M.Sc.I-Botany C B C S w.e.f.2016-17(REVISED)									
Sem I	**Code**	**Title of the Paper**	**Semester Exam.**			**L**	**T**	**P**	**Credits**
		Hard Core	UA	IA	Total				
BOT	HCT1.1	Biology and diversity of fungi, Bacteria, Viruses and Lichens.	70	30	100	4	----	----	4
	HCT1.2	Biolo (w.e.f. June 2015-16) Bryophytes and Pteridophytes.	70	30	100	4	----	----	4
	HCT1.3	Plant Ecology	70	30	100	4	----	----	4
Soft Core(Any one)									
	SCT1.1	Tools and Techniques in Botany	70	30	100	4	---	----	4
	SCTI1.2	Economic Botany and Biotechnology	7 0	30	100	4	---	----	
		Tutorial			25		1		1
Practical									
	HCP1.1	Practical Course HCP1.1	35	15	50	----	---	2	6
	HCP1.2	Practical Course HCP1.2	35	15	50	----	---	2	
	HCP1.3	Practical Course HCP1.3	35	15	50	----	---	2	
Soft Core (Any one)									
	SCP1.1	**Practical Course SCP1.1**	35	15	50	----	---	2	2
	SCP1.2	**Practical Course SCP1.2**	35	15	50	----	---	2	
Total for First Semester			420	180	625	----	---		25
Semester II									
	Code	**Title of the Paper**	**Semester Exam.**			**L**	**T**	**P**	**Credits**
BOT		**Hard Core**	UA	IA	Total				
	HCT2.1	Biology and diversity of Gymnosperms and Palaeobotany.	70	30	100	4	---	---	4
	HCT2.2	Taxonomy of Angiosperms.	70	30	100	4	---	---	4
Soft Core(Any one)									
	SCT2.1	Cell and Molecular Biology of plants	70	30	100	4	---	---	4
	SCT2.2	Analytical Techniques in Plant Sciences	70	30	100	4	---	---	4
Open Elective(Anyone)									
	OET2.1	Advances in Plant Pathology	7 0	30	100	4	---	---	4
	OET2.2	Research Methodology	7 0	30	100	4	---	---	
		Tutorial			25	---	1	---	1
Practical									
	HCP2.1	Practical Course HCP2.1	35	15	50	---	---	2	4
	HCP2.2	Practical Course HCP2.2)	35	15	50	---	---	2	
Soft Core(Any one)									
	SCP2.1	Practical Course SCP2.1	35	15	50	---	---	2	2
	SCP2.2	Practical Course SCP2.2	35	15	50	---	---	2	
Open Elective(Anyone)									
	OEP2.1	Practical Course OEP2.1	35	15	50	---	---	2	2
	OEP2.2	Practical Course OPWEP2.2	35	15	50	---	---	2	
Total for Second Semester			420	180	625	---	---	---	25

M.Sc.II-Botany C B C S w.e.f.2017-18(REVISED) Semester III									
	Code	**Title of the Paper**	**Semester Exam.**			**L**	**T**	**P**	**Credits**
BOT		**Hard Core**	UA	IA	Tot				
	HCT3.1	Plant Embryology and Palynology	70	30	100	4	---	---	4
	HCT3.2	Cytogenetics, Plant breeding and genetic engineering	70	30	100	4	---	---	4
		Soft Core(Any one)					---	---	
	SCT3.1	Advanced Plant Physiology and Biochemistry	70	30	100	4	---	---	4
	SCT3.2	Plant growth and development	70	30	100	4	---	---	4
	SCT3.3	Horti cultural Practices and Post harvest technology	70	30	100	4	---	---	4
		Open Elective (Any one)							
	OET3.1	Environmental Biotechnology	7 0	30	100	4	---	---	4
	OET3.2	Herbal technology	7 0	30	100	4	---	---	
		Tutorial			25		1		1
Practical									
	HCP31	Practical Course HCP3.1	35	15	50	---	---	2	2
	HCP3.2	Practical Course HCP3.2	35	15	50	---	---	2	2
	SCP3.1	Practical Course SCP3.1	35	15	50	---	---	2	2
		Open Elective(Anyone)							
	OEP3.1	Practical Course OEP3.1	35	15	50	---	---	2	2
	OEP3.2	Practical Course OEP3.2	35	15	50	---	---	2	
		Total for Third Semister	**420**	**180**	**625**	---	---		**25**
Semester IV									
Sem IV	**Code**	**Title of the Paper**	**Semester Exam.**			**L**	**T**	**P**	**Credits**
BOT		**Hard Core**	UA	IA	Total				
	HCT4.1	Phytogeography and conservation biology	70	30	100	4	---	---	4
	HCT4.2	Plant tissue culture, Green house technology and hydroponics	70	30	100	4	---	---	4
	HCT4.3	Environmental Plant Physiology	70	30	100	4	---	---	4
		Soft Core(Any one)					---	---	
	SCT4.1	Crop physiology	70	30	100	4	---	---	4
	SCT4.2	Stress Biology	7 0	30	100	4	---	---	
		Tutorial			25		1		1
Practical									
	MP 4.1	Project Work/Industrial Training	140	60	200	---	---		8
			420	180	625	---	---		25
									100

Solapur University , Solapur

M.Sc. I Botany

Syllabus to be implemented from June 2016

M.Sc. – I

Semester- I

Theory Papers:

HCT1.1	Biology and diversity of fungi, Bacteria, Viruses and Lichens.
HCT1.2	Biology and diversity of Algae , Bryophytes and Pteridophytes .
HCT1.3	Plant Ecology .
SCT1.1	Tools and Techniques in Botany
SCTI1.2	Economic Botany and Biotechnology

Practicals:

HCP1.1	Practical Course HCP1.1
HCP1.2	Practical Course HCP1.2
HCP1.3	Practical Course HCP1.3
SCP1.1	**Practical Course SCP1.1**
SCP1.2	**Practical Course SCP1.2**

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Semester II

Theory Papers:

HCT2.1	Biology and diversity of Gymnosperms and Palaeobotany.
HCT2.2	Taxonomy of Angiosperms.

SCT2.1	Cell and Molecular Biology of plants
SCT2.2	Analytical Techniques in Plant Sciences

OET2.1	Advances in Plant Pathology
OET2.2	Research Methodology

Practicals:

HCP2.1	Practical Course HCP2.1
HCP2.2	Practical Course HCP2.2)

SCP2.1	Practical Course SCP2.1
SCP2.2	Practical Course SCP2.2

OEP2.1	Practical Course OEP2.1
OEP2.2	Practical Course OPWEP2.2

HCT1.1 Biology and diversity of fungi, Bacteria, Viruses and Lichens.

(60 Periods)

Unit-1- Fungi :-General characters and recent trends in classification, Cell ultrastructure and Cell wall composition, nutrition (saprobic, biotrophic,symbiotic), reproduction (vegetative , asexual and sexual), fructification and Spore forming structures, heterothallism, heterokaryosis parasexuality. Economic importance of fungi : - Fungi in industry , medicine and food , Mushroom cultivation , Mycorrhizae , fungi as biocontrol agents , fungal as allergens and human pathogens. **(10)**

Unit-2-Taxonomical groups to understand life cycle patterns , growth, reproduction and phylogeny with respect to following major classes upto the level of order (Ainsworth`s 1973 system to be followed) **(14)**

Division	**Class**	**Order**
A) Myxomycota	1) Myxomycetes	Stemonitales
	2) Plasmodiophoromycetes	Plasmodiophoromycetales
B) Eumycota		
Sub divisions -		
1) Mastigomycotina	1)Chytridiomycet	Chytridiales
	2) Oomycetes	Peronosporales
2) Zygomycotina	1) Zygomycetes	Mucorales
3) Ascomycotina	1)Hemiascomycetes	Taphrinales
	2) Plectomycetes	Eurotiales
	3)Pyrenomycetes	Melioles, Xylariales, Claricepitales.
	4)Disomycetes	Pezizales
	5) Loculoascomycetes	Dothideales
Sub divisions-		
4) Basidiomycotina	1)Teliomycetes	Uridinales, Ustilaginales
	2)Hymenomycetes	Polyporales, Agaricales ,
	3)Gastromycetes	Lycoperlales ,Nidullariales
5) Deuteromycoyina	1)Hyphomycetes	Hypomycetales, Tubercularials
	2)Coelomycetes	Sphaeropsidales , Melanconials

Unit-3- Archaebacteria and Eubacteria : - General account , ultrastructure , nutrition and reproduction , nitrogen fixing bacteria and industrial uses. **(12)**

Unit-4-Viruses : - Characteristics , ultrastructure , nutrition isolation and purification ,chemical nature , replication , transmission and economic importance. **(12)**

Unit-5-Lichens-Distribution, in Forms, Biology and Economic importance.

(12)

HCT1.2 Biology and diversity of Algae , Bryophytes and Pteridophytes

(60 Periods)

Unit-1 Phycology :- Algae in diversified habitats (terrestrial , fresh water, marine), thallus organization , cell ultrastructure , reproduction (vegetative , asexual and sexual) , modern trends in classification of algae – criteria – pigments , reserve food , flagella etc. and Systems. **(12)**

Unit-2 Salient features , inter-relationship and phylogeny of the following classes of algae – Cyanophyceae , Chlorophyceae , Xanthophyceae , Bacillariophyceae , Phaeophyceae , Rhodophyceae **(12)**

Unit-3- Bryology :- Diversity in Bryophytes with respect to thallus structure, reproduction , life cycle , modern classification .
Salient features , phylogeny and inter-relationship of the following orders– Marchantiales , Jungermanniales , Anthocerotales , Sphagnales , Buxbaumiales , funariales and Polytrichales

(12)

Unit-4- Pteridology : - Diversity in Pteridophytes with respect to morphology, anatomy , reproduction and modern trends in classification , Telome concept and stelar evolution .

Salient features , phylogeny and inter-relationship of the following classes –

Psilopsida – Psilotum, Mesipteris,
Lycopsida - Lycopodium, Selaginella , Isoetes ,
Sphenopsida – Equisetum,
Pteropsida – Ophioglossum, Angiopteris, Gleichenia , Pteris,
Salvinia , Azzola. **(12)**

Unit-5- Isolation , cultrure , cultivation and preservation of algae Economic importance of Bryophytes .

Current trends of Research in Pteridophytes . **(12)**

HCT1.3 Plant Ecology

(60Periods)

Unit-1- Types of ecosystem , Marine and fresh water ecosystems , structural components , relationship between structure and function .
Succession :- Allogenic and autogenic succession , climatic climax , models of plant succession .

(12)

Unit-2- Wetlands and their characteristics , examples – mangroves and lakes EIA , MAB , Biosphere reserves , IUCN , Environmental awareness programmes,Carbon credit.

12)

Unit-3-General information on remote sensing technique and its applications particularly in vegetation analysis and wild life management . **(12)**

Unit-4-Pollution ecology :-Effect of air pollution on vegetation, water pollution and water hyacinth , land pollution due to pesticide residue and their effects on soil .
Climate change : - Green house gases (CO_2 , CH_4 , H 2 O , CFC s) , Ozone layer and depletion, consequences of climate changes (CO 2 fertilization , global warming , sea level rise and UV radiation)

(12)

Unit-5- Environmental toxicology :- Definition , toxic chemicals, factors affecting toxicity , Routes & rate of administration , Biotransformation of toxicants , Bio- accumulation of pollutants / Xenobiotics.
Phytoremediation / Bioremediation : - Definition , Mechanism, Phytoextraction , Rhizofiltration , Phytostabilization , Phytovolatization. **(12)**

SCT1.1 Tools and Techniques in Botany

(60 Periods)

Unit-1- Preparatory techniques :- Standard units of expression , pH and buffers

Biostatistics:- Coefficient of variation , confidence limits , probability, binomial distributions , test of statistical significance , simple correlation and regression , Analysis of variance.
Applications of computer in life sciences , Analysis and presentation of biological data with the help of computer softwares used in Biology. **(12)**

Unit-2-Microscopy:- Principles and applications of phase contrast ,fluorescence, Scanning and transmission electron microscopes , Cytophotometry, Immuno fluorescence microscopy and photomicrography.
Separation Techniques :- Principles and application of gel filtration , ion exchange and affinity chromatography , gas chromatography , HPLC, Gel electrophereris , isoelectric focusing , ultracentrifugation . **(12)**

Unit-3- Principles and applications of Colorimetry and spectrophotometry :- Visible , UV , fluorescence , NMR ,ESR spectroscopy , atomic absorption and flame spectrophotometry .
Cytological techniques :- Fixatives , treatments , stains , permanent preparation , banding – O – banding **(15)**

Unit-4- Tracer techniques :- Principles and applications in biology , Dosimetry , radioisotopes , half – life of radioisotopes , effect of radiation on biological systems , radioactivity counting systems.(09)

Unit-5-Collection and preservation of plant materials :-Herbarium technique preparation significance , important herbaria in India.
Herbarium - A brief account of principles & methodology. **(12)**

HCP1.1	Practical Course HCP1.1
HCP1.2	Practical Course HCP1.2
HCP1.3	Practical Course HCP1.3

Practicals based on Practical Course HCP1.1

1) Study of various forms of bacteria , Gram positive and Gram negative technique .

2) Isolation of plant pathogenic bacteria .

3) Study of different viral diseases :-
   a) Bean Mosaic Virus (BMV)
   b) Leaf curl of Papaya
   c) Bunchy top of banana
   d) Study of TMV (electron microphotograph)

4-5). A) Isolation and identification of water , soil , air and host fungi.
B) Fungal spore germination.

6-11) Detailed study of following types from each of the following orders :-

Class	**Order**	**Types**
Myxomycetes	Stemonitales	Stemonittis
Plasmodiophoromycetes	Plasmodiophorales	Plasmodiophora
Chytridiomycetes	Chytridiales	Physoderma /Synchytrium
Oomycetes	Peronosporales	Albugo / Plasmopara / Bremia
Zygomycetes	Mucorales	Mucor / Rhizopus
Hemiascomycetes	Taphrinales	
Plectomycetes	Eurotiales	Penicillium , Aspergillus
Pyrenomycetes	Meliolales	Meliola
	Erysiphales	Ericyphae , Uncinula
	Clavicipitales	Calviceps
Discomycetes	Pezizales	Peziza
Loculoascomycetes	Dothideales	Capnodium / Asterina
Teliomycetes	Uredinales	Melamospora / Uromyces
	Ustilaginales	
Hymenomycetes	Tremellales	Tremella
	Agaricales	Agaricus
	Polyporales	Polyporus, Ganoderma
Gastromycetes	Lycoperdales	Lycoperdon
	Nidulariales	Cyathus
Deteuromycetes	Hypomycetales	Alternaria
	Melanconiales	Colletotrichum
	Sphaeropsidales	Phoma

12. Lichens: - Types, Classification, Morphology and anatomy.
* Available plant disease material (available diseases) and fungal diseases of local crops .

1. Submission of at least 10 specimens of fungi .
2. Excursion report .