

SARDAR PATEL UNIVERSITY
Programme: MSC (Integrated Biotechnology)
Semester: VI
Syllabus with effect from: December 2012

Paper Code: PS06CIGB03	Total Credits: 3
Title Of Paper: Industrial Microbiology	

Unit	Description in detail	Weightage (%)
1	<p>Isolation, Preservation and Improvement of Industrially important: Microorganism: Isolation of industrially important microorganism and their characteristics Screening of industrially important microorganisms (Primary and secondary screening and their significance) Improvement of industrially important microorganisms: selection of natural variants, selection of induced mutants, use of recombinant systems and genetic engineering. Preservation of industrially important microorganism.</p>	
2	<p>Media for industrial fermentations and Sterilization: Ideal characteristics of fermentation medium. Raw materials of fermentation medium (carbon source, nitrogen source, minerals, growth factors, buffers, precursors, antifoam and water). Sterilization of medium: The design of batch and continuous sterilization process. Sterilization of air (Mechanism of filtration, introduction to absolute and depth filters.</p>	
3	<p>Fermenter Design, and K_{La}: Basic functions of a fermenter its aseptic operations and containment. Body construction Aeration and Agitation (impellers, baffles and sparger) Sampling and measurement of process variables (Methods of measurement, Types of measurement devices, control) like temperature, pH, dissolved oxygen, pressure and foam. Introduction to scale-up. Introduction to mass transfer of oxygen, K_{La}, method for measurement of K_{La} and factors affecting it (aeration and agitation).</p>	
4	<p>Fermentation types, recovery and purification of fermentative product: Surface, Solid state and submerged fermentation (batch, fed-batch and continuous fermentation). Citric acid fermentation by surface culture of <i>Aspergillus niger</i>. Amylase production by submerged and solid state fermentation. Product recovery by solvent extraction (Partition coefficient, Co current and counter current extraction), precipitation, and chromatography (Ion exchange)</p>	
	Practical:	
	<ul style="list-style-type: none"> • Preparation of media (Nutrient broth, PDA in plates and slant. • Sterility testing. • Isolation and Screening of organic acid and enzyme producing microorganisms from soil. • Replica plate technique. • Preservation of culture in slants, glycerol stock and wax. 	



	<ul style="list-style-type: none">• Inoculum preparation of spores.• Demonstration of lab scale fermenter.	
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Basic Text & Reference Books:

- Industrial Microbiology by Casida, L. E, Reprint 2005, New Age International, ISBN 0-85226-1012
- Industrial Microbiology by A. H. Patel, MacMillon India Madras, ISBN 9780333908426
- Industrial Microbiology by Prescott & Dunn, 4th edition, CBS Publishers, ISBN 81-239-1001-0
- Principles of Fermentation technology by Stanbury, Whitaker and Hall, 2nd edition, Butterworth-Heinemann Publications, ISBN 978-81-8147-808-5.
- Microbial technology Vol.I & II by Peppalar and Periman, 2nd edition, Academic Press, ISBN 81-8147-495-3 and 81-8147-496-1 respectively.

