

MICROBIOLOGY AND IMMUNOLOGY

Semester	Subject Code	Category	Lecture		Theory		Practical	Credits
			Hrs/ week	Total Hours/ Semester	Hrs/ week	Total Hours/ Semester		
III	21CPZO3C	Core-IX	5	75	5	75	Nil	5

COURSE OBJECTIVES

- To understand the structure and functions of Antibodies, Complement system , molecular structure of T-cell receptor, B-cell receptor, culture techniques and industrial ,food and dairy microbiology.

COURSE OUTCOMES

On the successful completion of the course, students will be able to:

CO Number	CO Statement	Knowledge Level (K1-K4)
CO1	To understand about the nature of antigens and antibodies and its interactions.	K2
CO2	To understand and imbibe knowledge on histocompatibility and expression of immunoglobulins.	K2
CO3	To understand about the mediate of immune system	K2
CO4	To understand the sterilization and culture techniques of microorganisms.	K2
CO5	Applications of microbes in food and diary industries and also in bioremediation	K3

Knowledge Level : K1-Remember ; K2 –Understand ; K3 – Apply ; K4 – Analyze

Mapping with Programme Outcome

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

S- Strong; M – Medium ; L- Low

DISTRIBUTION OF MARKS: THEORY 100%

UNIT-I

15 Hours

BENEFICIAL, HARMFUL AND INDUSTRIAL MICROBIOLOGY

Microbes in food - Role of microbes in food production. Dairy and non-dairy products fermented foods and alcoholic beverages. Pharmaceuticals (antibiotics and vaccines) Control of Microbes. Basic concepts of Probiotics. Bacterial (Cholera, Typhoid), Viral (Rabies, HIV), Fungal (Candidiasis, Dandruff) and Epidemiology (Transmission , Disease Susceptibility - control measures–Mitigation of Covid-19) diseases in man.

Industrial microbiology - Industrial uses of microbes - fermentation products (ethyl alcohol, antibiotic-penicillin, enzymes-protease and vinegar), bioconversions - bioremediation.

UNIT-II

STERILIZATION AND CULTURE

15 Hours

Sterilization: Principles - dry heat, moist heat, filtration, Tyndallization, pasteurization, Radiation - disinfection. Culture techniques - media preparation - Aerobic and anaerobic culture techniques - Wet mount, hanging drop, Staining methods-dyes, simple differential and special staining techniques - acid fast stain, spore stain, capsule stain, staining for pure and mixed cultures.

UNIT-III-IMMUNE SYSTEM

15 Hours

Innate and Acquired Immunity Phylogeny and Ontogeny of immune system - Organization and structure of lymphoid organs Cells of the immune system and their differentiation - Lymphocyte traffic .

Nature of immune response Antigenicity and immunogenicity - Factors influencing immunogenicity - Epitopes and haptens - Super antigens - Structure and Functions of Antibodies - Classes and subclasses - Gross and fine structure - Antibody mediated effector functions - Antigen- Ab interactions

UNIT-IV

RESPONSES OF IMMUNE SYSTEM

15 Hours

T-cell generation, activation and differentiation Isolation, molecular components and structure of T-cell receptor complex - T-cell maturation and thymus - T- cell differentiation - Cell death and T- cell population .

Mediators of Immune system-B- cell generation, activation and differentiation - B-cell receptors - B-cell activation and proliferation -T_H B- Cell interactions-Cytokines and Immune response-Effectors cells and molecules - CTL and NK cells- mechanism of action. Hypersensitivity-Types and Immunological reactions.

UNIT-V

COMPLEMENTS OF IMMUNE SYSTEM

15 Hours

MHC haplotypes - Class I and class II molecules -Cellular distribution - Peptide binding - Expression and diversity - Disease susceptibility.

MHC (Major Histocompatibility complexes)/HLA (Human leukocyte antigen genes)Organization and expression of Ig genes - Models for Ig gene structure - Multigene organization of Ig genes DNA rearrangements and mechanisms - Generation of antibody diversity - Differential expression of Ig genes.

TEXT BOOKS

S. NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1.	W. Paul	Fundamentals of immunology	Printed in china, Library of congress cataloging in publication	2012
2.	Kuby, J	Immunology. 6 t h edition	W.H. Freeman & Company, New York	2007
3.	Fathimunisa Begum	Immunology	PHI Learning Pvt. Ltd.	2014
4.	Roitt, I	Essential Immunology, VI edition	Elsevier Science Publishing Company, New York	2002
5.	M.Ledyard, A. Whelan and M.V. Fanger	Instant Notes in Immunology	Bios Scientific Publishers Ltd, Oxford,	2000
6.	Creager, J. C., Black J.D., Davison V. E.	Industrial Microbiology	New Age International Publishers, New Delhi	1990
7.	Dubey,R.C. and Maheshwari, D.K	Microbiology – Principles and Applications	Prentice Hall, Englewood Cliffs, New Jersey	2014
8.	Joanne,M., Linda,W., Sherwood,M. Christopher, J.	A Text book of Microbiology	S. Chand and Company Ltd.	2014
9.	Boston. Stainer et al	General Microbiology	Macmillan, London	2008

REFERENCE BOOKS

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1.	Dk. Maheshwari , Dr.Mc. Dubey	Textbook Of Microbiology	S. Chand Publications	2015
2.	A. Mani , Lm. Narayana, Dulsy Fatima , Am.Selvaraj & M. Arumugam	Immunology And Microbiology	Saras Publications	2014
3.	Michal L. Pelczar , Jr, E.C.S. Chan, Noel R. Krieg	Microbiology , Concept And Applications	Mcgraw Hill Education	2001
4.	A. Mani , Lm. Narayana, Dulsy Fatima , Am.Selvaraj & M. Arumugam	Immunology And Microbiology	Saras Publications	2014
5.	Lansing.M.Prescott	Microbiology, VEd	Fermentation. Blackwell Scientific Publication	2002

WEB SOURCES:

www.sciencedaily.com
www.sciencemag.com
www.treehugger.com
www.nature.com

TEACHING METHODOLOGY

- Class room teaching
 - Assignments ,Seminars and Models
 - Group Discussions
 - Home test
 - PPT Presentations
 - Board and chalk
- Demonstration from the Video slides, Animated videos and interactive software.

SYLLABUS DESIGNERS

- Dr D.Sasikala, Assistant Professor & HOD
- Dr.V.Kiruthiga, Assistant Professor
- Dr V.Rekha, Assistant Professor
- DrA.Vinodhini, Assistant Professor
- Dr.G.Vidhya, Assistant Professor
- Dr. S. Vijayakumari, Assistant Professor