CORE X

INDUSTRIAL AND PHARMACEUTICAL MICROBIOLOGY

Semester	Subject code	Category	Lecture		Theory		Practical		Credit
			Total hrs	Hrs/ week	Total hrs	Hrs / week	Total hrs	Hrs/ week	
VI		Core	60	4	60	4	0	0	4

COURSE OBJECTIVES

To enable the students to understand the aspects of microbial processes applicable in industries and scale up processes

COURSE OUTCOMES

On the successful completion of the course, students will be able to develop strong and potential skills in the various aspects of microbial processes in industries.

CO Number	CO Statement	Knowledge Level (K1-K4)
CO1	To identify microorganisms of relevance to healthcare and the pharmaceutical industry and their sources.	**K3**
CO2	To enable the students obtain the advanced knowledge in Industrial productions and to work in fermentation industries.	**K2**
CO3	To make the students self reliance in the pharmaceutical industry. Entrepreneurship can be established with the gained knowledge.	**K2**

CO4	To impart knowledge of various methods of disease control. With the knowledge students can work in hospitals, pharmacy and industries.	**K2**
CO5	To demonstrate and understand microbiological assays of growth promoting, growth inhibiting substances and acquire knowledge of GMP practices.	**K3**

MAPPING WITH PROGRAMME OUTCOMES:

COS	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**
CO1	S	S	S	S	S	S
CO2	M	S	M	S	S	S
CO3	S	S	S	S	S	S
CO4	S	M	M	S	S	S
CO5	S	M	M	S	S	S

S- Strong; M- Medium; L- Low

Unit- I Industrially important microorganisms 12 hrs

General concepts of Industrial Microbiology – Principles of exploitation of microorganisms and their products, Improvement of strains – Development of inoculum for various fermentation process – Media for Industrial fermentation – formulation – sterilization.

Unit-II: **Industrial productions 12 hrs**

Microbial production of Solvent - Ethanol, Organic acids-Citric Acid, Amino acids – Glutamic acid, Antibiotics – Penicillin, Enzymes – Protease, Vitamins – B12.

Unit-III: **Pharmaceutical Microbiology** **12 hrs**

Ecology of Microorganism affecting Pharmaceutical Industries– atmosphere –water, raw materials- packaging equipment. Hygiene and protective clothing.

Unit-IV: Pharmaceutical productions and standardization **12 hrs**

Production of bacterial and viral vaccines, toxoid, antisera and their standardization. Antiseptics and disinfectants- types, mode of action and their standardization.

Unit V: Sterility testing and Quality control **12 hrs**

Sterilization types - sterilization monitor - sterility test – pyrogen testing. Disinfectants and its evaluation – Ridel walker method, Chick – martin test. Microspoilage and preservation of pharmaceutical products. Quality control of pharmaceutical products.

DISTRIBUTION OF MARKS: Theory **-** 100% and Problems – Nil

TEACHING METHODOLOGY:

- **Lectures**
- **Power point presentation**
- **Charts**
- **Models**
- **Group discussion**
- **Group assignments**
- **Seminars**

TEXT BOOKS:

Sl No:	Book Name	Author	Publisher	Year of Publication
01	Industrial Microbiology	Casida, J.E	New Age International	2007
02	Industrial Microbiology.	Patel A H	Laxmi Publications, New Delhi; Second edition	2016
03	Industrial Microbiology.	Presscott and Dunn, S.,	The AVI Publishing Company Inc., USA; 4th edition.	1982

REFERENCE BOOKS:

Sl No:	Book Name	Author	Publisher	Year of Publication
01	Principles of fermentation technology,	Stanbury, P.F., Whittaker, A and Hall, S.J.,	Pergmon Press.	2005
02	Microbial Technology	Peppler, H. J. and Pearlman, D.	Academic press.	2014
03	Manual of Industrial Microbiology and Biotechnology	Demain, A. L. and Soloman INA	American society for Microbiology, Washington DC.	1986
04	Encyclopedia of Bioprocess Technology, Vol. 5,	Chisti, Y., Fermentation, Biocatalysis and bioseparation,.	John Wiley and Sons, N. Y	2000
05	Industrial Microbiology. Published by Student Edition,	Agarwal AK & Pradeep Parihar (2006).	Agrobios, India	2016

06	A text book of Industrial Microbiology and Biotechnology	Crueger and Crueger	Medtech.	2017

WEB REFERENCES:

http://www.biocarta.com/pathfites/h.glycolysis pathway.asp

http://www.pinkmonkey.com/studyguides/subjects/biology-edited/chap5/b0505601.asp.

http://wwww.sp uconn.edu/v ferry/229 spo3/lecturers/catabolism.html

http:// mcb berkely:edu/labs/kustu/mcb110/lecturer-notes.htm

http//www. Nuigelway.ie/microbiology/ cpoblab/teaching.html

SYLLABUS DESIGNER:

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