Course Code	Course Name	Teaching Scheme (Contact Hours)			Credits Assigned			
		Theory	Pract.	Tut.	Theory	TW/Pract	Tut.	Total
FEC106	Environmental Studies	02	--	--	02	--	--	02

Course Code	Course Name	Examination Scheme							
		Theory				Term Work	Pract	Oral	Total
		Internal Assessment			End Sem Exam				
		Test1	Test2	Av of Test 1 & 2					
FEC106	Environmental Studies	15	15	15	60	--	--	--	75

Objectives

1. Creating the awareness about environmental problems among students.
2. Imparting basic knowledge about the environment and its allied problems.
3. Developing an attitude of concern for the environment.
4. Motivating students to participate in environment protection and environment improvement.
5. Acquiring skills to help the concerned individuals in identifying and solving environmental problems.

Outcomes: Learner will be able to…

1. Illustrate Depleting Nature of Environmental Resources, Global Environmental Crisis, Ecosystem concept.
2. Adapt to 3R (Reuse, Recovery, Recycle).
3. Study different control measures related to Environmental Pollution.
4. Illustrate and analyse various Case Studies related to Environmental Legislation.
5. Demonstrate the working of Renewable energy sources & Equipments.
6. Illustrate the Techniques of Disaster Management and Green Building.

Module	Detailed Contents	Hrs.
01	**Overview of Environmental Aspects:** • Definition, Scope and Importance of Environmental Study • Need for Public awareness of environmental education • Introduction to depletion of natural resources: Soil, Water, Minerals and Forests. • Global crisis related to – Population, water, sanitation & Land. **Ecosystem:** • Study of ecosystems : Forest, desert and aquatic (in brief). • Energy flow in Ecosystem, overview of Food Chain, Food Web and Ecological Pyramid. • Concept of ecological succession and its impact on human beings (in brief). **Case Study on Chipko Movement (Uttarakhand, India), (began in 1973).**	4
02	**Aspects of Sustainable Development:** • Concept and Definition of Sustainable Development. • Social, Economical and Environmental aspects of sustainable development. • Control measures: 3R (Reuse, Recovery, Recycle), • Resource utilization as per the carrying capacity (in brief). **Case Study on Narmada BachaoAndolan (Gujarat, India, in the mid and late 1980s).**	2

03	**Types of Pollution:** • Water pollution: Sources of water pollution and Treatment of Domestic and industrial waste water (with flow-diagram of the treatment), • Land Pollution: Solid waste, Solid waste management by land filling, composting and incineration • Air pollution: Sources of air pollution, Consequences of air pollution :- Greenhouse effect (Explanation with schematic diagram), Photochemical Smog (Explanation with chemical reaction). Cleaning of gaseous effluents to reduce air contaminants namely dust particle or particulate matters by using:- (i) Electrostatic precipitators (ii) Venturi scrubber (Schematic diagram and working). • Noise pollution: Sources, effects, threshold limit for different areas and control methods. • E-Pollution: Definition, Sources and effects. • Nuclear pollution: Sources and effects. **Case study on Water Pollution of Ganga River.** **Case study on London smog (U. K.)(December, 1952).** **Case Study of Fukushima Disaster (March, 2011).**	**8**
04	**Pollution Control Legislation:** • Functions and powers of Central and State Pollution Control Board. • Environmental Clearance, Consent and Authorization Mechanism. **Case Study of Dombivali MIDC- Boiler Blast Tragedy (Thane, Maharashtra, India), (May, 2016).**	**3**
05	**Renewable Sources of Energy:** • Importance of renewable sources of energy. • Principle and working with schematic diagram of :- (i) Solar Energy: (a) Flat plate collector and (b) Photovoltaic cell. (ii) Wind Energy: Wind Turbines. (iii) Hydropower: Hydropower generation from water reservoir of the dam. (iv) Geothermal Energy: Utilisation of underground sources of steam for power generation.	**4**
06	**Technological Advances to overcome Environmental problems:** • Concept of Green Buildings, • Various indoor air pollutants and their effects on health. • Carbon Credit: Introduction and general concept. • Disaster Management: Techniques of Disaster Management to cope up with (i) Earthquake and (ii) Flood. **Case Study on Earthquake in Latur (Maharashtra, India), (September,1993).** **Case Study on Cloudburst and Landslides at Kedarnath (Uttarakhand, India), (June, 2013).**	**5**

Assessment:

Internal Assessment Test:

1. Each test will be of 15 marks.
2. At least one question will be based on case study. Candidate is expected to explain the salient features of the incident and suggest preventive measures.

End Semester Theory Examination:

1. Question paper will comprise of total six question, each carrying 15 marks.
2. Total four questions need to be solved.
3. Question Number One will be compulsory and it will be based on entire syllabus wherein sub-questions of 2 to 3 marks will be asked.
4. Remaining questions i.e. Q.2 to Q.6 will be mixed in nature and will be divided in three parts (a), (b) & (c) and they will belong to different modules.
5. In question paper, weight of each module will be proportional to number of respective lecture hours as mentioned in the syllabus.

References:

1. Environmental Studies by Benny Joseph, TataMcGraw Hill.
2. Environmental Studies by R.Rajagopalan, Oxford University Press.
3. Environmental Studies by. AnanditaBasak, Pearson Education.
4. Essentials of Environmental Studies by Kurian Joseph &Nagendran, Pearson Education.
5. Fundamentals of Environmental Studies by Varadbal G. Mhatre, Himalaya Publication House.
6. Perspective of Environmental Studies, by Kaushik and Kaushik,New Age International.
7. Renewable Energy by Godfrey Boyle, Oxford Publications.
8. Textbook of Environmental Studies by Dave and Katewa, Cengage Learning.
9. Textbook of Environmental studies by ErachBharucha, University Press.
10. Environmental pollution control engineering by C.S. Rao, New Age International (P) Limited Publishers.