Techno India NJR Institute of Technology

(Approved by AICTE, New Delhi and Affiliated to Rajasthan Technical University Kota (Raj.))

Course File

Environmental Engineering (6CE4-03)

Semester: VI, Year: III (2023-24)

Name of faculty: Nishit Jain

Email ID: nishit.jain@technonjr.org

Total Number of Lectures: 42

Techno India NJR Institute of Technology

(Approved by AICTE, New Delhi and Affiliated to Rajasthan Technical University Kota (Raj.))

INDEX - COURSE FILE

Techno India NJR Institute of Technology

(Approved by AICTE, New Delhi and Affiliated to Rajasthan Technical University Kota (Raj.))

VISSION & MISSION OF INSTITUTE

Vision

Empowering student with recent and emerging technologies to create innovative technical leaders capable of contributing to industrial and societal needs for betterment of mankind across the globe.

Mission

M1: To provide dynamic learning environment to students by providing constant exposure to latest technologies by linking closely with the industries.

M2: To establish effective interface with industry to obtain live problems to enhance critical thinking and problem solving skills among students and consultancy projects for faculty.

M3: To provide avenues and opportunities to faculty for domain specific trainings and qualification upgradation.

M4: To develop ethical leaders with strong communication skills.

VISION & MISSION OF DEPARTMENT

Department Vision

To increase students learning of fundamentals for designing and planning of buildings and latest technologies through industry-aligned project-based learning which will help in transforming students to be good civil engineering professionals leading to innovation and incubation of new ideas.

Department Mission

M1: To create experimental learning through solving problems of Government, Society, Smart Cities, Industry and other entities.

M2: To teach the latest technologies to the students as beyond the syllabus activity so that they are updated and industry ready.

M3: To enable engineering students understand industry-aligned technologies and learn to find solutions from their early engineering days and this is the only way to produce globally relevant engineers solving real-life problems applying current technologies.

M4: To enable students to generate projects through problem faced by and requirement of Smart cities, industry, Government and other entities whereby those outlined problem statements are to be studied deeply by a group of faculty members to convert them into real-time project format.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEOs 1: To provide an in-depth understanding of the fundamentals of Civil Engineering and create a foundation for lifelong learning to facilitate a progressive career in the construction Industry, as an entrepreneur and in pursuit of higher studies.

PEOs 2: To equip the students with technical and analytical skills to develop innovative solutions to complex real-life problems using existing and novel technologies. To equip the students with good communication and interpersonal skills, inter-disciplinary teamwork and leadership skills to enable them to fulfill professional responsibilities.

PEOs 3: To expose them to various contemporary issues which will enable them to become ethical and responsible towards themselves, co-workers, Society and the Nation.

PEOs 4: To make the student's industry ready by imparting education related to the latest technologies so that they can grab future industry jobs.

PROGRAM SPECIFIC OUTCOMES (PSO's)

PSO1: To be aware of and initiate some-work on future technologies and new developments which may impact the future Industry 4.0.

PSO2: Hands on training on upcoming technologies and project-based learning.

PSO3: Get exposure to BIM (Building Information Modeling).

PROGRAMME OUTCOMES (POs)

A student will develop:

PO01. ENGINEERING KNOWLEDGE: An ability to apply knowledge of Mathematics, Science and Engineering Fundamentals in Electronics and Communication Engineering.

PO02. PROBLEM ANALYSIS: Ability to analyze and interpret data by designing and conducting experiments. Develop the knowledge of developing algorithms, designing, implementation and testing applications in electronics and communication related areas.

PO03. DESIGN/ DEVELOPMENT OF SOLUTION: An ability to Design a system Component or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.

PO04. CONDUCTION OF INVESTIGATION OF COMPLEX PROBLEMS: Ability to Identify, formulate and solve engineering problems.

PO05. MODERN TOOL USAGE: An ability to use the techniques, skills and modern engineering tools necessary for engineering practice.

PO06. THE ENGINEERING AND SOCIETY: Broad education necessary to understand the impact of engineering solutions in a global, economic, environmental and societal context.

PO07. ENVIRONMENT & SUSTAINABILITY: Understand the impact of professional engineering solution in societal and environmental contexts, and demonstrate the knowledge of, and need of sustainable development.

PO08. ETHICS: An ability to understand the professional, social and ethical responsibility.

PO09. INDIVIDUAL AND TEAM WORK: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10. COMMUNICATION: An ability to Communicate effectively in order to succeed in their profession such as, being able to write effective reports and design documentation, make effective presentations.

PO11. PROJECT MANAGEMENT & FINANCE: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in team, to manage projects and in multidisciplinary environment.

PO12. LIFE-LONG LEARNING: Recognize the need and an ability to engage in life-long learning.

Course Overview:

This course will provide students with a foundational understanding of Environmental Engineering. Students will gain knowledge and skills in identifying, evaluating, and mitigating the impact of environmental pollutants on human health and ecosystems. The course covers essential topics such as water supply and treatment, wastewater management, air pollution control, and solid waste management. Students will learn to design and implement systems for pollution control, waste disposal, and recycling, with an emphasis on sustainable practices. Additionally, the course will explore public health considerations and the role of environmental engineering in protecting and improving the quality of the environment

Course Outcome:

6CE4-03	Cognitive Level	
6CE4-03.1	Analysis	Understand demand for water supply to households, industry and public services.
6CE4-03.2	Application	Understand source of water and their quality parameter.
6CE4-03.3	Design	Analyze the impact of pollutants and assess pollution control measures.
6CE4-03.4	Design	Analyze wastewater treatment processes and recommend disposal methods.
6CE4-03.5	Analysis	Explain an integrated air and noise pollution control plan for an urban or industrial area.

Prerequisites:

1. Analyze 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

Mapping COs, POs and PSOs:

ENVIRONMENTAL ENGINEERING															
Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO36403.1	0	2	2	2	0	0	0	1	0	2	2	0	0	0	0
CO36403.2	0	1	2	3	0	0	1	2	0	2	2	0	0	0	0
CO36403.3	0	3	2	1	0	0	0	1	0	3	3	0	0	0	0
CO36403.4	0	2	1	2	0	0	1	1	0	3	3	0	0	0	0
CO36403.5	0	1	0	2	0	0	2	0	0	2	2	0	0	0	0

UNIVERSITY ACADEMIC CALENDAR

Academic Calendar for Even Semester for Session

Course: Bachelor of Technology (B.TECH.)				
Course: Bachelor of Technology (B.TECH.)				
Semester	II	IV	VI	VIII
Commencement of Classes	26.02.2024	15.02.2024	15.02.2024	02.01.2024
First Mid Term	02.04.2024	20.03.2024	20.03.2024	15.02.2024
Second Mid Term	03.06.2024	06.05.2024	06.05.2024	21.03.2024
Last Working Day	10.06.2024	31.05.2024	31.05.2024	20.04.2024
Commencement of Practical Exams	01.07.2024	03.06.2024	03.06.2024	22.04.2024
Commencement of Theory Exams	19.06.2024	14.06.2024	15.06.2024	02.05.2024
Project (VIII)				
Practical Training (After II Sem.)	15.07.2024 To 31.07.2024			
Practical Training (After IV Sem.)	01.07.2024 To 17.08.2024			
Practical Training (After VI Sem.)	01.07.2024 To 17.08.2024			

Techno India NJR Institute of Technology

(Approved by AICTE, New Delhi and Affiliated to Rajasthan Technical University Kota (Raj.))

Evaluation Scheme

FACULTY DETAILS:

Name of the Faculty : Mr. Nishit Jain

Designation : Assistant Professor

Department : Civil Engineering

1. TARGET

a) Percentage Pass : 100 %
b) Percentage I class: 70 %

2. METHOD OF EVALUATION

2.1. Continuous Assessment Examinations (Mid-Term 1 & 2)

2.2. Assignments / Seminars

2.3. Mini Projects

2.4. Quiz

2.5. Semester Examination

Others_____

3. List out any new topic(s) or any innovation you would like to introduce in teaching the subject in this Semester.

1. Take the help of creative tools to stimulate creativity. Include slide presentations, demonstration or forms of visual exercises that will excite the young minds and capture their interest.

Signature of Faculty: **Signature of HOD**

RAJASTHAN TECHNICAL UNIVERSITY, KOTA
Syllabus
3rd Year - VI Semester: B.Tech. (Civil Engineering)

6CE4-03: ENVIRONMENTAL ENGINEERING

Credit: 3 **Max. Marks: 100(IA:30, ETE:70)**
3L+0T+0P **End Term Exam: 3 Hours**

SN	CONTENTS	Hours
1	**Introduction:** Objective, scope and outcome of the course.	1
2	*Water:* -Sources of Water and quality issues, water quality requirement for different beneficial uses, Water quality standards, water quality indices.	4
	Water Supply systems, Need for planned water supply schemes, Water demand industrial and agricultural water requirements, Components of water supply system; Transmission of water, Distribution system, Various valves used in W/S systems, service reservoirs and design.	5
	Water Treatment: aeration, sedimentation, coagulation flocculation, filtration, disinfection, advanced treatments like adsorption, ion exchange, membrane processes.	6
3	*Sewage*- Domestic and Storm water, Quantity of Sewage, Sewage flow variations. Conveyance of sewage- Sewers, shapes design parameters, operation and maintenance of sewers, Sewage pumping; Sewerage, Sewer appurtenances, Design of sewerage systems. Small bore systems, Storm Water- Quantification and design of Storm water.	5
	Sewage characteristics: Quality parameters: BOD, COD, TOC, Solids, DO, Nitrogen, Phosphorus, Standards of disposal into natural watercourses and on land, Indian standards.	4
	Sewage and Sullage, Pollution due to improper disposal of sewage, Wastewater treatment, aerobic and anaerobic treatment systems, suspended and attached growth systems, recycling of sewage – quality requirements for various purposes.	7
	Wastewater Disposal and Refuse: Disposal of sewage by dilution, Self-purification of streams, sewage disposal by irrigation sewage farming, waste water reuse.	5
4	*Air* - Composition and properties of air, Quantification of air pollutants, Monitoring of air pollutants, Air quality standards, Control measures for Air pollution	3
5	*Noise*- Basic concept, measurement and various control methods.	2
	Total	42

Office of Dean Academic Affairs
Rajasthan Technical University, Kota

TEXT/REFERENCEBOOKS

1. S.K. Garg (1999), Water supply Engineering – Environmental Engineering
2. P.N. Modi (2006), Water supply Engineering – Environmental
3. S.K. Garg (1999), Sewage Disposal and Air Pollution Engineering – Environmental

WEEKLY TIME TABLE OF THE TEACHER

Day	1	2	3	4	5	6	7
Monday						EE	
Tuesday						EE	
Wednesday							
Thursday						EE	
Friday						EE	
Saturday							

Techno India NJR Institute of Technology

(Approved by AICTE, New Delhi and Affiliated to Rajasthan Technical University Kota (Raj.))

COURSE-PLAN

Lecture No	Unit	Topic	Teaching Methods/ Teaching Aids
1	1	**INTRODUCTION:** Objective, scope and outcome of the course	White Board
2	2	**WATER:** Sources of Water and quality issues	White Board
3	2	Student Should be able to write about Water quality requirement for different beneficial uses	White Board
4	2	Student Should be able to write about Water quality standards, water quality indices	White Board
5	2	Student Should be able to write about Water quality standards, water quality indices	White Board
6	2	Student Should be able to write about Water Supply systems, Need for planned water supply schemes	White Board
7	2	Student Should be able to write about Water Supply systems, Need for planned water supply schemes	White Board
8	3	Student Should be able to write about Water demand industrial and agricultural water requirements	White Board
9	3	Student Should be able to write about Components of water supply system; Transmission of water, Distribution system.	White Board
10	3	Student Should be able to write about (Contd.) Components of water supply system	White Board
11	3	Student Should be able to write about Various valves used in W/S systems, service reservoirs and design.	White Board
12	3	Student Should be able to write about Water Treatment: Aeration, sedimentation	White Board
13	3	Student Should be able to write about Coagulation flocculation,	White Board
14	4	Student Should be able to write about Filtration.	White Board
15	4	Student Should be able to write about Disinfection	White Board

16	4	Student Should be able to write about Advanced treatments like adsorption, ion exchange, membrane processes	White Board
17	4	**SEWAGE:** Domestic and Storm water, Quantity of Sewage	White Board
18	4	Student Should be able to write about Sewage flow variations. Conveyance of sewage- Sewers	White Board
19	4	Student Should be able to write about Shapes design parameters, operation and maintenance of sewers	White Board
20	4	Student Should be able to write about Sewage pumping; Sewerage, Sewer appurtenances, Design of sewerage systems	White Board
21	4	Student Should be able to write about Small bore systems, Storm Water- Quantification and design of Storm water	White Board
22	4	Student Should be able to write about Sewage characteristics: Quality	White Board
23	5	parameters: BOD, COD	White Board
24	5	Student Should be able to write about TOC, solids, DO, nitrogen, phosphorus.	White Board
25	5	Student Should be able to write about Standards of disposal into natural	White Board
26	5	watercourses and on land, Indian standards	White Board
27	5	Student Should be able to write about Sewage and Sullage	White Board
28	5	Student Should be able to write about Pollution due to improper disposal of sewage	White Board
29	5	Student Should be able to write about Pollution due to improper disposal of sewage	White Board
30	6	Student Should be able to write about Wastewater treatment: aerobic and anaerobic treatment systems	White Board
31	6	Student Should be able to write about Aerobic and anaerobic treatment systems	White Board
32	6	Student Should be able to write about Suspended and attached growth systems	White Board
33	6	Student Should be able to write about Recycling of sewage – quality requirements for various purposes	White Board

34	7	Wastewater Disposal and Refuse: Disposal of sewage by dilution	White Board
35	7	Student Should be able to write about Self-purification of streams	White Board
36	7	Student Should be able to write about Sewage disposal by irrigation sewage farming	White Board
37	7	Student Should be able to write about Wastewater reuse	White Board
38	7	**AIR:** Composition and properties of air, Quantification of air Pollutants	White Board
39	8	Student Should be able to write about Monitoring of air pollutants, Air quality standards	White Board
		Student Should be able to write about Control measures for Air pollution	White Board
40	8	**NOISE- BASIC CONCEPT**,	White Board
		Student Should be able to write about Measurement and various control methods	White Board
41	8	Revision to course work	White Board
42	8	Revision to course work	White Board

Signature of Faculty: **Signature of HOD**

Techno India NJR Institute of Technology

(Approved by AICTE, New Delhi and Affiliated to Rajasthan Technical University Kota (Raj.))

Assignment Sheet

ASSIGNMENT NO. 1

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	6. Write a note on Domestic and Storm Water 7. Explain in detail about BOD of Sewage 8. Write a note on DO and COD of Sewage 9. Explain in detail Process of Wastewater Treatment 10. Explain in detail Methods of Sewage Treatment
3	11. Explain in detail about Composition of Air Pollution 12. Write a note on Quantification of Air Pollutants 13. How can we Monitoring the Air Pollution? 14. Explain in detail Air Quality Standards 15. 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

SAMPLE QUIZ QUESTIONS

1. What is the primary objective of Environmental Engineering?
a) Construction of buildings
b) Protection of human health and the environment
c) Designing transportation systems
d) Urban planning

Answer: b) Protection of human health and the environment
Explanation: Environmental Engineering focuses on safeguarding human health and protecting the environment from pollution and other harmful effects.

2. Which of the following is a major source of water pollution?
a) Industrial discharge
b) Road construction
c) Tree planting
d) Wind turbines

Answer: a) Industrial discharge
Explanation: Industrial discharge often contains harmful chemicals and pollutants that contaminate water sources.

3. What does BOD stand for in water quality measurement?
a) Biological Oxygen Demand
b) Basic Oxygenation Depth
c) Biochemical Oxidation Data
d) Balanced Oxygen Distribution

Answer: a) Biological Oxygen Demand
Explanation: BOD is a measure of the amount of oxygen required by aerobic microorganisms to decompose organic matter in water.

4. What is the primary purpose of sedimentation in water treatment?
a) Disinfection of water
b) Removal of dissolved gases
c) Removal of suspended solids
d) Aeration of water

Answer: c) Removal of suspended solids
Explanation: Sedimentation allows heavy particles to settle out of water, reducing the load of suspended solids before further treatment.

5. Which of the following is an advanced water treatment process?
a) Sedimentation

b) Filtration
c) Ion exchange
d) Coagulation

Answer: c) Ion exchange
Explanation: Ion exchange is an advanced process used to remove specific ions from water, often in softening or demineralization.

6. Which type of valve is typically used to control the flow of water in a distribution system?
a) Gate valve
b) Check valve
c) Pressure relief valve
d) Float valve

Answer: a) Gate valve
Explanation: Gate valves are used to start or stop the flow of water in pipelines.

7. What is the function of a service reservoir in a water supply system?
a) To filter water
b) To disinfect water
c) To store treated water
d) To remove solids

Answer: c) To store treated water
Explanation: Service reservoirs store treated water for distribution during periods of high demand.

8. What is the purpose of coagulation in water treatment?
a) To remove pathogens
b) To increase pH levels
c) To aggregate small particles into larger ones
d) To add fluoride to water

Answer: c) To aggregate small particles into larger ones
Explanation: Coagulation helps in gathering small suspended particles into larger aggregates that can be more easily removed by sedimentation or filtration.

9. What does COD stand for in wastewater analysis?
a) Chemical Oxygen Demand
b) Cumulative Organic Depth
c) Contaminant Oxygen Depletion
d) Composite Oxidation Data

Answer: a) Chemical Oxygen Demand
Explanation: COD measures the amount of oxygen required to oxidize all organic matter in water.

10. What type of system is used for the anaerobic treatment of sewage?
a) Trickling filter
b) Activated sludge process
c) Septic tank
d) Rapid sand filter

Answer: c) Septic tank
Explanation: A septic tank is a common anaerobic treatment system where sewage is decomposed by bacteria in the absence of oxygen.

11. Which pollutant is a primary concern in air quality management?
a) Nitrogen
b) Carbon Dioxide
c) Sulfur Dioxide
d) Oxygen

Answer: c) Sulfur Dioxide
Explanation: Sulfur Dioxide (SO_2) is a significant air pollutant that contributes to acid rain and respiratory problems.

12. Which parameter is crucial in determining the design of a stormwater system?
a) Water pH
b) Temperature
c) Flow rate
d) Odor

Answer: c) Flow rate
Explanation: The flow rate is essential in designing stormwater systems to ensure they can handle peak runoff during storms.

13. What is the purpose of disinfection in water treatment?
a) To improve taste
b) To remove solids
c) To kill pathogenic microorganisms
d) To reduce water hardness

Answer: c) To kill pathogenic microorganisms
Explanation: Disinfection is crucial for eliminating harmful bacteria, viruses, and other pathogens from water.

14. Which air pollutant is most commonly monitored to assess air quality?
a) Oxygen
b) Methane
c) Particulate Matter (PM)
d) Nitrogen

Answer: c) Particulate Matter (PM)
Explanation: Particulate Matter, especially PM2.5 and PM10, is a critical indicator of air quality and is monitored regularly.

15. What is a common method for controlling noise pollution?
a) Installing solar panels
b) Using sound barriers
c) Increasing vehicle speed
d) Growing more trees

Answer: b) Using sound barriers
Explanation: Sound barriers are often used along highways and industrial areas to block and reduce noise levels.

16. Which of the following is NOT a typical component of a wastewater treatment plant?
a) Screening
b) Chlorination
c) Incineration
d) Sedimentation

Answer: c) Incineration
Explanation: Incineration is not typically part of wastewater treatment but is used in solid waste management.

17. In which section of the water supply system is a float valve commonly used?
a) Transmission line
b) Service reservoir
c) Filtration unit
d) Water intake

Answer: b) Service reservoir
Explanation: A float valve controls water levels in service reservoirs by shutting off the flow when the tank is full.

18. Which water quality index is used to measure the suitability of water for drinking purposes?

a) Water Hardness
b) pH Level
c) Water Quality Index (WQI)
d) Turbidity

Answer: c) Water Quality Index (WQI)
Explanation: WQI is a comprehensive measure that aggregates various water quality parameters to assess water's suitability for drinking.

19. What is the purpose of a small bore system in sewage management?
a) To transport water for irrigation
b) To dispose of industrial waste
c) To convey sewage in areas with low flow
d) To filter drinking water

Answer: c) To convey sewage in areas with low flow
Explanation: Small bore systems are used in sewage management for transporting wastewater in areas with low flow, relying on septic tanks to remove solids.

20. Which of the following is a potential impact of improper sewage disposal?
a) Increased water pH
b) Decrease in biodiversity
c) Enhanced soil fertility
d) Improved air quality

Answer: b) Decrease in biodiversity
Explanation: Improper sewage disposal can lead to water pollution, which harms aquatic life and decreases biodiversity in affected ecosystems

TECHNO INDIA NJR INSTITUTE OF TECHNOLOGY, UDAIPUR

B. TECH 3rd – YEAR (VI SEM.) CIVIL ENGINEERING – MT-I (April 2024)

Environment Engineering (6CE3-03)

Time: 3 Hr **Max. Marks:** 70

Note:

1) The paper is divided into 2 parts: Part-A and, Part-B.
2) Part-A contains 10 questions and carries 2 mark each.
3) Part-B contains 5 questions. Each question is having two options and carries 10 marks each.

Part- A (20 Marks)

A.	Define Design period.	CO1
B.	Explain the purpose of water softening.	CO1
C.	Name different sources of water.	CO1
D.	What is fire demand?	CO1
E.	What is the minimum domestic water consumption as per IS 1172-1993?	CO2
F.	What is the pH range for the potable water supply	CO2
G.	What different chemicals are added as coagulants?	CO2
H.	Draw diagram for domestic water connection.	CO2
I.	What are different methods for distribution of water?	CO3
J.	Explain grid iron system.	CO3

Part- B (50 Marks)

1. What are the factors affecting the selection of surface sources of water	CO1
OR	
1. What are the factors affecting the selection of subsurface sources of water	CO1

2. Explain different types of water demands.	CO1
OR	
2. Explain hydrological cycle with diagram	CO1

3. What are different physical & chemical characteristics of water	CO2
OR	
3. Draw a table showing 15 characteristics of drinking water, with their permissible limits as per IS 10500-1991	CO2

4. What are distribution reservoirs?	CO2
OR	
4. What are requirements of good distribution systems?	CO2

5. Explain physical characteristics of water?	CO3
OR	
5. Explain the plumbing system used for a house water connection with a detailed diagram (plan).	CO3

Techno India NJR Institute of Technology

(Approved by AICTE, New Delhi and Affiliated to Rajasthan Technical University Kota (Raj.))

Marks and Gap Analysis of Mid-Term 1

S.No.	University Roll No.	Name of Student	Mid-Term 1 MM-70	Remark (Remedial Class need or not – Y/N)
1.	21ETCCE001	Dev vaishnav	50	N
0.	21ETCCE002	Hitesh Sutradhar	45	N
0.	21ETCCE004	Naved khan	50	N
0.	21ETCCE006	Pushpendra gehlot	56	N
0.	21ETCCE007	Shalin Dak	47	N
0.	21ETCCE009	Tamanna kumawat	58	N
0.	21ETCCE300	Muniraj Sharma	58	N
0.	22ETCCE200	Moiz Udaipurwala	63	N
0.	22ETCCE201	Vikas Suthar	47	N

*(Y, if obtained marks are <50%)

Signature of Faculty: **Signature of HOD**

Techno India NJR Institute of Technology

(Approved by AICTE, New Delhi and Affiliated to Rajasthan Technical University Kota (Raj.))

Remedial Action Taken to Remove the Gaps (After Mid- Term 1)

S.no.	University Roll no.	Name of Student	Topics to be discussed in Remedial Class	Schedule Date of Remedial Class	Outcome Achieved
1.	NIL				
2.					

Signature of Faculty: **Signature of HOD**

TECHNO INDIA NJR INSTITUTE OF TECHNOLOGY, UDAIPUR
B. TECH III YEAR (VI SEM.) – MT-II (JUN'24)
ENVIRONMENTAL ENGINEERING (6CE4-03)

Time: 3 Hr **Max. Marks:** 70

Note:

1. The paper is divided into 2 parts: Part-A and, Part-B.
2. Part-A contains 10 questions and carries 2 mark each.
3. Part-B contains 5 questions. Each question is having two options and carries 10 marks each.

	SECTION A (WORD LIMIT 25 WORDS)	
a	What factors are affecting the per-capita demand of water per-day?	CO1
b	What is super chlorination?	CO1
c	What is the principal of centrifugal pump?	CO2
d	What is circulation ratio in trickling filter?	CO2
e	What is population equivalent	CO3
f	What is the design period for the pumping plant?	CO3
g	Define BOD, COD, and TOC.	CO4
h	Name any 5, sewer appurtenances?	CO4
i	Which act defines the rules for noise pollution?	CO5
j	What is AQI?	CO5
	SECTION B (WORD LIMIT 200-300 WORDS)	
1	What are the common sources for water supply scheme?	CO1
	or	
	How to calculate the yield of underground water?	
2	What factors are considered when selecting pumps and the location for a pumping station?	CO2
	or	
	Explain plain sedimentation with the help of neat diagram.	
3	Distinguish between sewage and sewerage. What is sanitary sewage?	CO3
	or	
	Write in detail about functioning & construction of Trickling Filters.	
4	Calculate 1 day 37°C BOD of sewage sample whose 5 day 20° BOD is 100mg/l. Assume K_d at 20°C as 0.1	CO4
	or	
	With the help of flow dig, explain the working of WTP, enumerating the impurities getting removed at each step.	
5	What is the effect of SO_x NO_x, & SPM on human beings? What are their permissible limits in air?	CO5
	or	
	Describe methods to control air pollution	

Techno India NJR Institute of Technology

(Approved by AICTE, New Delhi and Affiliated to Rajasthan Technical University Kota (Raj.))

Marks and Gap Analysis of Mid-Term II

S.No.	University Roll No.	Name of Student	Mid-Term 1 MM-70	Remark (Remedial Class need or not – Y/N)
2.	21ETCCE001	Dev vaishnav	47	N
1.	21ETCCE002	Hitesh Sutradhar	45	N
1.	21ETCCE004	Naved khan	51	N
1.	21ETCCE006	Pushpendra gehlot	55	N
1.	21ETCCE007	Shalin Dak	46	N
1.	21ETCCE009	Tamanna kumawat	58	N
1.	21ETCCE300	Muniraj Sharma	59	N
1.	22ETCCE200	Moiz Udaipurwala	60	N
1.	22ETCCE201	Vikas Suthar	48	N

*(Y, if obtained marks are <50%)

Signature of Faculty: **Signature of HOD**

Techno India NJR Institute of Technology

(Approved by AICTE, New Delhi and Affiliated to Rajasthan Technical University Kota (Raj.))

Remedial Action Taken to Remove the Gaps (After Mid- Term II)

Sr. No.	University Roll no.	Name of Student	Topics to be discussed in Remedial Class	Schedule Date of Remedial Class	Course Outcome
1.	NIL				

Signature of Faculty: **Signature of HOD**

PREVIOUS YEAR PAPERS

Roll No. ..... Total Page No. : 3

610303

610303

B.TECH. VI SEM MAIN/BACK EXAM
AUGUST 2023
CIVIL ENGINEERING
(6CE4-03) - ENVIRONMENTAL ENGINEERING

Time : 3 Hours] [**Max. Marks** : 120

[**Min. Passing Marks** : ??

Instructions to Candidates : Part – A : Short answer type questions (up to 25 words) 10 × 2 marks = 20 marks. All ten questions are compulsory.

Part – B: Analytical/Problem Solving questions 5 × 8 marks = 40 marks. Candidates have to answer 5 questions out of 7.

Part – C: Descriptive/Analytical/Problem Solving questions 4 × 15 marks = 60 marks. Candidates have to answer 4 questions out of 5.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting materials is permitted during examination. (Mentioned in form No. 205)

1_____ 2_____

PART A

1. List down the physical and chemical characteristics of water.
2. What is the principal of centrifugal pump and reciprocating pump ?
3. Explain primary and secondary air polutants with example.
4. Explain briefly on break point chlorination.
5. Distinguish between self cleaning velocity and non-scouring velocity.
6. Discussthe biological concept taking place in septic tank.
7. Discuss the term recirculation ratio in trickling filter.

8. What is meant by self-purification of river ?
9. Differentiate between demineralisation and desalination.
10. List out the control and preventive measures of noise pollution.

PART B

1. Discuss the adverse effect of carbon monoxide on human health. How can the reduction in CO emission help mitigate these effects.
2. Explain in detail the disinfection in water and coagulation process involved in waste water treatment.
3. Discuss the pollution control process of gaseous contaminants through absorption.
4. (a) Write the design criteria for a grit chamber and brief its construction and functioning.
   (b) Describe the working of grit chamber and its types.
5. Define Intakes. Explain any one intake structure with neat sketch.
6. Chlorine usage in a treatment of 20000 m^3/d is 8 kg/d. The residual after 10 min contact is 0.2 mg/lit. Calculate the dosage in mg/lit and chlorine demand of water.
7. What is Disinfection ? Identify the factors affecting disinfection examine the conventional and modern methods which are used to disinfect water.

PART C

1. Discuss the control and preventive measures to be taken for noise pollution in a commercial complex.
2. Summarise the principle of the self-purification process of river and the various stages of oxygen sag curve.
3. Explain in detail about slow sand filter and rapid sand filter with suitable diagram and also write their advantages over them.
4. Examine the components and the operational principles of activated sludge process with neat sketch. Write its advantages and disadvantages.

5. (a) The BOD of sewage incubated for one day at 30°C has been found to be 400 mg/l. Calculate the 5 days 20°C BOD. Assume K_{10} = 0.12/day at 20°C.

(b) A city with a population of 100000 has an area of hectores. Calculate the D.W.F. and storm water flow for the sewer line for the following data :

(i) Rate of water supply = 200 LPCD

(ii) Avg. runoff coeff. for entire area = 0.5

(iii) Time of concentration = 50 min.

Assume 75% of water supplied reaches the sewer.

Techno India NJR Institute of Technology

(Approved by AICTE, New Delhi and Affiliated to Rajasthan Technical University Kota (Raj.))

STUDENT PERFORMANCE REPORT

Roll No.	Name of Student	I Mid-Term	II Mid-Term	Average
21ETCCE001	Dev vaishnav	50	47	48.5
21ETCCE002	Hitesh Sutradhar	45	45	45
21ETCCE004	Naved khan	50	51	50.5
21ETCCE006	Pushpendra gehlot	56	55	55.5
21ETCCE007	Shalin Dak	47	46	46.5
21ETCCE009	Tamanna kumawat	58	58	58
21ETCCE300	Muniraj Sharma	58	59	58.5
22ETCCE200	Moiz Udaipurwala	63	60	61.5
22ETCCE201	Vikas Suthar	47	48	47.5

Signature of Faculty: **Signature of HOD**

Techno India NJR Institute of Technology

(Approved by AICTE, New Delhi and Affiliated to Rajasthan Technical University Kota (Raj.))

RESULT ANALYSIS

S.NO.	RTU ROLL NUMBER	NAME OF STUDENT	END TERM MARKS	SESSIONAL MARKS	TOTAL
		MAX MARKS	**70**	**30**	**100**
1.	21ETCCE001	Dev vaishnav		22	
2.	21ETCCE002	Hitesh Sutradhar		20	
3.	21ETCCE004	Naved khan		22	
4.	21ETCCE006	Pushpendra gehlot		25	
5.	21ETCCE007	Shalin Dak		21	
6.	21ETCCE009	Tamanna kumawat		26	
7.	21ETCCE300	Muniraj Sharma		26	
8.	22ETCCE200	Moiz Udaipurwala		28	
9.	22ETCCE201	Vikas Suthar		21	

TOTAL	PASS	FAIL	ABSENT	PASS %
9				

Indirect Assessment:

Overall Teacher Self-Assessment (at the completion of course) in terms of course objective and outcomes

Course Objectives:

This course will provide students with a foundational understanding of Environmental Engineering. Students will gain knowledge and skills in identifying, evaluating, and mitigating the impact of environmental pollutants on human health and ecosystems. The course covers essential topics such as water supply and treatment, wastewater management, air pollution control, and solid waste management. Students will learn to design and implement systems for pollution control, waste disposal, and recycling, with an emphasis on sustainable practices. Additionally, the course will explore public health considerations and the role of environmental engineering in protecting and improving the quality of the environment.

Course Outcomes:

CO1: Understand demand for water supply to households, industry and public services.

CO2: Understand source of water and their quality parameter.

CO3 Analyze the impact of pollutants and assess pollution control measures

CO4: Analyze wastewater treatment processes and recommend disposal methods.

CO5:. Explain an integrated air and noise pollution control plan for an urban or industrial area.

Methodology to identify bright student

Considered a range of criteria, including academic performance, creativity, critical thinking, problem-solving skills, and enthusiasm for learning. Bright students often excel in multiple areas. Observed how students perform in the classroom. In terms of active participation, engagement in discussions, leadership, and the ability to grasp complex concepts.

Efforts to keep students engaged

1. Active Learning:
   - Incorporate active learning strategies, such as group discussions, problem-solving activities, and hands-on projects. Active participation keeps students engaged and encourages critical thinking.
2. Varied Teaching Methods:
   - Use a variety of teaching methods, including lectures, group work, multimedia presentations, and interactive activities to cater to different learning preferences.
3. Technology Integration:
   - Leverage technology, such as online platforms, educational apps, and interactive software, to make lessons more engaging and interactive.

Methodology to identify weak student

Considered a range of criteria, including classroom observation, formative assessment, summative assessment, assignment review e.t.c. Weak students are struggling students with sensitivity and a desire to support their learning. Some measures, such as additional tutoring, personalized assignments, or alternative assessment methods, to help students succeed.

Targeted inventions for weak student

1. Additional Resources

Offer supplementary learning materials, such as textbooks, online resources, or multimedia content, to provide alternative explanations and reinforce key concepts.

2. Remedial classes

Establish a tutoring program where students can receive extra help from teachers.

3. Flipped classroom

Students are assigned pre-class learning materials, often in the form of videos, readings, or online modules, to cover the foundational concepts before coming to class.