FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
DEPARTMENT OF INDUSTRIAL CHEMISTRY
COURSE CURRICULUM

PART-A: Introduction				
Program: Bachelor in Science *(Certificate / Diploma / Degree/Honors)*			**Semester - II/IV/V/VI**	Session: **2024-2025**
1	**Course Code**	**ICSEC**		
2	**Course Title**	**WATER REMEDIATION AND CONSERVATION STUDIES THEORY AND PRACTICAL**		
3	**Course Type**	**SEC**		
4	**Pre-requisite**(if,any)	*As per program*		
5	**Course Learning. Outcomes(CLO)**	➢ *Understand about Sources and Effect of Water Pollution.* ➢ *Learn about various control techniques.* ➢ *Learn and develop different approaches for water conservation.* ➢ *To execute case study/project on environmental pollution & conservation*		
6	**Credit Value**	**2 Credits (1C + 1C)**	*Credit = 15 Hours –Theoretical learning and = 30 Hours Laboratory or Field learning/Training*	
7	**Total Marks**	**Max.Marks:50**		**Min Passing Marks:20**

PART -B: Content of the Course

Total No. of Teaching–learning Periods:
Theory–15 Periods (15 Hrs) and Lab. or Field learning/Training 30 Periods (30 Hours)

Module	Topics(Course contents)	No.of Period
Theory Contents	**Water Pollution** Sources of water pollutants, pollutants, Industrial and human contribution, WHO recommendation about potable water, current scenario of drinking water quality. **Remediation Techniques** Remediation, techniques involved such as adsorption, coagulation-filtration,Nalgonda techniques, reverse osmosis, activated charcoal detoxification, mechanisms of detoxification, bioremediation, need of green chemistry, future scope. **Water Conservation** Introduction to water conservation and erosion of soil, forms of water erosion, factors affecting water erosion, types of water erosion, mechanics of water erosion control.	**15**
Lab./Field Training Contents	Water analysis (pH, Conductivity, hardness, Acidity, Alkalinity etc.). **Case study/Project** Case study/Project on water pollution, water conservation and water quality.	**30**
Keywords	***Water, pollution, remediation techniques, water conservation, pH, hardness, acidity, alkalinity, conductivity, case study, project, water quality.***	

Signature of Convener & Members (CBoS):

PART–C:Learning Resources

Text Books, Reference Books and Others

Text Books Recommended–

1. *Dara, S. S., & Mishra, D. D. (2006). A textbook of environmental chemistry and pollution control. S. Chand Publishing.*
2. *Birdie, G. S. (2020). Water supply and sanitary engineering (10th ed.). Dhanpat Rai Publishing Company.*

Reference Books Recommended–

1. *Crittenden, J. C., Trussell, R. R., Hand, D. W., Howe, K. J., & Tchobanoglous, G. (2022). Stantec's Water Treatment: Principles and Design. John Wiley & Sons.*
2. *DE, A. K. (1990). Environmental Chemistry. Boca Raton, FL: CRC Press.*
3. *Edzwald, J. K. (2011). Water quality & treatment: a handbook on drinking water. New York, NY: American Water Works Association.*

Online Resources-
e-Resources / e-books and e-learning portals

- https://tmv.ac.in/ematerial/chemistry/kkr/SEM-6%20Hons-Green%20Chemistry.pdf
- https://www.ncbi.nlm.nih.gov/books/NBK83730/
- https://www.mdpi.com/2227-9717/11/12/3270
- https://www.epa.gov/waterutilityresponse/basics-water-remediation
- https://www.embibe.com/exams/conservation-of-water/

Online Resources–

- **e-Resources / e-books and e-learning portals**

PART-D:Assessment andEvaluation

Suggested Continuous Evaluation Methods:
Maximum Marks: 50 Marks
Continuous Internal Assessment(CIA):15 Marks
End Semester Exam(ESE):35Marks

Continuous Internal Assessment(CIA): **(By Course Coordinator)**	Internal Test / Quiz-(2): **10 &10** Assignment/Seminar +Attendance- **05** Total Marks -**15**	Better marks out of the two Test / Quiz +obtained marks in Assignment shall be considered against **15** Marks
End Semester Exam (ESE):	**Laboratory / Field Skill Performance: On spot Assessment** **A. Performed the Task based on learned skill - 20 Marks** **B. Spotting based on tools (written) – 10 Marks** **C. Viva-voce (based on principle/technology) - 05 Marks**	**Managed by Coordinator as per skilling**

Name and Signature of Convener & Members of CBoS: