



M. C. E. Society's

Abeda Inamdar Senior College

Of Arts, Science and Commerce, Camp, Pune-1

(Autonomous) Affiliated to Savitribai Phule Pune University

NAAC accredited 'A' Grade

**F.Y.B.Sc. Botany
Semester I
(CBCS – Autonomy 2023 Pattern)**

Course Title	MUSHROOM CULTIVATION AND TECHNOLOGY	
Course Code: 23SBBO11SE		No. of Credits: 02
Course Type: Skill Enhancement Courses (SEC)		Total Teaching Hours: 30

Course Objectives

1.	Enable the students to identify edible and poisonous mushrooms
2.	Provide hands on training for the preparation of bed for mushroom cultivation and spawn production
3.	Give the students exposure to the experiences of experts and functioning mushroom farms
4.	Help the students to learn a means of self-employment and income generation.

Course Outcome

1.	The training course will prepare student for a career in mushroom cultivation.
2.	Gain the knowledge of cultivation of different types of edible mushrooms and spawn production
3.	Manage the diseases and pests of mushrooms
4.	Help the students for self employment and income generation.

Syllabus

1	Identification of different edible mushroom species Oyster and Button Mushroom	1 P
2	Microscopic and anatomical observations of different mushroom species. <i>Pleurotus</i> , <i>Agaricus</i> .	1 P
3	Pure culture - preparation of medium (PDA medium) and Master culture.	2 P

4	Isolation and stages of preparation of spawn.	1 P
5	Study of cultivation practices in mushroom cultivation.	1 P
6	Mushroom bed preparation - paddy straw / maize straw.	2 P
7	Inoculation and spawning of compost.	2 P
8	Incubation and harvesting of mushrooms and storage.	1 P
9	Diseases and pest management for mushroom cultivation.	1 P
10	Study of recipes of mushroom with its nutritional value added.	1 P
11	Study tour to mushroom cultivation farms.	2 P
12	Project work on preparation of mushroom bed by using paddy straw.	2 P

Suggested Readings	
1.	Pathak Yadav Gour (2010) <i>Mushroom Production and Processing Technology</i> , Published by Agrobios (India).
2.	S.Kannaiyan& K.Ramasamy (1980), <i>A hand book of edible mushroom</i> , Today & Tomorrows printers & publishers, New Delhi
3.	Nita Bahl, oxford, <i>Handbook on Mushrooms</i>
4.	Pandey R.K, S. K Ghosh, 1996, <i>A Hand Book on Mushroom Cultivation</i> . Emkey Publications.
5.	Pathak, V. N. and Yadav, N. (1998), <i>Mushroom Production and Processing Technology</i> , Agrobios, Jodhpur
6.	N. Pathak, Nagendra Yadav and Maneesha Gaur (2000), <i>Mushroom Production and Processing Technology</i> , Vedams Ebooks Pvt Ltd., New Delhi



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Semester I
(CBCS – Autonomy 2023 Pattern)**

Course Title	INDIAN SYSTEM OF MEDICINE	
Course Code: 23SBBO11IK		No. of Credits: 02
Course Type: Indian Knowledge System (IKS)		Total Teaching Hours: 30

Course Objectives	
1	To know the Ayurvedic System of Medicine
2	To learn about Siddha System of Medicine
3	To comprehend Unani System of Medicine
4	To be aware of the tribal medicine

Course Outcome	
1	Student will understand thoroughly about Indian system of medicines.
2	It will help the students to understand the principles and the importance of tribal medicine.
3	Student will know about the concept of Unani system of medicine.
4	Students will gain knowledge on method of preparation of Homeopathic medicines and its merits and demerits.

Syllabus		
Unit I	HERBAL MEDICINES	03 hours
	Concept, importance, history and scope of Indian medicinal system – Siddha, Ayurveda and Unani systems	
Unit II	AYURVEDIC SYSTEM OF MEDICINE	04 hours
	i. Introduction to various systems of Indigenous medicine. ii. History and Development of Ayurvedic medicine. iii. Principles and Concepts of Ayurveda. Methods of preparation of Ayurvedic medicines.	

	iv. Merits and demerits of Ayurvedic medicine	
Unit III	SCOPE AND USES OF MEDICINE	06 hours
	<p>i. Scope of Indian system of medicine compared with homeopathy and allopathic system of medicine.</p> <p>ii. Traditionally used medicinal plants in India (<i>Justicia adatoda</i>, <i>Ocimum tenuiflorum</i>, <i>Nigella sativa</i>, <i>Piper nigrum</i>, <i>Lawsonia inermis</i>, <i>Cinnamomum verum</i>, <i>Phyllanthus embilica</i>, <i>Curcuma longa</i>, Peepal, Banayan, Sandal wood, Bale and Neem)</p>	
Unit IV	SIDDHA SYSTEM OF MEDICINE	04 hours
	<p>i. History and Development of Siddha medicine.</p> <p>ii. Principles and concepts of Siddha systems of medicine.</p> <p>iii. Method of preparation of Siddha medicines.</p> <p>iv. Merits and demerits of Siddha medicine</p>	
Unit V	UNANI SYSTEM OF MEDICINE	05 hours
	<p>i. Principles and Concepts of Unani systems of medicine.</p> <p>ii. Introduction to different dosage forms and method of preparations of Unani medicines.</p> <p>iii. Merits and demerits of Unani system.</p>	
Unit VI	HOMEOPATHY SYSTEM OF MEDICINES	04 hours
	<p>i. History, Origin and development of Homeopathy.</p> <p>ii. Fundamentals, concepts and principles of Homeopathy.</p> <p>iii. Method of preparation of Homeopathic medicines.</p> <p>iv. Merits and demerits of Homeopathy medicines.</p>	
Unit VII	TRIBAL MEDICINE	04 hours
	<p>i. Principles, Importance, Merits and Demerits of Tribal Medicines.</p> <p>ii. Complimentary Medicines Medicinal sources - Herbal sources, Mineral sources and their collection, purification and processing.</p>	

Suggested Readings	
1	Indian Herbal Pharmacopoeia vol. I &II Indian Drug Manufacturer's association, Mumbai. 2006
2	British Herbal Pharmacopoeia British Herbal Medicine Association. vol.I. 1990
3	GMP for Botanicals - Regulatory and Quality issues on Phytomedicine, Business horizons, New Delhi, First edition, Robert Verpoorte, Pulok K Mukharjee. 2003.
4	Screening methods of Pharmacology by Robert turner. Toxicology and Clinical Pharmacology of Herbal Products, Melanie Johns Cupp. 2001
5	Hand Book on Ayurvedic Medicines, H.Panda National Institute of Industrial Research, Delhi- 2017.
	E-Reference link
6	https://www.hindawi.com/journals/ecam/2013/376327
7	https://www.researchgate.net/publication/41453693_Indian_Systems_of_Medicine_A_Brief_Profile
8	https://niimh.nic.in/ebooks/ayuhandbook/User%20Manual.pdf



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Semester I

(CBCS – Autonomy 2023 Pattern)

Course Title	HYDROPONIC TECHNOLOGY	
Course Code: 23SBBO110EA		No. of Credits: 02
Course Type: Open Elective (OE)		Total Teaching Hours: 30

Aims & Objectives of the Course

Sr. No.	Objectives
1.	The paper deals with general principles of Hydroponic Technology
2.	To understand Hydroponic technology in daily life.
3.	Create potential among students to become an entrepreneur.
4.	To equip the students with skills of the advanced techniques of soilless culture.
5.	To create foundation for further studies in Skill Development in Plant Science
6.	Conservation of water with liquid fertilizers.

Expected Course Specific Learning Outcome

Sr. No.	Learning Outcome
1.	Creation of skilled and trained manpower for agricultural sector
2.	Application of technology for higher production and profitability of farming
3.	Development of skills needed for future agriculture like hydroponics which will boost the intensive agriculture and production efficiencies.
4.	Supplementing farm income by promoting vegetable production, storage and marketing and also helping in preserving the health of people by providing sufficient healthy foods like vegetables.
5.	Knowledge resource persons for seed production, Agriculture Industry.

SYLLABUS

Unit No	Title with Contents	No. of Lectures
HYDROPONIC TECHNOLOGY		
Unit I	1.1. Introduction and Brief History Of Hydroponics, 1.2. Current Research, Types of Hydroponic Systems.	03
Unit II	2.1. Hydroponic Mediums. 2.2. Media Preparation, Coconut Coir Perlite.	02
Unit III	3.1. Soil less culture, Sand And Gravel Culture. 3.2. The Dutch Bucket Method, The Rockwool Slab Drip System. 3.3. The Nutrient Film Technique (NFT), The Raft System. 3.4. Ein Gedi System, Aeroponics. 3.5. The Autopot, Vertical Gardening	05
Unit IV	4.1. Introduction to Plant Nutrition and Vegetable Cultivation 4.2. The Organic Composition Of Plants. Macro Nutrients. Micro Nutrients. 4.3. Selecting a Hydroponic Nutrient. 4.4. Making Your Own Nutrients. 4.5. Maintaining Nutrient Concentration and pH. 4.6. Nutrient Solution Microbiology. 4.7. Hydroponic cultivation of Tomato, Sweet capcium and Mint	05
WORKING OF HYDROPONIC TECHNOLOGY		
Unit V	5.1. Study of Hydroponic system Design and Working 5.2. Components of Hydroponic System	05
Unit VI	6.1. Light Requirements, High Intensity Discharge (HID) Lighting. Intensity. 6.2. Duration (Photoperiod): Color (Photosynthetic spectrum). Choosing A Grow Light	05
Unit VII	7.1. Hydroponics as a Commercial activity 7.2. Making a Market For Your Garden, Investigate Your Local Market. 7.3. Product Quality Considerations, Approaching Prospective Customers. 7.4. Hydroponics Applications, Benefits and customization under Indian conditions.	05

Suggested Readings	
1.	How to Hydroponics - by Keith Roberto
2.	Hydroponic by Richard Bray.
3.	Aquaponic for Beginners by Nick Brooke.
4.	Complete Hydroponic Gardening book by Jason Wright



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Semester I
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Course Title	EXPERIMENTS ON HYDROPONIC TECHNOLOGY	
Course Code: 23SBBO12OEB		No. of Credits: 02
Course Type: Open Elective (OE)		Total Teaching Hours: 30

Aims & Objectives of the Course

Sr. No.	Objectives
1	To provide practical knowledge and to develop a sound understanding of hydroponics technology
2	To impart knowledge on raising crops in hydroponics sustainably
3	Create potential among students to become an entrepreneur.
4	To equip the students with skills of the advanced techniques of soilless culture.
5	Conservation of water and use of liquid fertilizers

Expected Course Specific Learning Outcome

Sr. No.	Learning Outcome
1	Gaining knowledge on hydroponics technology
2	Successful raising of crops under hydroponics system
3	Development of skills needed for future agriculture like hydroponics which will boost the intensive agriculture and production efficiencies.
4	Successful raising of crops under hydroponics system
5	Knowledge resource persons for seed production, Agriculture Industry.

SYLLABUS

Sr. No.	Practicals on Hydroponic Technology	No. of Practical
1.	Study of Hydroponic System, drip and aeroponics.	01
2.	Study of morphology some plants.	01
3.	Identify the crops and their suitability to Hydroponics system.	01
4.	Study of seed Sowing and establishments of the crop in laboratory.	01
5.	Study of germination under suitable temperature in the laboratory.	01
6.	Study of designing of Hydroponic system.	01
7.	Demonstration of equipment for Hydroponic system.	01
8.	Study of transplantation of germinated plant lets to Hydroponic system.	01
9.	Preparation of liquid macro- fertilizers for the Hydroponic system	01
10.	Study of Growth indices for plants grown in Hydroponic system.	01
11.	Effect of environmental paraments on the growth of plants.	01
12.	Preparation of liquid micro- fertilizers for the Hydroponic system	01
13.	Identification of plant diseases in hydroponic environment	01
14.	Study of pH and Nutrient Concentration in the hydroponic system	01
15.	Study of harvesting and post harvesting	01
16.	Study of storage of vegetable crops obtains from hydroponic system.	01
17.	Visit to commercial Hydroponic system in India.	01

Suggested Readings

1	How to Hydroponics - by Keith Roberto
2	Hydroponic by Richard Bray.
3	Aquaponic for Beginners by Nick Brooke.
4	Complete Hydroponic Gardening book by Jason Wright
5	Hydroponics: A Step-By-Step Hydroponic Gardening Guide to Grow Fruit, Vegetables, and Herbs at Home by Andy Jacobson
6	Hydroponics: A Practical Guide for the Soilless Grower (2nd Edition), by Dr. J. Benton Jones
7	Commercial Hydroponics by John Mason



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Semester II
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Course Title	PRINCIPLE OF PLANT SCIENCE	
Course Code: 23SBBO21MN		No. of Credits: 02
Course Type: Minor (MN)		Total Teaching Hours: 30

Aims & Objectives of the Course

Sr. No.	Objectives
1.	The paper deals with general principles of Plant Science
2.	To understand Plant Science in daily life.
3.	Create potential among students to become an entrepreneur.
4.	To equip the students with skills of the advanced techniques of DNA and RNA
5.	To create foundation for further studies in Skill Development in Plant Science
6.	Application of Plant Science processes for the beneficial of mankind.

Expected Course Specific Learning Outcome

Sr. No.	Learning Outcome
1.	Plant Science Creation of skilled and trained manpower for agricultural to become Aatmanirbhar Bharath to lead 21 st Century
2.	Application of Plant principles for higher production and profitability of farming by using DNA.
3.	Development of skills needed for future generation by using genetic character of Plants.
4.	To understand basics of Plant science.
5.	To become Knowledge and Skill resource persons for 21 st century.

SYLLABUS

Unit No	Title with Contents	No. of Lectures
	PRINCIPLE OF PLANT SCIENCE	
Unit I	1.1. Introduction and Brief History Of Cell. 1.2. Structure of plant Cell. 1.3. Difference between Prokaryotic and Eukaryotic cell. 1.4. Cell cycles in plants – phases of cell cycle (G1,M,G2 and S) Importance of cell cycle in plants. 1.5. Brief idea of cell cycle (recapitulation of mitosis and meiosis)	05
Unit II	2.1. Plant cell wall – Components of primary cell wall, structure and functions 2.2 Plasma membrane – bilayer and fluid mosaic model, components and functions	03
Unit III	3.1. Structure and Functions of Chloroplast 3.2 Structure and Functions of Mitochondria 3.3. Structure and Functions of Endoplasmic Reticulum	03
Unit IV	4.1. Carbohydrate: Structure, Function and properties of Monosaccharides (Hexoses and pentoses), 4.2. Disaccharides (sucrose, lactose, maltose), storage & structural Polysaccharide (glycogen, starch and cellulose). 4.3.Lipids : Definition and classification of lipids, Structure and function of fatty acid, storage lipids, structural lipids	04
	MOLECULAR BIOLOGY	
Unit V	5.1 Introduction to Molecular Biology. 5.2 Scope and Importance of Molecular Biology 5.3 Characteristics of Genetic Material 5.4 Central Dogma of Molecular Biology	05
Unit VI	6.1 DNA-Deoxyribose Nuclie Acid, Structure of DNA. 6.2 Chargaff's rule, C-Valu paradox 6.3 Watson and Cricks Model of DNA. 6.4 Types of DNA 6.5 Types of Chromosomes.	04
Unit VII	7.1 RNA-Ribo Nuclie Acid, Introduction 7.2 Structure and Constituents of RNA 7.3 Types of RNA	03
Unit VIII	8.1 DNA Replication 8.2 Types of replication 8.3 Bacterial DNA Replication	03

Suggested Readings

1.	Principles of molecular biology (2016) Veer Bala Rastogi publication
2.	P S Verma and V K Agarwal (2022) Molecular Biology
3.	N Vidyavathi and D M Chetan (2021)Molecular Biology
4.	K.N. Dhumal and Sayyed Iliyas (2022) Biochemistry Nirali Publication



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Semester II
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Course Title	PLANT MORPHOLOGY AND ECOLOGY	
Course Code: 23SBBO22MN		No. of Credits: 02
Course Type: Minor (MN)		Total Teaching Hours: 30

Course Objectives	
1	Understand the morphology of Angiosperms.
2	Learn about vegetative structure of Angiosperms.
3	Understand the detailed study of plant ecology.
4	Understand plant communities and ecological adaptations in plants.

Course Outcome	
1	During the course students will gain the Knowledge of Morphology of Reproductive parts of flower.
2	Students will be provided with the knowledge of Plant Morphology and Ecology.
3	Students will gain the knowledge on reproductive strategies in higher plants.
4	The students will increase the understanding of Ecosystem and ecological adaptations of plants.

Syllabus		
PLANT MORPHOLOGY		
Unit I	INTRODUCTION TO PLANT MORPHOLOGY	02 hours
	Introduction, definition, descriptive and interpretative morphology. Scope and Importance of Morphology: Identification, nomenclature, classification, phylogeny and Plant breeding.	
Unit II	MORPHOLOGY OF VEGETATIVE PARTS	03 hours
	i. Study of Roots- Characteristic, functions and types of root system	

	<p>(Tap root and adventitious root)</p> <p>ii. Study of Stem- Characteristic functions Stem, Characteristics and functions underground and Aerial.</p> <p>iii. Study of Leaf- Structure and functions, types of phyllotaxy, venation, types of leaves (simple and compound)</p>	
Unit III	MORPHOLOGY OF REPRODUCTIVE PARTS: INFLORESCENCE	03 hours
	<p>i. Introduction, definition and parts of inflorescence.</p> <p>ii. Types of Inflorescence: Outline classification of inflorescence</p> <p>iii. Racemose -Raceme, Spike, Spadix, Corymb, Umbel, Catkin and Capitulum.</p> <p>iv. Cymose -Solitary, Monochasial- Helicoid and scorpioid; Dichasial and Polychasial.</p> <p>v. Special types -Verticillaster, Cyathium and Hypanthodium.</p> <p>vi. Significance of Inflorescence.</p>	
Unit IV	MORPHOLOGY OF REPRODUCTIVE PARTS: FLOWER	04 hours
	<p>i. Introduction and definition</p> <p>ii. Parts of a typical flower: Bract, Pedicel, Thalamus- forms, Perianth- Calyx and Corolla, Androecium and Gynoecium.</p> <p>iii. Symmetry: Actinomorphic and zygomorphic, Sexuality- Unisexual and bisexual, Insertion of floral whorls on thalamus- Hypogyny, Epigynae and perigynae, Merous condition-Trimerous, tetramerous and pentamerous.</p> <p>iv. Floral whorls:</p> <p>a) Calyx: Nature, Polysepalous, Gamosepalous; Types of Aestivation, Modifications of Calyx- Pappus, Petaloid and Spurred.</p> <p>b) Corolla: Forms of Corolla</p> <p>i) Polypetalous- Cruciform and Papilionaceous.</p> <p>ii) Gamopetalous - Infundibuliform, Bilabiate, Tubular and Campanulate.</p> <p>iii) Aestivation- types and significance.</p> <p>c) Perianths: Polytepalous, Gamotepalous.</p> <p>d) Androecium: Structure of typical stamen, Variations- cohesion and adhesion.</p> <p>e) Gynoecium: Structure of typical carpel, number, position, cohesion and adhesion; types of placentation.</p>	

Unit V	FRUITS	03 hours
	i. Introduction and definition ii. Types of fruits:- Outline classification a) Simple: Indehiscent - Achene, Cypsela, Nut and Caryopsis. Dehiscent - Legume, Follicle and Capsule, b) Fleshy: Drupe, Berry, Hesperidium and Pepo. c) Aggregate: Etaerio of Berries and Etaerio of Follicles. d) Multiple fruits: Syconus and Sorosis.	
PLANT ECOLOGY		
Unit VI	INTRODUCTION TO PLANT ECOLOGY	03 hours
	i. Definition, concept, types (Autecology and Synecology), Scope and importance of ecological Studies. ii. Multidisciplinary approach of plant ecology.	
Unit VII	ECOSYSTEM	06 hours
	i. Meaning, Definition, Concept of population, community and ecosystem ii. Structure and Function of Ecosystem (Biotic and Abiotic components) iii. Processes within ecosystem- Food chain, food web, energy flow, homeostasis and ecological pyramids. iv. Nutrient cycling with reference to carbon, nitrogen and Sulphur.	
Unit VIII	ECOLOGICAL ADAPTATION IN PLANTS	06 hours
	i. Introduction, concept and definition of Ecological adaptation in plants. ii. Ecological classification of plants-Hydrophytes, Mesophytes, Xerophytes and Halophytes with Examples (Warming-1909) iii. Study of ecological adaptation in hydrophytes, xerophytes and halophytes with suitable example.	

Suggested Readings	
1	Lawrence, G.H.M. (2012). <i>Taxonomy of vascular Plants</i> . Scientific Publishers (India) Jodhpur.
2	Naik, V.N. (1994). <i>Taxonomy of Angiosperms</i> . Tata McGraw Hill Publishing Comp., New Delhi.
3	Pandey, B.P. (2009). <i>A Text Book of Botany- Angiosperms</i> . S. Chand and Co. Ltd. New Delhi.
4	Radford, Albert E. (1986). <i>Fundamentals of Plant Systematics</i> . Publ. Harper and Row, New York.
5	Sharma, O.P. (1993). <i>Plant Taxonomy</i> . 2 nd Edition, McGraw Hill Education, New Delhi.
6	Singh, Gurucharan (2005). <i>Systematics- Theory and Practice</i> . Oxford IBH.
7	Balfour Austin (2016). <i>Plant Taxonomy</i> . Syrawood Publishing House
8	Chapman, J.L. and Reiss, M.J. (1998). <i>Ecology: Principles and applications</i> . Cambridge, University Press.
9	Kormondy Edward (1995). <i>Concepts of Ecology</i> , Pearson Publ.
10	Michael P. (1984). <i>Ecological Methods for field and Laboratory investigations</i> TMH Co. ltd. Bombay.
11	Imtiyaz Hussain Zaheed (2013), <i>Text book of Environmental Biology</i> , Discovery publishing house PVT.LTD, ISBN 978-93-5056-231-4 ISBN No. 970-93-91204-39-9
12	Imtiyaz Hussain Zaheed (2023), <i>A textbook of Plant morphology and Ecology</i> .
13	Sayyed Iliyas (2004) <i>Fundamentals of Environmental Science</i> , Renuka prakashan, Aurangabad



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Semester II
(CBCS – Autonomy 2023 Pattern)**

Course Title	EXPERIMENTAL PLANT PHYSIOLOGY - I	
Course Code: 23SBBO21VS		No. of Credits: 02
Course Type: Vocational Skill Courses (VSC)		Total Teaching Hours: 30

Course Objectives	
1	Enable the students to understand basic of plant science experiments
2	To Provide hands on training to find out experiments on Transpiration, seed viability etc
3	Give the students exposure to the experiences of experts and functioning of plants
4	To develop skills of the students to learn a means of self employment and income generation.
5	Create foundation for further studies in Botany

Course Outcome	
1	The training course will prepare student for a career in the industries like seed testing etc
2	Equip the students with skills related to laboratory as well as field based studies
3	Students will enhance their skills on plant growth.
4	Equip students with effect of plant growth regulators on the growth of plant

Syllabus		
1	Determination of Diffusion Pressure Deficit (DPD) Using Potato Tuber.	2 P
2	Study of rate of transpiration in shade, light and wind using burette potometer	1 P
3	To demonstrate curling of tissue due to osmosis, Ringing and Imbibition.	1 P
4	To Study the phenomenon of Plasmolysis in <i>Rhoeo</i> leaf.	1 P
5	Demonstration of the Effect of Auxins on Rooting	2 P
6	Assessing seed viability by TTC method	1 P
7	Studying the structure and distribution of stomata	1 P
8	Demonstration of Mineral and Nutrient deficiency in plants.	1 P
9	To study extraction and estimation of Chlorophyll content in plant tissue	1 P
10	Study of plant growth by Arc Auxanometer	1 P
11	Effect of monochromatic light on the rate of photosynthesis	1 P
12	Estimation of carbohydrate	1 P
13	Separation of photosynthetic pigments by paper chromatography	1 P
14	Demonstration of anaerobic respiration	1 P
15	Field visit to study to seed testing Laboratory	1 P

Suggested Readings	
1	Jain, V.K. (2000) <i>Fundamentals of Plant Physiology</i> , S. Chand & Co, New Delhi.
2	Sayyed Iiyas (2020) <i>Steps in Plant Physiology</i> , Lambert Academic Publishing, Mauritius.
3	Fitter, A. and Hay, R.K.M. (2001) <i>Environmental Physiology of Plants</i> , Academic Press, UK.
4	Press, M.C., Barker, M.G., and Scholes, J.D. (2000) <i>Physiological Plant Ecology</i> , <i>British Ecological Society Symposium</i> , Volume 39, Blackwell Science, UK.
5	Kirkham, M.B. (2004) <i>Principles of Soil and Plant Water Relations</i> , Elsevier, Amsterdam, Netherlands.
6	Imtiyaz Hussain Zaheed (2023) <i>A text book of Plant Morphology and Ecology</i> , ISBN No 970-93-91204-38-9



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Course Title	PROPAGATION OF HORTICULTURAL PLANTS	
Course Code: 23SBBO21SE		No. of Credits: 02
Course Type: Skill Enhancement Courses (SEC)		Total Teaching Hours: 30

Course Objectives	
1	Understand the scope and potential of horticulture products in India
2	Explain sexual and asexual propagation methods of plants
3	Demonstrate skills on vegetative propagation of plants
4	Practicing different types of vegetative propagation techniques - cutting, layering grafting and budding.

Course Outcome	
1	Demonstrate skills related to vegetative plant propagation techniques such as cuttings, layering, grafting and budding
2	Students will get knowledge of tools and implements used in Horticulture
3	Student will Understand advantages and disadvantages of vegetative, asexual and sexual plant propagation methods
4	Students will know the causes for seed dormancy and methods to break dormancy

Syllabus		
1	Identify the horticulture tool/equipment and write its uses.	1 P
2	Study of methods of propagation with the help of suitable materials – tubers, bulbs, rhizomes, corms, suckers and runners.	2 P
3	Practicing different types of vegetative propagation techniques – stem cutting, air layering.	1 P
4	Propagation of horticultural plants by grafting (Approach and stone) and 'T' budding.	1 P

5	Preparation of nursery beds – flat, raised and sunken beds.	1 P
6	Physiological and bio chemical basis of rooting; factors influencing rooting of cuttings; Use of plant growth regulators in rooting of cuttings.	2 P
7	Methods of breaking dormancy in seeds, tubers, vegetative buds and other vegetative propagules.	1 P
8	Study of varieties of Mango, Papaya and Guava, Amla and Dates.	1 P
9	Study the viability of seeds.	1 P
10	Media preparation, culturing – <i>in vitro</i> clonal propagation, meristem culture, shoot tip culture, axillary bud culture of horticultural plants.	2 P
11	Manure and fertilizer application including biofertilizers in different fruit crops.	1 P
12	Visit to a local fruit market.	1 P

Suggested Readings

1	Rajan S & Baby LM. 2007. <i>Propagation of Horticultural Crops</i> . New India Publ. Agency.
2	Hartman, H.T. and D.E. Kester 1976 <i>Plant propagation. Principles and Practices</i> , Prentice Hall of India Pvt. Limited, Mumbai
3	Sarma. R. R. 2002 <i>Propagation of Horticultural crops : Principles and practices</i> Kalyani Publishers, New Delhi.