**Techno India NJR Institute of Technology**



Course File

**Environmental Engineering**

(Subject Code: 6CE4-03)

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**Department of CE**

Text

Description automatically generated **Course Overview:**

Student will learn basics of EVS from this 42-hour course. They will be able to perform operations such as insertion, deal with the protection of people from the effects of adverse environmental effects such as pollution. You will also work on improving the quality of the environment, recycling, waste disposal, public health as well as water and air pollution control. The main areas of environmental engineering include air pollution control, industrial hygiene, radiation protection, hazardous waste management, toxic materials control, recycling, water supply, wastewater management, storm water management, solid waste disposal, public health and land management.

**Course Outcomes:**

|  |  |  |
| --- | --- | --- |
| **CO. NO.** | **Cognitive Level** | **Course Outcome** |
| 1 | Analysis | Understand demand for water supply to households, industry and public services. |
| 2 | Application | Understand source of water and their quality parameter. |
| 3 | Design | Analyse the process of preliminary treatment of water and their transmission. |
| 4 | Design | Analyse the process of advanced treatment of water. |
| 5 | Synthesis | Understand the basic knowledge of water distribution and plumbing system in building. |

**Prerequisites:**

1. Analyse characteristics of water and wastewater

2. Calculate the quantity of drinking water and domestic wastewater generated

3. Illustrate the several types of water demands

4. Demonstrate an integrative approach to environmental issues with a

focus on sustainability

**Course Outcome Mapping with Program Outcome:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **ENVIRONMENTAL ENGINEERING** | | | | | | | | | | | | | | | |
| **Course Outcome** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| **CO363.1** | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 2 | 1 | 1 | 1 | 2 | 2 | 1 |
| **CO363.2** | 3 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 2 | 1 | 2 | 2 | 2 | 1 | 1 |
| **CO363.3** | 3 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 2 | 1 | 2 | 2 | 2 | 1 | 1 |
| **CO363.4** | 2 | 2 | 3 | 3 | 2 | 1 | 3 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 1 |
| **CO363.5** | 2 | 2 | 2 | 3 | 1 | 1 | 2 | 1 | 1 | 2 | 1 | 2 | 2 | 2 | 1 |
| **CO363 (AVG)** | 2.6 | 2 | 2.2 | 2.4 | 1.8 | 1.6 | 1.8 | 1 | 1.6 | 1.2 | 1.4 | 1.8 | 2 | 1.6 | 1 |

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| --- | --- | --- |
| Lecture No. | Unit | Topic |
| 1 | **1** | **INTRODUCTION:** Objective, scope and outcome of the course |
| 2 | **2** | **WATER:** Sources of Water and quality issues |
| 3 | 2 | Student Should be able to write about Water quality requirement for different beneficial uses |
| 4 | 2 | Student Should be able to write about Water quality standards, water quality indices |
| 5 | 2 | Student Should be able to write about Water quality standards, water quality indices |
| 6 | 2 | Student Should be able to write about Water Supply systems, Need for planned water supply schemes |
| 7 | 2 | Student Should be able to write about Water Supply systems, Need for planned water supply schemes |
| 8 | 2 | Student Should be able to write about Water demand industrial and agricultural water requirements |
| 9 | 2 | Student Should be able to write about Components of water supply system; Transmission of water, Distribution system. |
| 10 | 2 | Student Should be able to write about (Contd.) Components of water supply system |
| 11 | 2 | Student Should be able to write about Various valves used in W/S systems, service reservoirs and design. |

|  |  |  |
| --- | --- | --- |
| 12 | 2 | Student Should be able to write about Water Treatment: Aeration, sedimentation |
| 13 | 2 | Student Should be able to write about Coagulation flocculation, |
| 14 | 2 | Student Should be able to write about Filtration. |
| 15 | 2 | Student Should be able to write about Disinfection |
| 16 | 2 | Student Should be able to write about Advanced treatments like adsorption, ion exchange, membrane processes |
| 17 | **3** | **SEWAGE:** Domestic and Storm water, Quantity of Sewage |
| 18 | 3 | Student Should be able to write about Sewage flow variations. Conveyance of sewage- Sewers |
| 19 | 3 | Student Should be able to write about Shapes design parameters, operation and maintenance of sewers |
| 20 | 3 | Student Should be able to write about Sewage pumping; Sewerage, Sewer appurtenances, Design of sewerage systems |
| 21 | 3 | Student Should be able to write about Small bore systems, Storm Water- Quantification and design of Storm water |
| 22 | 3 | Student Should be able to write about Sewage characteristics: Quality parameters: BOD, COD |
| 23 | 3 | Student Should be able to write about TOC, solids, DO, nitrogen, phosphorus. |
| 24 | 3 | Student Should be able to write about Standards of disposal into natural watercourses and on land, Indian standards |
| 25 | 3 | Student Should be able to write about Sewage and Sullage |
| 26 | 3 | Student Should be able to write about Pollution due to improper disposal of sewage |
| 27 | 3 | Student Should be able to write about Pollution due to improper disposal of sewage |
| 28 | 3 | Student Should be able to write about Wastewater treatment: aerobic and anaerobic treatment systems |
| 29 | 3 | Student Should be able to write about Aerobic and anaerobic treatment systems |
| 30 | 3 | Student Should be able to write about Suspended and attached growth systems |
| 31 | 3 | Student Should be able to write about Recycling of sewage – quality requirements for various purposes |
| 32 | 3 | Wastewater Disposal and Refuse: Disposal of sewage by dilution |
| 33 | 3 | Student Should be able to write about Self-purification of streams |
| 34 | 3 | Student Should be able to write about Sewage disposal by irrigation sewage farming |
| 35 | 3 | Student Should be able to write about Wastewater reuse |
| 36 | **4** | **AIR:** Composition and properties of air, Quantification of air Pollutants |
| 37 | 4 | Student Should be able to write about Monitoring of air pollutants, Air quality standards |
| 38 | 4 | Student Should be able to write about Control measures for Air pollution |
| 39 | **5** | **NOISE- BASIC CONCEPT**, |
| 40 | 5 | Student Should be able to write about Measurement and various control methods |
| 41 |  | Revision to course work |
| 42 |  | Revision to course work |
|  |  |  |

TEXT/REFERENCE BOOKS

1. S.K. Garg (1999), Water supply Engineering – Environmental Engineering
2. P.N. Modi (2006), Water supply Engineering – Environmental Engineering (Vol.I) – Standard Book House.
3. S.K. Garg (1999), Sewage Disposal and Air Pollution Engineering – Environmental Engineering (Vol.II) – Khanna Publishers.

**Course Level Problems (Test Items):**

|  |  |
| --- | --- |
| **CO.NO.** | **Problem description** |
| **1** | 1. Write about importance of safe water in detail 2. Write about Requirement of safe water in urban area. 3. Write about sources of drinking water and Quality of Drinking water 4. Write a short note on Transmission of water and Component of water supply System 5. Write about different types of water treatment Process |
| **2** | 1. Write a note on Domestic and Storm Water 2. Explain in detail about BOD of Sewage 3. Write a note on DO and COD of Sewage 4. Explain in detail Process of Wastewater Treatment 5. Explain in detail Methods of Sewage Treatment |
| **3** | 1. Explain in detail about Composition of Air Pollution 2. Write a note on Quantification of Air Pollutants 3. How can we Monitoring the Air Pollution? 4. Explain in detail Air Quality Standards 5. Write a note on Control and Measures of Air Pollution |
| **4** | * + - 1. What is Noise and How we will Measure it       2. What are Typical Decibel Levels of some Common Sounds       3. Explain in detail BIS standards for pollutant in Air and noise       4. What are effects of Noise on Humans health       5. Write a note on Types of Pollutants in detail |

**Assessment Methodology:**

1. Practical exam in lab where they have to write Tests Related to the Quality of Water and Sewage . (Once in a week)
2. Assignments one from each unit.
3. Midterm subjective paper where they have to write About all Study Of Environmental Engineering (Twice during the semester)
4. Final paper at the end of the semester subjective.

**Teaching and Learning resources**

**Unit-1**

**Water**

Video Tutorials <https://www.youtube.com/watch?v=LiL0_sfdhQ0>

Water Quality

<https://www.youtube.com/watch?v=ZHYvoSF_BKk>

Water Supply System

<https://www.youtube.com/watch?v=b4stML-Mt9s>

Water Treatment

<https://www.youtube.com/watch?v=6u9L0nVUYPY>

Theory concepts

Water Quality

<https://www.who.int/water_sanitation_health/resourcesquality/wqachapter1.pdf>

Water Supply System

<https://www.cartercenter.org/resources/pdfs/health/ephti/library/lecture-notes/env-health-science-students/ln-water-supply-i-final.pdf>

Water Treatment <https://web.iitd.ac.in/~arunku/files/CVL100/L8.pdf>

Sample Quiz: <https://www.ruvival.de/water-quantity-quality-quiz/>

<https://www.objectivebooks.com/2018/03/exam-test-questions-on-water-supply.html>

**Unit 2**

**Sewage**

Video Tutorials <https://www.youtube.com/watch?v=-clXHOKhfmA>

Quantity of Sewage

<https://www.youtube.com/watch?v=pW3kB285_Ig>

Sewage Characteristics

<https://www.youtube.com/watch?v=z2l3_RSucqg>

waste water Disposal and Reuse

<https://www.youtube.com/watch?v=cNiy1kR-W74>

Theory concepts: <https://nptel.ac.in/courses/105/104/105104102/>

Quantity of Sewage

<https://www.youtube.com/watch?v=pW3kB285_Ig>

Sewage Characteristics

<https://www.youtube.com/watch?v=z2l3_RSucqg>

waste water Disposal and Reuse

<https://www.youtube.com/watch?v=cNiy1kR-W74>

Sample Quiz: <https://www.objectivebooks.com/2016/04/waste-water-engineering-mcq-practice.html>

**Unit 3**

**Air**

Video Tutorials <https://www.youtube.com/watch?v=uivuzDeEe1Q>

Theory concepts: <https://nptel.ac.in/courses/105/102/105102089/>

Sample Quiz: <https://quizizz.com/admin/quiz/572a0725d8da6c2816b69ab2/air-pollution>

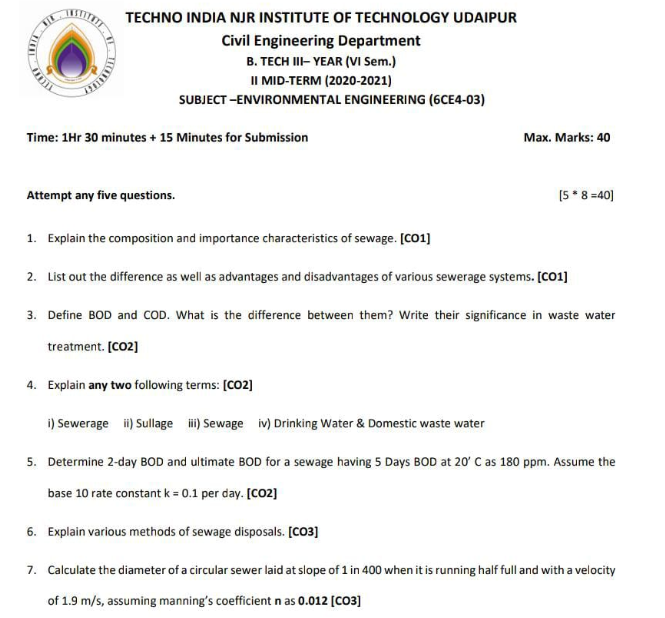
**Unit 4**

**Noise**

Video Tutorials Video Tutorials <https://www.youtube.com/watch?v=AQ4BakagMvM>

Theory concepts: <https://nptel.ac.in/courses/112/104/112104227/>

Sample Quiz: <https://quizizz.com/admin/quiz/572a0725d8da6c2816b69ab2/air-pollution>



**Course’s outcome mapping**

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| --- | --- | --- | --- | --- | --- |
|  | **Environmental Engineering VI Sem** |  |  |  |  |
|  | Online Midterm Examination II |  |  |  |  |
| **S.NO.** | **NAME OF STUDENTS** |  |  |  |  |
|  | **CO MAPPED** | **CO1** | **CO2** | **CO3** | **TOTAL** |
|  | **MAX MARKS** | **10** | **15** | **10** | **35** |
| 1 | Akash Soni | 8 | 7 | NO | 15 |
| 2 | Asif Ansari | 7 | 5 | 4 | 16 |
| 3 | Bhavna Meena | 9 | 9 | 4 | 22 |
| 4 | Bhupesh Chandaria | 8 | 8 | 4 | 20 |
| 5 | Chagan Singh | 8 | 7 | 4 | 19 |
| 6 | Dikshant panya | 8 | 7 | NO | 15 |
| 7 | Divyanshu Purbia | 7 | 8 | 3 | 18 |
| 8 | Hardik goswami |  |  |  | A |
| 9 | Ishika Sharma | 8 | 8 | 3 | 19 |
| 10 | Jayesh nagda | 8 | 8 | 3 | 19 |
| 11 | Kartik sharma |  |  |  | A |
| 12 | Kuldeep prjapat | 7 | 8 | 3 | 18 |
| 13 | Nikhil kumawat | 7 | 8 | 4 | 19 |
| 14 | Pawan salvi | 7 | 8 | 1 | 16 |
| 15 | Pearl bhanawat | 6 | 7 | 4 | 17 |
| 16 | Priyal kothari | 9 | 9 | 5 | 23 |
| 17 | Rohit Bishnoi | 6 | 7 | 3 | 16 |
| 18 | Sanjay prajapat |  |  |  | A |
| 19 | Vaibhav Tamboli | 8 | 8 | NO | 16 |

**Previous Year Question Papers**:

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