



**SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)**

SUNDARAKKOTTAI, MANNARGUDI- 614016

(For the Candidates admitted in the academic year 2025-2026)

DEPARTMENT OF MICROBIOLOGY

B.Sc., BIOCHEMISTRY

Semester: III-AC-III: Basic Microbiology

Ins. Hrs. / Week: 3

Course Credit: 2

Course Code: U25AMB301

UNIT-I: Introduction and classification

(09 Hours)

Definition, scope and History of microbiology. Germ theory of disease. Differences between prokaryotic and eukaryotic microorganisms. Classification of Bacteria: based on Gram's staining, temperature and oxygen requirement. Brief overview of Archaea.

UNIT – II: Viruses, fungi, algae and protozoans

(09 Hours)

Structure, General characteristics, Classification and economic importance of viruses, fungi, Algae and Protozoa

UNIT – III: Microbial growth

(09 Hours)

Microbial growth. Factors affecting microbial growth: nutrient factors (C, H, N, O, P, S and trace elements) and non-nutrients (temperature, hydrostatic pressure, pH, osmotic strength). Types of nutrient media and special nutrient media. Differential media, Streak plate, pour plate, Antibiotic sensitivity test.

UNIT – IV: Food and industrial microbiology

(09 Hours)

Quality control of drinking water: total coli form count. Microorganisms in milk and milk products, and the preservation of milk. Role of microbes in industrial production of fermented foods: alcoholic beverages, dairy products, coffee and chocolate. Preservation of wine. Single-cell proteins, microbial biofuel and biofertilizers.

UNIT – V: Microbial diseases and antimicrobial agents

(09 Hours)

Diseases caused by bacteria, viruses, protozoa and fungi: airborne diseases, water-borne diseases and milk-borne diseases. Prion diseases. Principles and methods of sterilization and disinfection. History, and brief overview of antibiotics, their mechanisms of action, and antibiotic resistance.

Total Lecture Hours-45

COURSE OUTCOME:

The students are able to,

1. Recall the Foundational and horizontal knowledge in microbiology
2. Compare the characteristics of diverse kinds of microorganisms
3. Develop skills for the preparation of different types of media.
4. Evaluate the microbial quality of water, milk and fermented food products
5. Identify the methods of sterilization and disinfection.

TEXT BOOK(S)

1. Joanne Willey, Kathleen Sandman and Dorothy Wood, 2023, Prescott's Microbiology, 12th Edition, McGraw Hill, New Delhi.
2. Leboffe MJ and Pierce BE, 2011, A photographic atlas for the microbiology laboratory (4th ed.), Englewood: Morton Publishing, Colorado.
3. Ananathanarayanan and Panikar, 2017, Text book of microbiology, 10th Edition, New Delhi: The Orient Blackswan.
4. Dubey R.C. and Maheshwari D. K. 2022, Textbook of Microbiology. 5th Edition S. Chand, Limited, Visakhapatnam.

REFERENCE BOOK(S)

1. Tortora G. J., Funke B. R. and Case C. L. 2015. Microbiology: An Introduction, 12th Edition. Pearson, London, United Kingdom.
2. Webster J. and Weber R.W.S. 2007, Introduction to Fungi. 3rd Edition, Cambridge University Press, Cambridge.
3. Schaechter M. and Leaderberg J. 2004, The Desk encyclopedia of Microbiology. Elsevier Academic Press, California.
4. Ingraham, J.L. and Ingraham, C.A. 2000, Introduction to Microbiology, 2nd Edition, Books/ Cole Thomson Learning, UK
5. Madigan M. T., Bender K.S., Buckley D. H. Sattley W. M. and Stahl, 2018, Brock Biology of Microorganisms, 15th Edition, Pearson, UK

E-RESOURCES

1. <http://sciencenetlinks.com/tools/microbeworld>
2. <https://www.microbes.info/>
3. <https://www.asmscience.org/VisualLibrary>
4. <https://open.umn.edu/opentextbooks/BookDetail.aspx?bookId=404>
5. https://www.grsmu.by/files/file/university/cafedry//files/essential_microbiology.pdf

MAPPING WITH PROGRAM OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

CO	Pos										PSOs			
	1	2	3	4	5	6	7	8	9	10	1	2	3	4
CO1	1								2	3			3	3
CO2	1	2	2	3									3	3
CO3	1	2	2	3				2	2				3	3
CO4		2			2	2	2		2			3	3	
CO5	1		2	3						3	2		3	

Strong -3; Medium -2; Low - 1



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DEPARTMENT OF MICROBIOLOGY

B.Sc., BIOCHEMISTRY

Semester: III & IV-AP- II: Microbiology Practical

Ins. Hrs. /Week: 2

Course Credit: 2

Course Code: U25AMB302P

1. Introduction to sterilization techniques- sterilization of glass wares, autoclaving.
2. Preparation of liquid and solid media
3. Isolation of Bacteria and fungi from soil samples – serial dilution technique
4. Measurement of bacterial population
5. Pure culture techniques: spread plate, streak plate technique and pour plate
6. Methylene blue reductase test (MBRT).
7. Determination of Bacterial growth curve
8. Identification of bacteria by morphological and Biochemical characteristics
9. Smear preparation and staining of bacteria: simple staining, Grams staining and spore Staining
10. In vitro antibiotic sensitivity tests for selected bacterial cultures
11. Methods for preserving microbial cultures: slant, glycerol stock and lyophilisation.

Total Lecture Hours-30

COURSE OUTCOME

The students are able to,

1. Acquire skills on sterilization and disinfection techniques.
2. Understand the microbial culture techniques.
3. Develop knowledge on isolation and characterization techniques.
4. Analyse the biochemical characteristics of bacteria.
5. Compare the antibiotic sensitivity of the bacteria.

TEXT BOOK(S)

1. Gunasekaran P. 2007, Laboratory Manual in Microbiology. New Age International. New Delhi.
2. James G Cappucino and Natalie Sherman, 2016, Microbiology – A Laboratory manual. (5th Edition). The Benjamin publishing company. New York.
3. Hurst, C.J., Crawford R.L., Garland J.L., Lipson D.A., Mills A.L. and Stetzenbach L.D. 2007, Manual of Environmental Microbiology. (3rd Edition). American Society for Microbiology, Washington, D.C.
4. Shukla Das and Rumpa Saha, 2024, Microbiology Practical Manual, CBS Publishers and Distributors Pvt. Ltd, Chennai.

REFERENCE BOOK(S)

1. Sherman, N. and Cappuccino, J.G. 2004, Microbiology A Laboratory Manual,
2. Benjamin Cummings Publishing Company, San Francisco.
3. Dubey R.C. and Maheshwari D. K. 2022, Practical Microbiology. S. Chand Publisher, Bangalore.
4. Cappuccino, J. and Sherman, N. 2002, Microbiology: A Laboratory Manual, (6th Edition). Pearson Education, Publication, New Delhi.
5. Cullimore D. R.2010, Practical Atlas for Bacterial Identification. (2nd Edition). -Taylor & Francis, New Delhi
6. Rich R. R., Fleisher T. A., Shearer W. T., Schroeder H, Frew A. J. and Weyand C. M. 2018, Clinical Immunology: Principles and Practice. (5th Edition). Elsevier, UK
7. Glick B. R. and Patten C.L.2018, Molecular Biotechnology – Principles and Applications of Recombinant DNA. (5th Edition). ASM Press, California, USA

E-RESOURCES

- 1.<http://www.biologydiscussion.com/micro-biology/sterilisation-and-disinfection-methods-and-principles-microbiology/24403>.
2. <https://www.ebooks.cambridge.org/ebook.jsf?bid=CBO9781139170635>
3. https://www.grsmu.by/files/file/university/cafedry//files/essential_microbiology.pdf
4. <https://microbiologyinfo.com/top-and-best-microbiology-books/>
5. <https://www.cliffsnotes.com/studyguides/biology/microbiology/introduction-to-microbiology/a-brief-history-of-microbiology>

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CO1	1		2	3				2	2	3			3	3
CO2	1	2	2	3					2	3			3	3
CO3	1	2	2	3									3	
CO4	1	2	2	3					2	3			3	3
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DEPARTMENT OF MICROBIOLOGY

B.Sc., BIOCHEMISTRY

Semester: IV-AC-IV: Medical Microbiology

Ins. Hrs. / Week: 3

Course Credit: 2

Course Code: U25AMB403

UNIT – I: Micro flora of the human body and host pathogen interaction (08 Hours)

Normal micro flora of the human body. Importance of normal microflora, - Skin, Throat, Gastrointestinal tract, Urogenital tract. Host pathogen interaction: Definitions - Infection, Invasion, Pathogen, Pathogenicity, Virulence and Toxigenicity.

UNIT – II: Bacterial disease and Fungal diseases (10 Hours)

Bacteria: Causative agent, Symptoms, mode of transmission, laboratory diagnosis, prophylaxis and control of Respiratory Diseases: *S.pyogenes*, *M.tuberculosis*. Gastrointestinal Diseases: *S.typhi*, *Vibrio cholerae*, *H.pylori*, *Clostridium botulinum*. Fungi: Causative agent, Symptoms, mode of transmission, laboratory diagnosis, prophylaxis and control of Cutaneous mycoses: Tinea pedis (Athlete's foot) Systemic mycoses: Histoplasmosis, Opportunistic mycoses: Candidiasis.

UNIT – III: Viral diseases and Protozoan diseases (10 Hours)

Viruses : Causative agent, Symptoms, mode of transmission, laboratory diagnosis , prophylaxis and control of Polio, Herpes, Hepatitis, Rabies, Dengue, AIDS, Influenza, swine flu, Ebola, Chikungunya. Protozoan diseases. Symptoms, mode of transmission, prophylaxis and control Malaria, Kala-azar.

UNIT – IV: Antimicrobial agents (09 Hours)

General characteristics and mode of action of Antibacterial agents and Antifungal agents: Mechanism of action of Amphotericin B, Griseofulvin and Antiviral agents such as Amantadine, Acyclovir, Antibiotic resistance.

UNIT – V: Sample collection, transport and diagnosis (08 Hours)

Sample collection, transport and diagnosis of clinical samples. Principles of different diagnostic tests, Diagnostic kits. (ELISA, Immunofluorescence, Agglutination based tests, Complement fixation, PCR, DNA probes).

Total Lecture Hours-45

COURSE OUTCOME

The students are able to,

1. Understand Mechanisms of host pathogen interactions.
2. Acquire the knowledge on the mechanisms of causation of bacterial and fungal diseases.
3. Identify the various types of viral infections.
4. Illustrate the significance of antimicrobial agents.

- Develop employability skills in diagnostic and research institutes.

TEXT BOOK(S)

- Ananthanarayan R. and Paniker C.K.J.2009,Textbook of Microbiology. 8th edition, University Press Publication, London.
- Jawetz, Melnick and Adelberg's Medical Microbiology.2015, 26th edition. McGrawHill Publication, New Delhi.
- Goering R., Dockrell H., Zuckerman M. and Wakelin D.2007, Mims' Medical Microbiology. 4th edition.
- Elsevier 4. Willey JM, Sherwood LM, and Woolverton CJ.2013, Prescott, Harley and Klein's Microbiology. 9th edition. New Delhi. McGraw Hill Higher Education
- Madigan MT, Martinko JM, Dunlap PV and Clark DP.2014.Brock Biology of Microorganisms. 14th edition. Pearson International Edition. Singapore.
- Dubey R.C. and Maheshwari D. K.2022, Textbook of Microbiology. 5th Edition S.Chand, Limited, Visakhapatnam.

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- Ananthanarayan R. and Paniker C.K.J. 2017, Textbook of Microbiology. 10th edition,
- anungo, Reba (Ed).Orient Blackswan Publication. Hyderabad.
- Brooks G.F., Carroll K.C., Butel J.S., Morse S.A. and Mietzner, T.A. 2016, Jawetz, Melnick and Adelberg's Medical Microbiology. 27th edition. McGraw Hill Publication. New Delhi.
- Willey JM, Sherwood LM and Woolverton CJ. 2017, Prescott, Harley and Klein's Microbiology. 9th edition. McGraw Hill Higher Education. New Delhi.
- Madigan , Bender, Buckley, Sattley and Stahl. 2018, Brock Biology of Microorganisms. 15th edition. Pearson Global Edition. Singapore.
- Tortora GJ, Funke BR, and Case CL.2016, Microbiology: An Introduction. 11th edition Pearson Education India.

E-RESOURCES

- <https://mechpath.com/2015/12/01/mycobacterium-leprae/> 7.
- https://www.slideshare.net/El_Omda/anthrax-1573
- <https://microscopemaster.com>
- <https://cartercenter.com>
- <https://microbesnotes.com>
- <https://microbiology.info>.

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