# Integrating education with consumer behaviour relevant to energy efficiency and climate change at the universities of Russia, Sri Lanka and Bangladesh (BECK)

## MODULE SPECIFICATION

| Originating Institution, Department | Module Co-ordinator(s) |
|---|---|
| Patuakhali Science and Technology University (PSTU), Department of Environmental Science | Mr. Md. Tariqul Islam, Assistant Professor, Dept. of Environmental Science, PSTU |

### TITLE OF THE MODULE

| Title of the module | Module code[1] |
|---|---|
| Green Energy and Climate Change | ENS 5209 |

### PROGRAMME(S) IN WHICH TO BE OFFERED:

Environmental Science

### LEVEL OF STUDIES[2]

| First cycle (BSc/BA) ☐ | Second cycle (MSc/MA) ☒ | Third cycle (PhD) ☐ |
|---|---|---|

### CREDITS AND LEARNING HOURS

| Credit Value[3] | ECTS Value[4] | Indicative academic learning hours[5] | Length (in Semesters)[6] | Year in which to be offered |
|---|---|---|---|---|
| 2 | 2 | 60* | 1 (6-months) | 2 |

* In Bangladesh, 2 credit value represent 16*2=32 contact hours. We have added additional 28 notional hours for this course which will be achieved by assignment and homework.

11.10.2021

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[1] To be indicated by the Institution
[2] According to the Framework of Qualifications for the European Higher Education Area, Annex 8: http://www.aic.lv/ace/ace_disk/Bologna/Bergen_conf/Reports/EQFreport.pdf
[3] Permissible credit values as set out in Institution's Academic Regulations
[4] European Credit Transfer System, 1 ECTS = 25-30 academic learning hours. Please refer to ECTS Users' Guide: https://ec.europa.eu/education/ects/users-guide/docs/ects-users-guide_en.pdf
[5] 1 academic learning hour is equal to 45 minutes
[6] Indicate 0.5, 1, 1.5 or 2

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# Course Details

(As per guideline of University Grants Commission, Bangladesh)

**Programme:** Department of Environmental Science
**Degree:** Master of Science

## Part A- Introduction

| | | |
|---|---|---|
| 1. Course Code | : | ENS 5209 |
| 2. Course Title | : | Green Energy and Climate Change |
| 3. Course Type | : | Electives (Online) |
| 4. Level/Term and Section | : | Level-5, Semester-2 |
| 5. Academic Session | : | 2015-16 and onward |
| 6. Pre-requisite (If any) | : | Not applicable |
| 7. Credit Value | : | 02 (Two) |
| 8. Contact Hours | : | 32 (Thirty-Two) |
| 9. Total Marks | : | 100 |
| 10. Course Objectives | : | The main objective of this online course is to equipped students with an in-depth knowledge of green energy, climate change and make them able to find out the inter relation of two broad issues. Also, the student will be able to expose themselves about the practical knowledge regarding local level climate change with green energy sources, its consumption behaviour, challenges and opportunities with RE commercialization, and country level energy policy. |
| 11. Course Learning Outcomes (CLO) | : | At the end of the course, the student will be able to:<br>**CLO-1:** Describe the importance of green energy and climate change and define the basic terminology including renewable and non-renewable energy, renewable energy technologies, consumer behaviour, sustainable development;<br>**CLO-2:** Explore the environmental impacts of different renewable energy.<br>**CLO-3:** Design commercialization of renewable energy.<br>**CLO-4:** Ascertain consumers behaviour on renewable energy and apprise themselves as well asl to find out the way of renewable energy-oriented consumer behaviour.<br>**CLO-5:** Explore production and consumption scenarios of different fossil fuels as well as analyse the global and regional statistics of carbon dioxide emission caused by fossil fuels.<br>**CLO-6:** Correlate the synergies among renewable energy, climate change, and sustainable development.<br>**CLO-7:** Recognize and evaluate existing energy policies in Bangladesh. |

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## Part B- Content of the Course

| Topics | Specific Outcome(s) | Time Frame | Teaching Strategy(s) | Alignment with CLO |
|---|---|---|---|---|
| **Introduction and Fundamental Aspects:** Introduction, Fundamental Aspects (Energy: Renewable and Non-renewable, Renewable Technologies, Consumer Behaviour, Sustainable Development) | • To acquire the general idea about the course<br>• To grasp the content and strategy for the class<br>• To introduce the basic terminology | Week 1 | • Audio-visual materials<br>• Online lecturing<br>• Group discussion<br>• Q&A session | Developed interest of the students on GE & CC, and basic terminology linked with CLO 1. |
| **Environmental Impacts of Renewable Energy:** Introduction, Environmental Impacts of Solar Energy, Wind Energy, Biomass Energy, Geothermal Power Plan, Hydropower Plant | • To discuss the environmental impact of every RETs<br>• To make them able for constructing relationship with RETs and its associated environmental issues | Week 2 | • Audio-visual materials<br>• Online lecturing<br>• Group discussion<br>• Q&A session<br>• Big data mining | Developed interest of the students on different environmental impacts of RETs linked with CLO 2. |
| **Design for Commercialization of Renewable Energy:** Introduction, Challenges of Marketing Renewable Energy, Current Barriers for Marketing of Renewable Technologies-RETs, Key Factors for Successful Commercialization of RETs, Framework for the Commercialization of RETs, Action Plans to Enhance Commercialization of RETs | • To familiar with the concept of RE commercialization<br>• To describe the barriers and also challenges of renewable energy commercialization.<br>• To investigate the key factors responsible for renewable energy commercialization<br>• To formulate framework for commercialization of RE worldwide. | Week 3 Week 4 | • Audio-visual materials<br>• Online lecturing<br>• Group discussion<br>• Q&A session<br>• Big data mining | Developed interest of the students on RE commercialization linked with CLO 3. |
| **Consumers' Behaviour and Renewable Energy:** Introduction, Consumer behaviour, Consumers' willingness to pay and investment in renewable energy technologies, Consumers' willingness to pay for solar energy in Bangladesh, Reasons: Adapt or Avoid RE, Types of behaviour changes that are needed to promote a sustainable renewable energy transition, Reason for behaviour change for | • To ascertain consumers behavior on RE<br>• To apprise themselves about find out he way of consumer behavior on RE<br>• To find out factors responsible for consumer | Week 5 Week 6 Week 7 | • Audio-visual materials<br>• Online lecturing<br>• Group discussion<br>• Q&A session<br>• Big data mining | Linked with CLO 4 |

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| Topics | Specific Outcome(s) | Time Frame | Teaching Strategy(s) | Alignment with CLO |
|---|---|---|---|---|
| adopting renewable energy, Factors for public acceptance of RET, Barriers to renewable/sustainable energy technologies adoption at national level, Barriers to efficient energy consumption at consumer level, Different ways for transition of consumer behaviour from traditional to sustainable energy | willingness to pay, barriers of RETs, acceptance and adoption of RETs.<br>• To construct possible way for transition of energy behavior | | | |
| **Fossil Fuels and Carbon Emissions:** Production-Consumption Scenarios of Fossil Fuels (Coal, Oil, Natural Gas), Global and Regional CO2 emission from fossil fuels | • To construct linkage between se of fossil fuel and carbon emission<br>• To assess different types of emission scenario comes from consumption of fossil fuel | Week 8 Week 9 | • Audio-visual materials<br>• Online lecturing<br>• Group discussion<br>• Q&A session<br>• Big data mining | Linked with CLO 5 |
| **Renewable Energy, Climate Change, and Sustainable Development:** Introduction, Sustainable Energy/ Renewable Energy Utilization, Climate Change, Causes of Climate Change, Sustainable Development, Sustainable Development Goal (SDG), Role of energy in achieving SDGs, Importance of Renewable Energies in Climate Change Mitigation (CCM), Synergies between Energy (SDG 7) and Climate Mitigation (SDG 13) | • To critically evaluate the linkage between RE and CC<br>• To synthesize the possible way for reducing GHG emission through consumption of RE | Week 10 Week 11 | • Audio-visual materials<br>• Online lecturing<br>• Group discussion<br>• Q&A session<br>• Big data mining | Linked with CLO 6 |
| **Energy Policies in Bangladesh:** Introduction, Bangladesh Energy Regulatory Commission Act (2003),<br>National Energy Policy (2005),<br>Renewable Energy Policy (2008)<br>Sustainable and Renewable Energy Development Authority Act (2012),<br>Action Plan for Energy Efficiency and Energy Conservation (2013),<br>Energy Efficiency and Conservation Master Plan up to 2030 | • To underline the energy related policy in Bangladesh.<br>• To recognize the energy regulatory act and action plan for energy regulation.<br>• To assess the pros and cons of existing energy policy in Bangladesh. | Week 12 Week 13 Week 14 | • Audio-visual materials<br>• Online lecturing<br>• Group discussion<br>• Q&A session<br>• Big data mining | Linked with CLO 7 |
| **Review Class** | • To make an overview | Week 15 | • Audio-visual materials<br>• Online lecturing<br>• Q&A session | Linked with all CLOs |

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| Topics | Specific Outcome(s) | Time Frame | Teaching Strategy(s) | Alignment with CLO |
|---|---|---|---|---|
| **Final Assessment** | | Week 16 | | |

## Part C- Assessment and Evaluation

- Online assessment and evaluation pattern of the University will be followed.

## Part D- Learning materials

- Green Energy and Climate Change Module.
- Audio-visual materials (www.pstu.ac.bd, http://beck-erasmus.com).

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