



Bajaj College of Science, Wardha (Autonomous)
Department of Chemistry

In Association with

St. Xavier's College (Autonomous), Mumbai

Organizes



Skill based Certificate Course in
“INDUSTRIAL WASTEWATER MANAGEMENT”
Course Code: CC-IWWM

Specifications of Course:

A) Nature	- Certificate Course
B) Duration	- 60 hrs
C) No. of Students to be admitted	- 50

I. COURSE OVERVIEW:

This course provides an understanding of various processes involved in the treatment of wastewater generated due to the anthropogenic activities prior to its discharge into the environment or its re-use. This course aids to understand various terminologies used in industrial wastewater treatment and to acquaint with different stages involved in treatment of industrial wastewater.

II. PREREQUISITE(S): UG/PG

III. COURSE OBJECTIVES:

The objective of the course is to impart knowledge and skills to the learner to:

1. Distinguish between the quality of domestic and industrial water requirements.
2. Understand the industrial process, water utilization and wastewater generation.
3. Impart knowledge on selection of treatment methods for industrial wastewater.
4. Gain knowledge on different techniques and methods for minimizing the generation.
5. Application of Physicochemical and biological treatment methods for recovery, reuse and disposal of industrial wastewater.

IV. COURSE OUTCOMES:

After completion of this course, the student will be able to demonstrate the knowledge and will have the ability to:

1. Identify environmental standards that apply to both direct and indirect industrial discharges.
2. Develop an overall treatment strategy for an industrial waste stream.
3. Specify design criteria for physical, chemical, and biological unit operations and processes necessary to treat an industrial wastewater.
4. Define and reason about fundamental concepts of wastewater treatment.
5. Design, conduct experiments and the ability to analyse the wastewater quality.

6. Select the most appropriate technique to control and treat industrial pollution.
7. Enhanced skills of the students will increase their employability in the related industries.

SYLLABUS

INDUSTRIAL WASTEWATER MANAGEMENT

Unit-I (8 hrs)

Types of industries and industrial pollution, Characteristics of industrial wastes, Difference between industrial and municipal waste waters, effects of industrial effluents on streams, sewer, land, sewage treatment plants and human health.

Environmental legislations related to prevention and control of industrial effluents and hazardous wastes

Unit-II (8 hrs)

Treatment of Industrial Effluents-Pre and Primary Treatment – Equalization, Proportioning, Neutralization, Oil Separation by floatation, Secondary Treatment and Tertiary Treatment.

Unit-III (8 hrs)

Waste Reduction Alternatives– Classification of wastes, waste Reduction – Volume Reduction – Strength Reduction, Zero effluent discharge

Unit-IV (8 hrs)

Waste Treatment Methods – Nitrification and De-nitrification process – phosphorous removal – Heavy Metal removal – Membrane Technologies, Photodegradation of dyes.

Unit-V (8 hrs)

Waste water Disposal Methods- Disposal of treated Waste Water, Standards of Dilution for Discharge of Wastewater Into Rivers, Types Of Receiving Waters For Dilution.

Unit-VI (8 hrs)

Characteristics and Composition of selected industries such as Sugar, Dairy, Pulp and Paper, Steel, Textile, Tannery, Fertilizer.

Textbooks:

1. Metcalf & Eddy, "Wastewater engineering Treatment disposal reuse", Tata McGraw Hill.
2. Eckenfelder, W.W., "Industrial Water Pollution Control", McGraw-Hill.

Reference Books:

1. M.N. Rao and Dutta – Industrial Waste.
2. Mark J. Hammer, Mark J. Hammer, Jr., "Water & Wastewater Technology", Prentice Hall of India.
3. N.L. Nemerrow – Theories and practices of Industrial Waste Engineering.
4. C.G. Gurnham – Principles of Industrial Waste Engineering.

Practical Syllabus

(12 hrs)

1. a) Determination of physical properties of wastewater: colour, turbidity, conductance and pH of water.
b) Determination of dissolved oxygen (DO) of water.
c) Determination of Biological Oxygen Demand (BOD) of water.
d) Determination of Chemical Oxygen Demand (COD) of water.
2. a) Determination of phenols in water colorimetrically.
b) Determination of Cl^- , PO_4^{3-} and SO_4^{2-} content in water samples.
c) Determination of Nitrite & nitrate content in water samples.
3. a) Determination of Ni (II) and Cu (II) in solution spectrophotometrically.
b) Determination of Silica in water sample.
c) Determination of sodium and potassium by flame photometric techniques.
4. a) Qualitative and quantitative determination of hardness and alkalinity of water.
5. a) Determination of suspended solids (ss), total dissolved solids (TDS) and total suspended solids (TSS) in water.

Project Work/Excursion/Field visit

Project is a part of practical examination. Project should be carried out by the student under the supervision of Guide/Teacher. The examination shall be conducted by External and Internal Examiners. Students are supposed to present their work through seminar.

Mode of Teaching:

The theory lectures and practical sessions of the course will be conducted via Online mode i.e. Pre-recorded video lectures and/or online lectures.

Course Coordinator

Dr. M. A. Haque
BCS, Wardha

Course Facilitator

Dr. P. V. Tekade
BCS, Wardha