



# Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

## Shri Vaishnav Institute of Science

### Department of Life Science

#### Generic Elective (GE) Post Graduate Courses

#### SEMESTER II

COURSE CODE	Category	COURSE NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		Th	T	P	CREDI TS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
<b>BTPG201</b>	<b>GE</b>	<b>Exploring Microorganisms</b>	60	20	20	0	0	4	0	0	4

**Legends:** L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit;

**\*Teacher Assessment shall be based following components: Quiz/ Assignment/ Project / Participation in Class, given that no component shall exceed more than 10 marks.**

#### Course Objectives:

1. To impart knowledge about microorganism, their, cell structure, metabolism and growth.
2. To develop understanding about cultivation of microorganisms, microbial quantification methods, microbial diseases.
3. To familiarize students with general principles and subject knowledge in the roles and applications of microorganism.

#### Course Outcomes:

1. Students will be able to recall the concepts of microbial world and its significance
2. Students will develop understanding about cultivating and enumerating microorganisms, most common medically important organism and the infections they cause.
3. Clarify application of microorganisms in varied fields of agricultural, environmental, medical and industries.

#### Unit I- Introduction to the world of Microorganisms

Scope & relevance of Microbiology, prokaryotic and eukaryotic cell structures, types of microorganisms, general characteristics of bacteria, algae, fungi, viruses and protozoa.

#### Unit II- Microbial Physiology and Cultivation

Cell division, Microbial growth, microbial metabolism, reproduction of viruses. Techniques used for the cultivation of bacteria, fungi, algae and viruses.

#### Unit III- Visualizing and Enumerating Microorganisms

Principles and applications of compound microscope and electron microscope, simple and differential staining. Measurement of microbial growth- Cell count, cell weight, cell metabolism assays, plaque assay.



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#### Unit IV- Control of Microbial Growth

Sterilization by physical methods- high temperature, low temperature, radiations, bacteriological filters.

Sterilization by chemical means- phenolics, alcohols, halogens, heavy metals and ethylene oxide

Control of microorganisms using sugars and organic acids.

#### Unit V -Role of microorganisms

**In agriculture:** As biofertilizers, bioinsecticides, in soil improvement (texture, water holding capacity) as geochemical agents, microbe plant interactions (phyllosphere, rhizosphere, mycorrhizal and nodule formation). Plant diseases: list of common plant diseases with their causative agents.

**In human and animal health:** list of common bacterial, fungal and viral diseases with their causative agents in human beings, role of normal flora of human body, concept of -antibiotics, vaccines and antisera.

**In industries:** list of microbial products (and producers) produced on industrial scale, role of contaminants.

**In food processing:** list of common fermented food & milk products with their representative organisms. Food spoilage, List of food poisoning & food infection causing microorganisms.

**In environment:** List of microorganisms responsible for bioremediation and biodeterioration

#### BOOKS

1. Pelczar, M. J., Reid, R. D., & Chan, E. C. (2001). Microbiology (5th Ed.). New York: McGraw-Hill.
2. Willey, J. M., Sherwood, L., Woolverton, C. J., Prescott, L. M., & Willey, J. M. (2011). Prescott's Microbiology(8th Ed, New York: McGraw-Hill.
3. Matthai, W., Berg, C. Y., & Black, J. G. (2005). Microbiology, Principles and Explorations. Boston, MA: John Wiley & Sons.
4. Cappuccino, J. G., & Welsh, C. (2016). Microbiology: a Laboratory Manual. Benjamin-Cummings Publishing Company.
5. Collins, C. H., Lyne, P. M., Grange, J. M., & Falkinham III, J. (2004). Collins and Lyne's Microbiological Methods (8th Ed.). Arnolds.
6. Tille, P. M., & Forbes, B. A., Bailey & Scott's Diagnostic Microbiology. (2018) 14th Edition.