

Techno India NJR Institute of Technology



Environmental Engineering and Disaster Management

(Subject Code: 7AG6-60.2)

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RAJASTHAN TECHNICAL UNIVERSITY, KOTA

Open Electives Syllabus

B. Tech.: IV Year- VII & VIII Semester

7AG6-60.2 : Environmental Engineering and Disaster Management

Credit: 3

Max. Marks: 150(IA:30, ETE:120)

3L+0T+0P

End Term Exam: 3 Hours

SN	Contents	Hours
1	Introduction: Objective, scope and outcome of the course. (This compulsory for all course)	01
2	Importance of safe water supply system. Domestic water requirements for urban and rural areas. Sources of Water supply. Intakes and transportation of water.	09
3	Drinking water quality. Indian Standards of drinking water. Introduction to water treatment for safe drinking, Importance of sanitation.	10
4	<i>Domestic waste water</i> : quantity, characteristics, disposal in urban and rural areas. Sewer: types, design discharge and hydraulic design. Introduction to domestic wastewater treatment.	10
5	<i>Solid waste</i> : quantity, characteristics and disposal for urban and rural areas. Introduction to air pollution. Types of pollutants, properties and their effects on living beings. BIS standards for pollutants in air and their abetments. Introduction to various disaster, Importance of disaster management.	10
	Total	40

Course Overview:

Student will learn basics of EE & DM from this 40-hour course. They will be able to protect public health by preserving and enhancing the environment. They are engaged in designing various pollution control equipment and devices, construction, installation, implementation and operation of environmentally related procedures. For example, they design the water management and water waste systems which clean our water and eliminate dangerous bacteria and viruses. New research helps environmental engineers develop new ways to improve our life.

EE & DM is the basic requirement for the job role of Environment engineer in the companies like Aquatec and enviro privet etc. Most of the questions asked during the placement drive for the EVS Company are created from this subject.

Course Outcomes:

CO. NO.	Cognitive Level	Course Outcome
1	Analysis	Analyse characteristics of water and wastewater.
2	Application	Estimate the quantity of drinking water and domestic wastewater generated.
3	Design	Design components of water supply systems.
4	Design	Accumulate the information about water supply fittings.
5	Synthesis	Calculate physical chemical properties by lab experiments for sewage sample.

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
5. Illustrate environmental information to both technical and non-technical audiences

Course Outcome Mapping with Program Outcome:

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO472.1	3	2	2	2	2	2	2	1	2	1	1	1	2	2	3
CO472.2	3	2	2	2	2	2	1	1	2	1	2	2	2	3	3
CO472.3	3	2	2	2	2	2	1	1	2	1	2	2	2	3	3
CO472.4	2	2	2	2	2	2	2	1	2	2	2	2	2	1	1

CO472.5	2	2	2	2	2	2	2	1	2	2	2	2	2	1	1
CO472 (AVG)	2.6	2	2	2	2	2	1.6	1	2	1.4	1.8	1.8	2	2	2.2

Course Coverage Module Wise:

Lecture No.	Unit	Topic
1	1	Introduction: Objective, scope and outcomes of course.
2	2	Safe water supply: Introduction of safe water.
3	2	Importance of safe water system.
4	2	Domestic water requirements for urban.
5	2	Domestic water requirements for Rural.
6	2	Important water sources.
7	2	Intake of water sources.
8	2	transportation and supply of water
9	2	Revision of the chapter
10	2	Class test of the chapter.
11	3	Drinking water quality: Introduction of pure water.
12	3	Quality of drinking water.
13	3	Indian standard quality of drinking water.
14	3	Introduction of water treatment plant.
15	3	Types of water treatment methods.
16	3	Characteristics of pure water.
17	3	Importance of sanitation.
18	3	Introduction of sanitation
19	3	Revision of the chapter.
20	3	Class test of the chapter.
21	4	Domestic wastewater: Introduction.

22	4	Quantity of domestic wastewater.
23	4	Characteristics of wastewater.
24	4	Disposal of wastewater in urban. Urban.
25	4	Disposal of wastewater in rural.
26	4	Introduction of sewer.
27	4	types of sewers
28	4	Discharge and Hydraulic design of sewer.
29	4	Introduction to domestic wastewater treatment.
30	4	Revision of the chapter.
31	5	Solid waste: Introduction.
32	5	Quantity of solid waste.
33	5	Characteristics of solid waste.
34	5	Disposal of solid waste in urban and rural.
35	5	Introduction of Air pollution and type of pollutants.
36	5	Properties and effects of pollutants on living beings.
37	5	BIS standard of pollutants of air and their abatement.
38	5	Introduction of various disaster.
39	5	Importance of disaster management and revision.
40	5	Class test of the chapter.

Course Level Problems (Test Items):

CO.NO.	Problem description
1	<ol style="list-style-type: none"> 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

	<p>4. Write a short note on Transportation of water</p> <p>5. Write about Requirement of safe water in Rural area.</p>
2	<p>1. Write a note on Indian Standards water quality</p> <p>2. Write about introduction of water treatment</p> <p>3. Write a note on importance Sanitation</p> <p>4. Explain in detail Drinking water quality</p>
3	<p>1 Explain in detail the Characteristics of domestic waste</p> <p>2 How we will disposal Wastewater in Urban area</p> <p>3 How we will disposal Wastewater in Rural area</p> <p>4 Explain in detail Different types of Severs</p> <p>5 Write a note on Domestic Wastewater Treatment</p>
4	<p>1 Explain in detail the Characteristics of Solid waste</p> <p>2 Write a note on Disposal of Solid waste in urban area</p> <p>3 Explain in detail BIS standards for pollutant in Air and noise</p> <p>4 Write a note on Importance Disaster Management</p> <p>5 Write a note on Types of Pollutants in detail</p>

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-wise:

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/In-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

Water quality

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 3

Waste water

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=z213_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 4

Solid waste Management

Video Tutorials <https://www.youtube.com/watch?v=k0ktJRoRcOA>

Theory concepts:

https://ec.europa.eu/echo/files/evaluation/watsan2005/annex_files/WEDC/es/ES07CD.pdf

Sample Quiz: <https://olc.worldbank.org/node/39614/take>

TECHNO INDIA NJR INSTITUTE OF TECHNOLOGY, UDAIPUR
Environmental Engineering & Disaster Management (7AG6-60.2)
(Common for all Branch)

Assignment

1. State the concept on Sources of Water supply in detail
2. State the concept on Various types of Water Demand in detail
3. State a note on Indian standard of drinking Water Quality
4. State a note on Water Treatment for safe drinking in detail
5. Explain In detail about Impotence of Sanitation
6. Write design steps of Hydraulic design of Sewers
7. Explain in Detail about Domestic wastewater quantity and treatment
8. Explain in detail about Types and Characteristics of Solid waste
9. Illustrate in detail about Air Pollution and Types of Pollutants
10. Illustrate in detail about Importance of Disaster Management

Quiz

1. The term 'Sullage' refers to:
 - a) Fresh wastewater
 - b) Septic wastewater
 - c) Wastewater from kitchen, laundry
 - d) Toxic wastewater
2. Wastewater can become septic by the loss of:
 - a) Dissolved oxygen content
 - b) Carbon content
 - c) Organic compounds
 - d) Water content
3. Which one of the below is not an attribute of drinking water?
 - a) Aesthetics
 - b) Economic
 - c) Safety
 - d) Source
4. The extent of water treatment depends on how many factors?
 - a) 5
 - b) 2
 - c) 3
 - d) 4
5. One of the major objectives of water treatment plants is the removal of turbidity.
 - a) True
 - b) False
6. What is added to the water treatment tank to settle the colloidal particles?
 - a) Alum
 - b) Alum and lime
 - c) Lime
 - d) Potash
7. Disinfection of water in our country is mainly done by _____
 - a) Oxygenation
 - b) Hydration
 - c) Chlorination
 - d) Filtration
8. Which minerals and in what form are present in ground water?
 - a) Fe & Mn in Ferrous and Manganous
 - b) Fe & Cu in Ferric and Cupric

- c) Fe & Mn in Ferric and manganous
- d) Cu & Mn in Cuprous and manganous

9. How many types of wastewater treatment plants are there based on the type of wastewater?

- a) 5
- b) 4
- c) 2
- d) 3

10. On how many conditions does the intervention of wastewater depend on?

- a) 5
- b) 7
- c) 6
- d) 4

Solution: 1.c , 2.a, 3.d, 4.b, 5.a, 6.b, 7c, 8.a, 9.d, 10.b

Quiz 2

1. Disasters can be broadly termed as _____ types.
 - a) 2
 - b) 4
 - c) 5
 - d) 3

2. The annual flood peaks in India are recorded in months of:
 - a) June, July
 - b) July, August
 - c) July, September
 - d) August, September

3. Uttarakhand lies in zone _____ of Earthquake prone areas.
 - a) 5
 - b) 3
 - c) 4
 - d) 2

4. To measure flood variability, _____ is used widely.
 - a) FFMI
 - b) FI
 - c) FMI
 - d) FFI

5. Disaster management deals with situation that occurs after the disaster.
 - a) True
 - b) False

6. How many elements of disaster management are there?
 - a) 8

- b) 7
- c) 4
- d) 6

7. Which of the below is an example of slow-onset disaster?

- a) Earthquake
- b) Tsunami
- c) Cyclone
- d) Draught

8. How many phases of disaster response are there?

- a) 5
- b) 4
- c) 3
- d) 2

9. The first step in preparedness planning is:

- a) Analysis of data collected
- b) Determination of objectives
- c) Development of implementing device
- d) Determination of strategy

10. Tsunami detectors are placed in sea at _____ kms from shore.

- a) 25
- b) 100
- c) 50
- d) 85

Solution: 1.a, 2.d, 3.c, 4.a, 5.b, 6.d, 7.d, 8.a, 9.b, 10.c

7E1711	Roll No. _____	[Total No. of Pages : 2]
	7E1711	
B.Tech. VII Sem. (Main / Back) Examination, January - 2023 Open Elective-I 7AG6-60.2 Environmental Engineering and Disaster Management		

Time : 3 Hours

Maximum Marks : 120
Min. Passing Marks : 42

Instructions to Candidates:

Attempt all ten questions from Part A, five questions out of seven from Part B and four questions out of five from Part C.

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

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

PART - A

(Answer should be given up to 25 words only)

ALL questions are compulsory. (10×2=20)

1. What do you mean by environment?
2. What are the characteristics of smoke?
3. What is sewage?
4. Enlist different types of pollutants.
5. Give the any four names of natural and man-made type of disaster.
6. What is importance of safe water supply system?
7. What is importance of sanitation?
8. What is disaster?
9. Write down different types of solid waste.
10. What is importance of disaster management?

PART - B

(Analytical/Problem solving questions)

Attempt any FIVE questions.

(5×8=40)

1. Describe different sources of water supply.
2. Describe physical characteristics of water.
3. What is air pollution? Explain harmful effects of air pollution on human being.
4. Describe the quality standards for drinking water as per Indian Standards.
5. Describe different types of sewer.
6. Explain different types of air pollutants with their properties.
7. Write a short note on disaster management cycle.

PART - C

(Descriptive/Analytical/Problem solving/Design Questions)

Attempt any FOUR questions.

(4×15=60)

1. Explain domestic waste water treatment process.
2. Describe various techniques of waste processing and methods of disposal.
3. Describe the various techniques and methods for controlling air pollution.
4. Describe different types of disaster.
5. Describe the various classification of solid waste.

7E1711

Roll No. _____

Total No of Pages: **2**

7E1711

**B. Tech. VII - Sem. (Main) Exam., Feb.- March - 2021
OE -I Open Elective-I Agricultural Engineering
7AG6 – 60.2 Environmental Engineering
& Disaster Management**

Time: 2 Hours

[To be converted as per scheme]

Max. Marks: 82

Min. Marks: 29

Instructions to Candidates:

Attempt all ten questions from Part A, four questions out of seven questions from Part B and two questions out of five from Part C.

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 material is permitted during examination.
(Mentioned in form No. 205)*

1. NIL

2. NIL

PART – A

(Answer should be given up to 25 words only)

[10×2=20]

All questions are compulsory

- Q.1 Define Environmental Engineering.
- Q.2 What is disaster management?
- Q.3 What is environment?
- Q.4 What is water sanitation?
- Q.5 List the sources of water supply.
- Q.6 Define the pH of drinking water.
- Q.7 What is air pollutant?
- Q.8 Define smog with an example.
- Q.9 What is bio-magnification?
- Q.10 Enlist different types of air pollutants.

[7E1711]

Page 1 of 2

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PART – B

(Analytical/Problem solving questions)

[4×8=32]

Attempt any four questions

- Q.1 Describe the components of environment in short.
- Q.2 Write in brief, standards of drinking water.
- Q.3 Write down steps /ways to meet the water crisis.
- Q.4 What is waste and why does it require management?
- Q.5 Write in short the various types of natural, human induced and slow acting disasters.
- Q.6 When is the National Disaster Reduction Day celebrated in India and why?
- Q.7 Report the state of urban air pollution in India. What is its impact on health, especially on that of children?

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions)

[2×15=30]

Attempt any two questions

- Q.1 Elaborate – scope and importance of Environmental Engineering. Why do we say that any study of the environment becomes an interdisciplinary one?
- Q.2 Discuss the requirements for urban and rural water supply system. How does intake and transportation of water affect its quality?
- Q.3 How will you measure the quality of drinking water? Why water is a unique source and how much water do we need daily?
- Q.4 What is a solid waste? Describe sources of solid waste. Give a detailed account of solid waste management.
- Q.5 Explain how do educated people view global warming and climate change. Why do we have so many sceptics? How can we convince them of the urgency of climate change?
