

**UNIVERSITY OF MUMBAI**



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

(Credit Based Semester and Grading System with  
effect from the academic year 2015–2016)

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

**S.Y.B.Sc. Botany Syllabus**  
**Restructured for Credit Based and Grading System**  
**To be implemented from the Academic year 2015-2016**

## SEMESTER III

Course Code	UNIT	TOPICS	Credits	L / Week
USBO301	<b><u>PLANT DIVERSITY II</u></b>			
	I	Thallophyta- Algae	2	1
	II	Bryophyta		1
	III	Angiosperms		1
USBO302	<b><u>FORM AND FUNCTION II</u></b>			
	I	Instrumentation and Techniques	2	1
	II	Cell Biology		1
	III	Cytogenetics		1
USBO303	<b><u>CURRENT TRENDS IN PLANT SCIENCES I</u></b>			
	I	Pharmacognosy & Phytochemistry	2	1
	II	Forestry & Economic Botany		1
	III	Molecular Biology		1
USBOP3	Practical based on all the three courses in theory		3	9

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

## SEMESTER IV

Course Code	UNIT	TOPICS	Credits	L / Week
<b>USBO401</b>	<b><u>PLANT DIVERSITY II</u></b>			
	<b>I</b>	<b>Thallophyta: Fungi, Plant Pathology and Lichens</b>	<b>2</b>	<b>1</b>
	<b>II</b>	<b>Pteridophyta and Paleobotany</b>		<b>1</b>
	<b>III</b>	<b>Gymnosperms</b>		<b>1</b>
<b>USBO402</b>	<b><u>FORM AND FUNCTION II</u></b>			
	<b>I</b>	<b>Anatomy</b>	<b>2</b>	<b>1</b>
	<b>II</b>	<b>Physiology and Plant Biochemistry</b>		<b>1</b>
	<b>III</b>	<b>Ecology and Environmental Botany</b>		<b>1</b>
<b>USBO403</b>	<b><u>CURRENT TRENDS IN BOTANY I</u></b>			
	<b>I</b>	<b>Horticulture</b>	<b>2</b>	<b>1</b>
	<b>II</b>	<b>Biotechnology</b>		<b>1</b>
	<b>III</b>	<b>Biostatistics &amp; Bioinformatics</b>		<b>1</b>
<b>USBOP4</b>	Practical based on all the three courses in theory		<b>3</b>	<b>9</b>

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

## SEMESTER III THEORY

Course Code	Title	Credits
<b>USBO301</b>	<b><u>PLANT DIVERSITY II</u></b>	<b>2 Credits (45 lectures )</b>
<p><b><u>Unit I : Thallophyta- Algae</u></b></p> <ul style="list-style-type: none"> <li>• General Characters of Division Phaeophyta: Distribution, Cell structure, pigments, reserve food, range of thallus, reproduction: asexual and sexual, Alternation of Generations, Economic Importance.</li> <li>• Structure, life cycle and systematic position of <i>Dictyota</i> <i>Sargassum</i></li> <li>• Pigments in Algae.</li> </ul>		<b>15 Lectures</b>
<p><b><u>Unit II : Bryophyta</u></b></p> <ul style="list-style-type: none"> <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>		<b>15 Lectures</b>
<p><b><u>Unit III : Angiosperms</u></b> <b><u>Morphology of Flowering Plants</u></b></p> <ul style="list-style-type: none"> <li>• <b>Flower Morphology :</b> <ul style="list-style-type: none"> <li>○ Parts of a flower, flower symmetry;</li> <li>○ Flower as a modified shoot,</li> <li>○ Thalamus, insertion of floral leaves on the thalamus</li> <li>○ The accessory whorls : Calyx types and modifications, Corolla – forms; Aestivation, The Perianth;</li> <li>○ The Essential whorls: Androecium parts of the androecium, Number and insertion of stamens, Union of stamens; Types of CoronaGynoecium: the carpel, style and stigma; Union of Carpel; ovary- placentation, types of ovules, evolution of placenta in Angiosperm.</li> <li>○ Floral formula, floral diagram.</li> </ul> </li> <li>• With the help of Bentham and Hooker’s system <b>of classification for flowering plants</b> study the vegetative, floral characters and economic importance of the following families:               <ul style="list-style-type: none"> <li>○ Magnoliaceae</li> <li>○ Myrtaceae</li> <li>○ Asteraceae</li> <li>○ Apocynaceae</li> <li>○ Amaranthaceae</li> <li>○ Palmae</li> </ul> </li> </ul>		<b>15 Lectures</b>

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

Course Code	Title	Credits
<b>USBO302</b>	<b><u>FORM AND FUNCTION II</u></b>	<b>2 Credits (45 lectures )</b>
<b><u>Unit I : Instrumentation and Techniques</u></b> <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>		<b>15 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</li> <li>○ Peroxisomes</li> <li>○ Glyoxysomes</li> <li>○ Ribosomes</li> </ul> </li> <li>• Cell Division and its significance <ul style="list-style-type: none"> <li>○ Cell Cycle</li> <li>○ Mitosis &amp; Meiosis</li> <li>○ Differences between Mitosis and Meiosis</li> </ul> </li> <li>• Nucleic Acids: Types, structure and functions of <ul style="list-style-type: none"> <li>○ DNA</li> <li>○ RNA</li> </ul> </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> Definition, Origin, Cytological and Genetic Effects of the following: Deletions, Duplications, Inversions and Translocations.</li> <li>• <b>Variation in Chromosome Number</b> Origin and production, morphological and cytological features, applications in crop improvement and evolution of Aneuploids and Euploids (Monoploids, Autopolyploids and allopolyploids)</li> <li>• <b>Extranuclear Genetics</b> Organelle heredity- <ul style="list-style-type: none"> <li>○ Chloroplast determines heredity -Plastid transmission in plants, Streptomycin resistance in <i>Chlamydomonas</i>.</li> <li>○ Mitochondrion determined heredity- petite colonies in yeast</li> </ul> </li> </ul>		<b>15 Lectures</b>

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

Course Code	Title	Credits
<b>USBO303</b>	<b><u>CURRENT TRENDS IN PLANT SCIENCES I</u></b>	<b>2 Credits (45 lectures )</b>
<b><u>Unit I : Pharmacognosy and Phytochemistry</u></b> <ul style="list-style-type: none"> <li>● Introduction to pharmacopoeia</li> <li>● Study of secondary metabolites (sources, properties and uses) with reference to                             <ul style="list-style-type: none"> <li>○ Alkaloids,</li> <li>○ Glycosides,</li> <li>○ Tannins,</li> <li>○ Volatile oils and</li> <li>○ Gums and resins (example of one plant for each category)</li> </ul> </li> </ul>		<b>15 Lectures</b>
<b><u>Unit II : Forestry and Economic Botany</u></b> <ul style="list-style-type: none"> <li>● <b>Types of forests</b> – classification of forests, different types of forests in India</li> <li>● <b>Applications of forestry</b>- Social forestry, Reforestation, Aforestation, Deforestation.</li> <li>● <b>Economic Botany:</b> <ul style="list-style-type: none"> <li>○ Fibres: Types of fibres, fibre yielding plants</li> <li>○ Paper: Types of paper, paper yielding plants, paper processing.</li> <li>○ Spices and condiments: Nutmeg, Mace, Clove, Cardamom and Saffron</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> : Replication(prokaryotic and eukaryotic)</li> <li>● <b>Protein Synthesis:</b> <ul style="list-style-type: none"> <li>○ Central dogma of Protein synthesis</li> <li>○ Transcription: The transcription process in prokaryotes and eukaryotes, RNA synthesis, 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

## SEMESTER III

### PRACTICAL

<b>Semester III USBOP3</b>		<b>Cr</b>
<b>PRACTICAL Paper I – Plant Diversity II</b>		<b>1</b>
<b>Algae</b>		
1. Study of stages in the life cycle of <i>Dictyota</i> from fresh/ preserved material and permanent slides.		
2. Study of stages in the life cycle of <i>Sargassum</i> from fresh/ preserved material and permanent slides.		
3. Economic importance and range of thallus in Phaeophyta		
<b>Bryophyta</b>		
4. Study of stages in the life cycle of <i>Anthoceros</i> from fresh/ preserved material and permanent slides.		
5. Study of stages in the life cycle of <i>Funaria</i> from fresh/ preserved material and permanent slides.		
<b>Angiosperms</b>		
6. Study of Floral Morphology		
7- Study of one plant from each family prescribed for theory: morphological		
9. peculiarities and economic importance of the members of these families.		

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<b>Semester III USBOP3</b>	<b>Cr</b>
<b>PRACTICAL Paper II – FORM AND FUNCTION- II</b>	<b>1</b>
<b>Instrumentation and Techniques</b>	
1 Preparation of herbarium and wet preservation technique	
2 Chromatography: Separation of amino by circular paper chromatography	
3 Separation of Carotenoids by thin layer chromatography	
4 Horizontal and Vertical Gel Electrophoresis – Demonstration	
<b>Cell Biology</b>	
5 Study of the ultra-structure of cell organelles prescribed for theory from Photomicrographs	
6 Estimation of DNA from plant material (one Std& one Unknown, No Std Graph)	
7 Estimation of RNA from plant material (one Std& one Unknown, No Std Graph)	
<b>Cytogenetics</b>	
8 Study of inheritance pattern with reference to Plastid Inheritance	
9 Aberrations --- karyotypes - Cri – du- chat, Philadelphia, D-G translocation, Down Syndrome.	

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

Semester III USBOP3		Cr
PRACTICAL - Paper III CURRENT TRENDS IN PLANT SCIENCES I		1
<b>Pharmacognosy</b>		
1 A. Tests for alkaloids from <i>Strychnos</i> (seeds) and <i>Holarrhena</i> (bark)		
B. Tests for glycosides from <i>Glycyrrhiza</i> rhizome/ <i>Aloe</i> leaf/ <i>Senna</i> leaf.		
2 Preparation of any herbal cosmetic.( Demonstration)		
3 Stomatal Index		
4 Palisade Ratio, Vein islet number		
<b>Forestry and Economic Botany</b>		
5 Study of Biodiversity Composition of different types of forests in India (tropical, subtropical & temperate)		
6 Sources, properties and uses of : fibres & paper		
7 Sources , properties and uses of spices and condiments		
<b>Molecular Biology</b>		
8 DNA sequencing- Sanger's method		
9 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 THEORY

Course Code	Title	Credits
USBO401	<u>PLANT DIVERSITY II</u>	2 Credits (45 lectures )
<p><b><u>Unit II : Thallophyta: Fungi, Plant Pathology and Lichens</u></b></p> <p><b><u>Fungi-</u></b></p> <ul style="list-style-type: none"> <li>• General characters of Ascomycetae</li> <li>• Structure, life cycle and systematic position of <i>Erysiphe and Xylaria</i></li> </ul> <p><b><u>Plant Pathology-</u></b></p> <ul style="list-style-type: none"> <li>• Symptoms, causative organism, disease cycle and control measures of               <ul style="list-style-type: none"> <li>○ Powdery mildew and</li> <li>○ Late blight of potato</li> </ul> </li> </ul> <p><b><u>Lichens-</u></b></p> <ul style="list-style-type: none"> <li>• Classification, Structure, Method of Reproduction, Economic Importance and Ecological Significance of Lichens.</li> </ul>		<b>15 Lectures</b>
<p><b><u>Unit II : Pteridophyta and Paleobotany</u></b></p> <p><b><u>Pteridophyta-</u></b></p> <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> </ul> <p><b><u>Paleobotany-</u></b></p> <ul style="list-style-type: none"> <li>• The geological time scale;</li> <li>• Formation and types of fossils;</li> <li>• Structure and systematic position of form genus <i>Rhynia</i></li> </ul>		<b>15 Lectures</b>
<p><b><u>Unit III : Gymnosperms</u></b></p> <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>Cordaites</i></li> </ul>		<b>15 Lectures</b>

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Course Code	Title	Credits
<b>USBO402</b>	<b><u>FORM AND FUNCTION II</u></b>	<b>2 Credits (45 lectures )</b>
<b><u>Unit I : Anatomy</u></b> <ul style="list-style-type: none"> <li>• Normal Secondary Growth in Dicotyledonous stem and root.</li> <li>• Secondary growth in Monocot stem – <i>Dracaena</i>.</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>• Conducting tissue system : <ul style="list-style-type: none"> <li>○ Xylem and its elements,</li> <li>○ Phloem and its elements</li> <li>○ Types of Vascular Bundles.</li> </ul> </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>

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Course Code	Title	Credits
<b>USBO403</b>	<b><u>CURRENT TRENDS IN PLANT SCIENCES I</u></b>	<b>2 Credits (45 lectures )</b>
<b><u>Unit I : Horticulture and Gardening</u></b> <ul style="list-style-type: none"> <li>• <b>Introduction to Horticulture:</b> Branches of Horticulture</li> <li>• <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). Focal point.</li> </ul> </li> <li>• <b>Types of gardens</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>		<b>15 Lectures</b>
<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>		<b>15 Lectures</b>
<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> <ul style="list-style-type: none"> <li>○ Information technology: History and tools of IT, Internet and its uses.</li> <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> </li> </ul>		<b>15 Lectures</b>

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

## SEMESTER IV PRACTICAL

Semester IV USBOTP4 PRACTICAL Paper I – Plant Diversity	Cr 1
<b>Fungi and Plant Pathology</b> <ol style="list-style-type: none"><li>1 Study of stages in the life cycle of <i>Erysiphe</i> from fresh/ preserved material and permanent slides.</li><li>2 Study of stages in the life cycle of <i>Xylaria</i> from fresh/ preserved material and permanent slides.</li><li>3 Study of fungal diseases as prescribed for theory.</li><li>4 Study of Lichens (crustose, foliose, &amp; fruiticose).</li></ol>	
<b>Pteridophyta and Palaeobotany</b> <ol style="list-style-type: none"><li>5-6 Study of stages in the life cycle of <i>Selaginella</i> from fresh/ preserved material and permanent slides.</li><li>7 Study of form genera <i>Rhynia</i> with the help of permanent slides/ photomicrographs.</li></ol>	
<b>Gymnosperms</b> <ol style="list-style-type: none"><li>8- Study of stages in the life cycle of <i>Pinus</i> from fresh/ preserved material and permanent slides.</li><li>9</li><li>10 Study of the form genus <i>Cordaites</i> with the help of permanent slide/ photomicrographs.</li></ol>	

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

<b>SEMESTER IV USBOT P4</b>	<b>Cr</b>
<b>PRACTICALS Paper II – FORM AND FUNCTION- II</b>	<b>1</b>
<b>Anatomy</b>	
1 Study of normal secondary growth in the stem and root of a Dicotyledonous plant	
2 Study of secondary growth in monocot stem ( <i>Dracena</i> ).	
3 Types of mechanical tissues, mechanical tissue system in aerial, underground organs.	
4 Study of conducting tissues- Xylem and phloem elements in Gymnosperms and Angiosperms as seen in LS and through maceration technique.	
5 Study of different types of vascular bundles.	
<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

<b>SEMESTER IV USBOP4</b>		<b>Cr</b>
<b>PRACTICALS - Paper III – CURRENT TRENTS IN PLANT SCIENCES</b>		<b>1</b>
<b>Horticulture</b>		
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	



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

## SEMESTER - III, , S.Y.B.Sc. BOTANY PRACTICAL SKELETON PAPER (PROPOSED)

TIME - 2 hours 15 min

PAPER – I

Total Marks – 50

- Q.1. Identify, Classify and describe specimen 'A' . Sketch neat and labeled diagram. (10)
- Q.2. Identify, Classify and describe specimen 'B' . Sketch neat and labeled diagram. (10)
- Q.3. Assign the specimen 'C' to its family giving reasons. Give the distinguishing characters, floral Diagram and floral formula. Sketch the L.S. of flower and T.S. of ovary. (10)
- Q.4. Identify and describe the specimen/ slide/ photograph - 'D', 'E', 'F', 'G' and 'H'. (15)
- Q.5. Journal. (05)

### KEY :

- A. – *Dictyota / Sargassum*  
B. – *Anthoceros / Funaria*  
C. Any Angiospermic Family as per syllabus.  
D. Algae – economic importance / range of thallus in Phaeophyta  
E. *Anthoceros / Funaria*  
F. Calyx / Corolla (any one type)  
G. Androecium / Gynoecium ( any one type)  
H. Economic importance or morphological peculiarity of any one family.
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## SEMESTER - III, , S.Y.B.Sc. BOTANY PRACTICAL SKELETON PAPER (PROPOSED)

TIME - 2 hours 15 min

PAPER – II

Total Marks – 50

- Q.1. To Separate given material 'A' by any appropriate chromatography technique . (10)
- Q.2. To estimate DNA/ RNA from the given sample 'B'. (10)
- Q.3. Make an Idiogram from the given Karyotype 'C'. Identify and enlist the symptoms of the chromosomal abberation. (10)
- Q.4. Identify and describe the specimen/ photograph - 'D' (05), 'E' (05) and 'F' (05 or 03 + 02). (15)
- Q.5. Field Report. (05)

### KEY :

- A. – Carotenoids/amino acids  
B. Cauliflower  
C. Cri-du-chat; Philadelphia; D-G translocation, Down Syndrome  
D. Electrophoresis  
E. Dry or wet preservation  
F. Cell organelles / Plastid inheritance.

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

## SEMESTER - III, , S.Y.B.Sc. BOTANY PRACTICAL SKELETON PAPER (PROPOSED)

TIME - 2 hours 15 min

PAPER – III

Total Marks – 50

- Q.1. a). Identify the active constituents present in specimen 'A' by performing suitable chemical tests. (08)
- Q.1. b). Calculate the stomatal index / palisade ratio / vein – islet numbers from the given specimen 'B'. (07)
- Q.2. Describe the ecological factors, enlist the dominant flora and mark the area on the map of a forest type 'C' . (10)
- Q.3. Determine the sequence of bases in a DNA strand by Sanger's method from the given data 'D' or Determine the sequence of amino acids in the polypeptide synthesized from the given m-RNA strand 'D' (08)
- Q.4. Identify and describe the specimen/ slide/ photograph - 'E', 'F', and 'G'. (12)
- Q.5. Viva - Voce. (05)

### KEY :

- A. Alkaloids / Glycosides.  
B. Betel leaf / *Vinca* leaf.  
E. Importance of \_\_\_\_\_ in herbal cosmetics.  
F. Fibres / Paper.  
G. Spices / Condiments.

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

## SEMESTER - IV, , S.Y.B.Sc. BOTANY PRACTICAL SKELETON PAPER (PROPOSED)

TIME - 2hours 15 min	PAPER – I	Total Marks – 50
Q.1. Identify, Classify and describe specimen 'A' . Sketch neat and labeled diagram.		(10)
Q.2. Identify, Classify and describe specimen 'B' . Sketch neat and labeled diagram.		(10)
Q.3. Identify, Classify and describe specimen 'C' .Sketch neat and labeled diagram.		(10)
Q.4. Identify and describe the specimen/ slide/ photograph -'D', 'E' and 'F' .		(15)
Q.5. Journal.		(05)

### KEY :

A. – *Xylaria / Erysiphe*

B. –*Selaginella – Stem / strobilus*

C. *Pinus – needle / stem / male cone.*

D. Fungal disease – Powdery mildew / any other disease as per syllabus.

E. Lichen.

F. *Rhynia / Cordaites.*

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## SEMESTER - IV, ,S.Y.B.Sc. BOTANY PRACTICAL SKELETON PAPER (PROPOSED)

TIME - 2hours 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 .		(10)
Q.1. b). Make a temporary stained preparation of T.S. of specimen 'B' and comment on the mechanical tissue system .		

OR

Macerate the given material 'B' and describe the conducting tissue seen.	(05)
Q.2. Perform the Physiological experiment 'C' allotted to you .	(12)
Q.3. Perform the Ecological experiment 'D' allotted to you .	(12)
Q.4. Identify and describe the specimen/ slide/ photograph - 'E', and 'F' .	(06)
Q.5. Viva - Voce.	(05)

### KEY :

A. – Dicot stem/ dicot root / monocot stem.

B. –Mechanical Tissue (*Coleus stem, Typha leaf, Maize stem and Maize root /Annona / Magnolia*formaceration).

E. – Vascular bundles / phloem/xXylem.

F. – Ecological Instrument.

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

## SEMESTER - IV, , S.Y.B.Sc. BOTANY PRACTICAL SKELETON PAPER (PROPOSED)

TIME - 2hours 15 min

PAPER – III

Total Marks – 50

- Q.1. Prepare a garden plan 'A' . Mention any three garden locations with suitable plants (Botanical names). (10)
- Q.2. Prepare MS medium **OR** Perform seed sterilization technique 'B' . (08)
- Q.3. a). Perform Chi- square test **OR** Coefficient of Correlation using the given data 'C' and analyse the results . (12)
- Q.3.b). Perform the experiment 'D' related to Web search. (06)
- Q.4.a). Identify and describe the specimen/ photograph -'E' (05)
- Q.4.b).** Identify and describe the specimen/ photograph - 'F', 'G' and 'H' . (09)

### **KEY :**

- E. Bottle or dish garden.
- F. Sterilization Technique.
- G. Cloning Vectors.
- H. Bioinformatics.