



Subject	Microbiology
Paper No. and Title	XV, Environmental Microbiology
Module (Flipped classroom) No. and Title	1, Waste water and parameters
Module Tag	DAYA_MICRO_NRD_M1

By,

Dr.

N.R. Damle Professor

r,

Department of Microbiology,

D. B. F. Dayanand College of Arts and Science, Solapur.

Module No. 1,

- **Prerequisites**–Learnershavereadout environmental microbiologybook.
- **Objectives of theModule**
⇒ **Sub Unit1**

	Content	Objectives (Learner should be able to)	Cognitive Level
1.1	Definition of waste water, types and composition	Define waste water, composition	Remembering
		Memorise the definition of waste water as used water	Remembering
		Recall the definition of waste water	Remembering
		Compare with the definitions and types of other wastes	Understanding
		Evaluate the definition of waste water	Evaluating
1.2	Composition	Understand the composition of waste water	Understanding
		Explain the various components of waste water	Understanding
		Apply the composition for variation to various wastes	Applying
		Compare the composition of various wastes	Creating

⇒

Detailed Plan of Out-of -class and In-class activities

Week 1

Sub Unit 1 –

Objectives –

- To know the definition of waste water, composition and types of waste water.
- To understand the variation in composition of waste water depending upon area, hourly and type of waste.

Resources Needed –

⇒ Title and Nature of Resources –

Syllabus of B.Sc.III

⇒ Material OER/URL/Instructor-made/Copywrited/Text Booketc.

1) Environmental Chemistry Book-

2) Agricultural and environmental microbiology-
N.S.Kulkarni

3) Instructor-made

PPT –Waste water treatment

<https://drive.google.com/file/d/1LPBcDhiFV1EUvi65abBbgpl7TluSeTEU/view?usp=sharing>

4) Instructor-made

Practice test-

[https://drive.google.com/file/d/1X-V-](https://drive.google.com/file/d/1X-V-Z0qvyy46vyy1re7dXfE4r6HmnYiS/view?usp=sharing)

[Z0qvyy46vyy1re7dXfE4r6HmnYiS/view?usp=sharing](https://drive.google.com/file/d/1X-V-Z0qvyy46vyy1re7dXfE4r6HmnYiS/view?usp=sharing)

Units	Out-of –class activity Details of Activity	In-class activity Details of Activity	Assessment
1.1	Students should read out the topic from referencebooks Students should read the PPT	Discussion on the topic Check the level of understanding of the topic through Question – answer session	Question – answer session
1.2	Students should read out the topic from referencebook. Students should read the PPT	Same as above Help the students to study the composition	Question answer session

Week 2

Sub Unit 2 - –

- To know the parameters of waste water
- To understand physical, chemical and biological parameters.
- To know what are the different methods to study the parameters.
- To know the significance of knowing the values of parameters.

Sub Unit2

	Content	Objectives (Learner should be able to)	Cognitive Level
2.1	Study of Parameters of waste water	To know the physical, chemical and biological parameters	Understanding
		Understand the illustrations of pH, temp, B.O.D, C.O.D, TS, TSS, TDS etc	Understanding
		Memorise the illustrations of pH, temp, B.O.D, C.O.D, TS, TSS, TDS etc	Remembering
		Recall the parameters	Understanding
2.2	Different methods to study parameter	Understand the methods of study the parameters	Understanding
		Know the relationship between parameter study and strength of sewage	Understanding
		Apply the parameter study to know quality of waste	Applying
		determinestrengthof waste water	Analyzing
		Write the types of waste water and different parameters in tabular form	Creating

Resources Needed –

→ Title and Nature of Resources –
Syllabus of B.Sc.III

→ Material OER/URL/Instructor-made/Copywrited/Text
Booketc.

1) Environmental Chemistry Book-

2) Instructor-made –

PPT –Waste water treatment

<https://drive.google.com/file/d/1LPBcDhiFV1EUvi65abBbqpl7TluSeTEU/view?usp=sharing>

3) Practice test-

[https://drive.google.com/file/d/1X-V-](https://drive.google.com/file/d/1X-V-Z0qvyy46vyy1re7dXfE4r6HmnYiS/view?usp=sharing)

[Z0qvyy46vyy1re7dXfE4r6HmnYiS/view?usp=sharing](https://drive.google.com/file/d/1X-V-Z0qvyy46vyy1re7dXfE4r6HmnYiS/view?usp=sharing)

Units	Out-of –class activity Details of Activity	In-class activity Details of Activity	Assessment
2.1	Students should read out the topic from Text book And PPT	Discussion on the – physical ,chemical and Biological parameters special emphasis on B.O.D, C.O.D, TSS,TS,TDS,pH, temp etc Check the level of understanding of the topic through Question – answer session	Question – answer session important parameters.
2.2	Students	Same as above	Question to write in

	<p>should read out the topic from Text book</p>	<p>Help students to Remember methods to study parameters and comparison of parameters of various wastes in tabular Form.</p>	<p>Detail –significance of studingparametes</p>
--	--	--	---

