

Department of Botany

Teaching Plan

Session 2018-2019

(CBCS system) Degree Course (Honours) B.Sc.

Semester-I: Paper- **BOTACOR01T**

(Credits: Theory-4, Practical-2)

**THEORY**

**Lectures: 60**

**Course I: Phycology and Microbiology**

Units	Course content	No. of Lectures	Jul-Sept Weeks(9-10)		Oct-Dec Weeks(9-10)	
			No. of Lectures		No. of Lectures	
1	Introduction to Microbial World: Primary concept of microorganism – 3 domain concept; Economic importance of viruses with reference to vaccine production, role in research, medicine and diagnostics and as causal organisms of plant diseases. Economic importance of bacteria with reference to their role in agriculture and industry.	7	4		3	
2	Viruses: Physiochemical and biological characteristics; general structure with special reference to viroids and prions; groups of virus, DNA virus, lytic and lysogenic cycle, RNA virus (TMV) – physico-chemical characteristics and its mode of multiplication.	7	4		3	
3	Bacteria: General characteristics, Microbial nutrition, growth and metabolism.Types; Cell structure; Nutritional types; Reproduction-vegetative,	7	3		4	

	asexual and recombination (conjugation, transformation and transduction).					
4	Algae: General characteristics; ecology and distribution; range of thallus organization; cell structure and components; cell wall, pigment system, reserve food, flagella and flagellar roots; methods of reproduction; Classification; criteria, evolutionary classification of Lee; Role of algae in the environment, agriculture, biotechnology and industry.	11	6	Internal Exam	5	Semester Exam
5	Cyanophyta and Xanthophyta: Ecology and occurrence; Range of thallus organization; Cell structure; Reproduction, Morphology and life-cycle of <i>Nostoc</i> and <i>Vaucheria</i> .	8	4		4	
6	Chlorophyta and Charophyta: General characteristics; Occurrence; Range of thallus organization; Cell structure; Reproduction. Morphology and life-cycles of <i>Volvox</i> , <i>Oedogonium</i> , <i>Chara</i> . Evolutionary significance of <i>Prochloron</i> .	8	4		4	
7	Phaeophyta and Rhodophyta: Characteristics; Occurrence; Range of thallus organization; Cell structure; Reproduction. Morphology and life-cycles of <i>Ectocarpus</i> , <i>Fucus</i> and <i>Polysiphonia</i> .	12	6		6	

**Practical**  
**Course Code: BOTACOR01P**

**Lectures: 60**

Units	Course content	No. of Lectures	Jul-Sept Weeks(9-10)		Oct-Dec Weeks(9-10)	
			No. of Lectures		No. of Lectures	
1	<b>Microbiology</b> 1. Electron micrographs/Models of viruses. 2. Types of Bacteria to be observed.... Electron micrographs of bacteria, binary fission, endospore, conjugation, root nodule. 3. Demonstration of the preparation of media, sterilization and sub culturing. 4. Gram staining; Endospore staining.	30	16	Internal Exam	14	Semester Exam
2	<b>Phycology</b> 1. Study of vegetative and reproductive..... 2. Illustration through drawing prism with magnification of vegetative and reproductive structure.....	30	14		16	

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(CBCS system) Degree Course (Honours) B.Sc.

Semester-I: Paper- **BOTACOR02T**

(Credits: Theory-4, Practical-2)

**THEORY**

**Lectures: 60**

**Core Course II: Biomolecules and Cell Biology**

Units	Course content	No. of Lectures	Jul-Sept Weeks(9-10)		Oct-Dec Weeks(9-10)	
			No. of Lectures		No. of Lectures	
1	Biomolecules: Types and significance of chemical bonds; structure and properties of water; pH and buffers. Carbohydrates, Proteins, Lipids and Nucleic Acids.	20	10		10	
2	Bioenergetics: Laws of thermodynamics, concept of free energy, endergonic and exergonic reactions, coupled reactions, redox reactions. ATP structure, its role as a energy currency molecule.	4	2		2	
3	Enzymes: Structure of enzyme, holoenzyme, apoenzyme, cofactors, coenzymes and prosthetic group; classification of enzymes; features of active site, substrate specificity, mechanism of action, Michaelis – Menten equation and Lineweaver-Burk Plot, enzyme inhibition and factors affecting enzyme activity.	6	3	Internal Exam	3	Semester Exam
4	The Cell: Cell as a unit of structure and					

	function; characteristics of prokaryotic and eukaryotic cells; Origin of eukaryotic cell.	4	3		1	
5	Cell Wall and Plasma Membrane: Chemistry, structure and function of plant cell wall; membrane function; fluid mosaic model; chemical composition of membranes; membrane transport, endocytosis and exocytosis.	4	3		1	
6	Nucleus Cytoskeleton Chloroplast, mitochondria and peroxisomes Endomembrane system	16	10		6	
7	Cell Division: Phases of eukaryotic cell cycle, mitosis and meiosis; regulation of cell cycle - checkpoints, role of protein kinases.	6	2		4	

**Practical**  
**Course Code: BOTACOR02P**

**Lectures: 60**

Units	Course content	No. of Lectures 60	Jul-Sept Weeks(9-10) No. of Lectures	Oct-Dec Weeks(9-10) No. of Lectures	
1	Qualitative tests		4		4
2	Study of plant cell structure		4		
3	Measurement of cell size				4
4	Counting the cells per unit volume		4		4
5	Study of cell and its organelles		4		4
6	Cytochemical staining of: DNA by Feulgen		8	Internal Exam	4
7	Study the effect of organic solvent and temperature on membrane permeability.		4		4
8	Study of the different stages of mitosis and meiosis		4		4

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(CBCS system) Degree Course (Honours) B.Sc.

Semester-II: Paper- **BOTACOR03T**

(Credits: Theory-4, Practical-2)

**THEORY**

**Lectures: 60**

**Core Course III: Mycology and Phytopathology**

Units	Course content	No. of Lectures	Jan-Mar Weeks(9-10) No. of Lectures		Apr-Jun Weeks(9-10) No. of Lectures	
1	<b>Introduction to true fungi</b> General characteristics; affinities with plants and animals; thallus organization; cell wall composition; nutrition;sexual and asexual reproduction; classification.	6	3		3	
2	<b>Chytridiomycota and Zygomycota</b> Characteristic features; ecology and significance; thallus organisation; reproduction; life cycle: <i>Synchytrium, Rhizopus</i> .	5	3		2	
3	<b>Ascomycota</b> General characteristics; ecology; life cycle, heterokaryosis and parasexuality; life cycle of <i>Saccharomyces, Aspergillus, Penicillium, Alternaria, Neurospora</i> and <i>Ascobolus</i>	10	6		4	
4	<b>Basidiomycota</b> General characteristics;ecology; life cycle Black stem rust of wheat <i>Puccinia</i> , Loose and covered smut , <i>Agaricus</i> ;	8	3		5	

	bioluminescence, fairy rings and mushroom cultivation.					
5	<b>Allied Fungi</b> General characteristics; status ..; occurrence; types of plasmodia; fruiting bodies.	3	2		1	
6	<b>Oomycota</b> General characteristics; ecology; life cycle and classification	4	2	Internal exam	2	Semester Exam
7	<b>Symbiotic associations</b> Lichen; mycorrhiza	4	2		2	
8	<b>Applied Mycology</b> Role of fungi in biotechnology; application of fungi in food industry ; secondary metabolites; agriculture; mycotoxins; biological control; Medical mycology.	10	4		6	
9	<b>Phytopathology</b> Terms and concepts; general symptoms; geographical distribution of diseases; etiology; symptomology; host-pathogen relationships; disease cycle and environmental relation; prevention and control and role of quarantine. Citrus canker. Tobacco Mosaic virus, vein clearing. Early and Late blight of potato, Black stem rust of wheat, Blast of Rice.	10	5		5	

**Practical**  
**Course Code: BOTACOR03P**  
**Lectures: 60**

Units	Course content	No. of Lectures (60)	Jan-Mar Weeks(9-10) No. of Lectures	Apr-Jun Weeks(9-10) No. of Lectures	
1	1. Introduction to the world of fungi through permanent slides		4		4
2	Micrometry		4		
3	<i>Rhizopus</i>				4
4	<i>Aspergillus</i> and <i>Penicillium</i>		4		4
5	<i>Ascobolus</i>		4	Internal Exam	Semester Exam
6	<i>Alternaria</i>				4
7	<i>Puccinia</i>		4		
8	<i>Agaricus</i>				4
9	<i>Albugo</i>		4		
10	Lichens		4		4
11	Phytopathology		4		4



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Session 2018-2019

(CBCS system) Degree Course (Honours) B.Sc.

Semester-II: Paper- **BOTACOR04T**

(Credits: Theory-4, Practical-2)

**THEORY**

**Lectures: 60**

**Core Course IV: Archegoniate**

Units	Course content	No. of Lectures	Jan-Mar Weeks(9-10) No. of Lectures		Apr-Jun Weeks(9-10) No. of Lectures	
1	<b>Introduction</b> Unifying features; transition to land habit; alternation of generations.	4	2		2	
2	<b>Bryophytes</b> General characteristics; adaptations to land habit; classification; thallus organization.	6	4		2	
3	<b>Type Studies- Bryophytes</b> Systematic position, morphology, anatomy and reproduction of..... . Ecological and economic Importance.	12	5	Internal Exam	7	Semester Exam
4	<b>Pteridophytes</b> General characteristics; classification; early land plants.	6	3		3	
5	<b>Type Studies- Pteridophytes</b> Systematic position, morphology, anatomy and reproduction of... . Apogamy and apospory, Heterospory and seed habit, telome theory, stelar evolution; ecological and economic importance.	14	8		6	

6	<b>Gymnosperms</b> General characteristics, classification, morphology, anatomy and reproduction of <i>Cycas</i> , <i>Pinus</i> and <i>Gnetum</i> ; ecological and economic importance.	18	9		9	
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**Practical**  
**Course Code: BOTACOR04P**  
**Lectures: 60**

Units	Course content	No. of Lectures (60)	Jan-Mar Weeks(9-10) No. of Lectures	Apr-Jun Weeks(9-10) No. of Lectures	
1	<i>Riccia</i>		4		
2	<i>Marchantia</i>			4	
3	<i>Anthoceros</i>		4		
4	<i>Sphagnum</i>			4	
5	<i>Funaria</i>		4		
				Internal Exam	Semester Exam
6	<i>Psilotum</i>			4	
7	<i>Selaginella</i>		4	4	
8	<i>Equisetum</i>		4	4	
9	<i>Pteris</i>		4		
10	<i>Cycas</i>		4	4	
11	<i>Pinus</i>		4		
12	<i>Gnetum</i>			4	

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Teaching Plan

Session 2018-2019

(CBCS system) Degree Course (General) B.Sc.

Generic Elective

Semester-I: **COURSE CODE: BOTHGEC01T**  
**(Credits: Theory-4, Practical-2)**

**THEORY**

**Lectures: 60**

**Biodiversity (Microbes, Algae, Fungi and Archegoniate)**

Units	Course content	No. of Lectures	Jul-Sep		Oct-Dec	
			Weeks(9-10)	No. of Lectures	Weeks(9-10)	No. of Lectures
1	<b>Microbes</b> Viruses – Discovery, general structure, replication, DNA virus; Lytic And lysogenic cycle, RNA virus; Economic importance; Bacteria – Discovery, General characteristics and cell structure; Reproduction – vegetative, asexual and recombination; Economic importance	10	5		5	
2	<b>Algae</b> General characteristics; Ecology and distribution; thallus organization and reproduction; Classification; Morphology and life-cycles.... Economic importance of algae.	12	6		6	
3	<b>Fungi</b> Introduction- General characteristics, ecology and significance, range of thallus organization, cell wall composition , nutrition, reproduction and classification; True Fungi, life cycle.... Symbiotic Associations-Lichens; Mycorrhiza	12	6	Internal Exam	6	Semester Exam
4	<b>Introduction to Archegoniate</b>					

	Unifying features of archegoniates, Transition to land habit, Alternation of generations.	2	2			
5	<b>Bryophytes</b> General characteristics, adaptations to land habit, Classification, thallus organization. Systematic position, morphology, anatomy and reproduction of..... Ecology and economic importance.	10	4		6	
6	<b>Pteridophytes</b> General characteristics, classification, Early land plants. Systematic position, morphology, anatomy and reproduction of ..... . Heterospory and seed habit, stelar evolution. Ecological and economic importance.	8	4		4	
7	<b>Gymnosperms</b> General characteristics, classification, Systematic position, morphology, anatomy and reproduction of <i>Cycas</i> and <i>Pinus</i> . Ecological and economical importance.	6	3		3	

**Practical**  
**COURSE CODE: BOTHGEC01P**

**Lectures: 60**

Units	Course content	No. of Lectures (60)	Jul-Sep Weeks(9-10) No. of Lectures	Oct-Dec Weeks(9-10) No. of Lectures
1	Gram staining from curd sample.		4	
2	<i>Nostoc, Oedogonium, Fucus and Polysiphonia.</i>		4	4
3	<i>Rhizopus and Penicillium</i>		4	
4	<i>Puccinia</i>			4
5	<i>Agaricus</i>		4	
6	Lichens		4	<b>Internal Exam</b>
7	Mycorrhiza		4	
8	<i>Marchantia</i>		4	
9	<i>Funaria</i>			4
10	<i>Selaginella</i>			4
11	<i>Equisetum</i>			4
13	<i>Pteris</i>			4
14	<i>Cycas</i>		4	
15	<i>Pinus</i>			4

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Session 2018-2019

(CBCS system) Degree Course (General) B.Sc.

Generic Elective

Semester-II: **COURSE CODE: BOTHGEC02T**  
**(Credits: Theory-4, Practical-2)**

**THEORY**

**Lectures: 60**

**Plant Ecology and Taxonomy**

Units	Course content	No. of Lectures	Jan-Mar Weeks(9-10) No. of Lectures	Apr-Jun Weeks(9-10) No. of Lectures		
1	<b>Introduction</b>	2	2			
2	<b>Ecological factors</b> Soil, Water, Light and Temperature. Variation Optimal and limiting factors; Shelfordlaw of tolerance. hydrophytes and xerophytes.	10	5	5		
3	<b>Plant communities</b> Characters; Ecotone and edge effect; Succession;	6	3	3		
4	<b>Ecosystem</b> Structure; energy flow; Food chains and food webs, Ecological pyramids; production and productivity; Biogeochemical cycling;	8	4	4		
5	<b>Phytogeography</b> Principle biogeographical zones; Endemism	4	2	2		
6	<b>Introduction to plant taxonomy</b> Identification, Classification, Nomenclature.			Internal Exam	2	Semester Exam
8	<b>Identification</b> Herbarium, and botanical gardens Documentation	4	2	2		
9	<b>Taxonomic evidences from palynology, cytology, phytochemistry and</b>	6	3	3		

	<b>molecular data.</b>					
10	<b>Taxonomic hierarchy</b>	2			2	
11	<b>Botanical nomenclature</b> Principles and rules (ICN); ranks and names; binominal system, typification, author citation, valid publication.	6	4		2	
12	<b>Classification</b> Types of classification. Bentham and Hooker, General idea of Cronquist's classification.	6	3		3	
13	<b>Numerical taxonomy and cladistics</b> Characters; variations; cluster analysis; phenograms, cladograms.	4	2		2	

**Practical**  
**COURSE CODE: BOTHGEC02P**

**Lectures: 60**

Units	Course content	No. of Lectures (60)	Jan-Mar Weeks(9-10) No. of Lectures	Apr-Jun Weeks(9-10) No. of Lectures	
<b>1</b>	Study of instruments.....		<b>4</b>		
<b>2</b>	Determination of pH, and analysis of two soil samples...		<b>4</b>	<b>4</b>	
<b>3</b>	<i>Nymphaea</i> petiole, <i>Nerium</i> leaf, Stem parasite ( <i>Cuscuta</i> ), Epiphytes (Orchid root)		<b>4</b>	<b>4</b>	
<b>4</b>	Determination of minimal quadrat size		<b>4</b>	<b>Internal Exam</b>	<b>Semester Exam</b>
<b>5</b>	Quantitative analysis.....			<b>4</b>	
<b>6</b>	Study of vegetative and floral characters.....		<b>12</b>	<b>12</b>	
<b>7</b>	Mounting of a properly dried and pressed specimen of any ten wild plant with herbarium.			<b>4</b>	