SRI DHARMASTHALA MANJUNATHESHWARA COLLEGE, (AUTONOMOUS),UJIRE-574240

(Re-Accredited by NAAC at 'A++' Grade)

DEPARTMENT OF BOTANY

SYLLABUS AS PER NEP 2020

(With effect from 2022-23)

SRI DHARMASTHALA MANJUNATHESHWARA COLLEGE, (AUTONOMOUS),UJIRE-574240

(Re-Accredited by NAAC at 'A++' Grade)

DEPARTMENT OF BOTANY

Syllabus of

Honor's Degree in ScienceSubject:

BOTANY

(AS PER NEP 2020 GUIDELINES)

2022– 2023 onwards

Approved in BOS meeting on

05.11.2022

Approved in Academic Council meeting held on

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SDM COLLEGE (AUTONOMOUS), UJIRE

DEPARTMENT OF BOTANY

SYLLABUS -FOUR YEARS UNDERGRADUATE PROGRAMME

PREAMBLE

The present situation necessitates transformation and/or redesigning of the system, not only by introducing innovations but developing a "learner-centric" approach. Thus, there is a need to allow flexibility in the education system, so that students depending upon their interests can choose inter-disciplinary, intra-disciplinary and skill-based courses. It is also to bridge the increasing gap between an undergraduate degree and employability.

Karnataka State Higher Education Council has proposed a model curriculum framework and an implementation plan for the State of Karnataka. Based on these recommendations, Mangalore University issued guidelines to its affiliated and autonomous colleges to implement the National Education Policy from the academic year 2021-2022. Hence, our college thought to implement multidisciplinary and holistic education in all the undergraduate programs with multiple entries and exit options with multiple certificate/diploma/degrees to replace the present undergraduate degree programs effective from the academic year 2021-2022.

The Department of Botany proposed a Four-year, Undergraduate Curriculum in Botany to cater to the needs of students with diverse talents, aspirations and professional requirements. Students will have the option to exit after one year with the certificate, two years with an award of the diploma and after three years with the award of the bachelor's degree. Successful completion of 4- year program will lead to the award of a bachelor degree with honours.

The salient features of the curriculum are as follows

Discipline Core Course (DCC)

Discipline Elective course (DEC)

Discipline Open Elective (DOE)

Program objectives

- To enhance Subject knowledge of all branches of Botany with exposure to new andrecent developments in Botany.
- To develop Experimental skills/Communication and Learning skills
- To enable ICT exposure through computer simulation experiments/presentations
- To have Research exposure through SRPs
- To develop Additional skills in the field of interest.
- To develop Scientific approach in attitude and reasoning, creativity and innovativeideas
- To create Awareness on energy conservation/environment/cleanliness
- To develop Motivation on Nation development

Program outcomes

PO1: Skill development for the accurate description using botanical terms, identification, naming, and classification of life forms especially plants and microbes.

PO2: Acquisition of knowledge on the structure, life cycle, and life processes among plant and microbial diversity through certain model organism studies.

PO3: Understanding various interactions between plants and microbes; to develop the curiosity about the dynamicity of nature.

PO4: Skill development for collecting, preserving, and recording information after observation and analysis- from simple illustration to molecular database development.

PO5: Internalization of the concept of conservation and evolution through the channel of the spirit of inquiry.

PO 6: To enable the graduates to prepare for national and international level competitive examinations like UGC-CSIR, UPSC, KPSC, etc.

PO 7: The graduate should demonstrate sufficient proficiency in the hands-on experimental techniques for their area of specialization within biology during research and their professional care

COURSE PATTERN AND SCHEME

Semesters- I to IV

I Sem								
DCC	BYCT 101	Microbial Diversity and Technology	4	2	40	60	100	4
DCC	BYCP101	Microbial Diversity and Technology	4	4	25	25	50	2
DOE	BYOE101	Plant and Human welfare	3	2	40	60	100	3
II Sem								
DCC	BYCT 151	Diversity of Non-Flowering Plants	4	2	40	60	100	4
DCC	BYCP 151	Diversity of Non-Flowering Plants	4	4	25	25	50	2
DOE	BYOE 151	Plant Propagation, Nursery management and Gardening	3	2	40	60	100	3
III Sem								
DCC	BYCT201	Plant Anatomy and Development Biology	4	2	40	60	100	4
DCC	BYCP201	Plant Anatomy and Development Biology	4	4	25	25	50	2
DOE	BYOE201	Landscaping and Gardening	3	2	40	60	100	3
IV Sem								
DCC	BYCT 251	Ecology and Conservation Biology	4	2	40	60	100	4
DCC	BYCP 251	Ecology and Conservation Biology	4	4	25	25	50	2
DOE	BYOE 251		3	2	40	60	100	3

Outline for Internal assessment (Theory)

Activity	1	2	Total marks
Internals	10	10	20
Assignments/Quiz	10	10	20
Total	20	20	40

Allotment of Marks for Practicals for I-IV Semesters

Internal Assessment

Lab performance based on Continuous assessment	10
Model practical examination after completing the minimum	15
Number of experiments	14
Total Marks.	: 25

B.Sc. BOTANY: SEMESTER - I

BYCT101: MICROBIAL DIVERSITY AND TECHNOLOGY

Course No.	Type of Course	Theory / Practical	Credits	Instruction hour per week	Total No. of Lectures/ Semester	Duration of Exam	Formative Assessment Marks	Summative Assessment Marks	Total Marks
BYCT 101	DCC	Theory	04	04	56 hrs	3hrs	40	60	100

Course Learning Outcomes (CO)

1. Understand the fascinating diversity, evolution, and significance of microorganisms.
2. Comprehend microbes' systematic position, structure, physiology, and life cycles and their impact on humans and the environment.
3. Gain laboratory skills such as microscopy, microbial cultures, staining, identification, preservation of microbes for their applications in research and industry.

Unit I **14 Hours**

Chapter No. 1: **04 Hours**

Microbial diversity-Introduction; Hierarchical organization and positions of microbes in the living world: Whittaker's five-kingdom system and Carl Richard Woese's three-domain system. Distribution of microbes in the soil, air, food, and water. Significance of microbial diversity in nature.

Chapter No. 2 **05 Hours**

History and development of microbiology-Microbiologists and their contributions (Leeuwenhoek, Louis Pasteur, Robert Koch, Joseph Lister, Dmitri Iwanowski, Sergius Winogradsky, and M W Beijerinck and Paul Ehrlich).

Chapter No. 3 **05 Hours**

Microscopy-Working principle and applications of light, darkfield, phase contrast, and electron microscopes (SEM and TEM). Microbiological stains (acidic, basic, and special) and Principles of staining- Simple, Gram and differential staining.

Self Study Components:

a. An overview of Pandemics. **b**. An account on Indian microbiologists. **c**. Sample preparation methods in Microscopy.

Unit II **14 Hours**

Chapter No. 4. **04 Hours**

Culture media for Microbes-Natural and Synthetic media, Routine media -basal media, enriched media, selective media, indicator media, transport media, and storage media.

Chapter No. 5. **05 Hours**

Sterilization methods:*Disinfection Methods* - Antiseptic, Tyndallization, and Pasteurization. *Physical*

methods- dry heat, moist heat, UV light, ionization radiation, filtration. *Chemical methods* - Phenolic compounds, anionic and cationic detergents.

Chapter No. 6. **05 Hours**

Microbial Growth: Microbial growth and measurement. Nutritional types of Microbes - autotrophs and heterotrophs; phototrophs and chemotrophs; lithotrophs and organotrophs.

Self Study Components:

a. Study of Microbial growth Curve. **b**. Study of Microbial Metabolism.

Unit III **14 Hours**

Chapter No. 7. **06 Hours**

Microbial cultures and preservation, *Microbial cultures*- Pure culture and axenic cultures, subculturing. *Preservation methods*-Overlaying cultures with mineral oils, Lyophilization. *Microbial culture collections and their importance.* A brief account of ITCC, MTCC, and ATCC.

Chapter No. 8. **04 Hours**

Viruses: General structure, ICTV system of classification. Structure and multiplication of TMV, SARS-COV-2, and Bacteriophage (T2). Cultivation of viruses. Vaccines and types.

Self Study Components:

An account on Viral plant diseases (Disease, Causative virus, Host plant, and Important symptoms)

Herbal Remedies for viral infections.

Chapter No. 9. **04 Hours**

Viroids- General characteristics and structure of Potato Spindle Tuber Viroid (PSTVd)

Prions - General characters and Prion diseases (**CJD**). Economic importance of viruses.

Unit IV **14 Hours**

Chapter No. 10. **05 Hours**

Bacteria- General characteristics and classification.(Bergey's classification)

Archaebacteria and Eubacteria. Ultrastructure of Bacterial cell; Bacterial growth and nutrition. Reproduction in bacteria- asexual and sexual methods. Study of *Rhizobium* and its applications. A brief account of Actinomycetes. **Mycoplasmas and Phytoplasmas**- General characteristics and diseases.

Chapter No. 11. **07 Hours**

Fungi-General characteristics and classification (Alexopoulos classification). Thallus organization and nutrition.

Reproduction in fungi (asexual and sexual). Heterothallism and parasexuality. **Type study**: Morphology of *Phytophthora, Rhizopus, Puccinia, Penicillium,* and *Trichoderma*. Reproduction of *Phytophthora* and *Puccinia*. VAM Fungi and their significance.

Microbial plant diseases: Late Blight of Potato, Black stem rust of wheat; Downy Mildew of Bajra, Grain smut of Sorghum, Sandal Spike, Citrus canker.

Chapter 12. **02 Hours**

Lichens –Types, Structure, and reproduction. Economic importance

Self Study Components:

An Account of Edible Mushrooms

Text Books

1. Ananthanarayan R and Panikar JCK. 1986. Textbook of Microbiology. Orient Longman Ltd. New Delhi.

2. Arora DR. 2004. Textbook of Microbiology, CBS, NewDelhi.

3. William CG. 1989. Understanding microbes. A laboratory textbook for Microbiology. W.H. Freeman and Company. New York.

4. Dubey RC and Maheshwari DK. 2007. A textbook of Microbiology, S. Chand and Company, NewDelhi.

5. Dubey RC and Maheshwari DK. 2002. A Textbook of Microbiology, S.C.Chand, and Company, Ltd. Ramnagar, New Delhi.

6. Sharma R. 2006. Textbook of Microbiology. Mittal Publications. New Delhi. 305pp.

7. Sharma PD. 1999. Microbiology and Plant Pathology. Rastogi publications. Meerut, India.

8. Vasanthkumari R. 2007. A textbook of Microbiology, BI Publications Pvt. Ltd., New Delhi.

References

1. Alexopoulos CJ and Mims CW. 1989. Introductory Mycology, Wiley Eastern Ltd., NewDelhi.

2. Allas RM. 1988. Microbiology: Fundamentals and Applications, Macmillan publishing co. New York.

3. Brook TD, Smith DW and Madigan MT. 1984. Biology of Microorganisms, 4th ed. Eaglewood Cliffs.

4. Burnell JH and Trinci APJ. 1979. Fungal walls and hyphal growth, Cambridge UniversityPress. Cambridge.

5. Jayaraman J. 1985. Laboratory Manual of Biochemistry, Wiley Eastern Limited. New Delhi.

6. Ketchum PA. 1988. Microbiology, concepts, and applications. John Wiley and Sons. New York.

7. Michel J, Pelczar Jr.EC and Krieg CR. 2005. Microbiology, Mc.Graw-Hill, New Delhi.

8. Powar CB and Daginawala. 1991. General Microbiology, Vol – I and Vol – II Himalaya publishing house, Bombay.

9. Reddy S and Ram. 2007. Microbial Physiology. Scientific Publishers, Jodhpur, 385pp.

10. Sullia SB and Shantharam S. 1998. General Microbiology. Oxford and IBH publishing Co.Pvt.Ltd. New Delhi.

11. Schlegel HG. 1986. General Microbiology. Cambridge. University Press. London, 587pp.

B.SC. BOTANY: SEMESTER - I

BYCP101: MICROBIAL DIVERSITY AND TECHNOLOGY

Course No.	Type of Course,	Theory / Practical	Credits	Instruction hour per week	Total No. of Lectures/ Semester	Duration of Exam	Formative Assessment Marks	Summative Assessment Marks	Total Marks
BYCP 101	DCC	Practical	02	04	56 hrs	3hrs	25	25	50

LIST OF EXPERIMENT TO BE CONDUCTED

Practical 1: Safety measures in microbiology laboratory and study of equipment/appliances used for microbiological studies (Microscopes, Hot air oven, Autoclave/Pressure Cooker, Inoculation needles/loop, Petri plates, Incubator, Laminar flow hood, Colony counter, Haemocytometer, Micrometer.

Practical 2: Preparation of culture media (NA/PDA) sterilization, inoculation, incubation of *E. coli* / *B. subtilis*/ Fungi, and study of cultural characteristics.

Practical 3: Enumeration of soil/food /seed microorganisms by serial dilution technique.

Practical 4: Preparation of agar slants, inoculation, incubation, pure culturing, and preservation of microbes by oil overlaying.

Practical 5: Determination of cell count using Hemocytometer and microbial cell dimension determination using Micrometer.

Practical 6: Simple staining of bacteria (Crystal violet /Nigrosine blue) and Gram's staining of bacteria.

Practical 7: Isolation and study of the morphology of Rhizobium from root nodules of legumes

Practical 8: Preparation of spawn and cultivation of paddy straw (Oyster) mushroom.

Practical 9: Study of vegetative structures and reproductive structures of any six: *Albugo, Phytophthora, Rhizopus/Mucor, Saccharomyces, Puccinia, Agaricus, Lycoperdon, Aspergillus/Penicillium, Trichoderma. (*Depending on local availability)

Practical 10: Study of late blight of Potato, Downy mildew of Bajra, Citrus canker, Tobacco mosaic disease, Sandal spike disease.

Practical 11: Studying well-known microbiologists and their contributions through charts and photographs.

Practical-12: Visiting water purification units/Composting/ microbiology labs/dairy and farms to understand the role of microbes in day-to-day life. The field study report is to be documented in the practical record.

(Note: Botanical study tour to a floristic rich area for 1-2 days and submission of the study report is compulsory)

Practical Exam pattern

Time: 3 hours **Marks:25**

Sl. No.	Question	Details	Mark distribution
1	List the materials required for the major experiment **A**, Write down the Procedure, set up the experiment & show the results. Draw the inference. Leave the set up for inspection	**As per the Lot** (anyone/student) Simple staining Gram's Staining Serial Dilution Haemocytometer	Aim-0.5 Requirement-0.5 Procedure with sketch-1 Performance-3 Result & Inference-1
2	Identify **B**, giving principle and uses.	Equipment/Tools used in microbiology	Identification-1 Working Principle-1 Uses-1
3	Identify the scientific personality **C** and mention any four significant contributions	Microbiologist and their contributions	Identification-1 Contribution-2
4	Identify the specimen **D**. Comment on its biological significance	Bacterial samples	Identification-0.5 Sketch-0.5 Significance-1
5	Identify the culture technique **E** and write its importance	Different types of Cultures, Culture methods, Inoculation methods	Identification-0.5 Sketch-0.5 Importance-1
6	Identify the slide **F** with reasons	Fungal types	Identification-0.5 Sketch-0.5 Reason-1
7	Identify the pathological specimen **G** giving the salient features	Pathology specimens	Disease – 0.5 Pathogen-0.5 Symptom-0.5 Control-0.5
8	CLASS RECORDS	Completeness Neatness	05

B.SC. BOTANY: SEMESTER - I

BYOE101: PLANTS AND HUMAN WELFARE

Course No.	Type of Course,	Theory / Practical	Credits	Instruction hour per week	Total No. of Lectures/ Semester	Duration of Exam	Formative Assessment Marks	Summative Assessment Marks	Total Marks
BYOE 101	DOE	Theory	03	03	42 hrs	2 hrs	40	60	100

Course Outcome:

On completion of this course, the students will be able to

1. To make the students familiar with the economic importance of diverse plants that offer resources to human life.
2. To make the students know about the plants used as food, medicinal value, and plant sources of different economic value.
3. To generate interest amongst the students on plants' importance in day-to-day life, conservation, ecosystem, and sustainability.

Unit I **14 Hours**

Origin of Cultivated Plants. Concept of Centres of Origin, their importance about Vavilov's work. Examples of major plant introductions. Crop domestication and loss of genetic diversity (Only conventional plant breeding methods). Importance of plant biodiversity and conservation.

Cereals: Wheat and Rice (origin, evolution, morphology, post-harvest processing & uses). Green revolution. A brief account of millets and their nutritional importance.

Legumes: General account (including chief pulses grown in Karnataka- red gram, green gram, chickpea, soybean). Importance to man and ecosystem.

Fruits: Mango, grapes, and Citrus (Origin, morphology, cultivation, processing, and uses)

Unit II **14 Hours**

Cash crops: Morphology, new varieties, and processing of sugarcane, products, and by-products of the sugarcane industry. Natural Rubber –cultivation, tapping, and processing.

Spices: Listing of important spices, their family and parts used, economic importance with special reference to Karnataka. Study of fennel, clove, black pepper, and cardamom.

Beverages: Tea, Coffee(morphology, processing & uses)

Oils and fats: General description, classification, extraction, their uses, and health implications; groundnut, coconut, sunflower and mustard (Botanical name, family & uses). Non-edible oil yielding trees and their importance as bio-fuel. Neem oil and applications.

Unit III **14 Hours**

Essential Oils: General account. Extraction methods of Sandalwood oil, Rose oil, and Eucalyptus oil. Economic importance as medicine, perfumes, and insect repellents.

Drug-yielding plants: Therapeutic and habit-forming drugs with special reference to *Cinchona*, *Digitalis*, *Aloe vera*, and *Cannabis*.

Fibers: Classification based on the origin of fibers; Cotton and jute (origin, morphology, processing and uses).

Forests: Forest and forest products. Community forestry. Concepts of reserve forests, sanctuaries, and national parks concerning India. Endangered species and red data book.

Text Books and References

1. Kochhar, S.L. (2012). Economic Botany in Tropics. New Delhi, India: MacMillan & Co.

2. Wickens, G.E. (2001). Economic Botany: Principles & Practices.The Netherlands: Kluwer Academic Publishers.

3. Chrispeels, M.J., and Sadava, D.E. (1994) Plants, Genes and Agriculture.Jones& Bartlett - Publishers.

B.SC. BOTANY: SEMESTER - I

BYCT 151: DIVERSITY OF NON-FLOWERING PLANTS

Course No.	Type of Course,	Theory / Practical	Credits	Instruction hour per week	Total No. of Lectures/ Semester	Duration of Exam	Formative Assessment Marks	Summative Assessment Marks	Total Marks
BYCT 151	DCC	Theory	04	04	56 hrs	2 hrs	40	60	100

Course Outcome:

1. Understand the diversity and affinities among Algae, Bryophytes, Pteridophytes, and Gymnosperms.
2. Understand the morphology, anatomy, reproduction, and life cycle across Algae, Bryophytes, Pteridophytes, and Gymnosperms and their ecological and evolutionary significance.
3. Obtain laboratory skills/explore non-flowering plants for their commercial applications.

Unit I **14 Hours**

Chapter No. 1 **05 Hours**

Algae –Introduction and historical development in algology. Distribution of Algae. General characteristics, classification of algae by Fritsch. Diversity- habitat, thallus organization, pigments, reserve food, flagella types, life cycle, and alternation of generation in Algae.

Chapter No. 2 **04 Hours**

Morphology and reproduction and life-cycles of *Nostoc*, *Scytonema*, *Oedogonium*, *Chara*, *Sargassum*, and *Polysiphonia/Batrachospermum*. Diatoms and their importance.

Chapter No. 3 **05 Hours**

Algal cultivation- a general account. Cultivation of microalgae *Spirulina* and *Dunaliella*; Algal products- Food and Nutraceuticals, Feedstocks, food colorants; fertilizers, aquaculture feed; therapeutics and cosmetics; medicines; dietary fibers from algae. Algal blooms and toxins.

Self-learning components:

Phylogenetic classification system of Algae.

Unit II **14 Hours**

Chapter No. 4. **02 Hours**

Bryophytes – General characteristics and classification (Rothmaler).

Chapter No. 5. **06 Hours**

Distribution, morphology, anatomy, reproduction, and life cycles of *Riccia*, *Anthoceros*, and *Funaria*. Ecological and economic importance of Bryophytes.

Chapter No. 6. **06 Hours**

Pteridophytes- General characteristics and classification (Smith); Distribution, morphology, anatomy, reproduction, and life-cycle in *Selaginella*, *Equisetum*, *Pteris*, and *Marselia*.

Unit III **14 Hours**

Chapter No. 7. **05 Hours**

Stelar evolution in Pterodophytes. A brief account of heterospory and seed habit. Affinities and evolutionary significance of Pteridophytes. Ecological and economic importance.

Chapter No. 8. **06 Hours**

Gymnosperms- General characteristics. Distribution and classification of Gymnosperms (Sporne). Study of the habitat, habit, anatomy, reproduction, and life-cycle in *Cycas*, *Pinus*, and *Gnetum*.

Chapter No. 9. **03 Hours**

Affinities and evolutionary significance of Gymnosperms. Economic importance of Gymnosperms - food, timber, industrial uses, and medicines.

Unit IV **14 Hours**

Chapter No. 10. **03 Hours**

Origin and evolution of Plants: Origin and evolution of plants through Geological Time scale.

Chapter No. 11. **07 Hours**

Paleobotany- Paleobotanical records, plant fossils, Types of plant fossils - impressions, compressions, incrustation, actual remains petrifaction. Radiocarbon dating. A general account of fossil Bryophytes.

Chapter No. 12. **04 Hours**

Fossil taxa- *Rhynia, Lepidodendron, Cycadeoidea*. Contributions of Birbal Sahni. Birbal Sahni Institute of Palaeosciences.

Self Study Component:

Fossil taxa- *Rhynia, Lepidodendron, Cycadeoidea*.

Text Books

1) Chopra, G.L. A textbook of Algae. Rastogi & Co., Meerut, Co., New Delhi, Depot. Allahabad.

2) Johri, Lata and Tyagi, 2012, A Text Book of, Vedam eBooks, New Delhi.

3) Sharma, O.P. 1990. Text Book of Pteridophyta. McMillan India Ltd. New Delhi.

4) Sharma, O.P. 1992. Text Book of Thallophytes. McGraw Hill Publishing Co. New Delhi.

B.SC. BOTANY: SEMESTER - II

BYCP 151: DIVERSITY OF NON-FLOWERING PLANTS

Course No.	Type of Course,	Theory / Practical	Credits	Instruction hour per week	Total No. of Lectures/ Semester	Duration of Exam	Formative Assessment Marks	Summative Assessment Marks	Total Marks
BYCP 151	DCC	Practical	02	04	56 hrs	2 hrs	25	25	50

Practical-1: Study of morphology, classification, reproduction, and life cycle of *Nostoc /Anabaena/ Oscillatoria.*

Practical-2: Study of morphology, classification, reproduction, and life-cycle of *Oedogonium & Chara, Sargassum, Batrachospermum/ Polysiphonia.*

Practical-3: Study of morphology, classification, reproduction, & life-cycle of *Marchantia/Riccia* & *Anthoceros.*

Practical-4: Study of morphology, classification, anatomy, reproduction, and life-cycle of *Selaginella* and *Equisetum.*

Practical -5: Study of morphology, classification, anatomy, reproduction and life-cycle of *Pteris, Azolla/Salvinia.*

Practical -6: Study of morphology, classification, anatomy and reproduction in *Cycas.*

Practical -7: Study of morphology, classification & anatomy, reproduction in *Pinus.*

Practical -8: Study of morphology, classification & anatomy, reproduction in *Gnetum.*

Practical -9: Study of important blue-green algae causing water blooms in the lakes.

Practical -10: Study of different methods of cultivation of ferns in a nursery.

Practical -11: Preparation of natural media and cultivation of *Azolla* in artificial ponds.

Practical -12: Media preparation and cultivation of *Spirulina.*

Practical -13: Study different algal products and fossils impressions and slides.

Practical-14: Visit algal cultivation units/lakes with algal blooms/Fern house/ Nurseries/Geology museum/lab to study plant fossils.

(Note: Botanical study tour to a floristic rich area for 1-2 days and submission of the study report is compulsory)

Sri Dharmasthala Manjunatheshwara College (Autonomous) Ujire.

B. Sc – II Semester, Botany Practical Examination

Diversity of Non-flowering plants

Time: 3 Hrs Max. Marks: 25

1. Prepare a temporary slide of material **A** and **B**, Identify, Sketch, Label and comment on their characteristics. **2X2=4**
2. Identify the slides **C** and **D**, Write critical note on them. **2X2=4**
3. Identify the Specimens **E** and **F**. Write the classification, labelled sketch and comment on their characteristics. **2X2=4**
4. Identify the spotters **G** and **H**. Comment on their significance. **2X2=4**
5. Prepare a temporary slide of material **I**. Identify, Sketch, Label and comment on its characteristics. Leave the slide for inspection. **04**
6. Class records. **05**

B.SC. BOTANY: SEMESTER - II

BYOE151: PLANT PROPAGATION, NURSERY MANAGEMENT AND GARDENING

Course No.	Type of Course,	Theory / Practical	Credits	Instruction hour per week	Total No. of Lectures/ Semester	Duration of Exam	Formative Assessment Marks	Summative Assessment Marks	Total Marks
BYOE 151	DCC	Practical	02	04	56 hrs	2 hrs	25	25	50

Course Outcome:

On completion of this course, the students will be able to

1. To gain knowledge of gardening, cultivation, multiplication, raising of seedlings of garden plants.
2. To get knowledge of new and modern techniques of plant propagation.
3. To develop an interest in nature and plant life.

Unit I **14 Hours**

Nursery: Definition, objectives and scope and general practices and building up of infrastructure for nursery, planning and seasonal activities. Planting - direct seeding and transplants, Soil free/soilless/ synthetic growth mediums for pots and nursery.

Seed: Structure and types - Seed dormancy; causes and methods of breaking dormancy. Seed storage: Seed banks, factors affecting seed viability, genetic erosion, Seed production technology. Seed testing and certification.

Unit II **14 Hours**

Vegetative propagation: Air-layering, cutting, selection of cutting, collecting season, treatment of cutting, rooting medium, and planting of cuttings. Hardening of plants. Greenhouse, mist chamber, shed roof, shade house, and glasshouse.

Gardening: Definition, objectives, and scope. Different types of gardening - landscape and home/terrace gardening, parks and its components. Plant materials and design. Computer applications in landscaping, Self study component: Ground layering, and Grafting.

Unit III **14 Hours**

Gardening operations: soil laying, Manuring, Watering, management of pests and diseases and harvesting. Sowing/raising of seeds and seedlings - Transplanting of seedlings - Study of cultivation of different vegetables and flowering plants: Cabbage, Brinjal, Lady's finger, Tomatoes, Carrots, Bougainvillea, Roses, Geranium, Ferns, Petunia, Orchids etc. Storage and marketing procedures. Developing and maintenance of different types of lawns. Bonsai technique.

Text Books and References

1. Agrawal, P.K. (1993). HandBook of Seed Technology. New Delhi, Delhi: Dept. of Agriculture and Cooperation, National Seed Corporation Ltd.

2. Bose T.K., Mukherjee, D. (1972). Gardening in India. New Delhi, Delhi: Oxford & IBH Publishing Co.

3. Jules, J. (1979). Horticultural Science, 3rd edition. San Francisco, California: W.H. Freeman and Co.

4. Kumar, N. (1997). Introduction to Horticulture. Nagercoil, Tamil Nadu: Rajalakshmi Publications.

Additional Resources:

1. Musser E., Andres. (2005). Fundamentals of Horticulture. New Delhi, Delhi: McGraw Hill Book Co.

2. Sandhu, M.K. (1989). Plant Propagation. Madras, Bangalore: Wile Eastern Ltd.