10-11	12	Recognizes the curves change the behavior of the different engine parameters with change the engine operation of both types of diesel and petrol and solving examples	Performance of S. I. Engine, performance of C. I. Engine, Illustrative examples	Theoretical lectures + +practical lab	daily Assessment, quarterly and final exams
12	4	It recognizes the parts energies inflows and outflows to and from the engine	Engine heat balance sheet. Illustrative examples	Theoretical lectures + +practical lab	daily Assessment, quarterly and final exams
13	4	Recognizes the impact of the strength mix (air and fuel) to perform engine	Effect of strength mixture (Fr) on engine performance factors	Theoretical lectures + +practical lab	daily Assessment, quarterly and final exams
14	4	How to get recognized by the combustion in the engine ignition and stages of this combustion	Combustion in S. I. Engines, stages of combustion in S. I. Engine	Theoretical lectures + +practical lab	daily Assessment, quarterly and final exams

15	9	It recognizes the impact of different variables of the engine on stages of combustion in the engine	Effect of engine variables on stages of combustion in S. I.Engine.	Theoretical lectures + +practical lab	daily Assessment, quarterly and final exams
16	4	It recognizes the phenomenon of knocking in the S.I. Engine and how it happened and its effects	Detonation or knocking in S. I. Engine, effects of detonation	Theoretical lectures + +practical lab	daily Assessment, quarterly and final exams
17	4	Identifies ways to control the phenomenon of knocking and the impact of the pre - ignition phenomenon on S.I.Engine	Control of detonation , pre-ignition , effect of pre-ignition on engine.	Theoretical lectures + +practical lab	daily Assessment, quarterly and final exams
18	4	It recognizes the different designs of the combustion chambers in S.I.Engines	S.I. engine combustion chamber designs	Theoretical lectures + +practical lab	daily Assessment, quarterly and final exams
19	4	Recognizes the carburetor and how it operates for the processing of an appropriate mixture of lecture the engine	Carburetion in S. I. Engine	Theoretical lectures + +practical lab	daily Assessment, quarterly and final exams
20	4	It recognizes the parts of simple carburetor and calculate the air / fuel ratio	Simple carburetor – calculation of the Air-fuel ratio for a simple carburetor	Theoretical lectures + +practical lab	daily Assessment, quarterly and final exams
21	4	Recognizes the electronic fuel injection systems of S.I.Engine	Injection fuel systems in S.I. engine	Theoretical lectures + +practical lab	daily Assessment, quarterly and final exams
22	4	How to get recognized by the combustion in the C.I.Engine, the stages of the combustion and the effect of these variables on theses stages	Combustion in C. I engines , stages of combustion in C.I. engine , variable affecting , stages of combustion	Theoretical lectures + +practical lab	daily Assessment, quarterly and final exams
23	4	It recognizes the phenomenon of knocking in the diesel engine and ways to control it	Diesel knock methods of controlling diesel knock	Theoretical lectures + +practical lab	daily Assessment, quarterly and final exams
24	4	It recognizes the different designs of the combustion chambers in C.I.Engines	C. I. Engine combustion chamber designs	Theoretical lectures + +practical lab	daily Assessment, quarterly and final exams
25	4	How to recognize the work of diesel fuel injection, the kinds	Fuel injection in C. I. Engine,	Theoretical lectures +	daily Assessment,

		and types of injectors and nozzles used in the C.I.Engine	requirements of diesel injection system , types of injection systems , types of fuel injectors and nozzles	+practical lab	quarterly and final exams
26	4	It recognizes the fuel used in internal combustion engine, how to extract and specifications of fuel of S.I.Engines & C.I.Engines	Fuel , specification , fuels for S. I. Engines , Octane number requirement , additives , fuels for C. I. Engine, cetane number requirement, additives	Theoretical lectures + +practical lab	daily Assessment, quarterly and final exams
27	4	Recognizes the boosting system, their types and their impact on the performance of an internal combustion engine	Effect of superchagring on performance of the engine, supercharging types	Theoretical lectures + +practical lab	daily Assessment, quarterly and final exams
28	4	It identifies areas where friction occurs in the engine, lubrication usefulness and impact of the additions added to the oil to reduce friction losses	Engine friction and lubrication , additives	Theoretical lectures + +practical lab	daily Assessment, quarterly and final exams
29	4	Recognizes the exhaust gases from S.I.Engine, the impact of the maintenance of the engine on the amount of exhaust pollutants and ways to control them	Pollutants from S. I. Engine , effect of engine maintenance on exhaust emissions , emissions control	Theoretical lectures + +practical lab	daily Assessment, quarterly and final exams
30	4	Recognizes the exhaust gases from C.I.Engine as well as exhaust smoke, methods of control of the smoke and the difference between pollutants from S.I.Engine and C.I.Engine	Diesel emissions , diesel smoke and its control, comparison diesel and gasoline emissions	Theoretical lectures + +practical lab	daily Assessment, quarterly and final exams

23-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- Bason &Whit "internal combustion engine " vol. 1& vol.2, 1979 2- P.L.Ballaney "internal combustion engine", 1980 3- Chorles F.T."the internal combustion engine in theory & practice", 1986

	4- Thermodynamics & heat engines"thermal engineering" 5- M.L.Mathur"acourse in internal combustion engines", 1984 6- "Internal combustion engine fundamentals, by: John Heywood pub.,Ma Graw – Hill , 1988, USA 7- "Introduction to internal combustion engines", by: Richard Stone pub., Mac Millan, 1992, USA 8- John Wiley "internal combustion engines, Applied Thermodynamics, by: Colin R.Ferguson &Allan T. Kirkpatrick, pub.,2001
Main references (sources)	
Recommended books and references (scientific journals, reports…)	- All competent scientific books internal combustion engines
Electronic References, Websites	Many of the sites in the specialty automotiv and related internal combustion engines

Course Description Form

1-Course Name:
Automotive Mechanics
2-Course Code:
3-Semester / Year:
First semester/2024
4-Description Preparation Date:
20/2/2024
5-Available Attendance Forms:
Presence in classroom
6-Number of Credit Hours (Total) / Number of Units (Total)
60 Credit Hours /4 Units
7- Course administrator's name (mention all, if more than one name)
Name: Sabah Hatim Obaid Email:

8−Course Objectives	
Course Objectives	To study and learning the forces and stresses affected on the automobile, the various system design and the power transmitted from the different components

9−Teaching and Learning Strategies	
Strategy	• **Lecture Method.** • **Skill Education.** • **Using of modern learning techniques and computer programs.** • **Using of videos and documentaries for teaching skill**

10−Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Recognizes the automotive performance , the total resistance affecting car motion	Automotive performance	Lecture+ solving examples	daily Rating, quarterly and final exams
2	3	Recognizes the Traction effort	Automotive performance	Lecture+ solving examples	daily Rating, quarterly and final exams
3-4	6	Surplus effort c examples	Automotive performance	Lecture+ solving	daily Rating,

				examples	quarterly and final exams
5-6	6	Recognizes the gears , types gearing system , motion between two gears , selecting the best gear ratio , drive axle gear ratio, overall gear ratio examples	Gears	Lecture+ solving examples	daily Rating, quarterly and final exams
7	3	Recognizes the bearing types , calculations and design of sliding bearing	Bearings	Lecture+ solving examples	daily Rating, quarterly and final exams
8	3	Recognizes the shafts , types , calculation and design of the shafts	Shafts	Lecture+ solving examples	daily Rating, quarterly and final exams
9-10-11	6	Recognizes the clutch , types , design , power transmitted , calculation	The Clutch	Lecture+ solving examples	daily Rating, quarterly and final exams
12-13-14	6	Recognizes the belts. Types, system types, calculation of power transmitted from flat and v. type.	The belts	Lecture+ solving examples	daily Rating, quarterly and final exams
15-16-17-18	8	Recognizes the brakes , types systems function , calculation of stopping distance , declaration , load transfer during brake , braking force on front and rear wheel , wheel piston diameter , all these calculation based on disc and shoes brake type.	The brakes	Lecture+ solving examples	daily Rating, quarterly and final exams
19-20	4	**Recognizes the suspension system types advantages and disadvantages** Calculation of leaf and coil spring	Suspension System	Lecture+ solving examples	daily Rating, quarterly and final exams
21-22	4	Definition and types of accident, Accidents with the change in speed, Plastic and elastic deformation, Equation of momentum, kinetic energy, energy deformation, Front and rear collisions, Collision barrier, Distribution of power in the body of the car during	Definition and types of accident	Lecture+ solving examples	daily Rating, quarterly and final exams

		collision, Active and passive safety.			
23-24	4	Recognizes the steering system , calculations , types	Steering System	Lecture+ solving examples	daily Rating, quarterly and final exams
25-26	4	Overturning and sliding speed	Overturning and sliding speed	Lecture+ solving examples	daily Rating, quarterly and final exams
27	2	Recognizes Piston , types , calculation of thermal and tensile stress	Pistons	Lecture+ solving examples	daily Rating, quarterly and final exams
28	2	Recognizes Crankshaft , types , calculation of thermal and tensile stress	Crankshaft	Lecture+ solving examples	daily Rating, quarterly and final exams
29-30	4	Study of various design car system (car with front engine mounted and rear wheel drive , car with front engine and rear wheel drive , car with rear engine mounted and wheel drive system	Study of various design car system	Lecture+ solving examples	daily Rating, quarterly and final exams

24-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	

Course Description Form

1-Course Name:	
Automotive Bodies (Structures)	
2-Course Code:	
3-Semester / Year:	
First semester/2024	
4-Description Preparation Date:	
20/2/2024	
5-Available Attendance Forms:	
Presence in classroom	
6-Number of Credit Hours (Total) / Number of Units (Total)	
90 Credit Hours /6 Units	
7- Course administrator's name (mention all, if more than one name)	
Name: Hadi Rahem Ibrahim Email: inm.hadi@atu.edu.iq	
8–Course Objectives	
Course Objectives	- Introduce students to .1 introduce students to the bodies of cars .2 Introduce students to the types of bodies of cars .3 introduce students to the materials used in the manufacture of bodies of cars 4. Introduce students to damage causes and the methods of reform. 5. Introduce student to methods to protect cars bodies from external influences.
9–Teaching and Learning Strategies	
Strategy	• **Lecture Method.** • **Skill Education.** • **Using of modern learning techniques and computer programs.** • **Using of videos and documentaries for teaching skill**

10–Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	The student can recognize the history of the evolution of cars	Auto industry	lectures +view teaching videos +Workshop	daily Rating, Oral and practical tests quarterly and

					final exams
2	3	The student can identify the types of bodies of cars	Bodies of cars	lectures +view teaching videos +Workshop	daily Rating, Oral and practical tests quarterly and final exams
3-4	6	The student can identify the engineering materials	Engineering Materials	lectures +view teaching videos +Workshop	daily Rating, Oral and practical tests quarterly and final exams
5	6	The student can identify the properties of engineering materials	Properties of engineering materials	lectures +view teaching videos +Workshop	daily Rating, Oral and practical tests quarterly and final exams
6	3	The student can recognize the stress and emotion	Simple stress and strain	lectures +solve examples +Workshop	daily Rating, Oral and practical tests quarterly and final exams
7	3	The student can identify direct stress	Stress direct or vertical, direct emotion	lectures +Solve examples +Workshop	daily Rating, Oral and practical tests quarterly and final exams
8	3	The student can identify material and elastic hook Act	Elastic material Act on hook	lectures +Solve examples +Workshop	daily Rating, Oral and practical tests quarterly and final exams
9	3	The student can identify and modulus of elasticity coefficient Jonk	Modulus of elasticity - Young's modulus	lectures +view teaching videos +Workshop	daily Rating, Oral and practical tests quarterly and final exams
10	3	The student can identify the tensile test	Tensile test (stress and strain) scheme	lectures +solve examples +Workshop	daily Rating, Oral and practical tests quarterly and final exams

11	3	The student can identify the sample questions	Issues unresolved relatively simple	lectures +view teaching videos +Workshop	daily Rating, Oral and practical tests quarterly and final exams
12	3	The student can identify Arc Welding	Electric arc welding, arc start and re-start the arc	lectures +view teaching videos +Workshop	daily Rating, Oral and practical tests quarterly and final exams
13	3	The student can identify autogenous welding	Welding	lectures +view teaching videos +Workshop	daily Rating, Oral and practical tests quarterly and final exams
14-15	3	The student can identify linkage By tong	Connectivity By tong	lectures +view teaching videos +Workshop	daily Rating, Oral and practical tests quarterly and final exams
16	3	The student can identify on a comparison between the types of connectivity	Comparison between connection types	lectures +view teaching videos +Workshop	daily Rating, Oral and practical tests quarterly and final exams
17	3	The student can identify the robot and its features	robot	lectures +view teaching videos +Workshop	daily Rating, Oral and practical tests quarterly and final exams
18-19	6	The student can identify the composition and types	Formation	lectures +view teaching videos +Workshop	daily Rating, Oral and practical tests quarterly and final exams
20-21	6	Study the special structure of the vehicle designs	Study the special structure of the vehicle designs	lectures +view teaching videos +Workshop	daily Rating, Oral and practical tests quarterly and final exams
22	3	The student can identify corrosion	corrosion and effect of weather factors and other	lectures +view teaching	daily Rating, Oral and practical tests quarterly and

			factors on the hull of the car	videos +Workshop	final exams
23	3	The student can identify the car paint and the necessary configuration	Car paint, creating the body	lectures +view teaching videos +Workshop	daily Rating, Oral and practical tests quarterly and final exams
24	3	The student can identify phosphorylation	Phosphorylatio n basic dyestuff	lectures +view teaching videos +Workshop	daily Rating, Oral and practical tests quarterly and final exams
25	3	The student can identify Basic paints	Basic paints	lectures +view teaching videos +Workshop	daily Rating, Oral and practical tests quarterly and final exams
26	3	The student can recognize the way the dye	The way the pigment in the laboratory productivity	lectures +view teaching videos +Workshop	daily Rating, Oral and practical tests quarterly and final exams
27	3	The final polishing and finishing operations	The student can identify finishing operations	lectures +view teaching videos +Workshop	daily Rating, Oral and practical tests quarterly and final exams
28	3	The student can identify paint problems	aint problems, diagnosis, treatment methods, reasons	lectures +view teaching videos +Workshop	daily Rating, Oral and practical tests quarterly and final exams
29-30	6	The student can identify and types of automotive glass	Auto Glass, types of repairs and the installation of the windscreen and the rear and side	lectures +view teaching videos +Workshop	daily Rating, Oral and practical tests quarterly and final exams

25-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)	Educational bag …, Bodies of cars –waleed al jarah
Main references (sources)	Manufacturing methods - D.aref Abu Safiya, the University of technology Technology parts A Car - d. Sami Mohsen body of technical education

Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Course Description Form

1-Course Name:
Computer Applications/2
2-Course Code:
3-Semester / Year:
First semester/2024
4-Description Preparation Date:
20/2/2024
5-Available Attendance Forms:
Presence in classroom
6-Number of Credit Hours (Total) / Number of Units (Total)
90 Credit Hours /6 Units
7- Course administrator's name (mention all, if more than one name)
Name: Email:

8–Course Objectives	
Course Objectives	Enable the student to the three-dimensional drawing by giving a physical form for drawing geometric and determine the design concept and to obtain forms and bilateral watershed dimensional and three-dimensional.

9–Teaching and Learning Strategies	
Strategy	• **Lecture Method.** • **Skill Education.** • **Using of modern learning techniques and computer programs.** • **Using of videos and documentaries for teaching skill**

10–Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-2-3	9	Network concept and types of networks - the concept internet	**Network**	Computer lab.	daily Rating, quarterly and final exams (Theoretical and Practical)
4-5-6-7-8-9-10	21	Excel recognize the concept of the program: the benefits and specifications and features program	**Excel**	Computer lab.	daily Rating, quarterly and final exams (Theoretical and Practical)

11	3	Auto CAD program to recognize the work of different program to screen environment	**Auto CAD**	Computer lab.	daily Rating, quarterly and final exams (Theoretical and Practical)
12	3	Prepare a paper drawing - open a new file - drawing boundaries Limits- units drawing Units- network Grid- jump Snap Storage Save as, Save	**Auto CAD**	Computer lab.	daily Rating, quarterly and final exams (Theoretical and Practical)
13-14-15	9	Arc– (Absolute – Relative – Polar) line Multiline – plane – point – circle	**Auto CAD**	Computer lab.	daily Rating, quarterly and final exams (Theoretical and Practical)
16-17-18	9	Editing Mirror - Move - Copy - Offset	**Auto CAD**	Computer lab.	daily Rating, quarterly and final exams (Theoretical and Practical)
19	3	O snap	**Auto CAD**	Computer lab.	daily Rating, quarterly and final exams (Theoretical and Practical)
20	3	Dimension	**Auto CAD**	Computer lab.	daily Rating, quarterly and final exams (Theoretical and Practical)
21	3	Text and Hatch	**Auto CAD**	Computer lab.	daily Rating, quarterly and final exams (Theoretical and Practical)
22	3	Layer - Properties - line types	**Auto CAD**	Computer lab.	daily Rating, quarterly and final exams (Theoretical and Practical)
23	3	Block& Attributes	**Auto CAD**	Computer lab.	daily Rating, quarterly and final exams (Theoretical and Practical)
24-25	6	Measure –Block – block – explode – divide	**Auto CAD**	Computer lab.	daily Rating, quarterly and final exams (Theoretical and Practical)
26	3	3 Dimension - thickness Ucs - Vports – Elev-	**Auto CAD**	Computer lab.	daily Rating, quarterly and final exams (Theoretical and

					Practical)
27-28	6	3D surfaces	**Auto CAD**	Computer lab.	daily Rating, quarterly and final exams (Theoretical and Practical)
29-30	6	3D solids	**Auto CAD**	Computer lab.	daily Rating, quarterly and final exams (Theoretical and Practical)

26-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)	Book of 3D Drawing
Main references (sources)	1-Learning AutoCAD 2000- Sami Ali Nemma 2-Full Guide of AutoCAD 2000- George Amurwi
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Course Description Form

1-Course Name:	
Graduation Project/2	
2-Course Code:	
3-Semester / Year:	
First semester/2024	
4-Description Preparation Date:	
20/2/2024	
5-Available Attendance Forms:	
Presence in classroom	
6-Number of Credit Hours (Total) / Number of Units (Total)	
90 Credit Hours /6 Units	
7- Course administrator's name (mention all, if more than one name)	
Name: Email:	
8–Course Objectives	
Course Objectives	Enable the student to the three-dimensional drawing by giving a physical form for drawing geometric and determine the design concept and to obtain forms and bilateral watershed dimensional and three-dimensional.
9–Teaching and Learning Strategies	
Strategy	• **Lecture Method.** • **Skill Education.** • **Using of modern learning techniques and computer programs.** • **Using of videos and documentaries for teaching skill**

10–Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1+2	6				
3	3				
4-5	6				
6-7	6				

8	3				
9-10	6				
11+12+13	9				
14+15	6				
16	3				
17-18-19	9				
20-21-22	9				
23	3				
24	3				
25	3				
26	3				
27	3				

27-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)	Electric cars
Main references (sources)	1-AUTO ELECTRICAL&ELECTRONIC SYSTEM. 2-MODERN AUTOMOTIVE ELECTRICITY
Recommended books and references (scientific journals, reports…)	- ADVAANCED AUTOMOTIVE TECHNOLO
Electronic References, Websites	

Course Description Form

1-Course Name:
Electrical Technology
2-Course Code:
3-Semester / Year:
First semester/2024
4-Description Preparation Date:
20/2/2024
5-Available Attendance Forms:
Presence in classroom
6-Number of Credit Hours (Total) / Number of Units (Total)
120Credit Hours /8 Units
7- Course administrator's name (mention all, if more than one name)
Name: Tawfeeq Naji Hussein Email: inm.twfeeq@atu.edu.iq

8−Course Objectives	
Course Objectives	**The course aims to provide the student with the scientific and practical foundations of electrical technology and machinery, which he uses not really when practicing the specialization.**

9−Teaching and Learning Strategies	
Strategy	• **Lecture Method.** • **Skill Education.** • **Using of modern learning techniques and computer programs.** • **Using of videos and documentaries for teaching skill**

10−Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	The student can identify an introduction to electron technology, definitions, amperes, current, voltage, resistance, ohms.	electron technology	Lecture & lab.	Theoretical exams daily, quarterly and final
2+3	8	The student can learn: electronic parallelism and energy, mutual circuit, mixed circuit.	electronic parallelism	Lecture & lab.	Theoretical exams daily, quarterly and final
4+5	8	The student can learn about Kirchhaf's Law, Ohm, Applications	Kirchhaf's Law	Lecture & lab.	Theoretical exams daily, quarterly and final

6	4	The student can learn about the principles of electromagnets,	electromagnets	Lecture & lab.	Theoretical exams daily, quarterly and final
7	4	The student can learn: electronic magnetism	electronic magnetism	Lecture & lab.	Theoretical exams daily, quarterly and final
8+9	8	The student can identify alternating current, alternating current generation and voltage characteristics, EMF wave formation, EMI	EMF	Lecture & lab.	Theoretical exams daily, quarterly and final
10	4	The student can identify the single-phase alternating current resistance circuit, the coil circuit, the capacitance circuit, the phase diagram, and the phase angle.	, the phase diagram	Lecture & lab.	Theoretical exams daily, quarterly and final
11+12	8	The student can identify the resistance file of the circuit contents, the connecting capacitors in series, power calculations, power factor, modified energy methods, direction diagrams.	direction diagrams	Lecture & lab.	Theoretical exams daily, quarterly and final
13+14	8	The student can identify three-phase alternating current, generation, wiring and linking methods, stellar, delta, voltage lines, current lines, phase diagrams, voltage current and power	three-phase alternating current,	Lecture & lab.	Theoretical exams daily, quarterly and final
15+16	8	The student can identify the electrical transformer, methods and types of work, construction, applications, loss in the transformer, transformer test, transformer efficiency, automatic transformer.	automatic transformer	Lecture & lab.	Theoretical exams daily, quarterly and final
17	4	The student can identify the distribution of electronic energy (the law of voltages).	the law of voltages	Lecture & lab.	Theoretical exams daily, quarterly and final
18	4	The student can learn about the conversion of solar energy into electricity.	the conversion of solar energy into electricity.	Lecture & lab.	Theoretical exams daily, quarterly and final
19+20+21	12	The student can identify DC motors, their components, principles of work, types of	power calculation	Lecture & lab.	Theoretical exams daily, quarterly and

		applications, types of start, loss, power calculation.			final
22+23+24	12	The student can identify alternating current motors, their components, principles of work, types of applications, single phase - three phases, types of starting,	three phases	Lecture & lab.	Theoretical exams daily, quarterly and final
25+26+27	12	The student can learn about motor protection, current protection devices, overload, temperature, increased protection.	increased protection	Lecture & lab.	Theoretical exams daily, quarterly and final
28+29+30	12	The student can learn about engine testing, engine maintenance and parts repair.		Lecture & lab.	Theoretical exams daily, quarterly and final

28-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)	Electrical Technology by Theraga
Main references (sources)	Electrical Technology by Hayke
Recommended books and references (scientific journals, reports…)	- Electrical Engineering ,theory & practical - Electrical Installation work by Franc
Electronic References, Websites	

Course Description Form

13.	Course Name:
Air-conditioning	
14.	Course Code:
15.	Semester / Year:
First semester/2024	
16.	Description Preparation Date:
20/2/2024	
17.Available Attendance Forms:	
Presence in classroom	
18.Number of Credit Hours (Total) / Number of Units (Total)	
120 Credit Hours /8 Units	
19.	Course administrator's name (mention all, if more than one name)
Name: Email:	
20.	Course Objectives
Course Objectives	Introducing the student to a detailed study of the foundations of air conditioning and calculating thermal loads in the cooling and heating systems, a study of the different air conditioning groups and the foundations of the design of air ducts and pipes, in addition to the topics of noise and air purification.
21.	Teaching and Learning Strategies
Strategy	• **Lecture Method**. • **Skill Education**. • **Using of modern learning techniques and computer programs**. • **Using of videos and documentaries for teaching skill**

22. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	The student can learn heat transfer types & overall coefficient.	Heat transfer types	Lecture & Lab	Daily exams Reporting Homework
2-3	8	The student can learn thermal comfort, parameters , limition & charts & comfort zones.	Thermal comfort	Lecture & Lab	Daily exams Reporting Homework

4	4	The student can learn heating load parameters & calculations.	Heating load parameters	Lecture & Lab	Daily exams Reporting Homework
5-7	12	The student can learn cooling load Parameters & Calculations	Cooling load Parameters	Lecture & Lab	Daily exams Reporting Homework
8-9	8	The student can learn heating & Cooling systems	Heating & Cooling systems	Lecture & Lab	Daily exams Reporting Homework
10	4	The student can learn automobile air conditioning system.	Automobile air conditioning	Lecture & Lab	Daily exams Reporting Homework
11	4	The student can learn actual Heating & Cooling Process	Actual Heating	Lecture & Lab	Daily exams Reporting Homework
12	4	Heating Recovery.	Heating Recovery	Lecture & Lab	Daily exams Reporting Homework
13	4	The student can learn computer-aided cooling load calculation.	cooling load calculation.	Lecture & Lab	Daily exams Reporting Homework
14-15	8	The student can learn air – ducting Design , kinds , pressure losses, calculation & dimensions.	Air – ducting Design	Lecture & Lab	Daily exams Reporting Homework
16 - 17	8	The student can learn fans , type & it's specification & laws.	Fans , type & it's specification	Lecture & Lab	Daily exams Reporting Homework
18	4	The student can learn vibrations , sources, measuring.	Vibrations , sources, measuring.	Lecture & Lab	Daily exams Reporting Homework
19-20	8	The student can learn pipes & pumps, types, selection, calculation and laws.	Pipes & pumps, types,	Lecture & Lab	Daily exams Reporting Homework
21	4	The student can learn air – conditioning system application	Air – conditioning system	Lecture & Lab	Daily exams Reporting Homework
22-23	8	The student can learn air – filtration methods.	Air – filtration methods.	Lecture & Lab	Daily exams Reporting Homework
24	4	The student can learn air Washers	Air Washers	Lecture & Lab	Daily exams Reporting Homework
25	4	The student can learn dehumidifiers & humidifiers.	Dehumidifiers & humidifiers.	Lecture & Lab	Daily exams Reporting Homework
26	4	The student can learn energy distribution in air conditioning system	Energy distribution	Lecture & Lab	Daily exams Reporting Homework
27	4	The student can learn noise, limition & measuring	Noise, limition & measuring	Lecture & Lab	Daily exams Reporting Homework

28-30	12	The student can learn energy conservation in Building.	Energy conservation	Lecture & Lab	Daily exams Reporting Homework

23. 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

24. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	1) Applied Air – conditioning and refrigeration by C.T Gosling 2) Air – conditioning Engineering , by W. P. Jones 3) Environment Engineering , analysis & practice by Jennings 4) A course of refrigeration & Air-conditioning by Arora S. Domkundwa
Recommended books and references (scientific journals, reports…)	1) Principles of air conditioning and refrigeration engineering - Khaled Al-Judi 2) Ashrae Handbook , Fundamentals
Electronic References, Websites	

Course Description Form

1-Course Name:
Refrigeration systems
2-Course Code:
3-Semester / Year:
First semester/2024
4-Description Preparation Date:
20/2/2024
5-Available Attendance Forms:
Presence in classroom
6-Number of Credit Hours (Total) / Number of Units (Total)
120 Credit Hours /8 Units
7- Course administrator's name (mention all, if more than one name)
Name: Email:
8–Course Objectives

Course Objectives	• Introducing the student to the systems used in the field of freezing and familiarizing himself with their theoretical basis. Studying the actual compression system, choosing tubes, and balancing the parts.
9–Teaching and Learning Strategies	
Strategy	• **Lecture Method.** • **Skill Education.** • **Using of modern learning techniques and computer programs.** • **Using of videos and documentaries for teaching skill**

10–Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-2	8	The student can learn compression refrigeration system (theoretical and actual) and media quality	Compression refrigeration system	Lecture & Lab	Theoretical exams daily, quarterly and final
3-5	12	The student can learn selection of the parts of the compression system: evaporator - condenser - compressor - condensing unit - group balance	Parts of the compressibility system	Lecture & Lab	Theoretical exams daily, quarterly and final

6-8	12	The student can learn Composite compression system - multiple compressors {the presence of an interchanger - the presence of a flash tank} or multiple evaporators	Composite compressibility system	Lecture & Lab	Theoretical exams daily, quarterly and final
9-10	8	The student can learn general considerations for designing and laying the pipeline network (discharge line - liquid line - suction line - water pipes)	Piping grid design	Lecture & Lab	Theoretical exams daily, quarterly and final
11-14	16	The student can learn on the attachments of the pressure system / target - location	compressibility system accessories	Lecture & Lab	Theoretical exams daily, quarterly and final
15-16	8	The student can learn control devices used in cooling systems	control devices	Lecture & Lab	Theoretical exams daily, quarterly and final
17-20	16	The student can learn absorption refrigeration system / working principle - advantages - use in the field of refrigeration and condensation / comparison with the compression system - use of solar energy for operation	absorption cooling system	Lecture & Lab	Theoretical exams daily, quarterly and final
21	4	The student can learn steam cooling system	Steam cooling system	Lecture & Lab	Theoretical exams daily, quarterly and final
22-23	8	The student can learn air cooling system - features - types	air cooling system	Lecture & Lab	Theoretical exams daily, quarterly and final
24-25	8	The student can learn air liquefaction refrigeration system.. Features - Types	air liquefaction refrigeration system	Lecture & Lab	Theoretical exams daily, quarterly and final
26	4	The student can learn thermoelectric cooling system – features and prospects?	thermoelectric cooling system	Lecture & Lab	Theoretical exams daily, quarterly and final
27-28	8	The student can learn food preservation technology - cold storage designs - calculation of warehouse loads - types of warehouses.	Food preservation	Lecture & Lab	Theoretical exams daily, quarterly and final
29-30	8	The student can learn Rationalizing energy consumption	Rationalizing energy	Lecture & Lab	Theoretical exams daily,

		in cooling systems	consumption		quarterly and final

29-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)	1- Modren Air – Condition practice by Harris 2- Principle & Refrigeration by Dossat 3- Refrigeration & Air – conditioning by ARORA
Recommended books and references (scientific journals, reports…)	**1-** Handbook of air-conditioning system design by carrier air-conditioning company **2-** Refrigeration and Air-conditioning by Stoecker **3-** Refrigeration & Air-conditioning by Ballany **4-** Refrigeration & Air-conditioning by Jordan & Priester **5-** Commercial Refrigeration by Andarase
Electronic References, Websites	

Course Description Form

1-Course Name:
Control systems
2-Course Code:
3-Semester / Year:
First semester/2024
4-Description Preparation Date:
20/2/2024
5-Available Attendance Forms:
Presence in classroom
6-Number of Credit Hours (Total) / Number of Units (Total)
90 Credit Hours /6 Units
7- Course administrator's name (mention all, if more than one name)
Name: Email:

8−Course Objectives	
Course Objectives	• Introducing the student to the basic principles that operate in command and control systems in general, specifically those used in the field of controlling the operation of air conditioning and refrigeration systems.

9−Teaching and Learning Strategies	
Strategy	• **Lecture Method.** • **Skill Education.** • **Using of modern learning techniques and computer programs.** • **Using of videos and documentaries for teaching skill**

10−Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	The student can learn principles of control...and general definitions of the most important terms used in control	Principles of control	Lecture & Lab	Theoretical exams daily, quarterly and final
2	3	The student can learn principles of control - types of control	Types of control	Lecture & Lab	Theoretical exams daily, quarterly and final
3	3	The student can learn principles of measurement - measurement -	Principles of measurement	Lecture & Lab	Theoretical exams daily,

		control and measurement - the most important factors that are subject to control			quarterly and final
4	3	The student can learn devices for measuring and sensing various factors in refrigeration and air conditioning devices {liquid level - pressure - temperature - humidity}	Measuring devices	Lecture & Lab	Theoretical exams daily, quarterly and final
5	3	The student can learn electrical control circuits/electrical control balance – diagrams for electrical control circuits and circuits	Electrical control circuits	Lecture & Lab	Theoretical exams daily, quarterly and final
6-7	6	The student can learn electrical control elements, thermal regulator - circuit breaker to prevent overload, humidity regulators, pressure regulators, final control elements, connectors.	Electrical control elements	Lecture & Lab	Theoretical exams daily, quarterly and final
8	3	The student can learn electronic control circuits – control circuit elements, thermostat, humidity regulator	Electronic control circuits	Lecture & Lab	Theoretical exams daily, quarterly and final
9-12	12	The student can learn Pneumatic control circuits, control components, control elements, thermostat, humidity regulator, pressure regulator, control elements, gate motor, pneumatic valves, pneumatic relays, compressed air processing equipment	Pneumatic control circuits	Lecture & Lab	Theoretical exams daily, quarterly and final
13-14	6	The student can learn components of the control system for refrigeration machines - dynamic properties	Components of the control system for refrigeration machines	Lecture & Lab	Theoretical exams daily, quarterly and final
15-19	15	The student can learn methods of controlling cooling capacity - controlling cooling capacity through the work of the evaporator - controlling cooling capacity through the work of centrifugal compressors and controlling cooling capacity using a thermal expansion valve,	Methods of controlling cooling capacity	Lecture & Lab	Theoretical exams daily, quarterly and final

		controlling capacity using a float in centrifuges			
20	3	The student can learn Practical applications on control devices for clean rooms - white rooms - computer rooms - hospitals	Practical applications on control devices	Lecture & Lab	Theoretical exams daily, quarterly and final
21-26	18	The student can learn control systems for home units - control circuits for wall air conditioners, home freezers - separate devices, multiple zones (control devices for the device or multiple zones) - central air conditioning device	Control systems for home units	Lecture & Lab	Theoretical exams daily, quarterly and final
27	3	The student can learn on the components of the control system for the central cooling system and the most important methods used to control temperature and humidity	Components of the control system	Lecture & Lab	Theoretical exams daily, quarterly and final
28	3	The student can learn the control system for the air conditioning system that operates throughout the year	Control system for air conditioning system	Lecture & Lab	Theoretical exams daily, quarterly and final
29	3	The student can learn control system for central heating devices	Control system for central heating devices	Lecture & Lab	Theoretical exams daily, quarterly and final
30	3	The student can learn preparing a detailed control map for central refrigeration and air conditioning devices	Develop a detailed control map	Lecture & Lab	Theoretical exams daily, quarterly and final

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)	1- Engineering Measurement & instrumentation by L. F. Adams 2 Control systems for heating & ventilation and Air-condition , by Haines
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Course Description Form

1-Course Name:
Heat Transfer
2-Course Code:
3-Semester / Year:
First semester/2024
4-Description Preparation Date:
20/2/2024
5-Available Attendance Forms:
Presence in classroom
6-Number of Credit Hours (Total) / Number of Units (Total)
90 Credit Hours /6 Units
7- Course administrator's name (mention all, if more than one name)
Name: Email:

8−Course Objectives	
Course Objectives	**.The aim of studying heat transfer is for the student to know the main general foundations of heat transfer and their practical applications in the field of air conditioning, such as finding the thermal load of a building, as well as finding the thermal conductivity, thickness and type of insulation used in the tubes of air conditioning systems and heat exchangers of all types and their uses in cooling.**

9−Teaching and Learning Strategies	
Strategy	• **Lecture Method.** • **Skill Education.** • **Using of modern learning techniques and computer programs.** • **Using of videos and documentaries for teaching skill**

10−Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	The student can learn basic principles and importance of heat transfer.	Basic principles	Lecture & Lab	Theoretical exams daily, quarterly and final
2	3	The student can learn the three kinds of heat transfer , conduction heat transfer, convection heat transfer , radiation heat transfer, examples	Three kinds of heat transfer	Lecture & Lab	Theoretical exams daily, quarterly and final

3	3	The student can learn conduction of heat transfer in the steady state conduction through a homogeneous plans wall	Conduction of heat transfer in the steady state	Lecture & Lab	Theoretical exams daily, quarterly and final
4	3	The student can learn conduction through a composite plans wall, heat resistance . conduction through a homogeneous cylinder wall	Conduction through a composite plans wall	Lecture & Lab	Theoretical exams daily, quarterly and final
5	3	The student can learn conduction through a composite cylinder wall , influence of variable conductivity , examples	Conduction through a composite cylinder wall	Lecture & Lab	Theoretical exams daily, quarterly and final
6	3	The student can learn heat transfer by convection , Reynolds concept of similarity of the flow of fluids and the viscosity , the most important dimensionless groups, examples	Heat transfer by convection	Lecture & Lab	Theoretical exams daily, quarterly and final
7	3	The student can learn heat transfer by free convection , heat transfer from vertical and horizontal surfaces , examples	Heat transfer by free convection	Lecture & Lab	Theoretical exams daily, quarterly and final
8-9	6	The student can learn heat transfer by free convection from horizontal square plates , heat transfer proportion of air at atmospheric pressure and properties of water . examples	Heat transfer by free convection	Lecture & Lab	Theoretical exams daily, quarterly and final
10	3	The student can learn heat transfer by forced convection , the heating of fluids in turbulent flow through pipes , examples	Heat transfer by forced convection	Lecture & Lab	Theoretical exams daily, quarterly and final
11	3	The student can learn the heating of fluids flowing normal to single wires and tubes the heating of fluids flowing normal to tube banks , examples	Heating of fluids flowing normal	Lecture & Lab	Theoretical exams daily, quarterly and final
12-13	6	The student can learn heat transfer by the combined effect of conduction and convection, heat transfer between two fluids through a	Heat transfer by the combined effect of conduction	Lecture & Lab	Theoretical exams daily, quarterly and final

		plane wall, heat transfer between two fluids through a cylinder wall,examples	and convection,		
14-15	6	The student can learn types of heat exchangers, the log mean temperature difference, examples	Types of heat exchangers,	Lecture & Lab	Theoretical exams daily, quarterly and final
16-17	6	The student can learn heat exchanger effectiveness ratio , examples	Exchanger effectiveness	Lecture & Lab	Theoretical exams daily, quarterly and final
18	3	The student can learn heat transfer through fins , condensation and boiling heat transfer	Fins	Lecture & Lab	Theoretical exams daily, quarterly and final
19	3	The student can learn heat transfer by radiation , the concept of a perfect black body	Heat transfer by radiation	Lecture & Lab	Theoretical exams daily, quarterly and final
20	3	The student can learn stefan – boltzmann's law of total radiation , general equation for heat exchange by radiation between black surfaces , examples	Boltzmann's law	Lecture & Lab	Theoretical exams daily, quarterly and final
21-23	9	The student can learn heat exchange by radiation between large parallel black plane , examples	Heat exchange by radiation	Lecture & Lab	Theoretical exams daily, quarterly and final
24-26	9	The student can learn heat exchange by radiation between large parallel planes of different emissivity , examples	Heat exchange by radiation	Lecture & Lab	Theoretical exams daily, quarterly and final
27-28	6	The student can learn heat conduction in series with convection and radiation, examples	Heat conduction in series	Lecture & Lab	Theoretical exams daily, quarterly and final
29	3	The student can learn heat transfer through air space , examples	Heat transfer through air space	Lecture & Lab	Theoretical exams daily, quarterly and final
30	3	General problems , home works	Home works	Lecture & Lab	Theoretical exams daily, quarterly and final

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)	1- Elements of heat transfer, obert McGrow – Hill – 1984 2- Physical similarity and Dimensional analyses Dancan Edward Arnold – 1953 3- Heat and mass transfer Jakob and Hawking John Wiley & Sons, Inc. 1957 Heat transfer by Holman
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Course Description Form

1-Course Name:
Maintenance of refrigeration and air conditioning devices
2-Course Code:
3-Semester / Year:
First semester/2024
4-Description Preparation Date:
20/2/2024
5-Available Attendance Forms:
Presence in classroom
6-Number of Credit Hours (Total) / Number of Units (Total)
180Credit Hours /12 Units
7- Course administrator's name (mention all, if more than one name)
Name: Email:

8–Course Objectives	
Course Objectives	**Educating the student and providing him with the necessary skills and experience for the maintenance and operation of air conditioning and refrigeration equipment**

9–Teaching and Learning Strategies	
Strategy	• **Lecture Method.** • **Skill Education.** • **Using of modern learning techniques and computer programs.** • **Using of videos and documentaries for teaching skill**

10–Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	6	The student can get a general idea of refrigeration and air conditioning devices and the maintenance of devices - and types of maintenance.	types of maintenance	Lecture & lab.	Theoretical exams daily, quarterly and final
2	6	The student can identify the mechanical circuit of the compressive cooling system. Maintenance of every part Expected malfunctions for each part – as well as malfunctions of auxiliary parts.	the mechanical circuit	Lecture & lab.	Theoretical exams daily, quarterly and final

3	6	The student can learn about the use of the external examination method – to identify mechanical and electrical faults	electrical faults	Lecture & lab.	Theoretical exams daily, quarterly and final
4	6	The student can learn about the maintenance of household cooling devices (refrigerator - freezer - water cooler) mechanical circuit	mechanical circuit	Lecture & lab.	Theoretical exams daily, quarterly and final
5	6	The student can learn about the study of the electrical circuit - identifying faults - causes and treatment for the home group	mechanical circuit	Lecture & lab.	Theoretical exams daily, quarterly and final
6	6	The student can learn about replacing the parts of the cycle - charging - discharging - adding oil - leakage check	leakage check	Lecture & lab.	Theoretical exams daily, quarterly and final
7+8	12	The student can learn about the maintenance of the wall room air conditioning unit (regular cycle air conditioning unit and reversed cycle) with the replacement of parts (mechanical and electrical cycle)	mechanical and electrical cycle	Lecture & lab.	Theoretical exams daily, quarterly and final
9	6	The student can identify the reciprocating compressor - checking the compressor - compressor malfunctions - treatment - maintenance of compressor parts - changing chairs - leakage fluids - valve maintenance	reciprocating compressor	Lecture & lab.	Theoretical exams daily, quarterly and final
10	6	The student can learn about the maintenance of the car air conditioning unit - description of parts - choosing the work of the device - discharge and charging - replacement of parts - malfunctions - treatment	three-phase alternating current,	Lecture & lab.	Theoretical exams daily, quarterly and final
11+12	12	The student can learn about the maintenance of separate and integrated air conditioners - installation of the device - description of the device - types of air or water cooled devices. Parts maintenance. Compressor – Condenser – Evaporator – Filter – Fans and Spindles	maintenance	Lecture & lab.	Theoretical exams daily, quarterly and final
13	6	The student can identify the discharge and charging - oil change - compressor replacement	compressor replacement	Lecture & lab.	Theoretical exams daily, quarterly and

		- check the control devices and the electrical control panel and the fault identification table			final
14	6	The student can learn about the maintenance of commercial refrigeration units - types of units - installation of units - unloading and charging and leak inspection - inspection and replacement of parts.	maintenance	Lecture & lab.	Theoretical exams daily, quarterly and final
15	6	The student can learn about the maintenance of the central air conditioner with a reciprocating compressor and centrifugal in the following cases - two compressors for two separate cycles - with two or more compressors for a common cycle	maintenance	Lecture & lab.	Theoretical exams daily, quarterly and final
16	6	The student can learn about the maintenance of air exchangers - fans - heating and cooling coils - filters of all kinds.	maintenance	Lecture & lab.	Theoretical exams daily, quarterly and final
17	6	The student can identify the air mixing box with gates - humidifier - electric heater with control valves	maintenance	Lecture & lab.	Theoretical exams daily, quarterly and final
18	6	The student can learn about the maintenance of the coil unit and the fan (system description, maintenance of the coil line and cleaning the coils and filter from dirt left by the air on the network)	system description	Lecture & lab.	Theoretical exams daily, quarterly and final
19	6	The student can learn about the control group and how to connect it with the electrical control panel	electrical control panel	Lecture & lab.	Theoretical exams daily, quarterly and final
20	6	The student can learn about the maintenance of central air conditioning parts - checking compressor oil with maintenance of service valves, washing the condenser with chemicals, cleaning the evaporator, regulating the expansion valve, checking and regulating pressure controllers (high and low pressure and oil controllers)	electrical control panel	Lecture & lab.	Theoretical exams daily, quarterly and final
21	6	The student can learn about the replacement of the parts of the device - the cycle of discharge, charging and leakage inspection (fault identification list)	fault identification list	Lecture & lab.	Theoretical exams daily, quarterly and final

22	6	The student can learn about the maintenance of the cooling tower (types), maintenance of the tower body and basin, raft, gasket, fan and motor, gearbox (if any), adjusting the straightness of the axes	cooling tower	Lecture & lab.	Theoretical exams daily, quarterly and final
23	6	The student can learn about the description of the different types of water pumps, engine maintenance and valves	cooling tower	Lecture & lab.	Theoretical exams daily, quarterly and final
24	6	The student can learn about adjusting the straightness of the motor and pump axis – types of seal, repair or replacement – replacing the pump, pipes and accessories	replacement – replacing	Lecture & lab.	Theoretical exams daily, quarterly and final
25	6	The student can learn about the maintenance of electrical parts	maintenance of electrical parts	Lecture & lab.	Theoretical exams daily, quarterly and final
26	6	The student can learn about the maintenance of the boiler - cleaning the body of the boiler from the inside and outside - dismantling the engine and its accessories and maintaining its various parts. Reinstallation on the boiler body	maintenance of electrical parts	Lecture & lab.	Theoretical exams daily, quarterly and final
27	6	The student can learn about the boiler setup in terms of water processing, checking the electricals and then running with re-checking his control systems.	maintenance of electrical parts	Lecture & lab.	Theoretical exams daily, quarterly and final
28	6	The student can learn about the maintenance of electrical panels and their reading of central air conditioners	maintenance of electrical parts	Lecture & lab.	Theoretical exams daily, quarterly and final
29	6	The student can learn about dismantling and cleaning the parts of the central air conditioning system electricity panel, especially the starter, checking the current drawn for each motor in the system and ensuring the correctness of the organization of the surge protector for each motor	maintenance of electrical parts	Lecture & lab.	Theoretical exams daily, quarterly and final
30	6	The student can learn about a scientific visit to one of the buildings that have advanced control panels for a central air conditioning system	maintenance of electrical parts	Lecture & lab.	Theoretical exams daily, quarterly and final

30-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)	Ashrae Guide and Data Book
Main references (sources)	Modern Refrigeration and Air-condition by Althouse & Turnquist
Recommended books and references (scientific journals, reports…)	- -Refrigeration & Air-condition - -Refrigeration & Air-condition institute
Electronic References, Websites	

Course Description Form

1-Course Name:
Drawing of refrigeration and air conditioning systems
2-Course Code:
3-Semester / Year:
First semester/2024
4-Description Preparation Date:
20/2/2024
5-Available Attendance Forms:
Presence in classroom
6-Number of Credit Hours (Total) / Number of Units (Total)
90Credit Hours /6 Units
7- Course administrator's name (mention all, if more than one name)
Name: Email:
8−Course Objectives

Course Objectives	- It aims to provide the student with experiences and skills to enable him to read and draw architectural plans and air duct maps during them (according to specifications), as well as drawing and reading water systems for the purpose of connecting water between parts of air conditioning systems.
9−Teaching and Learning Strategies	
Strategy	• **Lecture Method**. • **Skill Education**. • **Using of modern learning techniques and computer programs**. • **Using of videos and documentaries for teaching skill**

10−Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	The student can learn about drawing an architectural plan for a multi-story building	drawing an architectural plan for a multi-story building	Lecture & lab.	Theoretical exams daily, quarterly and final
2	3	The student can get a general idea of drawing air ducts in the single-line style	Type of line	Lecture & lab.	Theoretical exams daily, quarterly and final

3	3	The student can identify the drawing of an air duct with two lines showing the dimensions	dimensions	Lecture & lab.	Theoretical exams daily, quarterly and final
4+5	6	The student can identify the drawing of a complete duct diagram (containing curvature, T branching and other connections) with an indication of the dimensions on it	drawing of a complete	Lecture & lab.	Theoretical exams daily, quarterly and final
6	3	The student can familiarize himself with the drawing of the complete air duct diagram with the connection with the crane device or a swap unit	drawing of a complete	Lecture & lab.	Theoretical exams daily, quarterly and final
7	3	The student can identify the drawing of the complete air duct diagram with the details of drawing air windows and air diffusers. in their locations and indicators of dimensions and air quantities	Drawing by AutoCAD	Lecture & lab.	Theoretical exams daily, quarterly and final
8+9	6	The student can identify drawing panels for the network of coil pipes and the fan with single doors - dual - triple - quadruple	Drawing by AutoCAD	Lecture & lab.	Theoretical exams daily, quarterly and final
10+11	6	The student can identify drawing panels for the network of coil pipes and the fan with single doors - dual - triple - quadruple	Drawing by AutoCAD	Lecture & lab.	Theoretical exams daily, quarterly and final
12	3	The student can identify the drawing of the double rising tube within an integrated cooling system	Drawing by AutoCAD	Lecture & lab.	Theoretical exams daily, quarterly and final
13	3	The student can identify the drawing of a diagram of an integrated pipe network, including control and measurement devices	Drawing by AutoCAD	Lecture & lab.	Theoretical exams daily, quarterly and final
14	3	The student can identify the drawing of the machine room plan (single-line and two-line pipe style)	Drawing by AutoCAD	Lecture & lab.	Theoretical exams daily, quarterly and final
15	3	The student can identify drawing sections of the machine room to illustrate the movement of the pipe within the space of the room	Drawing by AutoCAD	Lecture & lab.	Theoretical exams daily, quarterly and final
16	3	The student can learn about drawing an architectural map of one floor - showing how to connect the coil and fan units	Drawing by AutoCAD	Lecture & lab.	Theoretical exams daily, quarterly and final

17	3	The student can identify a diagram of the cooling water pipes connecting the machine room to the impeller on a specific floor	Drawing by AutoCAD	Lecture & lab.	Theoretical exams daily, quarterly and final
18+19	6	The student can identify the drawing of the cooling water system, condensation and charging in a stereoscopic (three-dimensional) style on which valves and control devices are installed	Drawing by AutoCAD	Lecture & lab.	Theoretical exams daily, quarterly and final
20+21+22+23+24+25	18	The student can familiarize himself with the drawing of the control systems diagram of the condensing unit - for the air exchanger unit Household cooling plate... Separate cooling plate	Drawing by AutoCAD	Lecture & lab.	Theoretical exams daily, quarterly and final
26+27+28+29+30	18	The student can learn about drawing suspenders and pipe fasteners, device supports, pump bases - with a scientific visit to one of the buildings to see the implementation of air ducts - and the extension of the water pipe network	drawing suspenders and pipe fasteners	Lecture & lab.	Theoretical exams daily, quarterly and final

31-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)	Mechanical Drawing by Feach Thomas .
Main references (sources)	Handbook & Air-condition system design by Carrier
Recommended books and references (scientific journals, reports…)	- Sourcebook of H. V. A. C. Details by Frank E. Beaty, Jr. P. E.
Electronic References, Websites	

Course Description Form

1-Course Name:	
Occupational Management and Safety	
2-Course Code:	
3-Semester / Year:	
First semester/2024	
13- Description Preparation Date:	
20/2/2024	
14- Available Attendance Forms:	
Presence in classroom	
15- Number of Credit Hours (Total) / Number of Units (Total)	
60 Credit Hours /4 Units	
16- Course administrator's name (mention all, if more than one name)	
Name: Email:	
17- Course Objectives	
Course Objectives	**Teaching the student the foundations and principles of industrial management and occupational safety public and private through his dealings in the sites of refrigeration and air conditioning systems.**
18- Teaching and Learning Strategies	
Strategy	• **Lecture Method.** • **Skill Education.** • **Using of modern learning techniques and computer programs.** • **Using of videos and documentaries for teaching skill**

19- Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	The student can learn about the administration	the administration	Lecture	Theoretical exams daily, quarterly and final
2	2	The student can learn about the principles of management - levels of management and the factory - the organization of the factory	the administration	Lecture	Theoretical exams daily, quarterly and final
3	2	The student can identify administrative functions	the administration	Lecture	Theoretical exams daily, quarterly and

					final
4	2	Facility Functions	Facility Functions	Lecture	Theoretical exams daily, quarterly and final
5	2	The student can identify the choice of the factory location and the factors affecting	factors	Lecture	Theoretical exams daily, quarterly and final
6	2	The student can learn about procurement - the relationship of procurement with other functions of the establishment and the steps of purchasing	factors	Lecture	Theoretical exams daily, quarterly and final
7	2	The student can identify the store - inventory - types of inventory	types of inventory	Lecture	Theoretical exams daily, quarterly and final
8	2	The student can identify the types of stores - inventory of stores	types of inventory	Lecture	Theoretical exams daily, quarterly and final
9	2	The student can identify the determination of the economic quantity of demand	Control of materials	Lecture	Theoretical exams daily, quarterly and final
10	2	The student can identify initial concepts in costs	initial concepts in costs	Lecture	Theoretical exams daily, quarterly and final
11	2	The student can identify wages - its types	wages - its types	Lecture	Theoretical exams daily, quarterly and final
12	2	The student can learn about the methods of calculating wages	wages - its types	Lecture	Theoretical exams daily, quarterly and final
13	2	The student can learn about the training methods	the training methods	Lecture	Theoretical exams daily, quarterly and final
14	2	The student can identify leadership, competent managers, types of managers – characteristics and qualities of managers and signs of good and weak management	A maintenance operations	Lecture	Theoretical exams daily, quarterly and final
15	2	The student can identify the basic concepts of quality control (the concept of control) the concept of quality - the quality of quality	control	Lecture	Theoretical exams daily, quarterly and final

		control - the importance and benefits of quality control			
16	2	The student can define the station - types of stations and a detailed explanation of the stations	control	Lecture	Theoretical exams daily, quarterly and final
17	2	The student can identify the elements of quality - quality of design	A visit to a typical station Car Maintenance	Lecture	Theoretical exams daily, quarterly and final
18	2	The student can identify the quality of implementation - reliability - quality control costs	Service Station Sections	Lecture	Theoretical exams daily, quarterly and final
19	2	The student can identify the sections of heavy electrical service, business and business structures and dyeing and polishing etc ..	Heavy sections Service	Lecture	Theoretical exams daily, quarterly and final
20	2	The student can identify the collection of data and information - the frequency table - the histogram	Space station Account	Lecture	Theoretical exams daily, quarterly and final
21	2	The student can identify the labor expense and the expense of the needs of each department to workers and the calculation of the total number of workers	Account employment numbers for the station	Lecture	Theoretical exams daily, quarterly and final
22	2	The student can identify applications in the use of one of the types of charts	types of charts	Lecture	Theoretical exams daily, quarterly and final
23	22	The student can recognize a full explanation for the estimate and the basis on which they depend for extracting any assay	The foundations of the assay	Lecture	Theoretical exams daily, quarterly and final
24	2	The student can learn about preventive maintenance - its benefits - sudden maintenance	Assay for overnight car at the station Account	Lecture	Theoretical exams daily, quarterly and final
25	2	2The student can identify the assay 2car repair	Assay repairs	Lecture	Theoretical exams daily, quarterly and final
26	2	The student can identify to calculate the assay for the transfer of passengers by car	Assay transfer	Lecture	Theoretical exams daily, quarterly and final
27	2	The student can identify the methods of quality in industrial safety, general rules and regulations for the prevention of accidents	Used car pricing	Lecture	Theoretical exams daily, quarterly and final

28	2	The student can explain and discuss the report or research assigned to him	To discuss the reports and student research	Lecture	Theoretical exams daily, quarterly and final
29	2	The student can learn how to design modern workshops	Scientific films	Lecture	Theoretical exams daily, quarterly and final
30	2	The student can familiarize himself with the organization of the maintenance department	maintenance	Lecture	Theoretical exams daily, quarterly and final

20- 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

21- Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	
Recommended books and references (scientific journals, reports…)	- enry Alberts : Principles of managements , John Wiley N. Y. 1969
Electronic References, Websites	

Course Description Form

1-Course Name:
Principles of Refrigeration and Air Conditioning
2-Course Code:
3-Semester / Year:
First semester/2024

4-Description Preparation Date:
20/2/2024
5-Available Attendance Forms:
Presence in classroom
6-Number of Credit Hours (Total) / Number of Units (Total)
120Credit Hours /8 Units
7- Course administrator's name (mention all, if more than one name)
Name: Email:
8–Course Objectives

Course Objectives	**Introducing the student to a detailed study on the foundations of air conditioning and calculating thermal loads in the cooling and heating systems, a study of different air conditioning groups and the foundations of designing air ducts and pipes, in addition to the topics of noise and air purification.**

9–Teaching and Learning Strategies	
Strategy	• **Lecture Method.** • **Skill Education.** • **Using of modern learning techniques and computer programs.** • **Using of videos and documentaries for teaching skill**

10–Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	The student can learn about the Heat transfer – heat transfer by conduction – heat transfer coefficient, heat transfer by convection	Heat transfer	Lecture & lab.	Theoretical exams daily, quarterly and final
2	4	The student can learn about Excel to learn about the Heat transfer by radiation, heat transfer through walls and composite walls , total Heat transfer coefficient	Heat transfer	Lecture & lab.	Theoretical exams daily, quarterly and final
3	4	The student can learn Air-condition and feeling comfortable , Air movement , relative humidity wet and bulb temperature	Air- condition	Lecture & lab.	Theoretical exams daily, quarterly and final
4	4	The student can learn: Heating load , calculation of heating load losses	Air- condition	Lecture & lab.	Theoretical exams daily, quarterly and final
5+6+7	12	The student can learn about Cooling load Parameters &	Air- condition	Lecture & lab.	Theoretical exams daily,

		Calculations			quarterly and final
8	4	The student can learn about the Heating & Cooling systems	Air- condition	Lecture & lab.	Theoretical exams daily, quarterly and final
9	4	The student can learn Psychometric chart , sensible and latent heat , configuration of air leaving the heating & cooling coil	Psychometric chart	Lecture & lab.	Theoretical exams daily, quarterly and final
10	4	The student can learn: Computer-aided calculation of cooling load.	cooling load	Lecture & lab.	Theoretical exams daily, quarterly and final
11+12+ 13+14	16	The student can learn about Air ducting design , Kinds & pressure losses calculation included fittings	ducting design	Lecture & lab.	Theoretical exams daily, quarterly and final
15	4	The student can identify the Movement energy , air discharge in rooms -	Movement energy	Lecture & lab.	Theoretical exams daily, quarterly and final
16+17	8	The student can identify Fans , fan laws, specification	specification	Lecture & lab.	Theoretical exams daily, quarterly and final
18	4	The student can identify Vibration and vibration sources	Vibration	Lecture & lab.	Theoretical exams daily, quarterly and final
19+20+ 21	12	The student can identify Piping design , types and Pumps calculation	design	Lecture & lab.	Theoretical exams daily, quarterly and final
22+23+ 24+25	16	The student can learn Types of air condoning system & Air and water system	Types of air condoning system	Lecture & lab.	Theoretical exams daily, quarterly and final
26+27	8	The student can learn about the Application of air condoning systems in building	air condoning systems	Lecture & lab.	Theoretical exams daily, quarterly and final
28	4	The student can learn about the Air filtration methods	the Air filtration methods	Lecture & lab.	Theoretical exams daily, quarterly and final
29	4	The student can learn Air Washers	Air Washers	Lecture & lab.	Theoretical exams daily, quarterly and final

30	4	The student can learn Energy distribution in air condoning system	condoning system	Lecture & lab.	Theoretical exams daily, quarterly and final

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- Applied Air – conditioning and refrigeration by C.T Gosling
Main references (sources)	2) Air – conditioning Engineering , by W. P. Jones
Recommended books and references (scientific journals, reports…)	- Ashrae Handbook , Fundamentals - Environment Engineering , analysis & practice by Jennings - A course of refrigeration & Air-conditioning by Arora S. Domkundwa
Electronic References, Websites	