Course Content	Hours	Marks
Unit-I: Microbial Growth and Nutrition	**9 hrs**	**10**
• Introduction and Definition of Growth, Modes of Cell division in prokaryotes • Bacterial Growth Curve • Synchronous culture & Continuous Growth of Bacteria • Measurement of Bacterial Growth		
Unit-II: Microbial cultivation and Pure Culture Techniques	**9 hrs**	**10**
• Types of bacteria based on nutritional requirements • Chemical and Physical requirement of Growth- Bacteriological Media, Air, pH & Temperature • Cultivation of Anaerobes • Natural Microbial Population (Mixed Cultures), Selective methods to obtain Pure Cultures, Cultural Characteristics, Isolation, purification and Preservation of pure cultures		
Unit-III: Control of Microbes by Physical methods	**9 hrs**	**10**
• Definitions: Sanitization, Antisepsis, Sterilization, Disinfection, Microbiocidal & Microbiostasis, Thermal Death Time, Thermal Death Point, z-Value & F-value, D-Value • Control by Temperature: a) High Temperature: Moist Heat – Autoclave, Boiling, Pasteurization, Fractional Sterilization Dry Heat – Hot Air Oven, Incineration, b) Control by Desiccation c) Control by Low Temperature • Control by Radiation – UV radiation, x-rays, Gamma rays and Cathode rays • Control by Filtration		
Unit-IV: Control of Microbes by Chemical methods	**9 hrs**	**10**
• Characteristics of an Ideal Antimicrobial agent • Halogens – Iodine & Chlorine, Heavy Metals & Dyes • Phenol & Phenolic compounds, Phenol coefficient method, Alcohols • Detergents & Quaternary Ammonium Compounds, Aldehydes & Gaseous agents		
Unit- V: Control of Microbes by Antibiotics	**9 hrs**	**10**
• Chemotherapeutic agents and Chemotherapy, Characteristics of ideal chemotherapeutic agent • Antibiotics and their mode of action: Inhibition Effect on cell wall synthesis, nucleic acid and protein synthesis, Damage to cytoplasmic membrane, Inhibition of specific enzyme system • Antifungal, antiviral and antitumor chemotherapeutic agents • Microbiological assay of antibiotics		

Text books:

1. Pelczar, M.J., Chan, E.C.S. and Kreig, N.R. (2002) Microbiology. 5th Edition, Tata McGraw-Hill, New Delhi. (UNIT: 1 & 2)
2. Powar, C.B., Daginawala, J.F. (2010). General Microbiology Vol-I. Mumbai: Himalaya Publishing House. (UNIT: 3,4 &5)

Reference books:

1. Stanier, R.Y. (1987). General Microbiology, 5th Edition: Macmillan publication.

Pedagogic tools:

- Chalk and Board
- Power point presentation
- Video
- Seminars

Suggested reading / E-resources

https://www.youtube.com/watch?v=Uf8a7cCVjM4

https://www.youtube.com/watch?v=BkbLI2mAMP8

Suggested MOOCs

- https://alison.com/course/introduction-to-microbiology
- https://extendedstudies.ucsd.edu/courses-and-programs/microbiology-with-lab

Major Practical-3	
Sr. No.	**Experiment**
1	Measurement of size of microorganisms by Micrometry (Demonstration)
2	Calibrations of microscopic measurements (Ocular & stage micrometers)
3	Isolation of microorganisms by various methods
4	Turbidimetric study of growth curve of *E.coli* and derivation of Growth rate & Generation time.
5	Enumeration of bacteria by viable count technique.
6	Enumeration of bacteria by Total Count Technique.
7	Effect of various chemicals on microbial growth
8	Effect of antibiotics on microbial growth

Reference Books:

1. Patel. R.J., Patel. K.R. (2009). Experimental Microbiology, Vol-I, Ahmedabad: Aditya Publications.

2. Patel. R.J., Patel. K.R. (2009). Experimental Microbiology, Vol-II, Ahmedabad: Aditya Publications.
3. Dubey, R.C., Maheshwari, D.K. (2005). Practical Microbiology. New Delhi: S. Chand & Company Limited.
4. Sharma, K. (2005). Manual of Microbiology – Tools and Techniques. New Delhi: Ane books.
5. Benson, H.J. (2002). Microbiological Applications – Laboratory Manual in General Microbiology – 8th edition: MacGrow Hill Company.

Pedagogic tools:

- Chalk and Board
- Power point presentation
- Video

Suggested reading / E-resources

- https://www.youtube.com/watch?v=R6Uv__WJlmM
- https://www.youtube.com/watch?v=KHg_PyjQPwk

Suggested MOOCs

- https://alison.com/course/introduction-to-microbiology
- https://extendedstudies.ucsd.edu/courses-and-programs/microbiology-with-lab