

# Syllabus for the S.Y.B.Sc. Program: B.Sc. Course:BOTANY

## SEMESTER III THEORY

| Course Code                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Title           | Credits                     |
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| USBO301                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | PLANT DIVERSITY | 2 Credits<br>(45 lectures ) |
| <b><u>Unit I : Thallophyta (Algae) &amp; Bryophyta</u></b> <ul style="list-style-type: none"> <li>General Characters of Division Phaeophyta: Distribution, Cell structure, range of thallus, Economic Importance.</li> <li>Structure, life cycle and systematic position of <i>Sargassum</i></li> <li>General Account of Class Anthocerotae and Musci</li> <li>Structure, life cycle and systematic position of                             <ul style="list-style-type: none"> <li><i>Anthoceros</i></li> <li><i>Funaria</i></li> </ul> </li> </ul>                                                                                                                                                                                                   |                 | 15 Lectures                 |
| <b><u>Unit II: Angiosperms</u></b><br>Systematics: Objectives and Goals of Plant systematic <ul style="list-style-type: none"> <li>Plant Nomenclature</li> <li>Taxonomy in relation to                             <ul style="list-style-type: none"> <li>Anatomy</li> <li>Palynology</li> <li>Chemical constituents</li> <li>Embryology</li> <li>Cytology</li> <li>Ecology</li> </ul> </li> <li>With the help of Bentham and Hooker's system of <b>Classification for flowering plants</b> study the vegetative, floral characters and economic importance of the following families:                             <ul style="list-style-type: none"> <li>Leguminosae</li> <li>Asterace</li> <li>Amaranthaceae</li> <li>Palmae</li> </ul> </li> </ul> |                 | 15 Lectures                 |
| <b><u>Unit III :Modern Techniques to Study Plant Diversity</u></b><br>Preservation methods :Dry and Wet method <ul style="list-style-type: none"> <li>Microscopy – Principle and working of Light, and electron microscope.</li> <li>Chromatography- Principles and techniques in paper and thin layer chromatography.</li> <li>Principles and techniques of Horizontal and Vertical electrophoresis.</li> </ul>                                                                                                                                                                                                                                                                                                                                      |                 | 15 Lectures                 |

# Syllabus for the S.Y.B.Sc. Program: B.Sc.Course : BOTANY

## SEMESTER III PRACTICAL

| Semester III USBOP3<br>PRACTICAL Paper I – Plant Diversity II                                                                                                                                                                                                                                                                                                                                                                                                                                         | Cr<br>1 |
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| <b>Algae &amp; Bryophyta</b> <ol style="list-style-type: none"><li>1. Study of stages in the life cycle of <i>Sargassum</i> from fresh/ preserved material and permanent slides.</li><li>2. Economic importance and range of thallus in Phaeophyta</li><li>3 Study of stages in the life cycle of <i>Anthoceros</i> from fresh/ preserved material and permanent slides.</li><li>4 Study of stages in the life cycle of <i>Funaria</i> from fresh/ preserved material and permanent slides.</li></ol> |         |
| <b>Angiosperms</b> <ol style="list-style-type: none"><li>5. Study of plants for anatomy in relation to taxonomy</li><li>6. Study of plants for Phenols and Flavanoids ( chemotaxonomy)</li><li>7. Study of one plant from each family prescribed for theory: morphological peculiarities and economic importance of the members of these families.</li></ol>                                                                                                                                          |         |
| <b>Techniques to study Plant Diversity</b> <ol style="list-style-type: none"><li>8. Preparation of herbarium and wet preservation technique</li><li>9. Chromatography: Separation of amino by circular paper chromatography</li><li>10. Separation of Carotenoids by thin layer chromatography</li><li>11. Horizontal and Vertical Gel Electrophoresis – Demonstration</li></ol>                                                                                                                      |         |

# Syllabus for the S.Y.B.Sc. Program: B.Sc. Course:BOTANY

## SEMESTER IV THEORY

| Course Code                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Title           | Credits                     |
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| USBO401                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | PLANT DIVERSITY | 2 Credits<br>(45 lectures ) |
| <b><u>Unit I : Thallophyta: Fungi, Plant Pathology and Lichens Fungi</u></b> <ul style="list-style-type: none"><li>• General characters of Ascomycetae</li><li>• Structure, life cycle and systematic position of <i>Erysiphe</i> and <i>Xylaria</i></li><li>• Plant Pathology- Symptoms, causative organism, disease cycle and control measures of o Powdery mildew and Late blight of potato</li><li>• Lichens- Classification, Structure, Method of Reproduction, Economic Importance and Ecological Significance of Lichens.</li></ul> |                 | 15 Lectures                 |
| <b><u>Unit II: Pteridophyta and Paleobotany Pteridophyta-</u></b> <ul style="list-style-type: none"><li>• Salient features and classification upto orders (with examples of each) of Psilophyta and Lepidophyta (G M Smith's system of classification to be followed)</li><li>• Structure, life cycle and systematic position of <i>Selaginella</i></li><li>• Paleobotany- The geological time scale; Formation and types of fossils; Structure and systematic position of form genus <i>Rhynia</i></li></ul>                              |                 | 15 Lectures                 |
| <b><u>Unit III : Gymnosperms</u></b> <ul style="list-style-type: none"><li>• Salient features, classification up to orders (with examples of each) and economic importance of Coniferophyta (Chamberlain's system of classification to be followed)</li><li>• Structure life cycle and systematic position of <i>Pinus</i></li><li>• Structure and systematic position of the form genus <i>Cordaitea</i></li></ul>                                                                                                                        |                 | 15 Lectures                 |

# Syllabus for the S.Y.B.Sc. Program: B.Sc.Course : BOTANY

## SEMESTER IV PRACTICAL

| Semester III USBOP4<br>PRACTICAL Paper I – Plant Diversity II                                                                                                                                                                                                                                                                                                                  | Cr<br>1 |
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| <b>Fungi and Plant Pathology</b><br>1 Study of stages in the life cycle of <i>Erysiphe</i> from fresh/ preserved material and permanent slides.<br>2 Study of stages in the life cycle of <i>Xylaria</i> from fresh/ preserved material and permanent slides.<br>3 Study of fungal diseases as prescribed for theory.<br>4 Study of Lichens (crustose, foliose, & fruiticose). |         |
| <b>Pteridophyta and Palaeobotany</b><br>5-6 Study of stages in the life cycle of <i>Selaginella</i> from fresh/ preserved material and permanent slides.<br>7 Study of form genera <i>Rhynia</i> with the help of permanent slides/ photomicrographs.                                                                                                                          |         |
| <b>Gymnosperms</b><br>8- Study of stages in the life cycle of <i>Pinus</i> from fresh/ preserved material and permanent slides.<br>9- Study of the form genus <i>Cordaitea</i> with the help of permanent slide/ photomicrographs.                                                                                                                                             |         |

## Syllabus for the S.Y.B.Sc. Program: B.Sc.Course : BOTANY

| Course Code                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | SEM III- Title                     | Credits                             |
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| USBO302                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b><u>FORM AND FUNCTION II</u></b> | <b>2 Credits<br/>(45 lectures )</b> |
| <b><u>Unit II : Cell Biology</u></b> <ul style="list-style-type: none"> <li>• Ultra Structure and functions of the following cell organelles: <ul style="list-style-type: none"> <li>○ Mitochondrion(membranes, cristae, F1 particles and matrix)</li> <li>○ Peroxisomes and Glyoxysomes</li> <li>○ Ribosomes (prokaryotic, eukaryotic and subunits)</li> </ul> </li> <li>• Cell Division and its significance <ul style="list-style-type: none"> <li>○ Cell Cycle, structure of Interphase Nucleus(nuclear envelop, chromatin network, nucleolus and nucleoplasm)</li> <li>○ Mitosis &amp; Meiosis</li> <li>○ Differences between Mitosis and Meiosis</li> </ul> </li> <li>• Nucleic Acids: Types, structure and functions of DNA and RNA</li> </ul>                                                                                                                                                                                                                                                                                                                       |                                    | <b>15 Lectures</b>                  |
| <b><u>Unit III : Cytogenetics</u></b> <ul style="list-style-type: none"> <li>• <b>Variation in Chromosome structure (Chromosomal Aberrations)</b><br/>Definition, Origin, Cytological and Genetic Effects of the following: Deletions, Duplications, Inversions and Translocations.</li> <li>• <b>Sex determination, Sex linked, sex influenced and sex limited traits :</b><br/><b>Sex determination-</b> Chromosomal Methods: heterogametic males and heterogametic females. Sex determination in monoecious and dioecious plants. Genic Balance Theory of sex determination in <i>Drosophila</i>, Lyon's Hypothesis of X chromosome inactivation.<br/><b>Sex linked-</b> eye colour in <i>Drosophila</i>, Haemophilia, colour blindness<br/><b>Sex influenced-</b> baldness in man</li> <li>• <b>Extranuclear Genetics</b><br/>Organelle heredity- <ul style="list-style-type: none"> <li>○ Chloroplast determines heredity - Plastid transmission in plants, Streptomycin resistance in <i>Chlamydomonas</i>.</li> <li>○ Male sterility in maize</li> </ul> </li> </ul> |                                    | <b>15 Lectures</b>                  |
| <b><u>Unit III : Molecular Biology</u></b> <ul style="list-style-type: none"> <li>• <b>DNA replication :</b> Modes of Replication, Messelson and Stahl Experiment,<br/><b>DNA replication in prokaryotes and eukaryotes-</b> enzymes involved and molecular mechanism of replication.</li> <li>• <b>Protein Synthesis:</b> <ul style="list-style-type: none"> <li>○ Central dogma of Protein synthesis</li> <li>○ Transcription in prokaryotes and eukaryotes: promoter sites, initiation, elongation and termination.</li> <li>○ RNA processing: Adenylation &amp; Capping.</li> </ul> </li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                    | <b>15 Lectures</b>                  |

# Syllabus for the S.Y.B.Sc. Program: B.Sc.Course : BOTANY

| Course Code | SEM IV-Title | Credits |
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## Syllabus for the S.Y.B.Sc. Program: B.Sc.Course : BOTANY

| USBO402                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <u>FORM AND FUNCTION II</u> | 2 Credits<br>(45 lectures ) |
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| <b><u>Unit I : Anatomy</u></b> <ul style="list-style-type: none"> <li>• Normal Secondary Growth in Dicotyledonous stem and root.</li> <li>• Growth rings, periderm, lenticels, tyloses, heart wood and sap wood.</li> <li>• Mechanical Tissue system                             <ul style="list-style-type: none"> <li>○ Tissues providing mechanical strength and support and their disposition</li> <li>○ I-girders in aerial and underground organs</li> </ul> </li> <li>• Types of Vascular Bundles.</li> </ul>                                                             |                             | <b>15 Lectures</b>          |
| <b><u>Unit II : Plant Physiology and Plant Biochemistry</u></b> <ul style="list-style-type: none"> <li>• <b>Respiration: Aerobic:</b> Glycolysis, TCA Cycle, ETS &amp; Energetic of respiration; Anaerobic respiration.</li> <li>• <b>Photorespiration</b></li> <li>• <b>Photoperiodism:</b> Phytochrome Response and Vernalization with reference to flowering in higher plants, Physico-chemical properties of phytochrome, Pr-Pfr interconversion, role of phytochrome in flowering of SDPs and LDPs;</li> <li>• <b>Vernalization</b> mechanisms and applications.</li> </ul> |                             | <b>15 Lectures</b>          |
| <b><u>Unit III : Ecology and Environmental Botany</u></b> <ul style="list-style-type: none"> <li>• Biogeochemical Cycles- Carbon, Nitrogen and Water.</li> <li>• Ecological factors: Concept of environmental factors. Soil as an edaphic factor, Soil composition, types of soil, soil formation, soil profile.</li> <li>• Community ecology- Characters of community - Quantitative characters and qualitative characters</li> </ul>                                                                                                                                           |                             | <b>15 Lectures</b>          |

## Syllabus for the S.Y.B.Sc. Program: B.Sc.Course : BOTANY

| Semester III USBOP3                        |                                                                                                                                                                           | Cr |
|--------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| PRACTICAL Paper II – FORM AND FUNCTION- II |                                                                                                                                                                           | 1  |
| <b>Cell Biology</b>                        |                                                                                                                                                                           |    |
| 1                                          | Study of the ultra-structure of cell organelles prescribed for theory from Photomicrographs                                                                               |    |
| 2                                          | Estimation of DNA from plant material (one Std & one Unknown, No Std Graph)                                                                                               |    |
| 3                                          | Estimation of RNA from plant material (one Std & one Unknown, No Std Graph)                                                                                               |    |
| <b>Cytogenetics</b>                        |                                                                                                                                                                           |    |
| 4                                          | Study of inheritance pattern with reference to Plastid Inheritance                                                                                                        |    |
| 5                                          | Study of cytological consequences of chromosomal aberrations (Laggards, Chromosomal Bridge, Ring chromosome, Chromosomal ring) from permanent slides or photomicrographs. |    |
| 6                                          | Study of mitosis and meiosis from suitable plant material                                                                                                                 |    |
| <b>Molecular Biology</b>                   |                                                                                                                                                                           |    |
| 7                                          | DNA sequencing- Sanger’s method                                                                                                                                           |    |
| 8                                          | Determining the sequence of amino acids in the protein molecule synthesised from the given m-RNA strand (prokaryotic and eukaryotic)                                      |    |

## Syllabus for the S.Y.B.Sc. Program: B.Sc.Course : BOTANY

| SEMESTER IV USBOT P4<br>PRACTICALS Paper II – FORM AND FUNCTION- II                                                                     |  | Cr<br>1 |
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| <b>Anatomy</b>                                                                                                                          |  |         |
| 1 Study of normal secondary growth in the stem and root of a Dicotyledonous plant                                                       |  |         |
| 2 Types of mechanical tissues, mechanical tissue system in aerial, underground organs.                                                  |  |         |
| 3 Study of conducting tissues- Xylem and phloem elements in Gymnosperms and Angiosperms as seen in LS and through maceration technique. |  |         |
| 4 Study of different types of vascular bundles.                                                                                         |  |         |
| 5 Growth rings, periderm, lenticels, tyloses, heart wood and sap wood                                                                   |  |         |
| <b>Plant Physiology and Plant Biochemistry</b>                                                                                          |  |         |
| 6 $Q_{10}$ – germinating seeds using Phenol red indicator                                                                               |  |         |
| 7 NR activity – <i>in-vivo</i>                                                                                                          |  |         |
| 8 Estimation of proteins by Lowry's method (Prepare standard graph).                                                                    |  |         |
| <b>Ecology and Environmental Botany</b>                                                                                                 |  |         |
| 9 Study of the working of the following Ecological Instruments- Soil thermometer, Soil testing kit, Soil pH, Wind anemometer.           |  |         |
| 10 Mechanical analysis of soil by the sieve method & pH of soil.                                                                        |  |         |
| 11 Quantitative estimation of organic matter of the soil by Walkley and Blacks Rapid titration method.                                  |  |         |
| 12 Study of vegetation by the list quadrat method                                                                                       |  |         |

# **Syllabus for the S.Y.B.Sc. Program: B.Sc.Course : BOTANY**

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| <b>S.Y.B.Sc.</b>                                                                                                                       | <b>BOTANY PRACTICAL SKELETON PAPER</b> | <b>SEMESTER - III</b>   |
| <b>TIME - 3 hours</b>                                                                                                                  | <b>PAPER – II</b>                      | <b>Total Marks – 50</b> |
| Q.1. Make a squash/ smear preparation of specimen 'A'. Draw and comment on your observations and show the slides to examiners.<br>(10) |                                        |                         |
| Q.2. To estimate DNA/ RNA from the given sample 'B'.                                                                                   |                                        | (10)                    |
| Q.3. Determine the sequence of bases in a DNA strand by Sanger's method from the given data 'C'                                        |                                        |                         |
| <b>OR</b>                                                                                                                              |                                        |                         |
| Determine the sequence of amino acids in the polypeptide synthesized from the given m-RNA strand                                       |                                        | 'C'                     |
| (10)                                                                                                                                   |                                        |                         |
| Q.4. Identify and describe the specimen/ photograph - D, E and F                                                                       |                                        | (15)                    |
| Q.5.<br>(05)                                                                                                                           | Journal/Field                          | Report.                 |

## **KEY :**

- A. – Mitosis/ Meiosis
- B. Germinating seeds/Onion
- C. DNA seq/AA seq.
- D. Cell organelles
- E. Plastid inheritance
- F. Chromosomal aberrations

**Syllabus for the S.Y.B.Sc. Program: B.Sc.Course : BOTANY**

# UNIVERSITY OF MUMBAI

**S.Y.B.Sc. BOTANY PRACTICAL SKELETON PAPER**

**SEMESTER - IV**

**TIME - 2 hours 15 min**

## PAPER – II

**Total Marks – 50**

- Q.1. a). Make a temporary stained preparation of T.S. of specimen ‘A’ and comment on the secondary growth/ mechanical tissue system/ Macerate the given material ‘A’ and describe the conducting tissue seen. (10)
- Q.2. Perform the Physiological experiment ‘B’ allotted to you. (13)
- Q.3. Perform the Ecological experiment ‘C’ allotted to you. (13)
- Q.4. Identify and describe the specimen/ slide/ photograph - ‘D’ ‘E’ and ‘F’ . (06)
- Q.5. Viva - Voce. (05)

**KEY :**

- A. – Dicot stem/ dicot root / Mechanical Tissue (*Coleus stem, Typha leaf, Maize stem and Maize root /Annona / Magnolia* for maceration).
- B. – Q<sub>10</sub> – germinating seeds using Phenol red indicator  
NR activity – *in-vivo*  
Estimation of proteins by Lowry's method
- C- Mechanical analysis of soil by the sieve method & pH of soil  
Estimation of organic matter of the soil  
Study of vegetation by the list quadrat method
- D - Vascular bundles
- E. – Growth rings, periderm, lenticels, tyloses, heart wood and sap wood
- F. – Ecological Instrument

**PROPOSED SYBSC SYLLABUS FOR ACADEMIC YEAR 2017-18**

| Course Code                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Title                              | Credits                    |
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| USBO303                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | CURRENT TRENDS IN PLANT SCIENCES I | 2 Credits<br>(45 lectures) |
| <b>Unit1: Pharmacognosy and phytochemistry</b> <ul style="list-style-type: none"> <li>• Introduction to pharmacopoeia</li> <li>• Indian pharmacopoeia, Indian Herbal Pharmacopoeia and Ayurvedic Pharmacopoeia</li> <li>• Study of Monograph from pharmacopoeia</li> <li>• Secondary Metabolites: Sources, properties, uses and adulterants, regional and seasonal variations</li> <li>• Adulterants: <i>Saraca asoca</i>, <i>Polyalthia longifolia</i><br/><i>Terminalia arjuna</i>, <i>Terminalia tomentosa</i><br/><i>Bacopa monnieri</i>, <i>Centella asiatica</i><br/><i>Abrus</i>, <i>Glycyrrhiza</i><br/><i>Phyllanthus amarus</i> (<i>Bhuiamla</i>)</li> </ul> |                                    | 15 Lectures                |
| <b>Unit 2: Forestry and Economic Botany</b> <ul style="list-style-type: none"> <li>• Forestry: Outline of types of forest in India</li> <li>• Forestry: Agro-forestry, Urban forestry, organic farming, Silviculture</li> <li>• Economic Botany:</li> <li>• Types of fibers: Jute and cotton,</li> <li>• Current trends in Fiber industries</li> <li>• Spices and condiments: Saffron and cardamom</li> <li>• Commercial market of spices</li> </ul>                                                                                                                                                                                                                   |                                    | 15 Lectures                |
| <b>Unit 3: Industry based on plant products</b> <ul style="list-style-type: none"> <li>• Aromatherapy- Introduction, Uses with few examples.<br/>Jojoba, lemon, jasmin</li> <li>• Botanical and nutraceuticals -<i>Spirulina</i>, <i>Vanillin</i>, <i>Garcinia indica</i>/<br/><i>Garcinia cambogia</i>, <i>Chlorella</i>, and <i>Kale</i>.</li> <li>• Enzymes industry: Cellulases, Papain, Bromelain</li> <li>• Biofuels.</li> </ul>                                                                                                                                                                                                                                 |                                    | 15 Lectures                |

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|          | <p style="text-align: right;"><b>Semester III USBOP3</b></p> <p style="text-align: right;"><b>Cr 1</b></p> <p style="text-align: center;"><b>PRACTICAL - Paper III CURRENT TRENDS IN PLANT SCIENCES I</b></p>          |
| <b>1</b> | <p>Study of <i>Phyllanthus amarus</i></p> <p><i>Saraca asoka</i></p> <p><i>Bacopa monieri</i></p>                                                                                                                      |
| <b>2</b> | <p>Study of biodiversity<br/>(Visit to National Park/ Botanical Garden)</p> <p>Sources of : Fibres &amp; Paper</p> <p>Spices &amp; condiments</p> <p>Preparation of herbal cosmetics (Face pack/ De-tanning cream)</p> |
| <b>3</b> | Estimation of crude fibre in cereals & their products                                                                                                                                                                  |
| <b>4</b> | Preparation & evaluation of probiotic foods                                                                                                                                                                            |
| <b>5</b> | Evaluation of nutraceutical value of mushroom/ wheat germ                                                                                                                                                              |

| Course Code                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Title                              | Credits                    |
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| USBO403                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | CURRENT TRENDS IN PLANT SCIENCES I | 2 Credits<br>(45 lectures) |
| <b><u>Unit I : Horticulture and Gardening</u></b> <b>Introduction to Horticulture:</b> Branches of Horticulture <b>Gardening:</b> <ul style="list-style-type: none"> <li>• Locations in the garden- edges, hedges, lawn, flower beds, avenue, water garden (with names of two plants for each category).<br/>Focal point.</li> <li>• <b>Types of garden</b> <ul style="list-style-type: none"> <li>○ Formal and informal gardens</li> <li>○ National Park: Sanjay Gandhi National Park.</li> <li>○ Botanical Garden: Veer Mata Jijabai Udyan (Victoria Garden).</li> </ul> </li> </ul>                        |                                    | 15 Lectures                |
| <b><u>Unit II : Biotechnology</u></b> <ul style="list-style-type: none"> <li>• <b>Introduction to plant tissue culture</b> <ul style="list-style-type: none"> <li>○ Laboratory organization and techniques in plant tissue culture</li> <li>○ Totipotency</li> <li>○ Organogenesis</li> <li>○ Organ culture – root cultures, meristem cultures, anther and pollen culture, embryo culture.</li> </ul> </li> <li>• <b>R-DNA technology-</b> <ul style="list-style-type: none"> <li>○ Gene cloning</li> <li>○ Enzymes involved in Gene cloning</li> <li>○ Vectors used for Gene cloning.</li> </ul> </li> </ul> |                                    | 15 Lectures                |
| <b><u>Unit III : Biostatistics and Bioinformatics</u></b> <ul style="list-style-type: none"> <li>• <b>Biostatistics:</b> <ul style="list-style-type: none"> <li>○ The chi square test.</li> <li>○ Correlation – Calculation of coefficient of correlation.</li> </ul> </li> <li>• <b>Bioinformatics</b> ○ Information technology: History and tools of IT, Internet and its uses.</li> </ul>                                                                                                                                                                                                                  |                                    | 15 Lectures                |

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| <ul style="list-style-type: none"> <li>○ Introduction to Bioinformatics- goal, need, scope and limitation</li> <li>○ Aims of Bioinformatics: Data organization, Tools of Bioinformatics- tools for web search, Data retrieval tools- Entrez,</li> <li>○ BLAST</li> <li>○ Bioinformatics programme in India.</li> </ul> |  |
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| Semester III USBOP3                                      |                                                                                            | Cr 1 |
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| PRACTICAL - Paper III CURRENT TRENDS IN PLANT SCIENCES I |                                                                                            |      |
| Horticulture                                             |                                                                                            |      |
| 1                                                        | Study of five examples of plants for each of the garden locations as prescribed for theory |      |
| 2                                                        | Preparation of garden plans – formal and informal gardens                                  |      |
| 3                                                        | Bottle and dish garden preparation.                                                        |      |
| <b>Biotechnology</b>                                     |                                                                                            |      |
| 4                                                        | Various sterilization techniques                                                           |      |
| 5                                                        | Preparation of Stock solutions, Preparation of MS medium.                                  |      |
| 6                                                        | Seed sterilization, callus induction                                                       |      |
| 7                                                        | Regeneration of plantlet from callus.                                                      |      |
| 8                                                        | Identification of the cloning vectors – pBR322, pUC 18, Ti plasmid.                        |      |
| <b>Biostatistics and Bioinformatics</b>                  |                                                                                            |      |
| 9                                                        | Chi square test                                                                            |      |
| 10                                                       | Calculation of coefficient of correlation                                                  |      |
| 11                                                       | Web Search – Google, Entrez.                                                               |      |
| 12                                                       | BLAST                                                                                      |      |