

Shri Vaishnav Institute of Science **Department of Life Science Generic Electives (GE) Post Graduate Courses**

BTPGE01 Exploring Microorganisms

COURSE CODE	Category	COURSE NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*	Th	Т	Р	CREDI TS
BTPGE01	GE	Exploring Microorganisms	60	20	20	0	0	3	0	0	3

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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Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Shri Vaishnav Institute of Science **Department of Life Science Generic Electives (GE) Post Graduate Courses**

BTPGE01 Exploring Microorganisms

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.

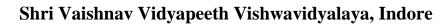


Life Science and Agriculture

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Shri Vaishnav Institute of Science **Department of Life Science Generic Electives (GE) Post Graduate Courses**

BTPGE02 Response of Plants to Light, Magnetic Field, Plasma and Sound Waves

COURSE CODE	Categ ory	COURSE NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*	Th	Т	Р	CREDI TS
BTPGE02	GE	Response of Plants to Light, Magnetic Field, Plasma and Sound Waves	60	20	20	0	0	3	0	0	3

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 study the response of plants to physical forces
- 2. To understand the mechanism of plant responses

Course Outcomes:

- 1. Students will understand the responses of plants to their physical environment
- 2. Students will know the agricultural importance of these responses

Unit – I

Solar radiation, Plant Photoreceptors and photo-responses

Mechanism of signal transduction in photosynthesis, phototropism and Photomorphogenesis Modulation of photo-responses in agriculture.

Unit – II

Magnetism and Magnetic Fields, Response of plants to magnetic fields Biochemical changes induced by magnetic fields in carbon and nitrogen metabolism Growth and yield of crop plants after magneto-priming of seeds

Unit – III

Plasma and plasma generators, Response of plants to Plasma Biochemical changes induced by plasma Plasma and applications in agriculture

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BTPGE02 Response of Plants to Light, Magnetic Field, Plasma and Sound Waves

Unit – IV Sound waves – production, modulation and measurement Impact of sound waves on plants Biochemical changes induced by sound waves Growth and yield of plants modulated by sound waves

Unit – V

Solar UV radiation, Importance of solar UV during evolution, Ozone hole and leakage of UV UV photoreceptors in plants, Physiological and biochemical changes induced by UV- B radiation Deleterious effects of UV - B, Agricultural advantages of UV-B exclusion

BOOKS:

- 1. Concepts in Photobiology, Photosynthesis and Photomorphogenesis Ed: Singhal et al, Elsevier, 1999
- 2. Magnetobiology- Vladimir N. Binhi, 2002

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