



Sri Venkateswara University, Tirupati

**Syllabus for MICROBIOLOGY Major in consonance with Curriculum frame work
w.e.f. AY 2026-27**

COURSE STRUCTURE (for Semester IV)

Year	Semester	Course	Title of the Course	No. of Hrs /Week	No. of Credits
II	IV	8	Basics of Immunology	3	3
			Basics of Immunology-Practical	2	1
		9	Medical Microbiology	3	3
			Medical Microbiology-Practical	2	1
		10	Agricultural Microbiology	3	3
			Agricultural Microbiology-Practical	2	1

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

SEMESTER-IV
COURSE 9: MEDICAL MICROBIOLOGY
Theory Credits: 3 3 hrs/week

I. Learning Objectives:

1. To summarize the role of normal microflora and host–pathogen interactions.
2. To demonstrate methods for collecting, transporting, and diagnosing microbial pathogens.
3. To describe key bacterial and viral diseases, their transmission, and control measures.
4. To classify protozoan and fungal diseases and outline their transmission and control.
5. To compare antimicrobial agents, their actions, and resistance mechanisms.

II. Course Outcomes: On completion of this course, students will be able to:

1. Identify normal microflora, define infection-related terms, and differentiate opportunistic and nosocomial infections.
2. Demonstrate sample collection, pathogen identification techniques, and interpret diagnostic results.
3. Summarize symptoms, transmission, and prevention methods of tuberculosis, COVID-19, typhoid, and hepatitis A.
4. Outline symptoms, transmission, and control of malaria, amoebiasis, candidiasis, and aspergillosis.
5. Classify antimicrobial agents, describe resistance mechanisms, and perform susceptibility testing.

III. Syllabus of Theory:

Unit 1 Normal microflora of the human body and host pathogen interaction 9 Hrs

- 1.1 Normal microflora of the human body: Importance of normal microflora of skin, throat, gastrointestinal tract, urogenital tract
- 1.2 Host pathogen interaction: Definitions - Infection, Invasion, Pathogen, Pathogenicity, Virulence, Toxigenicity, Carriers and their types, Transmission of infection
- 1.3 Opportunistic infections, Nosocomial infections.

Unit - 2: Bacterial and Viral diseases 9 Hrs

Detailed study of the following diseases covering Symptoms, mode of transmission, pathogenesis, diagnosis, prophylaxis, and control

- 2.1 Respiratory Diseases: Tuberculosis (*TB*) and COVID-19 (*SARS-CoV-2- CoV-2*)
- 2.2 Gastrointestinal Diseases: Typhoid (*Salmonella typhi*) and Hepatitis (Hepatitis A)
- 2.3 Sexually transmitted diseases: Gonorrhea (*Neisseria gonorrhoeae*) and AIDS (*Human Immunodeficiency Virus – HIV*)

Unit - 3: Fungal and Protozoan diseases**9 Hrs**

Detailed study of the following diseases covering Symptoms, mode of transmission, pathogenesis, diagnosis, prophylaxis, and control

- 3.1 Candidiasis
- 3.2 Aspergillosis
- 3.3 Amoebiasis (*Entamoeba histolytica*)
- 3.4 Malaria (*Plasmodium* spp.)

Unit 4 Sample collection, transport, and diagnosis**9 Hrs**

- 4.1 Collection and transport of clinical samples,
- 4.2 Isolation and identification of pathogens based on cultural characteristics, microscopy and biochemical/physiological properties
- 4.3 Principles of diagnostic tests: ELISA, Immunofluorescence, Agglutination, Complement fixation, molecular assays (PCR, DNA probes).

Unit - 5: Antimicrobial agents**9 Hrs**

- 5.1 Antimicrobial agents- Types and modes of action of antibacterial agents (Penicillin, Streptomycin, antifungal agents (Amphotericin and Griseofulvin), and antiviral agents (Amantadine, Acyclovir) agents, Interferons.
- 5.2. Antibiotic resistance: Definition, causes, brief mechanisms (Enzymatic degradation, Target site alteration, Efflux pumps, Reduced permeability), examples (MRSA, Multidrug-resistant TB), consequences, and prevention strategies.
- 5.3 MIC Tests for antimicrobial susceptibility (well method / Disc diffusion).

IV. Suggested extracurricular activities:

- 1. Visit the hospital/diagnostic lab to observe the patients' infection and discuss case studies.
- 2. Practice mock collection, labeling, and transport of clinical samples and discuss contamination prevention.
- 3. Prepare posters or digital presentations on diseases, highlighting symptoms, transmission, and prevention.
- 4. Design posters or digital content on proper antibiotic use, resistance, and prevention strategies.

V. Reference Books:

- 1. **Ananthanarayan R. &Paniker C.K.J.** (2009). *Textbook of Microbiology* (8th ed.). University Press.
- 2. **Brooks G.F., Carroll K.C., Butel J.S., Morse S.A., &Mietzner, T.A.** (2013). *Jawetz, Melnick, and Adelberg's Medical Microbiology* (26th ed.). McGraw-Hill.
- 3. **Goering R., Dockrell H., Zuckerman M., & Wakelin D.** (2007). *Mims' Medical Microbiology* (4th ed.). Elsevier.
- 4. **Wiley J.M., Sherwood L.M., & Woolverton C.J.** (2013). *Prescott, Harley, and Klein's Microbiology* (9th ed.). McGraw-Hill.

5. **Madigan M.T., Martinko J.M., Dunlap P.V., & Clark D.P.** (2014). *Brock Biology of Microorganisms* (14th ed.). Pearson.
6. **Patrick R. Murray** (2023). *Murray's Basic Medical Microbiology: Foundations and Clinical Cases* (2nd ed.). Elsevier. ISBN: 978-0323878104.
7. **Patrick R. Murray** (2023). *Medical Microbiology* (10th ed.). Elsevier. ISBN: 978-0443261336.

SEMESTER-IV
COURSE 9: MEDICAL MICROBIOLOGY
Practical Credits: 1 2 hrs/week

I. Course Outcomes: On successful completion of this practical course, the student shall be able to:

II. Laboratory/Field exercises:

1. Study of composition and use of important differential media for identification of bacteria: EMB Agar, McConkey agar, Mannitol salt agar, Deoxycholate citrate agar, TCBS
2. Isolation of the normal flora of the human body (Hands, Feet, Nostrils, and teeth surface) by the swab method.
3. Identify bacteria (any three of *E. coli*, *Salmonella*, *Pseudomonas*, *Staphylococcus*, *Bacillus*)
4. Using laboratory strains on the basis of cultural, morphological, and biochemical characteristics: IMViC,
5. Nitrate reduction, urease production, and catalase tests
6. Study symptoms of the diseases with the help of photographs: Polio, anthrax, herpes, chickenpox, Pox, HPV warts, AIDS (candidiasis), dermatomycoses (ringworms)
7. Study of various stages of the malarial parasite in RBCs using permanent mounts
8. Antibacterial sensitivity by the Kirby-Bauer method
9. Determination of the minimal inhibitory concentration of an antibiotic (Streptomycin).

**4- Year UG Honours, Major
Syllabus
(2026-27)
Semester-IV**

Model Question Paper

Time : 3hrs

Marks:75

Part-A

Answer any Five Questions. Each Question carries 3 Marks.

5x3=15

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.

Answer the following questions. Each question carries 12 Marks

5x12=60

11. a) Unit-I
(Or)
b) Unit-I

12. a) Unit-II
(Or)
b) Unit-II

13. a) Unit-III
(Or)
b) Unit-III

14. a) Unit-IV
(Or)
b) Unit-IV

15. a) Unit-V
(Or)
b) Unit-V