

University of Mosul جامعة الموصل



College of Science

كلية العلوم

First Cycle – Bachelor's degree (B.Sc.) – New and Renewable Energies

بكالوريوس علوم - الطاقات الجديدة والمتجددة



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1. **Mission & Vision Statement**

Vision Statement

The New and Renewable Energies academic staff at Mosul University believe that students come to understand the discipline of this department through a combination of course work, laboratory experiences, research, and fieldwork .

Our vision for the new and renewable energies department is to lead the way in transitioning towards a sustainable and clean energy future. We strive to be at the forefront of innovation and technology in the development and implementation of renewable energy sources, such as solar, wind, geothermal, and hydroelectric power. Our goal is to reduce our dependence on fossil fuels and minimize our carbon footprint while ensuring a reliable and affordable energy supply for all. We are committed to promoting energy efficiency and conservation, as well as educating and engaging the community to inspire positive change towards a greener future.

Mission Statement

Our mission is to accelerate the adoption and integration of new and renewable energy sources to meet the growing demand for sustainable and clean energy. We aim to drive innovation and collaboration across the energy sector to create a more resilient, reliable, and affordable energy system. We are committed to ensuring that our efforts are guided by a strong sense of environmental responsibility, social equity, and economic viability.

2. Program Specification

Programme code:	<i>BSc-NRE</i>	ECTS	<i>240</i>
Duration:	<i>4 levels, 8 Semesters</i>	Method of Attendance:	<i>Full Time</i>

A new and renewable energies department refer to teaching and researching renewable energy technologies and sustainability. Such a department offer courses and programs related to renewable energy, sustainable engineering, energy policy, and environmental science.

The department may also conduct research on renewable energy technologies, such as solar cells, wind turbines, and energy storage systems. This research could focus on areas such as improving efficiency, reducing costs, and developing new technologies.

In addition, a new and renewable energies department may collaborate with industry partners, government agencies, and non-profit organizations to promote renewable energy solutions and support the transition to a more sustainable energy system. They may also provide outreach and education to the broader community on the importance of renewable energy and sustainability.

Level 1 exposes students to the fundamentals of new and renewable energies, suitable for progression to all programmes within the department programme group. Programme-specific core topics are covered at Level 2 preparing for research-led subject specialist modules at Levels 3 and 4. The new and renewable energies graduate is therefore trained to appreciate how research informs teaching and field-working, according to the our vision.

Level 1: - Awareness of the importance of renewable energy and sustainability

- Understanding of the course objectives and content
- Perception of the quality of the course delivery and materials
- Motivation to learn more about renewable energy and sustainability

Level 2: - Knowledge of renewable energy technologies and their applications

- Understanding of the principles of sustainability and their relevance to energy systems
- Ability to analyze and evaluate different renewable energy options
- Familiarity with relevant policies, regulations, and standards

Level 3: - Ability to apply the knowledge and skills learned in the course to real-world situations

- Incorporation of sustainable practices in personal and professional life
- Confidence in making informed decisions related to renewable energy and sustainability
- Collaboration and communication skills to work effectively with others on REs projects

Level 4: - Increased adoption of renewable energy technologies and sustainable practices

- Reduced carbon emissions and other environmental impacts
- Improved energy efficiency and cost savings
- Increased awareness and understanding of renewable energy and sustainability issues

3. Program Objectives

1. To provide students with a comprehensive understanding of different renewable energy technologies, their applications, and their potential impact on the environment, economy, and society.
2. To develop students' skills in designing, implementing, and evaluating renewable energy systems to meet the energy needs of communities, organizations, and individuals.
3. To promote innovation and research in renewable energy technologies, and to encourage students to develop new and sustainable energy solutions that address real-world challenges.
4. To prepare students for careers in the renewable energy sector, and to provide them with the knowledge, skills, and experience necessary to succeed as professionals in the field.
5. To foster a culture of sustainability and environmental stewardship, and to encourage students to incorporate sustainability principles into their personal and professional lives.
6. To collaborate with industry partners, government agencies, and non-profit organizations to promote renewable energy solutions and support the transition to a more sustainable energy system.
7. To provide outreach and education to the broader community on the importance of renewable energy and sustainability, and to inspire and engage individuals to support the transition towards a cleaner, more sustainable energy future.

8. Student Learning Outcomes

The study of new and renewable energies typically focuses on the science, technology, and policy related to renewable energy sources, including solar, wind, geothermal, hydropower, biomass, and ocean energy. It involves understanding the physical and chemical principles underlying renewable energy technologies, as well as the economic, environmental, and social factors that influence their adoption and deployment.

While the organizational and operational aspects of renewable energy systems are important components of the field, they are not the sole focus. Instead, the study of new and renewable energies typically covers a broad range of topics.

Overall, the study of new and renewable energies is an interdisciplinary field that draws on principles and techniques from science, engineering, economics, policy, and social science to address the complex challenges of transitioning to a more sustainable energy system.

Outcome 1

Knowledge of renewable energy technologies

Graduates will have a comprehensive understanding of different renewable energy technologies, including their principles, applications, advantages, and limitations.

Outcome 2

Understanding of sustainability principles

Graduates will understand the principles of sustainability and their relevance to energy systems, and be able to analyze the social, environmental, and economic impacts of renewable energy technologies.

Outcome 3

Ethical and professional responsibility

Graduates will understand the ethical and professional responsibilities associated with renewable energy technologies, and be able to apply them in their personal and professional lives.

Outcome 4

Laboratory and Field Studies

Graduates will be able to perform laboratory experiments and field studies, by using scientific equipment and computer technology while observing appropriate safety protocols.

Outcome 5

Collaboration and communication skills

Graduates will be able to work effectively in teams, communicate their ideas clearly, and present their findings to diverse audiences.

Outcome 6

Scientific Knowledge

Graduates will be able to design and implement renewable energy systems that meet the energy needs of communities, organizations, and individuals, and to evaluate their performance.

Outcome 7

Data Analyses

Graduates will be able to evaluate the technical and economic feasibility of different renewable energy systems, and to compare them with conventional energy sources.

Outcome 8

Critical Thinking

Graduates will be able to identify and assess complex problems related to renewable energy and sustainability, and to develop and implement effective solutions.

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10. Credits, Grading and GPA

Credits

Mosul 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
Success Group (50 - 100)	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
Fail Group (0 - 49)	FX – Fail	راسب - قيد المعالجة	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note:				
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)

- 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:

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

11. Curriculum/Modules

Semester 1 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
NRE11001	General Physics I	94	81	7.00	C	
NRE11002	Principle of Energies and their Sources	47	103	6.00	C	
NRE11003	General Chemistry	94	81	7.00	B	
NRE11004	Environmental Pollution	47	103	6.00	B	
UNI11005	Human Rights and Democracy	47	3	2.00	S	
UNI11006	Arabic Language	47	3	2.00	S	

Semester 2 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
NRE12007	General Physics II (Optics)	79	46	5.00	C	
NRE12008	Fundamental of Electricity	94	81	7.00	C	
NRE12009	Analytical Chemistry	94	81	7.00	C	
NRE12010	Calculus	63	37	4.00	B	
NRE12011	Geology	94	31	5.00	B	
MUS12012	English Language	47	3	2.00	S	

Semester 3 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
NRE23013	Analog Electronics	94	81	7.00	C	
NRE23014	Circuit Analysis	94	81	7.00	C	
NRE23015	Organic Chemistry	94	56	6.00	C	
NRE23016	Differential Equations	63	37	4.00	B	
NRE23017	Thermodynamics	63	37	4.00	B	
MUS23018	Laboratory Safety	47	3	2.00	S	

Semester 4 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
NRE24019	Digital Electronics	94	56	6.00	C	
NRE24020	Materials Science and Fluids	94	56	6.00	C	
NRE24021	Computer Programming	93	81	6.00	C	
NRE24022	Inorganic Chemistry	64	36	4.00	B	
NRE24023	Meteorology	63	37	4.00	B	
NRE24024	Statistics	63	37	4.00	B	

Semester 5 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
NRE35025	Measurements and Control	64	61	5.00	B	
NRE35026	Heat Transfer	64	61	5.00	C	
NRE35027	Solar Energy	63	62	5.00	C	
NRE35028	Energy Transmission and Storage	94	56	6.00	C	
NRE35029	Modeling of Renewable Energy	78	47	5.00	B	
NRE35030	Hydro Electric Energy	63	37	4.00	C	

Semester 6 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
NRE36031	Solar Cell PV	64	61	5.00	C	
NRE36032	Economics of Energy	64	61	5.00	B	
NRE36033	Wind Energy	63	62	5.00	C	
NRE36034	Sustainable Buildings	63	62	5.00	B	
NRE36035	Petroleum energy	63	62	5.00	C	
NRE36036	Geothermal Energy	63	62	5.00	C	

Semester 7 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
NRE47037	Biomass Energy	64	61	5.00	C	
NRE47038	Methodology	63	62	3.00	C	
NRE47039	Solar Energy systems	94	56	6.00	C	
NRE47040	Nuclear Energy	64	86	6.00	B	
MUS47041	Professional Ethics	63	87	6.00	C	
NRE47042	Elective Course	47	3	2.00	E	

Semester 8 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
NRE48043	Nanotechnology	64	136	8.00	B	
NRE48044	Conductive Polymers	64	136	8.00	S	
NRE48045	Hydrology	63	137	8.00	C	
NRE48046	Grid Connected Systems	48	2	2.00	B	
NRE48047	Graduation Project	48	2	2.00	E	
NRE48048	Elective Course	47	3	2.00	B	

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