

Syllabus

B.Tech. Second Year

Semester A & B

Subject : Environmental Chemistry



Department of Chemistry
Shri G S. Institute of Technology and Science, Indore (MP)

Program Outcomes (POs):

POs describe what students should know and be able to do at the end of the programme. POs are to be in line with the graduate attributes as specified in the Washington Accord. POs are to be specific, measurable and achievable. NBA has defined 12 POs.

Graduates will be able to achieve:

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, & an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis:** Identify, formulate, review research literature, & analyze complex engineering problems reaching substantiated conclusions using 1st principles of math., natural sciences,& eng, sciences.
3. **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems:** Use research-based knowledge & research methods including design of experiments, analysis & interpretation of data, & synthesis of the information to provide valid conclusions.
5. **Modern tool usage:** Create, select,& apply appropriate techniques, resources,& modern engineering & IT tools including prediction & modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment & sustainability:** Understand the impact of the professional engineering solutions in societal & environmental contexts,& demonstrate the knowledge of, & need for sustainable development.
8. **Ethics:** Apply ethical principles & commit to professional ethics & responsibilities and norms of the engineering practice.
9. **Individual & team work:** Function effectively as an individual, & as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication:** Communicate effectively on complex engineering activities with the engineering community & with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give & receive clear instructions.
11. **Project management and finance:** Demonstrate knowledge & understanding of the engineering & management principles & apply these to one's own work, as a member & leader in a team, to manage projects & in multidisciplinary environments.
12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

**B.Tech. II Year
Semester- A & B
Environmental Science**

Period/week			Credits			Maximum marks				
T	P	Tu	T	P	Tu	Theory		Practical		Total Marks
						CW	End Sem	SW	End Sem	
2	-	-	-	-	-	50	-	-	-	50

Course Outcomes (COs): For Theory Course

Course outcomes are the statements of what a student should know, understand and/or be able to demonstrate after completion of a course.

The course will enable student to:

- CO1** Analyze the causes of pollution in our environment.
- CO2** Explain the effects of air pollution on environment and suggest ways to reduce them.
- CO3** Develop in depth knowledge about water Quality parameters and its estimation.
- CO4** Develop knowledge on soil and noise pollution & related parameters.
- CO5** Understand the Ethics and Evaluate policies of climate change mitigation Strategies and Create a knowledge base for global and national Action.

Pre-requisite: Knowledge of basics of science studied in Class XI and XII.

Course Objectives: This course aims at imparting knowledge of the environmental science to the students for making them understand about environment and ecosystems. To study about different types of natural resource and causes, effect and control of different type of environmental pollution.

Course Outcomes: The course will enable student to understand:

- Specifications, testing and treatment of water for industrial and domestic use.
- Fundamentals of classical and alternative fuels.
- Concepts, manufacturing and applications of different types of industrially important materials and their maintenance.
- Applications of spectral and analytical techniques in qualitative and quantitative analyses.
- The students will understand the Ethics behind applying Chemical Methods in Industries and day-to-day use.

Contents:

UNIT-I

From: BOS, Chemistry

To: Academic Council

Environment: General Studies:

- a) Introduction, segments of environment, Energy flow in environment, Composition and structure of atmosphere. Chemical Species and particulates in atmosphere. Reaction and Phenomena occurring in atmosphere.
- b) Man and Environment

UNIT-II

AIR Pollution

- a) Air pollution: Sources and effects, particulate control, control of gaseous pollutants (SO_x, NO_x, oxides of carbon, hydrocarbon pollutants), Air Quality standards and Management.
- b) Case studies

UNIT-III

Water Pollution

- a) Water Pollution: Types of water pollution, sources, water pollution control. Waste water treatment technologies and Recycle.
- b) Case studies.

UNIT-IV

Soil and Noise Pollution

- a) Soil Pollution: Introduction, sources/causes, effects and control.
- b) Noise Pollution: Introduction, sources/causes, effects and control, noise measuring instruments and noise pollution control technology.

UNIT-V

Environment, Society and Ethics

- a) Society and Environment, Solid waste-types, impact on society, solid waste management, specific applications to solid waste management.
- b) Environmental Ethics: Need and Types, Regulations: ISO 14000, 9000, pollution Acts and Regulations. Environmental Auditing

Assessment (Theory): Attendance, Quiz, case study, class assignments and presentation

Books & References Recommended:

Text Books

1. S.C. Bhatia, "Environmental Pollution and control in chemical process industries", Khanna Publishers, 1st edition, 2001.
2. C.S.Rao, "Environmental Pollution Control Engineering", Wiley Eastern, 1992.

Reference Books

1. S.P.Mahajan, Pollution control in Process Industries, Tata McGraw Hill, 1990.
2. F. P. Lees, Loss prevention in process industries, 2nd edition., Butter worth Heinemann, 1996.
3. Martin Crawford, Pollution Control Theory, McGraw Hill, 1976.
4. Marell, "Solid Wastes", John Wiley, 1975.