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

PART-A: Introduction				
Program:Bachelor in Science *(Honors/Honors with Research)*		**Semester -VII**		Session: **2024-2025**
1	**CourseCode**	**ICSC-07T**		
2	**CourseTitle**	**ENVIRONMENTAL POLLUTION ANALYSIS**		
3	**CourseType**	**DSC**		
4	**Pre-requisite(if,any)**	***As per program***		
5	**Course Learning. Outcomes(CLO)**	➢ *To Determine the air pollutants* ➢ *To learn physical, chemical and biological water quality parameters* ➢ *To analyses the soil composition* ➢ *To determine the heavy metals.*		
6	**CreditValue**	**3 Credits**	***Credit = 15 Hours -learning & Observation***	
7	**TotalMarks**	**Max.Marks: 100**		**Min Passing Marks:40**

PART -B: Content oftheCourse

TotalNo.of Teaching–learning Periods(01 Hr. per period) - 45 Periods (45 Hours)

Unit	Topics(Coursecontents)	No.ofPeriod
I	**Air pollutants:** CO, CO_2, ozone, CFC, & NOx, ozone depletion, global warming Harmful effects of pollutants on living and non-living species, Analytical methods fo monitoring air pollutants, international and national standards.	12
II	**Physical, chemical and biological water quality parameters**; their assessment; Water pollution; water pollutants; toxicity aspects; international and national standards; control; Water sampling techniques; Water treatment processes: aeration, solid purification, nanofiltration, chemical treatments, reverses osmosis, desalination. Waste water treatment processes. Water table maintenance & harvesting methods.	11
III	**Composition of soil**: inorganic and organic components, micro and macronutrients; Soil pollution; Fertilizers, insecticides, pesticides, plastics, toxic metals, dyes, surfactants; toxicity aspects; international and national standards; control.	11
IV	**Heavy metal in the environment**; Sources of heavy metals; Poisoning of heavy metals in every bite; Mercury, Copper, Chromium, Cadmium, Cobalt, Lead, Arsenic. **Industrial waste**; toxic aspects, management and disposal; Radioactive, municipal, agricultural and biomedical waste – toxicity hazards. Bhopal gas tragedy, Chernobyl disaster.	11
Keywords	***Gaseous Pollutants, Analytical Methods, Water Quality Parameters, Composition, Environment, Heavy Metals, Industrial Waste***	

SignatureofConvener&Members (CBoS):

PART–C:Learning Resources

Text Books, Reference Books and Others

Text Books Recommended –

1. *Jain, S.K. (2012). Chemical Kinetics. Vishal Publication.*
2. *Sharma, B.K. (2005). Industrial Analysis. Gael Publication.*
3. *Shah, R.K., Vora, J.C., Vora, K.P., & Shah, R.S. (2015). Principles of Analytical Chemistry: Elsevier.*

Reference Books Recommended –

1. *Smith, J.M. (1981). Chemical Engineering Kinetics. McGraw Hill Book Co.*
2. *Parsania, P.H. (2011). Physico-Chemical Exercise: Nirali Prakashan.*

Online Resources–

- **https://swayam.gov.in/course/11228-air-water-and-soil-pollution**
- **https://nptel.ac.in/courses/105/105/105105176/**
- **http://cpcb.nic.in/**
- **https://www.neeri.res.in/**
- **https://www.epa.gov/**
- **https://www.who.int/airpollution/en/**

Online Resources–

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

PART-D:Assessment andEvaluation

Suggested Continuous Evaluation Methods:
MaximumMarks: 100 Marks
ContinuousInternal Assessment(CIA):30 Marks
EndSemesterExam(ESE):70 Marks

Continuous InternalAssessment (CIA): (By Course Teacher)	Internal Test / Quiz-(2): **20** Assignment/Seminar- **10** Total Marks -**30**	Better marks out of the two Test / Quiz+ obtained marks in Assignment shall be considered against **30** Marks
End Semester Exam (ESE):	**Two section – A & B** Section A: **Q1**. Objective – **10 x1= 10** Mark; **Q2**. Short answer type- **5x4 =20Marks** Section B: Descriptive answer type qts.,**1out of 2** from each unit- **4x10=40Marks**	

Name and Signature of Convener & Members of CBoS:

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

PART-A: Introduction				
Program:Bachelor in Science *(Honors/Honors with Research)*			**Semester - VII**	Session: **2024-2025**
1	**Course Code**	**ICSC-07P**		
2	**Course Title**	**INDUSTRIAL CHEEM. LAB. COURSE-VII**		
3	**Course Type**	**DSC**		
4	**Pre-requisite**(if,any)	***As per program***		
5	**Course Learning. Outcomes(CLO)**	➢ *To determine the air pollutants.* ➢ *To determine the heavy metals contaminants in water and soil.* ➢ *To analyze techniques of removal of heavy metals from hazardous waste* ➢ *To learn colorimetric method and Winkler methods.*		
6	**Credit Value**	**1 Credits**	***Credit =30 Hours Laboratory or Field learning/Training***	
7	**Total Marks**	**Max.Marks:50**		**Min Passing Marks:20**

PART -B: Content oftheCourse		
TotalNo.of learning-Training/performancePeriods:30 Periods (30 Hours)		
Module	**Topics(Coursecontents)**	**No.ofPeriod**
Lab./Field Training/ Experiment Contents of Course	1. Determination of Henry's Law Constants. 2. Determination of an Ion Balance for a Water Sample. 3. Measuring the Concentration of Chlorinated Pesticides in Water Samples 4. Determination of nitrite in a water sample by colorimetric method. 5. Precipitation of Metals from Hazardous Waste 6. Determination of Dissolved Oxygen in Water Using the Winkler Method	**30**
Keywords	***Water Sample, Heavy Metals, Determination, Colorimetric method, Analytical Methods***	

Signature of Convener & Members (CBoS):

PART–C:Learning Resources

Text Books, Reference Books and Others

Text Books Recommended –

1. *Ahluwalia, V. K., and Sharma, R. (2010). Comprehensive Practical Organic Chemistry. Universities Press.*

Reference Books Recommended-

1. *Svehla, G. (1979). Inorganic Qualitative Analysis. Vogel.*
2. *Svehla, G. (1989). Organic Preparation. Vogel.*
3. *Mann, J. B., and Saunders, B. C. (1949). Organic Qualitative Analysis. Longmans, Green and Co.*

Online Resources–

- **https://www.epa.gov/sites/production/files/2015-05/documents/henryslawconstant_table.pdf**
- **https://www.epa.gov/sites/production/files/2015-05/documents/ionbalance_table.pdf**
- **https://www.epa.gov/sites/production/files/2021-05/documents/sw-846-update-vi-2019_edition_method-8081b.pdf**
- **https://www.epa.gov/sites/production/files/2015-07/documents/astm_d3867-04.pdf**
- **https://www.epa.gov/sites/production/files/2015-05/documents/precipitation_table.pdf**
- **https://www.epa.gov/sites/production/files/2015-05/documents/winkler_table.pdf**

Online Resources–

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

PART-D:Assessment andEvaluation

Suggested Continuous Evaluation Methods:
MaximumMarks: 50 Marks
ContinuousInternal Assessment(CIA):15 Marks
EndSemesterExam(ESE):35Marks

Continuous InternalAssessment(CIA): **(By Course Teacher)**	Internal Test / Quiz-(2): **10 &10** Assignment/Seminar +Attendance- **05** Total Marks -**15**	Better marks out of thetwo Test / Quiz +obtained marks in Assignment shall be considered against **15** Marks

End Semester Exam (ESE):	**Laboratory / Field Skill Performance: On spot Assessment** **P. Performed the Task based on lab. work - 20 Marks** **Q. Spotting based on tools& technology (written) – 10 Marks** **R. Viva-voce (based on principle/technology) - 05 Marks**	**Managed by Course teacher as per lab. status**

Name and Signature of Convener & Members of CBoS: