

University of Mumbai  
Board of Studies in Botany  
FYBSc Syllabus Credit System 2014-2015 onwards

**AC 7/4/2014**  
**Item No. 4.23**

Semester I USBO101		L	Cr
Paper I -- Plant Diversity 1		45	2
<b><u>UNIT I</u></b>		<b>15</b>	
<b><u>ALGAE</u></b>			
1	Structure, life cycle and systematic position of <i>Nostoc</i> and <i>Spirogyra</i> .		
2	Economic importance of Algae.		
<b><u>UNIT II</u></b>		<b>15</b>	
<b><u>FUNGI</u></b>			
1	Structure, life cycle and systematic position of <i>Rhizopus</i> and <i>Aspergillus</i>		
2	Economic importance of Fungi.		
3	Modes of nutrition in Fungi (Saprophytism and Parasitism).		
<b><u>UNIT III</u></b>		<b>15</b>	
<b><u>BRYOPHYTA</u></b>			
1	General characters of Hepaticae		
2	Structure, life cycle and systematic position of <i>Riccia</i> .		

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<b>Semester I</b> USBO102		<b>L</b>	<b>Cr</b>
<b>Paper II – Form and Function 1</b>		<b>45</b>	<b>2</b>
<b>UNIT I</b>		<b>15</b>	
<b>CELL BIOLOGY</b>			
1	General structure of plant cell: cell wall Plasma membrane (bilayer lipid structure, fluid mosaic model)		
2	Ultra structure and functions of the following cell organelles: Endoplasmic reticulum and Chloroplast		
<b>UNIT II</b>		<b>15</b>	
<b>ECOLOGY</b>			
1	Energy pyramids, energy flow in an ecosystem.		
2	Types of ecosystems: aquatic and terrestrial.		
<b>UNIT III</b>		<b>15</b>	
<b>GENETICS</b>			
1	Phenotype/Genotype, Mendelian Genetics- monohybrid, dihybrid; test cross; back cross ratios.		
2	Epistatic and non epistatic interactions; multiple alleles.		

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	<b>Semester I USBOP1</b>	<b>L</b>	<b>Cr</b>
	<b>PRACTICAL Paper I – Plant Diversity 1</b>	30	1
1	Study of stages in the life cycle of <i>Nostoc</i> from fresh/ preserved material and permanent slides.		
2	Study of stages in the life cycle of <i>Spirogyra</i> from fresh/ preserved material and permanent slides.		
3	Economic importance of algae: <i>Ulva</i> (Biofuel), <i>Spirulina</i> (Neutraceutical), <i>Gelidium</i> (Agar)		
4	Study of stages in the life cycle of <i>Rhizopus</i> from fresh/ preserved material and permanent slides.		
5	Study of stages in the life cycle of <i>Aspergillus</i> from fresh/ preserved material and permanent slides.		
6	Economic importance of Fungi: Mushroom , Yeast, wood rotting fungi (any bracket fungus).		
7	Study of stages in the life cycle of <i>Riccia</i> from fresh/ preserved material.		
8	Study of stages in the life cycle of <i>Riccia</i> with the help of permanent slides.		
	<b>PRACTICAL PAPER II- FORM AND FUNCTION 1</b>	30	1
1	Examining various stages of mitosis in root tip cells ( <i>Allium</i> )		
2	<b>Cell inclusions:</b> Starch grains (Potato and Rice); Aleurone Layer (Maize)		
3	Cystolith ( <i>Ficus</i> ); Raphides ( <i>Pistia</i> ); Sphaeraphides ( <i>Opuntia</i> ).		
4	Identification of cell organelles with the help of photomicrograph: Plastids: Chloroplast, Amyloplast, Endoplasmic Reticulum and Nucleus		
4	<b>Identification of plants adapted to different environmental conditions:</b> Hydrophytes: Floating: Free floating ( <i>Pistia/Eichornia</i> ); Rooted floating ( <i>Nymphaea</i> ); Submerged ( <i>Hydrilla</i> )		
5	Mesophytes (any common plant); Hygrophytes ( <i>Typha/Cyperus</i> )		

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6	Xerophytes : Succulent ( <i>Opuntia</i> ); Woody Xerophyte ( <i>Nerium</i> ); Halophyte ( <i>Avicennia</i> pneumatophore) No sections in ecology, only identification and description of specimens. Morphological adaptations only.		
7	Calculation of mean, median and mode.		
8	Calculation of standard deviation.		
9	Frequency distribution, graphical representation of data- frequency polygon, histogram, pie chart.		
10	Study of Karyotypes: Human: Normal male and female, <i>Allium cepa</i> .		

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<b>Semester II USBO201</b>		<b>Hrs</b>	<b>Cr</b>
<b>Paper I -- Plant Diversity 1</b>		<b>45</b>	<b>2</b>
<b>UNIT I</b>		<b>15</b>	
<b><u>PTERIDOPHYTES</u></b>			
1	Structure life cycle, systematic position and alternation of generations in <i>Nephrolepis</i>		
2	Stelar evolution		
<b>UNIT II</b>		<b>15</b>	
<b><u>GYMNOSPERMS</u></b>			
2	Structure life cycle systematic position and alternation of generations in <i>Cycas</i>		
3	Economic importance of Gymnosperms		
<b>Unit III</b>			
<b><u>ANGIOSPERMS</u></b>		<b>15</b>	
1.	Leaf: simple leaf, types of compound leaves, Incisions of leaf, venation, phyllotaxy, types of stipules, leaf apex, leaf margin, leaf base, leaf shapes. Modifications of leaf: spine, tendril, hooks, phyllode, pitcher, <i>Drosera</i> or insectivorous plants.		
2	Inflorescence: Racemose: simple raceme, spike, catkin, spadix, panicle. Cymose: monochasial, dichasial, polychasial. Compound: corymb, umbel, cyathium, capitulum, verticillaster, hypanthodium.		
3	Study of following families: Malvaceae, Amaryllidaceae.		

<b>Semester II USBO202</b>		<b>Hrs</b>	<b>Cr</b>
<b>Paper II – Form and Function 1</b>		<b>45</b>	<b>2</b>
<b>UNIT I</b>		<b>15</b>	
<b><u>ANATOMY</u></b>			
1	Simple tissues, complex tissues.		
2	Primary structure of dicot and monocot root, stem and leaf.		
3	Epidermal tissue system: types of hair, monocot and dicot stomata.		

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<b>UNIT II</b>		<b>15</b>	
<b>PHYSIOLOGY</b>			
1	Photosynthesis: Light reactions, photolysis of water, photophosphorylation (cyclic and non cyclic), carbon fixation phase (C <sub>3</sub> , C <sub>4</sub> and CAM pathways).		
<b>UNIT III</b>		<b>15</b>	
<b>MEDICINAL BOTANY</b>			
1	Concept of primary and secondary metabolites, difference between primary and secondary metabolites.		
2	Grandma's pouch: Following plants have to be studied with respect to botanical source, part of the plant used, active constituents present and medicinal uses: <i>Oscimum sanctum</i> , <i>Adathoda vasica</i> , <i>Zinziber officinale</i> , <i>Curcuma longa</i> , <i>Santalum album</i> , <i>Aloe vera</i> .		

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<b>Semester II USBOP2</b>		<b>Cr</b>
<b>PRACTICAL Paper I – Plant Diversity 1</b>		<b>1</b>
1	Study of stages in the life cycle of <i>Nephrolepis</i> : Mounting of ramentum, hydathode, T.S. of rachis.	
2	T.S. of pinna of <i>Nephrolepis</i> passing through sorus.	
3	Stelar evolution with the help of permanent slides: Protostele: haplostele, actinostele, plectostele, mixed protostele, siphonostele: ectophloic, amphiphloic, dictyostele, eustele and atactostele.	
4	<i>Cycas</i> : T.S of leaflet ( <i>Cycas</i> pinna)	
5	Megasporophyll, microsporophyll, coralloid root, microspore, L.S. of ovule of <i>Cycas</i> – all specimens to be shown.	
6	Economic importance of Gymnosperms: <i>Pinus</i> ( turpentine, wood, seeds)	
7	Leaf morphology : as per theory	
8	Types of inflorescence: as per theory	
9	Malvaceae	
10	Amaryllidaceae	
<b>PRACTICAL Paper II – Form and Function 1</b>		<b>1</b>
1	Primary structure of dicot and monocot root.	
2	Primary structure of dicot and monocot stem.	
3	Study of dicot and monocot stomata.	
4	Epidermal outgrowths: with the help of mountings Unicellular: <i>Gossypium</i> /Radish Multicellular: <i>Lantana</i> /Sunflower Glandular: <i>Drosera</i> and Stinging: <i>Urtica</i> – only identification with the help of permanent slides. Peltate: <i>Thespesia</i> Stellate: <i>Erythrina</i> / <i>Sida acuta</i> / <i>Solanum</i> / <i>Helecteris</i>	

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	T-shaped: <i>Avicennia</i>	
5	Separation of chlorophyll pigments by strip paper chromatography.	
6	Separation of amino acids by paper chromatography.	
7	Change in colour because of change in pH: Anthocyanin: black grapes/Purple cabbage	
8	Test for tannins: tea powder/catechu.	
9	Identification of plants or plant parts for grandma's pouch as per theory.	



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DISTRIBUTION OF TOPICS AND CREDITS  
F Y B Sc. BOTANY SEMESTER I

Course	Nomenclature	Credits	Topics
USBO1O1	PLANT DIVERSITY 1	02	1. Algae
			2. Fungi
			3. Bryophyta
USBO1O2	FORM AND FUNCTION I	02	1. Cell Biology
			2. Ecology
			3. Genetics
USBOP1	Plant Diversity I, form and Function I (Practical I & II)	02	

F Y B Sc BOTANY SEMESTER II

Course	Nomenclature	Credits	Topics
USBO2O1	PLANT DIVERSITY I	02	1. Pteridophytes
			2. Gymnosperms
			3. Angiosperms
USBO2O2	FORM AND FUNCTION I	02	1. Anatomy
			2. Physiology
			3. Medicinal Botany
USBOP2	Plant Diversity I, Form and Function I ( Practical I & II)	02	

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References

1. College Botany Volume I and II Gangulee, Das and Dutta latest edition. Central Education enterprises
2. Cryptogamic Botany Volume I and II by G M Smith McGraw Hill.
3. Genetics by Russel. Wesley Longman inc publishers. ( 5<sup>th</sup> edition)
4. Plant Physiology by Taiz and Zeiger Sinauer Associates inc. publishers
5. Fundamentals of Ecology by E P Odum and G W Barrett. Thompson Asia Pvt Ltd. Singapore.
6. Cell Biology by De Robertis

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**Scheme of Examinations**

Internal and External Assessment as per CBSS of University of Mumbai

Note:

- Two short field excursions for habitat studies are compulsory.  
Field work of not less than eight hours duration is equivalent to one period per week for a batch of 15 students.
- A candidate will be allowed to appear for the practical examinations only if he/she submits a certified journal of F.Y.B.Sc. Botany or a certificate from the Head of the department / Institute to the effect that the candidate has completed the practical course of F.Y.B.Sc. Botany as per the minimum requirements. In case of loss of journal a candidate must produce a certificate from the Head of the department /Institute that the practicals for the academic year were completed by the student. However such a candidate will be allowed to appear for the practical examination but the marks allotted for the journal will not be granted.