SARVAJANIK UNIVERSITY
Sarvajanik College of Engineering and Technology
Bachelor of Technology
Civil Engineering

B. Tech. III Semester V

Subject Name : Pollution Control and Waste Management **Subject Code:** BTCL14503

Type of course : PEC-I
Prerequisite : Environment Science(BTMD17102)
Rationale : This course is intended to familiarize students with the concepts of various traditional and modern pollution control methods along with identifying various pollutants. To understand key issues and its technical solutions pertaining to municipal and industrial solid waste management is necessary for practicing environmental engineers.

Teaching and Examination Scheme:

TEACHING SCHEME				Theory Marks			Practical Marks		Total
L	T	P	C	TEE	CA1	CA2	TEP	CA3	150
3	0	2	4	60	25	15	30	20	

CA1: Continuous Assessment (assignments/projects/open book tests/closed book tests **CA2:** Sincerity in attending classes/class tests/ timely submissions of assignments/self-learning attitude/solving advanced problems **TEE:** Term End Examination **TEP:** Term End Practical Exam (Performance and viva on practical skills learned in course) **CA3:** Regular submission of Lab work/Quality of work submitted/Active participation in lab sessions/viva on practical skills learned in course

Content:

Sr. No.	Topics	Teaching Hrs.	Module Weightage
1.	**Basics of Environmental Pollution:** Introduction of pollution and pollutants, Classify pollutants & pollution, Types of pollution and pollutants, Identify Sources of Pollution, Sources of air, water, noise, radioactive and land pollution, Effects of air, water, noise, radioactive and land pollution, Control of air, water and noise pollution.	14	30%
2.	**Waste Reduction**: Methods of volume reduction, Strength reduction, Neutralization, Equalization and proportioning as related to Industrial waste treatment.	6	15%
3.	**Solid & Hazardous Waste Management**: solid waste, Classification of Solid waste, Generation and collection of solid waste, Methods of solid waste disposal: Open Dumping Sanitary Land filling, Incineration, Compositing, Reuse, recovery and recycling. Hazardous Waste: Definition, Identification and Classification of Hazardous Solid Waste, Hazardous Waste Management: Waste Minimization, Waste Exchange, Recycling.	10	20%

PEC-I: Professional Elective Course -I

4.	**Biomedical Waste Management**: Sources, Generation, Storage, Transportation, Disposal, Waste Treatment: Disinfection, Irradiation, Incineration	5	10%
5.	**Pollution Control in Industries:** Origin, Characteristics and Treatment of major Industrial waste -Textile mill waste, Dairy waste, Sugar mill waste, fertilizer plant waste, pulp & paper Tannery waste, petrochemical Complex Wastes, Pharmaceutical wastes, CETP	10	25%

Suggested Specification table with Marks (Theory/Practical):

% Distribution of Marks					
R Level	**U Level**	**A Level**	**N Level**	**E Level**	**C Level**
25	**15**	**15**	**10**	**15**	**20**

Legends: R: Remembrance, **U:** Understanding; **A:** Application, **N:** Analyze, **E:** Evaluate **C:** Create and above Levels **(Revised Bloom's Taxonomy)**

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Reference Text Books:

Sr. No.	**Title of book /article**	**Author(s)**	**Publisher and details like ISBN**	**Year of publication**	**Publication Edition**
1	Environmental Pollution Control Engineering	C.S.Rao	New Age International Publishers ISBN 13-978-9386649898	2018	3rd
2	Handbook of Industrial Pollution & Control Vol. I & II	S.C. Bhatiya	CBS PUBLISHERS & distributions ISBN: 978-8123908069	2002	1st
3	Wastewater Treatment	M.N. Rao & A.K. Datta.	Oxford & IBH Publishing Co Pvt.Ltd ISBN: 9788120417120	2017	3rd
4	Industrial water pollution	W. Wesley Eckenfelder	Mcgraw-Hill International edition ISBN: 978-9339220433	2017	-

PEC-I: Professional Elective Course -I

5	Integrated Solid Waste Management : Engineering Principles and Management	George Tchobanoglous,	McGraw-Hill Publication ISBN: 9339205243	2014	1st
6	Solid and Hazardous Waste Management	M. N. Rao, Razia Sultana	BS Publication ISBN:978-0070195523	2020	2nd
7	Pollution Control in Process Industries	Mahajan S. P.	Tata Mc GrawHill, New Delhi, 21st reprint	2008	-

Course Outcome:

Sr. No.	CO Statement After learning this subject, students will be able to	Marks % weightage
CO-1	Recognize, define and describe the quality parameters typically used to characterize industrial wastewater*(R, U, N… Cognitive level)*	15
CO-2	Designs operate and optimize conventional and advanced water and wastewater treatment*(R, U, A, N, C… Cognitive level)*	20
CO-3	Describe and review various methods of waste Reduction*(R, U, C… Cognitive level)*	15
CO-4	Review about types of pollution, its sources, effects and control methodology and thereby environmental protection. *(R, U… Cognitive level)*	25
CO-5	Evaluate collection and transportation systems, treatment techniques and disposal methods of Different waste*(R, U, A, N, E… Cognitive level)*	25

Mapping with POs:

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO-1	-	-	-	-	-	2	2	1	-	-	1	-	1	-	1
CO-2	1	1	1	2	2	1	1	-	1	-	-	1	1	-	2
CO-3	-	-	-	-	-	-	2	1	-	1	-	-	1	2	-
CO-4	1	-	-	-	-	2	2	1	-	1	-	-	1	-	1
CO-5	-	-	1	1	-	-	1	-	1	1	-	-	-	2	3
Rationale*	**2**	**1**	**2**	**3**	**2**	**5**	**8**	**3**	**2**	**3**	**1**	**1**	**4**	**4**	**7**

Rationale*:
All CO's are compatible and matching to the derived POs to several extents. This course is intended to familiarize students with the concepts of various traditional and modern pollution control methods along with identifying various pollutants.

PEC-I: Professional Elective Course -I

LIST OF PRACTICALS:

1. Characterization of municipal solid waste (physical and chemical). Survey your locality and based on it suggest methods of solid waste collection.
2. Collection field data of one industry in detail related to its water requirement and waste water generation and treatment facility with the industry.
3. Preparation of charts of major Industrial water needs and waste water generation streams.
4. Treatability study of an industrial effluent.
5. Determination of Optimum Coagulant dose.

Major Equipment:

- BOD incubator
- COD Apparatus
- Jar test Apparatus
- Digital DO meter
- Top Loading Electronic balance