

CENTER FOR INTERNATIONAL PROGRAMS & SUSTAINABILITY STUDIES

Course name: Renewable Energy and Resource Management.

Course code: MGMT-3020

Total contact 60

COURSE DESCRIPTION

This course provides an introduction to renewable energy resources and resource management, with an emphasis on the use of alternate energy sources such as solar, wind power, geothermal, and hydrogen. This course will consider society's present needs and future energy demands, examine conventional energy sources and systems, including fossil fuels and then focus on alternate, renewable energy sources and how to manage them. We will cover the economic and social impact that both, conventional and renewable energy resources have on society. The students will have the opportunity to visit several projects related to hydrogen production's plants, windmills and solar panels all national and multinational projects dedicated to the supply of energy.

Course prerequisites

None.

Audience

This course is structured for International Students attending the Study Abroad program at Universidad Veritas. However, courses are not exclusive to foreigners so a few native students could enroll in this course. Some of the courses are also taught in Spanish as part of our Bachelors in Sustainability Management.

Attendance

Students are only allowed a total of 2 nonconsecutive (back to back) absences. The student will fail the course if he/she has more than two absences. Students will have a 0 on any assignment evaluated in class (presentations, evaluations, field trips, etc.) if he/she is absent unless the student presents an official document no later than one week after the absence. If the student presents an authoritative report to excuse the absence, he/she must submit the missed assignment on that same day. An unjustified absence to a field trip will immediately mean losing all of the points assigned to the field trip. If an official document is presented for the field trip absence students will have to present a research assignment to obtain 50% of the points. The only exception to this rule is when two-course field sessions collide in programming. Students can then opt for doing a research assignment not to lose any points on the field trip they don't attend but it must be coordinated ahead of time with the professors.

Three late arrivals to class (within the first 15 minutes) are treated as one absence. If you come to class 30 minutes late without an official justification document, it will also count as an absence.

Code of conduct

Professors have the right to expel a student from the classroom should he / she:

- Is disruptive in the classroom.

- Behave in a disrespectful way.
- Is under the influence of alcohol or even smell like alcohol.
- Is under the influence of any illegal drug.
- Shows hygiene problems that may disturb other students.

Electronic devices

The use of cell phones, smart phones, or other mobile communication devices is disruptive, and is therefore prohibited during class. **Please turn all devices OFF and put them away when class begins.** Devices may be used ONLY when the professor assigns a specific activity and allows the use of devices for internet search or recording. Those who fail to comply with the rule must leave the classroom for the remainder of the class period.

This is a theoretical-practical course and its goal is to answer the following question:

How to manage the use of renewable energy resources as a substitute of fossil fuels in a cost-effective and environmentally friendly way?

In order to answer this question, this course will cover the following:

- Basic Microeconomic concepts and definitions.
- Environmental Problems.
- Demographic issues.
- Externalities and Market Failures.
- Investment Decisions' process. Benefit-cost and Cost Effectiveness Analysis.
- Non-Renewable Resources

As we advance in this course, the following skills will be encouraged:

- Analytical thinking.
- Clear and effective communication.
- Efficient use of economic and business' tools in the decision making analysis.
- Application of ethical principles in business administration.
- Ability to integrate practical, social, economic, and environmental aspects in the analysis and resolution of problems related to different productive sectors, taking into account the objectives of Renewable energy and resource management.
- Ability to build personal criteria considering socioeconomic and environmental perspectives on the information available regarding controversial sustainability issues.

Values and attitudes:

- Empathy with the environment
- Teamwork and leadership
- Systemic thinking
- Logical and communicative intelligence
- Problem solving
- Learning how to learn

Competencies, criteria and evidence

At Veritas University competencies are reflexive and integrated actions that respond to the professional profile and to context issues ideally and ethically through the integration of abilities, skills and knowledge. What follows are the discipline and core competencies and their correspondent key competencies and evidence of learning for this course.

Table 1. Disciplinary and general competencies, linked to their performance criteria and performance evidences for this course.

Competencies	Performance criteria (Sub-competences)	Evidence of performance
Disciplinary Integrates the fundamentals of the externalities of the markets and its impact on the efficient allocation of natural resources, to promote awareness of the economic, social and ethical repercussions of the use of renewable resources.	Analyses the externalities of the markets considering its impact on the efficient allocation of natural resources.	Round table. Individual and group Presentations. Final project.
	Identifies the economic and social repercussions in the decision-making of market's equilibrium taking into account the inclusion of externalities.	Round table. Individual and group Presentations. Final project.
	Integrates the dynamics that exist between the free market forces and the efficient allocation of the factors of production.	Round table. Individual and group Presentations.

Competencies	Performance criteria (Sub-competences)	Evidence of performance
Core/Generic Builds the necessary knowledge, skills and attitudes to learn how to communicate orally and in written form in the different disciplines that make up the curriculum.	Communicate thoughts of the discipline orally, iconically, and in written form.	Round table. Individual and group Presentations. Final project.
Integrates the necessary knowledge, skills, and attitudes to learn teamwork and leadership techniques	Execute teamwork and leadership.	Round table. Individual and group Presentations. Final project.
Integrates the necessary knowledge, skills and attitudes to learn interpersonal communication techniques	Relate well to others. Manage responsibly. Listen attentively	Round table. Individual and group Presentations.

Content

Topic 1: Introduction and Overview of Environmental Problems.

Text book Chapter 1.

Topic 2: Review of Microeconomic Theory.

Text book Chapter 3.

Topic 3: Externalities, Market Failure, and Appropriate Intervention.

Text book Chapter 4

Topic 4: Climate Change / Global Warming Issues

Text book Chapter 11

Topic 5: Investment Decisions: Benefit-cost and Cost Effectiveness Analysis and Ethical Concerns

Text book Chapters 7

Topic 6: Reconciling Preservation and Development

Text book Chapters 10 and 16

Topic 7: Population Growth Issues

Text book Chapter 13

Topic 8: Forests.

Text book Chapter 13.

Topic 9: Water Resources

Text book Chapter 6.

Topic 10: Nonexclusively Owned: Common Property Resources; Fisheries as Well as Some Groundwater.

Text book Chapter 6.

Topic 11: Non-Renewable Resources

Text book Chapters 13, 5 and 6

Methodology

The student will be subject to a process of "learn to learn ". By doing so they will be exposed to economics and business tools presented in class relevant to the course, real live experiences coming from guest speakers and field trips to organizations and businesses related to this course topic.

Learning strategies

1. Presentations:

These aspects will always be taken into account for presentations:

- Preparation and content: topic relevance, knowledge assimilation, answers to classmates' and professor questions, and content depth due to evident research.
- Organization and style: smoothness, independence from notes and devices, speaking clarity, slides clarity and aesthetics, text and images balance.

- Time limit respect: each presentation has a time limit; students will be informed about this in advance.
- Personal opinion: robust personal opinion reflecting serious analysis of the topic and previous research.
- Punctuality: presentations must be presented on the assigned date, not following this rule means a grade of 0% on that particular presentation unless the absence or lack of assignment is properly justified.

2. The round table

The round table is a space dedicated to promoting oral expression techniques and research on different topics. The idea is that a group of students prepares a topic relevant to the course that preferably generates ideas or points of view equal or contradictory in order to generate new learning.

The group of students that can be made up of 4 to 6 people who should investigate as much as possible about the assigned topic, sit face to face with the other groupmates in order to create a "roundtable" panel. The members of the group choose a person who acts as moderator and opens the round table, announces the theme and respective sub-themes, introduces the members of the group and indicates the order in which each member will expose, launches the questions already planned between the different subtopics and generates notes that serve as closure or conclusions; in addition, the moderator must show adequate emotional management, be impartial, keep the group together.

The maximum recommended duration is 60 minutes (45 minutes of discussion between the presentation of the topic, sub-themes and questions launched by the moderator, and 15 minutes of closure - which is also done by the moderator). To make the round table, each group must be clear about the assigned topic, prepare and investigate about it, prepare written information and brief presentations in order to fully understand the topic and the respective subtopics; generate a closure with the synthesis and conclusions that emerge from the activity.

3. Final project

Each student chooses a final project in accordance to the course leaning experience. The professor will have to approve it.

The final project is developed along the course, the professor guides the process and assesses the results. Presenting time plus questions and discussion will be 30 minutes' maximum, depending of the amount of students enrolled. The final project represents 40% of total grade. Several class sessions will be dedicated to check and guide the project advances. Presentations must be uploaded to Canvas on deadline (before presenting. Field trips promote students' assimilation, reflection and the internalization of knowledge, sensitizing through observation and interaction. In addition, the theory addressed in class will be extensively exemplified and analyzed in the sites visited. This process promotes a critical thinking and put into practice the capacity to make decisions during the process of learning to learn.

Students will do research using class material, guest speakers' visits and field trip to elaborate their final presentation. It will relate to a specific country and a specific non-exhaustible resource of energy to be utilized by the chosen country. This will allow students to exercise their capacities to communicate in a clear and well-articulated manner.

Students will exercise the capacity for critical thinking and oral and written expression through the presentation of reports and class' discussions. There will also be two guest speakers who will discuss issues related to the course.

Teaching resources

The students will have access to VERITAS' libraries and free access to wireless internet in order to get needed information. The professor will also provide readings and other sources of information that will be posted in VERITAS-CANVAS. All class rooms are fully equipped to assist students in theirs learning process.

Learning evaluation:

Indicator	Grade
A –Class participation and two Round tables	60%
B-Final Research Project and Presentation.	40%
Final grade:	100%

Rubric for class participation and round tables. 60%

Criteria	Insufficient (69% or less)	Good (70% up to 79%)	Excellent (80% up to 100%)	Observations
Relevance: to what degree ideas, data and arguments relates to the topics under consideration.	Irrelevant participation or very little relevant.	Relevant participation but not extraordinary.	Extraordinary ideas and analysis.	
Clarity: Does the participation conveys clear ideas and arguments?	Participation hard to understand	Participation with clear and orderly ideas.	Extraordinary articulation of ideas and excellent communication with the group.	
To what degree is the presentation assisted	It lacks data and literature relevant to	Presentation assisted with	Presentation assisted with extraordinary	

with relevant data and statistics?	the presentation.	some data and literature.	amount of data and literature.	
Coordination among team members of the group making the presentation interesting and well organized.	Poor coordination among members of the group.	Good coordination among members of the group.	Extraordinary coordination among members of the group	

Rubrics to evaluate The Final Research Project and Presentation. Total value 40%. With the elaboration of an Entrepreneurship and Small Business Management final project the student will have the opportunity to apply knowledge and ideas from class discussions and readings as well guest speakers and field tours.

Evaluation rubric for the Final Research Project: Total value 40%

Indicator	Excellent 80% or higher	Good 70% up to 79%	Insufficient (69% or less)	Observations
It establishes a research problem and a research question, hypothesis or objectives, of high impact and relevance in the discipline.				
The justification for the study is clear.				
Shows mastery of the context in which the question is posed and explains it clearly.				
Describes the structure of the document clearly and logically				
Answers the question or hypothesis raised. It assumes a position with respect to the findings.				
The analysis is broad and deep, reflecting a diversity in nuances.				
The quality and quantity of information provides evidence to support the arguments.				

Expresses articulately the knowledge obtained during the investigation.				
It describes the purpose and justification of the project clearly and convincingly.				
It offers convincing elements about the validity of methodological decisions.				
Describe the results for the problem or issue that the author is proposing.				
Validates the importance of its recommendations and mentions at least one significant implication.				
The project is complete. It does not have grammatical errors Demonstrates excellent ability to express him/herself clearly.				

Rubric for the evaluation of the Presentation Week 15:

Indicator	Excellent 80% or higher	Good 70% up to 79%	Insufficient (69% or less)	Observations
Demonstrates mastery of the core aspects of his study and its outstanding details				
Is able to explain the relevance of his research question, for his disciplinary field and the country.				
Correctly justifies the research methods used in the study.				
Presents the results clearly and appropriately, evidencing management of the statistical processing of the information collected.				
Conclusions answer the research question and are based on the data collected				
Explains how the literature review contributed to the study design, data analysis, conclusions and recommendations.				
Identifies the limitations of the study.				

Identifies the lines for future research in the field and recommendations				
Explains how the research exercise contributed to her professional development.				
Maintains visual contact with the audience, his body language is assertive and the voice volume allows a clear understanding of the message.				
Presents her work fluently, using professional vocabulary, without repetitions or pet phrases or other language accidents.				
Presentation is coherent, has a logical order of ideas, as well as introduction, development and conclusion.				
Personal presentation is appropriate for the occasion. Has good posture, looks relaxed and confident.				
Duration of the presentation meets the established time of a maximum of 45 minutes.				
Tone of voice is natural, conversational, and conveys enthusiasm for the work presented.				

Bibliography

Mandatory:

Hackett, Steven C. 3rd edition. Environmental and Natural Resources Economics. Theory, Policy, and the Sustainable Society. New York. USA.

Optional readings:

Sharlissa Moore. Routledge. Edición:1. Sustainable Energy Transformations, Power and Politics. New York. USA.
 Roger Fouquet. First edition. The Economics of Renewable Energy. London.
 Filippou Proedrou. First edition Energy Policy and Security under Climate Change. Switzerland.

Videos and articles provided by the professor.

Schedule

Week	Sub competence	Content	Teaching Strategies
1.	Review main environmental problems related to the production of goods and services. Review of basic micro and macro analysis. The microeconomic analysis of externalities. The effect of climate change in costs of production.	Topic 1: Introduction and Overview of Environmental Problems.	Topic Presentation. Text book readings. Class discussion.
2		Topic 2: Review of Microeconomics and macroeconomics Theory.	Topic Presentation. Text book readings. Class discussion.
3		Topic 3: Externalities, Market Failure, And Appropriate Intervention.	Topic Presentation. Text book readings. Class discussion.
4		Topic 4: Climate Change/Global Warming Issues.	Topic Presentation. Text book readings. Class discussion.
5	Benefit-cost analysis. Ethical issues. Economic analysis of the effects of Population growth, forest extraction and water usage.	Topic 5: Benefit-cost and Cost Effectiveness Analysis and Ethical Concerns.	Topic Presentation. Text book readings. Class discussion.
6		Topic 6: Reconciling Preservation and Development.	Topic Presentation. Text book readings. Class discussion.
7		<ul style="list-style-type: none"> ● FIELD TRIP TO AD ASTRA ROCKET AND LAKE ARENAL DAM AND EOLIC WINDMILL. 	
8		Topic 7: Population Growth issues.	Topic Presentation. Text book readings. Class discussion.
9		Topic 8: Forest	Topic Presentation. Text book readings. Class discussion.
10		Topic 9: Water Resources.	Topic Presentation. Text book readings. Class discussion.

11	Non-Renewable Resources' administration. Sustainable usage of Fisheries activities.	Topic 10: Nonexclusively Owned: Common Property Resources; Fisheries and Groundwater.	Topic Presentation. Text book readings. Class discussion.
12		Topic 11: Non-Renewable Resources.	Topic Presentation. Text book readings. Class discussion.
13		Topic 11 and conclusions: Non-Renewable Resources.	Topic Presentation. Text book readings. Class discussion.
14		Final Presentations.	Presentations.
15		Final Presentations.	Presentations.

General observations

The student must comply with the provisions of the Student Regime Regulations of Veritas University. For reference you must go to the Student Self-Management Portal at the following address: <http://autogestion.veritas.cr/> and download it.