Lecture Plan

Name of the college: Government College of Arts, Science and Commerce, Sanquelim, Goa.

Name of Faculty: Ms. Shubha Shivdas Kauthankar	**Subject:** Botany	
Paper code: BOC 107- Microbiology and Plant Pathology	**Program: T.Y.B.Sc.**	**Division: -**
Academic year: 2024- 2025	**Semester: V**	**Total Lectures: 60**

Course Objectives: 1. The course deals with basic and advanced concepts of microbiology and plant pathology.

2. It aims to create awareness of the occurrence and economic value of various microbes; their interactions and impact on living organisms.

3. The laboratory exercises provide basic skills in isolation and handling of microorganisms and its relevant applications.

Course Outcome: 1. Acquire the knowledge of basic and advance concepts used in Microbiology and Plant Pathology
2. Discuss the significance of microorganisms.
3. Describe methods of Microbe preservation.
4. Diagnose common plant diseases and device control measures.

Student Learning Outcome: 1. Gain knowledge of sterilization methods, biohazards and biosafety measures.

2. Gain knowledge of methods for cultivation, preservation and maintenance of microbial cultures.

3. Understand the role and relevance of beneficial microorganisms and their applications in day to day life.

4. Understand the fundamental basis of plant-microbe interaction that leads to plant diseases and measures to be adopted for plant health management.

5. Acquire skills in isolation and handling of microbes.

Month	Lecture From	Lecture To	No. of lectures allotted	Topic, Subtopic to be covered	Exercise/ Assignment	ICT Tools	Reference books
July 2024	08/07/2024	13/07/2024	4	Unit 1: Introduction to microbiology- Terms and definitions Aseptic technique and concept of sterilization Physical and chemical methods of sterilization. Biosafety levels and biohazards in the laboratory. Disposal of laboratory wastes and cultures.	To enlist the biosafety hazards in the laboratory.	Powerpoint presentation	Dubey, R.C. and Maheshwari, D.K. 1999. A Text Book of Microbiology Sharma, K. 2011. Text Book of Microbiology Sambamurty, A.V.S.S. 2006. Text Book of Plant Pathology
July 2024	15/07/2024	20/07/2024	4	Unit 2: Methods in microbiology- Types and preparation of culture media. Methods of obtaining pure cultures of microorganisms (streak plate, spread plate and pour plate). Enumeration of microorganisms (direct methods) Enumeration of microorganisms (Indirect methods)	To list the types of media used in microbiology	Powerpoint presentation	
July 2024	22/07/2024	27/07/2024	4	Bacterial motility Bacterial growth curve. Unit 3: Preservation and maintenance of microbial cultures (periodic transfer, lyophilisation)	To draw a labelled bacterial growth curve.	Powerpoint presentation	

				Methods of preservation (use of mineral oil and liquid nitrogen)			Mehrotra, R.S. 1995. Plant Pathology Pelczar, M.J. and Chan, E.C.S. 1972. Laboratory Exercises in Microbiology
July-August 2024	29/07/2024	03/08/2024	4	Culture collection centres (culture banks) and their importance. Unit 4: Microbiology of air- Occurrence of microorganisms in air Microorganisms in soil. Role of microorganisms in decomposition of plant residues	To study the diversity of microbes in atmosphere.		
August 2024	05/08/2024	10/08/2024	4	Microorganisms in water; microorganisms as indicators of water pollution Bacteriological determination of potability of water (standard multiple tube fermentation) Bacteriological determination of potability of water (membrane filtration method) Methods of purification of water.	To study the diversity of microbes in water and enlist the methods of purification of water.		
August 2024	12/08/2024	17/08/2024	4	Unit 5: Applications of microorganisms-microorganisms in typical fermentation processes Application of microorganisms in fermented food and dairy products (bread, yoghurt and cheese) Application of microbes in organic acids (citric acid and vinegar)	To list the application of microbial cultures in dairy products.		

August 2024	19/08/2024	24/08/2024	4	Alcoholic beverages made from fruit juices (grape and cashew apple) Antibiotics (penicillin and streptomycin). Role of microorganisms in bioremediation Biodegradable plastics	To study the role of microorganisms in alcohol preparation.	Powerpoint presentation
August 2024	26/08/2024	31/08/2024	4	Production of biogas Unit 6: Introduction to plant pathology: Terms and Concepts. Classification of plant diseases. Disease symptoms caused by bacterial plant pathogens.	To list and photograph common plant diseases	
September 2024	02/09/2024	07/09/2024	3	Disease symptoms caused by fungal plant pathogens. Disease symptoms caused by viral plant pathogens. Identification of plant disease – Koch's postulates	To collect plant samples infected with fungal pathogens.	
September 2024	09/09/2024	14/09/2024	2	Unit 7: Pathogen attack and defense mechanisms Stages of disease establishment – the disease cycle.	-	
September 2024	16/09/2024	21/09/2024	4	Structural defense mechanisms in plants (pre-existing).		

				Structural defense mechanisms in plants (Induced). Biochemical defense mechanisms in plants (pre-existing). Biochemical defense mechanisms in plants (Induced).			
September 2024	23/09/2024	28/09/2024	4	Unit 8: Plant disease epidemiology Transmission and spread of plant pathogens Development of disease in plants - the disease triangle; Plant disease epidemics (monocyclic and polycyclic).	To study examples of common plant disease epidemics		
September-October 2024	30/09/2024	05/10/2024	3	Unit 9: Plant disease management- Physical, cultural. Plant disease management- chemical, biological. IPM systems; development of transgenics for disease management	To enlist methods of plant disease management		
October 2024	07/10/2024	12/10/2024	4	Biopesticides; plant disease clinics. Unit 10: Genetics of pathogenicity- Genes for virulence and avirulence and their role in susceptibility and resistance.			

				Molecular diagnosis - identification of genes and specific molecules in disease development (DNA based diagnostic kits) Molecular diagnosis - identification of genes and specific molecules in disease development (protein based diagnostic kits)			
October 2024	14/10/2024	19/10/2024	4	Unit 11: Application of modern technologies in plant pathology Computer simulation of epidemics and disease forecasting. Use of remote sensing and image analysis in plant pathology Revision	To study the role of remote sensing in plant disease forecasting.	Powerpoint presentation	
October 2024	20/10/2024	22/10/2024	1	Revision	-		

*** Assessment Rubrics**

Component	Max Marks
ISA 1	10
ISA 2	10
Practical	50
Project	-
Semester End Exam	80