

Academic Council 25/05/2011

Item No. 4.52

**UNIVERSITY OF MUMBAI**



**Syllabus for the F.Y.B.Sc.**

**Program: B.Sc.**

**Course : Botany**

(Credit Based Semester and Grading System with  
effect from the academic year 2011–2012)

Course Code : USBOT101	Semester I	<b>L</b>	<b>Cr</b>
	Plant Diversity 1	<b>45</b>	<b>2</b>

<b>UNIT I</b>		<b>15</b>	
<b>MICROBIOLOGY</b>			
1	<b>BACTERIA</b> Size Shape and arrangement; Ultra-structure of bacterial cell; Growth and Reproduction (binary fission, endospore formation, conjugation). Significance of bacteria.		
2	<b>VIRUSES</b> General characters, size and shapes; Ultrastructure; Classification (Plant, animal & bacterial virus); Multiplication of bacteriophage T <sub>4</sub> . Significance of viruses.		
3	<b>FERMENTATION</b> Detailed account of fermentation process of alcohol and acetic acid		
<b>ALGAE</b>			
1	Structure, life cycle and systematic position of <i>Zygnema</i>		
2	Economic Importance of Algae with special reference to Biofertilizers and Food.		

<b>UNIT II FUNGI AND LICHENS</b>		<b>15</b>	
<b>FUNGI</b>			
1	Structure, life cycle and systematic position of <i>Rhizopus</i> and <i>Aspergillus</i>		
2	Modes of nutrition in Fungi: Saprophytism and Parasitism		
3	Economic Importance of Fungi		
<b>LICHENS</b>			
	Classification, Structure, Method of Reproduction, Economic Importance and Ecological Significance of Lichens.		

<b>UNIT III BRYOPHYTA</b>		<b>15</b>	
1	Structure life cycle, systematic position and alternation of generations in <i>Riccia</i>		

Course Code : USBOT102	Semester I	<b>L</b>	<b>Cr</b>
<b>Form and Function 1</b>		<b>45</b>	<b>2</b>

<b><u>UNIT I</u></b>		<b>15</b>	
<b><u>PLANT BIOCHEMISTRY AND PHYSIOLOGY</u></b>			
1	<b><u>ENZYMES</u></b> Classification, mode of action, enzyme specification and inhibition		
2	<b><u>WATER PLANT INTERACTION-</u></b> Structure and properties of water, the polarity of water; Water transport processes; Osmosis; Water potential.		
3	<b><u>MINERAL NUTRITION –</u></b> Essential nutrients, deficiencies and plant disorders; Treating nutrient deficiencies; Soil roots and microbes.		

<b><u>UNIT II</u></b>		<b>15</b>	
<b><u>CELL BIOLOGY</u></b>			
1	Ultra structure and functions of the cell wall Plasma membrane (bilayer lipid structure, fluid mosaic model)		
2	Ultra structure and functions of the following cell organelles: Mitochondrion and Chloroplast		
3	Ultra structure of the Interphase Nucleus		
4	Ultrastructure of Chromosome		

<b><u>UNIT III</u></b>		<b>15</b>	
<b><u>GENETICS</u></b>			
1	<b><u>GENETIC INHERITANCE –</u></b> Mendelian Inheritance: Dominance and Incomplete dominance Gene interaction: Non-epistatic interaction, Epistatic interaction – recessive epistasis, duplicate recessive epistasis, dominant epistasis and duplicate dominant epistasis.		
2	<b><u>SEX DETERMINATION-</u></b> Chromosomal sex determination: Heterogametic male – XX-XY (man, <i>Drosophila</i> , ) XX-XO (Grass-hopper); Heterogametic female – ZW-ZZ (fowl); Genetic Counselling		

	<b>Course Code : USBOTP1      Semester I</b>	<b>L</b>	<b>Cr</b>
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<b>PRACTICAL – Plant Diversity 1</b>		45	1
1	Gram staining of Bacteria and yeast		
2	Alcohol fermentation by Kuhne’s tube (demonstration only)		
3	Study of stages in the life cycle of <i>Zygnema</i> from fresh/ preserved material and permanent slides.		
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	Study of Crustose, Foliose and Fructicose Lichen		
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 - FORM AND FUNCTION 1</b>		30	1
1	Study of the activity of the enzyme amylase, effect of variation of substrate concentration.		
2	Immobilization of enzymes: Encapsulation		
3	Determination of solute potential by plasmolytic method		
4	Determination of chloride uptake		
5	Examination of electron micrographs of eukaryotic cells with special reference to cell organelles		
6	Examining various stages of mitosis in root tip cells ( <i>Allium</i> )		
7	Study of karyotypes:Normal male		
8	Study of karyotypes:Normal female		
9	Demonstration of <i>Drosophila</i> culture : Morphological differentiation of male and female <i>Drosophila</i>		

<b>Course Code : USBOT201</b>	<b>Semester II</b>	<b>Hrs</b>	<b>Cr</b>
<b>Plant Diversity 1</b>		<b>45</b>	<b>2</b>

<b><u>UNIT I</u></b>		<b>15</b>	
<b><u>PTERIDOPHYTES</u></b>			
1	Structure life cycle, systematic position and alternation of generations in <i>Nephrolepis</i>		
<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><u>Unit II</u></b>		<b>15</b>	
<b><u>ANATOMY</u></b>			
1.	Tissue Systems in plants: Introduction to various tissue systems in plants: Epidermal tissue system, epidermal outgrowths, stomata ( typical dicot and monocot stomata)		
2	Study of the primary structure of dicot and monocot root, stem and leaf		

<b><u>UNIT III</u></b>		<b>15</b>	
<b><u>ANGIOSPERMS</u></b>			
Bentham and Hooker's system of classification up to orders with respect to the following prescribed families			
1	Malvaceae		
2	Leguminosae (Papilionaceae, Caesalpinae and Mimosae)		
3	Asteraceae		
4	Solanaceae		
5	Amaryllidaceae		

<b>Course Code : USBOT202</b>	<b>Semester II</b>	<b>Hrs</b>	<b>Cr</b>
<b>Form and Function 1</b>		<b>45</b>	<b>2</b>

<b><u>UNIT I</u></b>		<b>15</b>	
<b><u>ENVIRONMENTAL BOTANY</u></b>			
1	<b><u>ECOSYSTEMS-</u></b> Structure, functions and types of ecosystems; Productivity in an Ecosystem ( Terrestrial/ Pond)		
2	<b><u>APPLIED ECOLOGY-</u></b> Environmental Biotechnology- Bioremediation. Principles of conservation: Ex Situ and In Situ		

<b><u>UNIT II</u></b>		<b>15</b>	
<b><u>MOLECULAR BIOLOGY</u></b>			
1	<b><u>DNA- THE GENETIC MATERIAL-</u></b> DNA structure and replication(prokaryotic and eukaryotic),		
2	<b><u>ENZYMES IN GENE CLONING</u></b> Endonucleases, Exonucleases, Ligases		
3	<b><u>CLONING VECTORS</u></b> Plasmid ( pBR322) , Phage, Cosmid		

<b><u>UNIT III</u></b>		<b>15</b>	
<b><u>CURRENT TRENDS IN PLANT SCIENCES</u></b>			
1	<b><u>HERBAL COSMETICS IN SKIN CARE –</u></b> Concepts and applications, present status and scope : Structure of Human Skin.		
2	<b><u>AROMATHERAPY</u></b> Concepts and applications, present status and scope.		
3	<b><u>HORTICULTURE</u></b> Definition, branches, present status and scope.		
4	<b><u>FORESTRY</u></b> Definition, branches, present status and scope Minor Products From Forests: Gums, Resins, shellac, Tendu leaves.		

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Course Code : USBOTP2	Semester II	Cr
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<b>PRACTICAL – Plant Diversity 1</b>		<b>1</b>
1	Study of stages in the life cycle of <i>Nephrolepis</i> from permanent slides (only pinna for section cutting).	
2	Study of stages in the life cycle of <i>Cycas</i> from permanent slides (only pinna for section cutting)	
3	Study of Epidermal outgrowths of Unicellular (unbranched and branched), Multicellular (unbranched and branched), peltate and glandular types.	
4	Study of typical dicot and monocot stomata	
5	Study of primary structure of typical Dicot and Monocot root	
6	Study of primary structure of typical Dicot and Monocot stem.	
7	Malvaceae	
8	Leguminosae	
9	Asteraceae	
10	Solanaceae	
11	Amaryllidaceae	

<b>PRACTICAL – Form and Function 1</b>		<b>Cr</b>
1	Frequency distribution, graphical representation of data- frequency polygon, histogram, pie chart.	<b>1</b>
2	Calculation of mean, median and mode.	
3	Calculation of standard deviation	
3	Identification of plants used in skin care(3plants and 3 products)	
4	Identification of plants used in aromatherapy(3 plants and 3 products)	
5	Landscape gardening Plants for following locations : Floral beds – seasonal; Hedges, Borders, Lawns, Avenues.	
6	Preparation of a terrarium (demonstration)	
7	Identification of forest products: Gum, resin, shellac and Tendu leaves	

## DISTRIBUTION OF TOPICS AND CREDITS

### F Y B Sc. BOTANY SEMESTER I

Course Code	Nomenclature	Credits	Topics
USBOT101	PLANT DIVERSITY I	02	1. Microbiology and Algae
			2. Fungi and Lichens
			3. Bryophyta
USBOT102	FORM AND FUNCTION I	02	1. Plant Biochemistry and Physiology
			2. Cell Biology
			3. Genetics
USBOTP1	Plant Diversity I, form and Function I (Practical I & II)	02	

### F Y B Sc BOTANY SEMESTER II

Course Code	Nomenclature	Credits	Topics
USBOT201	PLANT DIVERSITY I	02	1. Anatomy
			2. Pteridophytes and Gymnosperms
			3. Angiosperms
USBOT202	FORM AND FUNCTION I	02	1. Environmental Botany
			2. Molecular Biology
			3. Current Trends in plant Sciences
USBOTP2	Plant Diversity I, Form and Function I (Practical I & II)	02	



## Scheme of Examination:

The performance of the learners shall be evaluated into two parts. The learner's performance shall be assessed by Internal Assessment with 40% marks in the first part & by conducting the Semester End Examinations with 60% marks in the second part.

The Course having Practical training will have Practical Examination for 50 marks at the end of Semester, out of which 30 marks for the Practical task assigned at the time of examination. The 20 marks are allotted as Internal Assessment.

The allocation of marks for the Internal Assessment and Semester End Examinations are as shown below:-

**Internal Assessment:** It is defined as the assessment of the learners on the basis of continuous evaluation as envisaged in the Credit based system by way of participation of learners in various academic and correlated activities in the given semester of the programme.

**Semester End Assessment :** It is defined as the assessment of the learners on the basis of Performance in the semester end Theory/ written/ Practical examination.

### Modality of Assessment :

**Internal Assessment - 40%** **40 marks.**

#### a) Theory 40 marks

Sr No	Evaluation type	Marks
1	Two Assignments/Case study/Project	20
2	One class Test (multiple choice questions objective)	10
3	Active participation in routine class instructional deliveries(case studies/ seminars//presentation)	05
4	Overall conduct as a responsible student, manners, skill in articulation, leadership qualities demonstrated through organizing co-curricular activities, etc.	05

#### b) Practicals 20 marks

Sr No	Evaluation type	Marks
1	Two best practicals	10
2	Journal	05
3	Viva	05

### B ) External examination - 60 %

**Semester End Theory Assessment - 60%** **60 marks**

- i. Duration - These examinations shall be of two hours duration.
- ii. Theory question paper pattern :-
  1. There shall be four questions each of 15 marks. On each unit there will be one question & fourth one will be based on entire syllabus.
  2. All questions shall be compulsory with internal choice within the questions. Each question will be of 20 to 23 marks with options.
  3. Questions may be sub divided into sub questions a, b, c, d & e only & the allocation of marks depends on the weightage of the topic.

**Practical External Assessment**

**30 marks**

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.