

Ministry of Higher Education & Scientific Research
Supervision and scientific evaluation directorate
Quality assurance and academic accreditation

Academic Program Specification Form For The Academic Year (2024-2025)

University: Northern Technical University

College/Institute: College of Oil and Gas Techniques Engineering/Kirkuk

Scientific Department: Renewable Energy Techniques Engineering

Deans Name:

Deans Assistant for Scientific Affairs

Head of Department

Assist.Prof. Dr.Obid Majed Ali
Date:10/10/2024

Assist.Prof. Dr.Galawish Nouri Taher
Date:10/10/2024

Assist.Prof. Dr. Naseer Tawfeeq Alwan
Date:10/10/2024

Signature:

Signature:

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The College Quality Assurance

And University Performance

Manager

Maha adnan Dawood

Date:10/10/2024

Signature:

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



الجامعة التقنية الشمالية
كلية هندسة تقنيات النفط والغاز/كركوك
قسم هندسة تقنيات الطاقة المتجددة

Academic Program Description Model for the Renewable Energy Techniques Engineering Department (2024-2025)

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

Head of Department: Asst. Prof. Dr. Naseer Tawfeeq Alwan

2024-2025



1. Academic Program Description Model

This academic program description provides a concise summary of the main features of the program and the learning outcomes expected of the student, demonstrating whether he or 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
Scientific Department / Center	Department of Renewable Energy Engineering Techniques
Name of academic or professional program	Renewable Energy Techniques Engineering
Final Certificate Name	Bachelor of Renewable Energy Techniques Engineering
The educational system:	Bologna Process
Accredited Certification Program	
Other external influences	Field and scientific visits
Date of preparation of the description	2024

2. Academic Program Objectives:

- Use applicable technological expertise in renewable energy systems, and succeed in advanced renewable energy engineering studies.
- Maintain the desire for creativity and commitment to continuous learning in line with the emergence of modern technologies, social development requirements and contemporary issues.



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- Maintain the desire for creativity and commitment to continuous learning in line with the emergence of modern technologies, social development requirements and contemporary issues.
- Build students capable of competing with other engineers for job opportunities and obtaining the required seats in completing postgraduate studies.
- Ability to apply for external tests by local, regional or international bodies for the purpose of completing studies or appointment.
- Encourage students to be creative and think about specialization projects and keep pace with the developments in this field.
- Provide students with scientific, practical and personal skills that enable them to solve practical problems and deal with them with 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, teaching, learning and assessment methods:

3.1 Required program outputs:

3.1.1 Cognitive objectives

- 1- Keeping pace with global development in all scientific fields, especially in renewable energy engineering
- 2- Understanding and teaching the student the engineering foundations of renewable energy technology engineering.



- 3- Enabling students to gain knowledge and understanding in working on modern renewable energy systems and in analyzing programs related to those systems.
- 4- Enabling students to gain knowledge and understanding in diagnosing faults and maintaining them for various renewable energy devices.
- 5- Enabling the student to analyze and design renewable energy systems.

3.1.2 Program Skill Objectives

- 1- Explaining the topics of the foundations of renewable energy engineering by specialists in the subject, with emphasis on using mathematics as a basis for understanding and learning.
- 2- Providing them with skills to solve practical problems related to power generation systems.
- 3- Introducing the student to the basics of renewable energy generation.
- 4- Focus is on topics of designing, analyzing, developing and controlling industrial systems using control systems.

3.1.3 Emotional and value-based 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 energy.
- 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. Explaining engineering theories related to the field of generating and transmitting electrical power.
2. Forming discussion groups 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 previous learning outcomes for skills to solve practical problems.
4. Solving a set of practical examples by academic staff specialized in the field of renewable energy engineering
5. Assigning students to solve homework for complex problems in preparation for moving them to the stage of solving practical problems.
6. Students participate during the lecture 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 surprise questions to students in the classroom on topics previously explained in preparation for explaining advanced topics.
- Daily exams with questions related to practical problems.
- Participation grades for competitive questions among students.
- Setting grades for scientific projects assigned to the student.
- Setting grades for homework and reports assigned to the student.



- Semester exams for the curriculum in addition to the mid-year exam and the final exam.
- Active participation in the classroom is evidence of the student's commitment and responsibility.
- Commitment to the specified date for submitting the assignments and reports required of the student.
- Semester and final exams express the student's commitment and cognitive and skill attainment.

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

4.1 General skills:

- Divide students into groups and assign each group to design and implement a specific project idea.
- Participate with students in some sports and entertainment activities to increase the student's self-confidence.
- Assign groups of students to manage a specific project to qualify leaders who can manage factories and laboratories in the future.
- Organize periodic scientific visits to some industrial areas such as renewable energy generation stations to familiarize the student with the work method in those departments.

4.2 Thinking skills:

- Description and analysis of engineering applications using renewable energy sources.



- Analysis of problems related to alternative energy production stations and discussion of possible solutions.
- Use of computer programs to analyze various engineering problems.

4.3 Professional and practical skills:

- Preparing engineering designs for mechanical parts of systems with control and control devices.
- Analyzing and discussing engineering test results to use them in design and evaluation processes.
- Ability to write and formulate engineering technical reports on the results of scientific tests and examinations.
- Ability to deduce test results and their effects from the test.

5. Program requirements:

To complete the program, the student must complete four academic years (4 levels) and the number of units required for the program is 240 units. The student must also complete the study in semesters that do not exceed three times the level of study, which is 4 levels. Therefore, the maximum possible number of semesters is 12 semesters, provided that deferral and non-failure semesters are not included.

6. Program structure:

Graduation Requirements									
Level 1									
No.	Subject code	Subject	ECTS	Weekly hours					
				CL.	Lect.	Lab.	Pr.	Tut.	Semn.
1	NTU 101	English Language	2.00	2					



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	1		3			
11	NTU 103	Arabic Language	2.00	2					

Graduation Requirements									
Level 2									
No.	Subject code	Subject	ECTS	Weekly hours					
				CL.	Lect.	Lab.	Pr.	Tut.	Semn.
1	COGTEK 200	Fluid Mechanics	8.00	3		2		1	
2	COGTEK 201	Mathematics	7.00	3				2	
3	RETE 200	Electronics	7.00	3		2		1	
4	RETE 201	Mechanical Drawing	6.00	1		3			
5	NTU 200	Baath Crimes	2.00	2					
6	RETE 202	Strength of Materials	6.00	3		2		1	
7	RETE 203	Electronics circuits	6.00	3		2		1	
8	RETE 204	Refrigeration & Air Conditioning Principles	5.00	2		2			
9	RETE 205	Introduction to sustainable energy	6.00	2		2			
10	RETE 206	Electric machines	5.00	2		2			
11	NTU 201	Professional Ethics	2.00	2					

Graduation Requirements									
Level 3									



No.	Subject code	Subject	ECTS	Weekly hours					
				CL.	Lect.	Lab.	Pr.	Tut.	Semn.
1	RETE 300	Conduction and radiation heat transfer	7.00	3		2		1	
2	COGTEK 300	Engineering Analysis	6.00	2		1		1	
3	RETE 302	Renewable Energy systems	6.00	2		2			1
4	RETE 303	Power electronics	5.00	2		2			
5	RETE 304	Gas dynamics	6.00	2		2			
6	RETE 305	Solar Energy Engineering	6.00	2		2		1	
7	RETE 306	Biofuel	5.00	2		2			1
8	RETE 301	Convection heat transfer, and heat exchanger design	7.00	3		2		1	
9	RETE 307	Combustion and Pollution Engineering	6.00	2		1		1	
10	COGTEK 301	Numerical Analysis	6.00	2		2		1	

Graduation Requirements									
Level 4									
No.	Subject code	Subject	ECTS	Weekly hours					
				CL.	Lect.	Lab.	Pr.	Tut.	Semn.
1	RETE 400	Wind energy	5.00	2		2			1
2	RETE 401	Solar Photovoltaic Conversion	5.00	2		2			1
3	RETE 402	Simulation of renewable energy systems	6.00	2		2		1	



4	COGTEK 400	Engineering projects management and its risks	4.00	2				1	1
5	RETE 404	Power Plants	5.00	2		2			1
6	NTU 400	Methodology of Scientific Research	5.00	2					1
7	RETE 405	Design of solar renewable systems	6.00	2		2			1
8	RETE 406	Store and recover Energies	5.00	2		2			
9	RETE 407	Control systems	5.00	2		2			
10	RETE 403	Computer-based modelling and simulation of renewable energy systems	8.00	2		4			
11	COGTEK 401	Graduation Project	6.00	1			3		1

7. Planning for personal development:

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

8. Admission criteria (setting regulations related to joining the college):

- Adopting admission requirements for students according to the regulations of the Ministry of Higher Education and Scientific Research (central admission)
- Passing the personal interview of the department.
- Be fit for the medical examination.
- Graduation rate from the preparatory stage.
- Department capacity.

9. The most important sources of information about the program.

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College of Oil & Gas Techniques
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- Market needs.
- Local trends of the governorate.
- Studies and questionnaires.