GUJARAT TECHNOLOGICAL UNIVERSITY

SUBJECT NAME: CHEMISTRY FOR ENVIRONMENTAL SCIENCE & TECHNOLOGY

SUBJECT CODE: 2133505

B.E.Semester: III Environmental Science & Technology

Type of course: Environmental Science & Technology

Prerequisite: A good fundamental backup of basics of chemistry for environmental science and technology

Rationale: The main objective of this subject is to make students aware about the basics of chemistry for environmental science and technology and the fundamentals of environmental chemistry which are very useful in knowing the analysis and treatment of environmental pollutants.

Teaching andExamination Scheme:

Teaching Scheme			Credits	Examination Marks						Total Marks
L	T	P	C	Theory Marks			Practical Marks			
				ESE (E)	PA (M)		PA (V)		PA (I)	
					PA	ALA	ESE	OEP		
3	0	0	3	70	20	10	0	0	0	100

Content:

Sr. No.	Topic	Teaching Hours	Module Weightage (%)
1.	Chemistry of water and waste water- Hydrological cycle, structure of water molecule, water as a solvent principal of equilibrium chemistry, pH, oxidation-reduction, and the application of principle of chemistry for solving environmental engineering problems	4	10
2.	Atmospheric Chemistry Segment of Environment, Structure of atmosphere, chemical and photochemical reactions in the atmosphere. Ozone chemistry- formation and depletion of ozone layer. Acid rain mechanism of formation and effects. Photochemical smog and sulfurous smog. Green house effect/global warming, Understanding and measurement of SOx, NOx, TOC, SPM, RSPM	10	20
3.	Instrumental analysis: Conductivity meter, pH meter, Turbidity meter Principles of optical methods such as Absorption, spectrophotometer, flame photometer, Fluorometry	6	15
4.	Water and waste water analysis: Temperature, pH, DO, Color, Odor, Solids, nitrate, TKN, chloride, potassium, hardness, Chlorophyll-a, phosphate, sulphate and	10	20

	various metals		
5.	Chemistry involve in water treatment procedure like disinfection, Coagulation, softening, defluoridation, iron and manganese removal, demineralization.	8	15
6.	Soil chemistry: Soil structure and component Soil properties, Analysis of soil, Sediments, Heavy metals and chemicals in soil	4	10
7.	Environmental Toxicology: Toxic chemical and Toxicity, Source of environmental toxicity, Toxicity of metals and organic compound, Bioaccumulation and Biomagnifications	4	10

ReferenceBooks:

- Environmental engineering and Science, Masters G.M.; Prentice Hall of India, New Delhi, 3rd Ed.,1994.
- Environmental Chemistry, Kudesia V.P.; Pragati Prakashan, 2000.
- Environmental Pollution Control and Engineering, Rao C.S., New Age International (P) Limited, 2nd Ed., 1991.
- Environmental Engineering, Kiely G., McGraw Hill Book Company, 1997.
- Environmental Chemistry, De A. K.; New Age International (P) Limited, 7th Ed.,2009.
- Basics Environmental Engineering, Gaur, R. C.; New Age International (P) Limited, 2008.
- Environmental Chemistry ,Sawyer & McCarty, Mc Graw Hill 5th Ed., 2002
- Environmental Chemistry, Samir Banerji, PHI, 2nd Ed, 2001

Course Outcome: After learning the course the students should be able:

1. To carry out various experiments related to environmental chemistry
2. To be able to understand basic knowledge about the environment & ecology and their relationship
3. To be able to apply this knowledge in environmental pollution control and management
4. To express the knowledge of environment and their chemistry
5. To build a bridge between theoretical and practical concept used in industry.

List of Open Source Software/learning website:

1) NPTEL
2) Delnet

ACTIVE LEARNING ASSIGNMENTS:

Preparation of power-point slides, which include videos, animations, Pictures, graphics for better understanding theory and practical work – The faculty will allocate chapters/ parts of chapters to groups of students so that the entire syllabus is covered. The power-point slides should be put up on the web-site of the College/ Institute, along with the names of the students of the group, the name of the faculty, Department and College on the first slide. The best three Works should be sent to achievements@gtu.edu.in.