 <p><b>NAGARJUNA</b> COLLEGE OF ENGINEERING &amp; TECHNOLOGY</p>	<p>NBA Accredited *</p> <p>NACC Accredited with “A” grade (An ISO 9001 – 2008 Certified Institution)</p> <p>Affiliated to Visvesvaraya Technological University (VTU)</p> <p>Recognized by Govt. of Karnataka &amp; Approved by A.I.C.T.E. New Delhi</p>
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Course No. : 17CVT743	Dept.: Civil
Course Title : Industrial Wastewater Treatment	Semester: 7 <sup>th</sup>
Instructor-in-charge :	Academic Year: 2020-21
Lab. Instructor :	

### Subject Description

This course covers the classification of industrial wastewater and the strategies of wastewater treatment to meet trade effluent standards and resource recovery; it also covers characteristics and treatment methodology of various industries.

### Text Books:


- T1. S. K Garg: “Sewage Disposal and Air pollution Engineering, Khanna Publication, New Delhi, ISBN – 978-8174092304.
- T2. Nelson L Nemerow: “Liquid Waste of industry, Theories, Practices and Treatment”, Addison-Wesley, 1<sup>st</sup> Edition, 1971, ISBN-13: 978-0201052640.
- T3. Rao M N, Dutta A.K: “Wastewater treatment”, 3<sup>rd</sup> Edition, Oxford and IBH Publications Pvt. Ltd., New Delhi, 2008, ISBN: 978-8120417120.

### Reference Books:

- R1. Mahajan S P.: “Pollution control in Process Industries”, Tata McGraw Hill Company, New Delhi, 1985, ISBN: 9780074517727
- R2. Eckenfelder: “Industrial Water pollution Control”, McGraw Hill Company, New Delhi American Chemical Society, Washington D.C., USA, 2000, ISBN: 9789339220433

### PREREQUISITES

<p>1. Environmental Engineering</p> <p>2. Water Supply Engineering</p> <p><i>A good understanding of the above topics is essential</i></p>	<p>Self study/ Online/</p>	<p>Referral Document</p> <p>1. <a href="https://www.youtube.com/watch?v=zVZ9c6EXfTA">https://www.youtube.com/watch?v=zVZ9c6EXfTA</a></p> <p>2. Environmental Engineering by-S K Garg</p>	<p>Remarks</p>
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## LECTURE PLAN

Topic	Topic Details	Number of Lectures	Cumulative lecture hrs.	Module/Chapter Reference
Overview	Introduction	1	1	
Module 1	Industrial activity and Environment	1	2	T1:Page No. 153-227
Industrial Scenario in India	Uses of Water by Industry	1	3	T2: Page No.1-25
	Difference between domestic and industrial wastewater	1	4	
	Parameters of pollution and their effects receiving streams	1	5	
	Classification of streams	1	6	
	Self - purification of streams, Oxygen sag curve – Derivation of streeter – phelps equation	1	7	
Revision		1	8	
Module 2	Introduction to Environmental Standards	1	9	T1: Page No. 436 – 440
Environmental Standards For Industrial Effluent	Effluent sampling	1	10	
	Grab and composite sampling	1	11	
	Treatment methods of industrial effluent	1	12	
	Pretreatment of waste, Equalization of Wastewater	1	13	
	Neutralization – Flotation, Volume reduction and strength reduction.	1	14	
Revision		1	15	
Assignment	Quiz	1	16	
Module 3	Introduction to Secondary treatment of industrial effluents	1	17	T1: Page No.230 – 298
Secondary Treatment of Wastewater	Design of an aeration unit	1	18	T2: Page No.135 - 160
	Design of a trickling filter	1	19	
	Design of an oxidation pond	1	20	


\*CV, ME, ECE & ISE departments were accredited by NBA for 3 years



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	Introduction and feasibility of combined treatment, Municipal waste and industrial waste	1	21	
	Volume ratio -Rental charges, Volume ratio - Rental charges and economics.	1	22	
Revision		1	23	
Module 4	Manufacturing process flow sheet	1	24	T1: Page No.445 – 456
Treatment of wastewater in different industries	Different Sources of Water	1	25	T2: Page No.237 – 265
	Characteristics of waste, Effects of untreated waste on land, Effects of untreated	1	26	
	waste on streams,	1	27	
	Treatment of textile mill wastewater	1	28	
	Treatment of Dairy wastewater,	1	29	
	Treatment of sugar mill wastewater		30	
Revision		1	31	
Assignment	AAT 2 -Test	1	32	
Module 5	Introduction to Manufacturing process in various Industries	1	33	T1:Page No. 445 –456
Treatment and Manufacturing Process in Different industries	Flow sheet of different industries	1	34	T2: Page No.193 – 215
	Characteristics of waste	1	35	
	Different Sources of Water	1	36	
	Effects of untreated waste on streams, Treatment of food processing industrial wastewater	1	37	
	Treatment of Paper and Pulp industrial wastewater, Treatment of Distillery wastewater	1	38	
Revision		1	39	
Future scope of learning	Application of IWWT	1	40	

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Evaluation Scheme:

Component	Duration	Weightage	Date (Time)
CIE 1	90 min	20%	29-9-2020
CIE 2	90 min	20%	7-10-2020
AIT 1	2 days	5%	24-9-2020
AIT 2	2 days	5%	4-10-2020
Make up CIE	90 min	20%	26-11-2020
SEE	180 min	50%	
Make up SEE	180 min	50%	
	Total	100%	

Course-in-charge

Chaitra D.H