



HSNC Board's
Smt. Chandibai Himathmal Mansukhani College
(Autonomous)



(Affiliated to the University of Mumbai)

University College Code : 217-JD Office : T14

Principal : Dr. Manju Lalwani Pathak

Ref No: CHM (A) AC/C/01/2025

Date: 18th June 2025

CIRCULAR

The immediate attention of all concerned is invited to this office Circular No. CHM (A) AC 05/2025 dated 19th May, 2025 regarding the Choice Based and Credit Based Syllabus (CBCS) for all subjects of F.Y.B.Sc. & T.Y.B.Sc. in Botany SEM - I & SEM - V respectively.

It is hereby communicated that the recommendations of the syllabus made by the Ad-hoc Board of Studies in Botany coordinated by the Dean, Faculty of Pure Sciences in the meeting of Academic Council held on 23rd May, 2025 vide item No. 5.4, have been accepted and subsequently passed.

In accordance, therewith, the syllabus as per the CBCS has been brought into force with effect from the academic year 2025 – 2026 and accordingly the same is attached for reference and is available on the College's website www.chmcollege.in

Ulhasnagar - 421 003

18th June, 2025

Dr. Manju Lalwani Pathak

Principal & Chairperson, Academic Council

Copy forwarded for information to:-

- 1) The Dean, Faculty of Humanities.
- 2) The Chairperson, Ad-hoc Board of Studies.
- 3) The Controller of Examination.
- 4) The Registrar



HSNC Board's
Smt. Chandibai Himathmal Mansukhani College, Ulhasnagar
(Autonomous)
Affiliated to the University of Mumbai

Bachelor of Science
(Botany)
(Aided Course)

Semester – V

Choice Based and Credit Based syllabus
with effect from the
Academic Year 2025-26

PREAMBLE

Botany is one of the most important subjects of life sciences. Plants have a unique position as a source of oxygen, food, fuel, medicines and almost all our daily necessities. Their role in the environment is unquestionable. This makes plant science a very interesting study with innumerable scopes. A B.Sc. degree in Botany opens doors to a myriad of career opportunities in fields such as plant science research, agriculture, environmental consulting, pharmaceuticals, biotechnology, conservation, education, and beyond. It provides a solid foundation for understanding and appreciating the fundamental role of plants in shaping our world.

The Botany department at this college has facilities of smart class, two laboratories as well as a well-equipped research laboratory, Fungal culture collection centre, seed bank, herbaria, Glass house for succulent plants, a well-managed K.M. Kundanani botanical garden with medicinal and economically important plants. The department conducts regular study tours, field studies, Nursery visit and industrial/research institute visits to impart knowledge on the basic and applied aspects of the subject. Through various experiments, projects, hands-on trainings and workshops; All such activities develop critical thinking, problem-solving, and analytical skills in students. Botany graduates are equipped to address pressing global challenges such as food security, biodiversity conservation, climate change, and sustainable resource management.

Program Outcomes for Undergraduate Degree in Botany

The Undergraduate Program in Botany is designed to provide students with comprehensive domain knowledge across various branches of plant science. In alignment with the **National Education Policy (NEP) 2020**, the program emphasizes skill-based learning, hands-on experience, and inter disciplinary integration.

This curriculum connects traditional Indian agricultural wisdom with modern scientific advances in Tissue culture, genetics, Plant Physiology, ecology, and environmental studies-preparing students for academic excellence, research, and real-world applications

PROGRAMME SPECIFIC OUTCOMES (PSOs)

PSO1: Comprehension of Plant Diversity-Understand the diversity and evolutionary complexity of plant life, ranging from lower forms such as algae and fungi to higher land plants. Examine representative taxa to analyze morphological, physiological, and ecological adaptations, as well as their interactions and significance to human welfare.

PSO2: Integration of Core Botanical Disciplines-Demonstrate foundational and advanced knowledge in core areas of plant science including:

- **Cell Biology:** Cellular structure, organelles, and cellular processes
- **Genetics:** Principles of inheritance, molecular genetics, and gene expression
- **Plant Anatomy and Taxonomy:** Internal structure of plant organs and systematic classification of plant species
- **Ecology and Environmental Science:** Ecosystem dynamics, biodiversity, and plant-environment interactions
- **Plant Physiology and Biochemistry:** Functional aspects of plant life processes and underlying chemical mechanisms

PSO3: Application of Botany in Agriculture and Industry-Apply botanical knowledge to the cultivation and management of food and industrial crops. Understand primary agricultural practices and explore the commercial application of plant products thereby developing entrepreneurial and agri-business skills

PSO4: Environmental Awareness and Sustainability-Recognize the interdependence of flora, fauna, and humans within ecosystems. Advocate for biodiversity conservation, promote sustainable resource use, and contribute towards achieving national and global environmental goals, including the **United Nations Sustainable Development Goals (UN-SDGs)**

PSO5: Experimental Competence and Scientific Inquiry-Design and perform experiments in laboratory and field settings. Develop competencies in data collection, statistical analysis, interpretation of results, scientific reporting, and effective communication of biological concepts

**Smt. Chandibai Himathmal Mansukhani College
(Autonomous)**

**Third Year B.Sc.
(Botany)**

Semester- V

**Title: Plant Diversity III
Paper I**

**With effect from the
Academic Year 2025-2026**

Title: Plant diversity III
Course Code: CHM(A)USBO501

Sr. No.	Heading	Particulars
1	Description of the Course	This course on Plant Diversity provides an in-depth understanding of the vast diversity among plants and organisms, including algae, fungi, and bacteria. Students will explore the structure, reproduction, and ecological roles of algae and fungi, highlighting their importance in natural and industrial processes. The course also covers plant pathology, focusing on the identification and management of plant diseases caused by various pathogens. Additionally, the study of types of microbes and their general characters. Together, these topics offer a comprehensive view of the biological and ecological significance of plant-associated organisms.
2	Vertical	--
3	Type Teaching Method	Theory Lecture/group discussion/ seminar/ presentation/ simulation etc.
4	Credit	2.5 Credits
5	Hours allotted	48 Hours
6	Marks allotted	100 Marks
7	Course Objectives: 1. Identify and classify major groups of algae and fungi based on morphology and reproductive structures. 2. Demonstrate basic techniques in microbiology, including culturing and staining of plant-associated microbes. 3. Observe and analyse common plant diseases, identifying symptoms and potential pathogens. 4. Understand ecological roles of algae, fungi, and microbes in plant health and ecosystems.	
8	Learning Outcomes: Student will be able to: LO1. gain knowledge about microbial diversity and techniques for culturing and visualization. LO2. understand the salient features of two major groups of algae, their life cycle patterns with a suitable example; to be able to identify them. LO3. learn the general characteristics and classification of three major groups of fungi along with life cycles of each group; to be able to identify them. LO4. understand the scope and importance of Plant Pathology and apply the concepts of various control measures of commonly widespread plant diseases.	

UNIT I: Microbiology

- Types of Microbes: Viruses, Bacteria, Protozoa, Mycoplasma and Actinomycetes.
- Culturing: Culture media, staining (differential staining).
- Pure cultures
- Role of microbes in fermentation: Antibiotic production (Penicillin)

UNIT II: Algae (G.M. Smith Classification System to be followed)

- Division Rhodophyta: Classification and General Characters: Distribution, Cell structure, Pigments, Reserve food, Range of thallus, Reproduction: asexual and sexual, Alternation of Generations.
- Structure, life cycle and systematic position of *Polysiphonia*.
- Classification and General Characters of Bacillariophyta: Distribution, Cell structure, Pigments, Reserve food, Range of thallus, Reproduction; asexual and sexual, Alternation of Generations.
- Structure, life cycle and systematic position of *Pinnularia*
- Industrial applications of Algae

Unit III: Fungi (G.M. Smith Classification System to be followed)

- General Characters of Myxomycetes; Life Cycle of *Physarum*
- Basidiomycetes Classification and General characters; Life cycle of *Puccinia*
- Deuteromycetae Classification and General Characters; Life cycle of *Alternaria*

Unit IV: Unit IV: Plant Pathology

- Study of plant diseases: Causative organism, Symptoms, Predisposing factors, Disease cycle and Control measures of the following;
- Fungal disease-White Rust-*Albugo candida*, Tikka disease of ground nut- *Cercospora* sp.
- Bacterial disease- Citrus canker -*Xanthomonas axonopodis* pv. citri.
- Viral disease- Yellow Vein Mosaic of Bhindi
- Study of Physical, chemical and biological control methods of plant disease

Scheme of Examination and Assessment Pattern (Paper – 100 Marks)**A. External Examination: Semester End External - 75 marks Time: 2.5 hours****Format of Question Paper****All questions are compulsory.**

Question No.	Nature of Questions	Marks
Q.1.	Multiple Choice 20 Questions Attempt any 15 (1 mark each)	15
Q.2.	Four (4) Long Answer Questions on Unit – I out of which two (2) to be solved	15
Q.3.	Four (4) Long Answer Questions on Unit – II out of which two (2) to be solved	15
Q.4.	Four (4) Long Answer Questions on Unit – III out of which two (2) to be	15

		solved	
	Q.5.	Four (4) Long Answer Questions on Unit – IV out of which two (2) to be solved	15
	Total 75		
	B. Internal Examination: Continuous Evaluation - 25 marks		
		Assessment / evaluation	Marks
	1.	Class Test (Short notes/ MCQ's/ Match the Pairs/ Answer in one sentence/ Puzzles)	20
	2.	Attendance / <i>Viva Voce</i>	5
	Total 25		
11	REFERENCES: 1. Text Book of Algae (1986) by O.P. Sharma. Tata McGraw Hill. 2. Text Book of Botany-Algae (1994) By B. P. Pandey. S. Chand 3. Text Book of Botany 3rd Edition (2004) Prof. V. Singh, DR. P.C. Pandey & Dr. D.K Jain. Rastogi Publication 4. Plant Pathology (1982) Dr. B. P. Pandey. S. Chand & Company LTD. 5. Botany for Degree Students (1960) By B.R. Vashishta, Dr. A.K. Sinha and Dr. V. P. Singh revised edition 2010 (Reprint 2012), S. Chand & Company LTD. 6. Text Book of Fungi (1989) by O.P. Sharma, Tata Mc. Graw 7. Text Book of Algae (1986) by O.P. Sharma. Tata McGraw Hill 8. Text Book of Botany 3rd Edition (2004) Prof. V. Singh, DR. P.C. Pandey & Dr. D.K Jain. Rastogi Publication		

**Smt. Chandibai Himathmal Mansukhani College
(Autonomous)**

**Third Year B.Sc.
(Botany)**

Semester- V

**Title: Practical based on Plant diversity III
Practical I**

**With effect from the
Academic Year 2025-2026**

Title: Practical based on Plant diversity III
Course Code: CHM(A)USBOP5

Sr. No.	Heading	Particulars
1	Description of the Course	This practical course provides hands-on experience in Microbiology, Phycology, Mycology, and Plant Pathology. Students will study airborne microorganisms and antimicrobial activity of bacteria. The course includes microscopic examination of life cycle, stages in algae and fungi. Additionally, students will learn to identify and analyze common fungal and viral plant disease. Through these practical exercises, students will develop essential skills in microbial culturing, pathogen identification, and plant disease diagnosis.
2	Vertical	--
3	Type	Practicum
4	Credit	1.5 Credits
5	Hours allotted	45 Hours
6	Marks allotted	50 Marks
7	Course Objectives: 1. Identify and classify major groups of algae and fungi based on morphology and reproductive structures. 2. Demonstrate basic techniques in microbiology, including culturing and staining of plant-associated microbes. 3. Observe and analyze common plant diseases, identifying symptoms and potential pathogens. 4. Understand ecological roles of algae, fungi, and microbes in plant health and ecosystems 5. Develop practical skills in microscopy, specimen preparation, and scientific documentation.	
8	Learning Outcomes: Student will be able to: LO 1 identify the major groups of organism's algae fungi and bacteria. LO 2 classify the major groups of organisms algae fungi and bacteria. LO 3 characterize microbes based on general features. LO 4 diagnose plant diseases by observing symptoms and identifying associated pathogens	
9	Syllabus Microbiology • Study of Aero microbiota by petri plate exposed method; Fungal isolate, Bacterial isolates. • Study of antimicrobial activity by the disc diffusion method; Turmeric/Garlic	

10	Algae - Study of stages in the life cycle of the following algae from fresh/ preserved material and permanent slides; <i>Polysiphonia</i> and <i>Pinnularia</i>. Fungi - Study of stages in the life cycle of the following Fungi from fresh/ preserved material and permanent slides: <i>Agaricus</i>, <i>Puccinia</i>, <i>Alternaria</i>. Plant Pathology - Study of the following fungal diseases; White rust in Cruciferae (Brassicaceae), Tikka disease in Groundnut, Citrus canker, Yellow vein Mosaic of Bhindi.		
	Scheme of Examination and Assessment Pattern (Paper – 50 Marks) A. External Examination: Semester End Practical - 50 marks Time: 4:00 hours Format of Question Paper		
	Duration: 4 hrs.		Marks-50
	Question No.	Experiment	Marks
	Q.1	Perform the given Microbiological Experiment 'A'	12
	Q.2	Identify, Classify and Describe Specimens B, C and D. Sketch neat and labeled diagrams of Morphological / Microscopical structures seen in the specimens	24
	Q.3	Identify and describe slides / specimens E, F and G	9
	Q.4	Journal	5

**Smt. Chandibai Himathmal Mansukhani College
(Autonomous)**

**Third Year B.Sc.
(Botany)**

Semester- V

**Title: Plant Diversity IV
Paper II**

**With effect from the
Academic Year 2025-2026**

Title: Plant diversity IV
Course Code: CHM(A)USBO502

Sr. No.	Heading	Particulars
1	Description of the Course	This course offers a comprehensive study of plant structure, evolution, and classification through the lens of Angiosperms, Paleobotany, Palynology, and Plant Anatomy. It explores the diversity and taxonomy of flowering plants (Angiosperms), the fossil record and evolutionary history of plants (Paleobotany), and the study of pollen and spores in both living and fossil forms (Palynology). In addition, the course delves into Plant Anatomy, focusing on the internal structure and function of plant tissues. Together, these topics provide a well-rounded understanding of plant form, function, and evolution.
2	Vertical	-----
3	Type and Teaching Methods	Theory Lecture, seminar, presentation, simulation etc.
4	Credit	2.5 Credits
5	Hours allotted	48 Hours
6	Marks allotted	100 Marks
7	Course Objectives: 1. To study the classification, morphology, and evolutionary relationships of flowering plants. 2. To examine fossil evidence and historical plant lineages through paleo botanical studies. 3. To develop skills in identifying and interpreting pollen and spores for ecological and geological applications. 4. To understand the internal anatomy of plants and relate structure to function in various plant organs	
8	Learning Outcomes: Student will be able to; LO1 acquire knowledge of different fossil forms and understand their role in evolution. LO2 provide plant description, describe the morphological and reproductive structures of seven families and also identify and classify according to Bentham and Hooker's system. LO3 gain proficiency in the use of keys and identification manuals for identifying any unknown plants to species level. LO4 relate anomalies in internal stem structure with function and appreciate the salient features of the root stem transition zone.	

Syllabus**Unit I: Paleobotany**

- Contribution of Birbal Sahni, Birbal Sahni Institute of Paleobotany, Lucknow
- *Lepidodendron*—All form genera root, stem, bark, leaf, male and female fructification.
- *Pentoxylon*—All form genera

Unit II: Angiosperms-I

- Morphology of Fruits
- Complete classification of Bentham and Hooker (only for prescribed families), Merits and demerits
- Bentham and Hooker's system of classification for flowering plants up to family with respect to the following prescribed families and economic and medicinal importance for members of the families. (Special stress on fruit morphology to be given)
 - Magnoliaceae
 - Umbelliferae
 - Cucurbitaceae
 - Rubiaceae
 - Solanaceae
 - Commelinaceae
 - Graminae

Unit III: Anatomy-I

- Anomalous secondary growth in the Stems of *Bignonia*, *Salvadora*, *Achyranthes*, *Dracaena*. Storage roots of Beet, Radish
- Root stem transition
- Types of Stomata—Anomocytic, Anisocytic, Diacytic, Paracytic, and Gramineous

Unit IV: Palynology

- Pollen Morphology
- Pollen viability—storage
- Germination and growth of pollen
- Application of Palynology in honey industry, coal and oil exploration, pollen allergies, forensic Sciences

Scheme of Examination and Assessment Pattern (Paper – 100 Marks)**A. External Examination: Semester End External - 75 marks Time: 2.5 hours****Format of Question Paper****All questions are compulsory**

S. No.	Evaluation type	Marks
Q.1.	Multiple Choice 20 Questions Attemptany15(1mark each)	15
Q.2.	Four (4) Long Answer Questions on Unit – I out of which two (2) to be solved	15
Q.3.	Four (4) Long Answer Questions on Unit – II out of which two (2) to be solved	15
Q.4.	Four (4) Long Answer Questions on Unit – III out of which two (2) to be solved	15
Q.5.	Four (4) Long Answer Questions on Unit – IV out of which two (2) to be	15

	solved	
	Total 75	
	B. Internal Examination: Continuous Evaluation - 25 marks	
	Assessment / evaluation	Marks
1.	Class Test (Short notes/ MCQ's/ Match the Pairs/ Answer in one sentence/ Puzzles)	20
2.	Attendance / <i>Viva Voce</i>	5
	Total 25	
11	Reference books: 1. Physiological Plant Anatomy by Haberlandt, Mac Millan and Company 2. College Botany Vol I, II and III by Gangulee Das and Dutta Central Education enterprises. 3. A Text book of Palenology Kashinath Bhattacharya Mans Majumdar and Swati Bhattachrya Central Publication 4. The Embryology of Angiosperm Edition 6th SS Bhojwani Sp Bhatnagar & PK Dantu Vikas Publisher	

**Smt. Chandibai Himathmal Mansukhani College
(Autonomous)**

**Third Year B.Sc.
(Botany)**

Semester- V

Title: Practical based on Plant Diversity IV

Practical II

**With effect from the
Academic Year 2025-2026**

Title: Practical based on Plant diversity IV
Course Code: CHM(A)USBOP05

Sr. No.	Heading	Particulars
1	Description of the Course	This practical course provides hands-on experience in the study of plant structure, classification, and evolution through detailed investigations in Angiosperm taxonomy, Paleobotany, Palynology, and Plant Anatomy. Students will examine the diversity of flowering plants through morphological and taxonomic analysis, they will study fossil specimens. In Plant Anatomy, students will prepare and observe microscopic sections to study the internal organization and function of various plant tissues. These practical exercises equip students with essential skills for understanding plant forms, function, and evolutionary relationships.
2	Vertical	-----
3	Type	Practicum
4	Credit	1.5 Credits
5	Hours allotted	45 Hours
6	Marks allotted	50 Marks
7	Course Objectives: 1. To develop hands-on skills in collecting, identifying, and classifying flowering plants using morphological features and taxonomic keys. 2. To examine and interpret plant fossils and understand their significance in reconstructing past vegetation and environments. 3. To prepare and analyze pollen and spore samples using microscopy for applications in taxonomy, ecology, and paleoclimate studies. 4. To prepare slides and study internal structures of plant organs (roots, stems, leaves) using sectioning and staining techniques	
8	Learning Outcomes: Student will be able to LO1 identify, describe, and classify flowering plants based on morphological and reproductive features. LO2 Recognize plant fossils and interpret their significance in understanding plant evolution and ancient ecosystems. LO3 Proficient in preparing and analyzing pollen and spore samples, and applying this knowledge in ecological and geological studies. LO4 Prepare anatomical slides, observe tissue organization, and relate internal plant structures to their functions.	

9	Syllabus Paleobotany - Study of the following form genera with the help of permanent slides/ photomicrographs; <i>Lepidodendron</i>, <i>Pentoxylon</i> Angiosperms-I - Morphology of Fruits - Study of one plant from each of the family given in theory as per Bentham and Hooker's system of classification. - Morphological peculiarities and economic importance of the given family Anatomy-I - Study of anomalous secondary growth in the stems of the following plants using double staining technique; <i>Bignonia</i>, <i>Salvadora</i>, <i>Achyranthes</i>, <i>Dracaena</i>. - Study of anomalous secondary growth in the roots of Beet and Radish - Types of Stomata: Anomocytic, Anisocytic, Diacytic, Paracytic, Gramineaceous Palynology-I - Study of pollen morphology (NPC Analysis) of the following by Chitale's Method; <i>Hibiscus</i>, <i>Datura</i>, <i>Ocimum</i>, <i>Pancratium</i>, <i>Canna</i>. - Determination of pollen viability - Pollen analysis from honey sample—uni-floral and multi floral honey - Effect of varying concentration of sucrose on <i>In vitro</i> Pollen germination																								
10	Scheme of Examination and Assessment Pattern (Paper – 50 Marks) C. External Examination: Semester End Practical - 50 marks Time: 4:00 hours Format of Question Paper <table><tr><th colspan="2">Duration 4 hours</th><th>Marks-50</th></tr><tr><th>Q. No.</th><th>Experiment</th><th>Mark</th></tr><tr><td>1.</td><td>Classify specimen 'A' up to their families giving reasons. Give floral formula. Sketch neat and labeled L. S. of flower and T.S. ovary</td><td>12</td></tr><tr><td>2</td><td>Make a temporary double stained preparation of T.S. specimen 'B' and comment on the type of secondary growth</td><td>6</td></tr><tr><td>3</td><td>Perform the Palynology experiment 'C' allotted to you</td><td>7</td></tr><tr><td>4</td><td>Identify and describe slide/ specimen' D 'E', 'F', 'G'</td><td>15</td></tr><tr><td>5</td><td>Field report</td><td>5</td></tr><tr><td>6</td><td>Viva voce (based on Paper I and Paper II).</td><td>5</td></tr></table>	Duration 4 hours		Marks-50	Q. No.	Experiment	Mark	1.	Classify specimen 'A' up to their families giving reasons. Give floral formula. Sketch neat and labeled L. S. of flower and T.S. ovary	12	2	Make a temporary double stained preparation of T.S. specimen 'B' and comment on the type of secondary growth	6	3	Perform the Palynology experiment 'C' allotted to you	7	4	Identify and describe slide/ specimen' D 'E', 'F', 'G'	15	5	Field report	5	6	Viva voce (based on Paper I and Paper II).	5
Duration 4 hours		Marks-50																							
Q. No.	Experiment	Mark																							
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5	Field report	5																							
6	Viva voce (based on Paper I and Paper II).	5																							

**Smt. Chandibai Himathmal Mansukhani College
(Autonomous)**

**Third Year B.Sc.
(Botany)**

Semester- V

**Title: Form and functions- II
Paper III**

**With effect from the
Academic Year 2025-2026**

Title: Form and functions- II
Course Code: CHM(A)USBO503

Sr. No.	Heading	Particulars
1	Description of the Course:	This course provides a comprehensive understanding of plant functions and cellular mechanisms through the study of cytology, molecular biology, plant physiology, environmental botany, and tissue culture. It combines theoretical knowledge with practical skills, enabling students to explore plant structure, function, environmental interactions, and modern biotechnological techniques used in plant science
2	Vertical	---
3	Type & Teaching Methods	Theory Lecture, seminar, presentation, simulation etc.
4	Credit	2.5 Credits
5	Hours allotted	48 Hours
6	Marks allotted	100 Marks
7	Course Objectives: 1. To study the structure and function of plant cells, chromosomes, and molecular processes such as DNA replication, transcription, and gene expression. 2. To examine key physiological functions in plants, including water relation, solute transport and translocation of food. 3. To understand how environmental factors influence plant growth, development, and distribution, with a focus on bioremediation, ecological adaptations and sustainability. 4. To gain practical knowledge of in-vitro techniques for plant propagation, regeneration, and genetic manipulation in research and agriculture	
8	Learning Outcomes: Student will be able to LO1 Student will acquire knowledge about two important cell organelle and molecular mechanisms of translation LO2 Student will understand water relations of plants, inorganic and organic solute transport. LO3 Student will understand succession in plant communities and study remediation technologies in order to apply knowledge acquired for clean-up of polluted sites. LO4 Student will get exposure to principles and techniques of plant tissue culture and apply these studies for improving agriculture and horticulture and to become an entrepreneur	

Syllabus**Unit I: Cytology and Molecular Biology**

- Structure and functions of nucleus
- Structure and functions of Golgi bodies
- Structure and Significances of giant chromosomes
- The genetic code: Characteristics of the genetic code
- Central Dogma of Protein Synthesis
- Translation in Prokaryotes and Eukaryotes

Unit II: Plant Physiology-I

- Water relations: Potential, Osmosis, Transpiration, Imbibition,
- Solute transport: Transport of ions across cell membranes, active and passive transport, carriers, channels and pumps.
- Translocation of solutes: Composition of phloem sap, girdling experiment.
- Pressure flow model (Munch's hypothesis): Phloem loading and unloading, anatomy of sieve tube elements and mechanisms of sieve tube translocation.

Unit III: Environmental Botany

- Bioremediation: Principles, factors responsible and microbial population in bioremediation.
- Phytoremediation: Metals, Organic pollutants
- Plant succession: Hydrosere and Xerosere – Formation of Barren Space, Succession on the Land Citing Different Sere leading up to The Climax, Succession in Water, Ecesis, Poly and Mono-climax theories

Unit IV: Plant Tissue Culture

- Aspects of Micro-propagation with reference to Floriculture:
- Detailed study of Orchid Cultivation
- Plant cell suspension cultures for the production of secondary metabolites: With special reference to Shikonin production.
- Somatic Embryogenesis and Artificial Seeds

Scheme of Examination and Assessment Pattern (Paper – 100 Marks)**A. External Examination: Semester End External - 75 marks Time: 2.5 hours**

Format of Question Paper

All questions are compulsory.

Sr. No.	Evaluation type	Marks
Q.1.	Multiple Choice 20 Questions (Attempt any 15 (1 mark each))	15
Q.2.	Four (4) Long Answer Questions on Unit – I out of which two (2) to be solved	15 Marks
Q.3.	Four (4) Long Answer Questions on Unit – II out of which two (2) to be solved	15 Marks
Q.4.	Four (4) Long Answer Questions on Unit – III out of which two (2) to be solved	15 Marks
Q.5.	Four (4) Long Answer Questions on Unit – IV out of which two (2) to be	15 Marks

	solved	
	Total 75	
	B. Internal Examination: Continuous Evaluation - 20 marks	
	Assessment / evaluation	Marks
1.	Class Test (Short notes/ MCQ's/ Match the Pairs/ Answer in one sentence/ Puzzles)	20
2.	Attendance + Class room performance	5
	Total 25	
11	Reference books: 1. Genetics by Russel Peter Adison Wesley Longman Inc. (5thedition) 2. Plant Tissue Culture by Kalyan Kumar De. Central Book Agency Calcutta 3. Comprehensive Biotechnology by K. Ramawat and Goel S. Chand &Co. 4. Cell Biology, Genetics, Molecular Biology, Evolution and Ecology by Verma and Agarwal S. Chand and Co. 5. Plant Physiology by Salisbury and Ross CBS Publishers 5. Plant Physiology by Taiz and Zeiger Sinauer Associates Inc. Publishers,2002 6. Plant Physiology by Salisbury and Ross CBS Publishers 5. Plant Physiology by Taiz and Zeiger Sinauer Associates Inc. Publishers,2002	

**Smt. Chandibai Himathmal Mansukhani College
(Autonomous)**

**Third Year B.Sc.
(Botany)**

Semester- V

**Title: Practical based on Form and functions- II
Practical III**

**With effect from the
Academic Year 2025-2026**

Title: Practical based on Form and functions- II
Course Code: CHM(A)USBOP6

Sr. No.	Heading	Particulars
1	Description of the Course	This practical course provides hands-on training in key techniques of Plant Physiology, Environmental Botany, and Micropropagation. Students will learn to estimate phosphate phosphorus and iron from plant acid extracts, assess water quality by determining dissolved oxygen, biological oxygen demand, hardness, salinity, and chlorinity, and prepare stock solutions for Murashige and Skoog (MS) medium. The course also introduces fundamental tissue culture techniques, including identification of multiple shoot cultures, somatic embryogenesis, and artificial seed preparation. Emphasis is placed on developing practical skills essential for plant science research, environmental assessment, and biotechnological applications.
2	Vertical	--
3	Type	Practicum
4	Credit	1.5 Credits
5	Hours allotted	45 Hours
6	Marks allotted	50 Marks
7	Course Objectives:	1. To perform experiments such as cell staining, mitosis/meiosis observation of chromosomes under microscope 2. To conduct experiments measuring physiological produces. 3. To conduct experiments measuring organic and inorganic pollutants. 4. To practice aseptic techniques, media preparation, and the in vitro propagation of plant tissues for micropropagation and experimental research
8	Learning Outcomes:	Student will be able to LO1 identify cell structures and observe stages of cell division. LO2 measure physiological parameters and plant function. LO3 analyze environmental pollutants. LO4 learn technique of plant tissue culture
9	Plant Physiology I	Syllabus • Estimation of Phosphate phosphorus (Plant acid extract) • Estimation of Iron(Plant acid extract)

	Note: Preparation of a standard graph and determination of the multiplication factor for Phosphate/Iron estimation using a given standard phosphate/standard Iron solution should be done in regular practical as this will also be put as a question in practical exam Environmental Botany - Estimation of the following in given water sample; Dissolved Oxygen Demand, Biological oxygen demand, Hardness, Salinity and Chlorinity. Micropropagation - Plant Tissue culture: Identification–Multiple shoot culture, somatic embryogenesis, Artificial seeds - Preparation of stock solutions for preparation of MS medium (Note: Concept of preparation of specified molar solutions should be taught and problems based on preparation of stock solutions for tissue culture media will be given).		
10	Scheme of Examination and Assessment Pattern (Paper – 50 Marks) D. External Examination: Semester End Practical - 50 marks Time: 4:00 hours Format of Question Paper		
	Duration 4 hrs		Marks:50
	Sr. No.	Experiment	Marks 50
	Q.1.	Make a smear preparation of material 'A' and show the slide to the Examiner. Comment on your observation / Expose the giant chromosomes from the salivary glands of Chironomous larva.	8
	Q.2.	Perform the experiment 'B' allotted to you (Physiology).	12
	Q.3.	Perform the experiment 'C' allotted to you (Ecology).	12
	Q.4.	Calculate the of the given solution 'D' to prepare the required solution	7
	Q.5	Identify and describe slide/specimen 'E' & 'F'	6
	Q.6.	Journal.	5

**Smt. Chandibai Himathmal Mansukhani College
(Autonomous)**

Third Year B.Sc. (Botany)

Semester- V

Title: Current trends in plant sciences – II

Paper IV

**with effect from the
Academic Year 2025-2026**

Title: Current trends in plant sciences – II
Course Code:CHM(A)USBO504

Sr. No.	Heading	Particulars
1	Description the Course:	This course offers an integrated study of Ethnobotany, Biotechnology, Instrumentation, and Pharmacognosy, focusing on the traditional uses of plants, modern biotechnological applications, analytical techniques, and the study of medicinal plants. It equips students with both theoretical knowledge and practical skills for exploring plant-based resources, their biochemical properties, and their relevance in medicine, research, and industry
2	Vertical	--
3	Type and Teaching Methods	Theory Lecture, seminar, presentation, simulation etc.
4	Credit	2.5 Credits
5	Lecture allotted	48 Hours
6	Marks allotted	100 Marks
7	Course Objectives: 1. To understand the cultural and medicinal uses of plants through ethnobotanical studies. 2. To learn the principles and applications of plant biotechnology in agriculture, medicine, and industry. 3. To gain knowledge of instruments used in plant research, including their principles, operation, and applications. 4. To identify and analyze bioactive compounds in medicinal plants and understand their pharmacological significance	
8	Learning Outcomes: The students would be able : LO1 get exposure to the technique of mushroom cultivation and explore the possibility of entrepreneurship in the same. LO2 learn ethno-botanical principles, applications and utilize indigenous plant knowledge for the cure of common human diseases. LO3 gain knowledge about the latest molecular biology techniques for isolation and characterization of genes. LO4 learn principles and application of commonly used techniques in instrumentation. LO5 gain proficiency in the monograph study and pharmacognostic analysis of six medicinal plants.	

Syllabus**Unit I: Ethnobotany and Mushroom Industry**

- Ethnobotany-Definition, Scope and methods Research, Interdisciplinary Approaches in Ethnobotany.
- Applications of ethno-botany; Ethno-medicines, Edible plants
- Significance of Sacred grooves
- Mushroom industry; Detail general account of production of mushrooms with respect Nutritional value, methods of Composting, spawning, casing, harvesting of mushroom. Cultivation of *Pleurotus*, *Agaricus*, mushroom, picking and packaging
- Entrepreneurship in Mushroom Industries

Unit II: Plant Biotechnology-I

- Construction of genomic DNA libraries, Chromosome libraries and c- DNA libraries.
- Identification of specific cloned sequences in c-DNA libraries and Genomic libraries
- Analysis of genes and gene transcripts –Restriction enzyme, analysis of cloned DNA sequences. Hybridization (Southern Hybridization)

Unit III: Instrumentation

- Colorimetry and Spectrophotometry (Visible, UV and IR)–Instrumentation, working, principle and applications.
- Chromatography: General account of Column chromatography. Principle and bedding material involved in adsorption chromatography, ion exchange chromatography, and molecular sieve chromatography

Unit IV: Pharmacognosy and Medicinal Botany

- Monographs of drugs with reference to biological sources, geographical distribution, common varieties, macro and microscopic characters, chemical constituents, therapeutic uses, adulterants- *Strychnos* seeds, *Senna* leaves, Clove buds and *Curcuma longa* rhizome, *Phyllanthus embilica* fruit

Scheme of Examination and Assessment Pattern (Paper – 100 Marks)**A. External Examination: Semester End External - 75 marks Time: 2.5 hours**

Format of Question Paper

All questions are compulsory.

Sr. No.	Evaluation type	Marks
Q.1.	MultipleChoice20Questions(Attemptany15(1markeach)	15
Q.2.	Four (4) Long Answer Questions on Unit – I out of which two (2) to be solved	15 Marks
Q.3.	Four (4) Long Answer Questions on Unit – II out of which two (2) to be solved	15 Marks
Q.4.	Four (4) Long Answer Questions on Unit – III out of which two (2) to be solved	15 Marks
Q.5.	Four (4) Long Answer Questions on Unit – IV out of which two (2) to be	15 Marks

	solved	
	Total 75	
	B. Internal Examination: Continuous Evaluation - 20 marks	
	Assessment / evaluation	Marks
1.	Class Test (Short notes/ MCQ's/ Match the Pairs/ Answer in one sentence/ Puzzles)	20
2.	Attendance + Class room performance	5
	Total 25	
11	Reference books: 1. Mushrooms Cultivation, Marketing and Consumption -Directorate of Mushroom Research (Indian Council of Agricultural Research) - Chambaghat Solan-173213 2. Manual of Ethnobotany by S.K. Jain. Scientific Publisher 3. Pharmacognosy by Kokate, Purohit and Gokhale , Nirali Publishers	

**Smt. Chandibai Himathmal Mansukhani College
(Autonomous)**

Third Year B.Sc. (Botany)

Semester- V

**Title: Practical based on Current trends
in plant sciences – II**

Practical IV

**With effect from the
Academic Year 2025-2026**

Title: Practical based on Current Trends in Plant Sciences-II
Course Code: CHM(A)USBOP6

Sr. No.	Heading	Particulars
1	Description of the Course	This practical course provides scientific training in ethnobotanical analysis, mushroom cultivation, molecular biology, analytical instrumentation, and pharmacognosy. It includes the study of medicinal plants traditionally used by tribal communities in Maharashtra, demonstration and identification of developmental stages in <i>Agaricus</i> and <i>Pleurotus</i> cultivation, and microbial growth analysis through <i>E. coli</i> growth curves. Students will learn molecular techniques, Chromatography, electrophoresis and colorimeter. Additionally Pharmacognostic analysis includes microscopic examination and chemical testing of bioactive compounds in selected medicinal plants.
2	Vertical	-----
3	Type	Practicum
4	Credit	1.5 Credits
5	Hours allotted	45 Hours
6	Marks allotted	50 Marks
7	Course Objectives: 1. To document and analyze traditional knowledge of medicinal and economic plants through field surveys and herbarium preparation. 2. To perform basic biotechnological techniques such as DNA extraction, gel electrophoresis, and microbial culture for plant improvement and analysis. 3. To operate and understand laboratory instruments like spectrophotometers, centrifuges, and chromatographic systems used in plant analysis. 4. To identify medicinal plants and prepare crude drug samples, and to carry out preliminary phytochemical screening for active compounds	
8	Learning Outcomes: Student will be able to LO1. Students will be able to collect, document, and classify traditionally used plants and prepare herbarium specimens for scientific reference. LO2. Students will gain hands-on experience in molecular biology techniques and	

	demonstrate the ability to apply these methods in plant research and improvement. LO3. Students will be able to correctly handle and interpret data from laboratory instruments used in plant analysis and compound identification. LO4. Students will be capable of identifying medicinal plants, preparing crude drug extracts, and conducting basic phytochemical tests to detect bioactive constituents															
9	Syllabus Ethno-botany and mushroom industry - Traditional medicines used by tribals in Maharashtra towards Skin ailments- Sandal wood Liver ailments- <i>Phyllanthus amarus</i>, Wound healing and ageing- <i>Terminalia</i>, <i>Tridax</i>. Fever-<i>Tinospora cordifolia</i> leaves, Diabetes- <i>Momordica charantia</i>, <i>Syzygium cuminii</i> - Study of plants mentioned in theory for Ethnobotany - Mushroom cultivation (To be demonstrated) - Identification of various stages involved in mushroom cultivation—spawn, pin head stage, mature/ harvest stage of <i>Agaricus</i>, <i>Pleurotus</i> Biotechnology-I: - Growth curve of <i>E. coli</i> - Restriction mapping(problems),Southern blotting Instrumentation: - Demonstration of Beer Lambert's Law - Experiment based on separation of dyes/ plant pigments using silica gel column. - Electrophoretic separation of DNA/Protein Pharmacognosy: - Macroscopic/Microscopic characters and Chemical tests for active constituents of the following plants; <i>Phylenthus emblica</i>, <i>Curcuma longa</i>, <i>Senna angustifolia</i>, <i>Strychnosnux-vomica</i>, <i>Eugenia caryophyllata</i>															
10	Scheme of Examination and Assessment Pattern (Paper – 50 Marks) C. External Examination: Semester End Practical - 50 marks Time: 4:00 hours Format of Question Paper <table><tr><td colspan="2">Duration: 4 hrs.</td><td>Marks: 50</td></tr><tr><td>Sr. No.</td><td></td><td>Marks 50</td></tr><tr><td>Q.1.</td><td>Perform the experiment A– growth curve of <i>E.coli</i> / Isolate plasmid DNA and separate using AGE</td><td>12</td></tr><tr><td>Q.2.</td><td>Perform the experiment 'B' allotted to you.</td><td>10</td></tr><tr><td>Q.3.</td><td>Describe macroscopical /microscopical character with the help of neat and labelled sketches of specimens 'C' and 'D'. Perform the chemical test /</td><td>14</td></tr></table>	Duration: 4 hrs.		Marks: 50	Sr. No.		Marks 50	Q.1.	Perform the experiment A– growth curve of <i>E.coli</i> / Isolate plasmid DNA and separate using AGE	12	Q.2.	Perform the experiment 'B' allotted to you.	10	Q.3.	Describe macroscopical /microscopical character with the help of neat and labelled sketches of specimens 'C' and 'D'. Perform the chemical test /	14
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Sr. No.		Marks 50														
Q.1.	Perform the experiment A– growth curve of <i>E.coli</i> / Isolate plasmid DNA and separate using AGE	12														
Q.2.	Perform the experiment 'B' allotted to you.	10														
Q.3.	Describe macroscopical /microscopical character with the help of neat and labelled sketches of specimens 'C' and 'D'. Perform the chemical test /	14														

		TLC to identify the active constituents.	
	Q.4.	Identify and explain the specimens/ photographs 'E', 'F' and 'G'.	9
	Q.5.	Journal.	5

**Smt. Chandibai Himathmal Mansukhani College
(Autonomous)**

**Third Year B.Sc.
(Botany)**

Semester- V

**Title: Horticulture and Gardening–I
(Applied Component Horticulture)**

Paper V

**With effect from the
Academic Year 2025-2026**

Title: Horticulture and Gardening–I
Course Code: CHM(A)USACHO501

Sr. No.	Heading	Particulars
1	Description of the Course	This course offers a foundational understanding of horticulture, covering key topics such as propagation practices, and soil management. Students will learn about the use of manures and fertilizers, identification and control of common plant diseases, and essential garden operations. The course combines theoretical knowledge with practical applications to prepare students for further study or work in horticultural fields.
2	Vertical	----
3	Type & Teaching Methods	Theory
4	Credit:	2 Credits
5	Hours Allotted:	48 hours
6	Marks Allotted:	100 Marks
7	Course Objectives: 1. To introduce the fundamental principles of horticulture including its significances and future aspects. 2. To develop proficiency in plant propagation techniques, both sexual and asexual, with an emphasis on their biological basis and practical application in commercial and research settings. 3. To impart knowledge of soil fertility management, focusing on the types, functions, and application methods of manures and fertilizers, as well as their impact on plant health and productivity. 4. To equip students with skills in disease diagnosis and garden operations, including pest and disease management strategies and essential horticultural practices for effective garden and crop management	
8	Learning Outcomes: LO1 Students will able to understanding of horticultural science and apply this knowledge to crop selection and cultivation practices. LO2 Students will able to apply appropriate propagation methods such as seed sowing, grafting and layering for the multiplication and improvement of horticultural plants. LO3 Students will able to analyze and manage soil fertility using scientific principles to	

	select and apply organic and inorganic fertilizers and manures effectively for optimum plant growth. LO4 Students will able to identify common horticultural diseases and disorders, and implement integrated garden and crop management practices, including pruning, irrigation, and plant protection measures.
9	Syllabus Unit1: Introduction to Horticulture • Definition, importance and objectives of Horticulture, Branches of Horticulture Pomology, Olericulture, Landscape Gardening, Nurseries and development. • Important Horticulture Research Institutes and Government Schemes for strategy plantations; • Konkan Krishi Vidyapeeth – Dapoli. • Horticulture Training Centre (H.T.C.) – Talegaon. • Central Potato Tuber Research Institute (CPTRI)– Shimla. • Horticulture Consultancy • Strategy plantation – Lakhibaug Yojana, Miyawaki Forest. Unit II: Propagation Practices • By Seeds-Method of seed propagation, Advantages and disadvantages. • By specialized Vegetative structures-Bulbs, Tubers, Corms, Rhizomes, Root stock, Runners, Offsets and suckers. • Artificial methods of plant propagation; • Cutting–Stem cuttings and leaf cuttings. • Layering – Definition, Types: Simple, compound, (Serpentine), Air Layering. • Grafting-Definition, Types: Splice, Whip/ Tongue • Budding – Definition, Types: T- budding, patch • Application of Tissue Culture in relation to Horticulture. – Micro propagation technique of Banana Unit III: Manures, Fertilizers, Pests and Diseases • Manures: Definition, importance, important manures FYM (compost) , green manure, organic manures and vermicompost. • Fertilizers: Definition, Types – Straight, Compound and Mixed. Nitrogenous, Urea, Phosphatic (Super phosphate,) Potassic (K₂SO₄) • Biofertilizers: Bacteria, Cyanobacteria, Mycorrhiza, Seaweeds. • Diseases: Horticultural plant diseases and their control. Fungal diseases– Smut, Bacterial – Oily spot of Pomegranate. Viral– TMV. • Pests: Common pests on horticultural crops- Aphids, beetle, stem borer, caterpillars and rats. • Friends of farmers: Earthworm, snakes and predaceous fungi Unit IV : Garden Operations For Traditional And Modern Horticulture • Selection of site, Preparation of soils for garden. • Mulching, top-dressing, and blanching. • Sowing, transplanting, tree transplanting. • Irrigation- Overhead, Surface, Underground. • Objectives of weeding and pruning,-

	• Water management and conservation through water, harvesting • Modern technique of Horticulture- Precision agriculture for weeds control, soil health and better yields																																		
10	Scheme of Examination and Assessment Pattern (Paper – 100 Marks) A. External Examination: Semester End External - 75 marks Time: 2.5 hours Format of Question Paper All questions are compulsory. <table> <tr> <th>Sr. No.</th><th>Evaluation type</th><th>Marks</th></tr> <tr> <td>Q.1.</td><td>Multiple Choice 20 Questions (Attempt any 15 (1 mark each))</td><td>15</td></tr> <tr> <td>Q.2.</td><td>Four (4) Long Answer Questions on Unit – I out of which two (2) to be solved</td><td>15 Marks</td></tr> <tr> <td>Q.3.</td><td>Four (4) Long Answer Questions on Unit – II out of which two (2) to be solved</td><td>15 Marks</td></tr> <tr> <td>Q.4.</td><td>Four (4) Long Answer Questions on Unit – III out of which two (2) to be solved</td><td>15 Marks</td></tr> <tr> <td>Q.5.</td><td>Four (4) Long Answer Questions on Unit – IV out of which two (2) to be solved</td><td>15 Marks</td></tr> <tr> <td align="right" colspan="2">Total 75</td><td></td></tr> </table> B. Internal Examination: Continuous Evaluation - 20 marks <table> <tr> <th></th><th>Assessment / evaluation</th><th>Marks</th></tr> <tr> <td>1.</td><td>Class Test (Short notes/ MCQ's/ Match the Pairs/ Answer in one sentence/ Puzzles)</td><td>20</td></tr> <tr> <td>2.</td><td>Attendance/Viva Voce</td><td>5</td></tr> <tr> <td align="right" colspan="2">Total 25</td><td></td></tr> </table>		Sr. No.	Evaluation type	Marks	Q.1.	Multiple Choice 20 Questions (Attempt any 15 (1 mark each))	15	Q.2.	Four (4) Long Answer Questions on Unit – I out of which two (2) to be solved	15 Marks	Q.3.	Four (4) Long Answer Questions on Unit – II out of which two (2) to be solved	15 Marks	Q.4.	Four (4) Long Answer Questions on Unit – III out of which two (2) to be solved	15 Marks	Q.5.	Four (4) Long Answer Questions on Unit – IV out of which two (2) to be solved	15 Marks	Total 75				Assessment / evaluation	Marks	1.	Class Test (Short notes/ MCQ's/ Match the Pairs/ Answer in one sentence/ Puzzles)	20	2.	Attendance/Viva Voce	5	Total 25		
Sr. No.	Evaluation type	Marks																																	
Q.1.	Multiple Choice 20 Questions (Attempt any 15 (1 mark each))	15																																	
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Total 75																																			
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1.	Class Test (Short notes/ MCQ's/ Match the Pairs/ Answer in one sentence/ Puzzles)	20																																	
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11	Reference books: 1. Acquaah G. (2002). Horticulture: Principles and Practices. Blackwell Publ. 2. Brown L. (2008). Applied Principles of Horticultural Science. Butterworth – Heinemann. 3. Chadha, K. L., (2014) Handbook of Horticulture, Indian Council of Agricultural Forum Pvt. Ltd. 4. Christopher E. P. (2005). Introductory Horticulture. Biotech Books, Delhi. 5. Kumar N. (Manibhushan Rao, K. (2005) Textbook of Horticulture, McMillan Publication, Second edition 6. Singh Jitendra (2011) Basic Horticulture, Kalyani Publishers, 7. Singh R. S. (2017). Plant Diseases. Oxford & IBH Publ. 2010). Introduction to Horticulture. Oxford & IBH Publ. Co. Pvt. Ltd.																																		

**Smt. Chandibai Himathmal Mansukhani College
(Autonomous)**

Third Year B.Sc. (Botany)

Semester- V

**Title: Practical based on Horticulture
and Gardening – II**

Practical V

**With effect from the
Academic Year 2025-2026**

**Practical: Horticulture and Gardening–I
(Course Code: CHM(A)USACHO5P1)**

Sr. No.	Heading	Particulars
1	Description of the Course	This course offers a foundational understanding of horticulture, covering key topics such as propagation practices, and soil management. Students will learn about the use of manures and fertilizers, identification and control of common plant diseases, and essential garden operations. The course combines theoretical knowledge with practical applications to prepare students for further study or work in horticultural fields.
2	Vertical	-
3	Type	Practicum
4	Credit:	2 Credits
5	Hours Allotted:	48 hours
6	Marks Allotted:	100 Marks
7	Course Objectives: 1. Demonstrate Basic Plant Propagation Techniques such as seed sowing, cutting, layering, and grafting for effective plant propagation. 2. To analyze soil texture, structure, and pH; recommend and implement appropriate soil management practices. 3. To identify different types of organic and inorganic fertilizers and demonstrate proper application methods for optimal plant growth. 4. To recognize symptoms of prevalent diseases and pests in horticultural crops and suggest appropriate control measures. 5. To execute operations such as pruning, weeding, irrigation, and mulching with proper tools and techniques.	
8	Learning Outcomes: Students will able to; LO1 understanding of horticultural science and apply this knowledge to crop selection and cultivation practices. LO2 apply appropriate propagation methods such as seed sowing, grafting and layering for the multiplication and improvement of horticultural plants. LO3 analyze and manage soil fertility using scientific principles to select and apply organic and inorganic fertilizers and manures effectively for optimum plant growth. LO4 identify common horticultural diseases and disorders, and implement integrated garden and crop management practices, including pruning, irrigation, and plant protection measures.	

Syllabus

- Garden implements and their uses.
- Different types of pots & Potting medium, Potting and repotting
- Propagation practices by seed, Vegetative propagation, Cutting, Layering, Budding, Grafting, Seed ball preparation
- Identification of;
 - Fertilizers–Identification by physical and chemical methods–Urea, Ammonium sulphate, Potassium sulphate, super phosphate
 - Manures–Identification of plants as green manure–Glyricidia, Alfaalfa Leucaena.
 - Biofertilizers–Identification (material as slides) VAM, Nostoc , Rhizobium .
- Composting of flowers and leaf litter wastes
- Soil pH, Use of soil testing Kit, electrical conductivity, pH of water, liquid fertilizers.
- Method of preparing bonsai, Terrarium, Hanging baskets, Dish Garden, Kokedama.
- Diseases and pests;
 - Fungal–Powdery mildew, Rust, Wilt, Blight and Smut
 - Bacterial – Oily spot disease in pomegranate
 - Viral – Leaf curl , Yellow Vein Mosaic
- Insects–Sucking, Biting, Chewing, Borers &Ants. Non Insects pests- Nematodes, Rodents.
- Preparation of natural insecticides–Neem arka, Dashparni arka, Seetaphal powder, Tobacco extracts.
- Project–Each student should individually present a project related to any topic related to Horticulture. It should be duly certified presented at practical examination. Project presentation at college level compulsory
- Visits : To Garden /Parks / Nurseries/ Exhibition / Horticulture industries / Research Station and record of visits should be duly certified and presented at practical examination

Scheme of Examination and Assessment Pattern (Paper – 50 Marks)

A. External Examination: Semester End Practical - 50 marks Time: 4:00 hours

Format of Question Paper

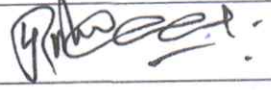
Duration: 4 hrs.

Marks-100

Q. No.	Experiment	Marks
1.	Practical	20
2	Identification	10
3	Identification	10
4	Identification	30
5	Project	20
6	Viva voce	05
7	Journal	05
		Total 100

11	Reference books: 1. Acquaah G. (2002). Horticulture: Principles and Practices. Blackwell Publ. 2. Brown L. (2008). Applied Principles of Horticultural Science. Butterworth – Heinemann. 3. Chadha, K. L., (2014) Handbook of Horticulture, Indian Council of Agricultural Forum Pvt. Ltd. 4. Christopher E. P. (2005). Introductory Horticulture. Biotech Books, Delhi. 5. Kumar N. (Manibhushan Rao, K. (2005) Textbook of Horticulture, McMillan Publication, Second edition 6. Singh Jitendra (2011) Basic Horticulture, Kalyani Publishers, 7. Singh R. S. (2017). Plant Diseases. Oxford & IBH Publ. 2010). Introduction to Horticulture. Oxford & IBH Publ. Co. Pvt. Ltd.
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Syllabus Committee:

Sr. No	Name of the Faculty	Designation and College	Signature
1.	Dr. Lal Sahab Yadav	Head & Associate Professor Smt. CHM College, Ulhasnagar	
2	Mr. Prashant Patil	Assistant Professor Smt. CHM College, Ulhasnagar	
3	Dr. Darshana Patil	Associate Professor Smt. CHM College, Ulhasnagar	
4	Dr. Lakshmi Girish	Associate Professor Smt. CHM College, Ulhasnagar	

Name & Signature of the BoS Chairperson: DR. LALSAHAB YADAV 

Name & Signature of the Dean: Dr. NEENA ANAND 