

**B.Sc MICROBIOLOGY (CBCS) SYLLABUS
THIRD YEAR – SEMESTER- V**

MBT- 501 ENVIRONMENTAL & AGRICULTURAL MICROBIOLOGY

TOTAL HOURS: 36

CREDITS: 3

UNIT - I

No. of hours: 8

Terrestrial Environment: Soil profile and soil microflora

Aquatic Environment: Microflora of fresh water and marine habitats

Atmosphere: Aeromicroflora and dispersal of microbes

Extreme Habitats: Extremophiles: Microbes thriving at high & low temperatures, pH, high hydrostatic & osmotic pressures, salinity, & low nutrient levels.

UNIT – II

No. of hours: 8

Role of microorganisms in nutrient cycling (Carbon, nitrogen, phosphorus).

Treatment and safety of drinking (potable) water, methods to detect potability of water samples: (a) standard qualitative procedure: presumptive test/MPN test, confirmed and completed tests for faecal coliforms (b)

Membrane filter technique. Microbial interactions – mutualism, commensalism, antagonism, competition, parasitism, predation.

UNIT – III

No. of hours: 6

Outlines of Solid Waste management: Sources and types of solid waste, Methods of solid waste disposal (composting and sanitary landfill).

Liquid waste management: Composition and strength of sewage (BOD and COD), Primary, secondary (oxidation ponds, trickling filter, activated sludge process and septic tank) and tertiary sewage treatment.

Xenobiotics – their recalcitrance and effects on microflora.

UNIT – IV

No. of hours: 7

Plant Growth Promoting Microorganisms - Mycorrhizae, Rhizobia, *Azospirillum*, *Azotobacter*, *Frankia*, phosphate-solubilizers fluorescent Pseudomonads.

Outlines of biological nitrogen fixation (symbiotic, non-symbiotic).

Biofertilizers - *Rhizobium*, *Cyanobacteria*.

UNIT – V

No. of hours: 7

Concept of disease in plants. Symptoms of plant diseases caused by fungi, bacteria, and viruses. Plant diseases - groundnut rust, Citrus canker and tomato leaf curl.

Principles of plant disease control.

MBP- 501 ENVIRONMENTAL & AGRICULTURAL MICROBIOLOGY

TOTAL HOURS: 36

CREDITS: 2

1. Analysis of soil – pH, Moisture content and water holding capacity.
2. Isolation of microbes (bacteria and fungi) from soil.
3. Study of air flora by petriplate exposure method.
4. Analysis of potable water: SPC, and MPN method.
5. Determination of Chemical Oxygen Demand (COD) of waste water samples.
6. Isolation of *Rhizobium* from root nodules.
7. Staining and observation of Vesicular Arbuscular Mycorrhizal (VAM) fungi.
8. Observation of plant diseases of local importance - Citrus canker, Tikka disease of Groundnut, Bhendi yellow vein mosaic, Rusts, Smuts, Powdery mildews, Tomato leaf curl.

SUGGESTED READINGS

Atlas RM and Bartha R. (2000). **Microbial Ecology: Fundamentals & Applications**. 4th edition. Benjamin/Cummings Science Publishing, USA

Barton LL & Northup DE (2011). **Microbial Ecology**. 1st edition, Wiley Blackwell, USA

Campbell RE. (1983). **Microbial Ecology**. Blackwell Scientific Publication, Oxford, England.

Lynch JM & Hobbie JE. (1988). **Microorganisms in Action: Concepts & Application in Microbial Ecology**. Blackwell Scientific Publication, U.K.

Madigan MT, Martinko JM and Parker J. (2014). **Brock Biology of Microorganisms**. 14th edition. Pearson/ Benjamin Cummings

Maier RM, Pepper IL and Gerba CP. (2009). **Environmental Microbiology**. 2nd edition, Academic Press

Martin A. (1977). **An Introduction to Soil Microbiology**. 2nd edition. John Wiley & Sons Inc. New York & London.

M. N. Reddy, V. Uma Maheswara Rao, P. Nagapadma, M. Raghuram and M. Charitha Devi (2012). **Applied Microbiology B.Sc Third Year Paper-IV**, Telugu Akademi, Hyderabad.

P.D. Sharma (2005) **Environmental Microbiology**. Alpha Science International New Delhi.

P.D. Sharma (2005) **Microbiology** – Rastogi Publication, India.

Subba Rao NS. (1999). **Soil Microbiology**. 4th edition. Oxford & IBH Publishing Co. New Delhi.

Willey JM, Sherwood LM, and Woolverton CJ. (2013). **Prescott's Microbiology**. 9th edition. McGraw Hill Higher Education.

SECTION – A

ANSWER ANY FIVE OF THE FOLLOWING 5 x 5 = 25 M

Draw labeled diagrams wherever necessary

1. Oligotrophs.
అతిగానీటి
2. Aeromicroflora.
వెలుపైకి ఉన్న మైక్రోజీవులు
3. Phosphorous cycle.
ఫాస్ఫరస్ వలయము
4. Types of solid wastes.
ఘన వ్యర్థాల రకాలు
5. MPN Test.
యంపి.పి.ఎం.ఎస్ పరీక్ష
6. Frankia.
ఫ్రాంకియా
7. Mosaic symptoms.
మోజైక్ సాక్షి లక్షణాలు
8. Tomato leaf curl.
టమాటా ఆకు కుప్పలు కట్టడం

SECTION – A

ANSWER ANY FIVE OF THE FOLLOWING

5 x 10 = 50 M

9. a) Write an essay on soil profile and soil microflora.
(or) నేల పొర మరియు మైక్రోజీవులు మరియు వాటి ప్రాధాన్యత
- b) Discuss briefly about 'extremophiles'.
అత్యధిక ఉష్ణ, తక్కువ ఉష్ణ, అత్యధిక ఆమ్ల, అత్యధిక ఆమ్ల, అత్యధిక ఉప్పు, అత్యధిక ఉప్పు
10. a) What is the role of microbes in nutrient cycling.
(or) మైక్రోజీవుల పాత్ర పోషక చక్రంలో
- b) Write an essay on treatment and safety of drinking water.
పానీయ నీటి చికిత్స మరియు భద్రత మరియు ప్రాధాన్యత
11. a) Explain in detail about secondary sewage treatments.
(or) ద్వితీయ మునిసిపల్ చికిత్స మరియు విధులు మరియు ప్రాధాన్యత
- b) Discuss about solid waste disposal.
ఘన వ్యర్థాల నిర్మూలన మరియు చికిత్స
11. a) Outline the symbiotic nitrogen fixation.
(or) సహజీవన శక్తిని స్థిరీకరించే మైక్రోజీవులు మరియు ప్రాధాన్యత
- b) Write any three growth promoting microorganisms.
వివిధ మూలకాలు మరియు మైక్రోజీవులు మరియు ప్రాధాన్యత

Ch. K. Ravi
10/5/17

B.Sc MICROBIOLOGY (CBCS) SYLLABUS
THIRD YEAR – SEMESTER- V
Paper-VI: FOOD AND INDUSTRIAL MICROBIOLOGY

TOTAL HOURS: 36

CREDITS: 3

UNIT- I

No. of hours: 8

Intrinsic and extrinsic parameters that affect microbial growth in food
 Microbial spoilage of food - fruits, vegetables, milk, meat, egg, bread and canned foods
 Food intoxication (botulism).
 Food-borne diseases (salmonellosis) and their detection.

UNIT – II

No. of hours: 7

Principles of food preservation - Physical and chemical methods.
 Fermented Dairy foods – cheese and yogurt.
 Microorganisms as food – SCP, edible mushrooms (white button, oyster and paddy straw). Probiotics and their benefits.

UNIT – III

No. of hours: 6

Microorganisms of industrial importance – yeasts, moulds, bacteria, actinomycetes.
 Isolation and Screening of industrially-important microorganisms.
 Outlines of strain improvement.

UNIT – IV

No. of hours: 8

Types of fermentation processes – solid state, liquid state, batch, fed-batch, continuous.
 Design of fermenter.
 Ingredients of Fermentation media
 Downstream processing - filtration, centrifugation, cell disruption, solvent extraction.

UNIT – V

No. of hours: 7

Microbial production of Industrial products - Citric acid, Ethanol, amylases, penicillin, glutamic acid and vitamin B12.

Ch. Praveen Kumar
 21/8/17
 Chairman Board of Studies (PG)
 MICROBIOLOGY
 S. V. UNIVERSITY
 TIRUPATI-517 502, A.P.

Practical –VI: FOOD AND INDUSTRIAL MICROBIOLOGY

TOTAL HOURS: 36

CREDITS: 2

1. Isolation of bacteria and fungi from spoiled bread/fruits/vegetables
2. Preparation of Yogurt/Dahi
3. Determination of the microbiological quality of milk sample by MBRT
4. Isolation of antagonistic microorganisms by crowded plate technique
5. Design of Fermenter
6. Microbial fermentation for the production and estimation of ethanol from Grapes.
7. Microbial fermentation for the production and estimation of citric acid.

SUGGESTED READING

Adams MR and Moss MO. (1995). **Food Microbiology**. 4th edition, New Age International (P) Limited Publishers, New Delhi, India.

Banwart JM. (1987). **Basic Food Microbiology**. 1st edition. CBS Publishers and Distributors, Delhi, India.

Casida LE. (1991). **Industrial Microbiology**. 1st edition. Wiley Eastern Limited.

Crueger W and Crueger A. (2000). **Biotechnology: A textbook of Industrial Microbiology**. 2nd Edition. Panima Publishing Company, New Delhi

Frazier WC and Westhoff DC. (1992). **Food Microbiology**. 3rd edition. Tata McGraw-Hill Publishing Company Ltd, New Delhi, India.


Jay JM, Loessner MJ and Golden DA. (2005). **Modern Food Microbiology**. 7th edition, CBS Publishers and Distributors, Delhi, India

Patel AH. (1996). **Industrial Microbiology** .1st Edition. MacMillan India Limited Publishing Company Ltd. New Delhi, India

Stanbury PF, Whitaker A and Hall SJ. (2006). **Principles of Fermentation Technology**. 2nd edition, Elsevier Science Ltd.

Tortora GJ, Funke BR, and Case CL. (2008). **Microbiology: An introduction**. 9th Edition. Pearson Education

Willey JM, Sherwood LM AND Woolverton CJ (2013), Prescott, Harley and Klein's **Microbiology**. 9th Edition. McGraw Hill Higher education


Chairman Board of Studies (PG)
MICROBIOLOGY
S. V. UNIVERSITY
TIRUPATI-517 502

**SUBJECT :: B.Sc., MICROBIOLOGY (CBCS) MODEL QUESTION PAPER
THIRD YEAR – SEMESTER – V**

Paper – VI: FOOD AND INDUSTRIAL MICROBIOLOGY

Max Marks - 75

Time : 3 hrs

SECTION – A

ANSWER ANY FIVE OF THE FOLLOWING

5 x 5 = 25 M

Draw labeled diagrams wherever necessary

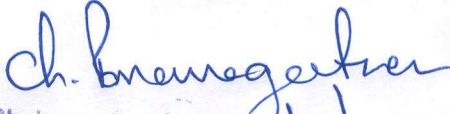
1. Food intoxication.
2. Yogurt.
3. Oyster mushrooms.
4. Importance of Moulds.
5. Batch fermentation.
6. Centrifugation.
7. Vitamin B₁₂.
8. Amylase.

SECTION – A

ANSWER ANY FIVE OF THE FOLLOWING

5 x 10 = 50 M

9. a) Discuss about intrinsic and extrinsic factors that affects microbial growth in food.
(or)
b) Comment on food-borne diseases and their detection.
10. a) What are the different types of food preservation?
(or)
b) Write an essay on probiotics and their benefits.
11. a) Describe the design of Fermenter.
(or)
b) Describe the different fermentation media.
12. a) Discuss the industrial production of citric acid.
(or)
b) Describe glutamic acid production.


Chairman Board of Studies (PG)
MICROBIOLOGY
S. V. UNIVERSITY
TIRUPATI-517 502, A.P.