



Learning Outcomes Based Curriculum Framework

(LOCF)

For

Skill Enhancement Course in Environmental Sciences,

Semesters 5th and 6th for

Undergraduate Programme

2022-24



Government College for Women,

Parade Ground,

Jammu

Dr. P. K. Gupta



Skill Enhancement Courses in Environmental Sciences Semester V

Title: GREEN TECHNOLOGY

Course number: UESTS 501

Credits: 2

Time of Examination: 2 hours.

Total Teaching Hours: 30 Max.

Marks: 50

End Term assessment: 40 marks

Sessional Assessment: 10 marks

COURSE OBJECTIVES:

The objective of this course is to :

- introduce students to the concept of green technology, its goals and advantages.
- highlight potential role of green technologies in realizing the goal of sustainable development
- focuses on community participation to tap the economic benefits associated with switching to green technologies

COURSE LEARNING OUTCOMES: Upon successful completion of this course, the students will be able to:

- Understand the importance of green technology .
- Enlist different concepts of green technologies in a project.
- Understand the principles of Energy efficient technologies .
- Identify the importance of life cycle assessment of products .
- Recognize the benefits of green and clean fuels with respect to sustainable development.

Unit 1 Introduction to Green Initiatives

- 1.1 Green Technology: Definition, history and evolution, Advantages and Disadvantages
- 1.2 Green buildings: Concept and relevance of green buildings over conventional buildings,. Concept of Green Building Index (GBI), LEED certification
- 1.3 Cleaner Production: Def, Importance, Advantages. Bio-degradable and Bio-accumulative products
- 1.4 Green Energy Sources: Wind Turbines, Solar Panels, Hydrogen fuel cells. Concept of Biogas, Bioethanol, Bio-Diesel Electric cars.*etc.*,



1.5 Green initiatives: Green Economy and UNEP's Green Economy Initiative

Unit 2 : Manifestation of Green measures

2.1 Certifications: Eco-Mark Certification and ISO -140001

2.2 Circular Economy: 3R's, 9R's concept and Waste to Energy (WTE)

2.3 Carbon Mitigation: Carbon Footprint, Carbon Credit ,Carbon Capture and Storage (CCS) technologies

2.4 Environmental clean-up and Restoration : Bioremediation and Microremediation ,Organic Farming and Agroforestry

2.5 Life Cycle Assessment (LCA) and its significance

Recommended literature

1. Arceivala, S.L. 2014. Green Technologies: For a Better Future. Mc-Graw Hill Publications.
2. Baker, S. 2006. Sustainable Development. Routledge Press.
3. Park, K. (2015). Parks Textbook of Preventive and social medicine. 23rd Ed., BanarsidasBhanot Publication.
4. Thangavel, P. &Sridevi, G. 2015. Environmental Sustainability: Role of Green Technologies. Springer Publications.
5. Woolley, T. &Kimmins, S. 2002. Green Building Handbook (Volume 1 and II). Spon Press.

Note for Theory Paper setter

A. **External Assessment:** Theory Question paper will consist of THREE sections 'A', 'B' and 'C'.

Section 'A' will consist of 4 short answer type questions of 2 marks each, two questions from each unit. All the questions would be compulsory. Candidate has to restrict the answers in 70 to 80 words. Section 'B' will consist of 4 medium answer type questions of 5 marks each, two question from each unit of prescribed course content. All the questions would be compulsory. Candidate has to restrict the answers in 250 to 300 words.

Section 'C' will consist of 2 long answer type questions of 12 marks each out of which candidates have to attempt only ONE . Candidate has to restrict the answers in 500 to 600 words.



B. Internal assessment test in theory course of Green Technology would be of 10 marks based on mid term examination upon completion of 40% syllabus.

SEMESTER-5

LAB COURSE FOR SKILL ENHANCEMENT IN ENVIRONMENTAL SCIENCES

Internal Evaluation

Course No: UESPS 502 Title: Laboratory Course

Credit:2

Marks: 50

Total Teaching Hours: 30

List of Practical

1. Familiarization with Renewable energy gadgets
2. Study of Fixed Drum Biogas Plants /Floating Drum Biogas Plants and its diagrammatic and schematic presentation .
3. Study of the Production Process of Biodiesel
4. Study of Production Process of Ethanol
5. Study of Production Process of Briquettes
6. Working of a Solar cooker
7. Demonstration of Vermicomposting
8. To set up an in-vessel vermicomposting unit at home and record the observations
9. Visit to an ISO-140001 certified enterprise and enlist various green initiatives taken by them.
10. Planting a sapling and documentation of its various growth stages with photographs
11. Rate electric/electronic gadgets in your household on the basis of their energy efficiency
12. Visit to green buildings/Green practices in and around Jammu city.

NOTE FOR PRACTICAL COURSE

Practicals are meant to give field experience /hands on training to manage solid waste efficiently. Daily assessment and attendance record of students would be maintained and students would be evaluated internally out of 50 marks at the end of semester according to following scheme:

- a. Attendance-5 marks
(Below 75%-zero,75-80%-2marks,80-85%-3marks,85-90%-4marks and above 90%5marks)
- b. Day to day performance-25 marks
- c. End semester practical test-10 marks



d. Viva-voce-10 marks

Skill Enhancement Courses in Environmental Sciences Semester VI

Title: Environmental Pollution

Course number: UESTS 601

Credits: 2

Time of Examination: 2 hours.

Total Teaching Hours: 30 Max.

Marks: 50

End Term assessment:40 marks

Sessional Assessment:10 marks

Course Objective: Upon successful completion of this course, the students will have a broad, integrated understanding the major problems associated with pollution of the atmosphere, water and the land surface. Students will be expected to be familiar with and have an understanding of the causes of global warming, ozone depletion, enhanced N and S emissions and Problems of pollution of the food chain by potentially toxic elements and persistent organic pollutions; Students are also expected to be aware of the procedures and prospects for reducing unwanted emissions to the environment and remediation of already polluted systems

Course Learning Outcomes : Upon successful completion of this course, the students will be able to:

- Examine the critical linkage between environmental pollution and human health.
- Develop understanding on the mode of various diseases as triggered by the spread of contaminants in soil, water and air.
- Analyze different types of pollution and methodologies for pollution control.

Unit 1 Air and Water Pollution

1.1 Air Pollution: Introduction, Definition, Sources and Effects

1.2 Air Pollution Control Technology: Gaseous and Particulate Pollutants control, Brief concept of BHARAT Emission Standards

1.3 Water Pollution and its effects : Definition , Sources of Water Pollution, Effects of Water Pollution (Eutrophication, Bioaccumulation, Biomagnification)

1.4 Control of Water pollution: Wastewater Treatment techniques

1.5 Case Studies: Bhopal Gas Tragedy, London Smog, Minamata Incident Japan,



Arsenic Poisoning West Bengal, Fluoride Pollution in Jammu

Unit 2 Noise and Soil Pollution.

- 2.1 Noise Pollution: Introduction, Sources and Effects
- 2.2 Noise Pollution Control Techniques: Sound Insulation, Sound Absorption, Vibration Damping, Vibration Isolation; Control in Transmission Path (Installation of Barriers and Closures, Green Mufflers); Control at the Receiver end (Using protective equipment, Job Rotation)
- 2.3 Soil Pollution: Introduction, sources of Soil pollution, Effects of Soil pollution : Effect on Soil quality and agricultural productivity
- 2.4 Control Measures for Soil degradation: Biofertilizers, Organic Farming, Biological Pest Management
- 2.5 Case studies: Love Canal Tragedy, New York ; Endo-sulfan Tragedy, Kerala; Yamuna River Pollution, Soil pollution in Punjab with special emphasis on increase in cancer incidences.

Literature Recommended:

1. Asthana, D. K. (2006). Text Book of Environmental Studies. S. Chand Publishing.
2. De, A.K., (2006). Environmental Chemistry, 6th Edition, New Age International, New Delhi.
3. Clifford, J. Jones (2008) Atmospheric pollution. Book boon Publisher, Aberden.
4. Goel, P.K. (2006) Water Pollution- Causes, Effects and Control. Revised Edition. New Age International Publishers..
5. Khitoliya, R.K. (2012) Environmental Pollution. S. Chand and Co.
6. Malviya, P., Singh, P. and Singh, A. (2012) Environmental Studies. Acme Learning Pvt. Limited, New Delhi.
7. Sharma, B.K. (2005) Environmental chemistry -9th Ed., Krishna Prakashan Media Pvt. Ltd, Meerut, U.P.
8. Dara, S.S. and Misra, D.D. (1993) A Textbook of Environmental Chemistry and Pollution Control (With Energy, Ecology, Ethics and Society) S. Chand Publishing.

Note for Theory Paper setter

A. External Examination

Theory Question paper will consist of THREE sections 'A', 'B' and 'C'.



Section 'A' will consist of 4 short answer type questions of 2 marks each, two questions from each unit. All the questions would be compulsory. Candidate has to restrict the answers in 70 to 80 words.

Section 'B' will consist of 4 medium answer type questions of 5 marks each, two question from each unit of prescribed course content. All the questions would be compulsory. Candidate has to restrict the answers in 250 to 300 words.

Section 'C' will consist of 2 or 3 long answer type questions of 12 marks each out of which candidates have to attempt only ONE . Candidate has to restrict the answers in 500 to 600 words.

B. Internal Assessment

Internal assessment test in theory course would be of 10 marks based on mid term examination upon completion of 40% syllabus

SEMESTER-VI

LAB COURSE FOR SKILL ENHANCEMENT IN ENVIRONMENTAL SCIENCES

(Internal Evaluation)

Title: Laboratory Course

Course No: UESPS- 602

Credit:2

Max. Marks: 50

Total Teaching Hours: 30

List of practicals

1. Visit to various areas for listing the various sources of Pollution: Air (indoor and outdoor), Water and Soil pollution.
2. Impact of vehicular pollution on road side plants- change in their colour, dust and carbon deposition.
3. Collection and processing of water and soil samples.
4. Physico chemical characterisation of soil /visit to soil testing lab
5. Measurement of pH of water samples and physical comparison of streams of the area.
6. Visit to wastewater /water treatment plant/weather station/ pollution control board.
7. Demonstration/Preparation of working model of water/rainwater harvesting structures.
8. Visit to various Industrial units using Pollution control devices.
9. Assessment of Noise levels of different zones- commercial, residential, traffic and silent zones.



10. Questionnaire based assessment of the impact of Pollution on human health.
11. Visit to Brick Kilns (Concept of Zig-zag Technology)

Note for Practical Course

Practicals would be conducted to give field experience/trainings to the students for conducting EIA. Daily assessment record and attendance of the students would be maintained and each student would be evaluated internally out of 50 marks at the end of the semester as per the following weightage

- a. Attendance – 5 marks

(Below 75% -Zero, 75-80%-2 marks, 80-85%- 3 marks, 85-90% -4marks and above 90% -5).

- b. Day to day performance- 25 marks
- c. End semester practical test-10 marks
- d. Viva-voce-10 mark