

SEMESTER COURSES FOR
SKILL ENHANCEMENT COURSE IN ENVIRONMENTAL SCIENCES

Skill enhancement courses for Semester III and IV at Undergraduate level in Environmental Sciences will be of 4 credit each, comprising of 2 credits of theory and 2 credits of lab course in each semester. The objective of the courses is to acquaint the students with the existing issues related to solid waste and Environmental Impact Assessment and to familiarize techniques/technologies available for the redressal of these issues.

Evaluation of Course work:

The students would be evaluated during the conduct of courses on the basis of their performances in internal assessment test in theory course that would be of 10 marks, based on questions from syllabus. The external examination (final semester examination) at the end of the semester will be of 40 marks in which Theory Question paper will consist of THREE sections 'A', 'B' and 'C'. Section 'A' will consist of 3 short answer type questions of 3 marks each, representing all units i.e. at least ONE 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 3 medium answer type questions of 6 marks each, representing all units i.e. at least ONE from each unit. 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 13 marks each out of which candidates have to attempt only ONE. Candidate has to restrict the answers in 500 to 600 words.

For Lab. Courses: Each student would be evaluated (INTERNALLY) out of 50 marks at the end of the semester as per the following weightage

- a. Attendance – 20% (10 marks) (Below 75% -Zero, 75-80%-4 marks, 80-85%-6 marks, 85- 90% -8 marks and above 90% -10 marks).
- b. Day to day performance – 40% (20 marks)
- c. Practical test and viva voce- 40% i.e. 20% each (20 marks i.e. 10 marks each)

The following Skill Enhancement courses of study are prescribed for the 3rd & 4th Semesters of Undergraduate Programme in Environmental Sciences :-

SEMESTER- III

**Examinations to be held in
Dec.,2017 ; Dec. 2018, and Dec. 2019**

Course No.	Title	Credit	Total Contact hours
------------	-------	--------	---------------------

THEORY COURSES:- Skill Enhancement Course

UESTS 301	Solid Waste Management	2	30
-----------	------------------------	---	----

LABORATORY COURSES:-

UESPS 302	Lab Course	2	30
-----------	------------	---	----

SEMESTER- IV

**Examinations to be held in
May,2018; May,2019, and May,2020**

Course No.	Title	Credit	Total Contact hours
------------	-------	--------	---------------------

THEORY COURSES :- Skill Enhancement Course

UESTS 401	Environmental Impact Assessment (EIA)	2	30
-----------	---------------------------------------	---	----

LABORATORY COURSES :-

UESPS 402	Lab Course	2	30
-----------	------------	---	----

SEMESTER-III

SKILL ENHANCEMENT COURSE IN ENVIRONMENTAL SCIENCES

Detailed Syllabus

Course No: UESTS 301

Title: Solid Waste Management

Credit:2

Time of Examination: 2.0 hrs

Marks:

(a) Semester Examination: 40

(b) Sessional Assessment: 10

Syllabus for the examinations to be held in Dec.,2017 ; Dec., 2018 and Dec., 2019

Unit-1 SOLID WASTE CONCEPT AND LEGISLATIVE MEASURES

- 1.1 Solid waste: Concept and Current scenario.
- 1.2 Sources and Classification of Solid waste.
- 1.3 Factors affecting the generation of Solid waste.
- 1.4 Evolutionary concept of legislative measures
 - a) Related to Environment
 - b) Related solid waste management.

Unit-2 SOLID WASTE-COLLECTION AND PROCESSING TECHNIQUES

- 2.1 Handling and segregation of Solid Waste at source and methods of separation
- 2.2 Solid Waste Reduction techniques
- 2.3 Collection of Solid Waste (equipments, methods and factors affecting collection)
- 2.4 Transfer and transportation of Solid Waste
- 2.5. Solid waste processing methods (storage, conveying, compacting, shredding, pulping, granulating, etc.).

Unit-3 SOLID WASTE MANAGEMENT TECHNIQUES

- 3.1 Management of organic waste
 - a) Composting
 - b) Vermi composting
 - c) Farmyard manure.
- 3.2 Solid waste Disposal
 - a) Sanitary landfill;
 - b) Incineration
 - c) Pyrolysis
 - d) Gasification
 - e) Injection wells
- 3.3 Management of E-waste.

3.4 Site selection and siting criteria for sanitary landfills

3.5 Community participation in Solid Waste Management

Literature Recommended:

1. Anonymous (2014).Waste to resources- A waste management Handbook. The Energy and Resources Institute (TERI) New Delhi.www.teriin.org.
2. Bhatia S.C.(2007), Solid and hazardous waste management ,Atlantic Publishers and Distributions(P). New Delhi
3. Khan, I. H. and Ahsan, N.(2011) Textbook of Solid Waste Mangement.CBS Publishers, New Delhi
4. Mishra, S.G. and Mani D.(1993). Pollution through solid waste. Ashok Publishing House, New Delhi.
5. Tchobanoglous, G.and Kreith, F.(2002).Handbook of Solid Waste Management: Mc Graw Hill Handbooks, Newyork
6. Zhu,D; Asnani, P.U.; Zurbrigg,C; Anapolsky,S and Mani,S.(2008).Improving solid waste management in India.The world Bank Washington D.C.www.worldbank.org.

Note:

II. Note for Theory Paper setter

- a. Theory Question paper will consist of THREE sections ‘A’, ‘B’ and ‘C’.
Section ‘A’ will consist of 3 short answer type questions of 3 marks each, representing all units i.e. at least ONE 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 3 medium answer type questions of 6 marks each, representing all units i.e. at least ONE from each unit. 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 13 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 SOLID WASTE MANAGEMENT would be of 10 marks, based on questions from syllabus.

SEMESTER-III

LAB COURSE FOR SKILL ENHANCEMENT IN ENVIRONMENTAL SCIENCES

(Internal Evaluation)

Course No: UESPS 302 Title: Laboratory Course

Credit:2

Duration of Examination: 3.0 hrs

Marks: 50

List of practicals for the examinations to be held in Dec.,2017 ; Dec., 2018 and Dec., 2019

1. Qualitative and Quantitative estimation of solid waste from Household/commercial /Institutional areas.
2. Cost estimation of recyclable waste generated from households /commercial /Institutional areas.
3. Estimate energy content of household solid waste.
4. Making recycled paper/paper items from used newspapers/paper.
5. Preparation and collection of items from recycled/reused material.
6. Laboratory demonstration of Vermi –composting
7. Laboratory demonstration of Aerobic Composting
8. Field visits to waste dumping/disposal site
9. Field visits to Solid Liquid Resource Management(SLRM)
10. Field visit to various Industries
11. Field visit to paper recycling unit or any other recycling unit
12. Field visit to plastic recycling unit or any other recycling unit.
13. Construction and working of Incinerators/biogas plants
14. Site selection and siting criteria for sanitary landfills in your area.

III. Note for Practical Course

Practicals would be conducted to give field experience/trainings to the students to manage the solid waste. 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 – 20% (10 marks) (Below 75% -Zero, 75-80%-4 marks, 80-85%-6 marks, 85- 90% -8 marks and above 90% -10 marks).
- b. Day to day performance – 40% (20 marks)
- c. Practical test and viva voce- 40% i.e. 20% each (20 marks i.e. 10 marks each)

SEMESTER-IV

SKILL ENHANCEMENT COURSE IN ENVIRONMENTAL SCIENCES

Detailed Syllabus

Course No: UESTS 401 Title : Environmental Impact Assessment (EIA) Credit:2

Time of Examination: 2.0 hrs

Marks:

(a) Semester Examination: 40

(b) Sessional Assessment: 10

Syllabus for the examinations to be held in May,2018 ; May 2019 and May, 2020

UNIT-I EIA: General introduction

- 1.1 EIA- concept and Historical background.
- 1.2 General process of EIA.
- 1.3 Environmental Impacts to be considered in EIA process and their types.
- 1.4 Overview of EIA notifications(1994,2006 and 2010)
- 1.5 Prediction and assessment of various Environmental Impacts- General Concept.

UNIT-II EIA Methodologies: Types, Advantages and Disadvantages

- 2.1 Adhoc and Checklist method
- 2.2 Matrix method
- 2.3 Overlay method
- 2.4 Cost- Benefit Analysis
- 2.5 Network and Modelling methods.

UNIT-III EIA Documentation and Reporting

- 3.1. Environmental Impact Statement
- 3.2 Environmental Audit.
- 3.3 Reviewing of EIA/EIS
- 3.4 People Participation in EIA
- 3.5 Environmental Management Plan

Literature Recommended:

1. Anjaneyulu, Y.(2002),Environmental Impact Assessment Methodologies.BSP BS Publications, Hyderabad.
2. Shukla S.K and Shrivastav P.R (1992).Concepts in Environmental Impact analysis. Commonwealth Publishers, New Delhi
3. Shukla S.K and Shrivastav P.R.(1992). Methodology of Environmental Monitoring and Assessment. Commonwealth Publishers, New Delhi.
4. Srivastav A.K (2011).Environmental Impact Assessment. A.P.H. Publishing Corporation New Delhi.
5. Trivadi P.R (2009), Environmental Impact Assessment. A.P.H. Publishing Corporation, New Delhi.
6. Vankhede G .(2012),Environmental Impact Assessment. Biotech Books New Delhi.
7. www.envfor.nic.in/divisions/iass/eia/Cover.htm

Note for Theory Paper setter

- a. Theory Question paper will consist of THREE sections ‘A’, ‘B’ and ‘C’.
Section ‘A’ will consist of 3 short answer type questions of 3 marks each, representing all units i.e. at least ONE 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 3 medium answer type questions of 6 marks each, representing all units i.e. at least ONE from each unit. 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 13 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 EIA would be of 10 marks, based on questions from syllabus.

SEMESTER-IV

LAB COURSE FOR SKILL ENHANCEMENT IN ENVIRONMENTAL SCIENCES

(Internal Evaluation)

Course No: UESPS 402 Title: Laboratory Course

Credit:2

Duration of Examination : 3.0 hrs

Marks: 50

List of practicals for the examinations to be held in May, 2018 ; May, 2019 and May, 2020

1. Rapid Environmental Assessment checklists (REA) of proposed project
2. To study baseline data collection for EIA.
3. Study of Environmental sensitive places of respective areas.
4. To study the impacts of any two developmental projects (Mining/industries/Transport sector/Hydroelectric project) by:
 - a. Checklist method
 - b. Adhoc method
 - c. Matrix method
5. To study the EMP of any two developmental projects. (Mining/industries/Transport sector/Hydroelectric project)
6. Rehabilitation plan of small project
7. Mitigation measures of any area specific project

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

- c. Attendance – 20% (10 marks) (Below 75% -Zero, 75-80%-4 marks, 80-85%-6 marks, 85- 90% -8 marks and above 90% -10 marks).
- d. Day to day performance – 40% (20 marks)
- e. Practical test and viva voce- 40% i.e. 20% each (20 marks i.e. 10 marks each)