

LESSON PLAN

Name of the Faculty: Dr. Sushma

Discipline: M.Sc. Environmental Science

Semester: Third

Subject: Industrial Water and Wastewater Treatment

Lesson plan duration: 12 weeks

| Week | Theory | |
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| | Lecture day | Topic |
| 1 | 1. | Types of industrial wastewater pollutants, |
| | 2. | Industrial wastewater characterization, |
| | 3. | Classification of industries into green, orange and red, |
| | 4. | Standards of disposal for industrial wastes, MINAS, |
| 2 | 5. | Industrial Estate planning, CETP |
| | 6. | Requirement and objectives of CETP, |
| | 7. | Planning and management of CETP facilities for small-scale industries. |
| | 8. | General steps for the treatment of industrial wastewater: equalization, neutralization, |
| 3 | 9. | Sedimentation, |
| | 10. | Oil Separation, |
| | 11. | Flotation, |
| | 12. | Coagulation |
| 4 | 13. | Biological oxidation - removal of organics: sorption |
| | 14. | Stripping |
| | 15. | Biodegradation |
| | 16. | Nutrient removal – nitrification, |
| 5 | 17. | denitrification, |
| | 18. | ANAMMOX, |
| | 19. | SHARON, |
| | 20. | CANON process; |
| 6 | 21. | Biological phosphate removal (BPR); |
| | 22. | Fundamentals of Membrane processes; |
| | 23. | Types and classification of membranes; |
| | 24. | Advanced oxidation process and its application for wastewater treatment |
| 7 | 25. | Photocatalysis, |
| | 26. | ozonation |
| | 27. | High Rate Technologies for industrial wastewater Treatment: Bioreactors for wastewater treatment - |
| | 28. | Membrane bioreactors (MBR) |
| 8. | 29. | Moving Bed Biological Reactors (MBBR) |
| | 30. | Anaerobic Baffled Reactor (ABR) |
| | 31. | Natural systems for the management of Industrial wastewater |
| | 32. | Constructed Wetland |

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| 9. | 33. | Duckweed ponds |
| | 34. | Reed Bed system |
| | 35. | Waste stabilization ponds |
| | 36. | Others; Energy recovery from wastewater; |
| 10 | 37. | Sludge management. |
| | 38. | Zero liquid discharge concept in Industries. |
| | 39. | Manufacturing process, |
| | 40. | Waste/emission generation sources, |
| 11 | 41. | Waste characteristics, Effluent Treatment, reuse and recovery of resources from (1) Textile Industries |
| | 42. | (2) Distilleries |
| | 43. | (3) Sugar |
| | 44. | (4) Paper and Pulp mills |
| 12 | 45. | (5) Tanneries |
| | 46. | (6) Food Processing industries |
| | 47. | (7) Fertilizer Industry |
| | 48. | (8) Mining industries |
| | 49. | (9) Petroleum industries |