

DEREE COLLEGE SYLLABUS FOR:	
ES 4115 ENERGY AND ENVIRONMENT	
3/0/3	
(Updated Spring 2025) <div>UK LEVEL: 6</div> <div>UK CREDITS:15</div>	
PREREQUISITES:	ES 1010 Environmental Science: Energy Resources and Pollution
CATALOG DESCRIPTION:	The course provides an overview of different energy resources with an analysis of main fossil fuels, nuclear, and renewable energy resources, energy management aspects with supply and demand technologies and practices, and finally key energy policies and associated energy transition challenges.
RATIONALE:	This course provides an overview of energy resources and analysis of the use of different forms of energy and their environmental, economic and social impacts. It examines conventional, nuclear and renewable resources and technologies, presenting and defining the current state as well as the future low carbon options, exploring the vital link between technology and related policy issues. The climate change policy, energy security and energy planning are analysed and discussed in both the developed and developing world. The significant future role and obstacles to the proliferation of sustainable energy choices, energy efficiency and renewable resources are debated on our effort to move towards a low carbon economy.
LEARNING OUTCOMES:	<p>As a result of taking this course, the student should be able to:</p> <ol style="list-style-type: none"> 1. Evaluate technical, environmental, economic and societal implications of major fossil fuel, nuclear, and renewable energy technologies. 2. Discuss the specifics of the energy sector and resource problems in terms of climate change policy, energy security and energy planning. 3. Examine the possibilities of application of low carbon energy supply solutions and energy demand technologies towards sustainable energy development. 4. Show ability to research, analyze and evaluate policy tools available for the promotion of sustainable energy and resource strategies in today's political and economic settings. 5. Demonstrate understanding of the global and regional challenges of moving towards a low carbon economy and develop a critical thinking about the world energy trends. 6. Adapt an interdisciplinary approach that will allow them to critically evaluate current energy technologies and formulate recommendations for the future energy transition as well to develop their analytical and communication skills.
METHOD OFTEACHING AND LEARNING:	<p>In congruence with the learning and teaching strategy of the college, the following tools are used:</p> <ul style="list-style-type: none"> • Class lectures, interactive learning (class discussions, group work), video presentations, and case studies discussed in class. • Exercises and primary source documents are assigned as homework, the answers and critical response to which are reviewed in class • Students' projects and presentations. • Use of a blackboard site, where instructors post lecture notes, assignment instructions, timely announcements, as well as additional resources. • Office hours: students are encouraged to make full use of the office

	hours of their instructor, where they can ask questions, see their exam paper, and/or go over lecture/lab material.						
ASSESSMENT:	<p>Summative:</p> <table border="1"> <tr> <td>Project (3,000 to 3,500 words).</td><td>50%</td></tr> <tr> <td>Final examination (2 hours, comprehensive):</td><td>50%</td></tr> </table> <p>Formative:</p> <table border="1"> <tr> <td>Critical response to selected questions during the semester – including a sample test</td><td>0%</td></tr> </table> <p>The formative tests aim to prepare students for the final examination and for the research project. The student project primarily tests learning outcomes 3, 4, 5 and 7 and, depending on the topic some of all of the other learning outcomes. The final examination tests all learning outcomes.</p> <p><i>Students are required to resit failed assessments in this module.</i></p>	Project (3,000 to 3,500 words).	50%	Final examination (2 hours, comprehensive):	50%	Critical response to selected questions during the semester – including a sample test	0%
Project (3,000 to 3,500 words).	50%						
Final examination (2 hours, comprehensive):	50%						
Critical response to selected questions during the semester – including a sample test	0%						
INDICATIVE READING:	<p>Required Reading:</p> <ul style="list-style-type: none"> Dunlap, R. A. 2019. Sustainable Energy, Cengage, 2nd ed, 978-1-33755-167-0 <p>Recommended Readings:</p> <ul style="list-style-type: none"> MacKay, D. J.C.. 2009. <i>Sustainable Energy - Without the Hot Air</i>, UIT Cambridge Ltd. http://www.withouthotair.com/ free textbook available online. Schobert H. 2014. <i>Energy and Society, An Introduction</i>, 2nd ed., CRC Press. 						
INDICATIVE MATERIAL: (e.g. audiovisual, digital material, etc.)	<p>REQUIRED MATERIAL: N/A</p> <p>RECOMMENDED MATERIAL: N/A</p>						
COMMUNICATION REQUIREMENTS:	Verbal skills using academic/professional English						
SOFTWARE REQUIREMENTS:	Word, PowerPoint, Excel, Blackboard CMS						
WWW RESOURCES:	<ul style="list-style-type: none"> IEA https://www.iea.org/ European Commission DG Energy https://ec.europa.eu/energy/ EU Science Hub https://ec.europa.eu/jrc/en/science-area/energy-and-transport EU Summaries of Legislation https://eur-lex.europa.eu/browse/summaries.html European Environment Agency http://www.eea.europa.eu/ U.S. Department of Energy https://www.energy.gov/ U.S. Energy Information Administration (EIA) https://www.eia.gov/ IRENA International Renewable Energy Agency https://www.irena.org/ REN21 https://www.ren21.net/ World Energy Council https://www.worldenergy.org/ 						

INDICATIVE CONTENT:

1. Introduction to energy resources
2. Energy policies, cost of energy and scenario planning
3. Energy and development planning
4. Rational Use of Energy
5. Conventional Fuels: Reserves, Resources, and Geopolitics
6. Nuclear Energy
7. Renewable Energy Resources
8. Low carbon energy futures
9. Global and regional energy resources