Northern Technical University
College of Oil & Gas Techniques
Engineering / Kirkuk
Department of Renewable Energy
Techniques Engineering

Northern Technical University
College of Oil and Gas Technology
Engineering/Kirkuk
Department of Renewable Energy
Technologies Engineering

Ministry of Higher Education & Scientific Research

Supervision and scientific evaluation directorate

Quality assurance and academic accreditation

Academic Program Specification Form For The Academic

University: Northern Technical University

College/Institute: College of Oil and Gas Technology Engineering

Scientific Department: Renewable Energy Technologies Engineering

Dean's Name:	*Deans Assistant for Scientific Affairs*	*Head of Department*
Assist.Prof. Dr. Obid Majed Ali	*Assist.Prof. Dr. Galawish Nouri Taher*	*Dr. Naseer Tawfiq Alwan*
Date : 10/ 01/ 2024	*Date : 10/ 01/ 2024*	*Date : 10/ 01/ 2024*
Signature:	*Signature:*	*Signature:*

Maha Adnan Dawood

Division of Quality Assurance and University Performance

Date: *10/ 01/ 2024*

Signature:

Northern Technical University
College of Oil & Gas Techniques
Engineering / Kirkuk
Department of Renewable Energy
Techniques Engineering

Northern Technical University
College of Oil and Gas Technology
Engineering/Kirkuk
Department of Renewable Energy
Technologies Engineering

Academic program description form for the Renewable Energy Technologies Engineering Department for the academic year 2023-2024

Northern Technical University

College of Oil and Gas Technology Engineering

Department of Renewable Energy Technologies Engineering

Head of the department: Dr. Naseer Tawfiq Alwan

2023-2024

Northern Technical University
College of Oil & Gas Techniques
Engineering / Kirkuk
Department of Renewable Energy
Techniques Engineering

Northern Technical University
College of Oil and Gas Technology
Engineering/Kirkuk
Department of Renewable Energy
Technologies Engineering

1. Academic program description form:

This academic program description provides a summary of the most important characteristics of the program and the learning outcomes that the student is expected to achieve, demonstrating whether he/she has made the most of the opportunities available. It is accompanied by a description of each course within the program

Educational institution	Northern Technical University/ Faculty of Oil and Gas Technology Engineering /Kirkuk
Scientific department/center	Department of Renewable Energy Technologies Engineering
Name of the academic or professional program	Renewable energy technical engineering
Name of the final certificate	Renewable energy technical engineering
Academic system:	Bologna system
Accredited accreditation program	Program of the Ministry of Higher Education and Scientific Research
Other external influences	Field and scientific visits
Date the description was prepared	2023

2- Academic program objectives:

- Using applicable technological expertise in renewable energy systems, and succeeding in engineering studies of advanced renewable energy technologies.
- Maintaining the desire for creativity and engagement with permanent learning in line with the emergence of modern technologies, social development requirements and contemporary issues.
- Building students capable of competing with other engineers for job opportunities and obtaining the required seats to complete postgraduate studies.
- Ability to submit to external tests by local, regional or international bodies for the purpose of completing studies or appointment.
- Urging the student to be creative and think about specialization projects and keep pace with developments in this field.
- Providing students with scientific, practical and personal skills that enable them to solve practical problems and deal with them using scientific concepts.
- To interact professionally and ethically in a modern work environment through effective communication, good leadership, and forming a responsible work team.

3-Required program outcomes and teaching, learning and evaluation methods

3.1 Required program outputs:

3.1.1 Cognitive goals

1- Keeping pace with global development in all scientific fields, especially in renewable energy engineering.

2- Understand and teach the student the engineering foundations of renewable energy technology engineering.

3- Enabling students to obtain knowledge and understanding in working on modern renewable energy systems and in analyzing programs related to those systems.

4- Enabling students to obtain knowledge and understanding of diagnosing faults and maintaining them for various renewable energy devices.

5- Enabling the student to analyze and design renewable energy systems.

3.1.2 Skills objectives of the programme

1 - Explanation of the topics of the foundations of renewable energy engineering by specialists in the subject, with an emphasis on the use of mathematics as a basis for understanding and learning.

2- Providing them with skills to solve applied problems related to power generation systems.

3- Introducing the student to the basics of renewable energy generation.

4 - The focus on the topics of design, analysis, development and control of industrial systems using control systems.

3.1.3 Emotional and value goals:

1- Enabling students to think and analyze topics related to the engineering framework, such as various electrical circuits, electrical power transmission systems, and programmable control systems in the field of industrial application of renewable energies.

2- Enabling students to think and analyze topics related to computer systems related to the engineering framework.

3- Enabling students to think and analyze topics related to solving practical problems related to renewable energy systems.

3.2 Teaching and learning methods

1. Explain the engineering theories related to the field of generating and transmitting electrical power.

2. Forming discussion circles during or outside lectures to discuss scientific engineering topics that require thinking and analysis.

3. Providing students with the basics and additional topics related to the previous educational outcomes and skills to solve practical problems.

4. Solve a group of practical examples by academic staff specialized in the field of renewable energy engineering

5. Assigning students to solve complex problems at home in preparation for moving to the stage of solving practical problems.

6. During the lecture, students participate in solving some practical problems.

7. The department's scientific laboratories are monitored by academic staff specialized in renewable energy engineering.

3.3 Evaluation methods

- Asking students surprise questions in the classroom regarding topics that were previously explained in preparation for explaining the advanced topics.
- Daily exams with questions related to practical problems.
- Participation scores for competitive questions among students.
- Establishing grades for the scientific projects assigned to the student.
- Assigning grades to the homework assignments and reports assigned to the student.
- Semester exams for the curriculum, in addition to the mid-year exam and final exam.

- Active participation in the classroom is evidence of the student's commitment and responsibility.
- Commitment to the specified deadline for submitting the assignments and reports required of the student.
- Semester and final exams express the student's commitment and cognitive and skill achievement.

4. Transferable general and qualifying skills (other skills related to employability and personal development):

4.1 General skills:

- Divide the students into groups and assign each group to design and implement a specific project idea.
- Participate with students in some sporting and entertainment events to increase the student's self-confidence.
- Assigning groups of students to manage a specific project to qualify leadership individuals who will be able to manage factories and laboratories in the future.
- Organizing periodic scientific visits to some industrial areas, such as renewable energy generation plants, to familiarize students with the method of work in those departments.

4.2 Thinking skills:

- Description and analysis of engineering applications using renewable energy sources.
- Analyzing problems related to alternative energy production plants and discussing possible solutions.
- Using computer programs to analyze various engineering problems.

4.3 Professional and practical skills:

- Preparing engineering designs for the mechanical parts of systems with command and control devices.

• Analyzing and discussing the results of engineering tests for use in design and evaluation processes.

• The ability to write and draft engineering technical reports on the results of scientific examinations and tests.

• The ability to extract test results and their effects from the test.

5. Study program requirements:

To complete the study program, the student must complete four academic years (4 levels), and the number of units required for the study program is 240 units. The student must also complete the study within semesters whose number does not exceed three times the level of study, which is 4 levels. Therefore, the maximum possible number of semesters is 12 semesters. Provided that postponement and non-failure classes are not counted among them.

6. Program structure:

Graduation Requirements									
First academic year:									
No.	Subject code	Subject	ECTS	Weekly hours					
				CL.	Lect.	Lab.	Pr.	Tut.	Semn.
1	NTU 101	English Language	2.00	2					1
2	RETE 100	Mechanics Engineering / Static	7.00	3				2	
3	COGTEK 100	Mathematics Principles	7.00	3				2	
4	RETE 102	Electrical Technology	6.00	2		2		1	
5	RETE 103	Workshop	6.00			6			
6	NTU 100	Human Rights & Democracy	2:00					1	
7	RETE 104	Thermodynamics' Principles	9.00	3		2		2	
8	NTU 102	Computer	3.00	1		1			
9	RETE 101	Eng. Mechanics/ Dynamics	8.00	3	1			2	
10	COGTEK 101	Engineering Drawing	8.00	2		2			
11	NTU 103	Arabic Language	2.00	2					1

Graduation Requirements
Second academic year:

Northern Technical University
College of Oil & Gas Techniques
Engineering / Kirkuk
Department of Renewable Energy
Techniques Engineering

Northern Technical University
College of Oil and Gas Technology
Engineering/Kirkuk
Department of Renewable Energy
Technologies Engineering

No.	Subject code	Subject	ECTS	Weekly hours					
				CL.	Lect.	Lab.	Pr.	Tut.	Semn.
١	RETE 200	Fluid Mechanics	7.00	3		2		1	
٢	COGTEK 200	Mathematics	5.00	3				2	
٣	RETE 201	Electronics	5.00	2		2		1	
٤	RETE 202	Mechanical Drawing	2.00	1		3			
٥	NTU 200	English Language	2.00	2					1
٦	NTU 203	Baath Crimes	2.00	2					
٧	NTU 204	Professional Ethics	7.00	2					
٨	RETE 203	Strength of Materials	5.00	2		2		1	
٩	RETE 204	Electronics circuits	5.00	2		2		1	
10	RETE 205	Refrigeration & Air Conditioning Principles	5.00	2		2			
11	RETE 206	Introduction to sustainable energy	5.00	2		2			
12	RETE 207	Electric machines	5.00	2		2			
13	NTU 201	Computer	3.00	1		1			
14	NTU 202	Arabic Language	2.00	2					

Graduation Requirements

Third academic year:

No.	Subject code	Subject	ECTS	Weekly hours					
				CL.	Lect.	Lab.	Pr.	Tut.	Semn.
١	RETE 300	Conduction and radiation heat transfer	7.00	3		2		1	
٢	COGTEK 300	Engineering Analysis	6.00	2		1		1	
٣	RETE 302	Renewable Energy systems	6.00	2		2			1
٤	RETE 303	Power electronics	5.00	2		2			
٥	RETE 304	Gas dynamics	6.00	2		2			
٦	RETE 305	Solar Energy Engineering	6.00	2		2		1	
٧	RETE 306	Biofuel	5.00	2		2			1
٨	RETE 301	Convection heat transfer, and heat exchanger design	7.00	3		2		1	
٩	RETE 307	Combustion and Pollution Engineering	6.00	2		1		1	
10	COGTEK 301	Numerical Analysis	6.00	2		2		1	

Graduation Requirements

Fourth academic year:

Northern Technical University
College of Oil & Gas Techniques
Engineering / Kirkuk
Department of Renewable Energy
Techniques Engineering

Northern Technical University
College of Oil and Gas Technology
Engineering/Kirkuk
Department of Renewable Energy
Technologies Engineering

No.	Subject code	Subject	ECTS	Weekly hours					
				CL.	Lect.	Lab.	Pr.	Tut.	Semn.
١	RETE 400	Wind energy	5.00	2		2			1
٢	RETE 401	Solar Photovoltaic Conversion	5.00	2		2			1
٣	RETE 402	Simulation of renewable energy systems	6.00	2		2		1	
٤	COGTEK 400	Engineering projects management	4.00	2				1	1
٥	RETE 404	Power Plants	5.00	2		2			1
٦	NTU 400	Methodology of Scientific Research	5.00	2					1
٧	RETE 405	Design of solar renewable systems	6.00	2		2			1
٨	RETE 406	Store and recover Energies	5.00	2		2			
٩	RETE 407	Control systems	5.00	2		2			
١٠	RETE 403	Computer-based modelling and simulation of renewable energy systems	8.00	2		4			
١١	COGTEK 401	Graduation Project	6.00	1			3		1

7- Planning for personal development:

- Training courses within the country
- Training courses within the country

8. Admission standard (establishing regulations related to college admission):

- Approving admission conditions for students in accordance with the regulations of the Ministry of Higher Education and Scientific Research (central admission)
- Passing the department's personal interview.
- Must be fit for medical examination.
- Graduation rate from middle school.
- The department's capacity.

9-The most important sources of information about the program

- Methodological books
- Auxiliary sources (secondary books)
- The Internet, self-education websites, reputable international university websites, and Iraqi university websites.