Punyashlok Ahilyadevi Holkar Solapur University, Solapur

पुण्यश्लोक अहिल्यादेवी होळकर
सोलापूर विद्यापीठ
।। विद्यया संपन्नता ।।

NAAC Accredited-2022
'B++' Grade (CGPA 2.96)

Name of the Faculty: Science & Technology

CHOICE BASED CREDIT SYSTEM

Syllabus: Botany (GE)

Name of the Course: B.Sc. I (Sem.– I & II)

(Syllabus to be implemented from June 2022)

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

B. Sc. First Year (Liberal Science)

Semester-I

Generic Elective: BOTANY (Paper-I)

Teaching Scheme:	**Examination Scheme:**
Lectures – 3 Hours/week, 2 Credits	**UA – 40 Marks**
Practical – 4 Hours/week, 4 Credits	**CIE – 10 Marks**

About Course:

The objective of any programme at Higher Education Institute is to prepare their students for the society at large. The PAH Solapur University envisions all its programmes in the best interest of their students and in this endeavour it offers a new vision to all its Under-Graduate courses. It imbibes a Learning Outcome-based Curriculum Framework (LOCF) for all its Under Graduate programmes.

The LOCF approach is envisioned to provide a focused, outcome-based syllabus at the undergraduate level with an agenda to structure the teaching-learning experiences in a more student-centric manner. The LOCF approach has been adopted to strengthen students' experiences as they engage themselves in the programme of their choice. The Under-Graduate Programmes will prepare the students for both, academia and employability.

Each programme vividly elaborates its nature and promises the outcomes that are to be accomplished by studying the courses. The programmes also state the attributes that it offers to inculcate at the graduation level. The graduate attributes encompass values related to well-being, emotional stability, critical thinking, social justice and also skills for employability. In short, each programme prepares students for sustainability and life-long learning.

The new curriculum of B.Sc.Liberal Science (Hons) Botany offer essential knowledge and technical skills to study plants in a holistic manner. Students

would be trained in all areas of plant biology using a unique combination of core and Genric elective papers with significant inter-disciplinary components. Students would be exposed to cutting-edge technologies that are currently used in the study of plant life forms, their evolution and interactions with other organisms within the ecosystem. Students would also become aware of the social and environmental significance of plants and their relevance to the national economy.

Introduction: This course includes four papers Paper I: NURSERY, GARDENING Paper II: Hotriculture Paper III: **Medicinal Botany** & Paper IV: Mushroom citivation. Each paper consists of two units. All these papers help students to improve their basic knowledge about microbes, algae, fungi, ecology, and Taxonomy.

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1) Advantages of Course: All these papers will be helpful to improve their skills in Nursery Gardening,Horticulture , Medicinal Botany, Mushroom cultivation .

Course Prerequisite:

Student shall have knowledge of skill based knowledge of applied Botany

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Course Objectives:

2) Objectives of the Course: To get the knowledge Gardening and and horticulture,Medicinal plants, its identification ,part used and biochemical active compounds and its uses , Mushrrom cultivation .

Course Outcomes:

1. Fascinating world of garden and branches of horticulture
2. Hands on Training aboutpropagation of palnts by seed and vegetative metods like budding, grafting , layering.
3. Making Drawings in Practical Records will enhance understanding morphological and structural details and related functional aspects in diverse plant groups.
4. Use of Illustrations, Photographs, Charts, Permanent Slides, Museum and Herbarium Specimens along with ICT Methods will provide an interesting insight into the beautiful world of gardens .
5. Scope of Biodiversity includes Medicinal field, Industry, Agriculture, Research and Study, Job Opportunities and Environmental Conservation. This paper is both informative and interesting and will enable students to learn about Biodiversity not only as a plant or nature lover, but also for higher academic pursuits, particularly in the field of Biological Sciences, Environment and Biodiversity Conservation.
6. Learn the basic concepts, principles and processes in plant biotechnology.
7. Have the ability of explanation of concepts, principles and usage of the acquired knowledge in biotechnological, pharmaceutical, medical, ecological and agricultural applications.
8. Use basic biotechnological techniques to explore molecular biology of plants Explain how biotechnology is used to for plant improvement and discuss the biosefty concern and ethical issue of that use.

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B. Sc. First Year (Liberal Science)

Semester-I

Generic Elective: BOTANY (Paper-I)

Paper No-I: NURSERY, GARDENING

Teaching Scheme:	**Examination Scheme:**
Lectures – 3 Hours/week, 2 Credits	**UA – 40 Marks**
Practical – 4 Hours/week, 4 Credits	**CIE – 10 Marks**

Unit1: Nursery & Gardening **(15 Lectures)**

Objective: To get the knowledge about the basic concepts in nursery management

Outcome: The student can understand the basic concept of Nursey

Unit 2: The Seed **(15Lectures)**

Objective: To get the knowledge about the characters, structure of seed

Outcome: The student can understand importance of sexual reproduction by seed

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B. Sc. First Year (Liberal Science)

Semester-I

Generic Elective: BOTANY (Paper-II)

Paper –II Horticulrure

Teaching Scheme:	**Examination Scheme:**
Lectures – 3 Hours/week, 2 Credits	**UA – 40 Marks**
Practical – 4 Hours/week, 4 Credits	**CIE – 10 Marks**

Paper -II
Horticulrure

Unit 1: Horticultural Techniques **(15 Lectures)**

Objective: To get the knowledge about Introduction,of Horticulture, Manures, PGR,Weed control, Biofertilizer,Biopesticides

Outcome: The student can understand about the general introduction of Horticulture Mangement

Unit02 : Floriculture **(15 Lectures)**

Objective: To get the knowledge about Introduction,of floriculturecut flower,Bonsai art and flower arrangement

Outcome: The student can understand about the floriculture, Bonsai prepration ,flower arrangement like Ekibena, Mrebena, prepration of garlands ,veni,Bouquet.

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B. Sc. First Year (Liberal Science)

Semester-I

Generic Elective: BOTANY (Paper-I)

Paper No-I: NURSERY, GARDENING

Teaching Scheme: **Examination Scheme:**

Lectures – 3 Hours/week, 2 Credits **UA – 40 Marks**

Practical – 4 Hours/week, 4 Credits **CIE – 10 Marks**

Unit1: Nursery & Gardening **(15 Lectures)**

1.1: Introduction.

1.2: Objectives and scope.

1.3: Types of gardening–landscape, home gardening and parks

1.4: Computer applications in land scaping.

1.5. Garden implements.

Unit 2: Propagation of pants by sexual and vegetative metod **(15 Lectures)**

2.1:Sexual propagation by seed Introduction.

2.2: Structure and types,Seed dormancy; causes and methods of breaking dormancy,Seed storage: Seed banks, factors affecting seed viability.

2.3.Propagation by Vegetative method –Introduction and types.

2.4: Cuutting, layering. Budding ,grafting

2.5: Potting and repotting.

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B. Sc. First Year (Liberal Science)

Semester-I

Generic Elective: BOTANY (Paper-II)

Paper –II **Horticulrure**

Teaching Scheme:	**Examination Scheme:**
Lectures – 3 Hours/week, 2 Credits	**UA – 40 Marks**
Practical – 4 Hours/week, 4 Credits	**CIE – 10 Marks**

Unit 1: Horticultural Techniques **(15 Lectures)**

1.1: Introduction.

1.2: Application of manure, fertilizers, nutrients and PGRs.

1.3: Weed control, and biopesticides.

1.4. Biofertilizer

Unit 2: Floriculture **(15 Lectures)**

2.1: Introduction.

2.2: Cut flowers. commerce (market demand and supply).

2.3: Bonsai Introduction

2. Prepration of Bonsai.Types,styles of Bonsai

2.5. Do and donts in bonsai , plants suitable for bonsai

Suggested Reading-

1. Singh, D. & Manivannan, S. (2009). Genetic Resources of Horticultural Crops. Ridhi International, Delhi, India.
2. Swaminathan, M. S. and Kochhar, S. L. (2007). Groves of Beauty and Plenty: An Atlas of Major Flowering Trees in India. Macmillan Publishers, India.
3. NIIR Board (2005). Cultivation of Fruits, Vegetables and Floriculture. National Institute of Industrial Research Board, Delhi.
4. Kader, A. A. (2002). Post-Harvest Technology of Horticultural Crops. UCANR Publications, U. S. A.

Capon, B. (2010). Botany for Gardeners. 3rd Edition. Timber Press, Portland, Oregon.

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Semester-II

Generic Elective: BOTANY (Paper-III)

Paper –III **Medicinal Botany**

Teaching Scheme:	**Examination Scheme:**
Lectures – 3 Hours/week, 2 Credits	**UA – 40 Marks**
Practical – 4 Hours/week, 4 Credits	**CIE – 10 Marks**

Unit 1: Introduction to Medicinal Plants

Objective: To learn about medicinal plants their importance, applications, conservation

Outcome: Students will get an idea about medicinal plants, its uses , importance, applications, conservation

Unit 2: Important medicinal plants

Objective: To get an idea bout medicinal plants, their identification stratergies, uses, Traditional System of Medicine,Principles of Ayurveda, Siddha, Unani and, Homeopathy, Naturopathy and Tibetan Medicine, phyto-medicines and herbal raw materials

Outcome: Students will get knowledge about identification stratergies, uses, Traditional System of Medicine,Principles of Ayurveda, Siddha, Unani and, Homeopathy, Naturopathy and Tibetan Medicine, phyto-medicines and herbal raw materials

B. Sc. First Year (Liberal Science)

Semester-II

Generic Elective: BOTANY (Paper-III)

Paper –III **Medicinal Botany**

Teaching Scheme:	**Examination Scheme:**
Lectures – 3 Hours/week, 2 Credits	**UA – 40 Marks**
Practical – 4 Hours/week, 4 Credit	**CIE – 10 Marks**

Unit 1: Introduction to Medicinal Plants (15 L)

1.1 Definition, history, importance and future prospects.
1.2 Medicinal Plants – past and present status in world and India.
1.3 MAPs as industrial crops - constraints and remedial measures. Medicinal plant diversity & local healthcare.
1.4 Medicinal plant conservation – issues and approaches.
1.5 Medicinal plant conservation areas (MPCA), Non-timber forest products (NTFP), Good Agriculture Practices (GAP). Indian Himalayan region (IHR).

Unit 2: Important medicinal plants (15 L)

2.1 Important medicinal plants of India with their systematics, geographical distribution and uses. *Acorus calamus, Adhatoda vasica, Abrus precatorius Aloe vera, Phyllanthus amarus, Stevia rebaudiana, Belladona* and *Cinchona*.

2.2.Traditional System of Medicine (TSM) in India.

2.3.Introduction, Concept and Principles of Ayurveda, Siddha, Unani and, Homeopathy; Importance of TSM

2.4. Concept and Principles of Naturopathy and Tibetan Medicine; Concept of herbalism and its significance.

2.5. Introduction to phyto-medicines and herbal raw materials. Local health traditions, ethanomedicines.

Suggested Reading-

1. Salisbury, F.B. and Ross, C.W.: Plant Physiology, 2. Hartmann, H.T & Kester, D.E (1989).
2. Plant Propagation – Principles and Practices. Prentice Hall of India
3. Hudsont: Plant propagation principles and practices
4. Recent Progress in Medicinal Plants Vol.12, Globalization of Herbal Health by A.K. Sharma (2006).
5. Handbook of Ayurvedic Medicinal Plants by L.D. Kapoor (2005). 4. Indian Medicinal Plants (Vol 1- 4) by K.R. Kirtikar and B.D. Basu (2006).
6. IUCN Red List Categories by IUCN (1993).
7. Indigenous Medicinal Plants Social Forestry & Tribals by M.P. Singh et al. (2003).
8. Ayurvedic Drugs and their Plant Sources by V.V. Sivarajan & I. Balachandran, Oxford & IBH (1994).
9. The Handbook of Ayurveda Shantha by Godagama, Bishen Singh Mahendrpal Singh, Dehradun (2004).

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Semester-II

Generic Elective: BOTANY (Paper-IV)

Paper –IV **Mushroom Cultivation**

Teaching Scheme:	**Examination Scheme:**
Lectures – 3 Hours/week, 2 Credits	**UA – 40 Marks**
Practical – 4 Hours/week, 4 Credits	**CIE – 10 Marks**

Unit: 1 Mushroom morphology

Objective: To get the knowledge about mushroom technology, morphology of mushroom, identification strategies of edible & non edible mushrooms, life cycle of mushroom & its nutritive value

Outcome: Students understand about mushroom cultivation their identification methods, life cycle of mushroom & nutritive values of mushroom

Unit: 2 Cultivation techniques

Objective: To get knowledge about cultivation methodology, material reqired for that infrastructure facilities, raw material required & techniques of cultivation

Outcome: Students will get knowledge about cultivation methodology, material reqired for that infrastructure facilities, raw material required & techniques of cultivation

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Semester-II

Generic Elective: BOTANY (Paper-IV)

Paper –IV **Mushroom cultivation**

Teaching Scheme:	**Examination Scheme:**
Lectures – 3 Hours/week, 2 Credits	**UA – 40 Marks**
Practical – 4 Hours/week, 4 Credits	**CIE – 10 Marks**

Unit: 1 Mushroom morphology: **(15 L)**

1.1 Introduction of mushroom technology, its objectives

1.2 Different parts of a typical mushroom & variations in mushroom morphology. Key to differentiate Edible from Poisonous mushrooms.

1.3. Mushroom Classification: Based on occurrence- Epigenous & Hypogenous, Natural Habitats-Humicolous, Lignicolous & Coprophilous, Color of spores- white,yellow ,pink, purple brown & black, Morphology

1.4. Biology of Mushrooms: Button, Straw& Oyster- General morphology, distinguishing characteristics, spore germination and life cycle.

1.5. Nutrient Profile of Mushroom: Pprotein, aminoacids, calorific values, carbohydrates , fats, vitamins & mineral

Unit: 2 Cultivation Technology: (15 L)

2.1Infrastructure, equipments and substrates in mushroom cultivation

2.2. Polythene bags, vessels, inoculation hook, inoculation loop, love cost stove, sieves, culture racks, mushroom unit or mushroom house, water sprayer, tray, boilers, driers, pure culture

2.3 Spawn: types of spawn, preparation of spawn, mushroom bed preparation

2.4 factors affecting mushroom bed preparation

2.5 Compost: materials used for compost preparation, compost technology in mushroom production

Suggested Reading-

1.Mushroom Cultivation, Tripathi, D.P.(2005) Oxford & IBH Publishing Co. PVT.LTD, New Delhi.

2. Mushroom Production and Processing Technology, Pathak Yadav Gour (2010) Published by Agrobios (India).

3. A hand book of edible mushroom, S.Kannaiyan& K.Ramasamy (1980). Today & Tomorrows printers & publishers, New Delhi

4.Handbook on Mushrooms, Nita Bahl, oxford & IBH Publishing Co.

PRACTICAL (CORE COURSE) BOTANY
B. Sc. First Year (Liberal Science)
Semester-I & II

Practical – I : Botany	**Examination Scheme:**
Teaching Scheme:	**UA – 80 Marks**
Practical – 4 Hours/week, 4 Credits	**CIE – 20 Marks**

List of Practicals:
(Minimum 20 Maximum 25)
Students should perform minimum 20 practical during Semester I & II

- **List of Practical (based on paper no I to IV):**

1. Study of tools and implements in horticulture.
2. Study of Vegetative methods as per theory.
3. Study of propagation by seeds
4. Cultivation methods for rose, gerbera, marigold
5. Study of Bonsai preparation
6. Study of flower arrangement, garland ,bouquet.
7. Study of common horticulture crop of diseases (any three)
8. Study of diseases management in horticulture crops
9. Study of harvesting methods in horticulture crops

10-15. Identification of plants according to syllabus (*Acorus calamus, Adhatoda vasica, Abrus precatorius Aloe vera, Phyllanthus amarus, Stevia rebaudiana, Belladona* and *Cinchona*)

16. Identification of mushroom

17. Sterilization of glassware, equipments, and culture media used in mushroom cultivation

18-19 Phytochemical analysis of medicinal plants & mushroom

20. Preparation of culture media: Potato Dextrose medium, Richards medium

21. Bed preparation for mushroom

22. Preparation of spawn: Grain spawn, Straw spawn, Sawdust spawn

23. Preparation of compost and known compost formulations

24. Cultivation procedure for Agaricus bisporus and Pleorotus ostreatu

25. Industrial visit