Ministry of Higher Education and Scientific Research

Scientific supervision and evaluation

Department of Quality Assurance and Academic Accreditation

The Accreditation Section

Description of the academic program and course

Department of Power Mechanics Techniques

2025

Introduction:

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

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

This guide in its second version includes a description of the academic program after updating the vocabulary and paragraphs of the previous guide in the light of the developments and developments of the educational system in Iraq, which included the description of the academic program in its traditional form (annual, Semester) system in addition to adopting the description of the academic program circulated in accordance with the letter of the Department of Studies GC.3/2906 of 3/5/2023 regarding the programs that adopt the Bologna process as the basis for their work.

In this regard, we cannot fail to stress the importance of writing the description of academic programs and curricula in order to ensure the proper functioning of the educational process.

Concepts and terms:

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

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

An ambitious picture of the future of the academic program to be an advanced, inspiring, stimulating, realistic and applicable program.

Program Mission: Outlines the objectives and activities needed to achieve them in a concise manner and outlines the development paths and directions of the program.

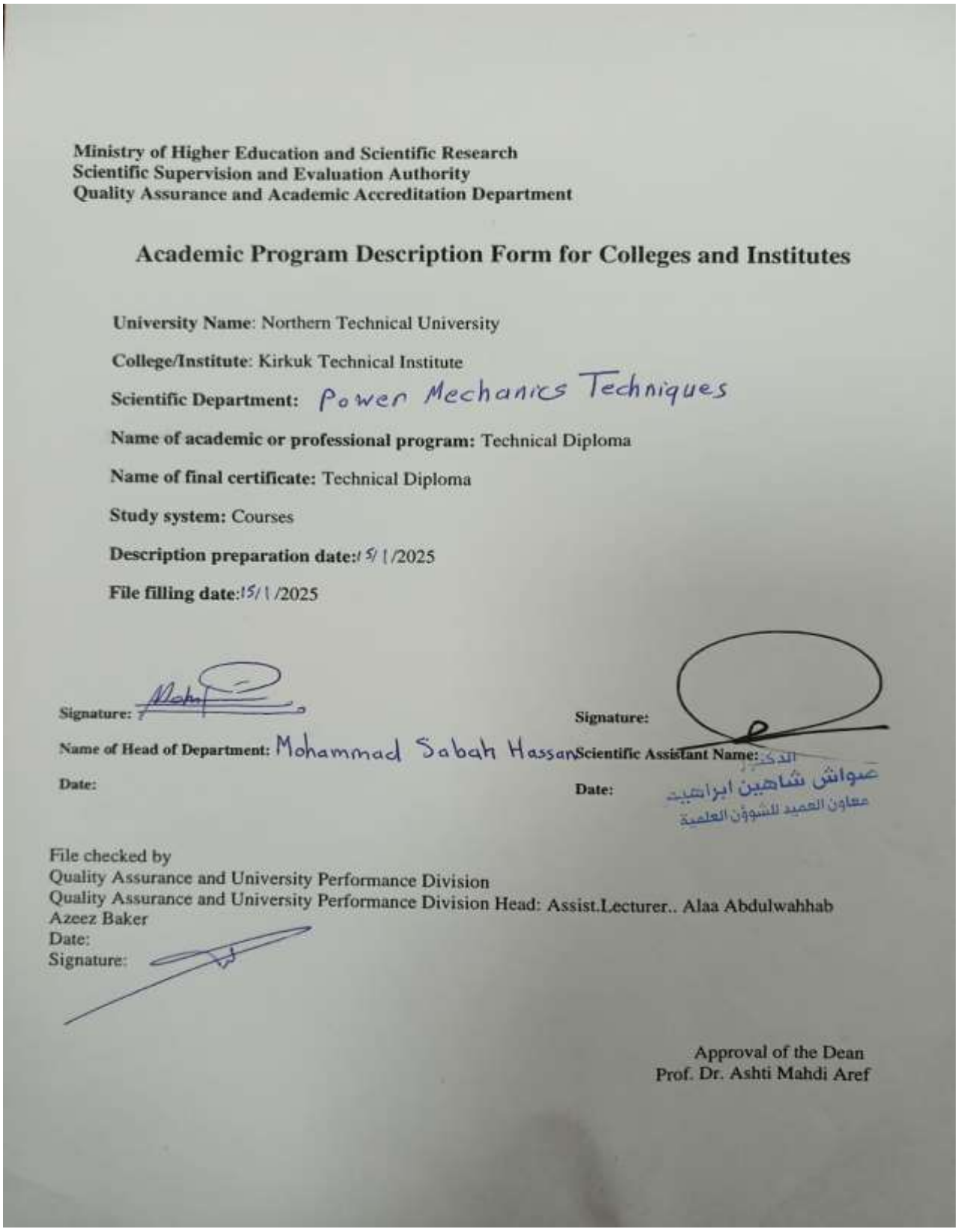
Program objectives: Statements that describe what the academic program intends to achieve within a specified period of time that are measurable and observable.

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

Learning Outcomes: A compatible set of knowledge, skills and values acquired by the student after the successful completion of the academic program and must determine the learning outcomes of each course in a way that achieves the objectives of the program.

Teaching and Learning strategies: Strategies used by the faculty member to develop the teaching and learning of the student are plans that are followed to reach the learning goals. That is, describe all classroom and extracurricular activities to achieve the learning outcomes of the program.

Academic program description form



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

Academic Program Description Form for Colleges and Institutes

University Name: Northern Technical University

College/Institute: Kirkuk Technical Institute

Scientific Department: Power Mechanics Techniques

Name of academic or professional program: Technical Diploma

Name of final certificate: Technical Diploma

Study system: Courses

Description preparation date: 15/1/2025

File filling date: 15/1/2025

Signature:

Name of Head of Department: Mohammad Sabah Hassan

Date:

Signature:

Scientific Assistant Name: الدكتور عواش شاهين ابراهيم
معاون العميد للشؤون العلمية

Date:

File checked by
Quality Assurance and University Performance Division
Quality Assurance and University Performance Division Head: Assist.Lecturer.. Alaa Abdulwahhab Azeez Baker
Date:
Signature:

Approval of the Dean
Prof. Dr. Ashti Mahdi Aref

1. Vision of the program

We look forward to developing the characteristics and skills of technical innovation among the middle cadres who possess the skill of managing, operating and maintaining a central and separate home and commercial air conditioning systems in accordance with the needs of the labour market.

2. Mission of the program

Qualifying the accepted students with cognitive and applied skills within the required disciplines in the field of refrigeration and conditioning to a high degree of efficiency in order to meet the needs of the labour market and to obtain the appropriate opportunities for them at the level of the state departments and private sector institutions.

3. Objectives of the program

The Section aims to create qualified technical staff to practice activities related to:

A. Graduating qualified technical staff to carry out the operation, maintenance and control of refrigeration and air conditioning equipment.
B. Knowledge in the preparation and reading of mechanical and electrical maps for refrigeration and air conditioning devices
C. Contribute to the installation, operation and maintenance of refrigeration and air-conditioning.
D. Periodic maintenance of refrigeration and air conditioning equipment
E. Human rights Use computer-programmed control and control systems and calculate capacities for thermal loads

4. Program appropriation

ABET

5. Other external influences

A compatible set of knowledge, skills and values acquired by the student after the successful completion of the academic program and must determine the learning outcomes of each course in a manner that achieves the program objectives

6. Structure of the program

Structure of the program	Number of curriculums	Unit of study	Percentage	Observations
Requirements of the institution (university)	11	22	17%	Compulsory + 2 is elective
Requirements of the Institute	3	7	6%	Compulsory
Requirements of the section	27	98	77%	Compulsory + 3 elective
Summer training	There it is	Complete only		Compulsory
Other	There is none			

You can also note whether the course is compulsory or elective.

7. Description of the program

Educational level	Type of curriculum	Symbol of curriculum	Name of Curriculum	Credit hours		
				Theoretical	Practical	Total
The first level	University courses	NTU100	Human Rights and Democracy (compulsory)	2	---	2
		NTU101	English Language (compulsory)	2	-	2
		NTU102	Computer (compulsory)	1	1	2
		NTU103	Arabic Language (compulsory)	2	-	2
		NTU104	Sports (elective)	2	-	2
		NTU107	French Language (elective)	2	-	2
	Curriculums of the Institute	TIK110	Principles of Mathematics (compulsory)	2	---	2
		TIK111	Applied Mathematics (compulsory)	2	---	2
		TIK112	Mechanical Workshops(compulsory)	---	3	3
	Curriculums of the section	PMTR136	Principles of Air Conditioning (compulsory)	2	2	4
		PMTR137	Principles of Thermodynamics (compulsory)	2	2	4
		PMTR138	Principles of Refrigeration (compulsory)	2	2	4
		PMTR139	Applied thermodynamics (compulsory)	2	2	4
		PMTR140	Fluid mechanics (compulsory)	2	2	4
		PMTR141	Refrigeration and air conditioning Workshops (compulsory)	---	3	3
		PMTR142	Principles of Electrical Technology (compulsory)	2	2	4
		PMTR143	Principles of engineering drawing (compulsory)	----	3	3
		PMTR144	Advanced engineering drawing (compulsory)	----	3	3
		PMTR145	Engineering Mechanic (elective)	2	2	4
		PMTR146	Advanced Electrical Technology (compulsory)	2	2	4
Total in hours				**31**	**29**	**60**
Total for the level				**60 * 15 = 900 hours**		
Summer training				**270 hours**		

Educational level	Type of curriculum	Symbol of curriculum	Name of Curriculum	Credit hours		
				Theoretical	Practical	Total
The Second level	University courses	NTU200	English Language (compulsory)	2	-	2
		NTU201	Computer (compulsory)	1	1	2
		NTU202	Arabic Language (compulsory)	2	-	2
		NTU203	Crimes of the Baath regime in Iraq (compulsory)	2	-	2
		NTU204	Profession Ethics (compulsory)	2	-	2
	Curriculums of the section	PMTR240	Fundamentals of Refrigeration Systems (compulsory)	2	2	4
		PMTR241	Fundamentals of air conditioning (compulsory)	2	2	4
		PMTR242	Fundamentals of heat transfer (compulsory)	2	2	4
		PMTR243	Maintenance fundamentals of Refrigeration and air conditioning equipment (compulsory)	2	4	6
		PMTR244	Fundamentals of Control Systems (compulsory)	2	2	4
		PMTR245	Fundamentals design of conditioning systems (compulsory)	---	3	3
		PMTR246	Advanced Refrigeration Systems (compulsory)	2	2	4
		PMTR247	Applied heat transfer (compulsory)	2	2	4
		PMTR248	Advanced Refrigeration and Air Conditioning Maintenance (compulsory)	2	4	6
		PMTR249	Project 1 (compulsory)	---	1	1
		PMTR250	Renewable energy (elective)	2	---	2
		PMTR251	Advanced design of airconditioning systems (compulsory)	---	3	3

		PMTR252	Advanced Air Conditioning (compulsory)	2	2	4
		PMTR253	Advanced control systems (compulsory)	2	2	4
		PMTR254	Project 2 (compulsory)		2	2
		PMTR255	Management and Occupational Safety (elective)	---	2	2
Total in hours				**31**	**36**	**67**
Total for the level				**60 * 15 = 900 hours**		
Summer training				**270 hours**		

8. Expected learning outcomes of the program

A.knowledge objectives

1. Provide the student with theoretical and applied knowledge in the design of models of refrigeration and air conditioning devices
2. Contribute to the provision of technology to qualify the implementation of graduation projects and the requirements of the labor market.
3. Identify how to calculate the refrigeration and air conditioning loads of buildings and identify the types of fluids used in refrigeration systems and their impact on the environment
4. Study of control systems of their types and uses in refrigeration and air conditioning devices.

B.skills objectives of the program

1. It aims to prepare qualified technical staff to practice the work of refrigeration and air conditioning equipment scientifically, professionally and technically.
2. Preparing high-tech cadres for skill in the field of installation and maintenance of refrigeration and air conditioning devices and the use of AutoCAD software in industrial drawings and plans.
3. The department qualifies as an effective cadre to detect and maintain hardware failures and the welding types of pipes used in refrigeration systems
4. Acquire skills in clarifying theoretical and practical information about refrigeration and air conditioning systems

C.emotional and value goals

1. Inculcating the spirit of citizenship and promoting the values of functional affiliation and establishing the principles of honesty and loyalty while working in the institution.
2. Establish the principle of preserving public property and public money
3. Guiding the student on the correct educational treatment with the professor and cooperation between the students.
4. Taking care of students and putting them on the right path and rejecting extraneous habits and warning them of societal pests such as addiction and anomaly.

General skills (other skills related to employability and personal development);

1. Encourage students to integrate into the labor market and transfer the academic aspect to a practical application. 2. Urge to keep pace with the scientific development, especially in practical applications in line with the progress made in the world, especially the international companies specialized in refrigeration and air conditioning.	3. Developing the teaching and technical aspect by involving them in specialized courses and preparing seminars in relation to modern scientific developments and participating in scientific conferences to exchange experiences. 4. Computer and Internet work should be a priority.

9. Teaching and learning strategies

1. Explain the scientific material to students in detail. 2. Participation of students in solving mathematical problems 3. Discussion and discussion on relevant topics 4. Use visual aids (such as data show) 5. Preparation of weekly and Semester reports	6. The strategy of interactive and direct education and the development of the capabilities of students and to help them in the delivery of the scientific material acquire the ability of the student to learn self and skill in the application of what has been learned in new areas.

10. Methods of evaluation

1. Semester exams (theoretical + practical) attendance or electronic.
2. Electronic and verbal tests .
3. Daily and electronic assessment.
4. Laboratory reports.
5. Practical exam attendance.
6. Final entrance exams.

11. Teaching staff

Teaching staff

Scientific level	Specialization		Special requirements/ skills (if any)		Teaching staff	
	General	Specific			employed	Not- employed
Lecturer	1	1			2	
Assistant Lecturer		2			2	

Professional development

Professional development of faculty members

1. Establishment of digital and development office courses, scientific seminars, seminars, guidance, preparation, strategy of lecturing, publishing research, curriculum development and improvement such as the development of the new course
2. The course is developed by following up on the latest publications of books related to the Department of Materials Management, Scientific Research, Reports, Projects, and devices
3. The course is developed through the follow-up of the latest publications of books related to the Department of capacity Mechanics and Scientific Research and reports books and references recommended by scientific journals.

12. Standard of Acceptance

1- **1- The division accepts graduates of preparatory schools in its scientific branch, in addition to graduates of profession preparatory schools.**

13. The most important sources of information about the program

1. Systematic writing

a. Principles of Fluid Mechanics - Part I/ composition of the beautiful Angels.

b. Engineering of air-conditioning and refrigeration by W.P.Jois

c. Air Conditioning Engineering by Dr. Khalid Ahmed Al-Judi

d. Principles of Refrigeration and Conditioning by Dr. Adnan Rickin

e. ASHRAE hand book

f. Engineering drawing by engineer Hashem Aboud Al-Moussawi

g. Yusef al-Rafi 1988

h. Technical mathematics by Panal colter

2. Modern methods of communication (Internet).

3. Virtual library

14. Program development plan

1- Organize a questionnaire for students about each course of study

2- Organize a proposal to develop more than 20% of the curriculum vocabulary from experienced teachers of that course

3- These questionnaires and proposals are discussed in the department Council by the scientific committee in the department and submit the proposals to the Institute Council and then the University Council to approach the relevant committees

4- Promote proposals with the latest global sources and products

The curriculum skills scheme																
Department of Power Mechanics Techniques/level I																
Learning outcomes required from the program																
Symbol of curriculum	Name of Curriculum	Compulsory or Elective	Knowledge objectives				Skill targets Of the program				Emotional goals And value				General and transferable skills			
			A 1	A 2	A 3	A 4	B 1	B 2	B 3	B 4	C 1	C 2	C 3	C 4	D 1	D 2	D 3	D 4
NTU100	Human Rights and Democracy	Compulsory								√	√	√	√	√		√	√	√
NTU101	English	Compulsory								√	√		√	√		√		
NTU102	Computer	Compulsory	√			√	√			√				√	√	√	√	√
NTU103	Arabic Language	Compulsory								√	√		√	√		√		
NTU104	Sports	Elective								√	√		√	√		√		
NTU107	French Language	Elective								√	√		√	√		√		
TIK110	Principles of Mathematics	Compulsory			√	√				√				√				√
TIK111	Applied Mathematics	Compulsory			√	√				√				√				√
TIK112	Mechanical workshops	Compulsory	√	√	√	√		√	√	√				√				√

The curriculum skills scheme																		
Department of Power Mechanics Techniques/ level II																		
PMTR137	**Principles of Thermodynamics**	Compulsory	√	√						√							√	√
PMTR138	**Principles of Refrigeration**	Compulsory	√	√	√	√			√	√					√	√		
PMTR139	**Applied thermodynamics**	Compulsory	√	√						√							√	√
PMTR140	**Fluid mechanics**	Compulsory	√	√		√				√						√		√
PMTR141	**Refrigeration and air conditioning workshops**	Compulsory	√	√	√	√		√	√	√				√				√
PMTR142	**Principles of Electrical Technology**	Compulsory	√			√			√	√				√			√	√
PMTR143	**Principles of engineering drawing**	Compulsory	√				√			√				√			√	√
PMTR144	**Advanced engineering drawing**	Compulsory	√				√			√				√			√	√
PMTR145	**Engineering Mechanic**	Elective	√	√		√				√						√		√
PMTR146	**Advanced Electrical Technology**	Compulsory	√			√			√	√				√			√	√

Learning outcomes required from the program																	
Symbol of curriculum	Name of Curriculum	Compulsory or elective	Knowledge objectives				Skill targets Of the program				Emotional goals And value				General and transferable skills			
			A 1	A 2	A 3	A 4	B 1	B 2	B 3	B 4	C 1	C 2	C 3	C 4	D 1	D 2	D 3	D 4
NTU200	English Language	Compulsory								√	√		√	√		√		
NTU201	Computer	Compulsory	√			√	√			√				√	√	√	√	√
NTU202	Arabic Language	Compulsory								√	√		√	√		√		
NTU203	Crimes of the Baath regime in Iraq	Compulsory								√	√	√	√	√	√	√		
NTU204	Profession Ethics	Compulsory								√	√	√	√	√	√	√		
PMTR240	Fundamentals of Refrigeration Systems	Compulsory	√	√	√	√		√	√	√				√	√	√	√	√
PMTR241	Fundamentals of air conditioning	Compulsory	√	√	√	√			√	√				√	√	√	√	√
PMTR242	Fundamentals of heat transfer	Compulsory	√	√	√	√		√	√	√				√	√	√	√	√
PMTR243	Maintenance fundamentals of refrigeration and air conditioning equipment	Compulsory	√	√	√	√		√	√	√	√	√	√	√		√	√	√
PMTR244	Fundamentals of Control Systems	Compulsory	√	√	√	√		√	√	√				√	√	√	√	√

PMTR245	**Fundamental design of Conditioning systems**	Compulsory	√		√	√	√			√						√	√	√
PMTR246	**Advanced Refrigeration Systems**	Compulsory	√	√	√	√		√	√	√				√	√	√	√	√
PMTR247	**Applied heat transfer**	Compulsory	√	√	√	√		√	√	√				√	√	√	√	√
PMTR248	**Advanced Refrigeration and Air Conditioning Maintenance**	Compulsory	√	√	√	√		√	√	√	√	√	√	√		√	√	√
PMTR249	**Project 1**	Compulsory	√	√	√	√		√	√	√				√	√	√	√	√
PMTR250	**Renewable energy**	Elective	√	√					√	√				√		√	√	
PMTR251	**Advanced design of airconditioning systems**	Compulsory	√		√	√	√			√						√	√	√
PMTR252	**Advanced Air Conditioning**	Compulsory	√	√	√	√			√	√				√	√	√	√	√
PMTR253	**Advanced control systems**	Compulsory	√	√	√	√		√	√	√				√	√	√	√	√
PMTR254	**Project 2**	Compulsory									√	√	√	√	√	√	√	
PMTR255	**Management and Occupational Safety**	Elective	√	√	√	√		√	√	√				√	√	√	√	√

Fluid Mechanics (compulsory) - PMTR140 - level I

Description of the Curriculum

Fluid mechanics is a branch of physics that studies the behaviour of liquids, gases, and plasma under the influence of forces and pressure. This course is concerned with the applications of fluid mechanics in areas such as mechanical and chemical engineering.

1- Educational institution	Northern Technical University/ Kirkuk Technical Institute
2- Department	Power Mechanics Techniques/Branch of Refrigeration and Airconditioning
3- Name/code of the curriculum	Fluid Mechanics (compulsory) - PMTR140 - level I
4- Forms of presence available	Attendance
5- Semester/annual system	The Semester system
6- Number of hours (total)	4 x 15 weeks = 60 hours (semester)
7- Date of preparation of this description	2025|1|15

8. Objectives of the curriculum

- Provide students with theoretical and applied knowledge in the field of fluid mechanics, fluid analysis, gases and plasma.
- Develop the skills of students in the use of mathematical, numerical and experimental tools to solve problems and practical cases in fluid mechanics.
- Enhance students' ability to think critically, creatively and innovatively in the field of fluid mechanics and the design of systems, machines and associated products.
- Improve students' skills in communication, presentation, evaluation, collaboration and continuous learning in the field of fluid mechanics.

9. Learning outcomes and teaching, learning and evaluation methods

A. Knowledge objectives

- The student understands the concepts, principles, theories, laws, equations, models and solutions related to fluid mechanics and can interpret, explain and apply them.
- The student distinguishes between the types, characteristics and behaviors of liquids, gases and plasma and can identify, measure, calculate, analyze and compare them.
- The student solves practical and complex problems and situations in fluid mechanics using mathematical, numerical, experimental and simulation methods and can simplify, estimate, interpret, document and evaluate them.
- The student searches for information, sources, references, research, articles, reports and publications related to fluid mechanics and can extract, summarize, infer, cite and critique them.

B. skills objectives of the Curriculum

- The student uses available software, technology, equipment and laboratories to implement, simulate, design, evaluate and improve systems, machines and products that use liquids, gases and plasma in the field of fluid mechanics.
- The student presents the results, outputs, projects, innovations and solutions in the field of fluid mechanics in a clear, organized, convincing and professional manner using language, graphics, tables, symbols, equations, reports, presentations and discussions.
- The student works collectively and collaboratively with his colleagues, teachers, assistants, supervisors, assessors and partners in the implementation, development and improvement of the course, program, projects and activities in the field of fluid mechanics.
- The student develops his skills, abilities, knowledge, interests, talents, values and ethics in the field of fluid mechanics and seeks continuous learning and professional and personal development.

Teaching and learning methods

- Theoretical and practical lectures covering concepts, principles, applications, examples and exercises in fluid mechanics.
- Laboratory processes and projects that allow students to carry out experiments,

simulations, design and evaluation in fluid mechanics.

- Effective use of available technology, software and resources to enhance learning, interaction and collaboration in fluid mechanics.
- Discussions, presentations, reports, inquiries and feedback that motivate students to think critically, creatively and creatively in fluid mechanics.

Methods of evaluation

- Semester and final tests that measure the extent to which students absorb theoretical and applied knowledge in fluid mechanics.
- Reports, projects and presentations that measure the extent to which students apply practical, analytical, design and evaluative skills in fluid mechanics.
- Participation, collaboration, innovation and continuous improvement that measure how students interact, motivate and grow in fluid mechanics.

C. General and transferable skills (other skills related to employability and personal development).

- Numeracy, mathematics, statistics, programming, numerical and experimental analysis, simulation, design, evaluation and improvement skills in the field of fluid mechanics.
- Communication, presentation, report, documentation, listening, discussion, dialogue, persuasion, negotiation, expression, critical, creative and innovative thinking in the field of fluid mechanics.
- Skills of collaboration, teamwork, leadership, responsibility, initiative, respect, appreciation, continuous learning and personal and professional development in the field of fluid mechanics.
- Skills of research, inquiry, exploration, discovery, verification, experimentation, innovation, alternative solutions, projects, competitions and awards in the field of fluid mechanics.
- Skills in technology, information, resources, software, equipment, laboratories, standards, specifications, security, safety, environment, ethics and values in the field of fluid mechanics.

10. Structure of the curriculum					
The week	Hours	Required learning outcomes	Name of unit or subject	Method of education	Method of assessment
1 – 6	4 hours a week	Understand the basic characteristics of fluids	Introduction to mechanics of fluid mechanics	Theoretical + Practical	Oral and practical exams
7 – 9	4 hours a week	Understand how pressure is distributed within the liquid, Pascal's principle, surfactant tension and the phenomenon of poetics	Fluid static	Theoretical + Practical	Reports and projects
10 – 12	4 hours a week	Use pressure measuring devices	Pressure measurements	Theoretical + Practical	Theoretical exams
13-15	4 hours a week	Understand and apply the continuity equation, calculating the volumetric flow rate	Dynamic fluid/ Continuity equation	Theoretical + Practical	Daily tests

11 the infrastructure	
A. prescribed books and main references	**1-Fluid Mechanic by streeter** **2- Fluid mechanics by Donglas**
Books and references (scientific journals, reports,...)	• Fundamentals and Applications, Fourth Edition, Yunus A. Singel, McGraw-Hill, 2018. • Fundamentals and Applications, Second Edition, John M. Simbaloka and Alison P. Fraser, Cambridge University Press, 2017. • Fundamentals and Applications, Third Edition, Frank M. White, Kangaré, 2016. • Fundamentals and Applications, Fifth Edition, Robert W. Fox, Alan T. McDonald, Philip J. Brett, Wiley, 2011. • Fundamentals and Applications, Sixth Edition, Bruce R. Munson, Crawford, 2012. • Fundamentals and Applications, seventh Edition, Victor L.

	Streeter way. Benjamin Whittle, Clarendon,
E-referencing, Web sites	• Fluid Mechanics website: A website that contains educational, training, interactive materials, simulations, games and tests in the field of fluid mechanics. The website can be visited at https://www.efluids.com/ • The Fluid Mechanics website on YouTube: Is a video channel that offers explanations, examples, applications and experiments in the field of fluid mechanics in a simplified and fun way. The channel can be viewed at https://www.youtube.com/channel/ucqo9j4rsca1fewogtdcnq • Coursera's Fluid Mechanics website: A website that offers online courses in the field of fluid mechanics from recognized universities and institutions. You can register and learn in the courses at: https://www.coursera.org/courses?query=fluid%20mechanics • Fluid Mechanics website on Wikipedia: A site that provides information, history, development, classification, branches, applications and references in the field of fluid mechanics. You can read this at https://ar.wikipedia.org/wiki/%d9%85%d9%8a%d9%83%d8%a7%d9%86%d9%8a%d9%83%d8%a7_%d8%a7%d9%84%d9%85%d9%88%d8%a7%d8%a6%d8%b9

12- the curriculum development plan
• Identify the objectives, outputs, content, methods and evaluation of the course based on academic, professional, market and community standards and requirements. • Design, implement, evaluate and improve the theoretical and practical program, projects, activities, resources, equipment, laboratories, technology and program related to the course. • Provide training, qualification, development, motivation, assessment and feedback to teachers, students, assistants, supervisors, residents and partners involved in the implementation and development of the course. • Analyze, review, update and develop the curriculum periodically and continuously based on data, information, opinions, suggestions, complaints and recommendations related to the curriculum from various sources and concerned parties

Engineering Mechanic (elective) - PMTR145- level I

Description of the Curriculum

Also known as material resistance, it is a field of study that focuses on the relationship between the mechanical behavior of materials and their internal properties. Material mechanics deals with many important concepts and topics.

1- Educational institution	Northern Technical University/ Kirkuk Technical Institute
2- Department	Power Mechanics Techniques/Branch of Refrigeration and Airconditioning
3- Name/code of the curriculum	Materials Mechanics (elective) - PMTR145 - level I
4- Forms of presence available	Attendance
5- Semester/annual system	The Semester system
6- Number of hours (total)	4 x 15 weeks = 60 hours (semester)
7- Date of preparation of this description	2025|1|15

8 objectives of the curriculum

- Understanding the concepts of mechanics and materials:
- Introduce students to concepts of mechanics and materials, including stress, strain, and forces affecting materials.
- Understand the importance of studying the behavior of materials under different loads.
- Stress and Stress Analysis:
- Teach students how to calculate stress and emotion in materials.
- Understand the relationship between stress, emotion, tension, and stress.

9- Learning outputs and methods of teaching, learning and evaluation

A- Knowledge objectives

- The student understands the concepts, principles, theories, laws, equations, models and solutions related to the mechanics of materials and can interpret, explain and apply them.
- The student solves practical and complex problems and situations in the mechanics

of materials using mathematical, numerical, experimental and simulation methods and can simplify, estimate, interpret, document and evaluate them.

- The student searches for information, sources, references, research, articles, reports and publications related to the mechanics of materials and can extract, summarize, infer, cite and critique them.

B. skills objectives of the Curriculum

- The student uses available software, technology, equipment and laboratories to implement, simulate, design, evaluate, and improve systems, machines, and products.
- The student presents the results, outputs, projects, innovations and solutions in the field of materials mechanics in a clear, structured, convincing and professional manner using language, graphics, tables, symbols, equations, reports, presentations and discussions.
- The student works collectively and collaboratively with his colleagues, teachers, assistants, supervisors, assessors and partners in the implementation, development and improvement of the course, program, projects and activities in the field of materials mechanics.
- The student develops his skills, abilities, knowledge, interests, talents, values and ethics in the field of materials mechanics and seeks continuous learning and professional and personal development.

Teaching and learning methods

- Theoretical and practical lectures covering concepts, applications, examples and exercises in materials mechanics.
- Laboratory processes and projects that allow students to carry out experiments, simulations and design in materials mechanics.
- Effective use of available technology, software and resources to enhance learning and interaction in materials mechanics.
- Discussions, presentations, reports, inquiries and feedback that motivate students to think critically, creatively and creatively in materials mechanics.

Methods of evaluation

- Semester and final tests that measure the extent to which students absorb theoretical and applied knowledge in materials mechanics.
- Reports, projects and presentations that measure the extent to which students apply practical, analytical, design and evaluative skills in materials mechanics.
- Participation, collaboration, innovation and continuous improvement that measure

how students interact, motivate and grow in materials mechanics.

C. General and transferable skills (other skills related to employability and personal development).

- Numeracy, mathematics, statistics, programming, numerical and experimental analysis, simulation, design, evaluation and improvement skills in the field of materials mechanics.
- Skills of communication, presentation, report, documentation, listening, debate, dialog, persuasion, negotiation, expression, critical, creative and innovative thinking in the field of materials mechanics.
- Skills of collaboration, teamwork, leadership, responsibility, initiative, respect, appreciation, continuous learning and personal and professional development in the field of materials mechanics.
- Skills of research, inquiry, exploration, discovery, verification, experimentation, innovation, alternative solutions, projects, competitions and awards in the field of materials mechanics.
- Skills in technology, information, resources, software, equipment, laboratories, standards, specifications, security, safety, environment, ethics and values in the field of materials mechanics.

10 the structure of the curriculum					
The week	Hours	Required learning outcomes	Name of unit or subject	Method of education	Method of assessment
1 – 6	4 hours a week	Understand the basic characteristics of materials mechanics	Mechanical properties of materials	Theoretical + Practical	Oral and practical exams
7 – 9	4 hours a week	Stress and stress Emotion Internal forces and external forces Axial and accidental pregnancy	Stress and stress, Emotion Internal forces and external forces Axial load and tangential load	Theoretical + Practical	Reports and projects
10 – 12	4 hours a week	Use the concepts of angular load and torque Curving and cutting	Angular load and moment Bending and shearing	Theoretical + Practical	Theoretical exams
13-15	4 hours a week	Understand and apply the critical stress and breakdown equation Thermal properties of materials	Critical stress and collapse Thermal properties of materials	Theoretical + Practical	Daily tests

11 the infrastructure	
A. prescribed books and main references	**"Mechanics of Materials" للمؤلفين Ferdinand P. Beer و E.R. Johnson**
Books and references (scientific journals, reports,...)	• Fundamentals and Applications, Fourth Edition, Younes A. Singel, McGraw-Hill, 2018. • Fundamentals and Applications, Second Edition, John M. Simbaloka and Alison P. Fraser, Cambridge University Press, 2017. • Fundamentals and Applications, Third Edition, Frank

	M. White, Kangaré, 2016. • Fundamentals and Applications, Fifth Edition, Robert W. Fox, Alan T. McDonald, Philip J. Brett, and Ellie, 2011. • Fundamentals and Applications, Sixth Edition, Bruce R. Munson, Crawford, 2012. • Fundamentals and Applications, seventh Edition, Victor L. Streeter way. Benjamin Whittle, Clarendon,
E-referencing, Web sites	• **https://bing.com/search?q=%d9%85%d8%b1%d8%a7%d8%ac%d8%b9+%d9%85%d9%8a%d9%83%d8%a7%d9%86%d9%8a%d9%83+%d8%a7%d9%84%d9%85%d9%88%d8%a7%d8%af** • **https://ar.wikipedia.org/wiki/%d9%85%d9%8a%d9%83%d8%a7%d9%86%d9%8a%d9%83%d8%a7_%d8%a7%d9%84%d9%85%d9%88%d8%a7%d8%af** • **https://www.noor-book.com/%d9%83%d8%aa%d8%a7%d8%a8-%d9%85%d9%8a%d9%83%d8%a7%d9%86%d9%8a%d9%83%d8%a7-%d8%a7%d9%84%d9%85%d9%88%d8%a7%d8%af-%d8%a7%d9%84%d8%ac%d8%b2%d8%a1-%d8%a7%d9%84%d8%a7%d9%88%d9%84-mechanics-of-materials-part-one-pdf**

12- the curriculum development plan
• Identify the objectives, outputs, content, methods and evaluation of the course based on academic, professional, market and community standards and requirements. • Design, implement, evaluate and improve the theoretical and practical program, projects, activities, resources, equipment, laboratories, technology and program related to the course. • Provide training, qualification, development, motivation, assessment and feedback to teachers, students, assistants, supervisors, residents and partners involved in the implementation and development of the course. • Analyze, review, update and develop the curriculum periodically and continuously based on data, information, opinions, suggestions, complaints and recommendations related to the curriculum from various sources and concerned parties

Principles of Mathematics (compulsory) - TIK110 - level I

Description of the Curriculum

The Mathematics course aims to develop the mental, logical and creative skills of students and provide them with the necessary tools to solve practical and theoretical problems in various fields. Mathematics is a universal language that can be used to describe and understand natural, social and artistic phenomena. Mathematics is also a source of beauty, inspiration and fun for many people.

1- Educational institution	Northern Technical University/ Kirkuk Technical Institute
2- Department	Power Mechanics Techniques/Branch of Refrigeration and Airconditioning
3- Name/code of the curriculum	Principles of Mathematics (compulsory) - TIK110 - first level
4- Forms of presence available	Attendance
5- Semester/annual system	The Semester system
6- Number of hours (total)	2 x 15 weeks = 30 hours (semester)
7- Date of preparation of this description	2025|1|15

8. Objectives of the curriculum

- Develop the ability to think logically, critically, analytically and deductively in students.
- Provide students with basic and advanced mathematical concepts, principles and terminology and apply them in different situations.
- Enhance the interest, participation, pleasure and self-confidence of students in learning and using mathematics.
- Improve the communication, collaboration, presentation and presentation skills of students in the field of mathematics.
- Broaden students' horizons, enrich their culture and prepare them for academic and professional life through mathematics.

9- Learning outputs and methods of teaching, learning and evaluation

A- Knowledge objectives

The objectives are to provide students with knowledge, understanding, application, analysis, evaluation and creativity in the field of engineering and applied mathematics and related technical and engineering disciplines. Some examples of the cognitive goals of a math course are:

- Students should be able to memorize, retrieve, apply and solve equations, variances, functions, derivatives, integrations, sequences, mathematical strings, matrices, vectors, vectors, levels, spaces, sizes, curves, cones, differential equations, integrative equations and differential equations.

B. skills objectives of the Curriculum

- Develop the ability to think logically, analytically and critically in solving mathematical and engineering problems.
- Learn and apply mathematical concepts, principles and rules in different fields such as algebra, geometry, calculus, statistics, probabilities, differential and linear equations, among others.
- Use appropriate computer tools and software to represent, analyze and interpret data and mathematical and engineering models.
- Communicate effectively and professionally with others using mathematical language, symbols, graphs, tables and charts.

Teaching and learning methods

- Lectures: Provide information and mathematical concepts directly to students.
- Active Learning: Encourage students to participate in the learning process through problem-solving, group discussions, and interactive activities.
- Project-based learning: Students are assigned to projects that require the application of mathematical knowledge in real-world contexts.
- Self-learning: Students are encouraged to research and explore independently to enhance their understanding of mathematical concepts.
- Digital learning: The use of digital tools and software to enhance learning and understanding.
- Continuous assessment: Students are continuously assessed through tests, assignments, and projects.

Methods of evaluation
• Written tests: Students' understanding of mathematical concepts is assessed through traditional written tests. • Homework: The ability to apply mathematical knowledge in problem solving is assessed through homework. • Projects: The ability to apply mathematical knowledge in real-world contexts is assessed through projects. • Class participation: The ability to effectively communicate mathematical ideas and concepts is assessed through class participation. • Electronic tests: Digital tools and software are used to assess students' understanding of mathematical concepts.
C. General and transferable skills (other skills related to employability and personal development). • Effective communication: The ability to communicate clearly, confidently and respectfully with others, whether they are colleagues, managers, clients or partners. • Teamwork: The ability to work collaboratively and in concert with others, to benefit from the skills, experience and opinions of each individual, and to contribute to the achievement of common goals. • Creative problem solving: The ability to think outside the box and use mathematics in new and innovative ways to solve real and complex problems facing an individual, society or the world.

10 the structure of the curriculum					
The week	Hours	Required learning outcomes	Name of unit or subject	Method of education	Method of assessment
1 – 6	2 hours a week	Solve matrix arithmetic problems	Matrices and their calculations	Theoretical + Practical	Oral exams
7 – 9	2 hours a week	Ability to solve determinants and equations	Determinants, linear equations, and Kramer's method	Theoretical + Practical	Written tests

10 – 12	2 hours a week	Identifying and resolving vectors	Vectors, their analysis, and standard and directional multiplication	Theoretical + Practical	Projects
13-15	2 hours a week	Solving equations and problems	Differential, string rule, implicit function, and exponential function derivative	Theoretical + Practical	Homework

11 the infrastructure	
A. prescribed books and main references	**1-_Thomas' Calculus** **2- Mathematics for the Nonmathematician**
Books and references (scientific journals, reports,...)	**1-Mathematics: A Very Short Introduction** **2- Journal of the American Mathematical Society**
E-referencing, Web sites	**1 - https://www.mathematicalreports.org/** **2 https://www.maa.org/press/periodicals/mathematics-magazine**

12- the curriculum development plan

- Provide students with basic and advanced mathematical concepts and skills that enable them to apply in their technical and professional fields.
- Develop critical, creative, analytical and logical thinking in students by solving diverse and complex mathematical problems.
- Encourage students to use modern computer tools and software to facilitate calculation, drawing, representation and mathematical analysis.
- Enhance students' ability to communicate, collaborate, and learn self and continuously in the field of mathematics.

Applied Mathematics (compulsory) - TIK111 - level I

Description of the Curriculum

The Mathematics course aims to develop the mental, logical and creative skills of students and provide them with the necessary tools to solve practical and theoretical problems in various fields. Mathematics is a universal language that can be used to describe and understand natural, social and artistic phenomena. Mathematics is also a source of beauty, inspiration and fun for many people.

1- Educational institution	Northern Technical University/ Kirkuk Technical Institute
2- Department	Power Mechanics Techniques/Branch of Refrigeration and Airconditioning
3- Name/code of the curriculum	Applied Mathematics (compulsory) - TIK111 - level I
4- Forms of presence available	Attendance
5- Semester/annual system	The Semester system
6- Number of hours (total)	2 x 15 weeks = 30 hours (semester)
7- Date of preparation of this description	2025|1|15

8. Objectives of the curriculum

- Develop the ability to think logically, critically, analytically and deductively in students.
- Provide students with basic and advanced mathematical concepts, principles and terminology and apply them in different situations.
- Enhance the interest, participation, pleasure and self-confidence of students in learning and using mathematics.
- Improve the communication, collaboration, presentation and presentation skills of students in the field of mathematics.
- Broaden students' horizons, enrich their culture and prepare them for academic and professional life through mathematics.

9- Learning outputs and methods of teaching, learning and evaluation

A- Knowledge objectives

- The objectives are to provide students with knowledge, understanding, application, analysis, evaluation and creativity in the field of engineering and applied mathematics and related technical and engineering disciplines. Some examples of the cognitive goals of a math course are:
- Students should be able to memorize, retrieve, apply and solve equations, variances, functions, derivatives, integrations, sequences, mathematical strings, matrices, vectors, vectors, levels, spaces, sizes, curves, cones, differential equations, integrative equations and differential equations.

B. skills objectives of the Curriculum

- Develop the ability to think logically, analytically and critically in solving mathematical and engineering problems.
- Learn and apply mathematical concepts, principles and rules in different fields such as algebra, geometry, calculus, statistics, probabilities, differential equations, linear and others.
- Use appropriate computer tools and software to represent, analyze and interpret data and mathematical and engineering models.
- Communicate effectively and professionally with others using mathematical language, symbols, graphs, tables and charts.

Teaching and learning methods

- Lectures: Provide information and mathematical concepts directly to students.
- Active Learning: Encourage students to participate in the learning process through problem-solving, group discussions, and interactive activities.
- Project-based learning: Students are assigned to projects that require the application of mathematical knowledge in real-world contexts.
- Self-learning: Students are encouraged to research and explore independently to enhance their understanding of mathematical concepts.
- Digital learning: The use of digital tools and software to enhance learning and understanding.
- Continuous assessment: Students are continuously assessed through tests, assignments, and projects.

Methods of evaluation

- Written tests: Students' understanding of mathematical concepts is assessed through traditional written tests.
- Homework: The ability to apply mathematical knowledge in problem solving is assessed through homework.
- Projects: The ability to apply mathematical knowledge in real-world contexts is assessed through projects.
- Class participation: The ability to effectively communicate mathematical ideas and concepts is assessed through class participation.
- Electronic tests: Digital tools and software are used to assess students' understanding of mathematical concepts.

C. General and transferable skills (other skills related to employability and personal development).

- Effective communication: The ability to communicate clearly, confidently and respectfully with others, whether they are colleagues, managers, clients or partners.
- Teamwork: The ability to work collaboratively and in concert with others, to benefit from the skills, experience and opinions of each individual, and to contribute to the achievement of common goals.
- Creative problem solving: The ability to think outside the box and use mathematics in new and innovative ways to solve real and complex problems facing an individual, society or the world.

10 the structure of the curriculum					
The week	Hours	Required learning outcomes	Name of unit or subject	Method of education	Method of assessment
1 – 6	2 hours a week	Identify and solve equations	Function, implicit function, trigonometric ratios, and purposes of algebraic functions	Theoretical + Practical	Oral exams
7 – 9	2 hours a week	Solving equations and problems	High-ranking derivatives and applications	Theoretical + Practical	Written tests
10 – 12	2 hours a week	Identify and solve integration equations	Undefined and defined integration and its applications	Theoretical + Practical	Projects
13-15	2 hours a week	Solve complex number equations	The composite numbers	Theoretical + Practical	Homework

11 the infrastructure	
A. prescribed books and main references	**1- Thomas' Calculus** **2- Mathematics for the Nonmathematician**
Books and references (scientific journals, reports,...)	**1-Mathematics: A Very Short Introduction** **2- Journal of the American Mathematical Society**
E-referencing, Web sites	**1 - https://www.mathematicalreports.org/** **2 https://www.maa.org/press/periodicals/mathematics-magazine**

12- the curriculum development plan
• Provide students with basic and advanced mathematical concepts and skills that enable them to apply in their technical and professional fields. • Develop critical, creative, analytical and logical thinking in students by solving diverse and complex mathematical problems. • Encourage students to use modern computer tools and software to facilitate calculation, drawing, representation and mathematical analysis. • Enhance students' ability to communicate, collaborate, and learn self and continuously in the field of mathematics.

Fundamentals of Air Conditioning (compulsory) - PMTR241 - level II

Description of the Curriculum

The student will learn about the basics of air conditioning and the mechanisms of heat transfer, the design of fans, ducts, pipes, pumps and electronic filters.

1. Educational institution	Northern Technical University/ Kirkuk Technical Institute
2. Department	Power Mechanics Techniques/Branch of Refrigeration and Airconditioning
3. Name/code of the curriculum	Fundamentals of Air Conditioning (compulsory) - PMTR241 - level II
4. Forms of presence available	Attendance
5. Semester/annual system	The Semester system
6. Number of hours (total)	4 x 15 weeks = 60 hours (semester)
7. Date of preparation of this description	2025|1|15

8. Objectives of the curriculum

- Provide the student with the basic skills to understand the basics of air conditioning and human comfort
- Identify the methods of heat transfer and design of fans and pumps
- Provide the student with the skills of connecting, designing, and maintaining pumps, pipes, and others.
- Design and study of air ducts

9- Learning outputs and methods of teaching, learning and evaluation

A- Knowledge objectives

- Provide the student with theoretical information for air conditioning.
- Introduce the student to the basic concepts of calculation and development of the total coefficient of walls and layers.

B. skills objectives of the Curriculum

- Give the student the skill of analyzing and interpreting fans used in

conditioning

- Perform engineering calculations for airway design and its applications.
- Perform calculations for air properties schemes in the main and subsections of the airway.

Teaching and learning methods

- Theoretical lectures workshops, laboratories and conducting practical experiments.

Methods of evaluation

- Oral or electronic tests
- Electronic tests
- Electronic Daily Assessment
- Laboratory reports
- Practical exam attendance
- The first electronic exam
- The second electronic exam
- Final physical and electronic exams

C. General and transferable skills (other skills related to employability and personal development).

- Maintenance and installation of air ducts applied to buildings
- The use of modern measurement devices, especially computer-programmed and adaptive.

10 the structure of the curriculum					
The week	Hours	Required learning outcomes	Name of unit or subject	Method of education	Method of assessment
1 – 6	4 hours a week		Heat transfer , conduction , convection , radiation , heat transfer coefficient , composite walls , total heat transfer coefficient , Fans , fan laws, specification	Theoretical + Practical	Oral and practical exams
7 – 9	4 hours a week		Air ducting design , pressure losses in duct, Movment energy and air discharge in room, Piping design pumps type calculation ,	Theoretical + Practical	Oral and practical exams
10 – 12	4 hours a week		Application of air conditioning system , Air and water systems	Theoretical + Practical	Oral and practical exams
13-15	4 hours a week		Air Washers, Energy distribution in air conditioning systems	Theoretical + Practical	Oral and practical exams

11- the infrastructure	
A. prescribed books and main references	**- Applied Air-conditioning and refrigeration by C.T Gosling - Air conditioning Engineering by W.P.Jones Khaled Al-Judi - Principles of Air Conditioning and Refrigeration Engineering**
Books and references (scientific journals, reports,...)	**Virtual Library of the Ministry of Higher Education and Scientific Research**
E-referencing, Web sites	**Virtual Library of the Ministry of higher Education and Scientific Research Books in the Institute's electronic library**

12- the curriculum development plan
• - Benefit from the virtual library of the Ministry of higher Education and Scientific Research. • - Take advantage of scientific websites in the development of the course through the presentation of scientific films and developments in the field of the course. • - Linking the theoretical and practical part of the course through the subject of the student project.

Advanced air conditioning (compulsory) - PMTR252- level II.

Description of the Curriculum

The student will learn about human comfort, air conditioning, Heating load calculations, Heating applications, refrigeration load calculations, refrigeration load applications and the most important computer programs in air conditioning calculations

1. Educational institution	Northern Technical University/ Kirkuk Technical Institute
2. Department	Power Mechanics Techniques/Branch of Refrigeration and Airconditioning
3. Name/code of the curriculum	Advanced air conditioning (compulsory) - PMTR252- level II.
4. Forms of presence available	Attendance
5. Semester/annual system	The Semester system
6. Number of hours (total)	4 x 15 weeks = 60 hours (semester)
7. Date of preparation of this description	2025|1|15

8. Objectives of the curriculum

- Provide the student with the basic skills to understand the basics of human comfort
- Identify Heating load calculations
- Provide the student with skills in applications of Heating loads.
- Identify the calculations of refrigeration loads and their applications
- The most important computer programs about calculations of air conditioning, refrigeration systems and Heating systems

9- Learning outputs and methods of teaching, learning and evaluation

A- Knowledge objectives

- Provide the student with theoretical information for advanced air conditioning.
- Introduce the student to the basic concepts of refrigeration files and Heating files.

B. skills objectives of the Curriculum

- Provide the student with the skill of analyzing and interpreting boilers and refrigeration towers used in air conditioning
- Perform engineering calculations for the design of refrigeration and Heating systems.

Teaching and learning methods

- Theoretical lectures workshops, laboratories and conducting practical experiments.

Methods of evaluation

- Oral or electronic tests
- Electronic tests
- Electronic Daily Assessment
- Laboratory reports
- Practical exam attendance
- The first electronic exam
- The second electronic exam
- Final physical and electronic exams

C. General and transferable skills (other skills related to employability and personal development).

- Maintenance and installation of air ducts applied to buildings
- The use of modern measurement devices, especially computer-programmed and adaptive.

10. Structure of the curriculum					
The week	Hours	Required learning outcomes	Name of unit or subject	Method of education	Method of assessment
1 – 6	4 hours a week		Human comfort , heating load calculations,heating systems	Theoretical + Practical	Oral and practical exams
7 – 9	4 hours a week		Refrigeration load calculations , refrigeration systems	Theoretical + Practical	Oral and practical exams
10 – 12	4 hours a week		Psychrometric chart , sensible and latent heat , computer aided calculation of refrigeration load ,	Theoretical + Practical	Oral and practical exams
13-15	4 hours a week		Air filter method s , Air washers ,	Theoretical + Practical	Oral and practical exams

11- the infrastructure	
A. prescribed books and main references	**- Applied Air-conditioning and refrigeration by C.T Gosling - Air conditioning Engneering by W.P.Jones Khaled Al-Judi - Principles of Air Conditioning and Refrigeration Engineering**
Books and references (scientific journals, reports,...)	**Virtual Library of the Ministry of higher Education and Scientific Research**
E-referencing, Web sites	**Virtual Library of the Ministry of higher Education and Scientific Research Books in the Institute's electronic library**

12. Curriculum development plan
• - Benefit from the virtual library of the Ministry of higher Education and Scientific Research. • - Take advantage of scientific websites in the development of the course through the presentation of scientific films and developments in the field of the course. • - Linking the theoretical and practical part of the course through the subject of the student project.

Arabic Language (compulsory) - NTU103 - level I

Description of the Curriculum

Introducing the student to the origins of the Arabic language, the language of Al-Dad, to teach the student the rules of correct communication with official and non-official institutions.

1. Educational institution	Northern Technical University/ Kirkuk Technical Institute
2. Department	Power Mechanics Techniques/Branch of Refrigeration and Airconditioning
3. Name/code of the curriculum	Arabic Language (compulsory) - NTU103 - level I
4. Forms of presence available	Attendance
5. Semester/annual system	The Semester system
6. Number of hours (total)	2 x 15 weeks = 30 hours (semester)
7. Date of preparation of this description	2025|1|15

8. Objectives of the curriculum

- Introducing the student to the correct method in administrative communications and daily life and avoiding grammatical errors to express the content of the message correctly.
- Learn the correct pronunciation of Arabic letters.
- Learn to form the letters of the Arabic language in their proper form.
- Encourage the student to continue reading.
- Teach the student brevity when communicating the idea in written form.

9- Learning outputs and methods of teaching, learning and evaluation

A- Knowledge objectives

- Provide the student with theoretical and practical information for the vocabulary of the Arabic language.
- Introducing the student to the origins of writing in the Arabic language.
- Learn the correct pronunciation of Arabic letters.
- Distinguish between Arabic characters that are similar to sound or shape.

B. skills objectives of the Curriculum

- The formation of the Queen of Arabic language in the student.
- Proper understanding in the formation of letters and words of the Arabic language.

Teaching and learning methods

- Theoretical lectures in the lecture hall.

Methods of evaluation

- Oral or written tests.
- The first semester exam is written.
- Daily assessment of attendance
- Theoretical reports for teaching the writing and pronunciation of Arabic correctly.
- Discussion of reports.
- The first semester exam.
- The second semester exam.
- Final exam attendance.

C. General and transferable skills (other skills related to employability and personal development).

- Learn to formulate speech correctly in administrative and public life communications.
- Learn the origins of numbering rules.

10. Structure of the curriculum					
The week	Hours	Required learning outcomes	Name of unit or subject	Method of education	Method of assessment
1 – 6	2 hours a week		The concept of language errors. Rules of tied and open-ended writing. A thousand outstretched and cabin, the solar and lunar letters. The light and the light. The link and the pieces. The average whisper. The extreme. Punctuation marks. Name and deed and distinguish between them	Theoretical + Practical	Oral and written exams
7 – 9	2 hours a week		The effect is the ultimate effect. Number. Application of common language errors.	Theoretical + Practical	Oral and written exams
10 – 12	2 hours a week		Meaning of free letters. The thousand difference rule	Theoretical + Practical	Oral and written exams
13-15	2 hours a week	Theoretical + Practical	Oral and written exams	Theoretical + Practical	Oral and written exams

11- the infrastructure	
A. prescribed books and main references	**Lectures adapted from: 1- Clear dictation: Abdul Majid al-Naimi, Dham al-Kiyal, Library of Dar al-Mutanabbi, Baghdad I 6,1987. 2- Lessons in language, grammar and spelling for state employees: Ismail Hamoud Atwan and others Press of the Ministry of Education No. (3) Baghdad, I 2, 1984. 4- General Arabic language for departments other than specialization: Abdul Qadir Hassan Amin and others, Ministry of higher Education and Scientific Research, T2, 2000.**
Books and references (scientific journals, reports,...)	**Virtual Library of the Ministry of higher Education and Scientific Research**
E-referencing, Web sites	**Virtual Library of the Ministry of higher Education and Scientific Research** **Books in the Institute's electronic library**

12. Curriculum development plan

- - Benefit from the virtual library of the Ministry of higher Education and Scientific Research.
- - Take advantage of scientific websites in the development of the course through the presentation of scientific films and developments in the field of the course.
- - Linking the theoretical and practical part of the course through the subject of the student project.

Arabic Language (compulsory) - NTU202 - Level II

Description of the Curriculum

Introducing the student to the origins of the Arabic language, the language of Al-Dad, to teach the student the rules of correct communication with official and non-official institutions.

1. Educational institution	Northern Technical University/ Kirkuk Technical Institute
2. Department	Power Mechanics Techniques/Branch of Refrigeration and Airconditioning
3. Name/code of the curriculum	Arabic Language (compulsory) - NTU202 - Level II
4. Forms of presence available	Attendance
5. Semester/annual system	The Semester system
6. Number of hours (total)	2 x 15 weeks = 30 hours (semester)
7. Date of preparation of this description	2025|1|15

8. Objectives of the curriculum

- Introducing the student to the correct method in administrative communications and daily life and avoiding grammatical errors to express the content of the message correctly.
- Learn the correct pronunciation of Arabic letters.
- Learn the correct pronunciation of Arabic letters.
- Distinguish between Arabic characters that are similar in sound or shape to proper typing in administrative communications.

9- Learning outputs and methods of teaching, learning and evaluation

A- Knowledge objectives

- Provide the student with theoretical and practical information for the vocabulary of the Arabic language.
- Introducing the student to the origins of writing in the Arabic language.
- Learn the correct pronunciation of Arabic letters.
- Distinguish between Arabic characters that are similar to sound or shape.

B. skills objectives of the Curriculum

- The formation of the Queen of Arabic language in the student.
- Proper understanding in the formation of letters and words of the Arabic language.

Teaching and learning methods

- Theoretical lectures in the lecture hall.

Methods of evaluation

- Oral or written tests.
- The first semester exam is written.
- Daily assessment of attendance
- Theoretical reports for teaching the writing and pronunciation of Arabic correctly.
- Discussion of reports.
- The first semester exam.
- The second semester exam.
- Final exam attendance.

C. General and transferable skills (other skills related to employability and personal development).

- Learn to formulate speech correctly in administrative and public life communications.
- Learn the origins of numbering rules.

10. Structure of the curriculum					
The week	Hours	Required learning outcomes	Name of unit or subject	Method of education	Method of assessment
1 – 6	2 hours a week		The concept of language errors. Rules of tied and open-ended writing. A thousand outstretched and cabin, the solar and lunar letters. The light and the light. The link and the pieces. The average whisper. The extreme. Punctuation marks. Name and deed and distinguish between them	Theoretical + Practical	Oral and written exams
7 – 9	2 hours a week		The effect is the ultimate effect. Number. Application of common language errors.	Theoretical + Practical	Oral and written exams
10 – 12	2 hours a week		Meaning of free letters. The thousand difference rule	Theoretical + Practical	Oral and written exams
13-15	2 hours a week	Theoretical + Practical	Base and toner. Formal aspects of the administrative discourse. Language of administrative speech.	Theoretical + Practical	Oral and written exams

11- the infrastructure	
A. prescribed books and main references	**Lectures adapted from: 1- Clear dictation: Abdul Majid al-Naimi, Dham al-Kiyal, Library of Dar al-Mutanabbi, Baghdad I 6,1987. 2- Lessons in language, grammar and spelling for state employees: Ismail Hamoud Atwan and others Press of the Ministry of Education No. (3) Baghdad, I 2, 1984. 4- General Arabic language for departments other than specialization: Abdul Qadir Hassan Amin and others, Ministry of higher Education and Scientific Research, T2, 2000.**
Books and references (scientific journals, reports,...)	**Virtual Library of the Ministry of higher Education and Scientific Research**
E-referencing, Web sites	**Virtual Library of the Ministry of higher Education and Scientific Research Books in the Institute's electronic library**

12. Curriculum development plan

- - Benefit from the virtual library of the Ministry of higher Education and Scientific Research.
- - Take advantage of scientific websites in the development of the course through the presentation of scientific films and developments in the field of the course.
- - Linking the theoretical and practical part of the course through the subject of the student project.

Human Rights and Democracy (compulsory) - NTU100 - level I.

Description of the Curriculum

Introducing the student to the origins of the Arabic language, the language of Al-Dad, to teach the student the rules of correct communication with official and non-official institutions.

1. Educational institution	Northern Technical University/ Kirkuk Technical Institute
2. Department	Power Mechanics Techniques/Branch of Refrigeration and Airconditioning
3. Name/code of the curriculum	Human Rights and Democracy (compulsory) - NTU100 - level I.
4. Forms of presence available	Attendance
5. Semester/annual system	The Semester system
6. Number of hours (total)	2 x 15 weeks = 30 hours (semester)
7. Date of preparation of this description	2025|1|15

8. Objectives of the curriculum

- Introducing students to the 1948 Universal Declaration of Human Rights.
- Identify international conventions on civil, political and social rights and freedoms.
- Introducing the student to the meaning of the Constitution and its legal principles and how to derive laws from them.
- Introduce the student to the rights of the people around him and teach him how to preserve his rights and not harm people.
- Introducing the student to the laws that are derived from the Constitution, including the Penal Code and the Civil Code.

9- Learning outputs and methods of teaching, learning and evaluation

A. knowledge objectives

- Teaching the student the legal rule stipulated in Article 216 of the Iraqi Civil Law (no harm or harm). Anyone who has caused damage must be compensated.

- Recognize the rights of the family, the rights of the neighbor and all people.
- Definition of democracy and the mechanism of its application to reality.
- Introducing the student to the types of democracies in the world and the statement of the democratic system in Iraq. Introduce students to the laws that they derive from

B. skills objectives of the Curriculum

- Explain judicial applications in relation to harm caused by a person against others.
- Statement of the application of international conventions to Iraqi legislation in general.

Teaching and learning methods

- Theoretical lectures and explain the practical reality by bringing the judgments of the Iraqi judiciary regarding human rights.

Methods of evaluation

- Oral or written tests.
- The first semester exam is written.
- Daily assessment of attendance
- Theoretical reports
- Discussion of reports.
- The first semester exam.
- The second semester exam.
- Final exam attendance.

C. General and transferable skills (other skills related to employability and personal development).

- Identify the types of democratic systems in the world and their impact on the citizen
- Identify international conventions and their impact on legislation and the impact of legislation on citizens.

10. Structure of the curriculum					
The week	Hours	Required learning outcomes	Name of unit or subject	Method of education	Method of assessment
1 – 6	2 hours a week		Human rights, their definition, their objectives Human rights in ancient civilizations, especially the Mesopotamian civilization. Human rights in the divine laws with a focus on human rights in Islam. Human Rights in modern and modern History: International Recognition of Human Rights since World War I and the League/United Nations. 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. Human rights in Iraqi constitutions between theory and reality.	Theoretical + Practical	Written examinations
7 – 9	2 hours a week		Guarantees and respect for the 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 constitutional oversight, guarantees in freedom of the press and public opinion, the role of NGOs in respecting and protecting human rights. Democracy is defined. Types. Democratic concepts of the world's democratic systems.	Theoretical + Practical	Written examinations
10 – 12	2 hours a week		Fundamental freedoms, intellectual freedoms, economic and social freedoms. Freedom of Education	Theoretical + Practical	Written examinations

			Freedom of the Press Freedom of Assembly, Freedom of Education Freedom of the Press, Freedom of Assembly.		
13-15	2 hours a week	Theoretical + Practical	Freedom of association. Freedom of work. Property rights. Freedom of trade and industry. Freedom of women political parties, public freedoms, scientific and technical progress and public freedoms. The future of public freedoms.	Theoretical + Practical	Written examinations

11- the infrastructure	
A. prescribed books and main references	**The lectures guarantee the vocabulary prescribed by the Ministry of higher Education and Scientific Research**
Books and references (scientific journals, reports,...)	**Virtual Library of the Ministry of higher Education and Scientific Research**
E-referencing, Web sites	**Virtual Library of the Ministry of higher Education and Scientific Research** **Books in the Institute's electronic library**

12. Curriculum development plan

- - Benefit from the virtual library of the Ministry of higher Education and Scientific Research.
- - Take advantage of scientific websites in the development of the course through the presentation of scientific films and developments in the field of the course.
- - Linking the theoretical and practical part of the course through the subject of the student project.

Profession Ethics (compulsory) - NTU204 - level II.

Description of the Curriculum

Introducing the student to the principles of human values when carrying out the profession and the sub-principles of basic principles and ethics that appear when dealing with people.

1. Educational institution	Northern Technical University/ Kirkuk Technical Institute
2. Department	Power Mechanics Techniques/Branch of Refrigeration and Airconditioning
3. Name/code of the curriculum	Profession Ethics (compulsory) - NTU204 - level II.
4. Forms of presence available	Attendance
5. Semester/annual system	The Semester system
6. Number of hours (total)	2 x 15 weeks = 30 hours (semester)
7. Date of preparation of this description	2025|1|15

8. Objectives of the curriculum

a. Educating the student about the highest human values and adhering to them as the basic criterion in controlling successful human behavior.

b. Teach the student that success does not only come in controlling the principles of the profession in which he works, but he needs to know the rules of dealing with people.

c. Teach the student that the profession needs legitimate methods to succeed, and these methods only come from ethics derived from higher human values.

d. Teach the student that mastering the work entrusted to him is one of the qualities of the successful man in life and this needs patience, and fraud and deception qualities of the failed man, and sure does not continue such a man in his profession.

9- Learning outputs and methods of teaching, learning and evaluation

. **Knowledge objectives**

- Provide the student with the principles of human values and good morals.
- The student is inspired by living examples, not by people in reality, whether kind or private

B. skills objectives of the Curriculum

- Give the student the results of the bad behavior and show its results on the reality and its harms.
- Statement of the legal rules that punish fraud, fraud and fraud.
- Introducing the student to the penalties of administrative corruption is a crime and bribery in the Iraqi Penal Code No. 111 of 1969.

Teaching and learning methods

- Theoretical lectures, giving examples of reality.

Methods of evaluation

- Oral or written tests.
- The first semester exam is written.
- Daily assessment of attendance
- Theoretical reports
- Discussion of reports.
- The first semester exam.
- The second semester exam.
- Final exam attendance.

C. General and transferable skills (other skills related to employability and personal development).

- Examples of real-life employees who are morally outstanding and have high principles
- Examples of reality for people with higher human values

10. Structure of the curriculum					
The week	Hours	Required learning outcomes	Name of unit or subject	Method of education	Method of assessment
1 – 6	2 hours a week		The definition of morality is language and terminology. Professional ethics. The Islamic concept of Ethics. Definition of profession by Islam. The concept of morality. The moral characteristics of Islam. Disgraced behavior in Islam. Standards based on the profession. Objectives of professional ethics.	Theoretical + Practical	Theoretical exams
7 – 9	2 hours a week		General rules of disagreement. Sources of morality. The legality of professional ethics. Benefits of administrative work ethics. Importance of professional ethics. Characteristics of work ethics. The highest human values. The difference between work and profession.	Theoretical + Practical	Theoretical exams
10 – 12	2 hours a week		Qualities of professional ethics. Things that are contrary to professional ethics. Things that are contrary to professional ethics. Causes of widespread administrative corruption.	Theoretical + Practical	Theoretical exams
13-15	2 hours a week		Steps to an acceptable level of professional ethics. Rules governing job behavior. Ways to build professional ethics. Ethical qualities of the employee. Ethics of the teaching profession. Behavioral deviations. Financial deviations. Bribery offense. The difference between gift and bribe. Fraud at work. Ethical assessment and examination. Ethical values of scientific research.	Theoretical + Practical	Theoretical exams

11- the infrastructure	
A. prescribed books and main references	**Lectures prepared according to the prescribed vocabulary**
Books and references (scientific journals, reports,...)	**Virtual Library of the Ministry of higher Education and Scientific Research**
E-referencing, Web sites	**Virtual Library of the Ministry of higher Education and Scientific Research** **Books in the Institute's electronic library**

12. Curriculum development plan
• Take advantage of the virtual library of the Ministry of higher Education and Scientific Research. • Benefit from scientific websites in the development of the course through the presentation of scientific films and developments in the field of the course. • Linking the theoretical and practical part of the course through the subject of the student project.

French Language (elective) - NTU107 - level I

Description of the Curriculum

Identify the types of tenses for verbs, structure small and complex sentences, and learn about methods of writing sentences. In addition to how to listen to her tips and exercises.

1. Educational institution	Northern Technical University/ Kirkuk Technical Institute
2. Department	Power Mechanics techniques/Branch of Refrigeration and Airconditioning
3. Name/code of the curriculum	French Language (elective) - NTU107 - level I
4. Forms of presence available	Attendance
5. Semester/year system	The Semester system
6. Number of hours (total)	2 x 15 weeks = 30 hours (semester)
7. Date of preparation of this description	2025|1|15

8- objectives of the curriculum

- Understanding of different French language texts.
- Speaks standard French in various communication situations.

9- Learning outputs and methods of teaching, learning and evaluation

A- Knowledge objectives

- To read linguistic texts in a way that reveals his understanding of their contents.
- Thinks, taking into account the foundations of French reading for its various purposes.

B. skills objectives of the Curriculum

- He decides to write correctly.
- He is able to read properly
- He suggests correcting the mistakes of others

Teaching and learning methods

- Theoretical lectures, open discussion, brainstorming, working in groups, training and practice. And self-learning

Methods of evaluation

- Oral or electronic tests
- Daily assessment
- Theoretical exam attendance
- The first Semester exam
- The second semester exam
- Final exams and electronic exams

C. General and transferable skills (other skills related to employability and personal development).

- Writing, pronunciation, and introducing yourself in the correct French language.

10. Structure of the curriculum					
The week	Hours	Required learning outcomes	Name of unit or subject	Method of education	Method of assessment
1 – 4	2 hours a week		:Sujets et vocabulaire ➢ Salutations Combinaison alphabet + lettres Nationalités et pays Emplois Nombres Donner des informations personnelles adresse, numéro de téléphone,) (email, âge Remplir un formulaire Nourriture et boissons :Parler ➢ Parler de famille, d'amis et de célébrités Parler de soi - informations personnelles clés + j'aime / n'aime pas	Theoretical + Oral	Oral and theoretical exams

5 – 8	2 hours a week		Parler de passe-temps Vie quotidienne - routines, habitudes, temps libre Jours de la semaine Animaux Dire l'heure Biens de consommation - vêtements, accessoires, nourriture Décrire des objets - forme, couleur, taille Parler de la météo Achats	Theoretical + Oral	Oral and theoretical exams
9 – 12	2 hours a week		:Grammaire ➢ Noms - féminin, masculin, singulier, pluriel Les verbes «être», «avoir» au présent Articles - définis et indéfinis Accord adjectif en genre et en nombre «Verbes dans «ER Etre et Avoir Prépositions de lieu Il y a + Il n'y a pas Ordre des mots: phrase / question Prépositions clés - à, dans, en, .au, etc Des questions oui ou non	Theoretical + Oral	Oral and theoretical exams
13-15	2 hours a week		Negative sentences Negative sentences Key verbs: faire, aller, sortir, .etc :Contenu culturel ➢ Paris Villes de France Les pays francophones Noms français Carte de France	Theoretical + Oral	Oral and theoretical exams

11- the infrastructure	
A. prescribed books and main references	**Alors A1** **Alors A2**
Books and references (scientific journals, reports,...)	**Virtual Library of the Ministry of higher Education and Scientific Research**
E-referencing, Web sites	**Virtual Library of the Ministry of higher Education and Scientific Research** **Books in the Institute's electronic library**

12. Curriculum development plan
• Take advantage of the virtual library of the Ministry of higher Education and Scientific Research. • Take advantage of scientific websites in the development of the course through the france universities website and developments in the field of the course.

Crimes of the Baath regime in Iraq (compulsory) - NTU203 - Level II

Description of the Curriculum

Introducing the student to the crimes committed by the Baath Party regime in Iraq in accordance with the curriculum s of the Iraqi Criminal Court.

1. Educational institution	Northern Technical University/ Kirkuk Technical Institute
2. Department	Power Mechanics Techniques/Branch of Refrigeration and Airconditioning
3. Name/code of the curriculum	Crimes of the Baath regime in Iraq (compulsory) - NTU203 - Level II
4. Forms of presence available	My presence
5. Semester /annual system	The Semester system
6. Number of hours (total)	2 x 15 weeks = 30 hours (semester)
7. Date of preparation of this description	2025|1|15

8. Objectives of the curriculum

a. Definition of international crimes.
b. Introducing human rights and the injustice that occurred by the Baath regime on the rights of citizens.
c. Statement of the fundamental rights and freedoms of the citizen in the Constitution.
d. Statement of the fundamental rights and freedoms of the citizen in the Iraqi legislation.

9- Learning outputs and methods of teaching, learning and evaluation

. Knowledge objectives

- Providing the student with the crimes of the Baath regime in Iraq.
- Introducing the student to the curriculum s issued against the Baath regime.

B. skills objectives of the Curriculum

- Identify the student with the mass graves committed
- Introducing the student to the environmental crimes committed by the Baath regime.
- Introducing students to human rights and protecting them.

Teaching and learning methods
• Theoretical lectures.
Methods of evaluation
• Oral or written tests. • The first semester exam is written. • Daily assessment of attendance • Theoretical reports • Discussion of reports. • The first semester exam. • The second semester exam. • Final exam attendance.
C. General and transferable skills (other skills related to employability and personal development). • Lectures with examples • Lectures with examples

10. Structure of the curriculum					
The week	Hours	Required learning outcomes	Name of unit or subject	Method of education	Method of assessment
1 – 6	2 hours a week		A general idea of the article of the Baath crimes, crimes of the Baath regime according to the Iraqi Supreme Criminal Court Law 2005. The concept of crimes and their sections, the definition of crime language, the definition of crime in terminology, the definition of crime in law, psychology, sociology, and Sharia science. Crimes, International Crime, political Crime, Social crimes, Authority and Government crimes, psychological crimes. The corporal crimes freedom of religion and belief, and the corporal of the crime of confiscation of funds, the crime of displacement, environmental crimes, statement of human rights violations. The crimes of the Baath regime documented in accordance with the Iraqi Supreme Criminal Court Law 2005. Types of international crimes, crimes of genocide.	Theoretical + Practical	Oral and formal exams
7 – 9	2 hours a week		Crimes against humanity, war crimes. Explain the curriculum s of the Supreme Criminal Court. Psychological and social crimes and their consequences. The responsibility of the state to balance the public interest with the interest of individuals. Violations of the Baathist regime in Iraq, violations of Iraqi laws, forms of human rights violations	Theoretical + Practical	Oral and formal exams

			and crimes of authority. Explain the mechanisms of psychological crimes and explain the effects of psychological crimes. Officer of social crimes.		
10 – 12	2 hours a week		Explain some of the curriculum s of political and military violations of the regime of some, and identify the places of prisons of the regime of some. Environmental crimes of the Baath regime. Military and radioactive contamination and mine explosions. The destruction of cities and villages (scorched earth policy). Crimes of drying the marshes by the Baath regime. And the destruction of palm groves, trees and crops. Mass grave crimes. The Genocide Cemetery. Events of 1963. The Iran-Iraq War, 1983, and its relationship to mass graves.	Theoretical + Practical	Oral and formal exams
13-15	2 hours a week		Statement of the events of the popular uprising. Chronological classification of mass graves from 1963 to 2003. Genocide graves dating back to the events of 1963. Genocide graves linked to the Iran-Iraq War. Cemetery of the 1983 Barzani Kurdish Genocide. The graves of the victims of the Anfal Massacre of 1987-1988. Explain the events of the genocide cemetery of the victims of the 1991 popular uprising.	Theoretical + Practical	Oral and formal exams

11- the infrastructure	
A. prescribed books and main references	**Lectures scheduled by the Ministry of higher Education and Scientific Research**
Books and references (scientific journals, reports,...)	**Virtual Library of the Ministry of higher Education and Scientific Research**
E-referencing, Web sites	**Virtual Library of the Ministry of higher Education and Scientific Research** **Books in the Institute's electronic library**

12. Curriculum development plan
• Take advantage of the virtual library of the Ministry of higher Education and Scientific Research. • Benefit from scientific websites in the development of the course through the presentation of scientific films and developments in the field of the course.

Principles of Thermodynamics (compulsory) - PMTR137 - level I

Description of the Curriculum

Introducing the student to the foundations of thermodynamics – and applications of zero law, first and second law with emphasis on the Carnot course and the Carnot reflected course.

1. Educational institution	Northern Technical University/ Kirkuk Technical Institute
2. Department	Power Mechanics Techniques/Branch of Refrigeration and Airconditioning
3. Name/code of the curriculum	Principles of Thermodynamics (compulsory) - PMTR137 - level I
4. Forms of presence available	Attendance
5. Semester/annual system	The Semester system
6. Number of hours (total)	4 x 15 weeks = 60 hours (semester)
7. Date of preparation of this description	2025|1|15

8. Objectives of the curriculum

e. Provide the student with the basic skills to understand the principles of thermodeinamics, measurement systems and properties of materials such as pressure and temperature
f. Identify natural sources of energy (solar, wind and falling water)
g. Provide the student with the necessary skills for energy analysis and balance in the applied systems of thermodynamics.
h. The principle of the normal chlornot cycle and the Carnot reflex cycle and their applications
i. Teach the student the thermal behavior of materials, especially water vapor and the mechanism of calculating its properties

9- Learning outputs and methods of teaching, learning and evaluation

i. Knowledge objectives

- Provide the student with theoretical information on the principles of thermodynamics and their applications.
- Introduce the student to the basic concepts of energies and their transformations.
- Introducing students to the three laws of thermodynamics.
- Perform equilibrium calculations for masses, energy and energy balance, and controlled volume

B. skills objectives of the Curriculum

- Provide the student with the skill of conducting the engineering analysis of energies on thermodynamics systems.
- Perform engineering calculations for the exchangers design and their capacities.
- Perform calculations of equations (energy, nthalpy, and properties of ice fluids).

Teaching and learning methods

- Theoretical lectures workshops, laboratories and conducting practical experiments.

Methods of evaluation

- Oral or written tests.
- The first semester exam is written.
- Daily assessment of attendance
- Theoretical reports
- Discussion of reports.
- The first semester exam.
- The second semester exam.
- Final entrance exams.

C. General and transferable skills (other skills related to employability and personal development).

- Convert units of measurement according to global systems and read capacities of thermal equipment.
- The use of modern measurement devices, especially computer-programmed and thermodynamic.

10. Structure of the curriculum					
The week	Hours	Required learning outcomes	Name of unit or subject	Method of education	Method of assessment
1 – 6	4 hours a week		Basic concepts, natural energy sources, heat workpiece, measuring instruments, pressure measurement, measurement of temperature	Theoretical + Practical	Oral and practical exams
7 – 9	4 hours a week		Internal thermal energy, flow energy, first law of thermodynamics, viscosity measurement of liquids	Theoretical + Practical	Oral and practical exams
10 – 12	4 hours a week		Applications of first Law, Publisher, throttle, condenser, evaporator, heat exchanger, heater, specific heat measurement of some materials	Theoretical + Practical	Oral and practical exams
13-15	4 hours a week		Pressure, heat, entropy stabilization, thermodynamic procedures and representation, steam boiler, the refrigeration towers	Theoretical + Practical	Oral and practical exams

11- the infrastructure	
- Applied Engineering of Thermodynamic by JJ. Yonus **- Thermodynamic by Sontag van Wylem** **- Thermodynamic by Eastop**	**A. prescribed books and main references**
Virtual Library of the Ministry of higher Education and Scientific Research	**Books and references (scientific journals, reports,...)**
Virtual Library of the Ministry of higher Education and Scientific Research **Books in the Institute's electronic library**	**E-referencing, Web sites**

12. Curriculum development plan
• Take advantage of the virtual library of the Ministry of higher Education and Scientific Research. • Benefit from scientific websites in the development of the course through the presentation of scientific films and developments in the field of the course.

Applied thermodynamics (compulsory) - PMTR139 - level I

Description of the Curriculum

Introducing the student to the foundations of thermodynamics – and applications of zero law, first and second law with emphasis on the Carnot course and the Carnot reflected course.

1. Educational institution	Northern Technical University/ Kirkuk Technical Institute
2. Department	Power Mechanics Techniques/Branch of Refrigeration and Airconditioning
3. Name/code of the curriculum	Applied thermodynamics (compulsory) - PMTR139 - level I
4. Forms of presence available	Attendance
5. Semester/annual system	The semester system
6. Number of hours (total)	4 x 15 weeks = 60 hours (semester)
7. Date of preparation of this description	2025|1|15

8. Objectives of the curriculum

- Provide the student with the basic skills to understand applied thermodienamic applications of the Carnot cycle and properties of materials such as pressure, temperature and gas mixing
- Recognize the stability of volume, pressure and temperature
- Provide the student with skills for the applications of compressive refrigeration and absorption cycles.
- Steam boilers and refrigeration towers and their applications.

9- Learning outputs and methods of teaching, learning and evaluation

ii. Knowledge objectives

- Provide the student with theoretical information for applied thermodynamics.
- Introduce the student to the basic concepts of refrigeration fluids and refrigeration cycles.

B. skills objectives of the Curriculum

- Provide the student with the skill of analyzing and interpreting fluid behavior in

different conditions

- Perform engineering calculations of refrigeration cycles & thermodynamic applications
- Perform calculations for the equations of pressure and temperature stability.

Teaching and learning methods

- Theoretical lectures, laboratories and conducting practical experiments.

Methods of evaluation

- Oral or written tests.
- The first semester exam is written.
- Daily assessment of attendance
- Theoretical reports
- Discussion of reports.
- The first semester exam.
- The second semester exam.
- Final entrance exams.

C. General and transferable skills (other skills related to employability and personal development).

- Maintenance and installation of thermodynamic applications such as boiler, exchangers and air conditioners
- Maintenance and installation of thermodynamic applications such as boiler, exchangers and air conditioners

10. Structure of the curriculum					
Method of assessment	Method of education	Name of unit or subject	Required learning outcomes	Hours	The week
Oral and practical exams	Theoretical + Practical	Study of the procedure, the procedure fixed and variable properties, the Carnot cycle and its applications, the reflected Carnot cycle and its applications, refrigeration devices, Heating devices (Heating)		4 hours a week	1 – 6
Oral and practical exams	Theoretical + Practical	Study of steam, steam properties, steam tables, calculations of steam and water mixture, constant pressure procedure, constant volume		4 hours a week	7 – 9
Oral and practical exams	Theoretical + Practical	The isotropy and adipatic procedure and their applications, fuel, fuel and energy calculations, boilers		4 hours a week	10 – 12
Oral and practical exams	Theoretical + Practical	Features of boilers, their use, absorption refrigeration systems		4 hours a week	13-15

11- the infrastructure	
- Applied Engineering of Thermodynamic by JJ. Yonus **- Thermodynamic by Sontag van Wylem** **- Thermodynamic by Eastop**	**A. prescribed books and main references**
Virtual Library of the Ministry of higher Education and Scientific Research	**Books and references (scientific journals, reports,...)**
Virtual Library of the Ministry of higher Education and Scientific Research **Books in the Institute's electronic library**	**E-referencing, Web sites**

12. Curriculum development plan
• Take advantage of the virtual library of the Ministry of higher Education and Scientific Research. • Benefit from scientific websites in the development of the course through the presentation of scientific films and developments in the field of the course.

Maintenance fundamentals of refrigeration and air conditioning equipment (compulsory) - PMTR243 - level II

Description of the Curriculum

Educate the student and provide him with the necessary skills and experience for the maintenance and operation of refrigeration and air-conditioning devices and equipment.

1. Educational institution	Northern Technical University/ Kirkuk Technical Institute
2. Department	Power Mechanics Techniques/Branch of Refrigeration and Airconditioning
3. Name/code of the curriculum	Maintenance fundamentals of refrigeration and air conditioning equipment (compulsory) - PMTR243 - level II
4. Forms of presence available	Attendance
5. Semester/annual system	The semester system
6. Number of hours (total)	6 x 15 weeks = 90 hours (semester)
7. Date of preparation of this description	2025|1|15

8. Objectives of the curriculum

- Provide the student with the basic skills to understand the basics of air conditioning maintenance
- Recognize the pressure circuit and maintain each part and its expected malfunctions.
- Teaching the student maintenance of household refrigerators (refrigerator - frozen - water cooler) mechanical circuit.
- Teaching the student maintenance of air conditioning units and cars

9- Learning outputs and methods of teaching, learning and evaluation

ii. Knowledge objectives

- Provide the student with information on means of protection from maintenance operations.
- Introduce the student to the basic concepts of maintenance of refrigeration and air conditioning equipment.

B. skills objectives of the Curriculum

- Provide the student with the skill of examining and identifying common failures in refrigeration and air conditioning equipment
- Carry out the loading and unloading of refrigeration and air conditioning systems.
- Conduct periodic and annual maintenance and cleaning of units.

Teaching and learning methods

- Theoretical lectures workshops, laboratories and conducting practical experiments.

Methods of evaluation

- Oral or written tests.
- The first semester exam is written.
- Daily assessment of attendance
- Theoretical reports
- Discussion of reports.
- The first semester exam.
- The second semester exam.
- Final entrance exams.

C. General and transferable skills (other skills related to employability and personal development).

- Convert units of measurement according to global systems and read capacities of thermal equipment.
- The use of modern measurement devices, especially computer-programmed and thermodynamic.

10. Structure of the curriculum					
The week	Hours	Required learning outcomes	Name of unit or subject	Method of education	Method of assessment
1 – 6	6 hours a week		Hardware maintenance - types of maintenance, identification of mechanical and electrical faults, maintenance of an air conditioning unit for buildings and vehicles, electrical circuit breakdowns and treatment	Theoretical + Practical	Oral and practical exams
7 – 9	6 hours a week		Replacement of cycle parts, maintenance of wall room air conditioning unit , maintenance of compressor parts, maintenance of valves	Theoretical + Practical	Oral and practical exams
10 – 12	6 hours a week		Maintenance of separate and integrated air conditioners, maintenance of vehicle air conditioning, jetters and fans	Theoretical + Practical	Oral and practical exams
13-15	6 hours a week		Offloading, charging and compressor oil replacement operations, maintenance of commercial refrigeration units, maintenance of the central air conditioner with frequency compressor and centrifuge	Theoretical + Practical	Oral and practical exams

11- the infrastructure	
A. prescribed books and main references	**Ashrae Guide and Data Book** **Modern Refrigeration and Air-condition by Althouse & Turnquist**

	Refrigeration & Air-condition **Refrigeration & Air-condition institute**
Books and references (scientific journals, reports,...)	**Virtual Library of the Ministry of higher Education and Scientific Research**
E-referencing, Web sites	**Virtual Library of the Ministry of higher Education and Scientific Research** **Books in the Institute's electronic library**

12. Curriculum development plan
• Take advantage of the virtual library of the Ministry of higher Education and Scientific Research. • Benefit from scientific websites in the development of the course through the presentation of scientific films and developments in the field of the course. • Linking the theoretical and practical part of the course through the subject of the student project.

Advanced Refrigeration and Air Conditioning Maintenance (Compulsory) - PMTR248 - level II.

Description of the Curriculum

Educate the student and provide him with the necessary skills and experience for the maintenance and operation of refrigeration and air-conditioning devices and equipment.

1. Educational institution	Northern Technical University/ Kirkuk Technical Institute
2. Department	Power Mechanics Techniques/Branch of Refrigeration and Airconditioning
3. Name/code of the curriculum	Advanced Refrigeration and Air Conditioning Maintenance (Compulsory) - PMTR248 - level II.
4. Forms of presence available	Attendance
5. Semester/annual system	The Semester system
6. Number of hours (total)	6 x 15 weeks = 90 hours (semester)
7. Date of preparation of this description	2025|1|15

8- the infrastructure

- Provide the student with advanced skills for the maintenance of refrigeration and air conditioning equipment
- Identification of boilers, pumps and central air-conditioning electric motors
- Provide the student with skills in the maintenance of air exchangers, humidifiers, coil units and fan.
- Identification and maintenance of refrigeration towers and components
- Identify the electrical panels of central air conditioning systems

9- Learning outputs and methods of teaching, learning and evaluation

i. Knowledge objectives

- Provide the student with the skills to maintain advanced refrigeration and air conditioning equipment
- Definition of boilers, pumps and central air-conditioning electric motors
- Identify electrical panels for central air conditioning systems
- Identify refrigeration towers, air handling unit, coil and fan units.

B. skills objectives of the Curriculum

- Provide the student with the skill of maintenance of refrigeration towers used in central air conditioning
- Maintenance of refrigeration towers, air handling unit, coil and fan units
- Maintenance of boilers, pumps and central air-conditioning electric motors
- Maintenance and reading of electrical panels for central air-conditioning devices

Teaching and learning methods

- Theoretical lectures, laboratories and conducting practical experiments.

Methods of evaluation

- Oral or written tests.
- The first semester exam is written.
- Daily assessment of attendance
- Theoretical reports
- Discussion of reports.
- The first semester exam.
- The second semester exam.
- Final entrance exams.

C. General and transferable skills (other skills related to employability and personal development).

- Maintenance and installation of air ducts applied to buildings
- The use of modern measurement devices, especially computer-programmed and adaptive.

10. Structure of the curriculum					
The week	Hours	Required learning outcomes	Name of unit or subject	Method of education	Method of assessment
1 – 6	6 hours a week		Maintenance of air exchangers, humidifiers, air mixing box with gates, maintenance of coil unit and fan, maintenance of central air conditioner parts	Theoretical + Practical	Oral and practical exams
7 – 9	6 hours a week		The discharge, shipping and leak inspection cycle	Theoretical + Practical	Oral and practical exams
10 – 12	6 hours a week		Refrigeration tower maintenance (types), water pumps, engine and valve maintenance, pump replacement, pipes and accessories	Theoretical + Practical	Oral and practical exams
13-15	6 hours a week		Maintenance of electrical parts, maintenance of boiler, maintenance of electrical panels, and reading of central air conditioning devices	Theoretical + Practical	Oral and practical exams

11- the infrastructure	
A. prescribed books and main references	**ASHRAE Guide and Data Book** **Modern Refrigeration and Air-condition by Althouse & Turnquist** **Refrigeration & Air-condition** **Refrigeration & Air-condition institute**
Books and references (scientific journals, reports,...)	**Virtual Library of the Ministry of higher Education and Scientific Research**
E-referencing, Web sites	**Virtual Library of the Ministry of higher Education and Scientific Research** **Books in the Institute's electronic library**

12. Curriculum development plan
• Take advantage of the virtual library of the Ministry of higher Education and Scientific Research. • Benefit from scientific websites in the development of the course through the presentation of scientific films and developments in the field of the course. • Linking the theoretical and practical part of the course through the subject of the student project.

Principles of air conditioning (Compulsory) - PMTR136 - level I

Description of the Curriculum

Educate the student and provide him with the necessary skills and experience for the maintenance and operation of refrigeration and air-conditioning devices and equipment.

1. Educational institution	Northern Technical University/ Kirkuk Technical Institute
2. Department	Power Mechanics Techniques/Branch of Refrigeration and Airconditioning
3. Name/code of the curriculum	Principles of air conditioning (Compulsory) - PMTR136 - level I
4. Forms of presence available	Attendance
5. Semester /annual system	The Semester system
6. Number of hours (total)	4 x 15 weeks = 60 hours (semester)
7. Date of preparation of this description	2025|1|15

8- skills objectives of the Curriculum

- Provide the student with the basic skills to understand the principles of air conditioning, measurement systems and air properties
- Identify the components of atmospheric air mass, volume, pressure, temperature and the general law of gases
- Provide the student with the necessary skills to calculate the properties of air using equations and charts.
- Learn about air mixing and humidification procedures and air refrigeration and Heating procedures
- Teach the student to calculate the total heat transfer coefficient, both tangible and latent, and the coefficient of transmission and contact of files

9- Learning outputs and methods of teaching, learning and evaluation

A. Knowledge objectives

- Provide the student with theoretical information on the principles of air conditioning and their applications.
- Introduce the student to the basic concepts of air properties.
- Introducing the student to the components of air air and the general law of gases.
- Perform calculations to find air properties using charts and equations

B. skills objectives of the Curriculum

- Provide the student with the skill of drawing air conditioning procedures and representing them on the air properties scheme.
- Perform calculations and load capacities of the refrigeration and Heating coil and air humidifiers and their efficiency.
- Perform calculations of equations (calculating the partial pressure of water vapor and air properties).

Teaching and learning methods

- Theoretical lectures, laboratories and conducting practical experiments.

Methods of evaluation

- Oral or written tests.
- The first semester exam is written.
- Daily assessment of attendance
- Theoretical reports
- Discussion of reports.
- The first semester exam.
- The second semester exam.
- Final entrance exams.

C. General and transferable skills (other skills related to employability and personal development).

- Convert units of measurement according to global systems and read capacities of refrigeration, Heating and air conditioning files.
- The use of modern measuring devices, especially computer programmed and air conditioning.

10. Structure of the curriculum					
The week	Hours	Required learning outcomes	Name of unit or subject	Method of education	Method of assessment
1 – 6	4 hours a week		Basic concepts, thermodynamic principles, material states, air properties, pressure and temperature measurement, electric scheme, air Heating and refrigeration procedures	Theoretical + Practical	Oral and practical exams
7 – 9	4 hours a week		Perform real air conditioning, mixing air, adding and removing moisture with reheating	Theoretical + Practical	Oral and practical exams
10 – 12	4 hours a week		Perceived and latent heat, contact and command coefficient, file efficiency	Theoretical + Practical	Oral and practical exams
13-15	4 hours a week		Humidification efficiency, thermal comfort in the space, applications of air properties	Theoretical + Practical	Oral and practical exams

11- the infrastructure	
A. prescribed books and main references	**Air- conditioning engineering by w.p.Joins** **ASHRAE hand book** **A course of air cond. and ref. by Arora and Domkundwar** **Air- conditioning engineering by Copta**
Books and references (scientific journals, reports,...)	**Virtual Library of the Ministry of higher Education and Scientific Research**
E-referencing, Web sites	**Virtual Library of the Ministry of higher Education and Scientific Research** **Books in the Institute's electronic library**

12. Curriculum development plan

- Take advantage of the virtual library of the Ministry of higher Education and Scientific Research.
- Benefit from scientific websites in the development of the course through the presentation of scientific films and developments in the field of the course.
- Linking the theoretical and practical part of the course through the subject of the student project.

Principles of Refrigeration (Compulsory) - PMTR138 - level I

Description of the Curriculum

Introducing the student to the basic refrigeration systems used in the field of refrigeration, focusing on the compressive systems and studying the types of compressors, capacitors, expansion valves, evaporators and the refrigeration media used in them.

1. Educational institution	Northern Technical University/ Kirkuk Technical Institute
2. Department	Power Mechanics Techniques/Branch of Refrigeration and Airconditioning
3. Name/code of the curriculum	Principles of Refrigeration (Compulsory) - PMTR138 - level I
4. Forms of presence available	Attendance
5. Semester /annual system	The Semester system
6. Number of hours (total)	4 x 15 weeks = 60 hours (semester)
7. Date of preparation of this description	2025|1|15

8- the infrastructure

- Provide the student the basic skills and concepts of pressurized refrigeration systems.
- Learn about the different refrigeration cycles and methods, especially compressive refrigeration and absorption.
- Provide the student with the skills and calculate the performance factor of the refrigeration courses and draw the course and represent it on the plan P-H))
- Identify compressors, capacitors, vaporizers and stretch tools in refrigeration cycles and types

9- Learning outputs and methods of teaching, learning and evaluation

i. Knowledge objectives

- Provide the student with theoretical information on the principles of refrigeration.
- Introduce the student to the basic concepts of different refrigeration courses.

B. skills objectives of the Curriculum

- Provide the student with the skill of analyzing and representing the

refrigeration cycle on the scheme (P-H).

- Perform engineering calculations for compressive refrigeration cycles and performance coefficient.
- Perform calculations for the refrigeration load and compressor operation equations and C. o.P.

Teaching and learning methods

- Theoretical lectures workshops, laboratories and conducting practical experiments.

Methods of evaluation

- Oral or written tests.
- The first semester exam is written.
- Daily assessment of attendance
- Theoretical reports
- Discussion of reports.
- The first semester exam.
- The second semester exam.
- Final entrance exams.

C. General and transferable skills (other skills related to employability and personal development).

- Maintenance and installation of applications of refrigeration systems such as various refrigerators.
- The use of modern measuring devices, especially computer-programmed and pressurized refrigeration systems.

10. Structure of the curriculum					
Method of assessment	Method of education	Name of unit or subject	Required learning outcomes	Hours	The week
Oral and practical exams	Theoretical + Practical	Study of different refrigeration methods, the use of the scheme (P-H) of different fluids, the compressive refrigeration system		4 hours a week	1 – 6
Oral and practical exams	Theoretical + Practical	Compressors and their types the pros and cons of each type, capacitors and refrigeration towers and their types the pros and cons of each type.		4 hours a week	7 – 9
Oral and practical exams	Theoretical + Practical	Stretching tools and their types the pros and cons of each type, evaporators and their types the pros and cons of each type.		4 hours a week	10 – 12
Oral and practical exams	Theoretical + Practical	Refrigeration fluids (primary and secondary), their types, classifications, properties and selection.		4 hours a week	13-15

11- the infrastructure	
Principles of refrigeration by Dossat **ASHRAE handbook** **A course on air conditioning and refrigeration by Arora and Domkundwar**	**A. prescribed books and main references**
Virtual Library of the Ministry of higher Education and Scientific Research	**Books and references (scientific journals, reports,...)**
Virtual Library of the Ministry of higher Education and Scientific Research **Books in the Institute's electronic library**	**E-referencing, Web sites**

12. Curriculum development plan
• Take advantage of the virtual library of the Ministry of higher Education and Scientific Research. • Benefit from scientific websites in the development of the course through the presentation of scientific films and developments in the field of the course. • Linking the theoretical and practical part of the course through the subject of the student project.

Computer (compulsory) - NTU102 - level I

Description of the Curriculum

It is a course of study that aims to teach students electronic computers and learn about operating systems and computer applications in different fields. The course includes topics such as computer history, computer types, computer parts, computer functions and computer systems. The course is taught in a theoretical and practical way that includes explaining concepts about icons and directives.

1. Educational institution	Northern Technical University/ Kirkuk Technical Institute
2. Department	Power Mechanics Techniques/Branch of Refrigeration and Airconditioning
3. Name/code of the curriculum	Computer (compulsory) - NTU102 - level I
4. Forms of presence available	Attendance
5. Semester/year system	The Semester system
6. Number of hours (total)	2 x 15 weeks = 30 hours (semester)
7. Date of preparation of this description	2025|1|15

8- the infrastructure

- Teaching the student to be familiar with the basic rules of dealing with the computer and its management to help him in the completion of projects and printing and the preparation of statistics and graphs and the creation of presentations and designs engineering charts and others.the emergence of the Internet as a means of communication available to everyone has become very necessary for the student to learn the use of the computer for the role of the Internet in many fields, including education scientific research, commerce and marketing through electronic correspondence, web pages and electronic talk

9- Learning outputs and methods of teaching, learning and evaluation

A- Knowledge objectives

- Amount of student absorption of the material
- Ability to analyze and apply what you learn practically to the calculator
- The evaluation is done by presenting the material among the students in the laboratory and then applied by them

B. skills objectives of the Curriculum

- Questions and answers about the previous article
- Analyze the student's ability to absorb through the work Homework carried out at home and stored on tablets to show directly in front of the student to see how much they learned from the previous lecture
- Showing educational films specific to the subject in order to establish the ability to learn
- Use appropriate tools, platforms, libraries and computer standards.

Teaching and learning methods

- • The theoretical method and explanation by presenting the material on the program Point Powerin the form of charts and images in order to attract the attention of the student and help him not to be bored. The practical method represented by applying what was presented on the calculator and conducting daily and monthly exams.

Methods of evaluation

- Tests and exams: Can include multiple-choice tests, or short questions.
- Class participation: In some cases, students may be evaluated based on their participation in class discussions or on online learning platforms.
- Final Exam: The final exam usually covers all topics covered during the semester.
- The first exam score of (20) practical degree (10) theoretical (10) Second exam score of (20) practical degree (10) theoretical (10) degree attendance and daily participation (10) final exam score of (50)

C. General and transferable skills (other skills related to employability and personal development).

- Instruct the student how to use the computer in a manner consistent with his or her cultural level
- Guide the student how to deal with social sites
- Collaboration: Many software projects require working as part of a team, so collaboration skills are important.

- Communication: The ability to communicate effectively with others, whether it's through reporting or making presentations, is a valuable skill.
- Project management: The ability to plan, organize and manage projects to ensure their completion on time

10. Structure of the curriculum					
The week	Hours	Required learning outcomes	Name of unit or subject	Method of education	Method of assessment
1 - 3	2 hours a week		Definition of computer, system software and application programs	Theoretical + Practical	Oral and practical exams
4 - 5	2 hours a week		Operating system	Theoretical + Practical	Oral and practical exams
6 - 8	2 hours a week		Programs of Assistance	Theoretical + Practical	Oral and practical exams
9 - 11	2 hours a week		Printing software	Theoretical + Practical	Oral and practical exams
12 - 13	2 hours a week		Practical applications	Theoretical + Practical	Oral and practical exams
14 - 15	2 hours a week		Public programs	Theoretical + Practical	Oral and practical exams

11- the infrastructure	
A. prescribed books and main references	
Books and references (scientific journals, reports,...)	**Virtual Library of the Ministry of higher Education and Scientific Research**
E-referencing, Web sites	**Virtual Library of the Ministry of higher Education and Scientific Research** **Books in the Institute's electronic library**

12. Curriculum development plan

- Goal setting: The educational objectives of the course should be set. What skills and knowledge should students acquire by the end of the course?
- Review current content: Review the current content of the course. Is it compatible with educational goals? Are there areas that can be improved or updated?
- Update content: Based on review, update content to meet educational goals. This may include adding new topics, updating existing topics, or even deleting some topics that are no longer relevant.
- Developing teaching strategies: Developing teaching strategies that support the achievement of educational goals. These may include such things as interactive lessons, practical projects, and theoretical and practical assessments.

Computer (compulsory) - NTU201 - level II.

Description of the Curriculum

It is a course of study aimed at teaching students electronic computers and the uses of computers in solving problems related to the specialization and in different fields. The course includes topics such as: The concept of networks the concept of the Internet, the program excelits advantages, etc. The course is taught in a theoretical and practical way that includes explaining concepts about directives and drawing electronic tables.

1. Educational institution	Northern Technical University/ Kirkuk Technical Institute
2. Department	Power Mechanics Techniques/Branch of Refrigeration and Airconditioning
3. Name/code of the curriculum	Computer (compulsory) - NTU201 - level II.
4. Forms of presence available	Attendance
5. Semester/year system	The Semester system
6. Number of hours (total)	2 x 15 weeks = 30 hours (semester)
7. Date of preparation of this description	2025|1|15

8- the infrastructure

- Teaching the student to be familiar with the basic rules of dealing with the computer and its management to help him in the completion of projects and printing and the preparation of statistics and graphs and the creation of presentations and designs engineering charts and others.the emergence of the Internet as a means of communication available to everyone has become very necessary for the student to learn the use of the computer for the role of the Internet in many fields, including education scientific research, commerce and marketing through electronic correspondence, web pages and electronic talk

9- Learning outputs and methods of teaching, learning and evaluation

A- Knowledge objectives

- Amount of student absorption of the material
- Ability to analyze and apply what you learn practically to the calculator
- The evaluation is done by presenting the material among the students in the laboratory and then applied by them

B. skills objectives of the Curriculum

- Questions and answers about the previous article
- Analyze the student's ability to absorb through the work Homework carried out at home and stored on tablets to show directly in front of the student to see how much they learned from the previous lecture
- Showing educational films specific to the subject in order to establish the ability to learn
- Use appropriate tools, platforms, libraries and computer standards.

Teaching and learning methods

- The theoretical method and explanation by presenting the material on the program Point Powerin the form of charts and images in order to attract the attention of the student and help him not to be bored. The practical method represented by applying what was presented on the calculator and conducting daily and monthly exams.

Methods of evaluation

- Tests and exams: Can include multiple-choice tests, or short questions.
- Class participation: In some cases, students may be evaluated based on their participation in class discussions or on online learning platforms.
- Final Exam: The final exam usually covers all topics covered during the semester.
- The first exam score of (20) practical degree (10) theoretical (10) Second exam score of (20) practical degree (10) theoretical (10) degree attendance and daily participation (10) final exam score of (50)

C. General and transferable skills (other skills related to employability and personal development).

- Instruct the student how to use the computer in a manner consistent with his or her cultural level
- Guide the student how to deal with social sites
- Collaboration: Many software projects require working as part of a team, so collaboration skills are important.

- Communication: The ability to communicate effectively with others, whether it's through reporting or making presentations, is a valuable skill.
- Project management: The ability to plan, organize and manage projects to ensure their completion on time

10. Structure of the curriculum					
The week	Hours	Required learning outcomes	Name of unit or subject	Method of education	Method of assessment
1 - 3	2 hours a week		Network and Internet concepts	Theoretical + Practical	Oral and practical exams
4 - 5	2 hours a week		Office program	Theoretical + Practical	Oral and practical exams
6 - 8	2 hours a week		Methods of collecting data and drawing tables	Theoretical + Practical	Oral and practical exams
9 - 11	2 hours a week		Accounting programs	Theoretical + Practical	Oral and practical exams
12 - 13	2 hours a week		Practical applications	Theoretical + Practical	Oral and practical exams
14 - 15	2 hours a week		Viruses and identify them	Theoretical + Practical	Oral and practical exams

11- the infrastructure	
A. prescribed books and main references	
Books and references (scientific journals, reports,...)	**Virtual Library of the Ministry of higher Education and Scientific Research**
E-referencing, Web sites	**Virtual Library of the Ministry of higher Education and Scientific Research** **Books in the Institute's electronic library**

12. Curriculum development plan

- Goal setting: The educational objectives of the course should be set. What skills and knowledge should students acquire by the end of the course?
- Review current content: Review the current content of the course. Is it compatible with educational goals? Are there areas that can be improved or updated?
- Update content: Based on review, update content to meet educational goals. This may include adding new topics, updating existing topics, or even deleting some topics that are no longer relevant.
- Developing teaching strategies: Developing teaching strategies that support the achievement of educational goals. These may include such things as interactive lessons, practical projects, and theoretical and practical assessments.

R242 -level II.

Description of the Curriculum

Students learn about heat transfer methods, non-dimensional totals and types of free and forced pregnancy transmission

1. Educational institution	Northern Technical University/ Kirkuk Technical Institute
2. Department	Power Mechanics Techniques/Branch of Refrigeration and Airconditioning
3. Name/code of the Curriculum	Fundamentals of heat transfer (Compulsory) - PMTR242 -level II.
4. Forms of presence available	Attendance
5. Semester/year system	The Semester system
6. Number of hours (total)	4 x 15 week = 60 hours (semester)
7. Date of preparation of this description	2025|1|15

8- objectives of the curriculum

- Provide the student with the basic skills to understand the basics of heat transfer methods
- Identify methods of heat transfer by convection on horizontal and vertical surfaces
- Provide the student with skills in measuring the thermal conductivity of different objects.

9- Learning outputs and methods of teaching, learning and evaluation

A- Knowledge objectives

- Provide the student with theoretical and practical information for heat transfer.
- Introduce the student to the basic concepts of calculating the rate of heat transfer for surfaces and buildings.

B. skills objectives of the Curriculum

- Provide the student with the skill of interpreting non-dimensional totals

and their impact on the methods of heat transfer

- Perform engineering calculations to measure the coefficient of thermal conductivity.
- Perform special calculations to measure the total heat transfer coefficient common between conduction and load heat transfer.

Teaching and learning methods

- Theoretical lectures, laboratories and conducting practical experiments.

Methods of evaluation

- Oral or electronic tests
- Electronic tests
- Electronic Daily Assessment
- Laboratory reports
- Practical exam attendance
- The first electronic exam
- The second electronic exam
- Final physical and electronic exams

C. General and transferable skills (other skills related to employability and personal development).

- Make the necessary calculations for the design of buildings and calculations of the rate of heat transfer, loads and others
- Use modern measuring devices to know the conductivity of materials approved in building designs

10. Structure of the Curriculum					
The week	Hours	Required learning outcomes	Name of unit or subject	Method of education	Method of assessment
1 – 6	4 hours a week		Heat transfer, conduction , convection , heat transfer coefficient	Theoretical + Practical	Oral and practical exams
7 – 9	4 hours a week		Thermal Conductivity (K) Thermal Diffusivity, The plane wall,The composite plane wall,	Theoretical + Practical	Oral and practical exams
10 – 12	4 hours a week		Cylindrical walls,heat convection,Film temperature,Dime nationless group,	Theoretical + Practical	Oral and practical exams
13-15	4 hours a week		Total heat transfer coefficient Over all heat transfer coefficient	Theoretical + Practical	Oral and practical exams

11- the infrastructure	
A. prescribed books and main references	**Principles of heat transfer**
Books and references (scientific journals, reports,...)	**Virtual Library of the Ministry of higher Education and Scientific Research**
E-referencing, Web sites	**Virtual Library of the Ministry of higher Education and Scientific Research** **Books in the Institute's electronic library**

12. Curriculum development plan
• Take advantage of the virtual library of the Ministry of higher Education and Scientific Research. • Benefit from scientific websites in the development of the course through the presentation of scientific films and developments in the field of the course. • Linking the theoretical and practical part of the course through the subject of the student project.

Applied heat transfer (Compulsory) - PMTR247-level II.

Description of the Curriculum

Students learn about heat transfer methods, non-dimensional totals and types of free and forced pregnancy transmission

1. Educational institution	Northern Technical University/ Kirkuk Technical Institute
2. Department	Power Mechanics Techniques/Branch of Refrigeration and Airconditioning
3. Name/code of the Curriculum	Applied heat transfer (Compulsory) - PMTR247-level II.
4. Forms of presence available	Attendance
5. Semester/year system	The Semester system
6. Number of hours (total)	4 x 15 week = 60 hours (for semester)
7. Date of preparation of this description	2025|1|15

8- objectives of the curriculum

- Provide the student the basic skills to understand the types of thermal bales
- Identify the efficiency of the fin, its types and uses
- Identify calculations of radiation heat transfer.
- Identify the calculations of the effectiveness of thermal care

9- Learning outputs and methods of teaching, learning and evaluation

A- Knowledge objectives

- Provide the student with theoretical information on radiation heat transfer.
- Introducing the student to the basics of thermal care

B. skills objectives of the Curriculum

- Student knowledge of the calculations of the efficiency of the fin
- Identify the types of heat exchangers and their uses in the fields of heat transfer

Teaching and learning methods
• Theoretical lectures, laboratories and conducting practical experiments.

Methods of evaluation
• Oral or electronic tests • Electronic tests • Electronic Daily Assessment • Laboratory reports • Practical exam attendance • The first electronic exam • The second electronic exam • Final physical and electronic exams
C. General and transferable skills (other skills related to employability and personal development). • Identify the application areas of heat exchangers • Identify the colors of objects and their reflectivity, absorption and permeability

10. Structure of the Curriculum					
The week	Hours	Required learning outcomes	Name of unit or subject	Method of education	Method of assessment
1 – 6	4 hours a week		Heat exchangers,Type of heat exchanger,	Theoretical + Practical	Oral and practical exams
7 – 9	4 hours a week		Log meanTemperature difference, Heat exchanger Effectiveness	Theoretical + Practical	Oral and practical exams
10 – 12	4 hours a week		Fins , uplecations of fins, Fin Efficiency	Theoretical + Practical	Oral and practical exams
13-15	4 hours a week		Heat Transfer by Radiation ,Stefan-Boltzmann Law ,Configuration Factor(F), Radiation Exchanger	Theoretical + Practical	Oral and practical exams

11- the infrastructure	
A. prescribed books and main references	**Principles of heat transfer**
Books and references (scientific journals, reports,...)	**Virtual Library of the Ministry of higher Education and Scientific Research**
E-referencing, Web sites	**Virtual Library of the Ministry of higher Education and Scientific Research** **Books in the Institute's electronic library**

12. Curriculum development plan

- Take advantage of the virtual library of the Ministry of higher Education and Scientific Research.
- Benefit from scientific websites in the development of the course through the presentation of scientific films and developments in the field of the course.
- Linking the theoretical and practical part of the course through the subject of the student project.

Fundamentals of Control Systems (Compulsory) - PMTR244 - level II

Description of the Curriculum

Students learn about heat transfer methods, non-dimensional totals and types of free and forced pregnancy transmission

1. Educational institution	Northern Technical University/ Kirkuk Technical Institute
2. Department	Power Mechanics Techniques/Branch of Refrigeration and Airconditioning
3. Name/code of the Curriculum	Fundamentals of Control Systems (Compulsory) - PMTR244 - level II
4. Forms of presence available	Attendance
5. Semester/year system	The Semester system
6. Number of hours (total)	4 x 15 week = 60 hours (for semester)
7. Date of preparation of this description	2025|1|15

8- objectives of the curriculum

- Provide the student with the basic skills to understand the fundamentals that operate in control systems
- Provide the student with skills in the field of control of the work of systems

9- Learning outputs and methods of teaching, learning and evaluation

A- Knowledge objectives

- Provide the student with theoretical information for control systems.
- Introduce the student to the basic concepts of control systems of refrigeration and air conditioning.

B. skills objectives of the Curriculum

- Provide the student with the skill of analyzing and interpreting the work of the control devices and how to connect and maintain them.

Teaching and learning methods

- Theoretical lectures, laboratories and conducting practical experiments.

Methods of evaluation
• Oral or electronic tests • Electronic tests • Electronic Daily Assessment • Laboratory reports • Practical exam attendance • The first electronic exam • The second electronic exam • Final physical and electronic exams
C. General and transferable skills (other skills related to employability and personal development). • Acquire a skill to interpret the work of control devices and how to maintain control devices and control of refrigeration and air conditioning devices.

10. Structure of the Curriculum					
The week	Hours	Required learning outcomes	Name of unit or subject	Method of education	Method of assessment
1 – 6	4 hours a week		Principles of Control Units	Theoretical + Practical	Oral and practical exams
7 – 9	4 hours a week		Elements of control systems	Theoretical + Practical	Oral and practical exams
10 – 12	4 hours a week		Valves (guided devices) and their types	Theoretical + Practical	Oral and practical exams
13-15	4 hours a week		Applications to control systems in refrigeration and air conditioning units	Theoretical + Practical	Oral and practical exams

11- the infrastructure	
A. prescribed books and main references	**Engineering Measurement and instrumentation by L. F. Adams** **Control systems Engineering Measurement and instrumentation by L. F. Adams** **Control systems**
Books and references (scientific journals, reports,...)	**Virtual Library of the Ministry of higher Education and Scientific Research**
E-referencing, Web sites	**Virtual Library of the Ministry of higher Education and Scientific Research** **Books in the Institute's electronic library**

12. Curriculum development plan
• Take advantage of the virtual library of the Ministry of higher Education and Scientific Research. • Benefit from scientific websites in the development of the course through the presentation of scientific films and developments in the field of the course. • Linking the theoretical and practical part of the course through the subject of the student project.

Advanced Control Systems (Compulsory) - PMTR253 - level II

Description of the Curriculum

Students learn about heat transfer methods, non-dimensional totals and types of free and forced pregnancy transmission

1. Educational institution	Northern Technical University/ Kirkuk Technical Institute
2. Department	Power Mechanics Techniques/Branch of Refrigeration and Airconditioning
3. Name/code of the Curriculum	Advanced Control Systems (Compulsory) - PMTR253 - level II
4. Forms of presence available	Attendance
5. Semester/year system	The Semester system
6. Number of hours (total)	4 x 15 week = 60 hours (for semester)
7. Date of preparation of this description	2025|1|15

8- objectives of the curriculum

- Provide the student with the basic skills to identify control devices in air conditioning and refrigeration systems
- Provide the student with skills in the field of electronic control circuits

9- Learning outputs and methods of teaching, learning and evaluation

A- Knowledge objectives

- Provide the student with theoretical information for control systems.
- Introducing the student to the laboratory equipment for air conditioning and refrigeration

B. skills objectives of the Curriculum

- Provide the student with the skill of analyzing and interpreting the work of the control devices and how to connect and maintain them.

Teaching and learning methods

- Theoretical lectures, laboratories and conducting practical experiments.

Methods of evaluation
• Oral or electronic tests • Electronic tests • Electronic Daily Assessment • Laboratory reports • Practical exam attendance • The first electronic exam • The second electronic exam • Final physical and electronic exams
C. General and transferable skills (other skills related to employability and personal development). • Acquire a skill to interpret the work of control devices and how to maintain control devices and control of refrigeration and air conditioning devices.

10. Structure of the Curriculum					
The week	Hours	Required learning outcomes	Name of unit or subject	Method of education	Method of assessment
1 – 6	4 hours a week		The power and control circuits of some simple devices and the identification of electrical circuits in control systems	Theoretical + Practical	Oral and practical exams
7 – 9	4 hours a week		Electrical plans and types	Theoretical + Practical	Oral and practical exams
10 – 12	4 hours a week		Power and control circuits for a separate air conditioning unit	Theoretical + Practical	Oral and practical exams
13-15	4 hours a week		Power and control circuits for a combined air conditioning unit	Theoretical + Practical	Oral and practical exams

11- the infrastructure	
A. prescribed books and main references	**Engineering Measurement and instrumentation by L. F. Adams** **Control systems Engineering Measurement and instrumentation by L. F. Adams** **Control systems**
Books and references (scientific journals, reports,...)	**Virtual Library of the Ministry of higher Education and Scientific Research**
E-referencing, Web sites	**Virtual Library of the Ministry of higher Education and Scientific Research** **Books in the Institute's electronic library**

12. Curriculum development plan
• Take advantage of the virtual library of the Ministry of higher Education and Scientific Research. • Benefit from scientific websites in the development of the course through the presentation of scientific films and developments in the field of the course. • Linking the theoretical and practical part of the course through the subject of the student project.

Principles of Electrical Technology (Compulsory) - PMTR142- level I

Description of the Curriculum

Students learn about electron technology, Kirchhoff's law, Ohm's law and its applications

1. Educational institution	Northern Technical University/ Kirkuk Technical Institute
2. Department	Power Mechanics Techniques/Branch of Refrigeration and Airconditioning
3. Name/code of the Curriculum	Principles of Electrical Technology (Compulsory) - PMTR142- level I
4. Forms of presence available	Attendance
5. Semester/year system	The Semester system
6. Number of hours (total)	4 x 15 week = 60 hours (for semester)
7. Date of preparation of this description	2025|1|15

8- objectives of the curriculum

- Know the basics about electricity and the nature of electricity by knowing about atoms, electrons, protons, and neutrons.
- Know important definitions of current, voltages and resistance.

9- Learning outputs and methods of teaching, learning and evaluation

A- Knowledge objectives

- Provide the student with theoretical information for the concept of the electron
- Introduce the student to the basic concepts of the atom and its components

B. skills objectives of the Curriculum

- Provide the student with the skill of understanding electrical circuits and their basics.
- Perform engineering calculations for electrical connection applications of devices.

Teaching and learning methods
• Theoretical lectures, laboratories and conducting practical experiments.

Methods of evaluation
• Oral or electronic tests • Electronic tests • Electronic Daily Assessment • Laboratory reports • Practical exam attendance • The first electronic exam • The second electronic exam • Final physical and electronic exams
C. General and transferable skills (other skills related to employability and personal development). • Provide the student with the scientific foundations of electricity technology and the machines that he uses later when practicing the specialty.

10. Structure of the Curriculum					
The week	Hours	Required learning outcomes	Name of unit or subject	Method of education	Method of assessment
1 – 6	4 hours a week		Introduction in Electrical Technology, Definitions, Ampers, current, Volts, resistance	Theoretical + Practical	Oral and practical exams
7 – 9	4 hours a week		Ohm's law and its applications	Theoretical + Practical	Oral and practical exams
10 – 12	4 hours a week		File resistance of the contents of the circuit, respectively fastening capacitors, power calculations, power coefficient.	Theoretical + Practical	Oral and practical exams
13-15	4 hours a week		Engine selection, engine maintenance and parts repair.	Theoretical + Practical	Oral and practical exams

11- the infrastructure	
Electrical Technology by Therage . **Electrical Technology by Hayke.** **Electrical Engineering theory and practical Electrical Installation work by Franc.**	**A. prescribed books and main references**
Virtual Library of the Ministry of higher Education and Scientific Research	**Books and references (scientific journals, reports,...)**
Virtual Library of the Ministry of higher Education and Scientific Research **Books in the Institute's electronic library**	**E-referencing, Web sites**

12. Curriculum development plan
• Take advantage of the virtual library of the Ministry of higher Education and Scientific Research. • Benefit from scientific websites in the development of the course through the presentation of scientific films and developments in the field of the course. • Linking the theoretical and practical part of the course through the subject of the student project.

Advanced Electricity Technology (Compulsory) - PMTR146 - level I

Description of the Curriculum

Students learn about electron technology, Kirchhoff's law, Ohm's law and its applications

1. Educational institution	Northern Technical University/ Kirkuk Technical Institute
2. Department	Power Mechanics Techniques/Branch of Refrigeration and Airconditioning
3. Name/code of the Curriculum	Advanced Electricity Technology (Compulsory) - PMTR146 - level I
4. Forms of presence available	Attendance
5. Semester/year system	The Semester system
6. Number of hours (total)	4 x 15 week = 60 hours (for semester)
7. Date of preparation of this description	2025|1|15

8- objectives of the curriculum

- Here are the important definitions of current, voltages and resistance.
- Identifying resistors and capacitors

9- Learning outputs and methods of teaching, learning and evaluation

A- Knowledge objectives

- Provide the student with theoretical information on standard schemes
- Introducing the student to the laboratory equipment of the air conditioning and refrigeration units

B. skills objectives of the Curriculum

- Provide the student with the skill of understanding electrical circuits and their basics.
- Perform engineering calculations for electrical connection applications of devices.

Teaching and learning methods

- Theoretical lectures, laboratories and conducting practical experiments.

Methods of evaluation
• Oral or electronic tests • Electronic tests • Electronic Daily Assessment • Laboratory reports • Practical exam attendance • The first electronic exam • The second electronic exam • Final physical and electronic exams
C. General and transferable skills (other skills related to employability and personal development). • Provide the student with the scientific foundations of electricity technology and the machines that he uses later when practicing the specialty.

10. Structure of the Curriculum					
The week	Hours	Required learning outcomes	Name of unit or subject	Method of education	Method of assessment
1 – 6	4 hours a week		Alternating current, alternating wave types, direct current	Theoretical + Practical	Oral and practical exams
7 – 9	4 hours a week		Electromagnetism, magnetic field, magnetic flux density	Theoretical + Practical	Oral and practical exams
10 – 12	4 hours a week		Multi-phase system	Theoretical + Practical	Oral and practical exams
13-15	4 hours a week		Cutting equipment and engine operation, maintenance	Theoretical + Practical	Oral and practical exams

11- the infrastructure	
A. prescribed books and main references	**Electrical Technology by Therage . Electrical Technology by Hayke. Electrical Engineering theory and practical Electrical Installation work by Franc.**
Books and references (scientific journals, reports,...)	**Virtual Library of the Ministry of higher Education and Scientific Research**
E-referencing, Web sites	**Virtual Library of the Ministry of higher Education and Scientific Research Books in the Institute's electronic library**

12. Curriculum development plan
• Take advantage of the virtual library of the Ministry of higher Education and Scientific Research. • Benefit from scientific websites in the development of the course through the presentation of scientific films and developments in the field of the course. • Linking the theoretical and practical part of the course through the subject of the student project.

Fundamentals of Refrigeration Systems (Compulsory) - PMTR240 - level II

Description of the Curriculum

This course description provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the student to achieve, demonstrating whether he or she has made the most of the available learning opportunities. It should be linked to the description of the program.

1. Educational institution	Northern Technical University/Kirkuk Technical Institute
2. Department	Power Mechanics Techniques/Branch of Refrigeration and Airconditioning
3. Name/code of the curriculum	Fundamentals of Refrigeration Systems (Compulsory) - PMTR240 - level II
4. Forms of presence available	Attendance
5. Semester/year system	The semester system
6. Number of hours (total)	4 x 15 weeks = 60 hours (semester)
7. Date of preparation of this description	2025|1|15

8- objectives of the curriculum

- Identify the systems used in freezing
- Identify the types of fluids used in freezing
- Perform calculations on a chart (pressure - anthalpine)
- Selection of pipes and balancing of cycle parts

9- Learning outputs and methods of teaching, learning and evaluation

A- Knowledge objectives

- Provide the student with theoretical information on standard schemes (air conditioning scheme Ashri)
- Identify temperature measurements and introduce the student to the laboratory equipment for air conditioning.

B. skills objectives of the Curriculum

- The use of pressure, temperature and humidity measuring devices.
- Use of air mixing devices.
- Perform calculations for air plans.

Teaching and learning methods

- Theoretical lectures workshops and laboratories and conducting practical experiments.

Methods of evaluation

- Oral or electronic tests
- Electronic tests
- Electronic Daily Assessment
- Laboratory reports
- Practical exam attendance
- The first electronic exam
- The second electronic exam
- Final physical and electronic exams

C. General and transferable skills (other skills related to employability and personal development).

- Conversion of units of measurement according to global systems.
- Use of modern measuring devices.

10. Structure of the curriculum					
The week	Hours	Required learning outcomes	Name of unit or subject	Method of education	Method of assessment
1 – 6	4 hours a week		Compression system (theoretical and actual) and media quality	Theoretical + Practical	Oral and practical exams
7 – 9	4 hours a week		Selection of parts of the compression system	Theoretical + Practical	Oral and practical exams
10 – 12	4 hours a week		Compressive or multi-evaporator compressive refrigeration cycle	Theoretical + Practical	Oral and practical exams
13-15	4 hours a week		Design of piping and accessories of the pressure system Control devices of the pressure system	Theoretical + Practical	Oral and practical exams

11- the infrastructure	
A. prescribed books and main references	Air-conditioning engineering by w.p.Joins. ASHRAE hand book Air-conditioning engineering by Gopta Principles of refrigeration by Dossat
Books and references (scientific journals, reports,...)	Virtual Library of the Ministry of higher Education and Scientific Research
E-referencing, Web sites	Virtual Library of the Ministry of higher Education and Scientific Research Books in the Institute's electronic library

12. Curriculum development plan

- Take advantage of the virtual library of the Ministry of higher Education and Scientific Research.
- Benefit from scientific websites in the development of the course through the presentation of scientific films and developments in the field of the course.
- Linking the theoretical and practical part of the course through the subject of the student project.

Advanced Refrigeration Systems - PMTR246 - level II

Description of the Curriculum

Students learn about heat transfer methods, non-dimensional totals and types of free and forced pregnancy transmission

1. Educational institution	Northern Technical University/Kirkuk Technical Institute
2. Department	Power Mechanics Techniques/Branch of Refrigeration and Airconditioning
3. Name/code of the curriculum	Advanced Refrigeration Systems - PMTR246 - level II
4. Forms of presence available	Attendance
5. Semester/year system	The semester system
6. Number of hours (total)	4 x 15 weeks = 60 hours (semester)
7. Date of preparation of this description	2025|1|15

8- objectives of the curriculum

- Identify the systems used in freezing
- Identify the types of fluids used in freezing
- Perform calculations on a chart (pressure - anthalpine)
- Selection of pipes and balancing of cycle parts

9- Learning outputs and methods of teaching, learning and evaluation

A- Knowledge objectives

- Provide the student with theoretical information on standard schemes (air conditioning scheme Ashri)
- Identify temperature measurements and introduce the student to the laboratory equipment for air conditioning.

B. skills objectives of the Curriculum

- The use of pressure, temperature and humidity measuring devices.
- Use of air mixing devices.
- Perform calculations for air plans.

Teaching and learning methods
• Theoretical lectures workshops and laboratories and conducting practical experiments.

Methods of evaluation
• Oral or electronic tests • Electronic tests • Electronic Daily Assessment • Laboratory reports • Practical exam attendance • The first electronic exam • The second electronic exam • Final physical and electronic exams
C. General and transferable skills (other skills related to employability and personal development). • Conversion of units of measurement according to global systems. • Use of modern measuring devices.

10. Structure of the curriculum					
The week	Hours	Required learning outcomes	Name of unit or subject	Method of education	Method of assessment
1 – 6	4 hours a week		The absorption refrigeration system, its types and the principle of its work	Theoretical + Practical	Oral and practical exams
7 – 9	4 hours a week		The steam-powered system The air refrigeration system	Theoretical + Practical	Oral and practical exams
10 – 12	4 hours a week		Air Liquid System The thermal refrigeration system	Theoretical + Practical	Oral and practical exams
13-15	4 hours a week		The thermal refrigeration system Food preservation Techniques	Theoretical + Practical	Oral and practical exams

11- the infrastructure	
A. prescribed books and main references	Air-conditioning engineering by w.p.Joins. ASHRAE hand book Air-conditioning engineering by Gopta Principles of refrigeration by Dossat
Books and references (scientific journals, reports,...)	Virtual Library of the Ministry of higher Education and Scientific Research
E-referencing, Web sites	Virtual Library of the Ministry of higher Education and Scientific Research Books in the Institute's electronic library

12. Curriculum development plan
• Take advantage of the virtual library of the Ministry of higher Education and Scientific Research. • Benefit from scientific websites in the development of the course through the presentation of scientific films and developments in the field of the course. • Linking the theoretical and practical part of the course through the subject of the student project.

Fundamentals design of conditioning systems (Compulsory) - PMTR245 - level II

Description of the Curriculum

Students learn about electron technology, Kirchhoff's law, Ohm's law and its applications

1. Educational institution	Northern Technical University/Kirkuk Technical Institute
2. Department	Power Mechanics Techniques/Branch of Refrigeration and Airconditioning
3. Name/code of the curriculum	Fundamentals design of conditioning systems (Compulsory) - PMTR245 - level II
4. Forms of presence available	Attendance
5. Semester/year system	The semester system
6. Number of hours (total)	3 x 15 weeks = 45 hours (for semester)
7. Date of preparation of this description	2025|1|15

8- objectives of the curriculum

- Provide the student with the experiences and skills to enable him to read and draw architectural charts and maps of air ducts.
- Identifying maps.
- Drawing and reading water systems for the purpose of delivering water between the parts of air conditioning systems.

9- Learning outputs and methods of teaching, learning and evaluation

A- Knowledge objectives

- Provide the student with theoretical and practical information on drawing air ducts
- Drawing of machine rooms, pullers and jellars.

B. skills objectives of the Curriculum

- Provide the student with a skill to be able to read and draw architectural charts and maps of air ducts
- Drawing and reading water systems for the purpose of delivering water

between the parts of the air-conditioning systems

Teaching and learning methods

- Practical lectures and electronic platforms.

Methods of evaluation

- Oral or electronic tests
- Electronic tests
- Electronic Daily Assessment
- Practical exam attendance
- The first electronic exam
- The second electronic exam
- Final physical and electronic exams

C. General and transferable skills (other skills related to employability and personal development).

- Use of AutoCAD software.
- Use of maps.
- Draw the air ducts
- Understand the components of a machine room

10. Structure of the curriculum					
The week	Hours	Required learning outcomes	Name of unit or subject	Method of education	Method of assessment
1 – 6	3 hours a week		Drawing an architectural chart of a multi-story building, a general idea of drawing the air ducts in a single line style, drawing an airway with two lines showing dimensions, drawing a complete air ductwork scheme (containing curvature and branching and other connections) with the dimensions, drawing a complete air ductwork scheme with the connection with the crane device or air handling unit.	Practical	Practical exams

7 – 9	3 hours a week		Draw the outline of the air ducts in full detail draw your air windows and air dispensers in their locations and indicator of the dimensions and quantities of air, a general idea of the drawing of water pipes for air conditioning units (refrigeration water system - Heating water system - condensation water system).	Practical	Practical exams
10 – 12	3 hours a week		Drawing of plates for the network of coil water pipes and single-door fan-duo-trio-quad, drawing the double-top tube within an integrated refrigeration system.	Practical	Practical exams
13-15	3 hours a week		Drawing a plan for an integrated pipeline network, including control and measurement devices, drawing a machine room layout (single line and sludge pipe method, drawing sections of the machine room to illustrate the movement of the pipe within the room space.	Practical	Practical exams

11- the infrastructure	
A. prescribed books and main references	**Mechanical Drawing by Feach Thomas** **Handbook& Air-condition system design by Carrire** **Sourcebook of H.V.A.C. Details by Frank E. Beaty , jr .P.E.**
Books and references (scientific journals, reports,...)	**Virtual Library of the Ministry of higher Education and Scientific Research**
E-referencing, Web sites	**Virtual Library of the Ministry of higher Education and Scientific Research** **Books in the Institute's electronic library**

12. Curriculum development plan
• Take advantage of the virtual library of the Ministry of higher Education and Scientific Research. • Benefit from scientific websites in the development of the course through the presentation of scientific films and developments in the field of the course. • Linking the theoretical and practical part of the course through the subject of the student project.

Advanced design of airconditioning systems (Compulsory) - PMTR251 - second level

Description of the Curriculum

The student learns to draw an architectural map for one floor as well as he can learn to draw a diagram of the pipes of refrigeration water and condensation and the unit of the air exchanger and draw the straws and fasteners of pipes and devices bases of pumps.

1. Educational institution	Northern Technical University/Kirkuk Technical Institute
2. Department	Power Mechanics Techniques/Branch of Refrigeration and Airconditioning
3. Name/code of the curriculum	Advanced design of airconditioning systems (Compulsory) - PMTR251 - second level
4. Forms of presence available	Attendance
5. Semester/year system	The semester system
6. Number of hours (total)	3 x 15 weeks = 45 hours (for semester)
7. Date of preparation of this description	2025|1|15

8- objectives of the curriculum

- Give the student the skill of conducting mechanical drawings.
- Draw an architectural map of one floor with basic requirements.
- Draw a chart of water pipes.
- Plan a control system.
- Draw brushes, pipe fasteners, armrests and bases for pumps.

9- Learning outputs and methods of teaching, learning and evaluation

A- Knowledge objectives

- Provide the student with practical information for drawing.
- Introduce the student to the necessary accessories in the machine room

B. skills objectives of the Curriculum

- Give the student a skill to be able to read and draw the architectural charts of the machine room

- Draw mechanical parts due in the machine room

Teaching and learning methods

- Practical lectures and electronic platforms.

Methods of evaluation

- Oral or electronic tests
- Electronic tests
- Electronic Daily Assessment
- Practical exam attendance
- The first electronic exam
- The second electronic exam
- Final physical and electronic exams

C. General and transferable skills (other skills related to employability and personal development).

- Use of AutoCAD software.
- Use of maps.
- Understand the mechanical parts of a machine room

10. Structure of the curriculum					
The week	Hours	Required learning outcomes	Name of unit or subject	Method of education	Method of assessment
1 – 6	3 hours a week		Drawing an architectural map of one floor - showing how to connect the coil and fan units, drawing a map of refrigeration water pipes connecting the chamber of engines driving on a certain floor, drawing the refrigeration, condensation and charging water system in a stereoscopic (three-dimensional) style with valves and control devices	Practical	Practical exams

7 – 9	3 hours a week		Schema of control systems for a condensing unit.	Practical	Practical exams
10 – 12	3 hours a week		Chart of the air exchanger unit home refrigeration plate-separate refrigeration panel, drawing of straps and pipe fasteners.	Practical	Practical exams
13-15	3 hours a week		The device rests drew the bases of the pumps, a scientific visit to a building to see the implementation of the air ducts - and the extension of the network of water pipes.	Practical	Practical exams

11- the infrastructure	
A. prescribed books and main references	**Mechanical Drawing by Feach Thomas** **Handbook& Air-condition system design by Carrire** **Sourcebook of H.V.A.C. Details by Frank E. Beaty , jr .P.E.**
Books and references (scientific journals, reports,...)	**Virtual Library of the Ministry of higher Education and Scientific Research**
E-referencing, Web sites	**Virtual Library of the Ministry of higher Education and Scientific Research** **Books in the Institute's electronic library**

12. Curriculum development plan

- Take advantage of the virtual library of the Ministry of higher Education and Scientific Research.
- Benefit from scientific websites in the development of the course through the presentation of scientific films and developments in the field of the course.
- Linking the theoretical and practical part of the course through the subject of the student project.

Principles of Engineering Drawing (compulsory) - PMTR143- level I

Description of the Curriculum

Qualifying the student so that he has the ability to deal with the drawing language and understand engineering plans or what is intended.

1. Educational institution	Northern Technical University/Kirkuk Technical Institute
2. Department	Power Mechanics Techniques/Branch of Refrigeration and Airconditioning
3. Name/code of the curriculum	Principles of Engineering Drawing (compulsory) - PMTR143- level I
4. Forms of presence available	Attendance
5. Semester/year system	The semester system
6. Number of hours (total)	3 x 15 weeks = 45 hours (semester)
7. Date of preparation of this description	2025|1|15

8- objectives of the curriculum

- Provide the student with engineering drawing skills and engineering processes.
- Qualifying the student so that he is able to deal with the language of drawing.
- Understand engineering plans and their implementation.
- How to draw perspective

9- Learning outputs and methods of teaching, learning and evaluation

A- Knowledge objectives

- Provide the student with the basics of engineering drawing.
- Introducing the student to the drawing scales and system interface.

B. skills objectives of the Curriculum

- Use drawing programs
- Use of engineering drawing programs.

Teaching and learning methods
• Practical lectures and electronic platforms.

Methods of evaluation
• Oral or electronic tests • Electronic tests • Daily assessment • Practical exam attendance • The first electronic exam • The second electronic exam • Final physical and electronic exams
C. General and transferable skills (other skills related to employability and personal development). • Use of AutoCAD software. • Understand and visualize geometric shapes and shapes.

10. Structure of the curriculum					
The week	Hours	Required learning outcomes	Name of unit or subject	Method of education	Method of assessment
1 – 6	3 hours a week		The importance of geometric drawing - the tools used - measuring drawing boards - zooming and miniaturization - spreadsheet, types of lines with exercises, writing letters and numbers in both languages, engineering operations - drawing a straight and equitable column for another straight from a point on it or outside it, drawing a triangle by knowing the dimensions of the ribs or angles, drawing a circle from a point on it or outside it.	Practical	Practical exams

7 – 9	3 hours a week		Draw an inner tangent of two circles, draw an arc that touches two circles from the outside, inside, or joint with a known radius, draw a circle that touches the heads of a triangle, draw a circle that touches the sides of a triangle, draw the elongated polygons-hexagon-eight-polygonal, draw the ellipse by the largest and smallest diagonal or by the diameter of a circle.	Practical	Practical exams
10 – 12	3 hours a week		Applications to geometric processes, perspective, species with isometric and 45 degree diagonal concentration, drawing a perspective containing circular holes in its three sides (using the center transfer method in the oval)	Practical	Practical exams
13-15	3 hours a week		Draw different shapes of objects in perspective	Practical	Practical exams

11- the infrastructure	
A. prescribed books and main references	**Engineering Drawing by Cousins** **- Engineering Drawing by A.W.Boundy** **- Engineering Drawing by B.Dash Sharwa** **Engineering Drawing: Dr. Fathi Al-Sherif** **Engineering Drawing: Abdul Rasul Al-Khafaq** **The engineering drawing: Josh pleased**
Books and references (scientific journals, reports,...)	**Virtual Library of the Ministry of higher Education and Scientific Research**
E-referencing, Web sites	**Virtual Library of the Ministry of higher Education and Scientific Research** **Books in the Institute's electronic library**

12. Curriculum development plan
• Take advantage of the virtual library of the Ministry of higher Education and Scientific Research. • Benefit from scientific websites in the development of the course through the presentation of scientific films and developments in the field of the course. • Linking the theoretical and practical part of the course through the subject of the student project.

Advanced Engineering drawing (Compulsory) - PMTR144 - level I

Description of the Curriculum

Introducing the student and qualifying him to draw perspective and dimensions, draw projections, and deduce the third projection.

1. Educational institution	Northern Technical University/ Kirkuk Technical Institute
2. Department	Power Mechanics techniques/Branch of Refrigeration and Airconditioning
3. Name/code of the curriculum	Advanced Engineering drawing (Compulsory) - PMTR144 - level I
4. Forms of presence available	Attendance
5. Semester/year system	The Semester system
6. Number of hours (total)	3 x 15 weeks = 45 hours (semester)
7. Date of preparation of this description	2025|1|15

8- objectives of the curriculum

- The student has to put the dimensions on the drawing.
- Give the student a drawing with his three faces.
- Give the student the skills to conclude the third projection.
- Give the student how to cut and know the types of cut lines.

9- Learning outputs and methods of teaching, learning and evaluation

A- Knowledge objectives

- Provide the student with practical information and apply it to the calculator.
- The student's definition of the fall.

B. skills objectives of the Curriculum

- The student is able to master the engineering drawing.
- Provide the student with an understanding of reading geometric shapes and falls.
- The student knows how to cut and determine the cut part

Teaching and learning methods
• Practical lectures and electronic platforms.

Methods of evaluation
• Oral or electronic tests • Electronic tests • Daily assessment • Practical exam attendance • The first electronic exam • The second electronic exam • Final physical and electronic exams
C. General and transferable skills (other skills related to employability and personal development). • Use of AutoCAD software. • Understand and visualize geometric shapes and shapes.

10. Structure of the curriculum					
The week	Hours	Required learning outcomes	Name of unit or subject	Method of education	Method of assessment
1 – 6	3 hours a week		Dimensions, how to place the dimensions and the most important errors in the position of the dimensions with drawing two plates with the position of the dimensions, drawing the three projections used from the perspective (front-side-horizontal), the conclusion of the third projection from the knowledge of only two drops.	Practical	Practical exams
7 – 9	3 hours a week		The conclusion of the third projection is from the knowledge of only two fallen.	Practical	Practical exams
10 – 12	3 hours a week		Cutting, the importance of cutting engineering drawing, the types of cutting lines in different cut materials with an indication of the parts that are not cut despite the passage of the cutting level.	Practical	Practical exams
13-15	3 hours a week		Exercises for perspective with cutting with the extraction of the falls and the placement of dimensions.	Practical	Practical exams

11- the infrastructure	
A. prescribed books and main references	**Engineering Drawing by Cousins** **- Engineering Drawing by A.W.Boundy** **- Engineering Drawing by B.Dash Sharwa** **Engineering Drawing: Dr. Fathi Al-Sherif** **Engineering Drawing: Abdul Rasul Al-Khafaq** **The engineering drawing: Josh pleased**
Books and references (scientific journals, reports,...)	**Virtual Library of the Ministry of higher Education and Scientific Research**
E-referencing, Web sites	**Virtual Library of the Ministry of higher Education and Scientific Research** **Books in the Institute's electronic library**

12. Curriculum development plan

- Take advantage of the virtual library of the Ministry of higher Education and Scientific Research.
- Benefit from scientific websites in the development of the course through the presentation of scientific films and developments in the field of the course.
- Linking the theoretical and practical part of the course through the subject of the student project.

English Language (compulsory) - NTU101 - level I

Description of the Curriculum

Introduce the student to the nature of the vocabulary of the English language in terms of pronunciation, reading, listening, conversation, previous sections, and subsequent and abnormal actions and others. This lesson also targets students with key vocabulary on a number of topics such as self-definition, family and friends, places, time, and birthdays.

8. Educational institution	Northern Technical University/ Kirkuk Technical Institute
9. Department	Power Mechanics techniques/Branch of Refrigeration and Airconditioning
10. Name/code of the curriculum	English Language (compulsory) - NTU101 - level I
11. Forms of presence available	Attendance
12. Semester/year system	The Semester system
13. Number of hours (total)	2 x 15 weeks = 30 hours (semester)
14. Date of preparation of this description	2025|1|15

8- objectives of the curriculum

- Give the student the skills of speech, reading, listening and conversation
- Qualifying the student so that he is able to use the previous and subsequent sections
- Understand the basic vocabulary of time, places and others

9- Learning outputs and methods of teaching, learning and evaluation

A- Knowledge objectives

- Provide the student with the basics of introducing oneself, family and friends
- Understand some times in English

B. skills objectives of the Curriculum

- Speech, reading, listening, conversation

Teaching and learning methods
• Theoretical lectures and electronic platforms.

Methods of evaluation
• Oral or electronic tests • Daily assessment • Theoretical exam attendance • The first Semester exam • The second semester exam • Final exams and electronic exams
C. General and transferable skills (other skills related to employability and personal development). • Learn about other cultures and countries • Learn how to talk and self-identify in interviews

10. Structure of the curriculum					
The week	Hours	Required learning outcomes	Name of unit or subject	Method of education	Method of assessment
1 – 4	2 hours a week		-Introduce Yourself (Hello) - conversation -vocabulary: objects, and food - every day English (numbers) And exercises -your world (where are you from) -pronunciation (countries and cities) -reading (they're from), listening (this is Carmen) -every day English (singular and plural And exercises	Theoretical + Oral	Oral and theoretical exams
5 – 8	2 hours a week		-personal information (your address, phone number) -jobs (what is your job?) - Grammar (Negative) -Reading and speaking (An international team) -Listening (A conversation with Kirsty) - pronunciation (word stress) -Translation -Every day English (social expressions) -Exercises	Theoretical + Oral	Oral and theoretical exams

9 – 12	2 hours a week		-Family and friends -vocabulary : Jobs , countries , families -Grammar (has/have) -Reading (My friend Andy), Speaking (My best friend) -Every day English (on the phone) And exercises -Life (it's my life) -Grammar (present simple , question) -preferences (Things I like) -Vocabulary : food , sport , drinks -pronunciation : Languages and nationalities -Reading (Gordon Wilson) , Listening (At the party) -Every day English (prices and currencies) And exercises	Theoretical + Oral	Oral and theoretical exams

13-15	2 hours a week		-The time -Listening (Anna `s day), Writing (Your day) -Grammar (Questions , negatives) -Every day English(Days of the weeks) And exercises And traveling -Speaking (Places I like, Listening (An interview with Dan) -Grammar (Object pronouns , why/because, this/ that) -Reading (A post card from from San Francisco) -Question words -Translation -Vocabulary : Adjectives -Every day English (can I?) And exercises	Theoretical + Oral	Oral and theoretical exams

11- the infrastructure	
A. prescribed books and main references	**new HEADWAY PLUS Beginner Student Book Audio + VideoHTTPS** **://elt.oup.com/student/headway/beg/download?cc=us&sellanguage=en**
Books and references (scientific journals, reports,...)	**Virtual Library of the Ministry of higher Education and Scientific Research**
E-referencing, Web sites	**Virtual Library of the Ministry of higher Education and Scientific Research** **Books in the Institute's electronic library**

12. Curriculum development plan
• Take advantage of the virtual library of the Ministry of higher Education and Scientific Research. • Take advantage of scientific websites in the development of the course through the Oxford website and developments in the field of the course.

English Language (compulsory) - NTU200 - level II

Description of the Curriculum

Introduce the student to the nature of the vocabulary of the English language in terms of pronunciation, reading, listening, conversation, previous sections, and subsequent and abnormal actions and others. This lesson also targets students with key vocabulary on a number of topics such as self-definition, family and friends, places, time, and birthdays.

1. Educational institution	Northern Technical University/ Kirkuk Technical Institute
2. Department	Power Mechanics techniques/Branch of Refrigeration and Airconditioning
3. Name/code of the curriculum	English Language (compulsory) - NTU200 - level II
4. Forms of presence available	Attendance
5. Semester/year system	The Semester system
6. Number of hours (total)	2 x 15 weeks = 30 hours (semester)
7. Date of preparation of this description	2025|1|15

8- objectives of the curriculum

- Give the student the skills of speech, reading, listening and conversation
- Qualifying the student so that he is able to use language and its time in the definition of self, expression and question
- Understand the basic vocabulary of time, places and others

9- Learning outputs and methods of teaching, learning and evaluation

- **Knowledge objectives**
- Provide the student with the basics of home definition and tools
- Understand the times in English past, present and future

B. skills objectives of the Curriculum

- Speech, reading, listening, conversation

Teaching and learning methods

- Theoretical lectures and electronic platforms.

Methods of evaluation
• Oral or electronic tests • Daily assessment • Theoretical exam attendance • The first Semester exam • The second semester exam • Final exams and electronic exams
C. General and transferable skills (other skills related to employability and personal development). • Learn about other cultures and countries • Learn how to talk and self-identify in interviews

10. Structure of the curriculum					
The week	Hours	Required learning outcomes	Name of unit or subject	Method of education	Method of assessment
1 – 4	2 hours a week		-Rooms and furniture -Grammar (There is/are, prepositions) -Pronunciation (Word stress) -Translations -Speaking (How to have good time in Sydney) -Reading and writing (Our house) -Every day English (Directions) And exercise -Years -Grammar (was/ were , past tense/irregular verbs) -Writing (famous people) -Vocabulary : words groups -Every day English(When's your Birthday?) And exercises	Theoretical + Oral	Oral and theoretical exams

5 – 8	2 hours a week		- -Past tense (We had a good time) -Grammar (past simple, regular verbs, irregular verbs) -Listening (Mike's day), Writing (Last Saturday) -Pronunciation (Who were they?) -Vocabulary : Sports, Months -Questions(Where, what , who.. etc) -Every day English (Fill in forms) And exercises -Activities (We can do it !) -Listening (Can I be in your pop group?) -Pronunciation (can/can't) -Requests and offers -Vocabulary (odd one out) -Every day English (What is the problem?) And exercises	Theoretical + Oral	Oral and theoretical exams
9 – 12	2 hours a week		-Asking politely (I want/I would like) -Speaking – in the restaurant (food and drink) -translation -Reading (you are what you eat) -Every day English (Going shopping) And exercises -Colours (Here and now) -Grammar (present simple , present Continuous) - translation -Reading (Summer in Portugal) - Vocabulary (Cloths) -Every day English (What's the matter) And exercise	Theoretical + Oral	Oral and theoretical exams
13-15	2 hours a week		-Holidays (Time to go) - Grammar (present continuous for the future) -Listening (Hannah's diary) -pronunciation (shifting sentence stress) - Translation - Vocabulary : Transport and travel -Reading and Speaking (The Smiths) -Every day English (going sightseeing) And exercises	Theoretical + Oral	Oral and theoretical exams

11- the infrastructure	
A. prescribed books and main references	**new HEADWAY PLUS Beginner Student Book Audio + VideoHTTPS** **://elt.oup.com/student/headway/beg/download?cc=us&sellanguage=en**
Books and references (scientific journals, reports,...)	**Virtual Library of the Ministry of higher Education and Scientific Research**
E-referencing, Web sites	**Virtual Library of the Ministry of higher Education and Scientific Research** **Books in the Institute's electronic library**

12. Curriculum development plan
• Take advantage of the virtual library of the Ministry of higher Education and Scientific Research. • Take advantage of scientific websites in the development of the course through the Oxford website and developments in the field of the course.

Sports - NTU104 - level one

Description of the Curriculum

The student must be able to recognize the motor mechanism of the human body and what are the common injuries that occur in the human body. Apply basic skills to individual and group games. Learn about the most important sports legislation and laws and how to manage sports leagues and competitions

8. Educational institution	Northern Technical University/ Kirkuk Technical Institute
9. Department	Power Mechanics techniques/Branch of Refrigeration and Airconditioning
10. Name/code of the curriculum	Sports - NTU104 - level one
11. Forms of presence available	Attendance
12. Semester/year system	The Semester system
13. Number of hours (total)	2 x 15 weeks = 30 hours (semester)
14. Date of preparation of this description	2025|1|15

8- objectives of the curriculum

- The student was able to understand the nature, importance and uses of sport and to acquire the necessary skill.

9- Learning outputs and methods of teaching, learning and evaluation

- **Knowledge objectives**
- During the school year, students learn the basics of sports.
- Enabling the student to know the main principles of the most prominent sports, its sources, types and mechanisms used for its purpose
- Enable the student to know all the basics that he uses in the scientific material

B. skills objectives of the Curriculum

- Students are able to get the basic information needed for sports
- Their knowledge of the most important principles of sport and instilling a sense of responsibility for their individual rights and public interests

Teaching and learning methods

- The teacher prepares lectures on the subject in electronic form and presents them to the students.
- The teacher gives lectures in detail.
- The teacher shall request periodic reports and homework on the basic topics of the subject.
- Methods and lectures
- Methods of dialog
- Use of projectors

Methods of evaluation

Daily discussion to find out the extent of students' absorption of the material and to develop an evaluation of daily contributions (daily participation)
Daily exams with various and short scientific questions to understand how well they understand the material.
Give a portion of each semester's grade to homework.
Daily exams (cuzat), monthly exams for curriculum and final exam. (Monthly tests. + Final exams (end of term))

C. General and transferable skills (other skills related to employability and personal development).

- Make the necessary calculations for the design of buildings and calculations of the rate of heat transfer, loads and others
- Use modern measuring devices to know the conductivity of materials approved in building designs

10. Structure of the curriculum					
The week	Hours	Required learning outcomes	Name of unit or subject	Method of education	Method of assessment
1 – 6	2 hours a week		Sport definition, importance and types mechanism of movement of the human body common sports injuries Basic skills of Basketball International Law of the Game of Basketball A film about the types of sports and what benefits can be used by the community to conduct tests for muscles working on the joints of the body and the motor ranges have the application of the basic stages to help the injured player and according to the type of injury and place learning some basic skills in basketball	Theoretical + Practical	Oral, practical and theoretical exams

7 – 9	2 hours a week		The basic skills of table tennis and its international law are the basic skills of volleyball and its international law Swimming sport Basic skills of the game of tennis and its international law Apply skills individually and collectively Apply some basic skills to table tennis ball learn some basic skills in volleyball A video presentation about swimming and a scientific trip to the pool of the University of Baghdad apply some basic skills of the game of tennis learn some basic skills in handball	Theoretical + Practical	Oral, practical and theoretical exams

10 – 12	2 hours a week		Basic skills for the game of handball International law of the game of handball Arena and Field Games types, International Law of the Game) Apply the skills individually and collectively, apply the basic skills of the most important events in the arena and the field and apply the most important rules of the game of football	Theoretical + Practical	Oral, practical and theoretical exams
13-15	2 hours a week		Basic football skills Management of sports competitions and competitions sports laws and legislation Practical applications on how to manage tournaments and sports competitions	Theoretical + Practical	Oral, practical and theoretical exams

11- the infrastructure	
A. prescribed books and main references	
Books and references (scientific journals, reports,...)	**Virtual Library of the Ministry of higher Education and Scientific Research**
E-referencing, Web sites	**Virtual Library of the Ministry of higher Education and Scientific Research** **Books in the Institute's electronic library**

12. Curriculum development plan

- Goal setting: The educational objectives of the course should be set. What skills and knowledge should students acquire by the end of the course?
- Review current content: Review the current content of the course. Is it compatible with educational goals? Are there areas that can be improved or updated?
- Update content: Based on review, update content to meet educational goals. This may include adding new topics, updating existing topics, or even deleting some topics that are no longer relevant.
- Developing teaching strategies: Developing teaching strategies that support the achievement of educational goals. These may include such things as interactive lessons, practical projects, and theoretical and practical assessments.