

**SARDAR PATEL UNIVERSITY**  
**Programme: MSC (Integrated Biotechnology)**  
**Semester: II**  
**Syllabus with effect from: December 2010**

<b>Paper Code:</b> PS02CIGB04	<b>Total Credits: 3</b>
<b>Title Of Paper:</b> Microbiology - I	

Unit	Description in detail	Weightage (%)
<b>1</b>	Discovery of Microorganisms. Spontaneous generation conflict. Germ theory of fermentation. Germ theory of Disease Developments of laboratory techniques. Contributions of scientists in field of Molecular Biology	
<b>2</b>	Morphology of bacteria Ultra structure of a bacterial cell <ul style="list-style-type: none"> <li>• Surface appendages – flagella, Pilli.</li> <li>• Surface layers of bacteria – glycocalyx, Cell wall</li> <li>• Internal cell structures – Cell membrane, Internal membrane system (Mesosomes &amp; gas vacuoles), cytoplasmic matrix ( Ribosomes, Nucleiod, Plasmids &amp; cytoplasmic inclusions).</li> <li>• Dormant structures – Exospores, Cysts, Endospores ( Sporulation &amp; Germination)</li> <li>• General characteristics of fungi, protozoan &amp; Viruses.</li> </ul>	
<b>3</b>	Microscopy Light microscopy <ul style="list-style-type: none"> <li>• Bright field microscopy (Simple &amp; Compound microscope)</li> <li>• Dark field microscopy</li> <li>• Phase contrast microscopy</li> <li>• U.V &amp; fluorescence microscopy</li> </ul> Electron Microscopy <ul style="list-style-type: none"> <li>• Types of electron microscopes (TEM &amp; SEM)</li> <li>• Preparation of specimen</li> <li>• Advantages &amp; Limitations</li> </ul> Stains and staining techniques <ul style="list-style-type: none"> <li>• Necessity of staining</li> <li>• Chemistry of dyes and stains</li> <li>• Fixation of smears: Mordents &amp; intensifiers: Decolorisers</li> <li>• Theories of staining: Physical and chemical.</li> </ul> Types of staining- simple, Negative, vital and differential ( Gram and Acid fast)	
<b>4</b>	Nutritional requirements of microorganisms. Nutritional types of bacteria. Common ingredients of culture media. Types of media Pure culture and methods of isolating pure cultures. Cultivation of anaerobes and Maintenance and preservation of pure cultures.	
	<b>Practical:</b>	
	<ul style="list-style-type: none"> <li>• Simple and negative staining</li> </ul>	



	<ul style="list-style-type: none"> <li>• Differential staining: Gram's staining and Acid fast staining</li> <li>• Special staining- Spirochete staining.</li> <li>• Cytological staining: Cell wall staining, Capsule staining, Endospore staining and Flagella staining.</li> <li>• Microchemical staining : Metachromatic granule staining</li> <li>• Demonstration of Micrometry.</li> <li>• Streak plate and spread plate techniques for isolation of bacteria.</li> <li>• Serial dilution and Pour plate method for isolation &amp; enumeration of microorganisms.</li> <li>• Pure culture study of Bacilli (B. subtilis, B. megaterium, B.cereus) and Pigment producing bacteria (Micrococcus luteus, Pseudomonas aeruginosa, Staphylococcus aureus, Serratia marcescens).</li> <li>• Structural studies of Mucor / Aspergillus / Penicillium / Rhizopus</li> </ul>	
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### Basic Text & Reference Books:

- Experimental Microbiology Volume 1 and 2 by Patel, Rakesh J. Aditya Publisher, 2004 Third edition
- Elementary Microbiology-1 by Modi, H A. Publisher Akta Prakashan 1995
- Microbiology by Pelczar, Michael J./ Chan, E.C.S./ Krieg, Noel R./ Chan, E. C. S. Publ: Tata Mcgraw-Hill Publishing Company Limited New Delhi, 2004 , Fifth edition
- Microbiology: Concepts and Applications, Michael J. Pelczar E. C. S. Chan Noel R. Krieg (ISBN: 0070492581), McGraw-Hill Company
- Fundamental Principles of Bacteriology.(7th edition) AJ Salle,.Tata McGraw-Hill publishing company Ltd, New Delhi.
- Fundamentals in Microbiology, Frobisher A H, 9th Ed.
- General Microbiology, Stanier RY, Adelberg, E.A., Ingraham, J.L., 5th Ed. Wheelis M.L. and Painter P.R. McMillan Press
- Prescott, Harley, and Klein's Microbiology Publ :McGraw-Hill Higher Education New York, Seventh edition
- Microbiology: An introduction by Tortora, Gerard J .Publ: Pearson Education , New Delhi, 2006 Eighth edition
- Textbook of microbiology by Dubey, R C. Publ: S. Chand & Company Ltd , New Delhi 2007, Second reprint
- Microbiology-A Laboratory Manual, (4th edition), James G. Cappuccino and Natalie Sheman.(1996) The Benjamin / Cummings publishing company Inc, California.
- Brock - Biology of Microorganisms, Michael T. Madigan, Jhon M. Martinko and Jack Parker. (1997). 9th Ed. Prentice Hall International Inc, London.
- Text book of Microbiology by Ananthanarayan R & Paniker CKJ, Orient Longman Publication.
- General Microbiology by Power C B and H F Dagainawala, Himalayas Publishing House.
- Lab Manual in Microbiology by Gunasekaran, P. Publisher:: New Age International

