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| DEREE COLLEGE SYLLABUS FOR: | |
| ES 1010 LE ENVIRONMENTAL SCIENCE: ENERGY RESOURCES AND POLLUTION | |
| 3/2/4 | |
| UK LEVEL: 4 | |
| UK CREDITS: 20 | |
| (Updated Fall 2022) | |
| PREREQUISITES: | No prerequisites |
| CATALOG DESCRIPTION: | Principles of environmental science including a discussion of non-renewable and renewable energy resources, water and air pollution, global climate change, hazardous and solid waste, sustainable cities; related environmental policy and management issues are discussed, with emphasis on sustainable solutions. |
| RATIONALE: | Environmental Science: Energy Resources and Pollution is a science course designed for students with little or no background in natural or environmental sciences and aims at giving them a more thorough understanding of major environmental issues of our days that reflect the human impact on the environment. The course provides a scientific background on issues such as energy resources, global climate change, ozone depletion, air and water pollution, hazardous chemicals and the solid waste problem. Current management practices and policies as well as options that lead toward a more sustainable future are discussed. The knowledge gained in this course may help students make more informed decisions concerning the environment in their future lives and careers. It is a required course for environmental studies majors. |
| LEARNING OUTCOMES: | As a result of taking this course, the student should be able to: <ol style="list-style-type: none"> 1. Demonstrate knowledge of core concepts and principles on the following topics: non-renewable and renewable energy resources, environmental hazards and human health, air pollution, climate change, ozone depletion, water pollution, solid waste, sustainable cities. 2. Apply the concept of sustainability and its different dimensions - environmental, economic, social- to the analysis of major environmental issues of contemporary societies. 3. Explain the scientific method and how it applies to the study of environmental issues and discuss the interdisciplinary approach needed in environmental problem solving, analyzing specific examples and case studies. 4. Develop skills for using basic methods in environmental science including the ability to use appropriate laboratory and field equipment and to acquire, process and evaluate data. |
| METHOD OF TEACHING AND LEARNING: | In congruence with the learning and teaching strategy of the college, the following tools are used: <ul style="list-style-type: none"> • Class lectures, interactive learning (class discussions, group work, flipped class activities), video presentations, and critical thinking questions/exercises discussed in class. • Laboratory and field activities (including practical work and laboratory reports). • Use of Blackboard course management system, through which instructors post course information, lecture notes, assignments, announcements, as well as additional resources; use of textbook online platforms that provide additional learning resources. • Group work in class/labs or with the help of Blackboard interactive |

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| | <p>tools (Discussion Board, Blog, Journal, Groups).</p> <ul style="list-style-type: none"> 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>Midterm examination (2 hours) (Multiple choice/short answers/essay questions)</td> <td>35%</td> </tr> <tr> <td>Final examination (2 hours) (Multiple choice/short answers/essay questions) (non-comprehensive)</td> <td>40%</td> </tr> <tr> <td>Lab report(s)</td> <td>25%</td> </tr> </table> <p>Formative:</p> <table border="1"> <tr> <td>Essay questions (as homework assignments)</td> <td>0</td> </tr> <tr> <td>In-class or online quizzes</td> <td>0</td> </tr> </table> <p>The formative tests aim to prepare students for the examinations. The lab report(s) test Learning Outcomes 3 and 4. The midterm examination tests Learning Outcomes 1, 2 and 3, focusing on the first part of the content. The final examination also tests Learning Outcomes 1, 2 and 3 focusing on the second part of the content.</p> | Midterm examination (2 hours) (Multiple choice/short answers/essay questions) | 35% | Final examination (2 hours) (Multiple choice/short answers/essay questions) (non-comprehensive) | 40% | Lab report(s) | 25% | Essay questions (as homework assignments) | 0 | In-class or online quizzes | 0 |
| Midterm examination (2 hours) (Multiple choice/short answers/essay questions) | 35% | | | | | | | | | | |
| Final examination (2 hours) (Multiple choice/short answers/essay questions) (non-comprehensive) | 40% | | | | | | | | | | |
| Lab report(s) | 25% | | | | | | | | | | |
| Essay questions (as homework assignments) | 0 | | | | | | | | | | |
| In-class or online quizzes | 0 | | | | | | | | | | |
| INDICATIVE READING: | <p>Required Reading:</p> <ul style="list-style-type: none"> Miller G.T. and Spoolman, S.2020. <i>Living in the Environment: Principles, Connections, and Solutions</i>. 20th edition, Cengage. <p>Recommended Readings:</p> <ul style="list-style-type: none"> Wright, R.T. and Boorse, D. 2020. <i>Environmental Science: Toward a Sustainable Future</i>. 14th edition, Pearson. | | | | | | | | | | |
| 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 | | | | | | | | | | |
| WWW RESOURCES: | <ul style="list-style-type: none"> Scientific American web site: www.sciam.com United Nations Environment Program: www.unep.org International Union for the Conservation of Nature: www.iucn.org Ecologist web site: www.theecologist.org International Institute for Sustainable Development: www.iisd.org U.S. Environmental Protection Agency: http://www.epa.gov/ European Environment Agency: http://www.eea.europa.eu/ European Commission – Environment: https://ec.europa.eu/environment/index_en | | | | | | | | | | |
| INDICATIVE CONTENT: | <ol style="list-style-type: none"> Environmental Science: An Introduction <ul style="list-style-type: none"> Sustainability Environmental Problems and their Causes Science, Matter, Energy and Systems | | | | | | | | | | |

- The Scientific Method
- Introduction to Matter
- Introduction to Energy
- Introduction to Systems
- 3. Non-renewable Energy
 - Energy Sources and Uses in the Past and Today
 - Energy from Fossil Fuels
 - Energy from Nuclear Power
- 4. Energy Efficiency and Renewable Energy
 - Energy Efficiency and How It Can Improve
 - Solar Energy
 - Water Energy
 - Wind Energy
 - Biomass Energy
 - Geothermal Energy
 - Hydrogen as a Fuel for Transportation
 - The Transition to a More Sustainable Energy Future
- 5. Environmental Hazards and Human Health
 - Human Health and the Environment
 - Biological Hazards
 - Chemical Hazards
 - Risk Assessment
- 6. Air Pollution
 - Structure of the Atmosphere
 - Air Pollutants and Their Sources
 - Acid Deposition
 - Indoor Air Pollution
 - Impact of Air Pollutants on Human Health
 - Addressing Air Pollution and Acid Deposition
- 7. Climate Change and Ozone Depletion
 - Atmosphere and Climate
 - Global Climate Change: Causes, Consequences and Solutions
 - Depletion of the Ozone Layer
- 8. Water Pollution
 - Water Pollutants: Classes, Causes and Effects
 - Major Pollution Problems in Lakes and Streams
 - Groundwater and Drinking Water Pollution
 - Ocean Pollution
 - Addressing Water Pollution Problems
- 9. Solid and Hazardous Waste
 - Municipal Solid Waste: Problems and Management Options
 - Integrated Waste Management
 - Hazardous Waste Management
 - The Transition to a More Sustainable, Low-Waste Society
- 10. Sustainable Cities
 - Urbanization and Environmental Problems
 - Transportation
 - Land Use Planning
 - Urban Sustainability
- 11. Economics, Politics, Environment and Sustainability
 - Use of Economic Tools in Dealing with Environmental Problems
 - A Transition to More Environmentally Sustainable Economies
 - The Transition to More Sustainable and Just Environmental Policies

LAB OUTLINE:

Lab activities are performed in the laboratory or outdoors.

Examples of topics may include, but are not limited to, the following:

- Safety and Laboratory Rules
- Energy Sources and Uses in Greece and in E.U
- Renewable Energy - Fuel Cell Cars
- Atmospheric Pollution: Data and Analysis
- Measuring Atmospheric Pollution and Acid Precipitation
- Greenhouse Effect and Global Warming
- Water Quality Characteristics
- Water Treatment
- Hazardous Chemicals
- Sustainable Cities
- Solid Waste Management