



Shri Vaishnav Vidyapeeth Vishwavidyalaya  
Shri Vaishnav Institute of Agriculture, Indore

Session 2024-25

Under-Graduate (Generic Elective course)

SEMESTER-VI

EVALUATION SCHEME

S. No.	Course Code	Course Name	Theory			Practical		Credit		Total Marks	
			End Sem University Exam	Mid Term Exam	Teachers Assessment*	End Sem University Exam	Teachers Assessment*	Theory	Practical		Sub total
1	AGGE601	Beneficial Microbes	60	20	20	00	00	04	00	04	100
			Total							04	100

*[Signature]*  
(Prof. Vinod Dhar)  
Chairperson  
Board of Studies  
Shri Vaishnav Vidyapeeth  
Vishwavidyalaya, Indore (M.P.)

*[Signature]*  
(Dr. K. N. Gurusasad)  
Dean  
Faculty of Agriculture  
Shri Vaishnav Vidyapeeth  
Vishwavidyalaya, Indore (M.P.)

*[Signature]*  
(Dr. Shishir Jain)  
Controller of Examination  
Shri Vaishnav Vidyapeeth  
Vishwavidyalaya, Indore (M.P.)

*[Signature]*  
(Dr. Arvind Singh)  
Registrar  
Shri Vaishnav Vidyapeeth  
Vishwavidyalaya, Indore (M.P.)

*[Signature]*  
(Prof. (Dr.) Upinder Dhar)  
Vice Chancellor  
Shri Vaishnav Vidyapeeth  
Vishwavidyalaya, Indore (M.P.)

*[Signature]*  
21.1.2025

*[Signature]*



Course Code	Course Name	TEACHING & EVALUATION SCHEME								
		Theory			Practical		Credits			
		END SEM University Exam	Mid term exam	Teachers Assessment	END SEM University	Teachers Assessment	L	P	Total	
AGGE601	Beneficial Microbes	60	20	20	00	00	00	4	0	4

1. Legends: L - Lecture; P – Practical

2. \*Teacher Assessment shall be based on following components: Quiz / Assignment / Project / Participation in Class.

#### Aim of the course

To Understand the role of beneficial microorganisms in agriculture, food, human health and the environment.

#### Theory

##### Unit I

Introduction to Beneficial Microbes and Their Importance: Definition of Beneficial Microbes, Distinction between harmful and beneficial microbes, Terminology, Types of Microorganisms, General Characteristics of fungi, bacteria, virus, algae etc.

##### Unit II

Beneficial Microbes in Agriculture and Soil Health: Soil Microbiology (Types of beneficial microbes in soil (bacteria, fungi, actinomycetes), Nitrogen Fixation and Soil Fertility (Nitrogen-fixing bacteria e.g., Rhizobium, Azotobacter), The role of free-living nitrogen-fixers in soil fertility, Arbuscular Mycorrhizal Fungi (AMF) and their role in nutrient uptake, Biological control agents, Mechanisms of biocontrol (competition, antibiosis, parasitism)

##### Unit III

Microbes as Food: Single-Cell Protein (SCP), Fermented Foods, Mushrooms (*Agaricus* spp. *Pleurotus* spp., *Volvariella volvacea*, *Calocybe indica*, *Lentinula edodes*, *Grifola frondose*, *Morchella conica*, *Flammulina velutipes*), Benefits of Microbes as Food.

##### Unit 4:

Microbes in Human Health and Food Industry: Overview of the human microbiome (gut, skin, respiratory tract, etc.), Role of the gut microbiota in digestion, immunity, and overall health, Probiotics and Their Applications, Production of Antibiotics vaccines, insulin etc., Microbes in Disease Prevention and Treatment, Fermentation in Food Production, Beneficial Microbes in Dairy Products, Probiotics.

##### Unit 5:

Environmental Applications of Beneficial Microbes: Bioremediation (Mechanisms of Bioremediation, Applications of Bioremediation), Microbial Fuel Cells and Bioenergy, Wastewater Treatment, Composting and Biodegradation, Green Biotechnology.



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**Shri Vaishnav Institute of Agriculture**

**Generic Elective Course, VI semester**

**References**

1. Singh, S. P. (2017). Microbial Biotechnology: Applications in Agriculture and the Environment, Publisher: Springer.
2. Khan, Shahid N. and Singh, Abhay P. (2017). Beneficial Microorganisms in Agriculture, Food, and the Environment: Safety Aspects" Publisher: Springer.
3. Aneja, .K. R. (2013). Soil Microorganisms and Plant Growth. Publisher: Kalyani Publishers
4. Tripathi, D.P. (2005). Mushroom Cultivation, , Oxford & IBH Publishing Co. Pvt.Ltd., New Delhi.

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