Syllabus on Vocational Education and Training Course (VTC)

Paper Title	**: Mushroom Cultivation -I**
CODE	**: VTC: 241.2**
Number of Credits	**: 4**
Semester	**: III**
No. of Theory Hours Per Week	**: One (1 hour)**
No. of Practical Hours per Week	**: Three (3 Hours)**

Outline of the Paper:

Type of Course	Units in the VTC	Hours	Credits	Total Marks	Distribution of Marks (as per OC-8)			
					In-Semester		End-Semester	
					Theory	Practical	Theory	Practical
Mushroom Cultivation-I	Unit-I Theory (25 Marks)	15	4	100	25			
	Unit-II to IV Theory (75 Marks)	90				15		60

Marks Distribution	**: Internal Assessment: 40** **: External Assessment: 60**
Course Objectives	**1.** To enrich the students with basic information of mushrooms, **2.** To enable them to identify edible and poisonous mushrooms **3.** To provide exposure on various aspects of mushroom cultivation through field visits.
Course Learning Outcome	At the end of the course students will be able to: • identify edible and poisonous mushrooms • demonstrate the aspects of production and processing of mushrooms.
Unit I: (Theory) **15 Hours**	• Introduction, history and scope of mushroom cultivation; Common edible mushrooms; Other economically important and medicinal mushrooms; • Different parts of a typical mushroom & variations in mushroom morphology; • Characters of edible and poisonous mushrooms; • Mushroom classification based on occurrence, Natural habitats, Colour of spores, Morphology, Structure and texture of fruit bodies; Nutritional and health benefits of mushrooms.
UNIT-II: (Practical) **30 Hours**	• Identification of edible and poisonous mushrooms (specimen/chart). • Study of nutritional profile of common edible mushrooms. • Study of general morphology, distinguishing

	characteristics, spore germination and life cycle of common edible mushrooms
UNIT-III: (Practical) **30 Hours**	• Determination of soil temperature, soil moisture content, soil pH etc • Identification of different parts of mushroom • Classification of mushroom
UNIT-IV: (Practical) **30 Hours**	• Visit to mushroom production unit • Visit to mushroom processing unit • Visit to spawn production unit.
Suggested Readings	1. Biswas, Subrata M. Datta, S. V. Ngchan. (2012) Mushrooms: A manual for Cultivation. PHI Learning Pvt Ltd. 2. Gogoi, R. Y. Rathaiah, T.R. Borah. (2006). Mushroom cultivation technology, Scientific Publishers, Jodhpur, India. 3. Kannaiyan S. & Ramasamy K. (1980). A hand book of edible mushrooms, Today & Tomorrows printers & publishers, New Delhi. 4. Nita, B. (2000). Handbook of Mushrooms. Vol 1 & 2. Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi. 5. Pandey, R.K. and Ghosh, S.K. (1996). A handbook of Mushroom Cultivation. Emkey Publication. 6. Som, D. 2021. A Practical Manual on Mushroom Cultivation. P.K. Publisher and Distributor. 7. Tripathi, D.P (2005). Mushroom Cultivation. Oxford & IBH Publishing Co. Pvt. Ltd, New Delhi.
Requirements	• Microscopes • Charts and specimens • Tools for studying nutritional profiles • Growing chambers or areas for cultivating mushrooms. • Soil testing kits (for temperature, moisture content, pH). • Equipment for measuring environmental factors (light, humidity). • Specimens of mushrooms for hands-on identification **Any other item as and when required**
Qualified instructors	• Qualified instructors with expertise in mushroom cultivation and related fields. • Support staff for maintaining equipment and facilities

Paper Title	**: Mushroom Cultivation -II**
CODE	**: VTC: 261.2**
Number of Credits	**: 4**
Semester	**: IV**
No. of Theory Hours Per Week	**: One (1 hour)**
No. of Practical Hours per Week	**: Three (3 Hours)**

Outline of the Paper:

Type of Course	Units in the VTC	Hours	Credits	Total Marks	Distribution of Marks (as per OC-8)			
					In-Semester		End-Semester	
					Theory	Practical	Theory	Practical
Mushroom Cultivation-II	Unit-I Theory (25 Marks)	15	4	100	25			
	Unit-II to IV Theory (75 Marks)	90				15		60

Marks Distribution	**: Internal Assessment: 40** **: External Assessment: 60**
Course Objectives	**1.** To impart knowledge on the different aspects of cultivation of common edible mushrooms **2.** To identify problems encountered during cultivation and management strategies.
Course Learning Outcome	At the end of the course students are able to: 1. create a mushroom cultivation unit. 2. apply various procedures required for cultivation of common edible mushrooms 3. detect diseases and pests effectively.
Unit I: (Theory) **15 Hours**	• Principles of mushroom cultivation: Structure and construction of mushroom house (small village unit and large commercial unit), Sterilization of substrates; • Spawn production: culture media preparation, preparation of mother spawn, production of planting spawn, storage and transportation of spawn, criteria for selection of good quality spawn; Cultivation of Button, • Oyster and Straw Mushrooms: Collection of raw materials, compost & composting, spawn & spawning methods —bed method, Polythene bag method, field cultivation; • Casing & case run: importance of casing mixture, quality parameters of casing soil, different types of casing mixtures and commonly used materials; cropping & crop management, picking & packing. • Problems in cultivation - diseases, pests, nematodes, weed moulds and their management strategies.

UNIT-II: (Practical) **30 Hours**	• Preparation of compost using paddy straw and mushroom bed preparation. • Spawning using different methods, spawn running and harvesting. • Preparation of casing mixture, casing and case run. • Sterilization and sanitation of mushroom house, instruments and substrates.
UNIT-III: (Practical) **30 Hours**	• Introduction to microbiology laboratory, Laminar air flow, Autoclave etc. • Preparation of mother culture, media, inoculation, incubation and spawn production. • Study of common diseases, pests, nematodes and their management strategies during mushroom cultivation.
UNIT-IV: (Practical) **30 Hours**	• Cultivation of Paddy straw mushroom. • Cultivation of Oyster mushroom using paddy straw. • Cultivation of Button mushroom.
Suggested Readings	1. Ahlawat, O.P. R.P. Tewari (2007). Cultivation technology of Paddy straw Mushroom. National Research Centre for Mushroom (ICAR), Chambaghat, Solan, India. 2. Biswas, Subrata M. Datta, S. V. Ngchan. (2012) Mushrooms: A manual for Cultivation. PHI Learning Pvt Ltd. 3. Gogoi,R. Y. Rathaiah, T.R. Borah. (2006). Mushroom cultivation technology, Scientific Publishers, Jodhpur, India. 4. Gupta P. K. Elements of Biotechnology. Rastogi Publications. 5. Som, D. 2021. A Practical Manual on Mushroom Cultivation. P.K. Publisher and Distributor. 6. Tripathi, D.P (2005). Mushroom Cultivation. Oxford & IBH Publishing Co. Pvt. Ltd, New Delhi.
Requirements	1. Mushroom Cultivation Area: 2. Sterilization Facilities: 3. Microbiology Laboratory: 4. Disease Management: **Any other item as required**
Qualified instructors:	• Qualified instructors with expertise in mushroom cultivation and related fields. • Support staff for maintaining equipment and facilities

Paper Title	**: Mushroom Cultivation -III**
CODE	**: VTC: 361.2**
Number of Credits	**: 4**
Semester	**:VI**
No. of Theory Hours Per Week	**: One (1 hour)**
No. of Practical Hours per Week	**: Three (3 Hours)**

Outline of the Paper:

Type of Course	Units in the VTC	Hours	Credits	Total Marks	Distribution of Marks (as per OC-8)			
					In-Semester		End-Semester	
					Theory	Practical	Theory	Practical
Mushroom Cultivation-III	Unit-I Theory (25 Marks)	15	4	100	25			
	Unit-II to IV Theory (75 Marks)	90				15		60

Marks Distribution	**: Internal Assessment: 40** **: External Assessment: 60**
Course Objectives	**1.** To explain on preparation of various value-added products from mushroom and funding opportunities in Mushroom Cultivation.
Course Learning Outcome	At the end of the course students are able to: 1. prepare and present proposals on mushroom and spawn production 2. prepare value added products from mushroom. 3. identify the economics of mushroom cultivation. 4. demonstrate the economics of value-added products from mushroom.
Unit I: (Theory) 15 Hours	• Post-harvest management and processing of mushrooms: Blanching, Steeping, sun drying, canning, pickling, freeze drying; packaging; Storage- short term and long term; Marketing • Economics of mushroom cultivation; Economics of processed products of mushrooms. • Application of Artificial Intelligence in mushroom cultivation.
UNIT-II: (Practical) 30 Hours	• Sterilization of glasswares, equipments etc. • Blanching, Steeping, sun drying of mushrooms. • Freeze drying of mushrooms. • Packaging of mushrooms.
UNIT-III: (Practical) 30 Hours	• Pickling of mushrooms. • Study of storage life of processed mushrooms. • Economics of processed products of mushroom.
UNIT-IV:	• Economics of Mushroom cultivation and spawn production.

(Practical) **30 Hours**	• Visit to various financial funding agencies. • Preparation of project proposal for mushroom cultivation and spawn production.
Suggested Readings	1. Biswas, Subrata M. Datta, S. V. Ngchan. (2012) Mushrooms: A manual for Cultivation. PHI Learning Pvt Ltd. 2. Gogoi,R. Y. Rathaiah, T.R. Borah. (2006). Mushroom cultivation technology, Scientific Publishers, Jodhpur, India. 3. Hand Book of Mushroom Cultivation, Processing and Packaging, Eiri Staff, Engineers India Research Institute (2007) 4. Pathak, V.N. Nagendra Yadav and Maneesha Gaur (2010). Mushroom Production and Processing Technology. Published by Agrobios (India). 5. Rai R.D. and T. Arumuganathan (2008). Post-Harvest Technology of Mushrooms, Technical Bulletin 2008, NRCM, ICAR, Chambaghat, Solan1731213, (H.P.). 6. Revathy, N. A. Vijayasamundeeswari, V.M. Indumathi, V. Gomathi Mushroom Cultivation (Paperback,), Shanlax Publications, ISBN: 9789390082735, Edition: 1, 2020 7. Som, D. 2021. A Practical Manual on Mushroom Cultivation. P.K. Publisher and Distributor. 8. Tripathi, D.P. (2005). Mushroom Cultivation. Oxford & IBH Publishing Co. Pvt. Ltd, New Delhi.
Requirements	• Microscopes • Charts and specimens • Tools for studying nutritional profiles • Growing chambers or areas for cultivating mushrooms. • Soil testing kits (for temperature, moisture content, pH). • Equipment for measuring environmental factors (light, humidity). • Specimens of mushrooms for hands-on identification • **Any other item as and when required**
Qualified instructors	• Qualified Instructors with expertise in mushroom cultivation and related fields. • Support staff for maintaining equipment and facilities