

SKILL FACULTY OF AGRICULTURE

B. Voc. (Agriculture)

3 Year Course

2021-24



SHRIVISHWAKARMA SKILL UNIVERSITY

DUDHOLA, PALWAL

B.Voc.Agriculture-Semester V

Category	Subject Code	Subjects	Credits			Hours			Theory(Marks)			Practical (Marks)			Total
			Th	P	To	Th	P	To	I	E	To	I	E	To	
General Education Component	AGB-21501	Fundamentals of Mushroom Production Technology	3	1	4	45	30	75	30	70	100	35	15	50	150
	AGB-21502	Post-Harvest Management	2	1	3	30	30	60	30	70	100	35	15	50	150
	AGB-21503	Micro Irrigation System	3	2	5	45	60	105	30	70	100	35	15	50	150
			8	4	12	120	120	240	90	210	300	105	45	150	450
Skill Education Component	AGB-21504	Dairy Farming-1	3	3	6	45	90	135	30	70	100	35	15	50	150
	AGB-21505	Dairy Farming-2	3	3	6	45	90	135	30	70	100	35	15	50	150
	AGB-21506	Bee Keeping	3	3	6	45	90	135	30	70	100	35	15	50	150
			9	9	18	135	270	405	90	210	300	105	45	150	450
		Total	17	13	30	255	390	645	180	420	600	210	90	300	900

Syllabus

Subject: Fundamentals of Mushroom Production Technology

Subject Code: AGB 21501

Course Credit: 04 (3-1-0)

Max. Marks: 100 (30I+70E); 50 (35I+15E)

Course Objectives: To acquaint students about understand the scopes and opportunities of mushroom cultivation, mushroom farm portfolios –layout, design and development, cultivation, harvesting and processing of mushroom.

Learning Outcomes

LO 1: Apply conceptual framework about mushroom morphology and classification

LO 2: Knowledge regarding the dietary value of mushroom

LO 3: Understand parameters of mushroom farm layout, design and development

LO 4: Exposure to cultivation, harvesting and processing of mushroom

Theory

UNIT 1

Present scenario and prospects for Mushroom Cultivation; Mushroom morphology: Different parts of a typical mushroom; Key to differentiate Edible from Poisonous mushrooms; Mushroom Classification: Based on Structure and texture of fruit bodies-gilled fungal and pore fungal, Fruit bodies and spores- Ainsworth *et al.*, (1973) classification.

UNIT II

Nutrient Profile of Mushroom: protein, amino acids, calorific values, carbohydrates, fats, vitamins & minerals; Health benefits of Mushroom: Antiviral value, antibacterial effect, antifungal effect, anti-tumour effect, hematological value cardiovascular and renal effect, in therapeutic diets, adolescence for aged persons and diabetes mellitus.

UNIT III

Cultivation System and Farm design: Principles of mushroom farm layout- location of building plot, design of the farm, bulk chamber, composting platform, equipments and facilities, pasteurization room and growing rooms; Spawn and Spawning: Facilities required for spawn preparation, Preparation of spawn substrate, preparation of pure culture, media used in raising pure culture, culture maintenance and storage of spawn.

UNIT IV

Mushroom cultivation methods; Selection of commercially important types of Mushroom; Purpose and process of using spawn and selection of correct spawn; Different types of Mushroom growing facilities and features; Package of practices of White button Mushroom and Oyster Mushroom; Harvesting of Mushroom; Identification of right stage of Mushroom; Methods of harvesting; Post Harvest Management: Post harvest packaging and Management, Disease and Pest Management.

Practical

- Identification of mushrooms: Poisonous and Edible mushroom (Chart/Specimens)
- Preparation of pure culture
- Preparation of spawn
- Preparation of compost
- Mushroom cultivation at small scale level
- Post-harvest processing of mushroom
- Insect-pest and disease management in mushroom
- Field visit.

Recommended Reading

1. Bhal, N. (2000). Handbook on Mushrooms. 2nd Ed. Vol. I and II. Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi
2. Kannaiyan, S. & Ramasamy K. (1980). A handbook of edible mushroom. Today & Tomorrows printers & publishers, New Delhi.
3. Marimuthu, T. (1991). Oyster Mushroom. Department of Plant Pathology. Tamil Nadu Agricultural University, Coimbatore.
4. Pathak, V.N., Yadav, N & Gour, M. (2010). Mushroom Production and Processing Technology. Agrobios (India).
5. Tripathi, D.P. (2005). Mushroom Cultivation. Oxford & IBH Publishing Co. Pvt. Ltd, New Delhi.

Syllabus

Subject: Post-Harvest Management

Subject Code: AGB-21502

Course credit: 03 (2+1)

Max. Marks: 100 (30I+70E); 50 (35I+15E)

Course Objectives: This course deals with overall postharvest management of fruits and vegetables from farm to folk.

Learning objective:

LO1: Understand the importance of post-harvest management of fruits and vegetables.

LO2: knowledge of various technologies for pre and post-harvest management of crop produce.

LO3: Analyse the factors causes post-harvest losses.

LO4: Apply the modern packaging techniques for harvested products.

Theory:

Unit I

Importance of post-harvest processing of fruits and vegetables and possible causes of post-harvest losses.

Unit II

Pre-harvest factors affecting postharvest quality, maturity, ripening and changes occurring during ripening.

Unit III

Respiration and factors affecting respiration rate; Harvesting and field handling; Storage (ZECC, cold storage, CA, MA, and hypobaric); Value addition concept.

Unit IV

Principles and methods of preservation; Intermediate moisture food- Jam, jelly, marmalade, Preserved food, candy - Concepts and Standards. Canning - Concepts and Standards, packaging of products.

Unit V

Fermented and non-fermented beverages. Tomato products- Concepts and Standards; Drying/ Dehydration of fruits and vegetables. Concept and methods, osmotic drying.

Practical

- Applications of different types of packaging; Containers for shelf-life extension;
- Effect of temperature on shelf life and quality of produce: Demonstration of chilling and freezing injury in vegetables and fruits;
- Extraction and preservation of pulps and juices;
- Preparation of jam, jelly, RTS, nectar, squash, osmotically dried products, fruit bar and candy and tomato products, canned products;
- Quality evaluation of products -- physical-chemical and sensory.
- Visit to processing unit/ industry.

Recommended Reading

1. Srivastava, R. P. and Kumar, Sanjeev. (2019). Fruit and Vegetable Preservation Principles and Practices Revised and Enlarged 3Ed. CBS.
2. Goel, Ashwani Kumar, Rajender Kumar & Satwinder S Mann. (2014). Postharvest Management and Value Addition. Daya Publishing House.
3. Barche, Swati. (2013). Postharvest Handling of Fruits Vegetables And Flowers 2nd ed. Jain Brothers.
4. Rathore N S, Mathur, G. K. and Chasta, S. S. (2012). Postharvest Management and Processing of Fruits And Vegetables. The Energy and Resources Institute.

Subject: Micro Irrigation System

Subject Code:AGB-21503

Course Credit: 05 (3+2)

Max. Marks: 100 (30I+70E); 50 (35I+15E)

Course Objectives:To make students familiar with different micro irrigation systems.

Learn the various layout and design along with fertilizer application through these systems.

Learning Outcomes

LO 1: Apply conceptual framework about different types of micro-irrigation systems and how they help in agriculture

LO 2: Knowledge and skills for scheduling and maintaining a micro-irrigation system.

LO 3: Understand parameters of design and layout of micro-irrigation system

LO 4: Exposure to benefits of micro-irrigation systems over surface irrigation system

UNIT 1

Micro-Irrigation: Introduction and Scope, Fundamentals of Fluid Mechanics and its Application in Micro Irrigation, Soil Water Concept, Soil Water Constants and Infiltration, Evapotranspiration, Determination of Evapotranspiration, Crop Coefficients and Crop Water Requirement, Demonstration of Agro-Meteorological Instruments, Demonstration of Lysimeter

UNIT II

Irrigation Scheduling, Soil and Plant Water Monitoring Instruments, Measurement of Irrigation Water, Irrigation Efficiency, Water Management, Introduction of Water Lifts and Pumps, Variable Displacement Pumps, Irrigation Water Quality, Irrigation Methods, Micro Irrigation System: Concept and Types. Fertigation and its application.

UNIT III

Drip Irrigation: Introduction and Types; Design Considerations & System Layout of Drip irrigation; Types and Selection of Emission Devices, Evaluation of Drip Emitters, Soil Water Movement under a Drip Emitter, Design and Development of Drip Emitters; Hydraulics of Drip

Irrigation System Pipe Network; Filtration System, Installation and Operation of Drip Irrigation System; Maintenance of Drip Irrigation System; Demonstration of Drip Irrigation Components; Standards and Quality Assurance of Drip Irrigation System;

UNIT IV

Sprinkler Irrigation System: Introduction and Types; Sprinkler Irrigation System Design, Performance and Evaluation; Installation and Component of Sprinkler Irrigation System; Operation and Maintenance; Standards and Quality Assurance of Sprinkler Irrigation System; Automation of Micro Irrigation System; Precision Agriculture.

Practical

- Study of different types of micro-irrigation systems and its components
- Study of water filtration unit,
- Study of automation in micro-irrigation system,
- Study of micro irrigation inside a Polyhouse,
- Field visit of micro-irrigation system.

Recommended Reading

1. Goyal, M. R. (2012). Management of drip/trickle or micro-irrigation. CRC Press.
2. James, Larry G. (1988). Principle of Farm Irrigation System Design, John Wiley and Sons, New York.
3. Keller, J., & Bliesner, R. D. (2001). Sprinkle and trickle irrigation. The Blackburn Press
4. Lamm, F. R., Ayars, J. E., & Nakayama, F. S. (2006). Micro-irrigation for crop production: design, operation, and management. Elsevier
5. Michael, A.M. (1982). Irrigation: Theory and Practice, Vikas Publishing House Pvt. Ltd., New Delhi.
6. Srinivasan, A. (Ed.). (2006). Handbook of precision agriculture: principles and applications. CRC press.

Subject: Dairy Farming I

Subject Code: AGB 21504

Course Credit: 06 (3+3)

Max. Marks: 100 (30I+70E); 50 (35I+15E)

Course Objectives:This course is designed to impart basic technical knowledge and skills required for entry level positions or to successfully run a dairy farm enterprise by developing competencies concerning the breeding of dairy cattle, housing and health care.

Learning Outcomes

LO1. Describe about dairy industry, input requirements, site selection, cattle selection, budget estimation, procurement of inputs, etc.

LO2. Describe the process of constructing and maintaining accommodation for cattle, resources availability, shed construction and types, maintenance of shed.

LO3. Describe the process of preparing and giving recommended feed and water for livestock, feed nutrients composition, feed requirements.

LO4. Maintaining health of livestock along with productivity and nutrient.

LO5. Describe about Dairy Farming economics and Finance and market information

Theory

UNIT I

Understand Role of a Dairy Farmer. Understand the different indigenous and exotic breeds. High milk yielding varieties. Selection of Cattle, Differentiate Healthy and sick animals.

UNIT II

Understand the accommodation needs of livestock. Understand the different types of accommodation. Use and recognize tools/equipment used for preparation of accommodation. Understand the different methods of waste handling/ management. Plan and follow the routine cleaning of animal shed.

UNIT III

Understand the Feed Composition and quality. Understand the nutrients requirement for animals.

Identify and procure the inputs required for the feed preparation. Feeding Chart.

UNIT IV

Understand the Pre-Milking, Milking and Post Milking activities. Understand the Mastitis disease and precautions to be taken. Procedure for clean milk production.

UNIT V

Understand the Dairy Farming economics and Finance. Market information and understand the method of marketing.

Practical

- Prepare and maintain livestock accommodation.
- Prepare the feed and maintain feed.
- Demonstrate how to perform Hand and Machine Milking.
- Carry out commercial activities such as buying and selling dairy related products using the appropriate e-commerce platforms or from authorized vendor.
- Demonstrate various methods of Forage Conservation. Explain the requirements of personal health, hygiene and fitness at work.

Subject: Dairy Farming II

Subject Code: AGB 21505

Course Credit: 06 (3+3)

Max. Marks: 100 (30I+70E); 50 (35I+15E)

Course Objectives: The Students are responsible for educating the trainees – Dairy herd management, feeding, milking and ensure healthy performance of dairy cattle, Documentation & Record keeping, Maintain Safety & Hygiene of the Dairy Farm, Manage & supervise the farm workers.

Learning Outcomes

LO1. Demonstrate overall supervision of activities of the dairy farm- ensure stress free environment, feed ration calculation, feeding, milking, disease prevention, herd health management, understand dairy economics, budgeting of dairy farm.

LO2. Explain the inventory management, classify the inventory and ensure timely supplies.

LO3. Demonstrate documentation & record keeping, maintain various registers, financial records, inventory records, attendance register, etc.

LO3. Explain the safety, hygiene & sanitation of the dairy farm, conduct workplace audit ensuring safety & hygiene of the workplace and the workers.

LO4. Demonstrate team management at the dairy farm, delegate work, address issues of the workers, upskill the workers.

Theory

UNIT I

Advantages of Dairying. Principles involved in successful dairying. Systems of dairy farming – Mixed farming and specialized dairy farming. Reception of milk: Unloading, Grading, Sampling, Testing, Weighing and Recording. Storage of milk. Straining, filtration and clarification of milk.

UNIT II

Definition of milk, Composition of cow milk, buffalo milk, sheep milk, goat milk and human milk. Differences between the composition of cow and buffalo milks. Constituents of milk: Minor and major constituents

UNIT III

Factors affecting composition and yield of milk – Species, Breed, Individuality, Stage of lactation, Age of the animal, Season, Interval between milking, Stage of milking, Feed and Exercise. Physico-chemical properties of milk -Colour, Flavour, Density, Specific gravity, freezing point, Boiling point, Surface tension, Viscosity, pH and acidity. Milk pasteurization: LTLT, HTST and Sterilization of milk and Homogenization of milk.

UNIT IV

Packaging of milk: Desirable characters and types of packaging materials; Forms of packaging. Disposal of dairy effluents: Sources of dairy waste; Necessity of treatment of dairy waste; Methods of treatment: Low cost methods and Conventional methods - Activated sludge process and trickling filters.

UNIT V

Dairy development programs implemented in India. Operation Flood program. Economics of maintaining Dairy Farm – Income and expenditure. Estimating the production cost of milk.

Practical's:

- 1.RMRD Testing of milk.
2. Standardization of milk.
3. Homogenization of milk.
4. Pasteurization of milk.
5. Sterilization of milk.
6. Preparation of toned milk and double toned milk.
7. Preparation of Reconstituted milk.
8. Cream separation

Subject: Bee keeping

Subject Code: AGB 21506

Course Credit: 06 (3+3)

Max. Marks: 100 (30I+70E); 50 (35I+15E)

Course Objectives: To manage the colonies of bee in order to harvest good quality of honey and other Bee related by-products (Wax, Pollen, Pro-polish, Royal Jelly, Bee venom*etc*) and generate the income.

Learning Outcomes

LO1: Understand the importance of Bee Keeping and its products

LO2: Enable to identify different types of honey bee and install bee hive

LO3: Acquire the knowledge about honey bee biology and its colony management.

LO4: Enable to analyze the traditional and modern techniques of Bee rearing and its maintenance.

LO5: Enable to identify the insect pests and diseases of honey bee and its management.

LO6: Able to harvest, process, packed and stored the honey bee products and sell in the market.

Theory

UNIT 1

Introduction of Bee keeping, Scope and importance of Bee keeping;Role of Beekeeper;Uses of honey bee products.

UNIT II

Role of bees in Pollination and its importance in crop productivity; Tools/equipments of bee keeping. Site selection and hive installation;Identification of different types of bees;

UNIT III

Biology and Life cycle of honey bee; Different castes of bees and their role in honeyproduction; Bee foraging and communication; Management of Bee colonies.

UNIT IV

Inspection and Maintenance of record; Migration of bee colonies; Commercial method of rearing; Difference between traditional and modern bee-keeping systems.

UNIT V

Identification of insect pest and diseases of honey bee and their management; Tools/equipments required for insect pest and disease management; Pesticide poisoning in bees.

UNIT VI

Important factors for harvesting; Tools/equipments required for harvesting; Time and method of harvesting, processing, packaging and storage of honey, Royal Jelly, Propolis, Pollen and Bee venom; Marketing of honey products.

Practical

- Identify different species of honey bees;
- Different castes of bees and their role in colony.
- Identify the tools/equipments required for the bee keeping;
- Site selection for hive installation;
- Manage the Colonies of Bee.
- Identification of insect pests of bee and their management
- Identification of common diseases of bee and their management
- Method of harvesting of honey bee produce.
- Processing, packaging and storage of honeybee products.

Unique Equipment Required:

A box bee hive with a complete colony of bees, Hive uncapping knife, Hive tool, Bee brush, Honey extractor, All personal protective equipment required while handling bees, smoker, Bee suite and gloves, royal jelly extractor, venom extractor, Propolis collector, Pollen Collector, Mass queen rearing kits, grafting needle, queen excluder, queen cage.

Suggested readings:

1. Rahman Atuar. (2017). Apiculture in India. ICAR, 2017th edition.
2. Sammataro D. and Avitabile A. (2011). The Beekeeper's Handbook, 4th edition. Cornell University Press, USA.
3. Ross, C. (2007). Natural Beekeeping: Organic Approaches to Modern Apiculture, White River Junction, London, UK.
4. Delaplane, K.S. (2006). Honey Bees and Beekeeping: A Year in the Life of an Apiary, 3rd Edition. The Georgia Center for Continuing Education, Athens, USA.
5. Sardar Singh. (1962). Beekeeping in India. ICAR Publication, New Delhi