

**DEPARTMENT OF MICROBIOLOGY**  
**PART III – SEC – III**  
**VALUE ADDED COURSE**  
(To be offered from Semester – II – V)

<b>16UMBVA01</b>	<b>Mushroom Cultivation</b>	<b>40 hrs Duration</b>	<b>2 Credits</b>
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**Course Profile:**

Once called “Food of the Gods”, edible Mushrooms are still treated as a garnish or delicacy and can be considered as healthy food rich in crude fibre, protein, low fat, low calories, high content vitamins, and mineral. Mushrooms also possess multi-functional medicinal properties. Mushroom cultivation technology is environmental friendly as many organic waste and refuse can be used for this purpose. The potential of mushroom farming in generating new employment opportunities is another positive element emanating from mushroom farming ventures. The course aims at developing skills and making the students become self-reliable and employable besides giving them an edge to become entrepreneur. That is, when students pass out of the college with their degrees, they also are equipped with additional skills to meet the challenges in future.

**Employment Opportunities:**

**a. Job Prospects:**

1. Lab assistant in mushroom labs.
2. Mushroom marketer in a industry
3. Mushroom lab equipment operator in a lab.
4. Mushroom spawn producer in a lab.
5. Mushroom processor in a farm.

**b. Entrepreneur:**

1. Mushroom spawn produce
2. Mushroom grower (crop producer),
3. Mushroom marketer
4. Mushroom processor.

## **Duration of course:**

The course shall be conducted in batches for 40 Hours as per the declared schedule as and when a batch is filled up. Students may opt to enrol anytime of their study from the II to V semesters.

## **Admission Procedure**

Candidates for admission to the course should be B.Sc or M.Sc degree students of Shree M. & N. Virani Science College, Rajkot. Interested students shall apply for admission at the time of notification in the prescribed form, and enroll with the co-ordinator of the course. The course will be conducted as soon a batch is filled up.

## **Examinations:**

The course carries 2 credits and the students will be evaluated on the basis of their performance in skill development and learning through regular practicals, assignments, field trips, group projects and tests. The pattern of evaluation will be 100% internal.

Certificates will be issued by the Autonomous College to the candidates on successful completion of the Course.

## **Course Objectives:**

The Course is designed:

- To enable the students to identify the edible and poisonous mushrooms.
- To provide hands-on training for the preparation of bed for mushroom cultivation and it's harvesting, pests and diseases control and post harvesting management.
- To provide the students awareness about the marketing trends of Mushrooms.
- To help the students to learn a means of self-employment and income generation.

### **UNIT I: Introduction**

**10hrs**

- Introduction: General History, edible mushrooms, mushrooms with medicinal importance and poisonous mushrooms.
- Common Indian mushrooms.
- Nutritional value, medicinal value and advantages.
- Systematic position, morphology, distribution, structure and life cycle of *Agaricus*.

### **UNIT II: Basics of Mushroom Cultivation**

**10hrs**

- Fundamentals of cultivation system- small village unit & larger commercial unit.
- Principles of mushroom farm layout- location of building plot, design of farm, bulk chamber, composting platform, equipments & facilities , pasteurization room & growing rooms.

- Cultivation: Paddy straw mushroom – substrate, spawn making.
- Methods – bedmethod, polythene bag method, field cultivation.
- Oyster mushroom cultivation –Substrate, spawning, pre-treatment of substrate.

### **UNIT III: Post Cultivation process**

**10hrs**

- Maintenance of mushroom.
- Diseases- Common pests, disease prevention and control measures.
- Processing - Blanching, steeping, sun drying, canning, pickling, freeze drying.
- Storage – short term and long term storage.

### **UNIT IV: Economics of Mushroom Cultivation**

**10hrs**

- Production level, economic return, Foreign exchange from Mushroom cultivating countries and international trade.

### **Practical**

1. Identification of Edible and poisonous mushrooms
2. Microscopic observations of mushrooms
3. Cultivation of mushrooms at laboratory level

### **Text Books**

1. Harander Singh. 1991. Mushrooms- The Art of Cultivation- Sterling Publishers.
2. Kaul, T.N. (1997). Introduction to Mushroom Science (Systematics). Oxford & IBH Publishing Co. Pvt. Ltd. New Delhi & Calcutta, India.
3. Vijaya Khader (1998). Mushrooms for Livelihood. Kalyani Publishers, Ludhiana, India.

### **Reference books**

1. Mushroom Production and Processing Technology, Pathak Yadav Gour (2010) Published by Agrobios (India).
2. Singh, Reeti and Singh, V.C. (2005). Modern Mushroom Cultivation. Agrobios, India.
3. Suman, B.C. and Sharma, V.P. (2005). Mushroom Cultivation and Uses. Agrobios, India.

**DEPARTMENT OF MICROBIOLOGY**  
**PART III – SEC – III**  
**VALUE ADDED COURSE**  
**(To be offered from Semester – II – V)**

<b>16UMBVA02</b>	<b>Vermicomposting</b>	<b>40 hrs Duration</b>	<b>2 Credits</b>
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**Course Profile:**

Vermicomposting is the process of using worms and microorganisms to convert organic matter into nutrient-rich humus. Earthworms and microorganisms eat the organic matter. Using worms to convert decomposing food waste into nutrient-rich fertilizer is simple, inexpensive, energy efficient, and a great way to teach students to become life-long recyclers. Vermicomposting can occur wherever food scraps or other organic matter are being generated or delivered. Charles Darwin studied earthworms for 39 years and demonstrated that they improve soil conditions and enhance plant productivity. Vermiculture enables any scale or size of operation. Vermicompost is being used in over 1, 00,000 hectare cultivated area in almost all agro-climatic zones in India.

**Employment Opportunities:**

**a. Job Prospects:**

1. In educational institutes as Vermicompost / vermiculture technician.
2. Vermicompost marketer in a industry
3. Government Agriculture Department.
4. Agriculture research institute.

**b. Entrepreneur:**

1. Students can construct their own compost farm & thereby can get monthly income of Rs. 7000-8000
2. Students by using Vermicompost in their field can increase the crop yield.
3. Can produce Vermicompost in small scale for garden/household plants.
4. Can generate income by supplying verms, vermiwash, & Vermicompost to the farmers.
5. Can have consultancy to create awareness and can motivate for practice of organic farming

## **Duration of course:**

The course shall be conducted in batches for 40 Hours as per the declared schedule as and when a batch is filled up. Students may opt to enrol anytime of their study from the II to V semesters.

## **Admission Procedure**

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## **Examinations:**

The course carries 2 credits and the students will be evaluated on the basis of their performance in skill development and learning through regular practicals, assignments, field trips, group projects and tests. The pattern of evaluation will be 100% internal.

Certificates will be issued by the Autonomous College to the candidates on successful completion of the Course.

## **Course Objectives:**

By completing this lesson, students will be able to:

- Identify the concepts of vermicomposting
- List several advantages of vermicomposting to recycle food waste
- Indicate how vermicomposting is beneficial to plants and soils
- Recall some ways earthworms have influenced history
- Describe categories of earthworms

### **UNIT-I: Introduction to Vermicomposting**

**10hrs**

- Definition,
- introduction and scope:
- Ecological classification:
- Humus feeders, Humus formers, leaf mold, top soil and sub soil types.

### **UNIT-II: Mechanism of Earthworm activity**

**10hrs**

- Physical changes brought by earth worm in soil
- Chemical changes brought by earth worm in soil
- Biological changes brought by earth worm in soil
- Burrows - drilosphere - earthworm casts.

### **UNIT-III: Conditions for Vermiculture**

**10hrs**

- Optimal conditions for Vermiculture
- Temperature
- Moisture
- pH
- Soil type, organic matter,
- Protection from sunlight, rain, predators
- Food preference.

### **UNIT-IV: Basic Components for vermiculture and Economics**

**10hrs**

- Culture practices - Home - School – Industries
- Vermi wash.
- Composting
- Required conditions
- Methods
- Advantages
- Cost-Benefit analysis of Vermicomposting.

### **Practical**

1. Key to identification of different types of earthworms
2. Study of Systematic position, habits, habitat & External characters of *Eisenia fetida*
3. Study of Vermiculture, Vermiwash & Vermicompost equipments, devices
4. Preparation vermibeds, maintenance of vermicompost & climatic conditions.
5. Harvesting, packaging, transport and storage of Vermicompost and separation

### **Text Books**

- Bhatt J.V. & S.R. Khambata (1959) “Role of Earthworms in Agriculture” Indian Council of Agricultural Research, New Delhi
- Dash, M.C., B.K. Senapati, P.C. Mishra (1980) “ Verms and Vermicomposting” Proceedings of the National Seminar on Organic Waste Utilization and Vermicomposting Dec. 5-8, 1984, (Part B), School of Life Sciences, Sambalpur University, Jyoti Vihar, Orissa.
- Rahudakar V.B. (2004). Gandul khatashivay Naisargeek Paryay, Atul Book Agency, Pune.

### **Reference books**

- Jsmail, S.A., 1970, Vermicology. The biology of earthworms. Orient Longman, London.
- Lee, K.E., 1985. Earthworms - Their ecology and relationship with soil and land use, Academic Press, Sydney.
- Kevin, A and K.E.Lee (1989) “ Earthworm for Gardeners and Fisherman” (CSIRO, Australia, Division of Soils)