

# Northern technical university

## الجامعة التقنية الشمالية

### *First Cycle – bachelor's degree (B.Sc.) – Renewable Energy Technologies Engineering*

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

#### جدول المحتويات | Table of Contents

1. Mission & Vision Statement	بيان المهمة والرؤية
2. Program Specification	مواصفات البرنامج
3. Program (Objectives) Goals	أهداف البرنامج
4. Program Student learning outcomes	مخرجات تعلم الطالب
5. Academic Staff	الهيئة التدريسية
6. Credits, Grading and GPA	الاعتمادات والدرجات والمعدل التراكمي
7. Modules	المواد الدراسية
8. Contact	اتصال



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



## Mission & Vision Statement

### Vision:

The department aims to raise awareness and knowledge in the field of Renewable Energy Engineering by providing a distinguished high-quality academic program that combines teaching and practical aspects. It aspires to attain a prestigious academic status among engineering colleges in Iraqi and regional universities. Furthermore, the department aims to supply the community with outstanding graduates capable of dealing with modern developments and changes in the field of energy. These graduates will contribute to the advancement of our scientific, health, industrial, and environmental institutions in solving the challenges they face. Students in this department will acquire the necessary skills for designing, implementing, and operating renewable energy systems such as solar energy, wind energy, and other renewable energy applications. The program includes both theoretical study of renewable energy engineering and practical application in well-equipped laboratories, as well as field visits to real-world projects. Additionally, students will undergo field training during their study years in ongoing projects, in collaboration with specialized companies in the job market, thus professionally preparing them for the job market.

### Mission:

The Renewable Energy Department aims to fulfill the mission of the North Technical University in building an educational institution capable of keeping pace with and assimilating continuous and ongoing developments in the basic sciences and their various applications. These missions encompass:

1. Providing the local and global private sectors and the government sector with generations of engineers and professionals with knowledge of the latest green energy generation technologies, and enhancing their expertise through scientific, research, educational, and industrial centers.
2. Offering the best educational services to students in the field of studying basic sciences for bachelor's degrees, equipping them with the required skills in the specialization through educational programs that adhere to global standards.
3. Contributing to the continuous development and updating of educational and research programs.
4. Playing an influential role in community development through training programs, awareness initiatives, consultations, and mutual interaction between the department and the community.
5. Fostering academic relationships between local and regional universities through scientific and cultural exchanges.
6. Deepening national loyalty and upholding the principles of society and noble human values.

### 1. Program Specification

Program code:	RETE	ECTS	240
Duration:	4 levels, 8 Semesters	Method of Attendance:	Full Time

The Department of Renewable Energy Engineering Techniques was established in 2023, along with the establishment of the College of Oil and Gas Engineering Techniques, as part of the North Technical University's organizational structure. This department is the first of its kind in Iraq and one of the most



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



sought-after rare specializations in the world. In a world where nations are striving to find alternative energy sources to fossil fuels (such as oil, gas, and coal), the field of Renewable Energy techniques focuses on the study of various renewable energy systems from both theoretical and practical perspectives. This includes the study of solar energy systems, both photovoltaic and thermal, as well as wind energy, thermal energy, nuclear energy, bioenergy, in addition to hybrid systems and energy management. The Renewable Energy program is a four-year program aimed at equipping graduates with advanced knowledge of the latest technologies for green energy generation. These technologies include solar cells, wind energy, biofuels, biomass, natural gas, and more.

Renewable Energy Engineering Techniques serves as a bridge between engineering disciplines involved in the design, installation, operation, and maintenance of renewable energy systems. These disciplines include electrical engineering, mechanical engineering, architectural engineering, environmental engineering, materials engineering, and other related engineering sciences. The specialization revolves around the methods and systems used for generating and distributing energy from sustainable and renewable sources. These methods and systems encompass people, materials, information, equipment, sustainable energy sources, and their applications in various environments.

## 2. Program Objectives

The department seeks to achieve the following strategic objectives:

### I. General Objectives:

- Keeping pace with global developments in all scientific fields, especially in Renewable Energy Engineering.
- Providing society and state institutions with scientific and technical expertise in the field of Renewable Energy Engineering and developing their scientific, health, and environmental institutions.
- Elevating performance and quality to the level of advanced global universities.

### II. Educational Objectives:

- Developing and updating scientific curricula, both theoretically and practically.
- Enhancing scientific competence and performance for professors, researchers, and students.
- Adopting modern technologies in practical laboratories.

### III. Scientific Research Objectives:

- Finding solutions to contemporary environmental problems. Understanding and scientifically studying the main causes of negative aspects prevalent in our environment and society and finding successful remedies for them. Investing in energy research and sustainable development to enhance industry in various fields such as medical, chemical, and food industries. Contributing to addressing energy-related problems in Iraq.

### IV. Community Service Objectives:

- Supporting community activities by organizing scientific conferences, seminars, and practical workshops in various fields of energy sciences and renewable energies. Collaborating with various government departments to improve the health, environmental, industrial, and agricultural sectors by providing scientific expertise and research results for implementation. Striving to uplift society by expanding public awareness about the importance of Renewable Energy Engineering in solving various health, environmental, and industrial problems.

### V. Student Activity Objectives:

- Supporting student activities in cultural, social, sports, and artistic fields.
- Promoting knowledge, cultural, and scientific exchange with local and international universities.
- Training students in our scientific, health, industrial, and environmental institutions during the summer break.
- Seeking agreements with universities and departments similar to ours, both inside and outside our region, to send outstanding students for training and exposure to scientific activities during the summer break.



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



Organizing an annual scientific conference for research projects (graduation projects) and honoring outstanding students.

**Study System and Awarded Degree:**

The duration of study in the department is four academic years, including a two-week spring break and a two-month summer break. The department awards a bachelor's degree in Renewable Energy Techniques after preparing the student both scientifically and methodologically to enable them to keep up with technological advances in scientific research and to provide services to both the public and private sectors. Specialization begins at the beginning of the third preparatory year.

**Human Resources:**

A sufficient number of holders of higher degrees in Renewable Energy specialties, as well as related specialties, are available in accordance with the basic and secondary department requirements, including those currently working within the university's organizational structure.

### 3. Student Learning Outcomes

Mechanical The renewable energy engineering curriculum and experiences are designed to prepare students, in part, for entry into professional engineering programs, graduate studies, technical careers, and education. Upon completion of the program, the student will be able to:

1. Describe the environmental aspects of non-conventional energy resources. In Comparison with various conventional energy systems, their prospects and limitations.
2. Know the need of renewable energy resources, historical and latest developments.
3. Describe the use of solar energy and the various components used in the energy production with respect to applications like - heating, cooling, desalination, power generation, drying, cooking etc.
4. Appreciate the need of Wind Energy and the various components used in energy generation and know the classifications.
5. Understand the concept of Biomass energy resources and their classification, types of biogas Plants-applications
6. Compare Solar, Wind and bio energy systems, their prospects, Advantages, and limitations.
7. Acquire the knowledge of fuel cells, wave power, tidal power and geothermal principles and applications.



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



#### 4. Academic Staff

Naseer Tawfeeq Alwan | Ph.D. in Renewable Energy Eng./ Lecturer  
Email: [naseer.t.alwan@ntu.edu.iq](mailto:naseer.t.alwan@ntu.edu.iq)  
Mobile no.: 07711487263

---

Obed Majeed Ali | Ph.D. in Energy and Fuel /Assistant prof.  
Email: [obedmajeed@ntu.edu.iq](mailto:obedmajeed@ntu.edu.iq)  
Mobile no.: 07701227454

---

Ahmed Saadallah Salman| Ph.D. in Mechanical engineering/Thermal Eng./ Lecturer  
Email: [ahmed.saadallah@ntu.edu.iq](mailto:ahmed.saadallah@ntu.edu.iq)  
Mobile no.: 07744558776

---

Galawesh Norri Taher. | PhD.in Chemistry Sciences /Biochemistry. | Assistant prof.  
Email: galawesh66@ ntu .edu .iq  
Mobil : 07702321613

---

Afrah Turki Awad. | PhD. In mechanical engineering- Renewable energy & nanotechnology. | Lecturer  
Email: [afrah.turki@ntu.edu.iq](mailto:afrah.turki@ntu.edu.iq)  
no.: 07766862303

---

Jamal Fateh Ali. | PhD. In 'Fundamentals of jurisprudence. | Lecturer  
Email: [jamal1978@ntu.edu.iq](mailto:jamal1978@ntu.edu.iq)  
no.: 0770 238 1651

---

Ali Jasim Mohammed | M.Sc. in in thermal energy.| Ass.Lecturer  
Email: [ali.jasim@ntu.edu.iq](mailto:ali.jasim@ntu.edu.iq)  
Mobile no.:07727282829

---

Saygin Siddiq Ahmed | M.Sc. in Electronic Eng./ Ass.Lecturer  
Email: saygin.ahmed@ntu.edu.iq  
Mobile no.: 07701254510

---

Laeth Ali Hussein| M.Sc. in Information systems.| Ass.Lecturer  
Email: [Layth.ali@ntu.edu.iq](mailto:Layth.ali@ntu.edu.iq)  
Mobile no.: 07700539113

---

Hasnaa Saleh Khalaf | M.Sc. in Engineering Geology. | Ass.Lecturer  
Email : [hasnaa\\_hwj@ntu.edu.iq](mailto:hasnaa_hwj@ntu.edu.iq)  
Mobile no: 07706571381

---



## 5. Credits, Grading and GPA

### Credits

Northern technical University is following the Bologna Process with the European Credit Transfer System (ECTS) credit system. The total degree program number of ECTS is 240, 30 ECTS per semester. 1 ECTS is equivalent to 25 hrs student workload, including structured and unstructured workload.

### Grading

Before the evaluation, the results are divided into two subgroups: pass and fail. Therefore, the results are independent of the students who failed a course. The grading system is defined as follows:

GRADING SCHEME				
مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
<b>Success Group (50 - 100)</b>	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
<b>Fail Group (0 - 49)</b>	FX – Fail	راسب – قيد المعالجة	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
<b>Note:</b>				
Number Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

### Calculation of the Cumulative Grade Point Average (CGPA)

1. The CGPA is calculated by the summation of each module score multiplied by its ECTS, all are divided by the program total ECTS.  
CGPA of a 4-year B.Sc. degree:

$$CGPA = [ (1^{st} \text{ module score} \times ECTS) + (2^{nd} \text{ module score} \times ECTS) + \dots ] / 240$$



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



## 6. Curriculum/Modules

**Semester 1 | 30 ECTS | 1 ECTS = 25 hr.**

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
NTU 101	English Language	33	17	2.00	B	
RETE 100	Engineering Mechanics / Static	78	97	7.00	C	
COGTEK 100	Mathematics Principles	78	97	7.00	C	
RETE 102	Electrical Technology	78	72	6.00	C	
RETE 103	Workshop	93	57	6.00	C	
NTU 100	Human Rights & Democracy	33	17	2.00	B	

**Semester 2 | 30 ECTS | 1 ECTS = 25 hr.**

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
RETE 104	Thermodynamics	108	117	9.00	C	
NTU 102	Computer	33	42	3.00	B	
RETE 101	Engineering Mechanics/ Dynamics	78	122	8.00	C	
COGTEK 101	Engineering Drawing	63	137	8.00	C	
NTU 103	Arabic Language	32	17	2.00	B	

**Semester 3 | 30 ECTS | 1 ECTS = 25 hr.**

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
RETE 200	Fluid Mechanics	93	82	7.00	C	
COGTEK 200	Mathematics	78	97	7.00	C	
RETE 201	Electronics	78	47	5.00	C	
RETE 202	Mechanical Drawing	63	62	5.00	C	
NTU 200	English Language	33	17	2.00	B	
NTU 203	Baath Crimes	33	17	2.00	B	
NTU 204	Professional Ethics	33	17	2.00	B	



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



**Semester 4 | 30 ECTS | 1 ECTS = 25 hr.**

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
RETE 203	Strength of Materials	78	47	5.00	C	
RETE 204	Electronics circuits	78	47	5.00	C	
RETE 205	Refrigeration & Air Conditioning Principles	63	62	5.00	C	
RETE 206	Introduction to sustainable energy	63	62	5.00	C	
RETE 207	Electric machines	63	62	5.00	C	
NTU 201	Computer	33	42	3.00	B	
NTU 202	Arabic Language	33	17	2.00	B	

**Semester 5 | 30 ECTS | 1 ECTS = 25 hr.**

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
RETE 300	Conduction and radiation heat transfer	93	82	7.00	C	
COGTEK 300	Engineering Analysis	63	87	6.00	C	
RETE 302	Renewable Energy systems	63	87	6.00	C	
RETE 303	Power electronics	63	62	5.00	C	
RETE 304	Gas dynamics	63	87	6.00	C	

**Semester 6 | 30 ECTS | 1 ECTS = 25 hr.**

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
RETE 305	Solar Energy Engineering	78	72	6.00	C	
RETE 306	Biofuel	63	62	5.00	C	
RETE 301	Convection heat transfer, and heat exchanger design	93	82	7.00	C	
RETE 307	Combustion and Pollution Engineering	63	87	6.00	C	
COGTEK 301	Numerical Analysis	78	72	6.00	C	





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



**Semester 7 | 30 ECTS | 1 ECTS = 25 hr.**

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
RETE 400	Wind energy	63	62	5.00	C	
RETE 401	Solar Photovoltaic Conversion	63	62	5.00	C	
RETE 402	Simulation of renewable energy systems	78	72	6.00	C	
COGTEK 400	Engineering projects management	48	52	4.00	S	
RETE 404	Power Plants	63	62	5.00	C	
NTU 400	Methodology of Scientific Research	33	92	5.00	B	

**Semester 8 | 30 ECTS | 1 ECTS = 25 hr.**

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
RETE 405	Design of solar renewable systems	63	87	6.00	C	
RETE 406	Store and recover energies	63	62	5.00	C	
RETE 407	Control systems	63	62	5.00	C	
RETE 403	Computer-based modeling and simulation of renewable energy systems	93	107	8.00	C	
COGTEK 401	Graduation Project	62	88	6.00	C	

Program Manager:

Naseer T. Alwan | Ph.D. in Renewable Energy Eng./ Lecturer

Email: [naseer.t.alwan@ntu.edu.iq](mailto:naseer.t.alwan@ntu.edu.iq)

Mobile no.: 07711487263

Program Coordinator:

Saygin Siddiq Ahmed | M.Sc. in Electronic Eng./ Ass.Lecturer

Email: [saygin.ahmed@ntu.edu.iq](mailto:saygin.ahmed@ntu.edu.iq)

Mobile no.: 07701254510

Program Members:

Afrah Turki Awad. | PhD. In mechanical engineering- Renewable energy & nanotechnology. | Lecturer

Email: [afrah.turki@ntu.edu.iq](mailto:afrah.turki@ntu.edu.iq)



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



Mobile no.: 07766862303

Ali Qani Alkurdi | BSc. in Refrigeration and Air-Conditioning Engineering Techniques.

Email: [ali.alkurdi23@ntu.edu.iq](mailto:ali.alkurdi23@ntu.edu.iq)

Mobile no.:07502137671

Program Member:

Mustafa Ihsan Rmaidh | BSc. in Electronics and Control Engineering Techniques.

Email: [mustafa.ihsan10@ntu.edu.iq](mailto:mustafa.ihsan10@ntu.edu.iq)

Mobile no.:07708133166

