SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN - THEORY

Department of Biotechnology		LP: BT 22302
~~B.E~~/B.Tech/~~M.E/M.Tech~~ : Biotechnology	Regulation: 2022	Rev. No: 00
PG Specialisation : -NA-		Date: 01/08/2023
Sub. Code / Sub. Name : BT 22302 / Microbiology		
Unit : 1		

Unit Syllabus: **ISOLATION AND STAINING (9 h)**

Basics of microbial existence, History of microbiology, Classification and Nomenclature of microorganisms, Microscopic examination of microorganisms, Light and electron microscopy, Principles of different staining techniques like gram staining, acid-fast, capsular staining, flagellar staining. Sources and isolation of Industrially important microbes.

Objective:
To introduce students to the isolation and staining of microbes.

Session No *	Topics to be covered	Ref	Teaching Aids
1.	Introduction to microbiology	T1(2-5)	BB & PPT
2.	Basic of microbial existence	T1(14)	BB & PPT
3.	History of microbiology	T1(13-16)	BB & PPT
4.	Classification and nomenclature of microorganisms	T1(19-21)	BB & PPT
5.	Light Microscopic examination of microorganisms	T3(23-31)	GCR, BB & PPT
6.	Electron microscopy examination of microorganisms	T3(34-41)	BB & PPT
7.	Principles of different staining techniques - gram staining, acid fast staining	T3(32,33)	BB & PPT
8.	Principles of different staining techniques - capsular staining, flagellar staining	T3(32,33)	BB & PPT
9.	Sources and isolation of Industrially important microbes.	T1(62)	BB & PPT
Content beyond syllabus covered (if any): Nil			

* Session duration: 50 minutes

SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN - THEORY

Sub. Code / Sub. Name: BT **22302** / Microbiology

Unit : II

Unit Syllabus: **Microbes-structure and multiplication (9 h)**

Structural organization and Multiplication of bacteria, viruses, algae and fungi with special mention of life history of actinomycetes, yeast, mycoplasma and bacteriophages. microbiology of water, air and soil, Strain improvement.

Objective:
To help them to understand the morphological differences and reproduction.

Session No *	Topics to be covered	Ref	Teaching Aids
10.	Structural organization and Multiplication of bacteria	T2(73-132)	GCR, BB & PPT
11.	Structural organization and Multiplication of virus	T1(177-179)	BB & PPT
12.	Structural organization and Multiplication of algae	T2(365-387)	BB & PPT
13.	Structural organization and Multiplication of fungi	T2(333-363)	BB & PPT
14.	Life cycle of Actinomycetes and Yeast	T1(138-145)	BB & PPT
15.	Life cycle of Bacteriophage and Mycoplasma	T1(160-179)	GCR, BB & PPT
16.	Microbial Strain improvement	T1(310-319)	BB & PPT
17.	Microbiology of soil	T2(543-568)	BB & PPT
18.	Microbiology of water and air	T2(569-617)	BB & PPT
Content beyond syllabus covered (if any): Nil.			

* Session duration: 50 mins

SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN - THEORY

Sub. Code / Sub. Name: BT **22302** / Microbiology

Unit: III

Unit Syllabus: **Microbial Nutrition, Growth and Metabolism (9 h)**

Nutritional requirements of bacteria and different media used for bacterial culture; growth curve and different methods to quantitate bacterial growth, aerobic and anaerobic bioenergetics and utilization of energy for biosynthesis of important molecules. Media formulation, Microbial communication system, Probiotics.

Objective:
To support them to know the pattern of growth and nutritional requirement for growth

Session No *	Topics to be covered	Ref	Teaching Aids
19.	Nutritional requirements of bacteria	T1(193-196)	BB & PPT
20.	Different types of media used for bacterial culture	T1(188-193)	GCR, BB & PPT
21.	Media formulation	T1(188-190)	BB & PPT
22.	Bacterial growth curve	T1(212-215)	BB & PPT
23.	Different methods to quantitate bacterial growth	T1(216-217)	BB & PPT
24.	Aerobic and Anaerobic bioenergetics	T2(171-195)	BB & PPT
25.	Utilization of energy for biosynthesis of smaller molecules	T2(196-226)	GCR, BB & PPT
26.	Utilization of energy for biosynthesis of macro molecules	T2(196-226)	BB & PPT
27.	Microbial communication system in Probiotics	T2(618-641)	BB & PPT
Content beyond syllabus covered (if any): Nil			

* Session duration: 50 mins

SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN - THEORY

Sub. Code / Sub. Name: BT **22302** / Microbiology

Unit: IV

Unit Syllabus: **Control of Microorganisms (9h)**

Physical and chemical control of microorganisms, Host-microbe interactions, Anti-bacterial, Antifungal and Anti-viral agents, Mode of action and resistance to antibiotics, Clinically important microorganisms. Preservation and maintenance of industrially important strains.

Objective:

To solve the problems in microbial infection and their control

Session No *	Topics to be covered	Ref	Teaching Aids
28.	Physical control of microorganisms	T2(469-487)	BB & PPT
29.	Chemical control of microorganisms	T2(488-509)	BB & PPT
30.	Host-microbe interactions	T2(687-702)	GCR, BB & PPT
31.	Anti-bacterial agents	T2(510-527)	BB & PPT
32.	Antifungal agents	T2(527)	BB & PPT
33.	Antiviral agents	T2(528)	BB & PPT
34.	Mode of action and resistance to antibiotics	T2(531-532)	BB & PPT
35.	Clinically important microorganisms	T2 (789 – 822)	GCR, BB & PPT
36.	Preservation and maintenance of industrially important strains.	T3(1060-1086)	BB & PPT
Content beyond syllabus covered (if any): Sterility maintenance in various industries is discussed			

* Session duration: 50 mins

SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN - THEORY

Sub. Code / Sub. Name: BT **22302** / Microbiology

Unit: V

Unit Syllabus: **Industrial and Environmental Microbiology (9 h)**

Bioremediation, Bioleaching, Bioreduction, Biotransformation, Vermicomposting Biofertilizers and Biopesticides, Microorganisms and Pollution control, Biosensors.

Objective:
To apply the microbial nature of behavior to bring about solution to the environmental pollution issues

Session No *	Topics to be covered	Ref	Teaching Aids
37.	Bioremediation	T5(1-18)	BB & PPT
38.	Bioleaching	T5(48-55)	BB & PPT
39.	Bioreduction	T1(820-825)	BB & PPT
40.	Biotransformation	T1(188-190)	GCR, BB & PPT
41.	Biofertilizers	T1(207-12)	BB & PPT
42.	Vermicomposting Biofertilizers	T1(207-12)	BB & PPT
43.	Biopesticides	T4(857/859)	BB & PPT
44.	Microorganisms and pollution control	T1(231-33)	BB & PPT
45.	Biosensor	T3(959-962)	GCR, BB & PPT
Content beyond syllabus covered (if any): Nil			

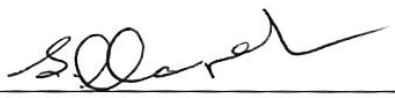
* Session duration: 50 mins

Sub Code / Sub Name: BT **22302** / Microbiology

REFERENCES:

Text Books:

1. Talaron, K. and Chess, B Foundations in Microbiology, 10th Edition, McGraw-Hill Education, 2017
2. Pelczar, M.J., Chan, E.C.S. and Krein, N.R., Microbiology, 5th Ed., Tata McGraw Hill Edition, 2012.
3. Woolverton, J. C,. Sherwood, L. and Willey, J. Prescott's Microbiology, 10th Edition, McGraw-Hill Education, 2016
4. Madigan, M., Bender K. S., Buckley D.H., Sattley W. M., and Stahl D.A. Brock Biology of Microorganisms. 16th ed. New York: Pearson, 2020.
5. Mishra B. B., Samantaray, D., Nayak, S.K. and Mohapatra S., Environmental and Agricultural Microbiology: Applications for Sustainability. (2021). United Kingdom: Wiley.

	Prepared by	Approved by
Signature		
Name	Mr. S. Naga Vignesh	Prof. E. Nakkeeran
Designation	Assistant Professor	Head of the Department
Date	2.08.2023	2.08.2023

Remarks *:

The same lesson plan will be followed in subsequent future.