SHIV CHHATRAPATI SHIKSHAN SANSTHA'S

RAJARSHI SHAHU MAHAVIDYALAYA (AUTONOMOUS), LATUR

B. Sc. GENERAL (SEMESTER PATTERN)

B. Sc. SECOND YEAR (CBCS)

BOTANY – CURRICULUM

w. e. f. JUNE, 2023

SHIV CHHATRAPATI SHIKSHAN SANSTHA'S

RAJARSHI SHAHU MAHAVIDYALAYA (AUTONOMOUS), LATUR

B. Sc. General (Semester Pattern)

B.Sc. Second Year (CBCS)

Botany– Curriculum Structure

Semester	Paper/ Lab course No.	Paper Title	Course Code	Marks		Total Marks	Lectures/ Practicals	Credits
				In Sem. Evaluation	End Sem. Evaluation			
III	**V**	Morphology and Taxonomy of Angiosperms	U-BOT-367	20	30	50	45	02
	VI	Economic Botany and Pharmacognosy	U-BOT-368	20	30	50	45	02
	Lab. Course- III	Based on CC–V	U-BOT-369	-	-	50	24	02
	Lab. Course-IV	Based on CC–VI	U-BOT-370	-	-	50	24	02
	SEC-I	Nursery and Floriculture	U-ADC-334N	-	50	50	45	02
IV	**VII**	Environmental Biology; Gardening and Land Scaping	U-BOT-467	20	30	50	45	02
	VIII	Plant Breeding and Biotechnology	U-BOT-468	20	30	50	45	02
	Lab. Course-V	Based on CC–VII	U-BOT-469	-	-	50	24	02
	Lab. Course-VI	Based on CC–VIII	U-BOT-470	-	-	50	24	02
	SEC-II	Mushroom Cultivation Techniques	U-ADC-434M	-	50	50	45	02
					Total	**500**		**20**

Workload:

1. Theory: Three Lectures / Paper / Week.

2. Practical: One practical (Three Lectures) / Batch / Week.

S. N. Shinde
Chairman
Board of Studies in Botany

B. Sc. Second Year
Semester-III
(MCQ + Theory Pattern)
BOTANY
CC-V: Morphology and Taxonomy of Angiosperms

Lectures:45 Maximum Marks: 50 Credits: 02 Course Code: U-BOT- 367

Course Objectives:

The student will be able to:

1. Describe the function of classification.
2. Distinguish between Taxonomy and Systematics.
3. Describe the reasons for preferring natural classifications over artificial classifications.
4. Describe the reason that classical taxonomy is hierarchical scheme of classification.
5. Relate the reason that botanical taxonomy uses "division", rather than "phylum".
6. Define different taxonomic terms.

Course outcomes:

Students are able to:

1. Identify the taxa on the basis of morphological features.
2. Distinguish between taxonomy and systematics.
3. Correlate the reasons of hierarchical levels in the classifications.
4. Describe the reasons for preference to natural classification over artificial classification.

UNIT-I: MORPHOLOGY OF ANGIOSPERMS-I (10 L)

1. Root: Definition, characters, types (taproot and adventitious) and functions
2. Stem: Definition, characters, modifications (stem tendril, runner, and rhizome) and functions
3. Leaf: Definition, structure of typical leaf (Hibiscus), Types of leaf apex and Margin, Types, Phyllotaxy and Venation, Functions

UNIT-II: MORPHOLOGY OF ANGIOSPERMS-II (10 L)

1. Inflorescence: Definition, structure of typical inflorescence Types-Solitary, Racemose and Cymose
2. Flower: Definition, structure of typical flower (Hibiscus), symmetry and types (hypogynous, epigynous, perigynous)
3. Fruit: Definition and its Types

UNIT-III: TAXONOMY OF ANGIOSPERMS (12 L)

1. Introduction
2. Scope and objectives of angiosperm taxonomy

3. Binomial nomenclature
4. Chemotaxonomy and Cytotaxonomy
5. Taxonomic ranks
6. Types of classification (Artificial, Natural and Phylogenetic)
7. Bentham & Hooker's system of classification with merits and demerits

UNIT-IV: STUDY OF FAMILIES (13 L)

Distribution, vegetative morphology (habitat, habit, root, stem, leaf), Reproductive morphology (inflorescence, flower, pollination, fruit) Floral Formula, Floral Diagram, Systematic position (as per Bentham & Hooker system) Distinguishing characters and Economic importance of plants (at least two) of the following families:

1. Brassicaceae
2. Fabaceae
3. Solanaceae
4. Lamiaceae
5. Euphorbiaceae
6. Poaceae

Reference Book :

1. A Text Book of Systematic Botany- Sutaria R N
2. Taxonomy of Angiosperms- Pandey S N and Mishra S D
3. Taxonomy of Angiosperms- Sambamurthy A V S
4. Taxonomy of Angiosperms- Vashishta P.C
5. Modern Plant Taxonomy- Subramanyam N S
6. Principles of Angiosperms Taxonomy- Davis P. H. and Heywood V.H.
7. Angiosperms-Chopra G.L
8. Taxonomy of Angiosperms- Kumarsen Annie
9. Introductory Taxonomy of Angiosperms- S. Sundara Rajan

B. Sc. Second Year
Semester-III
BOTANY
CC- VI: Economic Botany and Pharmacognosy

Lectures: 45 Maximum Marks: 50 Credits: 02 Course Code: U-BOT-368

Course Objectives:

1. To acquire good knowledge about economic importance of cereals, pulses, oilseed crops.
2. To learn about chemistry of active constituents of medicinal plants.
3. To understand methods of isolation of active constituents of medicinal plants.
4. To identify and estimate of active constituents of medicinal plants.

Course outcomes:

Students are able to:

1. Analyze active constituents of Medicinal plants.
2. Identify and estimate active constituents of medicinal plants
3. Acquire good knowledge about Pharmacognosy.
4. Describe Ayurvedic Principles and formulations.

UNIT-I: ECONOMIC BOTANY-I (10 L)

Introduction: Botanical name, family, distinguishing characters (at least two), method of cultivation and economic importance of the following-

1. Cereals (Wheat)
2. Pulses (Pigeon pea)
3. Fiber yielding plants (Cotton)
4. Cotton processing
5. Rubber production

UNIT-II: ECONOMIC BOTANY-II (10 L)

Botanical name, family, distinguishing characters (at least two), method of cultivation and economic importance of the following-

1. Oil yielding plants (Soybean, Sunflower)
2. Soya milk production
3. Starch processing
4. Timber yielding plants (Teak, Neem)
5. Medicinal plants (Aloe, Withania)

UNIT-III: INTRODUCTION TO PHARMACOGNOSY (11L)

1. History, definition and scope of Pharmacognosy
2. Traditional and alternative systems of medicine
3. Indigenous systems of Medicine (Ayurveda, Siddha, Unani)
4. Classification of crude drugs

5. Concept of active principle (Five examples)

UNIT-IV: AYURVEDIC PHARMACY (14L)

1. Introduction
2. Tridosha concept
3. Ayurvedic principles- Ras, Guna, Vipaka, Virya, Prabhava.
4. Ayurvedic formulations – Asava, Arishta, Kvatha, Churna, Ksharas, Leha, Vatika, Taila, Bhasma.
5. Drug adulteration
6. Study of drugs w.r.t. occurrence, distribution, morphological characters, Constituents and uses of *Adhatoda* (Leaf drug).

Reference Book:

1. Economic Botany- Pandey B. P (1987)
2. Text book of Economic Botany- Verma V. (1984)
3. Economic Botany- Hill A.W (1981)
4. Economic Botany- Albert, F.H.
5. Economic Botany- Hill, A.F
6. Pharmacognosy-Trease and Evans
7. Pharmacognosy- Shah and Qadry
8. A Text Book of Pharmacognosy - Ghani A
9. Text book of Pharmacognosy- M. Ali.
10. Practical Pharmacognosy- Kokate C.K.,
11. Pharmacognosy- Kokate C.K. Purohit A.P. and Gokhale S.B.
12. Pharmacognosy-Trease G.E. and Evans. W.C. · Tyler V.E Brady
13. Bhaishyajakalpana- Vaidya S.S. and Dole. V. A

SKILL ENHANCEMENT COURSE -I

PAPER II: MUSHROOM CULTIVATION TECHNIQUES (SEC)

Lectures: 45 Maximum Marks: 50 Credits: 02 Course Code: U-ADC 334M

Course Objectives:

1. To develop skills that make the students self-reliable and best entrepreneurs.
2. To develop a business plan on mushroom cultivation.
3. To make the learners self-reliant to identify several kinds of mushrooms.
4. To provide detailed hands on training on mushroom cultivation packaging and marketing.

Course Outcomes:

The students will be able to:

1. Cultivate mushrooms in house.
2. Describe the nutritional and medicinal value of mushrooms.
3. Explain important types of Mushroom and their cultivation.
4. Maintain Mushroom farm in a hygienic and scientific way.
5. Effectively manage small business enterprise.

UNIT: I CULTIVATION SYSTEM & FARM DESIGN

Fundamentals of cultivation system- small village unit & larger commercial unit. Principles of mushroom farm layout- location of building plot, design of farm, bulk chamber, composting platform, equipments & facilities, pasteurization room & growing rooms

UNIT: II COMPOSTING, SPAWN & SPAWNING

Principles of composting, machinery required for compost making, materials for compost preparation. Methods of Composting- Long method of composting (LMC) & Short method of composting (SMC)

UNIT: III CASTING MATERIALS & CASE RUNNING

Importance of casing mixture, Quality parameters of casing soil, different types of casing mixtures, commonly used materials

UNIT: IV CULTIVATION OF BUTTON, OYSTER AND STRAW MUSHROOMS

Collection of raw materials, compost & composting, spawn & spawning, casing & case run, cropping & crop management, picking & packing.

Visit to relevant Labs/Field Visits.

PRACTICALS:

1. Oyster cultivation and demonstration of Button mushroom cultivation
2. Tissue isolation, Sub culturing, Spawn making and fruiting bags production, Processing.
3. Field trip to commercial mushroom farms and scientific institutions.

Reference Book:

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 & Tomorrow's printers & publishers, New Delhi
4. Handbook on Mushrooms, Nita Bahl, oxford & IBH Publishing Co.

B. Sc. Second Year
Semester-III
BOTANY
Laboratory Course-III
(Based on CC-V)

Practicals: 10 Maximum Marks :50 Credits: 02 Course Code: U-BOT-369

Course Objectives:

1. To distinguish between taxonomy and Systematics.
2. To describe the reason that classical taxonomy is a hierarchical scheme of classification.
3. To classify the species based on their shared traits and lineage.
4. To provide classification system based on natural affinities of organisms as far as possible.

Course outcomes:

The students will be able to:

1. Identify the different types of roots and its modification.
2. Explain different forms of stem and its modification.
3. Describe the leaf, its types, Phyllotaxy and venation.
4. Correlate the Inflorescence, Flower and Fruit of angiospermic families.

Practical 1: Study of Root and its modifications

Practical 2: Study of Stem and its modifications

Practical 3-4: Study of Leaf

Practical 5: Study of Inflorescence

Practical 6-7: Study of flower

Practical 8-13: Description, identification and classification of the plants with floral formulae and floral diagrams of their families (mentioned in theory syllabus)

Practical 14-15: Botanical excursions (one long excursion =3 practicals)

B. Sc. Second Year

Semester-III

BOTANY

Laboratory Course-IV

(Based on CC- VI)

Practicals: 10 Maximum Marks:50 Credits: 02 Course Code: U-BOT-370

Course Objectives:

1. To learn the nutritional value and economic importance of cereals, pulses, oilseed crops.
2. To know the chemistry of active constituents of medicinal plants.
3. To understand the methods of isolation of active constituents of medicinal plants.
4. To study the methods of preparation of Ayurvedic formulations.

Course outcomes:

The students will be able to:

1. Easily distinguish between cereals and pulse crops.
2. Perform cultivation practices in field.
3. Describe and recognize different adulteration in food product.
4. Isolate the active components of plants by different methods.

Practical 1: Botanical name, family, distinguishing characters (at least two), method of cultivation and economic importance of Wheat and pigeon pea

Practical 2: Botanical name, family, distinguishing characters (at least two), method of cultivation and economic importance of Soybean and Sunflower

Practical 3: Botanical name, family, distinguishing characters (at least two), method of cultivation and economic importance of Cotton

Practical 4: Botanical name, family, distinguishing characters (at least two), method of cultivation and economic importance of Neem and Teak

Practical 5: Botanical name, family, distinguishing characters (at least two), method of cultivation and economic importance of Aloe and Withania

Practical 6: Histochemical tests of food storing tissue in pigeon pea, Wheat, lignin and cellulose

Practical 7: Extraction of pectic substance

Practical 8: Extraction of Tannin

Practical 9-11: Preparation of Ayurvedic formulations (as per syllabus)

Practical 12: Botanical excursion

N.B:

1) any ten Practicals

2) Several Short Excursions and At least One Long Excursion.

B. Sc. Second Year
Semester-IV
BOTANY
CC-VII: Environmental Biology; Gardening and Land Scaping

Lectures: 45 Maximum Marks: 50 Credits: 02 Course Code: U-BOT-467

Course Objectives:

1. To provide an understanding for the fate and impact of pollution on "organic life".
2. To characterize the biological impacts of toxins and contaminants on "organic life".
4. To critically evaluate environmental issues and their impact.
5. To learn an understanding of the methods of gardening.
6. To understand the technique potting.
7. To know aesthetic importance of garden.

Course outcomes:
The students will be able to:

1. Describe the methods of gardening.
2. Characterize the biological impacts of toxins and contaminants on organic life.
3. Explain the effect pollution on living beings.
4. Evaluate environmental issues and their impact.
5. Describe the different ecosystems and their role.

UNIT – I: ENVIRONMENTAL BIOLOGY-I (12 L)

1. Ecology – Definition and Scope
2. Structure of ecosystem (Abiotic and Biotic)
3. Types of ecosystem (Pond ecosystem and Forest ecosystem)
4. Ecological pyramids and energy flow
5. Food chain and Food web
6. Morphological and anatomical adaptations of plants to water stress conditions
   i. Hydrophytes –Lotus leaf (petiole), Hydrilla
   ii. Xerophytes – Nerium leaf, Casurina stem

UNIT – II: ENVIRONMENTAL BIOLOGY-II (10 L)

1. Pollution: Causes, effects and control measures of:
   i. Water pollution
   ii. Soil pollution
   iii. Air pollution
2. Aforestation and deforestation

3. Chipko movement

UNIT – III: GARDENING (13 L)

1. Scope and objectives of gardening
2. Style of gardens: Formal, Informal
3. Types of gardens: English, Mughal, Hindu-Buddhist and Japanese
4. Components of garden
5. Pots and container
6. Essentials of pot culture
7. Potting compost
8. Potting

UNIT – IV: LANDSCAPE DESIGNS (10 L)

1. Landscape Design: Definition, Landscape elements of construction
2. Computer application in landscape
3. Hedges for gardens & farms
4. Lawns & Grasses: Planting methods, maintenance and pest management
5. Development of flowerbeds and their designs
6. Preparation of Bonsai and Flower Arrangement

Reference Book:

1. A text book of Plant Ecology-Ambasht R.S.
2. Fundamentals of Ecology- Dash M.C.
3. Ecology- Michael S.
4. Ecology and Environment- Sharma, P.D.
5. Modern Concepts of Ecology- Kumar H.D.
6. Fundamentals of Ecology- E.P. Odum
7. Environmental Chemistry- A.K. De
8. Environmetal Biology- Biswarup Muhkerjee
9. Modern Concepts of Ecology- H.D.Kumar
10. Environmental Science- Turk and Turk
11. Manual of Field Ecology- R. Mishra
12. Plant Ecology- Ambhast
13. Air Pollution Vol I - A.C. Stern
14. Environmental Impact Assessment- Larry Canter
15. Environmental management - Biswarup Muhkerjee V.
16. Pollution Biology- Hyne
17. Nursery and Landscaping - VeenaAmarnath
18. Indoor Gardening- S.C.Day
19. Gardening- Parimal Mehra

B. Sc. Second Year
Semester – IV
BOTANY
CC-VIII: Plant Breeding and Biotechnology

Lectures: 45 Maximum Marks: 50 Credits: 02 Course Code: U-BOT-468

Course Objectives:

1. To understand different methods of plant breeding.
2. To learn about techniques in genetic engineering.
3. To acquire good knowledge about plant tissue culture.
4. To know the methods of isolation of protoplasts and its fusion.

Course outcomes:

The students will be able to:

1. Describe the importance of GMO.
2. Explain different methods of plant breeding.
3. Perform independently isolation of protoplasts and its fusion.
4. Develop skill in genetic engineering.

UNIT-I: PLANT BREEDING-I (10L)

1. Definition, Aims and Objectives
2. Centers of origin
3. Methods of Plant Breeding
   - i. Plant introduction and acclimatization
   - ii. Mass Selection
   - iii. Pure line selection
   - iv. Clonal selection
   - v. Pedigree selection

UNIT-II: PLANT BREEDING-II. (10L)

1. Hybridization
2. Heterosis and hybrid vigour
3. Mutation breeding
4. Polyploidy
5. Breeding in cotton

UNIT-III: BIOTECHNOLOGY – I (13)

1. Genetic Engineering:

i. Definition, scope and importance

ii. Tools:

a) Restriction Endonucleases

b) Vectors: plasmids, cosmids

iii. Technique of r-DNA

iv. Genomic and c-DNA libraries

2. Agrobacterium mediated gene transfer: (Biology of *Agrobacterium,* Ti - plasmid and *Agrobacterium* mediated transfer technique)

3. Transgenic plants

UNIT –IV: BIOTECHNOLOGY – II (12)

1. Tissue culture:

- **i.** Introduction
- **ii.** Concept of Totipotency of cell
- **iii.** Basic aspects of tissue culture laboratory
- **iv.** Technique of tissue culture
- **v.** Callus culture, differentiation & morphogenesis

2. Applications of Tissue culture

- **i.** Micropropagation
- **ii.** Production of secondary metabolites
- **iii.** Somatic hybridization
- **iv.** Anther culture and production of haploids

Reference Book

1. Plant Breeding: Principles and Methods- 7th edition Singh, B.D. (2005)

2. Principles of plant breeding-Allard, R.W. (1960).

3. Plant Breeding: Theory and Practice 2nd edition-Chopra, V.L. (2000). New Delhi.

4. Plant Breeding: Mendalian to Molecular Approaches-Jain, H. K. and Kharwal, M.C. (2003)

5. Advances in Plant Breeding-Vol 1 and 2, Mandal, A.K., Ganguli, P.K., Banerjee,

6. Principles and Practices of Plant Breeding -Sharma, J. R

7. Plant Breeding-H.K. Chowdhari

8.Biotechnology An Expanding Horizons -B.D.Singh

9. Biotechnology -Verma S.K.

SKILL ENHANCEMENT COURSE -II

PAPER II: NURSERY, GARDENING AND FLORICULTURE (SEC)

Lectures: 45 Maximum Marks: 50 Credits: 02 Course code: U-ADC-434N

Course Objectives:

1. The courses aims at developing skills and making the students become self-reliable and employable besides giving them an edge when they seek employment in other Government and private sectors.
2. When students pass out of the college with their degrees, they also are equipped with additional skills to meet the challenges in future.

Course Outcomes:

The students will be able to:

1. Describe the concept of nursery and Gardening management.
2. Familiarize with principles and practices of propagation of floricultural crops,
3. Explain various ornamental plants and their uses.
4. Correlate the commercial value of floriculture.

UNIT-I: NURSERY

1. Definition, objectives, scope and building up of infrastructure for nursery.
2. Planning and seasonal activities - Planting - direct seeding and transplants.
3. Nursery Management and Routine Garden Operations.

UNIT- II: PROPAGATION METHODS

1 Sowing/ raising of seeds and seedlings, transplanting of seedlings.

2. Air-layering, cutting, selection of cutting, propagules collecting season, treatment of cutting rooting medium and planting of cuttings - Hardening of plants.
3. Propagation of ornamental plants by rhizomes, corms tubers, bulbs and bulbils.
4. Green house - mist chamber, shed root, shade house and glass house for propagation.

UNIT- III: FLORICULTURE

1. Ornamental Plants: Flowering annuals; herbaceous, perennials; Divine vines; Shade and ornamental trees.
2. Ornamental bulbous and foliage plants; Cacti and succulents.
3. Ornamentals-palms.
4. Cultivation of plants in pots; Indoor gardening; Bonsai.

UNIT IV: COMMERCIAL FLORICULTURE

1. Factors affecting flower production; Production and packaging of cut flowers; Flower arrangements; Methods to prolong vase life of flowers
2. Cultivation of Important cut flowers (Carnation, Aster, Dahlia, Gerbera, Anthuriams, Gladiolous, Marigold, Rose, Lilium)
3. Management of pests, diseases and harvesting.
4. Methods of harvesting.

Reference Book:

1. Gardening in India, Bose T.K. & Mukherjee, D., 1972, Oxford & IBH Publishing Co., New Delhi.
2. Plant Propagation, Sandhu, M.K., 1989, Wile Eastern Ltd., Bangalore, Madras.
3. Introduction to Horticulture Kumar, N., 1997, Rajalakshmi Publications, Nagercoil. institution)
4. Floriculture in India Randhawa, G.S. and Mukhopadhyay, A. 1986.. Allied Publishers.

Suggested Activities:

Raising a nursery, managing it, studying and drawing various land scaping designs, practicing layering methods, using shade nets to protect horticultural crops, practicing indoor gardening, techniques, visiting florists and recording their methods of prolonging vase life of commercial cut flowers.

Practicals:

1.Tools, implements and containers used for propagation and nursery techniques.

2.Propagation by cutting, layering, budding and grafting

3.Seed propagation- preparation of portable trays, seed treatments, sowing and seedling production.

4. Identification and description of annuals, herbaceous perennials, climbers, creepers, foliage and flowering shrubs, trees, palms, ferns, ornamental grasses; cacti and succulents..

5. Planning and designing of gardens, functional uses of plants in the landscape
6. Preparation of land for lawn and planting.
7. Identification of commercially important flower crops and their varieties.
8. Propagation practices in flower crops, sowing of seeds and raising of seedlings of annuals.
9. Use of chemicals and other compounds for prolonging the vase life of cut flowers.
10. Grading, packing and marketing of cut flowers.
11. Visit to commercial nurseries and commercial tissue culture laboratory
12. Study project under supervision of lecturer – nursery/ornamental flowers/ plants/lawn designing/landscape designing

Expected domain skills to be achieved:

Ability to use a variety of garden tools and implements, proficiency in layering and grafting techniques (cleft grafting and bud grafting), land scape drawings using computers, raising of healthy nurseries of flowering plants, managing vase life of cut flowers etc.

B. Sc. Second Year

Semester-IV

BOTANY

Laboratory Course-V

(Based on CC-VII)

Practicals:10 Maximum Marks: 50 Credit: 02 Course Code: U-BOT-469

Course Objectives:

1. To improve and conserve natural resources by reducing soil erosion.
2. To reduce noise and environmental Pollution.
3. To understand the distribution of biotic and abiotic factors of living things in the Environment.

Course outcomes:

The students will be able to:

1. Identify morphological characters of plant.
2. Manage the crops in different soil by identify the soil pH, water holding capacity of soil etc.
3. Identify the different species of plant in some proper area i.e. diversity of plant.
4. Improve the gardens by different method.

Practical 1: Study of morphological and anatomical adaptations in hydrophytes – *Lotus petiole*

Practical 2: Study of morphological and anatomical adaptations in xerophytes –*Nerium*

Practical 3: Determination of water holding capacity of different soils

Practical 4: Estimation of salinity of different water samples

Practical 5-6: Study of vegetation by quadrate method

Practical 7: Determination of pH of different soils by pH paper/ pH meter

Practical 8: Garden tools and implements

Practical 9: Different types of pots

Practical 10: Procedure of potting

Practical 11: Preparation of Bonsai

Practical 12-13: Visits to Gardens, Nurseries, Agriculture Colleges/Universities, Exhibitions, Polyhouses, Flower shows etc.

N.B: 1) Any ten Practicals

2) Several Short Excursions and At least one Long Excursion

B. Sc. Second Year
Semester – IV
BOTANY
Laboratory Course-VI
(Based on CC-VIII)

Practicals: 10 Maximum Marks: 50 Credits: 02 Course Code: U-BOT-470

Course Objective:

1. To understand methods of isolation of protoplasts and its fusion.
2. To study different methods of plant breeding.
3. To learn about tissue culture in plants.
4. To acquire the knowledge of various mutagens.
5. To study the effect of Colchicine in polyploidy.

Course outcomes:

The students will be able to:

1) Identify easily ploidy level of different plants.
2) Perform different techniques of hybridization.
3) Describe the methods of preparation of different media.
4) Evaluate the effect of colchicine in polyploidy.
5) Correlate the effect of mutagens on various crops.

Practical 1-3: Colchicine treatment to induce tetraploidy in onion root cells.

Practical 4-5: Demonstration of techniques of hybridization (emasculation, pollination, tagging and bagging).

Practical 6-7: Effect of physical or chemical mutagens on crop plants (photographs) of M_1 and M_2 population.

Practical 8-9: Preparation and sterilization of the MS medium, slant preparation and inoculation.

Practical 10-11: Demonstration of techniques in callus culture and somatic hybridization

Practical 12-13: Visit to Plant breeding station, tissue culture laboratory/ Biotechnology institute is compulsory.

N.B: 1) Any Ten practicals

2) Several short Excursion and at least one Long Excursion.

Shiv Chhatrapati Shikshan Sanstha's

Rajarshi Shahu Mahavidyalaya (Autonomous), Latur

B.Sc. II (Botany)

Semester III and IV

Continuous Internal Assessment

Unit Test I	Activity based Test (Surprise test, Seminar, Group discussion, Poster presentation etc.)	05 Marks
Unit Test II	MCQ Pattern	10 Marks (20 Marks converted into 10 Marks)
Attendance	Attendance	05 Marks
	Total	20 Marks

Shiv Chhatrapati Shikshan Sanstha's

Rajarshi Shahu Mahavidyalaya (Autonomous), Latur

B.Sc. II

Semester End Examination

Skeleton of Question Paper

Botany Theory Paper- V, VI, VII, VIII

Time: 1.30 hours **Maximum Marks: 30**

Note: (i) Attempt all questions.

(ii) Draw neat and well labeled diagrams wherever necessary.

Q1. Attempt any four of the following (Each 3 marks) **12**

(At least 1 question on each unit)

a)

b)

c)

d)

e)

Q2. Attempt any Two of the following **08**

(Each question on unit 1, 2 & 3)

a)

b)

c)

Q3. Attempt any ONE of the following **10**

(Questions on remaining units)

a)

b)

***

Shiv Chhatrapati Shikshan Sanstha's

Rajarshi Shahu Mahavidyalaya (Autonomous), Latur

B.Sc. II

PRACTICAL EXAMINATION IN BOTANY

SEE WINTER/SUMMER

Time: Three Hours **Maximum Marks: 30**

Note: - (i) Attempt all questions.
(ii) Draw neat and well labeled diagrams wherever necessary.

Q. 1.	Long answer type question.	10
Q. 2.	Long answer type question.	10
Q. 3.	Spotting (02 spots)	05
Q. 4.	Viva- Voce.	05

S. N. Shinde
Chairman
Board of Studies in Botany