GUJARAT TECHNOLOGICAL UNIVERSITY, AHMEDABAD, GUJARAT
COURSE CURRICULUM

Course Title: Environmental Science
(Code: 3316307)

Diploma Programmes in which this course is offered	**Semester in which offered**
Agriculture Engineering	1st semester

1. RATIONALE

For a country to progress, sustainable development is one of the key factors. Environment conservation and hazard management is of much importance to every citizen of India. The country has suffered a lot due to various natural disasters. Considerable amount of energy is being wasted. Energy saved is energy produced. Environmental pollution is on the rise due to rampant industrial mismanagement and indiscipline. Renewable energy is one of the answers to the energy crisis and also to reduce environmental pollution. Therefore this course has been designed to develop a general awareness of these and related issues so that the every student will start acting as a responsible citizen to make the country and the world a better place to live in.

2. COMPETENCIES

The course content should be taught and implemented with the aim to develop different types of skills leading to the achievement of the following competencies.

i. Take care of issues related to environment conservation and disaster management while working as diploma engineer.

3. TEACHING AND EXAMINATION SCHEME

Teaching Scheme (In Hours)			**Total Credits L+T+P)**	**Examination Scheme**				
				Theory Marks		**Practical Marks**		**Total Marks**
L	**T**	**P**	**C**	**ESE**	**PA**	**ESE**	**PA**	100
4	0	0	4	70	30	0	0	

Legends: L-Lecture; **T** – Tutorial/Teacher Guided Theory Practice; **P** -Practical; C– Credit; **ESE** -End Semester Examination; **PA** - Progressive Assessment.

4. DETAILED COURSE CONTENTS

Unit	Major Learning Outcomes	Topics and Sub topics
UNIT –I **Environment and Ecosystem**	**1.1** Define Scope and importance Enhance knowledge about engineering aspects of Environment **1.2** Correlate the facts of ecology and environment **1.3** Describe Ecosystem Types, Structure and Function	**1.1** Definition, scope and Importance of environment and scope **1.2** Engineering and environment issues **1.3** Types, structure and functions ecology and ecosystem
UNIT –II **Natural Resources and Biodiversity**	**2.1** Explain importance of forests, minerals, soil and water **2.2** Understand value of biodiversity **2.3** List threats and conservation of bio-diversity	**2.**1 Forests , Minerals, Soil and Water- Their uses and abuses **2.2** Biodiversity Value, Threats and Conservation
UNIT –III **Global Warming, Environmental Pollution and Nuclear Hazards**	**3.1** Assess the effect of pollution **3.2** List the causes of environmental pollution **3.3** State the major causes of air, water, marine, thermal and noise pollution. **3.4**Describe how industrial waste contaminates the land **3.5** Describe how the nuclear hazards take place.	**3.1** Causes of environmental pollution **3.2** Pollution due to solid waste **3.3** water pollution, air pollution, the Noise as pollution ,marine pollution , thermal pollution **3.4** Pollution of land due to industrial and chemical waste **3.5** Causes, effects and treatment to nuclear hazards
UNIT –IV **Human Population, Rural and Urban Waste Management**	**4.1** Describe the Risks of urbanization **4.2** Enlist your Population forecast **4.3** Explain Methods of rural waste control **4.4** Explain Methods of urban waste control **4.5** Comprehend bio safety and risk assessment	**4.1** Human population, health and social welfare **4.2** Methods of population forecast **4.3** Urbanization and its positive and negative aspects **4.4** Waste management technologies for rural areas**.** **4.5** Waste management technologies for urban areas- municipal solid waste management **4.6** Bio Safety and Risk Assessment
UNIT –V **Environmental Act**	**5.1** State the major Acts for environmental preservation. **5.2** State the various Acts of Water, Noise, Thermal pollution and Acts regarding waste handling**.**	**5.1** Water pollution Act, Noise pollution Act, Thermal pollution Act, Air pollution Act, acts regarding waste handling and management**.**

5. SUGGESTED SPECIFICATION TABLE WITH HOURS & MARKS (THEORY)

Unit No.	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
1	**Environment and Ecosystem**	**7**	2	4	4	10
2	**Natural Resources and Biodiversity**	**12**	4	8	8	18
3	**Global Warming, Environmental Pollution and Nuclear Hazards**	**12**	4	8	8	18
4	**Human Population, Rural and Urban Waste Management**	**10**	4	6	4	14
5	**Environmental Act**	**7**	4	2	4	10
	TOTAL	**48**				70

Legends: R = Remembrance; U = Understanding; A = Application and above levels (Revised Bloom's taxonomy)

6. SUGGESTED LIST OF EXPERIMENTS/PRACTICAL EXERCISES

Nil

7. SUGGESTED LIST OF STUDENT ACTIVITIES

i) Prepare paper on various sustainable developments.
ii) Make a report after gathering information the values of water, noise pollution and air pollution in your city/town and compare the values in other cities and towns in India with respect to environmentally acceptable levels
iii) Prepare a paper on air and water pollution in an industry/institute
iv) Undertake some small mini projects in any one of the renewable energies
v) Visit an energy park and submit project on various sources of energy
vi) Prepare PowerPoint on clean and green technologies
vii) Prepare a list of do's and don'ts applicable during disasters
viii) Submit a report on garbage disposal system in your city/town

8. SUGGESTED LEARNING RESOURCES

A. List of Books

Sr. No.	Title of Book	Author	Publication/Year
1	Environmental Science- Anew Approach	S.S.Purohit , Q.J. Shamnani and A.K.Agarwal	
2	Environment, Biodiversity and Conservation	M.A.Khan and S. Farooq	
3	Conservation of Biodiversity and Natural Resources	M.P.Singh , Soma Dey and Bijay S. Singh	

B. List of Major Equipment/ Instrument

i) Digital sound level meters (to check noise pollution)
ii) Digital air quality meter (to measure air pollution)
iii) Digital handheld anemometer (to measure wind speeds)
iv) Digital hand held pyrometer (to measure solar radiation levels)

C. List of Software/Learning Websites

i) http://www1.eere.energy.gov/wind/wind_animation.html
ii) http://www.nrel.gov/learning/re_solar.html
iii) http://www.nrel.gov/learning/re_biomass.html
iv) http://www.mnre.gov.in/schemes/grid-connected/solar-thermal-2/
v) http://www.mnre.gov.in/schemes/grid-connected/biomass-powercogen/

9. COURSE CURRICULUM DEVELOPMENT COMMITTEE