

Course Syllabus

1	Course title	Alternative Energy Sources	
2	Course number	0302301	
3	Credit hours	3h	--
	Contact hours (theory, practical)	3h, 0h	
4	Prerequisites/corequisites	--	
5	Program title	B.Sc. Physics	
6	Program code	0302	
7	Awarding institution	University of Jordan	
8	School	School of Science	
9	Department	Physics	
10	Course level	Bachelor	
11	Year of study and semester (s)	3 rd , First and Second Semesters	
12	Other department (s) involved in teaching the course	--	
13	Main teaching language		
14	Delivery method	<input type="checkbox"/> Face to face learning <input type="checkbox"/> Blended <input checked="" type="checkbox"/> Fully online	
15	Online platforms(s)	<input checked="" type="checkbox"/> Moodle <input checked="" type="checkbox"/> Microsoft Teams <input type="checkbox"/> Skype <input type="checkbox"/> Zoom <input type="checkbox"/> Others.....	
16	Issuing/Revision Date		

17 Course Coordinator:

Name: Prof. Riyad Manasrah	Contact hours: Sun, Tue, Thu 10:30-11:30; Mon, Tue. 11:30-13:00
Office number: 016	Phone number: 22023
Email: r.manasrah@ju.edu.jo	

Other instructors:

Name:

Office number:

Phone number:

Email:

Contact hours:

Name:

Office number:

Phone number:

Email:

Contact hours:

19 Course Description:

The course Alternative Energy Resources (0302301) is an introductory course about energy resources and their utilization to satisfy the socio-economical needs. The topics included, but not limited to, renewable and non-renewable energy resources and their strategy, economy, targets, production, distribution, and consumption. As a physics student, this course will discuss the principles of thermodynamics in heat exchange, transfer, and conservation. The student will learn how energy is balanced in common systems. The basic principle of the turbine will be discussed and how it is utilized in power plants: hydroelectric, wind, thermosolar, geothermal, nuclear, fossil fuel, etc. Small scale (i.e. micro power plants) heating and energy utilization is also presented in this course: biomass, household heaters, etc. Photovoltaic and solar energy as well as fuel cells and storage systems as future promising power sources will be given attention in this course. After all, environmental issues such health effects and impacts of energy production will take a part in this course.



Course aims and outcomes:


A- Aims:

Providing students with a scientific details and deep understanding of Alternative Energy Resources for further studies or work in physics, engineer and technology.

B- Students Learning Outcomes (SLOs):

For purposes of mapping the course SLOs to the physics program SLOs, at the successful completion of the physics program, graduates are expected to be able to:

SLO (1) Master professionally a broad set of knowledge concerning the fundamentals in the basic areas of physics: Quantum Mechanics, Classical Mechanics, Electrostatics and Magnetism, Thermal Physics, Optics, Theory of Special Relativity, Mathematical Physics, Electronics.

SLO (2) Apply knowledge of mathematics and fundamental concepts in the basic areas of physics to identify and solve physics related problems.

SLO (3) Utilize computers and available software in both data collections and data analysis.

SLO (4) Utilize standard laboratory equipment, modern instrumentation, and classical techniques to design and conduct experiments as well as to analyze and interpret data.

SLO (5) Develop a recognition of the need and ability to engage in life-long learning.

SLO (6) Demonstrate ability to use techniques, skills, and modern scientific tools necessary for professional practice.

SLO (7) Communicate clearly and effectively in both written and oral forms.

SLO (8) Apply proficiently team-work skills and employ team-based learning strategies.

Program SLOs	SLO (9) Apply professional and ethical responsibility to society								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Course SLOs									
1. Learning key terms related to energy types and differentiate between renewable and non-renewable sources of energy	✓	✓					✓		
2. Developing an understanding of the different types of energy and its importance in our everyday.	✓	✓	✓						
3. Describe the environmental and resources in comparison with various conventional energy systems, their prospects and limitations.	✓	✓	✓						
4. Know the need of renewable energy resources, historical and latest developments.	✓		✓						✓
5. Knowing to apply the basic mathematical relations of energy and energy efficiency calculations of different types of energy resources.	✓		✓					✓	



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21. Topic Outline and Schedule:

Week	Lecture	Topic	Student Learning Outcome	Learning Methods (Face to Face/Blended/ Fully Online)	Platform	Synchronous / Asynchronous Lecturing	Evaluation Methods	Resources
1	1-1	Chapter 1: Energy Demand and Supply	1,2	Online	Microsoft Teams	Synchronous	Quiz, Seminar, Report, Midterm Exam, Final Exam	Efstathios E. (Stathis) Michaelides
	2-1							
2	2-1	Chapter 2: Environmental and Ecological Effects of Energy Production and Consumption	1,3					Alternative Energy Sources. Springer-Verlag Berlin Heidelberg 2012.
	2-2							
3	3-1	Chapter 3: Fundamentals of Energy Conversion	1-5					
	3-2							
4	4-1	Chapter 4: Introduction to Nuclear Energy	3-5					
	4-2							
5	5-1	Chapter 5: Nuclear Power Plants	3-5					
	5-2							
6	6-1	Chapter 6: Fusion Energy	3-5					
	6-2							
7	7-1	Chapter 7: Solar Energy	3-5					
	7-2							
8	8-1	Chapter 8: Wind Power	3-5					
	8-2							
9	9-1	Chapter 9: Geothermal Energy	3-5					
	9-2							
10	10-1	Chapter 10: Biomass	3-5					
	10-2							
11	11-1	Chapter 11: Power from the Water	3-5					
	11-2							
12	12-1	Chapter 12: Biomass	3-5					
	12-2							
13	13-1	Chapter 13: Biomass	3-5					
	13-2							
14	14-1	Chapter 14: Biomass	3-5					
	14-2							



22. Evaluation Methods:

Opportunities to demonstrate achievement of the SLOs are provided through the following assessment methods and requirements:

Evaluation Activity	Mark	Topic(s)	SLOs	Period (Week)	Platform
Quizzes	10%	Electrostatics	1-5	4, 7	Paper Quiz
Seminar	10%		1-5	4-15	Microsoft teams
Midterm Exam	30%	Special Techniques (Potentials), Electric Fields in Matter	1-5	9	Paper Exam
Final Exam	50%	All topics	1-5	15	Paper Exam

23. Course Requirements

(e.g: students should have a computer, internet connection, webcam, account on a specific software/platform...etc):

Textbook, computer, Internet access, Microsoft Teams

24. Course Policies:

A- Attendance policies:

Students are expected to attend all classes. Absence should not exceed 15%.

B- Absences from exams and submitting assignments on time:

Exam makeups will be arranged for students with valid absence excuses.

C- Health and safety procedures:

Students are required to abide by all mandated health and safety procedures.

D- Honesty policy regarding cheating, plagiarism, misbehavior:

Cheating, plagiarism, and misbehavior will be dealt with according to University regulations.

E- Grading policy:

Quizzes and seminar: 20%, Midterm Exam: 30%, Final Exam: 50%.

F- Available university services that support achievement in the course:

Microsoft Teams, E-Learning platform, Moodle.

References:

A- Required book(s), assigned reading and audio-visuals:

- Efstathios E. (Stathis) Michaelides. Alternative Energy Sources. Springer- Verlag Berlin Heidelberg 2012.

B- Recommended books, materials, and media:

- Farret F. A. and Simos M. G. Integration of Alternative Sources of Energy. John Wiley & Sons, 2006, NJ, USA.
- Boeker E. and Van Grondelle R. Environmental Physics: Sustainable Energy and Climate Change. John Wiley & Sons, 2011, 3rd edition.
- Kaltschmitt M., Streicher W., and Wiese A. Renewable Energy: Technology, Economics and Environment. Springer, 2007.

26 Additional information:

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Name of Course Coordinator: Prof. Riyad Manasrah Signature:  Date: 25/2/2024
Head of Curriculum Committee/Department: ----- Signature: -----
Head of Department: ----- Signature: -----
Head of Curriculum Committee/Faculty: ----- Signature: -----
Dean: ----- Signature: -----