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



Academic Program and Course Description Guide

Introduction:

The department was established in 1987-1988 under the leadership of Dr. Tahseen Ali Hussein, and it has been successively led by many competent academic and administrative professors. It began with two branches (Automobiles and Refrigeration), and currently, it is chaired by Mr. Ahmed Hasan Tawfeeq. In 1993, the Automobile branch was transferred to Kufa Technical Institute as part of the state's austerity policy during the economic blockade at that time.

The department prepares and qualifies students academically, technically, and skillfully to deal with various heating and cooling devices and systems for various industrial, medical, automotive, and domestic applications, including design, installation, regular maintenance, troubleshooting, and blueprint preparation under the supervision of experienced and competent professors. Hundreds of competent students have graduated from the department, some of whom have completed their university and postgraduate studies and have assumed scientific and administrative positions at the university.

The department, its staff, and students have contributed to the maintenance, repair, and rehabilitation of many refrigeration devices and advanced systems and provided consultations to sacred institutions such as the Holy Imam Ali Shrine, Al-Hanana Mosque, and Al-Kufa Grand Mosque.

Quality Policy in the Department of Power Mechanical Techniques:

The quality system is based on the quality policy of the Ministry of Higher Education and Scientific Research, which aims to achieve the development objectives of the ministry's plans, programs, and initiatives, meeting the requirements of the internal and external academic community. The administration of the department is committed to the implementation of the quality system and the continuous improvement process, focusing on the quality and effectiveness of educational and research outputs. The department cooperates with the scientific committees in the scientific departments to ensure the success of the quality system through the adoption of the best practices and continuous development of the department's capabilities.

Academic Program Description Form

University Name: Al-Furat Al-Awsat technical university Faculty/Institute: Najaf technical institute Scientific Department: Mechanical power techniques Academic or Professional Program Name: Diploma of Mechanical power techniques. Final Certificate Name: Diploma in Mechanical power techniques. Academic System: Annual system

Description Preparation Date: 2024/2023

File Completion Date: 2024/3/26

Signature Head of Department Name:

Mr.Ahmed Hasan Tawfeeq Date:

alar

Signature: Scientific Associate Name: Dr.Salah Mahdi Salih Date: 24 4 / 20 2 4

The file is checked by: Dr. Mohammed N. Nemma Department of Quality Assurance and University Performance Director of the Quality Assurance and University Performance Department: Date: 16.04.2024 Signature:

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Approval of the Dean

1. Program Vision

Deepening the students' technical concepts and keeping pace with modern technologies in the field of air conditioning and refrigeration enable graduates to work in various sectors.

2. Program Mission

Starting from the edges of science to develop curricula theoretically and practically, utilizing the latest teaching and training methods, and actively participating in the development of the university and community environment.

3. Program Objectives

1-Preparing technical personnel to work professionally in various projects in both the public and private sectors in the field of air conditioning and refrigeration with high dedication.

2- Enhancing the performance efficiency of department members by engaging them in specialized courses to update their knowledge, develop their skills and expertise, and provide them with resources and information to conduct scientific research.

3- Creating a suitable university environment for students and enhancing social, sports, and other activities to strengthen the sense of belonging to the institute and the department.

4- Continuously updating curricula theoretically and practically to adopt the latest and most suitable curricula according to the principles of sustainable engineering and providing appropriate laboratories for this purpose.

5- Establishing collaborative relationships and interactions between the department and governmental agencies and sacred institutions. 6- Providing services and training to all segments of society, such as the unemployed and the families of martyrs, to contribute to job opportunities and eliminate unemployment.

4. Program Accreditation

5. Other external influences

6. Program Structure

Program Structure	Number of Courses	Credit hours	Percentage	Reviews*
Institution Requirements	6	20	% 16	
College Requirements	3	22	% 18	
Department Requirements	12	82	% 66	

Summer Training	1	0	% 0	
Other				

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

7. Program D	escription			
Year/Level	Course Code	Course Name	Credi	t Hours
First level		Principles of air	2 theoretical	2 practical
		refrigeration and air-		
		conditioning		
		Thermodynamics	2 theoretical	1 practical
		Mechanics	2 theoretical	1 practical
		Computer	1 theoretical	2 practical
		applications 1		
		Engineering drawing		3 practical
		mathematics	2 theoretical	
		Electrical technique	2 theoretical	2 practical
		English language	2 theoretical	
		skills 1		
		Human rights and	2 theoretical	
		democracy		
		Mechanical		6 practical
		workshops		
Second level		Refrigeration system	2 theoretical	2 practical
		Air conditioning	2 theoretical	2 practical
		Heat transfer	2 theoretical	1 practical
		Control systems	2 theoretical	1 practical
		Maintenance of	2 theoretical	4 practical
		refrigeration and air		
		conditioning systems		
		Drawings of		3 practical
		refrigeration and air		
		conditioning systems		
		Management and	2 theoretical	
		occupational safety		
		Computer	1 theoretical	2 practical
		applications 2		
		English language	2 theoretical	
		skills 2		
		project		2 theoretical

8. Expected learning	outcomes of the program
Knowledge	1 0
 Acquiring theoretical knowledge in various scientific curricula relevant to the specialization. Reading blueprints, drawings, and designs. Performing theoretical calculations for various specialized issues. Participating in the design of air conditioning equipment blueprints. 	 Pipe and joint welding. Refrigeration equipment charging. Connecting separate refrigeration units. Calculating heat loads.
Skills	
1- Practical maintenance and troubleshooting in refrigeration systems. 2- Installation, assembly, and disassembly of various parts of refrigeration devices and systems.	 Connecting electrical circuits related to the specialty. Pabricating air ducts and welding various types.
Ethics	
 Learning installation of refrigeration devices. Learning maintenance of refrigeration devices Detecting and diagnosing faults. 	Maintenance and installation of various refrigeration devices for residential, commercial, and centralized packages.

9. Teaching and Learning Strategies

Teaching and learning strategies and methods adopted in the implementation of the program in general.

10. Evaluation methods

Oral exams - Theoretical exams - Semester exams - Final exams - Daily assessments

11.Faculty							
Faculty Members							
Academic Rank	Specialization		Special Requirements (if applicable	/ Skills)	Number of the teaching staff		
	General	Special			Staff	Lecturer	
Ass.Proff. Mr	Mechanical Engineering	Air conditioning and refrigeration			V		

Ass.proff. Dr	Mechanical Engineering	Thermal engineering		✓
Mr,	Mechanical Engineering	Thermal engineering		√
Mr,	Mechanical Engineering	Thermal engineering		~
Mr,	Mechanical Engineering	Thermal engineering		✓

Regular meetings for refining academic and administrative skills, engaging them in core committees, and attending courses and workshops relevant to the program and the institution as a whole.

Participation in academic courses and workshops, encouragement of scientific research, involvement in local and international scientific conferences, and community service.

12.Acceptance Criterion

The admission system is centrally managed by the ministry and is subject to selection criteria determined by the institution based on the secondary vocational and preparatory study grades.

13. The most important sources of information about the program

Websites of ATU and Najaf technical institute

14.Program Development Plan

Working on increasing the department's capacity and upgrading the laboratories by equipping them with modern devices to keep pace with the advancements in refrigeration and air conditioning systems to meet the demands of the job market.

	Program Skills Outline														
				Required program Learning outcomes											
Year/Level	Course Code	Course Name	Basic or optional	Kno	Knowledge		Skills				Ethics	Ethics			
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4
First level		Principles of air refrigeration and air- conditioning		*	*	*		*	*	*	*	*	*	*	*
		Thermodynamics		*		*			*	*	*		*	*	*
		Mechanics		*		*			*	*	*		*	*	*
		Computer applications 1		*	*	*			*	*	*		*	*	*
		Engineering drawings		*		*		*		*		*	*		
		mathematics				*		*		*		*	*		
		Electrical technique				*		*	*	*	*		*	*	*
		English language skills 1				*	*	*	*	*	*		*	*	*
		Human rights and democracy		*	*	*	*	*	*	*	*	*	*	*	*

	Mechanical workshops			*	*	*					*			*
Second level	Refrigeration system			*	*	*	*	*	*		*	*	*	
	Air conditioning		*	*		*	*	*	*	*	*	*	*	*
	Heat transfer	Heat transfer			*	*	*	*	*	*	*	*		*
	Control systems	Control systems		*			*	*	*		*	*	*	*
	Maintenance of refrigeration and air conditioning systems			*			*	*	*		*	*	*	*
	Drawings of refrigeration and air conditioning systems		*		*		*		*		*	*		
	Management and occupational safety		*	*	*	*		*		*	*	*		*
	Computer applications 2			*		*	*	*	*		*	*	*	
	English language skills 2		*	*	*					*			*	
	project			*		*		*		*	*			

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

Course Description Form

				-				
1. Co	ourse Na	me:						
Principles of	of Refrigera	tion and Ai	r Conditioning					
2. Co	ourse Co	de:						
3. Se	3. Semester / Year:							
First yea	first year							
4. De	escriptio	n Prepai	cation Date:					
2024/3/2	26							
5. Av	vailable	Attenda	nce Forms:					
Fu	ll attendand	ce system						
6. Ni	umber of	f Credit	Hours (Total)	/ Number of Units (To	tal)			
4	hours/ 8	units						
7. Co	ourse ad	ministra	tor's name (me	ention all, if more than	one name)			
N	ame. Al	i Iabir T	alih					
F	mail· ali	talih@g	tu edu ia					
	inani. an	.tuno e t	itu.euu.iq					
8. Co	ourse Ob	jectives						
Course O	bjectives	5	• Introducing stud	dents to the basic procedures	for air condition	ing of buildings and		
	Ū		calculating the cap	pacity and efficiency of each pr	ocedure.			
			• Introducing stuc	dents to the fundamental refrig	geration systems	used in the field of		
			compressors, cond	lensers, expansion valves, evan	orators, and refri	gerants used in them.		
9. Te	aching a	and Lear	ning Strategie	s		8		
Strategy		Theoreti	cal lectures					
		Practical	lectures					
		Scientifi	c trips					
		Summer	training					
	_	Student	projects					
10 Cou	rse Stru	rture						
Week	Hours	Real	uired Learning	Unit or subject name	Learning	Evaluation		
		Out	comes	C 01 0000 Joor	method	method		
1-2	8			Principles of	Lecture +	Oral Exams +		
	Ũ			thermodynamics, property,	Practical	Written Exams +		
				state, Temp.(dry and wet),	Examples +	Daily assignments		
				volume, sp. humidity, Rel.	Laboratory			
				humidity, heat (sens. And				
				lat.), dew-point, air				
				conditioning, refrigeration,				
				refrigeration types element				
				and equipment for property				
				measurements.				

		 	-	
3	4	Air properties, Dalton laws, psychometric properties calculations, sp. humidity, rel. humidity, enthalpy,	Lecture + Practical Examples + Laboratory	Oral Exams + Written Exams + Daily assignments
	4	Pressure and Temp.	Locturo	Oral Exame
4	4	Psychometric chart.	Practical +	Written Exams +
			Examples +	Daily assignments
			Laboratory	,
5-6	8	Psychometric chart using,	Lecture +	Oral Exams +
		for mixing process, sen.	Practical	Written Exams +
		Heating and cooling, lat.	Examples +	Daily assignments
		humidification and	Laboratory	
		dehumidification, steam		
		injection.		
7-8	8	Actual air conditioning	Lecture +	Oral Exams +
	_	process, air- mixing and	Practical	Written Exams +
		cooling with	Examples +	Daily assignments
		without re heat coils	Laboratory	
		humidification of air and		
		heating with reheat coils.		
9-10	8	Sensible heat factor, by-bass	Lecture +	Oral Exams +
		factor, contact factor,	Practical	Written Exams +
		humidification efficiency,	Examples +	Daily assignments
		requirements in space	Laboratory	
11	1	Principle of refrigeration	Lecture +	Oral Exams +
11	4	method of heat transfer, sp.	Practical	Written Exams +
		heat, pressure and critical	Examples +	Daily assignments
		pressure, temp. and critical	Laboratory	
		temp. , phase change		
12-14	8	Refrigeration method,	Lecture +	Oral Exams +
		system. vapour-	Examples +	Daily assignments
		compression system,	Laboratory	2 ang assignments
		absorption system, steam-		
		jet system, thermos-electric		
		system, liquefaction of		
		gases system, air- system in air-craft and others		
15	1	Pressure –enthalpy chart. for	Lecture +	Oral Exams +
13	-	common refrigerant	Practical	Written Exams +
		Ĭ	Examples +	Daily assignments
			Laboratory	
16-17	8	Vapor-compression system,	Lecture +	Oral Exams +
		added heat rejected work	Fractical	written Exams + Daily assignments
		compressor . con quantity	Laboratory	Daily assignments
		of refrigerant)		
18-19	8	Actual vapor compression	Lecture +	Oral Exams +
-		system, the effect of vapor	Practical	Written Exams +
		super-heated in suction line,	Examples +	Daily assignments
		sub-cooled in liquid line,	Laboratory	
		losses and heat exchanger		
		on C.O.P.		
20-22	8	Compressor, classification,	Lecture +	Oral Exams +
		working principles, types,	Practical	Written Exams +
		(reciprocating, rotary, center		Daily assignments

		1	fugal, screw, and another types), construction, secondary types, type of refrigerant using, advantage and disadvantage for each	Examples + Laboratory	
		1	type.		
23-24	8		Condensers and cooling tower, classification condenser (air- cooled, water cooled, evaporative), advantages and disadvantages for each types, classification of cooling tower.	Lecture + Practical Examples + Laboratory	Oral Exams + Written Exams + Daily assignments
25-26	8		Expansion devices types, (manual device, automatic valve, thermostatic valve, low and high side float valve, capillary tubes, advantages and disadvantages for each type.	Lecture + Practical Examples + Laboratory	Oral Exams + Written Exams + Daily assignments
27-28	8		Evaporators types-(natural and forced convection), (floated and dry expansion) advantages and disadvantages for each type.	Lecture + Practical Examples + Laboratory	Oral Exams + Written Exams + Daily assignments
29-30	8]	Refrigerant, classification, (main and secondary) required prosperities, selection of refrigerant	Lecture + Practical Examples + Laboratory	Oral Exams + Written Exams + Daily assignments
11.Course	e Evaluat	tion			
For the first se practical), it als theoretical exar 12.Learni	emester (10 so accounts i m is 40%, and ing and T	theoretical + 10 practical), it for 20%. Yearly assignments id the final practical exam is Ceaching Resources	t accounts for 20%. For the s s count for 10%. Consequentl 10%. (The total is 100%).	second semester y, the annual eff	(10 theoretical + 10 Fort is 50%. The final
1- Princ	iples of	Refrigeration and Ai	ir		
Cond	litioning b	y Adnan Rikan.			
2- Princ	ciples of	Refrigeration and Ai	ir		
Cond	litioning	by Abdul Hadi Nam	a		
Khali	ifa.	-			
The book "Prin Khalid Al-Joud	nciples of R li.	efrigeration and Air Condit	tioning'		
Website of N	Najaf techn	ical institute			
		Course Do	escription Form		

13.Course Name:
Thermodynamics
14.Course Code:
15.Semester / Year:
First year
16.Description Preparation Date:
2024/3/26

17. Available Attendance Forms:

Full attendance system

18.Number of Credit Hours (Total) / Number of Units (Total)

3 hours/ 6 units

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

Name: Mr.Ahmed Hasan Tawfeeq

Email: Ahmed.h.t @atu.edu.iq

20.Course Objectives

Course Objectives	To give the students information about basic principles of thermodynamic, first law, and second law of thermodynamic, deep study for Carnot power cycle and reverse
	Cycle.
21.Teaching	and Learning Strategies
Strategy	Theoretical lectures
	Practical lectures
	Scientific trips
	Summer training
	Student projects

22. Cou	22. Course Structure							
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method			
1-6	18		Thermodynamic term- measuring devices- properties- state — process- cycles –density and specific volume – the pressure (gage, vacuum, and absolute)- temperature relations (Celsius, Kelvin and ranking scale)-energy- renewable energy-resources (solar energy, wind energy, energy of water falling, tidal energy)-hydrocarbons source (oil & gas)-form of energy used in thermodynamic-potential energy-kinetic energy-flow work.	Lecture + Practical Examples + Laboratory	Oral Exams + Written Exams + Daily assignments			
7-8	6		First law of thermodynamics-flow system-nun flow system — steady –un steady –open – closed. examples.	Lecture + Practical Examples + Laboratory	Oral Exams + Written Exams + Daily assignments			
9-10-11	9		Applications of the first law on nozzle, diffuser, condenser, evaporator, compressor, heat exchanger	Lecture + Practical Examples + Laboratory	Oral Exams + Written Exams + Daily assignments			

T				1	1	
			(surface, open), turbine,			
12 - 13	6		Thermodynamic process	Lecture +	Oral Exams +	
12-13	0		undergoing at constant	Practical	Written Exams +	
			(pressure, volume,	Examples +	Daily assignments	
			tommomotume on the law)-	Laboratory	, ,	
			nelutrophie process with	_		
			representation on a(P			
			V).(T-S)&(P-H) diagram.			
14	3		Specific heat, kind of	Lecture +	Oral Exams +	
	5		specific heat- gas constant.	Practical	Written Exams +	
				Examples +	Daily assignments	
				Laboratory		
15	3		The second law of	Lecture +	Oral Exams +	
			thermodynamics,	Practical	Written Exams +	
			statement of the second	Examples +	Daily assignments	
			Dump.	Laboratory		
16 – 17	6		Carnot power cvcle-	Lecture +	Oral Exams +	
10 1/	0		reversed Carnot cycle	Practical	Written Exams +	
			(refrigeration & heat pump	Examples +	Daily assignments	
			applications). Examples.	Laboratory		
18 - 19	6		Study of steam. Steam	Lecture +	Oral Exams +	
10 17	0		properties- using steam	Practical	Written Exams +	
			tables .	Examples +	Daily assignments	
				Laboratory	, ,	
20	3		Calculations of the	Lecture +	Oral Exams +	
			properties for (liquid-	Practical	Written Exams +	
			vapour)mixture(wet steam).	Examples +	Daily assignments	
21_22	6		Steam process under going		Oral Exame +	
$\Sigma 1 - \Sigma \Sigma$	0		at constant (pressure.	Practical	Written Exams +	
			volume)-isentropic process,	Examples +	Daily assignments	
			adiabatic process &	Laboratory	, ,	
			applications.			
23 - 24	6		The Rankine cycle	Lecture +	Oral Exams +	
			, processes of the cycle ,	Practical	Written Exams +	
			examples	Examples +	Daily assignments	
25	2		The vapour Compression	Lecture +	Oral Exams +	
25	3		cycle.	Practical	Written Exams +	
			·	Examples +	Daily assignments	
				Laboratory		
26 - 27 - 28	9		Fuel –definition of accounts	Lecture +	Oral Exams +	
			and properties of the fuel	Practical	Written Exams +	
			used in boilers and cooling	Examples +	Daily assignments	
20 20	6		Boiler _ types		Oral Evame	
29-30	0		characteristics	Practical	Written Exams +	
				Examples +	Daily assignments	
				Laboratory		
23.Course Evaluation						
For the first semester (10 theoretical + 10 practical), it accounts for 20%. For the second semester (10 theoretical + 10						
practical), it also accounts for 20%. Yearly assignments count for 10%. Consequently, the annual effort is 50%. The final						
theoretical exam is 40%, and the final practical exam is 10%. (The total is 100%).						
24.Lea	rning and T	Teaching Resources				
1-8	applied thermo	odynamics by Khurmi				

2-applied thermodynamics by Yunus Singel	
Website of Najaf technical institute	

Course Description Form

Machanica						
Mechanics						
26.Course Code:						
27.Semester / Year:						
First year						
28.Description Preparation Date:						
2024/3/26						
29.Available Attendance Forms:						
Full attendance system						
30.Number of Credit Hours (Total) / Number of Units (Total)						
3 hours/ 6 units						
31.Course administrator's name (mention all, if more than one name)						
Name: Ali Abdul Ameer Abbas						
32.Course Objectives						
Course Objectives The aim of the course is to equip students with the fundamental skills						
in mechanical calculations of materials and applied fluids.						
33 Teaching and Learning Strategies						
Strategy Theoretical lectures						
Practical lectures						
Scientific trips						
Summer training						
Student projects						
34 Course Structure						
Week Hours Required Unit or subject name Learning Evaluation						
Learning Learning method						
Outcomes						
1 3 Introduction to Lecture + Oral Exams						
mechanics Practical Written Exams						
(Definitions, Units, Laboratory Daily assignments						
Load, Applied						
mecnanics, Stress, Strain Safety factor						

		Mechanical Properties,		
		Stress Strain diagram)		
2 - 8	21	Stresses due to :	Lecture +	Oral Exams +
		- Normal Load	Practical	Written Exams +
		(Tension &	Examples +	Daily assignments
		compression)	Laboratory	
		- Tangential Load		
		(Shear & Torsion)		
		- Change in		
		Temperature		
		(Thermal)		
9 – 10	6	Application with	Lecture +	Oral Exams +
<i>y</i> 10	0	uniform and non	Practical	Written Exams +
		uniform material and	Examples +	Daily assignments
		load with variable	Laboratory	
		load with variable		
11	2		Locture	Oral Exama
11	5	Introduction to Fluid	Practical +	Written Exams +
		Mechanics	Examples +	Daily assignments
		(Definition, Properties	Laboratory	
10		of fluid, steady flow)	Transformer	
12	3	Fluid static, Pressure	Lecture +	Written Exams +
		of a certain depth	Examples +	Daily assignments
			Laboratory	Dung ussignments
13	3	Specific Gravity,	Lecture +	Oral Exams +
	_	Viscosity (Newton's	Practical	Written Exams +
		law of Viscosity.	Examples +	Daily assignments
		Types of fluids), effect	Laboratory	
		of temperature on		
		viscosity . effect of		
		pressure on viscosity		
14	3	Pressure Measurement	Lecture +	Oral Exams +
	5	(Boarder gage.	Practical	Written Exams +
		Piezometer	Examples +	Daily assignments
		manometer, Pitot)	Laboratory	
15	3	Floating and sub –	Lecture +	Oral Exams +
10	5	merged calculation	Practical	Written Exams +
		merged calculation	Examples +	Daily assignments
16 17			Laboratory	01 E
16-17	6	Continuity equation	Lecture +	Ural Exams + Written Exame
		with application	Examples +	Daily assignments
			Laboratory	2 any assignments
18-19	6	Bernolli equation with	Lecture +	Oral Exams +
		application	Practical	Written Exams +
		**	Examples +	Daily assignments
20.21			Laboratory	Oral Exama
20-21	0	Energy equation with	Practical +	Written Exams +
		application	Examples +	Daily assignments
			Laboratory	
22-23	6	Momentum equation	Lecture +	Oral Exams +
		with application	Practical	Written Exams +
		11	Examples +	Daily assignments
			Laboratory	

2423	6		Orifice & Gates	Lecture +	Oral Exams +
				Practical	Written Exams +
				Examples +	Daily assignments
25.26				Laboratory	Oral Energy
25-26	6		Flow in pipes (parallel	Lecture +	Ural Exams + Writton Exame
			and series losses in	Fractical	Doily assignments
			pipes)	Laboratory	Daily assignments
27.28	6		Friction losses in pipes	Lecture +	Oral Exams +
27-20	0		Friction losses in pipes	Practical	Written Exams +
				Examples +	Daily assignments
				Laboratory	,
29-30	6		Air flow in ducts	Lecture +	Oral Exams +
	0			Practical	Written Exams +
				Examples +	Daily assignments
				Laboratory	
35.Cour	se Evaluati	on			
For the first	semester (10 th	neoretical + 10 practical), i	it accounts for 20%. For the s	econd semester	(10 theoretical + 10)
practical), it	also accounts fo	or 20%. Yearly assignment	s count for 10%. Consequently	y, the annual effe	ort is 50%. The final
theoretical ex	$\frac{1}{100}$ $\frac{1}{100}$	the final practical exam is	10%. (The total is 100%).		
36.Lear	ning and Te	eaching Resources			
1. Stro	ength of mate	erials by singer			
2. Stro	ength of mate	erials by young			
&Т	imoshenko				
3. Flu	id mechanics	by Streeter			
		5			
Website of	Najaf techni	cal institute			

Course Description Form

37.Course Name:
Mathematics
38.Course Code:
39.Semester / Year:
First year
40.Description Preparation Date:
2024/3/26
41.Available Attendance Forms:
Full attendance system
42.Number of Credit Hours (Total) / Number of Units (Total)
2hours/ 4 units
43.Course administrator's name (mention all, if more than one name)
Name: Maha Salah Juhaid
44.Course Objectives
16

Course O	bjectives	The objectiv scientific sul Moreover, it	ye is to familiarize students with bjects, enhancing their logical t aims to improve their ability to c	the application of the hyperbolic chinking skills we connect data with	of mathematics in other hen solving exercises. their knowledge to find
		solutions to	problems		
45.T	eaching	and Learning Strat	tegies		
Strategy		Theoretical lectures			
		Summer training			
		Student projects			
46. Cou	rse Stru	cture			
Week	Hours	Required	Unit or subject	Learning	Evaluation
		Learning	name	method	method
		Outcomes			
1	2		matrices, determinants,	Theoretical	Oral Exams +
			their properties	lecture	Written Exams +
2	2		linear equations. Kramer's	Theoretical	Oral Exams +
	<i>–</i>		method, applications, arc	lecture	Written Exams +
			analysis, vectors,		Daily assignments
3	2		vector analysis, types of vectors scalars standard	Theoretical	Oral Exams + Written Exams +
			vector algebra,	lecture	Daily assignments
4	2		operations on vectors,	Theoretical	Oral Exams +
			orthogonal vector unit,	lecture	Written Exams +
5	2		standard and directional	Theoretical	Oral Exams +
5	Z		multiplication, vector	lecture	Written Exams +
			applications, torque arc		Daily assignments
	2		analysis	Theoretical	Oral Exama
6	2		definition, logarithm laws.	lecture	Written Exams +
			solving logarithmic		Daily assignments
			equations, trigonometric		
7	2		laws of trigonometric	Theoretical	Oral Exams +
/	2		ratios, function meaning	lecture	Written Exams +
					Daily assignments
8	2		independent and dependent variables	Theoretical	Oral Exams + Written Exams +
			explicit and implicit	lecture	Daily assignments
			functions		
9	2		measurements,	Theoretical	Oral Exams +
			algebraic functions	lecture	Daily assignments
10	2		linear speed applications,	Theoretical	Oral Exams +
			areas, details, derivatives	lecture	Written Exams +
11	2		derivatives of algebraic	Theoretical	Daily assignments
11	2		functions, chain rule	lecture	Written Exams +
			applications,		Daily assignments
12	2		implicit function	Theoretical	Oral Exams +
			derivatives, nigner-order derivatives, exponential	lecture	Daily assignments
			function derivatives,		2 any assignments
13	2		logarithmic function	Theoretical	Oral Exams +
			derivatives, trigonometric	lecture	Written Exams +
		1	runction derivatives		Daily assignments

r	1	T	1	1	· · · · · · · · · · · · · · · · · · ·
14	2		exponential function	Theoretical	Oral Exams +
			derivatives, logarithmic	lecture	Written Exams +
15	2		trigonometric function	Theoretical	Oral Exams +
15	2		derivatives. circular	lecture	Written Exams +
			function derivatives,		Daily assignments
16	2		partial differentiation,	Theoretical	Oral Exams +
			derivative applications	lecture	Written Exams +
			(slope equation, tangent,		Daily assignments
10	2		derivative applications	Theoretical	Oral Exame +
10	2		(instantaneous change).	lecture	Written Exams +
			increase, decrease,		Daily assignments
			maximum and minimum		
			points, function graphing,		
10	2		integration	Theoretical	Oral Exama
19	Z		integration of algebraic	lecture	Written Exams +
			functions, integration of	locture	Daily assignments
			exponential and		
			logarithmic functions		
20	2		integration of	Theoretical	Oral Exams +
			definite integration	lecture	Written Exams +
			applications (area under		Daily assignments
			the curve, distance		
			between curves)		
21	2		rotational volumes and arc	Theoretical	Oral Exams +
			length of the curve,	lecture	Written Exams +
			(trapezoidal rule		Daily assignments
			Simpson's rule)		
22	2		integration methods,	Theoretical	Oral Exams +
			integration by parts,	lecture	Written Exams +
			decomposition		Daily assignments
			integration, solving first-		
			order and first-degree		
			differential equations,		
23	2		continuous homogeneous	Theoretical	Oral Exams + Written Examp
			differential equations -	lecture	Daily assignments
			linear - applications,		Dury assignments
24	2		complex numbers -	Theoretical	Oral Exams +
			addition - subtraction -	lecture	Written Exams +
			division - multiplication,		Daily assignments
25	2		converting the carbine	Theoretical	Oral Exame +
23			attribute to linear and vice	lecture	Written Exams +
			versa		Daily assignments
27-26	4		statistical operations,	Theoretical	Oral Exams +
			repetitive distributions,	lecture	Written Exams +
20.27	4		oumulativo distribution	Theoretical	Daily assignments
28-21	4		repetitive curve	lecture	Written Exams +
				locure	Daily assignments
30-29	4		arithmetic mean, range,	Theoretical	Oral Exams +
			standard deviation,	lecture	Written Exams +
45 ~			variance.		Daily assignments
47.Co	urse Evalua	ation			

For the first semester 20%. For the second semester 20%. Yearly assignments count for 10%. Consequently, the annual effort is 50%. The final theoretical exam is 50% (The total is 100%).							
48.Learning and Teaching Resources							
 Panal colter "Technical Mathematics" Murray R. "Mathematical handbook" Shantinarayam "Engineering Mathematics part 1 – 1987 							
Website of Najaf technical institute							

Course Description Form

49.C	ourse Na	ame:					
Engineeri	ng Drawi	ings					
50.Course Code:							
51.Se	emester	/ Year:					
First yea	r						
52.D	escriptio	on Prepa	ration Date:				
2024/3/2	26						
53.A	vailable	Attenda	ince Forms:				
Fu	ll attendand	ce system					
54.N	umber o	of Credit	Hours (Total) / Number of Units ((Total)		
31	nours/ 6	units					
55.C	ourse ad	lministra	tor's name (n	nention all, if more th	an one name)		
N	ame: Za	inab Ah	med Abd				
56.C	ourse O	bjectives	5				
Course Ol	ojectives		The importance engineering drav program	of engineering drawing - Th ving - Standard drawing boa	e importance of us rd dimensions - Ov	ing the computer for rerview of AutoCAD	
57.Te	eaching	and Lea	rning Strategi	ies			
Strategy practical lectures Summer training Student projects							
58. Cou	rse Stru	cture					
Week	Hours	Requ Lear Outo	iired ning omes	Unit or subject name	Learning method	Evaluation method	
1 2			Introduction to importance of engineering drawing by computer –	Practical lecture	Oral Exams + Written Exams + Daily assignments		
				- 19			

		limits and dimension of drawing palate by AutoCAD history		
2	2	Type of line in AutoCAD – using the menu and tool bar for line and texts	Practical lecture	Oral Exams + Written Exams + Daily assignments
3	2	Basic shapes by AutoCAD	Practical lecture	Oral Exams + Written Exams + Daily assignments
4	2	Drawing modifications by AutoCAD – drawing assistance by AutoCAD	Practical lecture	Oral Exams + Written Exams + Daily assignments
5	2	Engineering operation by AutoCAD – Dimension	Practical lecture	Oral Exams + Written Exams + Daily assignments
6	2	Application on pervious concepts	Practical lecture	Oral Exams + Written Exams + Daily assignments
7	2	Drawing perspective – drawing perspective contain circle, rectangle, triangle	Practical lecture	Oral Exams + Written Exams + Daily assignments
8	2	Projection theory – drawing simple projection	Practical lecture	Oral Exams + Written Exams + Daily assignments
9	2	But dimension on 3-D shapes and on projection drawing	Practical lecture	Oral Exams + Written Exams + Daily assignments
10	2	Investigate the third projection from previous two projection	Practical lecture	Oral Exams + Written Exams + Daily assignments
11	2	Cutting theory – type of cutting lines according to the material - practice	Practical lecture	Oral Exams + Written Exams + Daily assignments
12	2	Practice on cutting projection from specific projection Practice on partially cut projection Application and project	Practical lecture	Oral Exams + Written Exams + Daily assignments
13	2	Introduction to importance of engineering drawing by computer – limits and dimension of drawing palate by AutoCAD history	Practical lecture	Oral Exams + Written Exams + Daily assignments
14	2	Type of line in AutoCAD – using the menu and tool bar for line and texts	Practical lecture	Oral Exams + Written Exams + Daily assignments
15	2	Basic shapes by AutoCAD	Practical lecture	Oral Exams + Written Exams + Daily assignments
16	2	Drawing modifications by AutoCAD – drawing assistance by AutoCAD	Practical lecture	Oral Exams + Written Exams + Daily assignments
18	2	Engineering operation by AutoCAD – Dimension	Practical lecture	Oral Exams + Written Exams + Daily assignments

19	2			Practical lecture	Oral Exams +		
			Application on pervious		Written Exams +		
			concepts		Daily assignments		
20	2		Drawing perspective –	Practical lecture	Oral Exams +		
	-		drawing perspective		Written Exams +		
			contain circle, rectangle,		Daily assignments		
			triangle				
21	2			Practical lecture	Oral Exams +		
			Projection theory –		Written Exams +		
			drawing simple projection		Daily assignments		
22	2		But dimension on 3-D	Practical lecture	Oral Exams +		
			shapes and on projection		Written Exams +		
			drawing		Daily assignments		
23	2		Investigate the third	Practical lecture	Oral Exams +		
			projection from previous		Written Exams +		
			two projection		Daily assignments		
24	2		Cutting theory – type of	Practical lecture	Oral Exams +		
			cutting lines according to		Written Exams +		
25			the material - practice	Duration 1 1 and an	Daily assignments		
25	2		Practice on cutting	Practical lecture	Oral Exams +		
			projection from specific		Written Exams +		
			projection Prostice on porticily out		Daily assignments		
			projection				
			Application and project				
27-26	Λ		Introduction to	Practical lecture	Oral Exame +		
27 20	4		importance of engineering	I factical fecture	Written Exams +		
			drawing by computer –		Daily assignments		
			limits and dimension of		Dully assignments		
			drawing palate by				
			AutoCAD history				
28-27	Δ		Type of line in AutoCAD	Practical lecture	Oral Exams +		
20-27	4		– using the menu and tool		Written Exams +		
			bar for line and texts		Daily assignments		
30-29	4		Dania sharaa ka	Practical lecture	Oral Exams +		
	•		AutoCAD		Written Exams +		
			AutoCAD		Daily assignments		
59.Cou	rse Evalua	tion					
For the first	semester 20%	6. For the second semester	r 20%. Yearly assignments c	count for 10%. Cons	equently, the annual		
effort is 50%	6. The final the	eoretical exam is 50% (The	e total is 100%).				
60.Lean	ming and	Feaching Resource	8				
AutoCA	AutoCAD 2014 Tutorial - First Level: 2D						
i iuto er	Eundom	antala by Dandy U	Shih				
	runuaine	entais by Kalluy H.					
Wakatta	f Natof to 1	ni o ol in otitu-t-					
website o	i majai tech	meat institute					

61.Course Name:
Electrical techniques
62.Course Code:
63.Semester / Year:
First year
64.Description Preparation Date:

2024/3/26

65. Available Attendance Forms:

Full attendance system

66.Number of Credit Hours (Total) / Number of Units (Total)

4 hours/ 8 units

67.Course administrator's name (mention all, if more than one name) Name: Qasim Hammodi Hassan

68.Course Objectives

Course Objectives	The aim of the subject is to provide the student with the theoretical and			
	practical foundations of electrical and machinery technology, which they			
	will truly need when practicing their specialization.			
60 Teaching and Learning Startogies				

07.1 Caeling and LC	
Strategy	Theoretical lectures
	Practical lectures
	Scientific trips
	Summer training
	Student projects

70. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4		Introduction to electron technology, definitions, amperes, current, voltage, resistance, ohms.	Lecture + Practical Examples + Laboratory	Oral Exams + Written Exams + Daily assignments
3-2	8		Electronic parallelism and energy, mutual circuit, mixed circuit	Lecture + Practical Examples + Laboratory	Oral Exams + Written Exams + Daily assignments
5-4	8		Kirchhoff's law, Ohm's applications	Lecture + Practical Examples + Laboratory	Oral Exams + Written Exams + Daily assignments
6	4		Principles of electronic magnets, magnetic field, magnetic force, magnetic density	Lecture + Practical Examples + Laboratory	Oral Exams + Written Exams + Daily assignments
7	4		Electronic magnetism.	Lecture + Practical Examples + Laboratory	Oral Exams + Written Exams + Daily assignments
9-8	8		Alternating current, alternating current generation and voltage characteristics, EMF, EMI wave formation, example.	Lecture + Practical Examples + Laboratory	Oral Exams + Written Exams + Daily assignments
10	4		Single-phase alternating current resistance circuit, coil circuit,	Lecture + Practical Examples + Laboratory	Oral Exams + Written Exams + Daily assignments

		capacitor circuit,	phase	
		diagram, phase ar	ngle.	
12-11	8	Resistance file of contents, cap connected in power calcul power factor, mo power methods, diagrams	circuit Lecture + acitors Practical series, Examples + ations, Laboratory odified trend	Oral Exams + Written Exams + Daily assignments
14-13	8	Three-phase alter current, gene wiring and conn methods, star, voltage lines, c lines, phase diag current, voltage power.	rnating Lecture + pration, Practical ection Examples + delta, Laboratory uurrent grams, e and	Oral Exams + Written Exams + Daily assignments
16-15	8	Electrical transfo methods and type work, constr applications, lo transformer, transformer t transformer effic automatic transfo	rmer, Lecture + es of Practical uction, Examples + ss in Laboratory esting, iency, rmer	Oral Exams + Written Exams + Daily assignments
17	4	Electronic distribution (v law).	energy Lecture + voltage Practical Examples + Laboratory	Oral Exams + Written Exams + Daily assignments
18	4	Converting solar to electric	energy Lecture + Practical Examples + Laboratory	Oral Exams + Written Exams + Daily assignments
21-20-19	12	DC motors, components, bu principles, type applications, type start, loss, calculation	their Lecture + usiness Practical es of Examples + Laboratory power	Oral Exams + Written Exams + Daily assignments
24-23-22	12	AC n components, prin of work, type applications, phase – three p types of start, control	notors, Lecture + nciples Practical es of Examples + single Laboratory hases, speed	Oral Exams + Written Exams + Daily assignments
27-26-25	12	Motor Protecti Current Pro Devices , Overl Heat , Inc Protection	on , Lecture + tection Practical oad , Examples + tereased Laboratory	Oral Exams + Written Exams + Daily assignments
30-29-28	12	Engine Testing, I Maintenance & F Repair	Engine Lecture + Parts Practical Examples + Laboratory	Oral Exams + Written Exams + Daily assignments
71.Course Evalu	uation			

For the first semester (10 theoretical + 10 practical), it accounts for 20%. For the second semester (10 theoretical + 10 practical), it also accounts for 20%. Yearly assignments count for 10%. Consequently, the annual effort is 50%. The final theoretical exam is 40%, and the final practical exam is 10%. (The total is 100%).

72.Learning and Teaching Resources

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73.Course Name:

Human Rights

74.Course Code:

75.Semester / Year:

First year

76.Description Preparation Date:

2024/3/26

77. Available Attendance Forms:

Full attendance system

78.Number of Credit Hours (Total) / Number of Units (Total)

2hours/ 4 units

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

Name: Mahdi Ali Mohammed

80.Course Objectives

Course Objectives	Introducing the student to human rights, their objectives and their development
	throughout human history
81 Teaching and Lear	ming Strategies

81.1 caching	and Learning Strategies
Strategy	Theoretical lectures, daily assignments

82. Course Structure

02. Course Structure						
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method	
1	2		Human rights, definition, objectives	theoretical lecture	Oral Exams + Written Exams + Daily assignments	
2	2		The roots and development of human rights in human history: human rights in antiquity and medieval times	theoretical lecture	Oral Exams + Written Exams + Daily assignments	
3	2		Human rights in ancient civilizations, especially the civilization of Mesopotamia	theoretical lecture	Oral Exams + Written Exams + Daily assignments	
4	2		Human rights in divine laws with a focus on human rights in Islam	theoretical lecture	Oral Exams + Written Exams + Daily assignments	

5	2	Human rights in the Middle Ages: human rights in doctrines - schools - political theories - human rights in companies - their declarations - revolutions and constitutions	theoretical lecture	Oral Exams + Written Exams + Daily assignments
6	2	Human Rights in Contemporary and Modern History: International Recognition of Human Rights since World War I and the League of Nations	theoretical lecture	Oral Exams + Written Exams + Daily assignments
7	2	Regional recognition of human rights: European Convention on Human Rights 1950 American Convention on Human Rights 1969 African Charter on Human Rights 1981 Arab Charter on Human Rights 1994	theoretical lecture	Oral Exams + Written Exams + Daily assignments
9-8	4	NGOs and human rights (ICRC, Amnesty International, Human Rights Watch) National Human Rights Organizations	theoretical lecture	Oral Exams + Written Exams + Daily assignments
10	2	Human rights in Iraqi constitutions between theory and reality	theoretical lecture	Oral Exams + Written Exams + Daily assignments
12-11	4	The relationship between human rights and public freedoms: in the Universal Declaration of Human Rights in regional conventions and national constitutions	theoretical lecture	Oral Exams + Written Exams + Daily assignments
13	2	Essential human rights and collective human rights	theoretical lecture	Oral Exams + Written Exams + Daily assignments
14	2	Economic, social and cultural human rights and civil and political human rights	theoretical lecture	Oral Exams + Written Exams + Daily assignments
15	2	Modern human rights: facts in development, the right to a clean environment, the right to solidarity, the right to religion	theoretical lecture	Oral Exams + Written Exams + Daily assignments
17-16	4	Guarantees of respect and protection of human rights at the national level, guarantees in the Constitution and laws, guarantees in the principle of the rule of law Guarantees in	theoretical lecture	Oral Exams + Written Exams + Daily assignments

			constitutional oversight,		
			Guarantees in freedom of		
			opinion		
19-18	1		Guarantees, respect and	theoretical	Oral Exams +
	4		protection of human rights	lecture	Written Exams +
			at the international level:		Daily assignments
			the role of the United		
			Nations and its specialized		
			agencies in providing		
			regional organizations		
			(League of Arab States,		
			European Union, African		
			Union, Organization of		
			American States,		
20	2		ASEAN) The general theory of	theoretical	Oral Exame
20	۷		freedoms: the origin of	lecture	Written Exams +
			rights and freedoms, the		Daily assignments
			position of the project on		
			the declared rights and		
			term public freedoms		
21	2		The functional nature of	theoretical	Oral Exams +
	2		the concept of public	lecture	Written Exams +
			freedoms: philosophical		Daily assignments
			considerations of the right		
			to employment - structural		
			right - economic		
			considerations and public		
			freedoms		
23-22	4		The legal basis of the rule	theoretical	Oral Exams +
			of law	lecture	Written Exams +
24	2		Regulation of public	theoretical	Oral Exams +
	Δ		freedoms by public	lecture	Written Exams +
			authorities		Daily assignments
25	2		Non-judicial litigation or	theoretical	Oral Exams +
			grievance	lecture	Written Exams +
26	2		Iudicial appeal	theoretical	Oral Exams +
20	۷		determining the	lecture	Written Exams +
			responsibility of the state		Daily assignments
			for its legitimate acts		
27	2		The effect of dual	theoretical	Oral Exams +
			freedoms Public freedoms	lecture	written Exams + Daily assignments
			under administrative		Daily assignments
			jurisprudence		
28	2		Equality: the historical	theoretical	Oral Exams +
			development of the	lecture	Written Exams +
20	2		The modern development	theoretical	Oral Example
29	2		of the idea of equality	lecture	Written Exams +
			or equality		Daily assignments
30	4		Gender equality between	theoretical	Oral Exams +
			individuals according to	lecture	Written Exams +
02.0			men benefs and race		Daily assignments
83.COU	irse Evalu	auon			

N.										
For the first semester	20%. Fo	r the se	cond semeste	r 20%. Y	Cearly assignments	count f	or 10%.	Conseq	uently, the a	annual
effort is 50%. The final	d Too	ching	m is 50% (The Resource)	e total 1s	100%).					
	u i ca	ching	Resource	3						
Website of Naiaf te	chnica	l instit	ute							
85 Course Nar	ne									
Mechanical Labor	ne. ratorie	S								
86 Course Coo	le:									
87.Semester /	Year:									
First year										
88.Description	Prepa	aratio	n Date:							
2024/3/26	•									
89.Available A	Attend	ance l	Forms:							
Full attendance	system				1					
90.Number of	Credi	t Hou	rs (Total)	/ Num	iber of Units (Total)				
6 hours/ 12	units									
01 Course adm	ninistr	otor's	nomo (m	ontion	all if more th	<u>on on</u>	<u>a nom</u>	<u>a)</u>		
Nome: Lab	orator	$\frac{101}{100}$	d worksh			an one		()		
Inallie. Lau	orator	ies an	u workshi	ops sta	1 11					
92 Course Obi	ective	S								
Course Objectives			Gair	n the m	nanual skill, cra	aftsmai	nship	of the	student	when
			carr	ying ou	t work and mai	nufactu	ring u	sing va	arious tool	s and
02 Taashing a	ndIa	rnino	tools							
95.1 Caching an		Practi	cal lectures	22						
Strategy		Scien	tific trips							
		Sumn	ner training							
		Stude	nt projects							
94. Course Struct	ure									
Week	Hour	'S	Required		Unit or subjec	et	Lear	ning	Evaluati	on
			Learning	r.	name		meth	od	method	
3-2-1	18		outcome	Plumb	bing – the	Lectur	e	Oral H	Exams +	
				impor	tance of plumbing	Practic	cal +	Writte	n Exams +	
				the wo	orkshop – sand –	Labora	1101 y	assign	ments	
				its typ	es Forming the					
				piece	model – melting					
	1			and no	ouring metal into			1		

		the mold – molds for a two-piece or more model with the assembly of cast models Other types such as other rotary – fixed mold Study of castings to identify defects and know their causes		
6-5-4	18	The importance of chips - safety precautions in the workshop - types of files used and according to the minerals and shapes required Filing exercises to obtain a good surface. And a good angle – and some filings shapes	Lecture Practical + Laboratory	Oral Exams + Written Exams + Daily assignments
9-8-7	18	Turning – Lathe parts – Measuring equipment – Various turning operations – External – Internal surface turning – Fair or stolen turning – Knowing how to change the speed of the lathe with introducing the student to the necessary security precautions inside the workshop	Lecture Practical + Laboratory	Oral Exams + Written Exams + Daily assignments
12-11-10	18	Carpentry – types of wood – types of tools used and how to use tools such as cutting, filing, drilling and forming	Lecture Practical + Laboratory	Oral Exams + Written Exams + Daily assignments
15-14-13	18	Welding study - the importance of welding - the necessary security rules in welding workshops - types of welding methods - and their relationship to the metal required to be welded with the implementation of several forms of welding	Lecture Practical + Laboratory	Oral Exams + Written Exams + Daily assignments
ورشة التبريد			Lecture Practical + Laboratory	Oral Exams + Written Exams + Daily assignments
16	6	Pipes used in the field of refrigeration – with welding exercises and cutting pipes with the use of tools in this field	Lecture Practical + Laboratory	Oral Exams + Written Exams + Daily assignments

17	6	Expansion and flattening of pipes / study of tools used in the field of pipe expansion in preparation for connecting the two pipes to the other with the use of tools for this fieldLecture Practical + LaboratoryOral Exams + Written Exams + Daily assignmentsExpansion in preparation for connecting the two pipes to the other with the use of tools for this fieldLecture Practical + LaboratoryOral Exams + Written Exams + Daily assignments
21-20-19-18	24	Gas welding – welding system parts – copper welding – with silver and stool with the experience of welding two tube pieces – and aluminum welding – weldingLecture Practical + LaboratoryOral Exams + Written Exams + Daily assignments
22	6	Compression cooling system in smallLectureOral Exams +refrigeration systemsPractical +Written Exams +LaboratoryDaily(home refrigerator -assignmentsfreezer - aironditioner)
24-23	12	Charging and discharging process of the cooling medium of the systemLecture Practical + LaboratoryOral Exams + Written Exams + Daily assignments
25	6	Inspection and inspection of leaks in the system's pipesLectureOral Exams +Vertical + LaboratoryWritten Exams + Daily assignments
26	6	Adding oil to the household cooling kitLectureOralExams +Practical + LaboratoryWritten Exams + Daily assignments
30-29-28-27	24	Plumbing – tools used – Types and gauges of sheets – Tin cutting – Simple bending process and other types of folds with the manufacture of a fixed duct of air section – Reverse (bend) expansion, contraction or Shunt T or quadrupleLecture Practical + LaboratoryOral Exams + Written Exams + Daily assignments
95.Course Eva	luation	
Continuous / Final	Evaluation 50	Total 100%
96.Learning a	nd Teaching	esources
Website of Naiaf t	echnical institu	

Courses of the second stage

97	.Course	Name:				
Refriger	ation system	ms				
98	.Course	Code:				
99	.Semeste	er / Year	:			
Secon	d year					
10	0. I	Descriptio	on Preparatio	n Date:		
2024/	3/26					
10	1. A	Available	Attendance	Forms:		
10	Full attend	lance system				
10	2. N	Number o	of Credit Hou	rs (Total) / Number of	Units (Tota	l)
	4 hours/	8 units				
10	3. (Course ad	lministrator's	name (mention all, if r	nore than or	ne name)
	Name:	Mr.Haziı	m Ali Sahib			
	Email:	Hazim_a	lzurfi@atu.eo	du.iq		
10	4. 0	Course O	bjectives			
Course	Objectiv	es	Introducing st	tudents to a detailed study	of the princip	les of air
			conditioning	and calculating heat loads i	in both refrige	eration and
			heating system	ns.		
			• Studying va	rious air conditioning syste	ems and the pr	rinciples of
			purification.	ducts and pipes, in addition	n to topics on	noise and air
10	5. Т	Teaching	and Learning	g Strategies		
Strateg	y	Theoreti	cal lectures			
		Practical	lectures			
		Scientifi	c trips			
		Summer	training			
		Student j	projects			
106.C	ourse St	tructure				
Week	Hours	Requ	uired	Unit or subject name	Learning	Evaluation
		Lear	ning		method	method
		Outo	comes		Lestur	Oral E
	0			The cooling system	Lecture + Practical	Urai Exams + Written Exams +
2-1	8			(theoretical and practical) and type of refrigerant	Examples +	Daily Journals
				Selection of parts of the	Laboratory	Oral Evame
	compressor system / Practical Written Exam					Written Exams +
5_3	5-3 12 evaporator - condenser - Examples + Daily Journa					Daily Journals
5-5	14			compressor - unit of	Laboratory	
				group		
	10			Multi-compressor system	Lecture +	Oral Exams +
8-6	12			(multi-compressor) (interstitial exchanger -	Practical	Written Exams + Daily Journals
		1		(interstition excitalizer -		Duny Journais

			flashing reservoir) and	Examples +					
			multiple evaporators	Laboratory					
			General considerations for	Lecture +	Oral Exams +				
10.0	8		the design of the piping	Practical	Written Exams +				
10-9	8		(discharge line - liquid line -	Examples +	Daily Journals				
			section line - water pipes)	Laboratory					
			Accessories of the system of	Lecture +	Ural Exams + Written Exams +				
14-11	16		pressure / target - location	Examples +	Daily Journals				
			pressure / target location	Laboratory	Durfy Southurs				
				Lecture +	Oral Exams +				
16 15	Q		Control devices used in	Practical	Written Exams +				
10-15	8		cooling systems	Examples +	Daily Journals				
				Laboratory					
			Cooling system absorption /	Lecture +	Oral Exams +				
			advantages - use in	Fractical Examples +	Daily Journals				
20-17	16		refrigeration and	Laboratory	Daily Journals				
			condensation / comparison	j,					
			with the system						
				Lecture +	Oral Exams +				
22-21	8		Steam cooling systems	Practical	Written Exams +				
	0		0,1	Examples +	Daily Journals				
				Lecture +	Oral Exams +				
25.22	10		Cooling System Using Air	Practical	Written Exams +				
25-23	12		features – types	Examples +	Daily Journals				
				Laboratory					
				Lecture +	Oral Exams +				
27-26	8		Cooling system with air	Practical	Written Exams +				
_, _0	0		inqueraction reatures - types	Examples +	Daily Journals				
				Lecture +	Oral Exams +				
20	4	4	Electro thermal cooling	Practical	Written Exams +				
28			system	Examples +	Daily Journals				
				Laboratory					
			Food preservation	Lecture +	Oral Exams +				
20.20	0		warehouse designs - Storage	Fractical Examples \perp	Daily Journals				
30-29	8		load account - Warehouse	Laboratory	Duriy Journais				
			types						
107.	Course Ev	aluation							
For the f	first semester (1	0 theoretical + 10 practica	al), it accounts for 20%. For the	second semester	r (10 theoretical $+$ 10				
practical	l), it also accour	ts for 20%. Yearly assignment	nents count for 10%. Consequen	tly, the annual ef	fort is 50%. The final				
theoretic	cal exam is 40%	, and the final practical ex	am is 10%. (The total is 100%).						
108.	Learning a	nd Teaching Resou	urces						
1-A	pplied Air –	conditioning and							
ref	rigeration by	C.T Gosling	V D						
2-4	Air – conditio	ning Engineering, by V	<i>N</i> . P.						
Jon	ies								
3 -1	Environment	Engineering, analysis	&						
bra	practice by Jennings								
4-A	course of refr	igeration & Air-condition	ning by						
Aro	ora S. Domkun	dwar	_ •						
5-A Wahait	shrae Handbo	ok, Fundamentals							
websit	e of majar teo	chinical institute							

10	9. (Course Name:								
Air cond	doning	Course Code:								
11	0. (Course C	ode:							
11	111. Semester / Year:									
Secon	Second year									
11	112. Description Preparation Date:									
2024/	3/26									
11	3. /	Available	Attendance	Forms:						
	Full attend	lance system	1							
11	4. ľ	Number (of Credit Hou	rs (Total) / Number of	Units (Total	l)				
	4 hours	s/ 8 units								
11	5. (Course ac	lministrator's	name (mention all, if n	nore than or	ne name)				
	Name:	Karim Ja	afer Alwan							
11	6. (Course O	bjectives							
Course	e Objectiv	es	Introducing the	e student to a detailed study o	n the foundatio	ons of air				
			conditioning an	nd calculating thermal loads in event air conditioning groups a	n the cooling an nd the foundati	nd heating systems,				
			air ducts and r	pipes in addition to the topics	of noise and ai	ir purification.				
						n pullioutorii				
11	7. 7	Feaching	and Learning	g Strategies						
Strateg	y	Theoreti	cal lectures							
		Practical	lectures							
		Scientifi	c trips							
		Student	projects							
		Student	projects							
118.C	Course S	tructure								
Week	Hours	Req	uired	Unit or subject name	Learning	Evaluation				
		Lear	rning		method	method				
1		Out	comes	Heat transfor turnes 9	Lastrana	Orel Energy (
	_			overall coefficient	Lecture + Practical	Urai Exams + Written Exams +				
	4				Examples +	Daily assignments				
					Laboratory					
2-3				Thermal comfort,	Lecture + Practical	Oral Exams + Written Exams				
	8			charts & comfort zones.	Examples +	Daily assignments				
		Laboratory								
4	4 Heating load parameters Lecture + Oral Exams									
	4 & calculations. Practical Written Exams Examples + Daily assignme									
					Laboratory					
5 – 7				Cooling load Parameters	Lecture +	Oral Exams +				
	8			& Calculations	Practical Examples +	written Exams + Daily assignments				
					Laboratory	zung ussignments				

8-9		Heating & Cooling	Lecture +	Oral Exams +
	8	systems	Practical	Written Exams +
	0		Examples +	Daily assignments
			Laboratory	
10		Automobile air	Lecture +	Oral Exams +
	1	conditioning system.	Practical	Written Exams +
	4		Examples +	Daily assignments
			Laboratory	
11		Actual Heating & Cooling	Lecture +	Oral Exams +
	1	Process	Practical	Written Exams +
	4		Examples +	Daily assignments
			Laboratory	, ,
12		Heating Recovery.	Lecture +	Oral Exams +
			Practical	Written Exams +
	4		Examples +	Daily assignments
			Laboratory	Duity assignments
13		Computer-aided cooling	Lecture +	Oral Exams +
			Practical	Written Exame
	4		Fractical	Daily aggiggments
			Laboratory	Daily assignments
14-15		Air ducting Design	Laboratory	Oral Exama
14-15		All – ducung Design ,	Dreatical	Utal Exams +
	8	kinus, pressure iosses,	Fractical	written Exams +
	-	calculation & dimensions.	Examples +	Daily assignments
40.47			Laboratory	
16-1/		⊢ans , type & it's	Lecture +	Oral Exams +
	8	specification & laws.	Practical	Written Exams +
	0		Examples +	Daily assignments
			Laboratory	
18		Vibrations , sources,	Lecture +	Oral Exams +
	Λ.	measuring.	Practical	Written Exams +
	Ŧ		Examples +	Daily assignments
			Laboratory	
19-20		Pipes & pumps, types,	Lecture +	Oral Exams +
	0	selection, calculation and	Practical	Written Exams +
	0	laws.	Examples +	Daily assignments
			Laboratory	
21		Air – conditioning system	Lecture +	Oral Exams +
	1	application	Practical	Written Exams +
	4		Examples +	Daily assignments
			Laboratory	
22-23		Air – filtration methods.	Lecture +	Oral Exams +
	0		Practical	Written Exams +
	Ø		Examples +	Daily assignments
			Laboratory	,
24		Air Washers	Lecture +	Oral Exams +
			Practical	Written Exams +
	4		Examples +	Daily assignments
			Laboratory	= any assignments
25		Dehumidifiers &	Lecture +	Oral Exams +
		humidifiere	Practical	Written Exame
	4		Framples ±	Daily assignments
			Laboratory	Daily assignments
90		Energy distribution in air	Lacture	Oral Exame
20			Dreatics ¹	Viai Exains +
	4	conditioning system	Fractical	written Exams +
			Examples +	Daily assignments
07		Nata Parter o	Laboratory	0.1 5
27		Noise, limitation &	Lecture +	Oral Exams +
	4	measuring	Practical	Written Exams +
			Examples +	Daily assignments
			Laboratory	

28-30			Energy	conservation	in	Lecture +	Oral Exams +
	Q		Building	I.		Practical	Written Exams +
	0					Examples +	Daily assignments
						Laboratory	
119.	Course Eva	aluation					
For the f	ïrst semester (1	0 theoretical + 10 practica	al), it acco	unts for 20%. For	r the	second semester	(10 theoretical + 10)
practical), it also accoun	ts for 20%. Yearly assignn	nents coun	t for 10%. Conse	quen	tly, the annual ef	fort is 50%. The final
theoretic	al exam is 40%	, and the final practical exa	am is 10%	. (The total is 10	0%).		
120.	Learning a	nd Teaching Resou	urces				
1)	Applied A	ir – conditioning					
	and refrig	eration by C.T					
	Gosling	-					
2)	Air – cond	litioning					
	Engineeri	ng , by W. P.					
	Jones						
3- P	rinciples of Air	· Conditioning and					
Ref	rigeration Engi	neering Khaled Al-Judi					
Websit	e of Najaf tec	chnical institute					
I							

121.	Course Name:						
Heat transfer							
122.	Course Code:						
123.	Semester / Year:						
Second year	r						
124.	Description Preparation Date:						
2024/3/26							
125.	Available Attendance Forms:						
Full att	tendance system						
126.	Number of Credit Hours (Total) / Number of Units (Total)						
3 hou	urs/ 6 units						
127.	Course administrator's name (mention all, if more than one name)						
Name	e: Qasim Hammodi Hassan						
128.	Course Objectives						
Course Objec	It aims to study heat transfer to know the student the main general foundations of heat transfer and its practical applications in the field of air conditioning, such as finding the convection of a building, as well as finding thermal continuity, thickness and type of insulator used in the pipes of air conditioning systems and heat exchangers of all kinds and their uses in refrigeration						
129.	129. Teaching and Learning Strategies						

Strateg	y	Theoretical lectures Practical lectures Scientific trips Summer training Student projects			
130.C	ourse St	tructure	TT •/ T • /	. .	
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3		Basic principles and importance of heat transfer.	Lecture + Practical Examples + Laboratory	Oral Exams + Written Exams + Daily assignments
2	3		The three kinds of heat transfer, conduction heat transfer, convection heat transfer, radiation heat transfer, examples	Lecture + Practical Examples + Laboratory	Oral Exams + Written Exams + Daily assignments
3	3		Conduction of heat transfer in the steady state conduction through a homogeneous plans wall	Lecture + Practical Examples + Laboratory	Oral Exams + Written Exams + Daily assignments
4	3		Conduction through a composite plans wall, heat resistance . conduction through a homogeneous cylinder wall	Lecture + Practical Examples + Laboratory	Oral Exams + Written Exams + Daily assignments
5	3		Conduction through a composite cylinder wall , influence of variable conductivity , examples	Lecture + Practical Examples + Laboratory	Oral Exams + Written Exams + Daily assignments
6	3		Heat transfer by convection , Reynolds concept of similarity of the flow of fluids and the viscosity , the most important dimensionless groups, examples	Lecture + Practical Examples + Laboratory	Oral Exams + Written Exams + Daily assignments
7	3		Heat transfer by free convection , heat transfer from vertical and horizontal surfaces , examples	Lecture + Practical Examples + Laboratory	Oral Exams + Written Exams + Daily assignments
8-9	6		Heat transfer by free convection from horizontal square plates , heat transfer proportion of air at atmospheric pressure and properties of water . examples	Lecture + Practical Examples + Laboratory	Oral Exams + Written Exams + Daily assignments
10	3		Heat transfer by forced convection, the heating of fluids in turbulent flow through pipes, examples	Lecture + Practical Examples + Laboratory	Oral Exams + Written Exams + Daily assignments
11	3		The heating of fluids flowing normal to single wires and tubes the heating of fluids flowing	Lecture + Practical Examples + Laboratory	Oral Exams + Written Exams + Daily assignments

			normal to tube banks,		
10.40			examples	T	
12-13			neat transfer by the combined effect of	Lecture + Practical	Oral Exams + Writter Exams +
			conduction and	Examples +	Daily assignments
			convection, heat transfer	Laboratory	,
	6		between two fluids		
			through a plane wall, heat		
			transfer between two		
			wall examples		
14-15			Types of heat exchangers,	Lecture +	Oral Exams +
	6		the log mean temperature	Practical	Writter Exams +
	0		difference, examples	Examples +	Daily assignments
16-17			Heat exchanger	Laboratory	Oral Exame
10-17			effectiveness ratio	Practical +	Writter Exams +
	6		examples	Examples +	Daily assignments
			-	Laboratory	
18			Heat transfer through fins,	Lecture +	Oral Exams +
	3		condensation and boiling	Practical	Written Exams +
	-		lieat transfer	Laboratory	Daily assignments
19			Heat transfer by radiation,	Lecture +	Oral Exams +
	2		the concept of a perfect	Practical	Writter Exams +
	3		black body	Examples +	Daily assignments
20			Stofon Boltzmann'a low	Laboratory	Oral Evana
20			of total radiation general	Practical +	Writter Exams +
	2		equation for heat	Examples +	Daily assignments
	3		exchange by radiation	Laboratory	
			between black surfaces,		
1-22-23			examples Heat exchange by	Locturo	Oral Exame
1-22-25	0		radiation between large	Practical	Writter Exams +
	9		parallel black plane ,	Examples +	Daily assignments
			examples	Laboratory	
4-25-26			Heat exchange by	Lecture +	Oral Exams +
	9		nation between large	Fractical	Writter Exams +
			emissivity, examples	Laboratory	Durry assignments
27-28			Heat conduction in series	Lecture +	Oral Exams +
	6		with convection and	Practical	Writter Exams +
	0		radiation, examples	Examples +	Daily assignments
29			Heat transfer through air	Laboratory	Oral Exams +
25	2		space, examples	Practical	Written Exams +
	3			Examples +	Daily assignments
				Laboratory	
30	3		General problems, home		
121	Course Ev	aluation	WOIN2		
For the f	first semester (1	0 theoretical ± 10 practice	al) it accounts for 20% For the	second semester	r (10 theoretical ± 10
practical	l), it also accour	its for 20%. Yearly assign	nents count for 10%. Consequen	tly, the annual ef	fort is 50%. The final
theoretic	cal exam is 40%	, and the final practical ex	am is 10%. (The total is 100%).) ,	
132.	Learning a	and Teaching Resou	urces		
1- 1	Physical simila	arity and Dimensional			
	analyses Dar	ncan Edward Arnold –			
	1903				

 2- Heat and mass transfer Jakob and Hawking John Wiley & Sons, Inc. 1957 3- Heat transfer by Holman 	
Website of Najaf technical institute	

133	3. C	Course Name:				
Contro	l systems					
134	4. C	Course Co	ode:			
13:	5. S	emester /	/ Year:			
Secon	d year					
130	5. D	Description	on Preparation	n Date:		
2024/3	3/26					
13	7. A	vailable	Attendance H	Forms:		
	Full attend	ance system				
138	8. N	Number o	f Credit Hour	rs (Total) / Number of	Units (Total)
	3hours/	6 units				
139	9. C	Course ad	ministrator's	name (mention all, if n	nore than on	e name)
	Name: 1	Haroon F	Rashid			
140). C	Course Ob	ojectives			
Course	Objective	es	Introducing th	e student to the basic princ	ciples that wor	k in control and
			control system	ns in general, specifically the	hose used in the	he field of
			controlling the	e work of air conditioning	and refrigerati	on systems
14	1. T	eaching	and Learning	Strategies		
Strateg	y	Theoretic	cal lectures			
		Practical	lectures			
		Scientific	e trips			
		Summer	training			
		Student p	projects			
142.C	ourse St	ructure				
Week	Hours	Requ	iired	Unit or subject name	Learning	Evaluation
Learning			ning		method	method
		Outc	omes			
1				Principles of control. and general definitions of the	Lecture + Practical	Oral Exams + Written Exams +
	3			most important terms used in	Examples +	Daily assignments
				control	Laboratory	
2				Principles of control – types	Lecture + Practical	Oral Exams + Written Exams
	3				Examples +	Daily assignments
					Laboratory	

3 Principles of measurement - control and measurement - control and subject to control and examples + subject to control and examples + all passignments subject to control devices for various factors in refrigeration and arise conditioning devices (fuguid level - pressure - temperature - humidity) Lecture + Practical Examples + Laboratory Oral Exams + Writen Exams + Daily assignments Laboratory 5 3 Electrical control circuits, - humidity) Lecture + Practical and control elements, thermostat - no breaker for overload protection, moisture regulators, pressure regulators, pressure regulators, pressure regulators, pressure regulators, pressure regulators, inal control elements, connectors. Lecture + Practical Examples + Daily assignments Laboratory Oral Exams + Writen Exams + Daily assignments Daily assignment					[]
3 measurement - control and measurement - the most important factors that are subject to control and important factors that are subject to control subject - control origonic factors in terrigreration and air conditioning devices [flugth] Written Exams + Daily assignments 4 Measuring and sensing devices for virous factors in terrigreration and air conditioning devices [flugth] I ceture + laboratory Oral Exams + Daily assignments 5 3 Electrical control eliance - diagrams of electrical control eliance in the observe regulators, final control elements, thermostat - no breaker for overload protection, moisture regulators, final control elements, connectors. I ceture + Practical Examples + Laboratory Oral Exams + Daily assignments 8 3 Electroic control circuits regulator, final control elements, connectors. Lecture + Laboratory Oral Exams + Daily assignments 10-9 12-11 Pneumatic control circuits regulator, control elements, connectors. Lecture + Practical Examples + Laboratory Oral Exams + Written Exams + Daily assignments 14-13 6 Control System Components, for Refrigeration Machines- paeumatic relays, compressed air processing equipment Lecture + Practical Examples + Laboratory Oral Exams + Written Exams + Daily assignments 14-13 6 Cooling capacity control of centringe compression and control of cooling capacity throigh the action of centringe compression and control of cooling capacity throigh the action of centringe compression and control of cooling capacity throigh the action of centringe compression and control of cooling capacity throi	3		Principles of measurement -	Lecture +	Oral Exams +
3 Interstution - the most state and only sestimulation - the most state and control structure - the matter and control structure - the matter and control structure - the matter and control structure - the state -		2	measurement - control and	Practical	Written Exams +
4 Measuring and sensing terminate control Lecture + Practical control and and and terminate conditioning devices (figuration and and terminate conditioning devices (figuration) de		3	important factors that are	Examples +	Daily assignments
4 Measuring and sensing Lecture + devices for various factors in Practical Examples + and control circuits / electrical control balance - humidity I.ecture + electrical control balance - humidity Notal Exams + bally assignments 5 3 Electrical control circuits / electrical control balance - humidity Lecture + electrical control balance - protection, moisture regulators, final control Oral Exams + bally assignments 7-6 Electrical control balance - protection, moisture regulators, final control Oral Exams + Writen Exams + bally assignments 8 3 Electroic control elements, thermostat - protection, moisture regulators, final control Lecture + taboratory Oral Exams + Writen Exams + bally assignments 10-9 12-11 Electronic control circuits, tergulator, control elements, gate drive, pneumatic valves, pneumatic control circuits, terments Lecture + taboratory Oral Exams + Writen Exams + bally assignments 14-13 6 Control System Components, control evapoator equiption, ressore and control of control circuits, terture + bumidity regulator, pressore gate drive, pneumatic valves, pneumatic valves, pneumatic preasity control balay assignments Oral Exams + Writen Exams + balay assignments 14-13 6 Control System Components, control evapoatory equiption, pressore and control of control circuits for wall wing the taboratory Oral Exams + Writen Exams + balay assignments 14-13 6 Control System Components, control using rafi in control devices for cochan requiption pressore Lecture + Practical t			subject to control	Laboratory	
3 devices for various factors in refrigrention and aris conditioning devices (liquid level - pressure - temperature - humidity) Functical Examples + Laboratory Waity assignments 5 3 Electrical control oricuits / elegrents (loguid) Lecture + Practical Examples + Laboratory Oral Exams + Writen Exams + Daily assignments 7-6 Electrical control backet diagrams of electrical circuits and control circuits, regulators, pressure regulators, final control elements, connectors. Lecture + Practical Examples + Laboratory Oral Exams + Writen Exams + Daily assignments 8 3 Electronic control circuits, regulators, pressure regulators, connectors. Lecture + Practical Examples + Laboratory Oral Exams + Writen Exams + Daily assignments 10-9 12-11 Electronic control circuits, thermostar, humidity regulator, control circuits, thermostar, humidity regulator, control circuits, pregulator, control circuits, thermostar, humidity regulator, control circuits, thermostar, humidity regulator, control circuits, thermostar, humidity regulator, control circuits, pregulator, control circuits, thermostar, humidity regulator, control circuits, pregulator, control circuits, thermostar, humidity regulator, control circuits, pregulator, control circuits, pregulator, control circuits, pregulator, control circuits, thermostar, humidity regulator, control circuits, pregulator, control circuits, predictive, prementia valves, pregulator, control devices, pregulator, control devices, pregulator, control devices, pregulator, control of conting capacity through teapon actor, control devices, for clean rooms - while rooms - control wing mt in control wing mt in control wing mt in control devices for clean rooms - while rooms -	4		Measuring and sensing	Lecture +	Oral Exams +
3 refrigeration and air conditioning devices (tight level-pressure temperature -humidity) Daily assignments 5 3 Electrical control circuits / electrical control balance - log diagrams of electrical circuits / and control Lecture + electrical control balance - electrical control balance - balance - stand control Oral Exams + Daily assignments 7-6 Electrical control balance - elements, thermostat - no breaker for overload protection, moisture regulators, final control elements, connectors. Lecture + Examples + Laboratory Oral Exams + Writen Exams + Daily assignments 8 3 Electronic control circuits - regulators, final control elements, connectors. Lecture + Haboratory Oral Exams + Writen Exams + Daily assignments 10-9 Preumatic control circuits - thermostat, humidity elements, control circuits - thermostat, humidity elements, control circuits, proumatic rulexy, compressed air processing equipment Lecture + Haboratory Oral Exams + Writen Exams + Daily assignments 14-13 6 Control System Components for Refrigeration Machines - Dynamic Properties Lecture + Examples + Laboratory Oral Exams + Writen Exams + Daily assignments 14-13 6 Control System Components for Refrigeration Machines - Dynamic Properties Lecture + Laboratory Oral Exams + Writen Exams + Daily assignments 18-17 19 15 Control System Components for Refrigeration and control of coling capacity through the action of centrifuge Lecture + Practical expansion valve, capacity control using rul in	-		devices for various factors in	Practical	Written Exams +
3 conditioning devices (liquid) level - pressure - emperature + humidity) Laboratory 5 3 Electrical control balance - diagrams of dectrical circuits and control Lecture - Practical taboratory Oral Exams + Written Exams + Daily assignments 7-6 Electrical control balance - digrams of dectrical circuits and control Lecture - Practical protection, moisture regulators, final control elements, connectors. Oral Exams + Daily assignments 8 3 Electronic control circuits - regulators, final control elements, connectors. Lecture Practical protection, moisture regulator, pressure regulator, control circuits - control components, control control components, control control components, control control components, control elements, thermostat thermostat, humidity regulator, pressure regulator, control elements, control elements, control control elements, control control elements, control control ecapacity through the action of centrifugal compressors and control of cooling capacity through the action of centrifugal compressors and control devices for clean commuter white romas - computer roms - hospitals Oral Exams + Written Exams + Daily assignments 20 3 Control systems for consol white rooms - control circuits for wall aris control devices for clean rooms white rooms - control circuits for wall aris control devices for clea		3	refrigeration and air	Examples +	Daily assignments
8 3 Electrical control circuits diagrams of electrical circuits and control Lecture + Laboratory Oral Exams + Written Exams + Daily assignments 7-6 Electrical control elements, thermostat - no breaker for overla Oral Exams + Laboratory Oral Exams + Written Exams + Daily assignments 8 3 Electrical control circuits regulators, final control elements, connectors. I ceture + Practical Examples + Laboratory Oral Exams + Written Exams + Daily assignments 10-9 12-11 I ceture + regulator, control circuits, thermostat, humidity regulator, control elements, gate drive, pneumatic valves, pneumatic relays, compressed ai processing equipment I ceture + Vritten Exams + Daily assignments Oral Exams + Written Exams + Daily assignments 14-13 6 Control System Components, for Refrigeration Machines - Dynamic properties I ceture + Laboratory Oral Exams + Written Exams + Daily assignments 14-13 6 Control System Components for Refrigeration Machines - Dynamic properties I ceture + Laboratory Oral Exams + Written Exams + Daily assignments 15 Cooling capacity control of centriluge I ceture + Practical Examples + Laboratory Oral Exams + Daily assignments 20 3 Practical applications on control devices for clean rooms - white rooms - hospitals I ceture + Practical Examples + Daily assignments 22-21 18 Control system for circuits for wall arit conditorer, howshite Oral Exams + Daily assignments		5	conditioning devices {liquid	Laboratory	
5 3 Electrical control balance - diagrams of electrical circuits and control Lecture + Practical Examples + Laboratory Oral Exams + Daily assignments Laboratory 7-6 Electrical control elements, thermostar no breaker for overload protection, moisture regulators, final control elements, connectors. Oral Exams + Written Exams + Daily assignments 8 3 Electronic control circuits thermostat, humidity regulator, pressure regulator Lecture + Practical elements, connectors. Oral Exams + Written Exams + Daily assignments 10-9 Pneumatic control circuits, thermostat, humidity regulator, pressure regulator, control circuits, gate drive, pacumatic velays, compressed air processing equipment Oral Exams + Daily assignments 14-13 6 Control System Components, cancia - control of cooling capacity through teaction of centrifuge Lecture + Practical etaments, thermostat, humidity regulator, control elements, gate drive, pacumatic velays, compressed air processing capacity through teaction of centrifuge control of cooling capacity through teaction of centrifuge compressors and control of cooling capacity through teaction of centrifuge compressors and control of cooling capacity using thermat expansion valve, capacity control using raft in condicioner, household firezer - separat appliances, multiple zones (control drivers for clean roms - white roms - hospitals Control Exams + Written Exams + Daily assignments Laboratory 20 3 Control systems for curcuits for wall asit conditioner, household firezer - separat appliances, multiple zones (control control systems for control systems for control systems for control systems for control systems for control			level - pressure - temperature		
3 Decention control circuits and control Decention control diagrams of electrical circuits and control Decention circuits barretical control Writen Exams + Daily assignments 7-6 Electrical control elements, thermostat no breaker for overload protection, moisture regulators, final control elements, connectors. Lecture + tractical Examples + laboratory Writen Exams + Daily assignments 8 3 Electronic control circuits thermostat, humidity regulator, control circuits control components, control circuits protection Dotal Exams + Writen Exams + Daily assignments 10-9 Preumatic control circuits control components, control circuits tregulator Lecture + elements, thermostat, humidity regulator, control elements, gate drive, pneumatic valves, pneumatic relays, compressed air processing equipment Oral Exams + Writen Exams + Daily assignments 14-13 6 Control System Components for Refigeration Machines - prostrical capacity through te acpacity control of cooling capacity using thermal expansion valve, capacity control devices for clean rooms, white rooms, white rooms, ecurtifiag Oral Exams + Writen Exams + Daily assignments 20 3 Control systems for control devices for clean rooms, white rooms, white rooms computer rooms - hospitals Lecture + Practical Examples + Laboratory Oral Exams + Writen Exams + Writen Exams + Writen Exams + Writen Exams + Daily assignments <td>5</td> <td></td> <td>Flectrical control circuits /</td> <td>Lecture +</td> <td>Oral Exams +</td>	5		Flectrical control circuits /	Lecture +	Oral Exams +
3 diagrams of electrical circuits and control Examples + Laboratory Daily assignments 7-6 Electrical control elements, thermostat protection, moisture regulators, final control elements, connectors. Oral Exams + Partical aboratory Oral Exams + Daily assignments 8 3 Electronic control circuits - regulators, final control elements, connectors. Lecture + Practical aboratory Oral Exams + Daily assignments 10-9 12-11 Preumatic control circuits, control components, control elements, thermostat, humidity regulator, control elements, gate drive, pneumatic relays, compressed air processing equipment Lecture + Practical torrel components, gate drive, pneumatic control of cooling capacity through the action of centrifuge Oral Exams + Written Exams + Daily assignments 14-13 6 Cooling capacity coroling capacity through the action of centrifuge Lecture + Daily assignments Oral Exams + Written Exams + Daily assignments 14-13 6 Cooling capacity coroling capacity through the action of centrifuge Lecture + Daily assignments Oral Exams + Written Exams + Daily assignments 15 Cooling capacity coroling capacity through the action of centrifuge Lecture + Daily assignments Oral Exams + Written Exams + Daily assignments 20 3 Control devices for clean rooms - white coons - control devices for clean rooms - white coons - control devices for clean rooms - white rooms - control devices for clean rooms - white coons - control devices for clean rooms - white coons Control Sys	5	2	electrical control balance –	Practical	Written Exams +
7-6LaboratoryLaboratory6Electrical elements, thermostat no breaker for overload protection, moisture regulators, final control elements, connectors.Lecture + taboratoryOral Exams + Witten Exams + Daily assignments83Electroaic control circuits - clements, connectors.Lecture + Practical Examples + Daily assignmentsOral Exams + Written Exams + Daily assignments10-912-11Pneumatic control circuits, elements, control components, termutaic neumatic equilator, control clements, gate drive, pneumatic valves, prequilator, control clements, gate drive, pneumatic equipmentLecture + Practical Examples + Daily assignments14-136Control System Components regulator, control decoding equipmentLecture + Practical elements, control of cooling equipmentOral Exams + Written Exams + Daily assignments14-136Control System Components refrigeration Machine - Dynamic PropertiesLecture + Practical Examples + LaboratoryOral Exams + Written Exams + Daily assignments14-136Cooling capacity control control of cooling capacity through evaporator of centrifuga Compressons and control of cooling capacity through the action of centrifuga Control cooling capacity through the action control devices for clean control devices for clean computer roms - hospitalOral Exams + Written Exams + Daily assignments203Control system for recurs for wall ari conditioner, household freezer -separate appliances, nutified zonatoryCoral Exams + Daily assignments22-21		3	diagrams of electrical circuits	Examples +	Daily assignments
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6 protection, moisture regulators, final control elements, connectors. Lecture + Practical Examples + Laboratory Oral Exams + Written Exams + Daily assignments 3 elements of control circuits thermostat, regulator, pressure elements, control control elements, control circuits, thermostat, humidity Lecture + Practical Examples + Laboratory Oral Exams + Written Exams + Daily assignments 10-9 12-11 Precumatic control circuits, control components, control elements, thermostat, preumatic relays, compressed air processing equipment Oral Exams + Practical Examples + Laboratory Oral Exams + Written Exams + Daily assignments 14-13 6 Control System Components for Refrigeration Machines - Dynamic Properties Lecture + Practical Examples + Laboratory Oral Exams + Written Exams + Daily assignments 16-15 18-17 19 Cooling capacity control methods - control of cooling capacity through the action of centrifuga compressors and control of cooling capacity through the action or centrifuga compressors and control of cooling capacity utrough the action control devices for clean rooms - white rooms - computer rooms - hospital Laboratory Oral Exams + Written Exams + Daily assignments 20 3 3 Practical applications on control devices for clean rooms - white rooms - computer rooms - hospital Laboratory Oral Exams + Written Exams + Daily assignments 22-21 24-23 26-25 18 Control systems for household units - control circuits for wall air conditioner, householf reczr - separate appliances, multiple zones (control			no breaker for overload	Examples + Laboratory	Daily assignments
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22-21 24-23 26-2518Control systems household circuits for wall rezer - separate appliances, multipleControl systems control practical household timeDescription control Written Written Daily assignments26-2518			computer rooms - hospitals	Laboratory	
24-23 26-2518household units - control circuits for wall air freezer - separate appliances, multiple zones (controlPractical Examples + LaboratoryWritten Exams + Daily assignments	22-21		Control systems for	Lecture +	Oral Exams +
24-23 26-2518circuits for wall air conditioner, household freezer – separate appliances, multiple zones (controlExamples + LaboratoryDaily assignments			household units – control	Practical	Written Exams +
26-25 freezer – separate appliances, multiple zones (control	24-23	18	circuits for wall air	Examples +	Daily assignments
multiple zones (control	26-25		freezer – separate appliances	Laboratory	
			multiple zones (control		

			devices for the device or multiple zones) – central air conditioning		
27	3		Components of the control system of the central cooling system and the most important methods used to control temperature and humidity	Lecture + Practical Examples + Laboratory	Oral Exams + Written Exams + Daily assignments
28	3		Control system for air conditioning system that operates throughout the world	Lecture + Practical Examples + Laboratory	Oral Exams + Written Exams + Daily assignments
29	3		Control system for central heating devices	Lecture + Practical Examples + Laboratory	Oral Exams + Written Exams + Daily assignments
30	3		Develop a detailed control map for central refrigeration and air conditioning devices	Lecture + Practical Examples + Laboratory	Oral Exams + Written Exams + Daily assignments
143. For the f	Course Eva	aluation 0 theoretical + 10 practica ts for 20% Yearly assign	al), it accounts for 20%. For the	second semester	(10 theoretical + 10)
theoretic	cal exam is 40%	, and the final practical examples of Table 1	am is 10%. (The total is 100%).		
<u>144.</u> 1- 2-	Engineering instrumentat Control sys ventilation a Haines	Measurement & Measurement & ion by L. F. Adams tems for heating & nd Air-condition , by	Irces		
	naines				

Website of Najaf technical i	institute
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145.	Course Name:				
Maintenance	Maintenance of refrigeration and air conditioning devices				
146.	Course Code:				
147.	Semester / Year:				
Second year	r				
148.	Description Preparation Date:				
2024/3/26					
149.	Available Attendance Forms:				
Full att	endance system				
150.	Number of Credit Hours (Total) / Number of Units (Total)				
бhou	rs/ 12 units				
151.	Course administrator's name (mention all, if more than one name)				
Name	e: Haroon Rashid				

152. Course Objectives						
Course ObjectivesTeaching the student and providing him with the skills, techniques and experiences necessary for th development in the field of refrigeration and air conditioning maintenance						
15	3. 7	Feaching	and Learning	g Strategies		
Strateg		Theoreti Practical Scientifi Summer Student	cal lectures l lectures c trips training projects			
154.C	ourse S	tructure		TT	T	T
vv eek	Hours		rning	Unit of subject name	method	method
1	3	Out		Maintenance corporal, types and purpose	Lecture + Practical Examples + Laboratory	Oral Exams + Written Exams + Daily assignments
2	3			The basic electrical parts of the postal and air conditioning cycle and how to check them (compressor / overload / railing / thermostat) and the mechanical cycle	Lecture + Practical Examples + Laboratory	Oral Exams + Written Exams + Daily assignments
3	3			Electric refrigerator and its types (electrical circuit andits types / mechanical circuit and its types)	Lecture + Practical Examples + Laboratory	Oral Exams + Written Exams + Daily assignments
4	3			Electrical and mechanical failures / replacement of any part of the cycle and then inspection, discharge and charging	Lecture + Practical Examples + Laboratory	Oral Exams + Written Exams + Daily assignments
5	3			Frozen and its types (electrical circuit / mechanical circuit) Electrical and mechanical malfunctions of the freezer Leak detection in the cycle - inspection, discharge and charging	Lecture + Practical Examples + Laboratory	Oral Exams + Written Exams + Daily assignments
6	3			Water supply (electrical and mechanical circuit / water cycle) electrical and mechanical failures andwater cycle malfunctions / inspection, discharge and charging	Lecture + Practical Examples + Laboratory	Oral Exams + Written Exams + Daily assignments
7	3			Oil substitute, types of oils, methods of adding oil and amount of oil according to types of compressors	Lecture + Practical Examples + Laboratory	Oral Exams + Written Exams + Daily assignments

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143A scientific visit to one of the industrial sites that have refrigeration and air conditioning devicesLecture + Practical Examples + LaboratoryOral Exams + Written Exams + Daily assignments153Types of compressors, how to maintain them, electrical and mechanical parts for each type / types of refrigerant media and environmentally friendly alternativesLecture + Practical Examples + LaboratoryOral Exams + Written Exams + Daily assignments163Combined units (package unit) electrical and mechanical and functional and mechanical and functional and mechanical and functional and how to maintain and maintain parts of the unitsLecture + Practical Examples + LaboratoryOral Exams + Written Exams + Daily assignments			electrical and mechanical	Examples +	Daily assignments
143A scientific visit to one of the industrial sites that have refrigeration and air conditioning devicesLecture + Practical LaboratoryOral Exams + Written Exams + Daily assignments153Types of compressors, how to maintain them, electrical and mechanical parts for refrigerant media and environmentally friendly alternativesLecture + Practical LaboratoryOral Exams + Written Exams + Daily assignments163Combined units (package unit) electrical and mechanical information environmentally friendly alternativesLecture + Practical Examples + LaboratoryOral Exams + Written Exams + Daily assignments163Combined units (package unit) electrical and mechanical circuit / electrical and mechanical malfunctions and how to maintain and maintain parts of the unitsOral Exams + Written Exams + Daily assignments			malfunctions / how to detect	Laboratory	
143A scientific visit to one of the industrial sites that have refrigeration and air conditioning devicesLecture + Practical Examples + LaboratoryOral Exams + Written Exams + Daily assignments153Types of compressors, how to maintain them, electrical and mechanical parts for each type / types of refrigerant media and environmentally friendly alternativesLecture + Practical Examples + LaboratoryOral Exams + Written Exams + Daily assignments163Combined units (package unit) electrical and mechanical malfunctions and how to maintain and mechanical malfunctions and how to maintain and maintain parts of the unitsLecture + Practical Examples + LaboratoryOral Exams + Written Exams + Daily assignments			leakage and then inspection,		
143A scientific visit to one of the industrial sites that have refrigeration and air conditioning devicesLecture + Practical LaboratoryOral Exams + Written Exams + Daily assignments153Types of compressors, how to maintain them, electrical and mechanical parts for each type / types of electrical and environmentally friendly alternativesLecture + Practical Practical LaboratoryOral Exams + Written Exams + Daily assignments163Combined units (package unit) electrical and mechanical circuit / electrical and mechanical malfunctions and how to maintain and maintain parts of the unitsLecture + Practical LaboratoryOral Exams + Written Exams + Daily assignments			uischarge and charging		
1-42industrial sites that have refrigeration and air conditioning devicesPractical Examples + LaboratoryWritten Exams + Daily assignments153Types of compressors, how to maintain them, electrical and mechanical parts for each type / types of refrigerant media and environmentally friendly alternativesLecture + Practical Examples + LaboratoryOral Exams + Written Exams + Daily assignments163Combined units (package unit) electrical and mechanical circuit/electrical and mechanical malfunctions and how to maintain and maintain parts of the unitsLecture + Practical Examples + LaboratoryOral Exams + Written Exams + Daily assignments	1/	3	A scientific visit to one of the	Lecture +	Oral Exams +
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153Types of compressors, how to maintain them, electrical and mechanical parts for each type / types of refrigerant media and environmentally friendly alternativesLecture + Practical LaboratoryOral Exams + Written Exams + Daily assignments163Combined units (package unit) electrical and mechanical circuit/electrical and mechanical malfunctions and mechanical malfunctions and how to maintain and meintain parts of the unitsLecture + Practical LaboratoryOral Exams + Written Exams + Daily assignments			refrigeration and air	Examples +	Daily assignments
15 3 Types of compressors, now it to maintain them, electrical and mechanical parts for each type / types of refrigerant media and environmentally friendly alternatives Practical Exams + Written Exams + Daily assignments 16 3 Combined units (package unit) electrical and mechanical circuit / electrical and mechanical malfunctions and how to maintain and maintain parts of the units Lecture + Practical Exams + Daily assignments		2	Conditioning devices	Laboratory	Orol Evere
16and mechanical parts for each type / types of refrigerant media and environmentally friendly alternativesExamples + LaboratoryDaily assignments16Combined units (package unit) electrical and mechanical circuit / electrical and mechanical malfunctions and how to maintain and maintain parts of the unitsLecture + Practical Examples + Daily assignmentsOral Exams + Written Exams + Daily assignments	15	3	to maintain them electrical	Practical +	Written Exams +
16Image: Intermediation of typeImage: Intermediation of typeImage: Intermediation of type16Combined units (package unit) electrical and mechanical circuit / electrical and mechanical circuit / electrical and how to maintain and maintain parts of the unitsLecture +Oral Exams +16Image: Image: I			and mechanical parts for	Examples +	Daily assignments
16 3 Combined units (package unit) electrical and mechanical circuit / electrical and mechanical malfunctions and how to maintain and maintain parts of the units Lecture + Practical Exams + Written Exams + Daily assignments			each type / types of	Laboratory	, <u>,</u>
16environmentally friendly alternativesLecture + PracticalOral Exams + Written Exams + Daily assignments33			refrigerant media and		
16 3 alternatives Oral Exams + 16 Combined units (package unit) electrical and mechanical circuit / electrical and mechanical circuit / electrical and mechanical malfunctions and how to maintain and maintain parts of the units Lecture + Oral Exams +			environmentally friendly		
16 Combined units (package units (package units)) Lecture + Practical units) Oral Exams + Written Exams + Daily assignments 3 and mechanical circuit / electrical and mechanical malfunctions and how to maintain and maintain parts of the units Laboratory Daily assignments			alternatives	.	
3 and mechanical circuit / electrical and maintain parts of the units whiten Exams + Daily assignments	16		Combined units (package	Lecture +	Oral Exams + Writton Examp
3 and mechanical malfunctions and how to maintain and maintain parts of the units		0	mechanical circuit / electrical	Examples +	Daily assignments
and how to maintain and maintain parts of the units		3	and mechanical malfunctions	Laboratory	Duny assignments
maintain parts of the units			and how to maintain and	· · · · · · - · - · - · ·	
			maintain parts of the units		

		r	1	1 1
		and how to check, discharge		
17		The boiler, its components,	Lecture +	Oral Exams +
1/		types and how to maintain it	Practical	Written Exams +
	3	/ maintenance before the	Examples +	Daily assignments
		winter season Explain the	Laboratory	
1.0		parts in detail	Trading	01 E
18	3	Cold and freezing stores	Lecture +	Written Exams +
		how to maintain them	Examples +	Daily assignments
		now to maintain them	Laboratory	Duity ussignments
19	3	Central cooling, its types,	Lecture +	Oral Exams +
17	0	components, types of each	Practical	Written Exams +
		part of the cycle, how to	Examples +	Daily assignments
		maintain it, detect faults, how	Laboratory	
		to charge the cycle with		
		liquid, cooling medium, now		
		chemicals and clean each		
		part of the cycle		
20	3	Cooling towers, their types,	Lecture +	Oral Exams +
20	5	components, how to maintain	Practical	Written Exams +
		and sustain before the	Examples +	Daily assignments
		summer season	Laboratory	
21	3	Types of humidifiers and	Lecture +	Oral Exams +
		types of air filters used by	Practical	Written Exams +
		district cooling	L aboratory	Daily assignments
22	2	Modern cooling systems	Lecture +	Oral Exams +
	3	(VRV / VRF), their	Practical	Written Exams +
		components, how to install	Examples +	Daily assignments
		them and the development in	Laboratory	
		this field		
	2	A scientific visit to one of the	Lastura	Oral Exama
23	3	sites that contain modern	Practical +	Written Exams +
		(VRV and VRF) systems	Examples +	Daily assignments
		(Laboratory	
24	3	Pumps, their types, how to	Lecture +	Oral Exams +
21	-	maintain them and to sustain	Practical	Written Exams +
		them before the operating	Examples +	Daily assignments
		season	Laboratory	Orel Economic
25	3	rans, their types, methods of	Lecture +	Urai Exams + Writton Exams
		maintain before the operating	Fractical Examples +	Daily assignments
		season	Laboratory	Durry assignments
26	3	Control devices in small and	Lecture +	Oral Exams +
20	0	large units and the work of	Practical	Written Exams +
		each part in the devices and	Examples +	Daily assignments
		how to maintain and sustain	Laboratory	
	2	them Charling mainten 1	T and the set	Oral E
27	3	Linecking resistors, how to	Lecture +	Ural Exams + Written Exame
		and electrical examination	Fractical Examples ±	Daily assignments
			Laboratory	Daily assignments
28	3	Ice plants how they work and	Lecture +	Oral Exams +
20	5	maintain	Practical	Written Exams +
			Examples +	Daily assignments
			Laboratory	

29	3		Control p	anels for small and	Lecture +	Oral Exams +
<u></u> /	-		large devi	ces	Practical	Written Exams +
					Examples +	Daily assignments
					Laboratory	
30	3		Air mix	ing boxes, their	Lecture +	Oral Exams +
50	0		purpose, t	ypes and how they	Practical	Written Exams +
			work in ea	ach location	Examples +	Daily assignments
					Laboratory	
155.	Course Eva	aluation			-	
For the f	irst semester (1	0 theoretical + 10 practica	al), it accou	nts for 20%. For the	second semester	(10 theoretical + 10)
practical), it also accoun	ts for 20%. Yearly assignm	nents count	for 10%. Consequer	tly, the annual ef	fort is 50%. The final
theoretic	al exam is 40%	, and the final practical ex	am is 10%.	(The total is 100%)		
156.	Learning a	nd Teaching Resou	urces			
3-	Engineering	Measurement &				
	instrumentat	ion by L. F. Adams				
4-	Control svs	tems for heating &				
	ventilation a	nd Air condition by				
		na All-condition, by				
	Haines					
Websit	e of Najaf teo	chnical institute				
L						

157.	Course Name:
Industrial Ma	nagement and Safety
158.	Course Code:
159.	Semester / Year:
Second yea	r
160.	Description Preparation Date:
2024/3/26	
161.	Available Attendance Forms:
Full att	endance system
162.	Number of Credit Hours (Total) / Number of Units (Total)
2hou	rs/ 4 units
163.	Course administrator's name (mention all, if more than one name)
Nam	e: Duaa Makki Ahmed
164.	Course Objectives
Course Objec	tives 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
165.	Teaching and Learning Strategies

Strateg	y	Theoretical lectures Scientific trips Summer training Student projects			
166 C	ourse St	ructure			
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2		Management	Lecture	Oral Exams + Written Exams + Daily assignments
2	2		Principles of management - levels of management and factory - factory organization	Lecture	Oral Exams + Written Exams + Daily assignments
3	2		Administrative functions	Lecture	Oral Exams + Written Exams + Daily assignments
4	2		Facility Functions	Lecture	Oral Exams + Written Exams + Daily assignments
5	2		Choosing the location of the plant and the factors affecting it	Lecture	Oral Exams + Written Exams + Daily assignments
6	2		Procurement – the relationship of procurement to other functions of the establishment and the procurement steps	Lecture	Oral Exams + Written Exams + Daily assignments
7	2		Warehouse – Inventory – Inventory Types	Lecture	Oral Exams + Written Exams + Daily assignments
8	2		Types of stores – warehouse inventory	Lecture	Oral Exams + Written Exams + Daily assignments
9	2		Determination of the economic quantity of demand	Lecture	Oral Exams + Written Exams + Daily assignments
10	2		Elementary concepts in costs	Lecture	Oral Exams + Written Exams + Daily assignments
11	2		Wages – Types	Lecture	Oral Exams + Written Exams + Daily assignments
12	2		Methods of calculating wages	Lecture	Oral Exams + Written Exams + Daily assignments
13	2		Training – the importance of training	Lecture	Oral Exams + Written Exams + Daily assignments
14	2		Training methods	Lecture	Oral Exams + Written Exams + Daily assignments
15	2		Leadership, competent manager and types of managers – characteristics and qualities of managers	Lecture	Lecture + Practical Examples + Laboratory

			and signs of good and t	noor	
			management	poor	
16	2		Basic concepts in qui control (the concept control) The concept quality - the quality of qui control - the importance benefits of quality control	ality Lecture of of ality and ol	Lecture + Practical Examples + Laboratory
17	2		Quality Elements – Desig Quality	gn Lecture	Lecture + Practical Examples + Laboratory
18	2		Quality of implementation reliability – costs of qui control	on – Lecture aality	Lecture + Practical Examples + Laboratory
19	2		Standardization – Stan Specifications (Definitio Specification)	adard Lecture on of	Lecture + Practical Examples + Laboratory
20	2		Types of stand specifications	idard Lecture	Lecture + Practical Examples + Laboratory
21	2		Data and informa collection – frequency tak histogram	ation Lecture ble –	Lecture + Practical Examples + Laboratory
22	2		Quality control method sample method – types schemes	ds – Lecture es of	Lecture + Practical Examples + Laboratory
23	2		Applications in the use of of the types of charts	fone Lecture	Lecture + Practical Examples + Laboratory
24	2		Maintenance – Objective Types	res – Lecture	Lecture + Practical Examples + Laboratory
25	2		Preventive maintenance benefits – suc maintenance	e – Lecture dden	Lecture + Practical Examples + Laboratory
26	2		نەظېر ۋسم الصيانة	Lecture	Lecture + Practical Examples + Laboratory
27	2		Honesty and industrialsat the impact of indus safety on produce efficiency	afety, Lecture strial ction	Lecture + Practical Examples + Laboratory
28	2		Qualitative methods industrial safety, ger rules and regulations for prevention of accidents	with Lecture neral r the	Lecture + Practical Examples + Laboratory
29	2		Industrial accident and w to prevent it	ways Lecture	Lecture + Practical Examples + Laboratory
30	2		Personal protect equipment - fires methods of fighting them	ctive Lecture and n	Lecture + Practical Examples + Laboratory
167.	Course Ev	aluation			
For the annual e	first semester for fort is 50%. The	or 20%. For the second see final theoretical exam is	emester 20%. Yearly assig 50%, (The total is 100%).	gnments count for 10	%. Consequently, the
168.	Learning a	nd Teaching Resou	irces		
1-	Aysar Sousa	an: the importance of i	ndustrial		
	engineering	/ February 1986 / Bag	ghdad		

2- 3- 4-	 Dr. Ali Abdul Majeed Abdul: Scientific Or Management and Dar Al-Nahda 1972 Dr. Mohieddin Abbas: Procurement Mana Dar Al-Fikr Al-Arabi, Cairo 19774-Henry A Principles of managements , John Wiley N 	igins of Igement, Iberts : I. Y. 1969)
XV-1	to of Naiof to shuizal institute		

169.	Course Name:					
Computer Ap	plications					
170.	Course Co	ode:				
171.	Semester /	Year:				
Second year	r					
172.	Descriptio	n Preparation	Date:			
2024/3/26						
173.	Available	Attendance Fo	rms:			
Full at	endance system					
174.	Number of	f Credit Hours	(Total) / Number of U	Jnits (Total))	
3hou	rs/ 6 units					
175.	Course ad	ministrator's na	ame (mention all, if m	ore than on	e name)	
Nam	e: Ragad M	ahdi				
176.	Course Ob	ojectives				
Course Object	tives	Introducing t	Introducing the student to electronic computers and their uses in			
		solving probl	solving problems related to specialization			
177	Taashina	and Learning S	tratagias			
1//.	Teaching	and Learning S	otrategies			
Strategy	Dreatice	Ical lectures				
	Practica Scientifi	ic trips				
	Summer	r training				
Student projects						
170 0		1 - J				
178.Course	Structure			-		
Week	Hours	Required	Unit or subject name	Learning	Evaluation	
		Learning		method	method	
		outcomes				
			46			

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3-2-1	9		The concept of networks and their types - the concept of the Internet - Internet - its operation - description of the home screen and its components - how to connect with the World Wide Web (Web) - take advantage of the famous search engines Yahoo , Goggle - Learn ways to search for and access information	Lecture + Practical Examples + Laboratory	Oral Exams + Written Exams + Daily assignments
-8-7-6-5-4 10-9	21		Excel program Learn about the concept of the program: its benefits, specifications, features, methods of operation, identify thehome screen and its components, and contain various menus and effective tools. The concept of the cell, basic data typesand how to enter them How to save a work pageWorkbook, Worksheet Close the program and close the file Open the saved file, enter data, perform simple calculations, and learn how to adjust or format data and structure it within a single cell or group of cells Learn about methods of collecting data or group of cells in their different forms, aswell as how to sort data Using some functions provided by the program such as, Sum, Min, Max< count, SQRT, Average and other relevant useful statistical functions Learn about the editing process provided by the program, how to copy data or transfer data and learn about the concept of copying calculations aswell as the concept of relative cells and absolute cells Control cell width: change its style and format through the use of formatting tools Dealing with charts and how to convert numeric and text data into charts of various kinds through the	Lecture + Practical Examples + Laboratory	Oral Exams + Written Exams + Daily assignments

Chain Wizara Commanda and Learn how to add or delete rows or columns on the work page and how to print numeric dual or chartsOral Exams + Written Exams + Daily assignments113Auto CAD program Learn about the different porgan Bars - tool Bars - I PropertiesLeture + Practical Examples + Daily assignmentsOral Exams + Written Exams + Daily assignments123Proparing adrawing barch opening and the different opening adrawing limits - drawing units - grito-indices toricelOral Exams + Written Exams + Daily assignments15-14-139Learn about the different drawing commands - Arc - (Abotator - Protecilal drawing commands - Arc - (Abotator - Protecilal drawing commands - Arc - bally ussignmentsOral Exams + Written Exams + Daily assignments18-17-169Learn about editing mirror - move - cony - offsetLecture + Practical taboratoryOral Exams + Written Exams + Daily assignments193Exact drawing OsnapLecture + Practical taboratoryOral Exams + Written Exams + Daily assignments203Add dimensionsLecture + Practical taboratoryOral Exams + Written Exams + Daily assignments213Text HatchCoral Exams + Written Exams + LaboratoryOral Exams + Written Exams + Daily assignments223Layer - Properties - line LaboratoryOral Exams + Written Exams + HatoratoryOral Exams + Written Exams + Written Exams + Daily assignments233Block& AttributesLecture + Practical Examples + L	[]		Chose Wiend		ll
11 3 Auto CAD program Learn how to allow to pints 11 3 Auto CAD program Learn how to allow to pints 11 3 Auto CAD program Learn how to allow to pints 11 3 Auto CAD program Learn how to allow to pints 12 3 Auto CAD program Learn how to allow to pints 12 3 Proparing a drawing sheet - opening a new file - drawing immis - drawing immads - Arc - Properties Oral Exams + Written Exam + Daily assignments 15-14-13 9 Learn about the different drawing commands - Arc - Proint - Carl Exam s + Written Exam + Daily assignments 18-17-16 9 Learn about the different drawing commands - Arc - Proint - Carl Exam s + Written Exam + Daily assignments 19 3 Exact drawing Osap 20 3 Add dimensions 21 3 Text Hatch 22 3 Layer - Properties - line trans + Written Exam s + Daily assignments Laboratory 23 3 Block& Attributes Lecture + Practical Exam s + Written Exam s + Daily assignments Laboratory 24 3 Measure - Block - w block Lecture + Practical Exam s + Written Exam s + Daily assignments Laboratory 24 3 Measure - Block - w block Lecture + Practical Exam s + Written Exam s + Daily assignments Laboratory <tr< td=""><td></td><td></td><td>chart Wizard command</td><td></td><td></td></tr<>			chart Wizard command		
Image: Second			adjustments and revisions		
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28-27 9 3D surfaces Lecture + Oral Exams + Practical Written Exams + Examples + Daily assignments Laboratory				Laboratory	
Practical Written Exams + Examples + Laboratory	70 07	g	3D surfaces	Lecture +	Oral Exams +
Examples + Daily assignments Laboratory	20-21	2		Practical	Written Exams +
Laboratory				Examples +	Daily assignments
				Laboratory	

30 – 29	9	3D Solie	is I I I I	Lecture + Practical Examples + Laboratory	Lecture + Practical Examples + Laboratory	
179. Cour	se Evaluati	on				
For the first sen practical), it also theoretical exan	For the first semester (10 theoretical + 10 practical), it accounts for 20%. For the second semester (10 theoretical + 10 practical), it also accounts for 20%. Yearly assignments count for 10%. Consequently, the annual effort is 50%. The final theoretical exam is 40% and the final practical exam is 10% (The total is 100%)					
180. Lear	ning and Te	eaching Resources				
Website of N	ajaf technica	l institute				

18	1. C	Course Name:				
Drawin	g of cool	ing systen	ns			
182	2. C	Course Co	ode:			
18.	3. S	emester	/ Year:			
Secon	d year					
184	4. D	Descriptio	on Preparation	n Date:		
2024/3	3/26					
18:	5. A	vailable	Attendance I	Forms:		
	Full attend	ance system	l			
18	5. N	Number c	of Credit Hour	rs (Total) / Number of	Units (Total	.)
	3hours/	6 units				
18′	7. C	Course ad	lministrator's	name (mention all, if r	nore than or	ie name)
	Name:]	Karim Ja	afer Alwan			
18	8. C	Course O	bjectives			
Course	Objective	es	Introducing the	student to electronic compute	ers and their use	es in solving
			problems relate	d to specialization and markin	ng air paths in c	ooling systems
18	Э. Т	eaching	and Learning	Strategies		
Strateg	у	Practical	lectures			
		Scientifie	e trips			
		Summer	training			
		Student p	projects			
190.Course Structure						
Week	Hours	Requ	uired	Unit or subject name	Learning	Evaluation
		Lear	ning	v	method	method
		Outo	comes			

1	3	General introduction about line drawing by Auto CAD	Lecture + Practical Examples + Laboratory	Oral Exams + Written Exams + Daily assignments
2	3	Drawing of all duct fittings (A section of a duct- the inverse of right angle branching from one side –branching two sides four sided fittings.	Lecture + Practical Examples + Laboratory	Oral Exams + Written Exams + Daily assignments
3	3	The collection of airduct fittings in one design	Lecture + Practical Examples + Laboratory	Oral Exams + Written Exams + Daily assignments
4	3	Drawing of a complete air duct design with dimensions and how to calculate the allocation value for each duct.	Lecture + Practical Examples + Laboratory	Oral Exams + Written Exams + Daily assignments
5	3	Drawing of a complete air duct design with linking by the A.H.U, air grills, and air quantities.	Lecture + Practical Examples + Laboratory	Oral Exams + Written Exams + Daily assignments
6	3	Drawing of a complete air duct design with linking by the A.H.U, air grills, and air quantities.	Lecture + Practical Examples + Laboratory	Oral Exams + Written Exams + Daily assignments
7	3	Drawing of a building design labeled with details of windows and rooms, entrance, and exit doors.	Lecture + Practical Examples + Laboratory	Oral Exams + Written Exams + Daily assignments
8	3	Drawing of an air duct inside a building	Lecture + Practical Examples + Laboratory	Oral Exams + Written Exams + Daily assignments
9	3	Drawing of an air duct inside a building	Lecture + Practical Examples + Laboratory	Oral Exams + Written Exams + Daily assignments
10	3	General introduction about the pipe systems. Drawing of all linking and valves, fittings.	Lecture + Practical Examples + Laboratory	Oral Exams + Written Exams + Daily assignments
11	3	Drawing of a condensed refrigeration system cooled with water in addition to a cooling tower, a working pump, and another pump or emergency.	Lecture + Practical Examples + Laboratory	Oral Exams + Written Exams + Daily assignments

12	3	Drawing of a condensed refrigeration system cooled with water in addition to a cooling tower, a working pump, and another pump or emergency.	Lecture + Practical Examples + Laboratory	Oral Exams + Written Exams + Daily assignments
13	3	Drawing of a cooling and warming system that works by water of one pipe system with an expansion reservoir for each system.	Lecture + Practical Examples + Laboratory	Oral Exams + Written Exams + Daily assignments
14	3	Drawing of a cooling and warming system that works by water of two pipe system with an expansion reservoir for each system.	Lecture + Practical Examples + Laboratory	Oral Exams + Written Exams + Daily assignments
15	3	Drawing of a cooling and warming system that works by water of three pipe system with an expansion reservoir for each system.	Lecture + Practical Examples + Laboratory	Lecture + Practical Examples + Laboratory
16	3	Drawing of a cooling and warming system that works by water of four pipe system with an expansion reservoir for each system.	Lecture + Practical Examples + Laboratory	Lecture + Practical Examples + Laboratory
17	3	Drawing of a machines room labeled with chillers, boilers, closed expansions reservoirs, pumps, pipes, and valves.	Lecture + Practical Examples + Laboratory	Lecture + Practical Examples + Laboratory
18	3	Drawing of a machines room labeled with chillers, boilers, closed expansions reservoirs, pumps, pipes, and valves.	Lecture + Practical Examples + Laboratory	Lecture + Practical Examples + Laboratory
19	3	Drawing of a map for a one-floor building labeled with the linking of fans and coil units and their linking with the machines room.	Lecture + Practical Examples + Laboratory	Lecture + Practical Examples + Laboratory

20	3	Drawing of a building design labeled with linking of an air blower with a coil that works by cool water and the distribution of ducts on the rooms and water pipes from the machines room.	Lecture + Practical Examples + Laboratory	Lecture + Practical Examples + Laboratory
21	3	Drawing of a building design labeled with linking of an air blower with a coil that works by cool water and the distribution of ducts on the rooms and water pipes from the machines room.	Lecture + Practical Examples + Laboratory	Lecture + Practical Examples + Laboratory
22	3	Drawing of a building design labeled with linking of an air blower with a coil that works by cool water and the distribution of ducts on the rooms and water pipes from the machines room.	Lecture + Practical Examples + Laboratory	Lecture + Practical Examples + Laboratory
23	3	Drawing of a dual duct system.	Lecture + Practical Examples + Laboratory	Lecture + Practical Examples + Laboratory
24	3	Drawing the induction system.	Lecture + Practical Examples + Laboratory	Lecture + Practical Examples + Laboratory
25	3	A scientific trip to learn about cooling and duct systems for a work site under construction or a complete system.	Lecture + Practical Examples + Laboratory	Lecture + Practical Examples + Laboratory
26	3	Drawing of a control system on cooling water of condenser by using the flow switch.	Lecture + Practical Examples + Laboratory	Lecture + Practical Examples + Laboratory
27	3	Drawing of a control system on the cooling of an air conditioner.	Lecture + Practical Examples + Laboratory	Lecture + Practical Examples + Laboratory
28	3	Drawing of a control system on the cooling of a separated air cooler.	Lecture + Practical Examples + Laboratory	Lecture + Practical Examples + Laboratory

20	2		Drawing of an operation	Lecture +	Lecture + Practical
29	3		for fixing of air ducto	Practical	Examples +
			under the secondary	Examples +	Laboratory
			roof-devices supporters-	Laboratory	
			numps bases-nines –		
			Ascending ducts		
30	3		Drawing of an operation	Lecture +	Lecture + Practical
50	5		for fixing of air ducts	Practical	Examples +
			under the secondary	Examples +	Laboratory
			roof-devices supporters-	Laboratory	
			pumps ,bases-pipes –		
			Ascending ducts.		
191.	Course Eva	aluation			
For the f	first semester 2	0%. For the second seme	ster), it also accounts for 20%.	Yearly assignment	ents count for 10%.
Consequ	ently, the annua	l effort is 50%. The final	practical exam is 50%, (The tota	ll is 100%).	
192.	Learning a	nd Teaching Resou	irces		
1-	Carrier hand	d book			
2-	Brochure	drawing of refrige	eration and air		
	conditionin	g systems. Preparec	l by Abdul Amir		
	Abdul Zahra	3			
3-	Industrial c	Irawing book. Prepar	ed by Abdul Amir		
	Abdul Zahra	.			
Wahait	of Noiof to	hai a al in atitata			
website	e or majar tec	chnical institute			

193.	Course Name:
The project	
194.	Course Code:
195.	Semester / Year:
Second year	r
196.	Description Preparation Date:
2024/3/26	
197.	Available Attendance Forms:
Full att	endance system
198.	Number of Credit Hours (Total) / Number of Units (Total)
2hou	rs/ 4units
199.	Course administrator's name (mention all, if more than one name)
Name	e: Department lecturers
	-
200.	Course Objectives

Course Objectives		Introducing t solving prob	Introducing the student to electronic computers and their uses in solving problems related to specialization				
201. Teaching and Learning Strategies							
Strategy Theoretica		tical lectures	al lectures				
	Practic	al lectures	lectures				
	Scienti	fic trips	trips				
	Summe	er training	raining				
	Studen	t projects	rojects				
202.Course Structure							
Week	Hours	Required	Unit o	r subject name	Learning	Evaluation	
		Learning			method	method	
		Outcomes					
Student projects are distributed to the students of the branch by the branch or department and under the supervision of a							
professor, so that the projects include one of the following aspects. Making integrated maps for a refrigeration of air conditioning device, within the specialized devices, manufacturing parts or assembly for devices or accessories, with the							
necessary examinations and tests on it after that. The process of calculating air conditioning loads for any public building,							
drawing the necessary plans and maps for all air ducts and water transport pipes, as well as illustrations of the required							
accessories, installation of pipes and devices, sequence of control devices and testing devices							
203. Course Evaluation							
Continuous evaluation / seminars / project discussion final grade 100%							
204. Learning and Teaching Resources							
Website of Najaf technical institute							