Vellalar College for Women (Autonomous), Erode - 12.

Bachelor of Science in Botany

2018 - 2019 Onwards

Course Content and Scheme of Examinations (CBCS & OBE Pattern)
(Applicable to students admitted during the academic year 2018 - 19 and onwards)

Semester I

Part	Study Components	Subject Code	Title of the Paper	Inst. Hrs./ Week	Exam. Dur. Hrs.	Max. Marks			Credits
						CIA	ESE	Total	
I	Language I	18TAMU101/ 18HINU101	Tamil / Hindi	6	3	25	75	100	3
II	Language II	18ENLU101	English	6	3	25	75	100	3
III	Core	18BOUC101	Paper I Plant Diversity I - Algae, Fungi, Lichen, Bacteria, Virus & Plant Pathology	6	3	25	75	100	4
			Practical - I Paper I	3					
	Allied I	18ZOUA101	Zoology - Paper I	4	3	20	55	75	4
			Practical - I Paper I	3					
IV	Foundation course	18FOCU1ES	Environmental studies	2	3		100	100	2
Total								475	16

Semester II

I	Language I	18TAMU202/ 18HINU202	Tamil /Hindi	6	3	25	75	100	3
II	Language II	18ENLU202	English	6	3	25	75	100	3
III	Core	18BOUC202	Paper II Plant Diversity II Bryophytes, Pteridophytes, Gymnosperms &Palaeo Botany	6	3	25	75	100	4
			Practical - I Paper II	3					
		18BOUCP01	Practical - I (Exam) Paper I & II		3	40	60	100	4
	Allied I	18ZOUA202	Zoology Paper II	4	3	20	55	75	4
			Practical - I Paper II	3					
		18ZOUAP01	Practical – I (Exam) Paper I & II		3	20	30	50	2
IV	Value Education	18VEDU2HR	Value Education and Human Rights	2	3		100	100	2
Total								625	22

Question Paper Pattern for OBE

Components of CIA Marks (Theory –Core papers)

Tests (I & II)	Assignment / Seminar / Subject Viva	Model Examination	Total
10	5	10	25

Components of CIA Marks (Theory- Allied Papers)

Tests (I & II)	Assignment / Seminar / Subject Viva	Model Examination	Total
8	4	8	20

CIA (Core and Allied Papers)

Bloom's Category	Section	Choice	Marks	Total
K_1	A	Compulsory	2 x 2 = 4	30
K1 &K_2	B	Either / Or	2 x 5 = 10	
K2 &K_3	C	Open Choice (2 out of 3)	2 x 8 = 16	

Model and End Semester Examination (Core and Allied Papers)

Bloom's Category	Section	Choice	Marks	Total
K_1	A	Compulsory	5 x 2 = 10	75
K1 &K_2	B	Either / Or	5 x 5 = 25	
K2 &K_3	C	Open Choice (5 out of 8)	5 x 8 = 40	

Components of CIA Marks (Core Practicals)

Tests (I & II)	Skill	Record	Model Examination	Total
10	15	5	10	40

Components of CIA Marks (Allied Practicals)

Tests (I & II)	Skill	Record	Model Examination	Total
5	7	3	5	20

SEMESTER I

CODE	COURSE TITLE
18BOUC101	PLANT DIVERSITY –I (ALGAE, FUNGI, LICHENS, BACTERIA, VIRUS AND PLANT PATHOLOGY)

Category	CIA	ESE	L	T	P	Credit
Core	25	75	85	5	-	4

Preamble

To evaluate plant diversityin terms of structure, reproduction and environmental relationships in order to ensure an up-to-date level of understanding of primitive plant groups
To develop an understanding of biological facts and appreciation of their economicsignificance
To understand the characteristics of microorganisms,nature of plant disease epidemics and how to manage them

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Demonstrate the various trends for classification ofAlgae, Fungi and lichens and to relate the different classification systems to gain knowledge on the lower plants in plant kingdom	K1, K2
CO2	Compare and contrast the characteristics of lower group of plants and compare the diversity with other forms of plant kingdom	K2 , K3
CO3	Provide a framework approaches in plant disease managementthat can be used for their profession	K2 , K3
CO4	Familiarize with basic information in Botany with special attention to the economic importance of lower group of plants	K2, K3
CO5	Analyze the skills in culturing microorganisms and identify the future use in industries	K3

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	M	M	M	M
CO2	S	M	M	S	S
CO3	S	S	M	S	S
CO4	S	M	M	S	S
CO5	S	S	S	S	S

S- Strong; M-Medium; L-Low

Syllabus

UNIT I (18hrs.)

Algae - Classification of Algae (G.M. Smith, 1955) - Study of the Structure - Reproduction and Life cycle of Anabaena –Chlamydomonas – Volvox – Oedogonium - Caulerpa and Chara

UNIT II(18hrs.)

Structure - Reproduction and Life cycle of Diatoms – Pennate and Centric–Dictyota and Polysiphonia- Economic importance of Algae

UNIT III(18 hrs.)

Fungi -Classification of Fungi (Alexopoulos, 1962) - Structure - Reproduction and Life cycle of Albugo– Rhizopus – Saccharomyces – Aspergillus– Puccinia and Agaricus

UNIT IV(18hrs.)

Structure - Reproduction and Life cycle of Lycoperdon - Cercospora – Fusarium and Alternaria- Economic importance of Fungi. Structure and Reproduction of Lichens – Crustose - Foliose and Fruticose

UNIT V(18 hrs.)

Structure and Reproduction of Bacteria and Bacteriophage (T_4). Plant Diseases: Bunchy top of banana – Leaf spot disease of groundnut- Blight disease of paddy – Red rot of sugarcane (symptoms- causal organisms and control measures)

Text Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Vashishta, B.R.	Botany for Degree Students – Algae	S. Chand & Co., New Delhi	2010, Revised Edition
2.	Vashishta, B.R.	Botany for Degree Students – Fungi	S. Chand & Co., New Delhi	2014, Revised Edition
3.	Pandey,B.P.	Plant Pathology – Pathogen and Plant Disease	S. Chand & Co., New Delhi	2012, Revised Edition

Reference Books

SI.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Vandenhoek,C.Mann,D.G. and Jahns, H.M.	Algae - An introduction to Phycology	CambridgeUniversity Press	2009,1st South Asian Edition
2.	Aneja,K.R.and Mehrotra,R.S.	An Introduction to Mycology	New Age International Publishers	2015, 2ndEdition

Web Resource

https://www.plantscience4u.com/2014/04/classification-of-algae-by-smith.html

www.biologydiscussion.com/bryophyta/polysiphonia...structure...reproduction/21249

www.biologydiscussion.com/fungi/life-cycle-of-albugo-with-diagram.../63415

www.biologydiscussion.com/lichens-2/lichens...structure-and-reproduction.../69697

www.knowledgebank.irri.org/decision-tools/rice-doctor/rice...fact.../bacterial-blight

Pedagogy

Lecture- Chalk & Talk, PPT, Quiz, Assignment, Seminar, Algal collection, Micro preparation

SEMESTER I

CODE	COURSE TITLE
18BOUA101	ALLIED BOTANY- PAPER - I

Category	CIA	ESE	L	T	P	Credit
Allied Botany	20	55	55	5	-	4

Preamble

To know the vegetative and reproductive structures of various types of Algae, Fungi, Bryophytes, Pteridophytes and Gymnosperms

To identify the plants and their economic importance

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowled Level
CO1	Acquire knowledge to describe the structure, reproduction and life cycle of diverse forms of plants	K1,K2
CO2	Compare and contrast the distinguishing characters of Algae, Fungi, Bryophytes, Pteridophytes and Gymnosperms	K1,K2, K
CO3	Understand the systematic position and economic importance of plants	K1,K2
CO4	Familiarize the taxonomic characters to identify the unknown plant species	K2, K3
CO5	Apply the skill and techniques to produce algal, fungal and bacterial biomass	K2, K3

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	M	M	S	S
CO2	S	M	M	S	M
CO3	S	S	S	S	S
CO4	S	S	S	M	S
CO5	S	S	S	S	S

S- Strong; M-Medium; L-Low

Syllabus

UNIT I **(12hrs.)**

Structure and Reproduction of Bacteria and Bacteriophage(T_4).Plant Disease: Tikka Disease-symptoms- causal organisms and control measures

UNIT II **(12hrs.)**

Algae– Structure- Reproduction and Life cycle of the following – Oscillatoria – Chlorella-Dictyota Fungi–Albugo – Saccharomyces -Polyporus- Cercospora

UNIT III **(12 hrs.)**

Bryophytes - Pteridophytes - Gymnosperms - Structure - reproduction and life cycle of Riccia–Funaria – Lycopodium – Marsilea - Cycas and Pinus

UNIT IV **(12hrs.)**

Plant Taxonomy - Study of the following families with their Systematic position - Description and Economic importanceofAnonaceae –Cucurbitaceae –Rubiaceae –Acanthaceae - Amarantaceae and Poaceae

UNIT V **(12 hrs.)**

Applied Botany - Single cell protein-Cultivation and Nutritive values-Spirulina.Mushroom–Oyster –Biofertilizer uses – Mass production - Rhizobium

Text Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Pandey. B.P.	Botany for Degree Students	S. Chand & Company Ltd.	2007, 1st Edition
2.	Srivastava, H.N.	Plant Pathology	Pradeep Publications,Jalandhar	2004, Millennium New Edition

Reference Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Editio
1.	Sporne,K.R.	The Morphology of Pteridophytes	B. I Publications, NewDelhi	1967,4th Edition
2.	Foster,A. S. and Gifford, E. M.	Comparative Morphology of Vascular Plants	W.H. Freeman and Co.	1973, 3rdEdition
3.	Frank Cavers	The interrelationship of the Bryophyta	S.R. Technico Book House, Patna.	2003,2ndEdition

Web Resource

agropedia.iitk.ac.in/content/chemical-control-rust-disease-groundnut

www.biologydiscussion.com/algae/oscillatoria...thallus-structure...reproduction/53740

www.biologydiscussion.com/fungi/albugo-habitat-symptoms...reproduction.../23942

https://www.sciencedirect.com/topics/biochemistry-genetics-and.../single-cell-protein

Pedagogy

Lecture- Chalk &Talk, PPT, Quiz, Assignment, Seminar, Industrial visit, Field visit

SEMESTER I

CODE	COURSE TITLE
18FOCU1ES	ENVIRONMENTAL STUDIES

Category	CIA	ESE	L	T	P	Credit
Foundation Course	-	100	27	3	-	2

Preamble

To study the physical and biological characters of the environment, the social and cultural factors and the impact of man on environment

To share perspectives on key global environmental issues such as global warming, ozone depletion, desertification, biodiversity conservation and hazardous waste

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand about plants, animals and micro organism and their relationship or interdependence on other living and non living environment	K1
CO2	Study the nature and its function, flow of energy and exchange of various materials between the biotic and abiotic components of environment (i.e) Biogeochemical cycles	K1
CO3	Developing an attitude to clarify modern environmental concept like how to conserve biodiversity	K2
CO4	Impart the knowledge about the environment and its allied problems and to know the more sustainable way of living	K2
CO5	Acquire skills to help the concerned individuals in identifying and solving environmental problems	K3

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	M	M	M	M
CO2	S	M	M	M	L
CO3	S	S	S	S	S
CO4	S	S	S	S	S
CO5	S	S	S	S	S

S- Strong; M-Medium; L-Low

Syllabus

UNIT I **(6 hrs.)**

The multidisciplinary nature of environmental studies -Definition - Scope and importance - Need for public awareness - Natural resources and associated problems – Forest resources - Water resources - Mineral resources - Food resources - Energy resources - Land resources - Role of an

individual in conservation of natural resources - Equitable use of resources for sustainable life styles

UNIT II **(6 hrs.)**

Concept of Ecosystem - Structure and function of an ecosystem – Producers - Consumers and Decomposers. Energy flow in the ecosystem –Food chain - Food webs and Ecological pyramids - Ecological succession

UNIT III **(6 hrs.)**

Biodiversity and its Conservation - Introduction – definition- genetic species and ecosystem diversity- Conservation of biodiversity – *In –situ* and *Ex-situ* conservation of biodiversity

UNIT IV **(6 hrs.)**

Environmental Pollution - Definition – causes - effects and control measures of air pollution- water pollution- soil pollution- noise pollution and thermal pollution- Disaster management – floods- earthquake- cyclone and landslides

UNIT V **(6 hrs.)**

Social Issues and the Environment - Global warming - Ozone layer depletion - Acid rain - Nuclear accidents and Social issues - Holocaust (case studies). Consumerism and waste products - Environmental awareness- protection Act – air – water – wildlife – forest - Issues involved in enforcement of environmental legislation and Public

Text Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Shukla, R.S, Chandel,P.S	A text book of plant Ecology Including Ethnobotany and soil science	S.Chand& company Ltd. New Delhi	2003,1st Edition
2.	Ranganathan, S.	Environmental studies	Publication Division, Bharathiar University, Coimbatore	2004,1st Edition
3.	Verma, P.S. and Agarwal,V.K.	Environmental Biology	S. Chand & Company Ltd, New Delhi	1993,4th Edition

Reference Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Sharma, P.D.	Ecology & Environment	Rastogi Publications, Meerut	2005,11th Edition
2.	Eugene, P. Odum	Fundamentals of Ecology	W.B.Saunders company, Philadelphia and London	2005,3rd Edition

Web Resource

www.preservearticles.com/.../essay-on-natural-resources-and-associated-problems.htm...

https://www.learner.org/courses/envsci/unit/text.php?unit=4&secNum=3

www.jamaicachm.org.jm/BHS/conservation.htm

https://www.conserve-energy-future.com/causes-effects-solutions-of-air-pollution.php

Pedagogy

Lecture, PPT, Quiz, Assignment, Industrial visit, Seminar

FIELD WORK

Visit to a local area to document environmental assets – river/ forest/ grass land/ hill/ mountain.
Visit to a local polluted site – urban/ rural/ industrial/ agricultural.
Study of common plants, insects, birds.
Study of simple ecosystems – pond, river, hill slope, etc.

SEMESTER II

CODE	COURSE TITLE
18BOUC202	PLANT DIVERSITY – II (BRYOPHYTES, PTERIDOPHYTES, GYMNOSPERMS AND PALAEOBOTANY)

Category	CIA	ESE	L	T	P	Credit
Core	25	75	85	5	-	4

Preamble

To acquaint the students about the classification, morphology, anatomy, reproduction and economic importance of bryophytes, pteridophytes and gymnosperms with an evolutionary link

To interpret the evolutionary history of heterospory and seed habit of pteridophytes

To study the plants forms and diversity in the past with reference to Geological time scale

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Distinguish the classification of Bryophytes, Pteridophytesand Gymnosperms in plant kingdom and relate their characteristic features	K1, K2
CO2	Understand the phylogenetic evidence between the fossils and the living plants	K2,K3
CO3	Recall the biological facts, concepts and principles and appreciating significance ofplant kingdom	K1, K2
CO4	Familiarize with basic information in Bryophytes, Pteridophytes and Gymnosperms with special attention to the economic importance of plants to society	K2,K3
CO5	Develop the ability for the application of acquired knowledge in various fields of plantsciences	K2 ,K3

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	M	M	M	M
CO2	S	M	M	M	M
CO3	S	S	M	M	S
CO4	S	M	M	S	S
CO5	S	S	S	S	S

S- Strong; M-Medium; L-Low

Syllabus

UNIT I **(18 hrs.)**

Bryophytes -Classification of Bryophytes (Reimer's, 1954 - Outline only) Structure and Reproduction ofMarchantia–Anthoceros and Funaria - Economic Importance of Bryophytes

UNIT II (18 hrs.)

Pteridophytes– ClassificationofPteridophytes(Sporne, 1962 - Outline only) Stellartypes- Structure and Reproduction ofPsilotum–Lycopodium- Selaginella and Equisetum

UNIT III (18 hrs.)

Structure and Reproduction ofOphioglossum- Adiantum–Marsilea- Heterospory and Seed Habit

UNIT IV (18 hrs.)

Gymnosperms -Classification of Gymnosperms (Sporne, 1965- Outline only) - Structure and Reproduction ofCycasandGnetum. Angiospermic characters in Gnetum, Economic Importance of Gymnosperms

UNIT V (18 hrs.)

Palaeobotany- Geological time scale- Radio carbon dating- Fossils and kinds of fossils- Study of the following: Lepidodendron (Stem)- Lepidophyllum (Leaf)-Lepidocarpon (Fruit)- Calamites (Stem) and Williamsonia

Text Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Vashishta, B.R. Sinha,A.K.and Adarshkumar	Botany for degree students – Bryophyta	S. Chand & Company Ltd., New Delhi	2011, Revised Edition
2.	Vashishta, P.C. Sinha,A.K. and Anilkumar	Botany for degree students – Pteridophyta	S. Chand & Company Ltd., New Delhi	2008, Revised Edition
3.	Vashishta, P.C.Sinha,A.K. and Anilkumar	Botany for degree students – Gymnosperms	S. Chand & Company Ltd., New Delhi	2008, Revised Edition

Reference Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Foster,A. S. and Gifford, E. M.	Comparative Morphology of Vascular Plants	W.H. Freeman and Co.	1973, 1st Edition
2.	Peter George	Introduction to Palaeobotany	Rajat Publications, New Delhi	2008, 1st Edition

Web Resource

www.biology.lifeeasy.org/5290/economic-importance-of-bryophytes

www.skyandtelescope.com/observing/stellar-spectral-types-03302016/

https://www.britannica.com/science/heterospory

https://www.plantscience4u.com/2014/05/economic-importance-of-gymnosperms.html

www.enchantedlearning.com/subjects/dinosaurs/dinofossils/Fossiltypes.html

Pedagogy

Lecture-- Chalk & Talk,PPT, Quiz, Assignment, Group Discussion, Seminar

SEMESTER II

CODE	COURSE TITLE
18BOUCP01	CORE PRACTICAL - I (ALGAE, FUNGI, LICHENS, BACTERIA,VIRUS, PLANT PATHOLOGY, BRYOPHYTES, PTERIDOPHYTES,GYMNOSPERMS AND PALAEOBOTANY)

Category	CIA	ESE	L	T	P	Credit
Core Practical	40	60	-	-	45	4

Preamble

To enable the student to identify the different organisms by morphological and anatomical studies

To demonstrate the principle of microscopes – Dissection and Compound and to obtain hands on training on sectioning, staining and mounting of plant materials

To learn about the fossilized plant forms and plant evolution

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Develop skill in sectioning staining and mounting, instrumentation techniques along with collection and interpretation of biological materials	K1,K2,K3
CO2	Acquire knowledge on various forms of lower plants	K2,K3
CO3	Diagnose the structural features of plant organs and differentiate microscopically their tissue elements	K2, K3
CO4	Analyze the age and scientific perspective of most important fossils	K2, K3
CO5	Think critically, design and execute an experiment which will serve as a practical basis for a career in research	K2

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	M	M
CO2	S	S	M	S	S
CO3	S	M	M	M	M
CO4	S	S	M	S	S
CO5	S	S	M	S	S

S- Strong; M-Medium; L-Low

Syllabus

PRACTICALS

1. Demonstration of simple microscopes – Dissection and Compound
2. Demonstration of sectioning, staining and mounting
3. Study of the habit / anatomy / reproduction of the types mentioned below:

Algae -Sectioning:Caulerpa - Dictyota

Spotters: Anabaena – Chlamydomonas – Volvox – Oedogonium - Caulerpa –Chara - Diatoms – Pennate– Dictyota–Polysiphonia

Fungi -Sectioning:Albugo – Puccinia - Cercospora

Spotters: Albugo – Rhizopus – Saccharomyces -Aspergillus - Puccinia – Agaricus–Lycoperdon-Cercospora –Lichens- Bacteria - Virus

Plant Diseases - Spotters: Bunchy top of banana – Leaf spot disease of groundnut - Blight disease of paddy- Red rot of sugarcane

Bryophytes – Sectioning:Marchantia, Anthoceros

Spotters: Marchantia -Anthoceros-Funaria

Pteridophytes - Sectioning:Lycopodium – Selaginella – Equisetum - Adiantum

Spotters: Lycopodium – Selaginella – Equisetum –Ophioglossum –Adiantum- Marsilea.

Gymnosperms - Sectioning:Cycas

Spotters: Cycas and Gnetum

Palaeobotany - Spotters: Lepidodendron –Lepidophyllum - Lepidocarpon- Calamites - Williamsonia.

SEMESTER II

CODE	COURSE TITLE
18BOUA202	ALLIED BOTANY- PAPER - II

Category	CIA	ESE	L	T	P	Credit
Allied Botany	20	55	55	5	-	4

Preamble

To study the histology, ecological adaptations and physiology of plants

To learn the essential horticultural techniques

To understand the medicinal properties and active principles of medicinal plants

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Acquire knowledge on tissues and histological structures of plants	K1,K2
CO2	Understand the Structure and functions of ecosystems and adaptations of plants	K1,K2
CO3	Recall the physiological functions of plants	K1,K2
CO4	Analyse and apply the skill of commercial horticultural techniques	K3
CO5	Gain knowledge on identification of medicinal plants and apply the skill to cultivate and marketing of commercial plants	K3

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	M	M
CO2	S	M	M	S	S
CO3	S	M	S	M	M
CO4	S	S	S	S	S
CO5	S	S	S	S	S

S- Strong; M-Medium; L-Low

Syllabus

UNIT I **(12hrs.)**

Anatomy -Meristem –Types. Simple and Complex tissues - Primary structure of Dicot and Monocot root, Dicot andMonocot stem, Dicot and Monocot leaf

UNIT II **(12hrs.)**

Ecology -Ecosystem – Structure (Biotic and Abiotic) and functions-food chain, food web- Morphological and Anatomical adaptations of Hydrophytes and Xerophytes

UNIT III **(12 hrs.)**

Physiology – Photosynthesis- Photosynthetic apparatus- Light and Dark reactions (Calvin cycle) - Respiration- Glycolysis and Kreb`s cycle

UNIT IV **(12hrs.)**

Horticulture -Scope and importance - Propagating methods of Horticultural Plants – Layering, Grafting, Kitchen garden, Terrace garden and flower arrangement-Cultivation methods of commercial flowers – Rose- Jasmine

UNIT V **(12 hrs.)**

Pharmacognosy -A brief account on the identifying features- medicinal properties and active principles of the following: Ginger – Vasaka – Curcuma – Brahmi- Cultivation and marketing of commercial medicinal plants – Vinca and Aloe vera

Text Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Tayal, M.S.	Plant Anatomy	Rastogi Publications	2001, 5th Edition
2.	Shukla,R.S.&Chandel,P.S.	A text book of plant Ecology Including Ethnobotany and soil science	S.Chand& company Ltd. New Delhi	2003, 1stEdition
3.	Jain,V.K.	Fundamentals of Plant Physiology	Chand and Company Ltd.	2017, 19thEdition

Reference Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Kokate, C.K.Purohit,A.andGokhal, S.R.	Pharmacognosy	NiraliPrakashan, Pune	2009, 43rd Edition
2.	K. ManibhushanRao	Textbook of Horticulture	Macmillan India Ltd.	2000, 1stEdition
3.	G. Ray Noggle and George J. Fritz	Introduction to Plant Physiology	Prentice – Hall of India Pvt Ltd., New Delhi	1986, 2ndEdition

Web Resource

https://www.pmfias.com/plant-tissue-meristematic-simple-complex-permanent-tissue/

https://www.nature.com/scitable/.../food-web-concept-and-applications-84077181

www.eschooltoday.com/photosynthesis/dark-and-light-reactions.html

https://www.omicsonline.org/.../propagation-methods-of-selected-horticultural-crops-...

https://discuss.farmnest.com/t/need...medicinal-plant-cultivation-and-marketing/1229

Pedagogy

Lecture - Chalk & Talk, PPT,Quiz, Assignment, Seminar, Nursery visit

SEMESTER II

CODE	COURSE TITLE					
18BOUAP01	ALLIED BOTANY PRACTICAL					
Category	**CIA**	**ESE**	**L**	**T**	**P**	**Credit**
Allied Botany	20	30	-	-	45	2

Preamble

To acquire knowledge to differentiate diverse forms of plants. To develop the skill of micro preparation of plants

To understand physiological function and medicinal value of plants. To apply the horticultural techniques

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Obtain facts to illustrate the morphology, anatomy and physiology of various forms of plants	K1,K2,K3
CO2	Evaluate the different characters of plants in different environment	K2, K3
CO3	Identify the diverse of plants using histological structures of plants	K2
CO4	Develop and apply the skills of horticultural techniques on crop plants	K3
CO5	Apply the skill and techniques to produce economically important bio-products	K3

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	M	M	S	S
CO2	S	M	S	S	M
CO3	S	S	S	S	S
CO4	S	S	S	M	S
CO5	S	S	S	S	S

S- Strong; M-Medium; L-Low

Syllabus

Study of the habit / anatomy / reproduction of the types mentioned below:
Spotters:Bacteria – Virus – Tikka Disease

Algae – Sectioning:Dictyota

Spotters: Oscillatoria – Chlorella- Dictyota

Fungi - Sectioning: Albugo

Spotters: Albugo – Saccharomyces - Polyporus - Cercospora.

Bryophytes – Sectioning: Riccia

Spotters: Riccia– Funaria

Pteridophytes – Sectioning: Lycopodium

Spotters: Lycopodium – Marsilea

Gymnosperms – Sectioning:Cycas- Pinus

Spotters: Cycas - Pinus

Plant Taxonomy –Anonaceae –Cucurbitaceae – Rubiaceae –Acanthaceae -Amarantaceae- Poaceae.

Applied Botany - Spotters: Spirulina -Oyster Mushroom - Rhizobium.

Anatomy - Sectioning: Primary structure of Dicot root - Monocot root, Dicot stem - Monocot stem, Dicot leaf - Monocot leaf.

Spotters: Meristem – simple and complex tissues

Ecology -Spotters: Hydrophytes – Xerophytes

Physiology – Demonstrations: Evolution of Oxygen during Photosynthesis – Ganong's Light screen Experiment - Respiroscope

Horticulture – Spotters: Layering – Grafting

Pharmacognosy – Spotters**:** Ginger – Vasaka – Curcuma – Brahmi

Vellalar College for Women (Autonomous), Erode - 12.

Bachelor of Science in Botany

2015 - 2016 Onwards

Course Content and Scheme of Examinations (CBCS Pattern)

Semester III

Part	Study Components	Subject Code	Title of the Paper	Inst. Hrs./ Week	Exam. Dur. Hrs.	Max. Marks			Credits
						CIA	ESE	Total	
I	Language - I	14TAMU303/ 15HINU303	Tamil /Hindi	6	3	25	75	100	3
II	Language - II	13ENLU303	English	6	3	25	75	100	3
III	Core	15BOUC303	Paper III - Anatomy & Embryology	4	3	25	75	100	4
			Practical - II Paper III	2					
	Allied II	11CHUA001	Chemistry - Paper I	5	3	20	55	75	4
			Practical - II Paper I	2					
IV	Skill Based Subject I	15BOUS301		3	3	25	75	100	3
	Basic Tamil/ Advanced Tamil/ Non - Major Elective I	15BOUN301		2	-	100	-	100	2
					3	25	100		
					3	-	100		
Total								575	19

Semester IV

I	Language - I	14TAMU404/ 15HINU404	Tamil /Hindi	6	3	25	75	100	3
II	Language-II	13ENLU404	English	6	3	25	75	100	3
III	Core	15BOUC404	Paper IV Cell Biology & Tissue Culture	4	3	25	75	100	4
			Practical - II Paper IV	2					
		15BOUCPO2	Practical - II (Exam) Paper III & IV		3	40	60	100	4
	Allied II	11CHUA002	Chemistry - Paper II	5	3	20	55	75	4
			Practical - II Paper II	2					

		15CHUAPO1	Practical–II (Exam) Paper I & II		3	20	30	50	2
IV	Skill Based Subject II	13BOUS402		3	1*	40	60	100	3
	Basic Tamil/ Advanced Tamil/ Non - Major Elective II	15BOUN402		2	-	100	-	100	2
					3	-	100		
					3	-	100		
Total								725	25
* Online Examination									

Vellalar College for Women (Autonomous), Erode - 12.

Bachelor of Science in Botany

2015- 2016 Onwards

Course Content and Scheme of Examinations (CBCS Pattern)

SKILL BASED SUBJECTS

S.No.	Subject Code	Title of the Paper
1	15BOUS301	Herbs and Health (Cafeteria)
2	13BOUS402	Multi Skill Development Paper*
3	15BOUS503	Herbal Botany (Cafeteria)
4	15BOUS604	Mushroom Technology (Cafeteria)

BASIC TAMIL / ADVANCED TAMIL/ NON MAJOR ELECTIVES

S.No.	Subject Code	Title of the Paper
1	14TMLU301	Basic Tamil*
	14TMLU402	
2	14ADTU301	Advanced Tamil**
	14ADTU402	
3	15BOUN301	Ornamental Horticulture
	15BOUN402	Nursery and Landscaping

* For Students whose Part I in secondary education is not Tamil

** For Students whose Part I in Higher secondary education is not Tamil

SELF LEARNING SUBJECT

S.No.	Subject Code	Title of the Paper
1	13AUGSL05	General awareness (Optional) (Online)
2	13BOUSL03	Preservation Techniques (Optional)

*Online examination for three units for a maximum of 60 marks.

Units IV & V are CIA for a maximum of 40 marks.

SEMESTER - III

Core Paper- III ANATOMY AND EMBRYOLOGY

Instructional Hrs.: 60 **Sub. Code: 16BOUC303**

Max. Marks: CIA – 25; ESE - 75 **Credits: 4**

Objectives: To study types of tissues and primary, secondary structures & anomaly of stem and root.To study the types and development of male and female gametophyte and embryo.

UNIT – I **12 Hrs.**

Anatomy - Meristem –Types –Structure of Shoot and root apex and theories- General account of simple and complex tissues - Vascular cambium- Types of stomata and ***trichomes.***

UNIT – II **12 Hrs.**

Primary structure-Internal anatomy of Dicot root and stem - ***monocot root***and stem- Nodal anatomy - dicot leaf and monocot leaf.

UNIT – III **12 Hrs.**

Secondary structure- Secondary thickening- Dicot root and stem - Anomalous secondary thickening - ***Cortical vascular bundles (Nyctanthes)***- Medullary vascular bundles (Piper)and primary thickening meristem in arborescent monocots (Dracaena).

UNIT – IV **12 Hrs.**

Embryology - Structure and development of anther- development of male gametophyte - structure and types of ovules, development of female gametophytes (Monosporic – Polygonum- Bisporic – Allium and Tetrasporic – Peperomia)- Fertilization - ***Double fertilization.***

UNIT – V **12 Hrs.**

Endosperm – Nuclear, Cellular, Helobial and Ruminate -Embryo - Structure and development of dicot embryo (*Capsella*) - Structure and development of ***monocot embryo*** (Najas).

Note : Bold and***Italics*** **denotes Self Study Topics**

PRACTICALS :

Anatomy :

1.Study of tissues mentioned in the theory- Maceration- Vein clearing- Shoot apex and Root apex - Stomata – Trichomes- Stem - Primary structure – Tridax – Sorghum, Root - Primary structure – Bean – Canna, Nodal anatomy –Unilacunar –Calophyllum, Trilacunar - Azadirachta– Multilacunar - Aralia , Leaf – Polyalthia, Maize, Secondary thickening -Stem- Thespesia, Secondary thickening - Root - Ficus - Anomalous secondary thickening – Nyctanthes, Piper - Dracaena.

Embryology:

T.S of anther - types of ovules- - Embryo mounting – Tridax/ Crotalaria. Endosperm –Cellular Endosperm with haustoria

TEXT BOOKS:

1. **Pandey, B.P.,**" Plant Anatomy", S. Chand & Company Ltd., New Delhi, Revised Edition, 2005.

2.**Bhojwani, S.S.** and **Bhatnagar, S.P.,** " *The Embryology of Angiosperms*", Vikas Publishing House Pvt Ltd., New Delhi, Revised Edition, 2007.

REFERENCE BOOKS:

1.**Fahn, A.,**" *Plant Anatomy*", Robert Maxwell, M.C., New York, Revised Edition, 1982.

2.**Katherine Esau,**" *Plant Anatomy"*, Wiley Eastern Private Ltd., New Delhi, Second Edition, 1974.

3.**Maheswari . P.,** "*An Introduction to the embryology of Angiosperms*", Mc Graw-Hill Book Company, Inc. New York, Revised Edition,1994.

SEMESTER - III

Skill Based Subject -I

HERBS AND HEALTH

Instructional Hrs. : 45 **Sub. Code : 16BOUS301**

Max.Marks:CIA–25;ESE- 75 **Credits : 3**

Objectives: To acquire knowledge of medicinal plants, their medicinal uses and uses of various components of Traditional systems of medicine

UNIT – I **9 Hrs.**

Indigenous Medicinal Systems of India - Ayurveda – Siddha – Homeopathy – ***Unani*** **-** Need to preserve the knowledge of the aforesaid systems.

UNIT – II **9 Hrs.**

Higher plants and their Medicinal Uses -*Ocimum sanctum - Emblica officinalis – Aloe vera - Vinca rosea - Cissus quadrangularis - Piper betle* and ***Allium sativum***.

UNIT – III **9 Hrs.**

Nutraceutical Fruits & Vegetables - Tomato – Carrot – Beetroot - Soya Bean – Pomegranate - Jamun and ***Grapes.***

UNIT – IV **9 Hrs.**

Plants for Body care – Tooth Paste - Bath oil - Hair oil – Shampoo and ***Herbal Perfumes***.

UNIT – V **9 Hrs.**

Herbal Home Remedies – Skin Diseases – Skin care compounds – Skin pigmentation – Memory power- Intelligence and ***Kidney stone***.

Note : Bold and***Italics*** **denotes Self Study Topics**

TEXT BOOKS:

1. **Panda, H**., "*Hand Book on Herbal Drugs and its Plant Sources*", National Institute of Industrial Research, Delhi.

2. **Panda, H.,** "*Complete Technology Book on Herbal Perfumes and Cosmetics*", National Institute of Industrial Research, Delhi.

3. **Gokhale, S.B, Kokale, C.K,Purohit, A.P.,***Pharmacognosy* ,NiraliPrakashan, Pune.

REFERENCE BOOKS :

1**. Acharya Vipul Rao .** "*Herbs that Heal,* Diamond Pocket Books , NewDelhi.

2.**Kokate, C.K, Purohit, A and Gokhale, S.R.,** "*Pharmacognosy*", NiraliPrakashan, Pune, 43rd Edition, 2009.

SEMESTER-III

Non - Major Elective- I

ORNAMENTAL HORTICULTURE

Instructional Hrs.: 30 **Sub. Code : 16BOUN301**

Max. Marks : ESE - 100 **Credits : 2**

Objectives: To understand the basic aspects of indoor and outdoor gardening. To know different types of ornamental plants and implements used in gardening. To develop the art of miniature plants and soil less culture.

UNIT – I **6 Hrs.**

Horticulture – History, scope and applications - branches of Horticulture - ***garden styles***.

UNIT – II **6 Hrs.**

Elements of garden - Living elements – hedges, edges, lawn, arches, pergolas, topiary, trophy – garden adornments – fountains, statues -***Garden implements***.

UNIT – III **6 Hrs.**

Garden Plants - Annuals, biennials, perennials, climbers, special group of garden plants- succulents- and cacti- ornamental palms- bulbous plants- ***orchids*.**

UNIT – IV **6 Hrs.**

Indoor gardening - Terrarium- Bottle and Dish garden and ***Hanging Basket***-Bonsai- Hydroponics- Vegetable and fruit carving.

UNIT – V **6 Hrs.**

Outdoor gardening - Rockery and water garden-***Kitchen garden*** –Cut flowers-Flower arrangement – dry – fresh decoration and horticultural shows.

Note : Bold and ***Italics* denote Self Study Topics**

TEXT BOOKS:

1. **Kumar**, **N., "**Introduction to Horticulture", Oxford and IBH, Publishing Co. Pvt. Ltd. NewDelhi, 2010
2. **Prasad, S. and Kumar, U.,** "*Principles of Horticulture*", Agro Botanica, India, Revised Edition, 1999.

REFERENCE BOOKS:

1.**George Acquaah.,** "*Horticulture Principles and practices*", Prentice-Hall of India PrivateLtd., 2nd Edition, 1673.

2.**Manibhushan Rao, K.,** "*Textbook of Horticulture*", Macmillan India Ltd., 2000.

3.**Dey,S.C.,** "Complete home gardening", Agrobios 2001.

4.**Chauhan, R. K., "**Encyclopedia of General garding for common people", Dominant publications and distributers, 2011.

SEMESTER - IV

Core Paper- IV

CELL BIOLOGY AND PLANT TISSUE CULTURE

Instructional Hrs: 60Sub. Code: 16BOUC404

Max. Marks: CIA – 25; ESE - 75 **Credits: 4**

Objectives: To study the structure and functions of Cell organelles. To know the mechanism of Gene expression and Protein synthesis. To know the techniques related to tissue culture.

UNIT – I **12 Hrs.**

Cell Organelles - Structure and function of cell wall, Plasma membrane (Fluid mosaic model only) - Endoplasmic reticulum- Mitochondria and ***Ribosome.***

UNIT – II **12 Hrs.**

Cell Organelles - Chloroplast- Nucleus- Chromosome - ***Dictyosomes*** (Structure and functions only).

UNIT – III **12 Hrs.**

Nucleic acids and Cell division - Structure and ReplicationofDNA.Structure andtypes of RNA- Protein synthesis - ***Mitosis***and Meiosis.

UNIT – IV **12 Hrs.**

Tissue culture Techniques - Basic requirements- Sterilization techniques- ***Aseptic Manipulation*** - preparation – M.S. Medium. Cellular totipotency- Explants preparation - Suspension culture- Callus culture and Organogenesis.

UNIT – V **12 Hrs.**

Tissue culture Techniques -*Meristem culture* - Anther culture -Protoplast isolation and culture – Production of artificial seeds and its application.

Note: Bold and***Italics*** **denote Self Study Topics**

PRACTICALS:

1. Study of mitosis using Onion root

2. Study of cell organelles through slides and photographs

3. Sterilization techniques

4. Preparation of M.S medium.

5. Preparation of Explant

6. Callus induction

7. Synthetic seed

TEXT BOOKS:

1**. Arumugam, N.,** "*Cell Biology*,Saras Publication, Kanyakkumari Dt., Revised Edition, 2003.

2. **Verma, P.S.** and **Agarwal, V.K.,** "*Cytology*", S. Chand & Company Ltd., New Delhi, Revised Edition, 1983.

REFERENCE BOOKS :

1. **Dubey, R.C., "***A text book of Biotechnology"*, S. Chand & Company Ltd., New Delhi, Revised Edition, 2009.

2. **Purohit, S.S.,"** *Biotechnology Fundamentals & Applications"* Mrs. Saraswathi Purohit for student Edition, India, Third Edition, 2005.

3. **Razdan, M.K., "***Introduction to plant tissue culture"* , Oxford & IBH publishing Co. Pvt. Ltd., Second Edition, New Delhi, 2008.

4. **Trevan, M.D., Boffey, S., Goulding, K.H., Stanbury, P., "***Biotechnology - The Biological principles*", Tata McGraw-Hill publishing company Ltd., New Delhi, 1996.

5. **Power, C.B.,** "Cell *biology"*, Himalaya Publishing House, Nagpur, Second Edition, 1977.

SEMESTER - IV

Skill Based Subject – II

MULTI SKILL DEVELOPMENT PAPER

Instructional Hrs.: 45 **Sub. Code: 13BOUS402**

Max.Marks: CIA–40; ESE- 60 **Credits : 3**

Objectives : To equip the students with knowledge on all topics as desirable from the point of view of brilliant success in the competitive examinations. To familiarize the students with various types of tests that are employed by the diverse examining bodies.

UNIT – I **9 Hrs.**

Communication - Question tag – Gerund and Infinitives – Spotting the errors – Vocabulary- Synonyms – Antonyms - Prepositions – Articles – One word substitution – Sentence completion.

UNIT- II **9 Hrs.**

Numerical Aptitude - Problems on numbers - Problems on Ages – Percentage - Profit and loss - Ratio & Proportion - Time & Work - Time & Distance - Simple Interest - Compound Interest.

UNIT – III **9 Hrs.**

Critical Reasoning - Logical Inference Questions and Syllogism. **Analytical Reasoning -** Arrangement problems – Family / Blood Relation Qualms – Sense of Directions – Age Doubts.**Verbal Reasoning -** Verbal Analogy (Letter series and number series only) – Coding and Decoding.

UNIT – IV **9 Hrs.**

Presentation skills – Power Point Presentation on Algae in Medicine- FoodIndustry - Role of Fungi in Medicine Industry- Cell Organelles- DNA structure and replication- Tissue culture techniques – Bacteria – Bacteriophage - Plant Diseases.

UNIT – V **9 Hrs.**

Preparation of Resumes - Interview techniques – Verbal – Greeting- Speaking - Non- verbal – Movement- Posture- Gesture- Eye contact- Voice modulation- Dress code- Group discussion on Current affairs.

REFERENCE BOOKS :

1.**Prakesh, C.L.N**, " *An advanced course in communication skills and Media Awareness*", Cambridge University Press, India.

2. **Faculty of English**, PG and Research Department of English, Vellalar College of Women, Expressions – "*Interactive English communicative skills*", Sre Sakthi Printers, Erode, 2007.

3. **Prasad, H.M**, "*How to prepare for group discussion and interview*", Tata Mc graw Hill Publishing Company Ltd., 2011.

4. **AjaiBkher**, "*Group Discussion*", Volire Publishers, New Delhi.

SEMESTER- IV

Non-Major Elective - II

NURSERY AND LANDSCAPING

Instructional Hrs. : 30 **Sub.Code : 16BOUN402**

Max. Marks : ESE - 100 **Credits : 2**

Objectives : To acquire the aspects and perspectives on nursery and landscape gardening.To know the different kinds of nursery structures

UNIT – I **6 Hrs.**

Nursery preparation- Scope and importance – components of nursery- media for nursery plants - preparation of nursery beds - ***Organic manuringand its applications***.

UNIT – II **6 Hrs.**

Plant growing structures - ***Pots and containers*** **-** Nursery structures – Hot bed, Cold Frame, Green house, Lath house, Conservatory, Poly tunnels, Net house – Role of growth regulators in horticulture.

UNIT – III **6 Hrs.**

Methods of Propagation - ***Cutting***–Layering-Simple, Compound and Air layering-Grafting-Approach grafting , Cleft grafting and Bud grafting (Outline only).

UNIT – IV **6 Hrs.**

After care of plants - Transplantation– hardening, Pruning and thinning -Plant protection – disease causing organisms – ***control measures***.

UNIT – V **6 Hrs.**

Landscaping &designing -***Importance of garden*** -landscape gardening- beauty components and principles-designing a garden- trees in landscaping.

Note : Bold and***Italics*** **denote Self Study Topics**

TEXT BOOKS :

1**. Kumar, N**. Introduction to Horticulture, Oxford and IBH, Publishing Co. Pvt. Ltd. NewDelhi, 2010.

2**. Prasad, S. and Kumar, U.,** "*Principles of Horticulture*", Agro Botanica, India, Revised Edition, 1999.

REFERENCE BOOKS :

1. **George Acquaah**, "*Horticulture Principles and practices*", Prentice-Hall of India PrivateLtd., 2nd Edition 1673.

2. **Jitendra Singh,** "*Basic Horticulture*", Kalyani Publishers, New Delhi, Reprint, 2004.

3. **Manibhushan Rao, K.,** "*Textbook of Horticulture*", Macmillan India Ltd., 2000.

4. **Saini, R.S., Kaushik, N., Kanshik, R.A. and Godara, N.R.** Practical Nursery Production, Agrobios, 2006.

VELLALAR COLLEGE FOR WOMEN (AUTONOMOUS), ERODE

B.Sc., DEGREE PRACTICAL EXAMINATION,

Model Question Paper Pattern

Core Practical – II

ANATOMY, EMBRYOLOGY, CELL BIOLOGY & PLANT TISSUE CULTURE

Hrs. : 3 **Sub. Code : 16BOUCP02**

Max. Marks : CIA – 40; ESE - 60 **Credits : 4**

I.Make suitable micro preparations of **A** and **B**. Draw labeled sketches. Identify giving reasons and submit the slides for valuation. 2 x 7 = 14

II. Mount any one stage of the given specimen **C .** Submit the slide for valuation. Draw sketch and give reasons 1x 5 =5

.

III. Make a squash of the given specimen **D**. Identify any one stage, draw sketch and give reasons. 1x 6 =6

1V. Identify **E, F, G, H** and **I**. Draw sketches and write notes. 5 x 5 = 25

50

Record 10

Total 60

PRACTICAL – II

SCHEME OF VALUATION

I.	A – Anatomy – Primary/Secondary Structure	Identification	- 1
	B – Anatomy – Anomalous secondary growth	Slide	- 2
		Sketch	- 2
		Reasons	- 2
			2 x 7 = 14
II.	C – Embryo Mounting	Identification	- 1
		Slide	- 2
		Sketch	- 1
		Reasons	- 1
			1 x 5 = 5
III.	D – Mitosis	Identification	- 1
		Slide	- 2
		Sketch	- 1
		Reasons	- 2
			1 x 6 = 6
IV.	E – Anatomy	Identification	- 1
	F – Embryology	Sketch	- 1
	G – Cell Biology	Reasons	- 3
	H - Medium / Sterilization Techniques / Synthetic seed		
	I - Tissue culture – Callus / Meristem / Anther		5 x 5 = 25

			50
		Record	10

		Total	60

Vellalar College for Women (Autonomous), Erode - 12.

Bachelor of Science in Botany

2016 - 2017 Onwards

Course Content and Scheme of Examinations (CBCS Pattern)

Semester V

Part	Study Components	Subject Code	Title of the Paper	Inst. Hrs./ Week	Exam. Dur. Hrs.	Max. Marks			Credits
						CIA	ESE	Total	
III	Core	16BOUC505	Paper V Taxonomy of Angiosperms & Economic Botany	5	3	25	75	100	4
		16BOUC506	Paper VI Plant Physiology	5	3	25	75	100	4
		16BOUC507	Paper VII Phytochemistry	4	3	25	75	100	4
			Practical- III Papers V, VIII & IX	7					
	Elective I	16BOUE501	Paper I Applied Microbiology	3	3	25	75	100	4
	Elective II	16BOUE502	Paper II Horticulture and Plant Breeding	3	3	25	75	100	4
IV	Skill Based Subject III	16BOUS503		3	3	25	75	100	3
Total								600	23

Semester VI

III	Core	16BOUC608	Paper VIII Ecology & Phytogeography	4	3	25	75	100	4
		16BOUC609	Paper IX Genetics & Biostatistics	4	3	25	75	100	4
		16BOUC610	Paper X Biotechnology I - Concepts &Techniques	4	3	25	75	100	4
		16BOUC611	Paper XI Biotechnology II – Applied Biotechnology	4	3	25	75	100	4
		16BOUC612	Paper XII Fundamentals of Computer & Bioinformatics	4	3	25	75	100	4
			Practical –IV Papers VI, VII, X, XI &XII	5					
			Elective Practical-I Paper I & II	2					
		16BOUCP03	Practical -III Papers V, VIII & IX (Exam)		3	40	60	100	4
		16BOUCP04	Practical- IV Papers VI, VII, X, XI & XII(Exam)		3	40	60	100	4
		16BOUEP01	Elective Practical-I Paper I & II (Exam)		3	40	60	100	3
IV	Skill Based Subject IV	16BOUS604		3	3	25	75	100	3
V	Extension activity NCC/NSS/Physical education/YRC/ Green Society/CCC/EDP							100	1
Total								1000	35

Grand Total (I to VI Semester)		4000	140

Vellalar College for Women (Autonomous), Erode - 12.

Bachelor of Science in Botany

2016- 2017 Onwards

Course Content and Scheme of Examinations (CBCS Pattern)

SKILL BASED SUBJECTS

S.No.	Subject Code	Title of the Paper
1	16BOUS301	Herbs and Health (Cafeteria)
2	13BOUS402	Multi Skill Development Paper*
3	16BOUS503	Organic Farming(Cafeteria)
4	16BOUS604	Mushroom Technology (Cafeteria)

BASIC TAMIL / ADVANCED TAMIL/ NON MAJOR ELECTIVES

S.No.	Subject Code	Title of the Paper
1	14TMLU301	Basic Tamil*
	14TMLU402	
2	14ADTU301	Advanced Tamil**
	14ADTU402	
3	16BOUN301	Ornamental Horticulture
	16BOUN402	Nursery and Landscaping

* For Students whose Part I in secondary education is not Tamil

** For Students whose Part I in Higher secondary education is not Tamil

SELF LEARNING SUBJECT

S.No.	Subject Code	Title of the Paper
1	13AUGSL05	General awareness (Optional) (Online)
2	13BOUSL03	Preservation Techniques (Optional)

*Online examination for three units for a maximum of 60 marks.

Units IV & V are CIA for a maximum of 40 marks.

SEMESTER – V

Core Paper - V

TAXONOMY OF ANGIOSPERMS AND ECONOMIC BOTANY

Ins. Hrs. : 75 **Sub. Code : 16BOUC505**

Max. Marks : CIA- 25; ESE -75 **Credits: 4**

Objectives : To identify the families of the plants in the theory syllabus. To identify medicinally and economically important plants and plant products.

UNIT – I **15 Hrs.**

Descriptive terms used in taxonomy -***stem***- leaf- inflorescence- flower - fruit. Systems of classification – Natural - (Bentham and Hooker) - Modern – (Takhtajan) (outline only).

UNIT – II **15 Hrs.**

Herbarium techniques and uses- Nomenclature - ICBN-Priority - Typification- Effective and Valid publication- ***Author citation***.

UNIT – III **15 Hrs**.

A detailed study of the following families - Systematic position- Description and the ***economic importance of the types*** and pollination mechanisms wherever applicable - Annonaceae- Capparidaceae- Sterculiaceae- Rutaceae- Anacardiaceae- Curcurbitaceae- Apiaceae.

UNIT – IV **15 Hrs.**

Rubiaceae - Sapotaceae - Convolvulaceae- Scrophulariaceae- Acanthaceae-Verbenaceae- ***Lamiaceae.***

UNIT - V **15 Hrs.**

Amarantaceae- Euphorbiaceae- Moraceae- Orchidaceae -Liliaceae- Arecaceae and ***Poaceae.***

Note :**Bold** and ***Italics denote Self Study Topics***

PRACTICALS

1. Taxonomical studies of selected plant species included in the families mentioned in the theory.
2. Study of economic products of the plants belonging to the families mentioned.
3. Students should submit 20 herbarium sheets at the time of Practical examinations.
4. Field trip for 5 days to study vegetation and for specimen collection.
5. Visit to BSI / Nilgiri Biosphere Nature Park.

TEXT BOOKS:

1. Pandey, B.P, " *Taxonomy of Angiosperms*", S. Chand & Company Ltd. 1982, New Delhi.

2. Pandey, B.P, "*Economic Botany*", S. Chand & Company Ltd., New Delhi, 2007.

3. Singh, V. and Jain, D.K, "*Taxonomy of Angiosperms*", Rastogi Publications, Second Edition, 2004.

REFERENCE BOOKS:

1. Lawrence- G.H.M, " *Taxonomyof Vascular plants"*, Oxford and IBU Publishing Co. Pvt.. Ltd., New Delhi, 1951.

2. Saxena, N.B. and **Saxena, S,** "*Plant Taxonomy"*, PragatiPrakashan, Revised Edition, 2001.

SEMESTER – V

Core Paper - VI

PLANT PHYSIOLOGY

Ins. Hrs. : 75 **Sub. Code : 16BOUC506**

Max. Marks : CIA 25; ESE -75 **Credits:4**

Objectives : To understand the water relations with Plant system. To understand the energy relations and enzymes involved in various metabolic activities.

UNIT - I **15 Hrs.**

Water relations of plant –Structure and properties of water - Diffusion- Osmosis – Osmotic pressure- Turgor pressure- ***Plasmolysis-*** Imbibition - absorption of water- ascent of sap- absorption of mineral salts.

UNIT - II **15 Hrs.**

Transpiration- Kinds of transpiration- Mechanism of stomatal transpiration- Factors affecting stomatal movement. Translocation of solutes and ***assimilates***.

UNIT - III **15 Hrs.**

Photosynthesis – Photosyntheticapparatus and ***pigments***- pigment system, Light reaction and photosynthetic electron transport system– Carbon fixation : C_3,C_4 and CAM Pathways.

UNIT - IV **15 Hrs.**

Respiration - Aerobic respiration - Glycolysis - Kreb's cycle - Electron transport system and oxidative phosphorylation - ***anaerobic respiration-***an outline of HMP pathway.

UNIT – V **15 Hrs.**

Plant growth regulators – Auxin - Gibberellin- Cytokinin(outline only) **Physiology of flowering** – Photoperiodism- Plant movements -Physiology of seed germination and ***seed dormanacy.***

Note :**Bold** and ***Italics denote Self Study Topics***

TEXT BOOKS :

1**. Verma, S.K.,** "*A Text book of Plant Physiology and Biochemistry",* S. Chand and Company, New Delhi.

2**. Jain, V.K.,** "*Fundamentals of Plant Physiology"*, S. Chand and Company Ltd, 1990.

REFERENCE BOOKS:

1. **Arthur C. Giese** , "*Cell Physiology''*, Toppan Company Ltd.Tokyo, Japan, Fifth Edition, 1979.

2. **Frank B. Salisbury** and **Cleon W. Ross,** "*Plant Physiology*", CBS Publisher and Distributors, New Delhi, Third Edition, 1996.

3. **Gill, P.S.,** "*Plant Physiology"*, S. Chand and Company Ltd., New Delhi, 2001.

4. **Jayaraman, J,** "*Laboratory Manual in Bio-chemistry"*, New Age International (P) Ltd. Publishers, New Delhi, 2008.

5. **Ray Noggle, G**. and **George J. Fritz,** "*Introduction to Plant Physiology"*, Prentice – Hall of India Pvt Ltd., New Delhi, 1986.

6.**Rober M. Devlin,** "*Plant Physiology"*, Lifton Educational Publishing INC, New York , Third Edition, 1979.

SEMESTER -V

Core Paper –VII

PHYTOCHEMISTRY

Ins. Hrs. : 60 **Sub. Code : 16BOUC507**

Max. Marks : CIA 25; ESE - 75 **Credits: 4**

Objectives : To understand the structure and properties of Biomolecules, secondary metabolites and free radicals. To study the principles and working mechanism of Instruments.

UNIT- I **12 Hrs.**

Bonding - Ionic bond- Covalent bond- Hydrogen bond Acids and Bases- Solutions- pH and ***Buffer system***.

UNIT- II **12 Hrs.**

Biomolecules - Outline of Structure and Classification of Carbohydrates- Amino acids- Protein and ***Lipids.***

UNIT- III **12 Hrs.**

Enzymes and Nitrogen metabolism -*Classification*- properties- mode of action- factors affecting enzyme activity-Nitrogen metabolism

UNIT- IV **12 Hrs.**

Study of secondary metabolites – Polyphenolics - Terpenoids and Alkaloids. ***Free radicals*** – Types and Scavenging activity.

UNIT-V **12 Hrs.**

Principles and working mechanism of pH Meter – Centrifuge - Colorimetry- Spectrometry and Chromatography – Paper and ***Thin layer*.**

Note :Bold and ***Italics*** **denote Self Study Topics**

PRACTICALS :

Physiology - Individual Experiments

1. Determination of Osmotic Pressure of the cell sap of the given specimen (Rhoeo leaf).

2. Measurement of the rate of photosynthesis under varying condition of CO_2 concentration.

3. Effect of light intensity on O_2 evolution during photosynthesis

4. Effect of light on transpiration using transpiration pull apparatus

5. Rate of respiration in flower buds/germinated seeds using simple Respiroscope

Phytochemistry - Individual Experiments

1. Preparation of Molar, Normal & Percentage of solution

2. Separation of leaf pigments by Paper chromatography

3. Separation of leaf pigments by Thin Layer Chromatography

4. Estimation of Chlorophyll

5. Qualitative analysis of Phytoconstituents

Physiology and Phytochemistry - Demonstration Experiments

1. Determination of water absorption and transpiration ratio
2.. Comparison of imbibition of water by starchy and fatty seeds
3. Determination of seed viability using tetrazolium test
4. Estimation of Protein-(Lowry*et al*. method)
5. Estimation of Starch – (Anthrone method)
6. Determination of Transpiration by Ganong's Potometer.
7. Demonstration of pH Meter- Centrifuge- Colorimeter

TEXT BOOKS:

1. **Verma, S.K.,** "*A Text book of Plant Physiology and Biochemistry",* S. Chand and Company, New Delhi.
2. **Jain V.K.** "*Fundamentals of Plant Physiology"*, S. Chand and Company Ltd., New Delhi.

REFERENCE BOOKS :

1. **Arthur C. Giese**, "*Cell Physiology''*, Toppan Company Ltd., Tokyo, Japan, Fifth Edition, 1979.
2.**Jain , J.L.**, "*Fundamentals of Bio-chemistry"*, S. Chand and Company Ltd., New Delhi, 2001.
3. **Jayaraman, J,** "*Laboratory Manual in Bio-chemistry",* New Age International (P) Ltd., Publishers, New Delhi, 2008.
4. **Robert M. Devlin**, "*Plant Physiology"*, Lifton Educational Publishing INC, New York, Third Edition, 1979.

SEMESTER - V

Elective –I APPLIED MICROBIOLOGY

Ins. Hrs. : 45 **Sub. Code : 16BOUE501**

Max. Marks : CIA 25; ESE -75 **Credits : 4**

Objectives: To install necessary skills on fermentation process, isolation, identification and production of microbes used in industry. To understand culture and application of microbes in Agriculture.

UNIT – I **9 Hrs.**

Fermentation- Introduction – Substrates for industrial fermentation- Kinds of fermentation – Batch, Fed-Batch and Continuousculture-Fermentation media– Sterilization - methods of sterilization – physical and chemical sterilization- ***Advantages***.

UNIT – II **9 Hrs.**

Soil & Air Microbiology– Soil microbes – Algae, Fungi and Bacteria. Role of micro organism in soil fertility –Rhizosphere and Rhizoplane micro organisms –Mycorrhiza-.Ecto and Endo- Air microbiology – Role of Microorganism in air- ***Phylloplane micro flora***.

UNIT – III **9 Hrs.**

Microbiology of water- Microorganism in water - Purification- ***Determination of sanitary quality***. Microbiology of sewage and treatment – Primary- Secondary- Tertiary- Oxidation Pond -Reuse of water - Composting methods –Organic matter decomposition - Vermicomposting.

UNIT – IV **9 Hrs.**

Food Microbiology- Composition of milk - Pasteurization - Dairy products – Production of cheese and Lactic acid- Microbial flora of fresh food - Microbial examination of foods – Food poisoning- ***Botulism***.

UNIT – V **9 Hrs.**

Industrial Microbiology - Manufacture of Ethanol **–** Streptomycin **-** Vitamin B_{12}**-** ***Glutamic acids–*** Citric acid.

Note :Bold and ***Italics*** **denote Self Study Topics**

PRACTICALS :

1.Simple staining for study of Bacterial morpology

2. Gram's staining

3. Negative staining of Bacteria

4. Preparation of agar streak and agar slant

5. Sterilization Techniques

6. Preparation of culture media for bacteria and fungi

7. Enumeration of bacterial colonies from soil by serial dilution method

8. Antibacterial activity

9. Microbial flora of fresh food

10. Methylene blue reduction test (MBRT) for Milk.

11. Eosin Methylene blue agar test for Coliforms.

TEXT BOOKS:

1.**Casida, JR. L.E.,** *"Industrial Microbiology*", New Age International (P) Ltd. Publishers, New Delhi, Revised Edition, 2000.

2. **Dubey, R.C., "***A text book of Microbiology*", S.Chand& Company Ltd, New Delhi, Third Edition, 2004.

3. **Power, C.B.,** *"Microbiology Vol II"*, Himalaya Publishing House, Nagpur, Second Edition, 1977.

REFERENCE BOOKS :

1. **Gerald Reed, Prescott** and **Dunn's,** *"Industrial Microbiology*", CBS Publishers & Distributors, New Delhi, Fourth Edition, 1987.

2.**Lechtman, M.D**, " *Microbiology",* Macmillan Publishing Co. London, 1976.

3. **Pelzar, M.J., Reid, R.D and Chan, E.C.S,** "*Microbiology"*, Tata Mc Graw Hill, 1983.

5. **Prescott, A. and Dunns,** "*Industrial Microbiology"*, AVS Publishing, Revised Edition, 1983.

6. **Purohit, S.S,** " *Microbiology Fundamentals & Applications"*, Mrs. Saraswathi Purohit for Student Edition, India, Sixth Edition, 2005.

7. **Dubey, R.C. &Maheswari, D. K.,** *"Practical Microbiology",*S.Chand& Company Ltd, New Delhi, First Edition, 2002.

8. **Bisen, P.S. & Kavita Verma**, "*Handbook of Microbiology*" CBS Publishers & Distributors, New Delhi, First Edition, 1994.

SEMESTER –V
Elective - II

HORTICULTUREAND PLANT BREEDING

Instructional Hrs: 45Sub. Code: 16BOUE502

Max. Marks: CIA – 25; ESE - 75 **Credits: 4**

Objectives: To provide theoretical and practical aspects of gardening to enable them to be self employed. To give insight into the science of breeding.

UNIT - I9 Hrs.

Introduction-Scope and division of Horticulture, Nursery structures-Nursery beds, propagating frames, hot beds, green house and glass house. Nursery Management-cutting, layering, grafting, and ***potting.***

UNIT - II 9 Hrs.

Gardening- Garden styles- Indoor garden-terrarium, Hanging Baskets, bonsai- Outdoor garden-Public Garden, Terrace , Rock and Kitchen garden- ***Lawn* .**

UNIT - III9 Hrs.

Garden operations: Garden implements and accessories- planting and transplantation, pinching, disbudding, defoliation, staking, pruning ,watering, mulching and ***topiary*** - Organic farming-vermicompost, green manure.

UNIT - IV9 Hrs.

Cut flowers- Commercial floriculture - Cultural practices of rose and ***jasmine*** **-** Flower arrangements- dry, wet and ikebana.

UNIT - V9 Hrs.

Plant breeding - Objectives - Conventional methods – Introduction, ***Selection*** – Mass, Pure and Clonal, Hybridization Techniques- types, Heterosis.

Note:Bold and ***Italics*** **denotes Self Study Topics**

PRACTICALS:

1. Demonstration of vegetative propagation methods – Grafting and layering.
2. Flower arrangements.
3. Types of garden – Kitchen garden, Green house.
4. Hybridization techniques – Emasculation and Bagging.

TEXT BOOKS:

1. **Kumar, N**. Introduction to Horticulture, Oxford and IBH, Publishing Co. Pvt. Ltd. NewDelhi, 2010.
2. **Sharma, J.R,** "*Principles and Practice of Plant breeding"*, Tata MCG raw–Hill publishing Company Ltd., New Delhi, 1994.
3. **Prasad, S. and Kumar, U.,** "*Principles of Horticulture*", Agro Botanica, India, Revised Edition, 1999.

REFERENCE BOOKS:

1. **George Acquaah**, "*Horticulture Principles and practices*", Prentice-Hall of India Private Ltd., 2nd Edition 1673.
2. **Jitendra Singh,** "*Basic Horticulture*", Kalyani Publishers, New Delhi, Reprint, 2004.
3. **Manibhushan Rao, K.,** "*Textbook of Horticulture*", Macmillan India Ltd., 2000.
4. **Saini, R.S., Kaushik, N., Kanshik, R.A. and Godara, N.R.** Practical Nursery Production, Agrobios, 2006.
5. **Allard, R.W, "***Principlesof plant breeding"*, John Wiley & sons, INC. Singapore, 2000.
6. **Singh, J. R, "***Plant breeding principles and methods"*, Kalyani Publishers, Ludiana, Seventh Edition, 2008.

SEMESTER –VI

Core Paper –VIII

ECOLOGY AND PHYTOGEOGRAPHY

Ins. Hrs. : 60 **Sub. Code : 16BOUC608**

Max. Marks : CIA 25;ESE - 75 **Credits: 4**

Objectives : To enable the students to acquire knowledge about the environment and to identify the environmental problems**.** To facilitate the students to find out remedial solutions.

UNIT- I **12 Hrs.**

Ecological factors: Principles- Role of Climatic - Edaphic - Biotic factors on plants **–** Kinds and Structure of Ecosystem - Biogeochemical cycles (Water, ***Nitrogen*** and Sulphur cycle).

UNIT - II 12 Hrs.

Autecology– Ecological life history of species- Characteristics of Population- Dispersal and migration - Synecology – Vegetation types - Methods of studying vegetation – Quadrat-Belt and***Line transect***.

UNIT – III 12 Hrs.

Ecological Adaptations - Hydrophytes **–**Mesophytes**-** Xerophytes – ***Halophytes*****-** Morphological and Anatomical features in relation to their habitats - Plant succession- Hydrosere- Xerosere.

UNIT – IV 12 Hrs.

Plant Distribution – Factors affecting distribution- Concept of Barriers **-** Continental drift **–** Endemism **-** Major and Minor biomes of the world- ***Ecological indicators***.

UNIT – V 12 Hrs.

Plant geography and Climate of India- Principles and vegetational types of India – Tropical, Sub tropical and Temperate forests, Grass land vegetation. ***Phytogeographical regions of India.***

Note :Bold and ***Italics*** **denote Self Study Topics**

PRACTICALS:

1.Structure of ecosystem – Food chain , Food web and Ecological Pyramid

2. Study of morphological and anatomical adaptations of hydrophytes, xerophytes, halophytes and mesophytes using representative samples.
3. Determination of frequency and density constituent of plant species in a terrestrial community through Quadrat and Transect (line, belt).
4. Phytogeographical regions of India.
5. Analysis of Physico – chemical characters of soil
6. Analysis of Physico – chemical characters of water.
7. Analysis of Physico – chemical characters of effluent

TEXT BOOKS:

1. **Sharma P.D.,**. "*Ecology & Environment"*, Rastogi Publications, Meerut, Eleventh Edition, 2005.
2. **Shukla, R.S, Chandel,P.S.,** "*A text book of plant Ecology Including Ethnobotany and soil science"*,S.Chand& company Ltd. New Delhi, First edition, 2003.
3. **Vasishta. P.C.,** "*A text book of Plant Ecology*", Vishal Publications, NewDelhi, Second Edition, 1979.

REFERENCE BOOKS:

1. **Eugene P. Odum ,** "*Fundamentals of Ecology"*, W.B Saunders company, Philadelphia and London, Third Edition, 2005.
2. **Verma, P.S.** and **Agarwal,V.*K.,*** *"Environmental Biology*", S. Chand & Company Ltd, New Delhi, Fourth edition. 1993.
3. **Subrahmanyam, N.S.** and**Sambamurthy**, A.V.S.S. "*Ecology*", Narosa Publishing House Pvt. Ltd. Second edition, 2006.

SEMESTER -VI

Core Paper - IX

GENETICS AND BIOSTATISTICS

Instructional Hrs. : 60 **Sub.Code : 16BOUC609**

Max. Marks : CIA 25; ESE - 75 **Credits: 4**

Objectives : To study the basics of Mendelian genetics. To understand the mechanism and concept of gene expression and mutation. To apply statistics in plant science.

UNIT- I **12 Hrs.**

Mendelismand Interaction –Mendel's law of inheritance -Monohybrid - Dihybrid Cross - Back Cross - Test cross - Incomplete dominance - Complementary – Supplementary and***Duplicate factors***.

UNIT- II **12 Hrs.**

Classical Genetics - ***Linkages*** and Crossing over - Multiple alleles - Blood groups in man –- Sex determination in plants and Drosophila .

UNIT-III **12 Hrs.**

Gene and Extra chromosomal inheritance – Gene definition, Classification and Structure. Cytoplasmic inheritance (Plastid only) – Extra nuclear Inheritance in Prokaryotes – Episomes and ***Plasmids.***

UNIT-IV **12 Hrs.**

Mutationand Gene Regulation– Mutation – Kinds of mutation - Somatic mutation- Spontaneous mutation- Induced mutation –-Physical and chemical mutagens – Reverse mutation Polyploidy - Genetic code - gene regulation in prokaryotes – ***Operon concept.***

UNIT- V **12 Hrs.**

Biostatistics – Collection of data – Primary Data and Secondary Data - Sampling methods- Measures of Central tendency - ***Arithmetic Mean***- Median and Mode. Measures of Dispersion- Range- Standard deviation and Standard error (only theory).

Note :Bold and ***Italics*** **denote Self Study Topics**

PRACTICALS:

1. Genetic Problems- Monohybrid & Dihybrid cross, Backcross, Test cross, Incomplete dominance, Complementary factors, Supplementary factors & Duplicate factors.
2. Simple problems in Biostatistics - Mean, Median, Mode, Standard deviation, Standard error.

TEXT BOOKS:

1. **Rama Krishnan, P, "***Biostatistics"* Saras Publications, Nagercoil, First Edition, 2001.
2. **Verma, P. S., Agarwal, V.K,** "*Genetics",* First Edition , S. Chand & Company Ltd, New Delhi, 2002.

REFERENCE BOOKS:

1. **Allard, R.W, "***Principlesof plant breeding"*, John Wiley & sons, INC. Singapore, 2000.
2. **Sharma, J.R,** " *Principles and Practice of Plant breeding",* Tata MCG raw–Hill publishing Company Ltd., New Delhi, 1994.
3. **Singh, J. R, "***Plant breeding principles and methods"*, Kalyani Publishers, Ludiana, Seventh Edition, 2008.

SEMESTER – VI
Core Paper- X
BIOTECHNOLOGY I – CONCEPTS AND TECHNIQUES

Ins. Hrs. : 60 **Sub. Code : 16BOUC610**

Max. Marks : CIA 25; ESE - 75 **Credits: 4**

Objectives : To know the outlines of genetic engineering.To develop the skill on gene transfer methods. To understand the applications and the uses of various bio molecules separation techniques. To study the extraction and separation of enzymes used in industries.

UNIT- I **12 Hrs.**

Biotechnology – Scope and its branches - Modern Biotechnology- Gene Bank and Commercial potential of Biotechnology- Enzymes used in gene cloning – Restriction enzymes, Polymerases, Ligases and ***Reverse transcriptase***.

UNIT- II **12 Hrs.**

Cloning vectors – Plasmid – Phage - YAC – Transposons - ***CaMV*** -Ti plasmid -Methods of Gene cloning - Applications of Genetic Engineering.

UNIT- III **12 Hrs.**

Gene transfer Methods - Direct gene transfer methods- Electroporation, ***Microinjection,*** Liposome fusion, Biolistics, Transfection in plants and Agroinfection-Vector mediated gene transfer in higher plants – Agrobacterium mediated Ti Plasmid - Advantages and disadvantages of gene transfer - Genomic Library.

UNIT - IV **12 Hrs.**

Techniques in biotechnology – PCR techniques - Applications of PCR- Southern, Northern and Western blotting techniques - DNA finger printing –***Agarose gel electrophoresis***.

UNIT - V **12 Hrs.**

Enzyme technology – Microbial production - Extraction- separation - purification of enzymes – Immobilization methods-***Application of enzymes***.

Note :**Bold** and ***Italics denote Self Study Topics***

TEXT BOOKS:

1. **Kumaresan, V., "***Biotechnology"*, Saras Publications, Nagercoil, 2009.

2. **Dubey, R.C., "***A text book of Biotechnology*" ,S.Chand& Company Ltd, New Delhi, Third Edition, 2004.

3. **Gupta, P.K., "***Elements of Biotechnology*", Rastogi publications – Meerut first edition, 2004.

REFERENCE BOOKS:

1. **Balasubramanian, P.,** Bryce, CFA., Dharmalingam, K. Green,J., Kunthala Jayaraman "*Concepts in biotechnology"*, Universities press India Pvt. Ltd., Hyderabad, 2004.

2. **Joshi, P., "***Genetic Engineering and its Applications*", Student Edition Jodhpur, 2000.

3. **Purohit, S.S., Mathur, S.K., "***Biotechnology Fundamentals & Applications"*, Agro botanical Publishers India, 1996.

4. **Purohit, S.S.,"** *Biotechnology Fundamentals & Applications"* Mrs. Saraswathi Purohit for student Edition, India, Third Edition, 2005.

5.**Razdan, M.K., "***Introduction to plant tissue culture"* , Oxford & IBH publishing Co. Pvt. Ltd., Second Edition, New Delhi, 2008.

6.**Trevan, M.D., Boffey, S., Goulding, K.H., Stanbury, P., "***Biotechnology - The Biological principles*", Tata McGraw-Hill publishing company Ltd., New Delhi, 1996.

SEMESTER – VI

Core Paper – XI

BIOTECHNOLOGY II – APPLIED BIOTECHNOLOGY

Ins. Hrs. : 60 **Sub. Code : 16BOUC611**

Max. Marks : CIA 25; ESE - 75 **Credits: 4**

Objectives : To understand the application of genetic manipulation in Agriculture, Food, . Medicines, Biopesticides. To study Bioprocess Technology and their applications.

UNIT - I **12 Hrs.**

Food Technology – SCP as microbial food for future **-** Mass cultivation and nutritional value of Spirulina- ***Scenedesmus,***Yeast *and* Bacteria (Methylophilus) **-** Mushroom Technology – Cultivation techniques and nutritional value of *Pleurotussajor-caju – Agaricusbisporous*.

UNIT - II **12 Hrs.**

Biofertilizers – Advantages of mass cultivation and application technique of Rhizobium- Azospirillum- Blue Green Algae (Nitrogen Fixers)- Phosphobacteria- Azolla and ***VAM*.**

UNIT - III **12 Hrs.**

Application of genetic engineering - Agriculture (transgenic plants) -. Medicine **-** ***Insulin***-Gene therapy **-** Monoclonal antibodies and Hybridoma techniques.

UNIT - IV **12 Hrs.**

Biotechnology in pollution control – Xenobiotic Compounds - Phytoremediation – Bioleaching – Biosorption – ***Bioplastics***.Waste water treatment.

UNIT - V **12 Hrs.**

Biofuels -Bioethanol- Biogas production - Methane – Biohydrogen. Petro plants - Biodiesel - Plant biomass – Types, Composition and ***Energy plantation***.

Note : **Bold** and ***Italics denote Self Study Topics***

PRACTICALS:

Demonstration

1**.** Isolation of DNA

2. PCR Techniques

3. Cultivation of *Pleurotussajor-caju* and *Agaricusbisporous*

4. Culture of Yeast and Azolla.

5. Biofetilizers – Azospirillum- Rhizobium- VAM – Phosphobacteria- Photographs.

6. Blotting techniques – Southern/ Western - Photographs.

7.Petrochemical plants – Materials / Photographs

8. Biogas production - Photographs.

TEXT BOOKS :

1. **Kumaresan, V., "***Biotechnology"*, Saras Publications, Nagercoil, 2009.

2. **Dubey, R.C., "***A text book of Biotechnology*" ,S.Chand& Company Ltd, New Delhi, Third Edition, 2004.

3. **Gupta, P.K., "***Elements of Biotechnology*", Rastogi publications – Meerut first edition, 2004.

REFERENCE BOOKS:

1. **Balasubramanian, P.,** Bryce, CFA., Dharmalingam, K. Green,J., Kunthala Jayaraman , "*Concepts in biotechnology"*, Universities Press India Pvt. Ltd., Hyderabad, 2004.

2. **Joshi, P., "***Genetic Engineering and its Applications*", Student Edition Jodhpur, 2000.

3. **Kumar, H.D.**, *"Modern Concepts of Biotechnology*", Vikas publishing house Pvt. Ltd., 2001.

4. **Purohit, S.S.,"** *Bitechnology Fundamentals & Applications"* Mrs. Saraswathi Purohit for student Edition, India, Third Edition, 2005.

5.**Trevan, M.D., Boffey, S., Goulding, K.H., Stanbury, P., "***Biotechnology the Bological principles*", Tata McGraw-Hill publishing company Ltd., New Delhi, 1996.

SEMESTER - VI

Core Paper - XII

FUNDAMENTALS OF COMPUTER AND BIOINFORMATICS

Ins. Hrs. : 60 **Sub. Code : 16BOUC612**

Max. Marks : CIA 25; ESE - 75 **Credits : 4**

Objectives: To acquire the knowledge of worldwide collection of computer networks. To acquire the knowledge of databases and sequence analysis

UNIT – I **12 Hrs.**

Introduction to computer– Components of Computer **-** Capabilities of Computer **–** Hardware and Software **–** Input **-** Output devices **-** Operating System ***-Computer applications***.

UNIT –II **12 Hrs.**

Microsoft Office- M.S Word **-** Creation of documents **–** Excel **-** Spread sheet- workbook ***-charts*** *and* ***table*** **-** Power Point presentation.

UNIT – III **12 Hrs.**

Introduction to Internet – Data communication concepts **–**WWW **-** E- mail- Smiley- Service Provider **–** Internet addressing (Domain IP) **-** Net Browser- search engine - ***News groups*.**

UNIT – IV **12 Hrs.**

Bioinformatics – Types of Database **–** Nucleotide sequence Database **–** NCBI - GENBANK-ENTREZ-EMBL. Protein Sequence Database **–** SWISS-PROT- Literature Database – Pub Med – AGRICOLA-Data Mining- ***Virtual library***.

UNIT – V **12 Hrs.**

Sequence analysis – Similarity Search **-** Gene Finding- Protein prediction- Genome mapping - Phylogenetic analysis Biomolecular visualization –***Drug Designing***.

Note :Bold and ***Italics*** **denote Self Study Topics**

PRACTICALS:

1. MS - word.
2. Microsoft Excel.
3. Power point presentation
4. Web browsing.
5. E-mailing.
6. Gene finding.
7. Biomolecular visualization using Pymol
8. Retrieving sequence data from Entrez
9. Locating the chromosome of a Gene

TEXT BOOKS :

1. **Mani, K.,** and**Vijayaraj, N,** "*Bioinformatics for beginners*". KalaikathirAchchagam, Coimbatore, First Edition, 2002.
2. **SundaraRajan, S.** and **Balaji, R,** *"Introduction to Bioinformatics",* Himalaya Publishing Housing, First Edition, Mumbai, 2002

REFERENCE BOOKS :

1. **Arthur M. Lesk**, "*Introduction to Bioinformatics",* Oxford University Press, First Edition, NewDelhi, 2003.
2. **Attwood, T. K.** and **Parry Smith**, **D.J,**" *Introduction to Bioinformatics"*, Pearson Education Ltd., Fifth Edition, NewDelhi, 2003.
3. **Irfan A. Khan** and **Atiya Khanum**, "*Emergingtrends in Bioinformatics",*Ukaaz Publications, First Edition, Hyderabad, 2002.

VELLALAR COLLEGE FOR WOMEN (AUTONOMOUS), ERODE

B.Sc., DEGREE PRACTICAL EXAMINATION,

Model Question Paper Pattern

Core Practical – III

TAXONOMY OF ANGIOSPERMS & ECONOMIC BOTANY, ECOLOGY AND PHYTOGEOGRAPHY, GENETICS AND BIOSTATISTICS

Hrs. : 3 **Sub.Code : 16BOUCP03**

Max. Marks : CIA – 40; ESE - 60 **Credits : 4**

I.	Assign the specimen **A** toitsrespective family giving reasons	**6**
II.	Describe the specimen **B** in technical terms. Draw sketches of floral parts. Construct floral diagram and write floral formula.	**6**
III.	Assign the specimen **C** to its respective habitat by giving the morphological and anatomical adaptations.	**4**
IV.	Analyze the plant communities present in the constructed belt / quadrat / line transect **D** by quantitative method. Present the data and give the inference.	**6**
V.	Write the family, binomial and the morphology of the useful part in **E**, **F** &**G**	**9**
VI.	Workout the given problems **H&I**	**8**
VII.	Write notes on**J & K**	**6**
		45
	Herbarium	**5**
	Record	**10**
	Total	**60**

PRACTICAL – III

SCHEME OF VALUATION

I. **A** - Taxonomy	Identification	2	
	Reasons	4	**6**
II. **B** - Taxonomy	Sketches	2	
	Floral Diagram	1	
	Floral Formula	1	
	Description	2	**6**
III**. C** - Ecology - Xerophytes / Hydrophytes			
	Habitat	1	
	Adaptation	2	
	Sketches	1	**4**
IV**. D** - Quadrat /Belt /Line	Identification	1	
	Data	3	
	Inference	2	**6**
V**. E, F** &**G** - Economic Botany	Family	1	
	Genus, Species	1	
	Morphology of useful part	1	**3 x 3 = 9**

VI. **H** &**I** - Genetics Problems / Biostatistics **2 x 4 = 8**

VII. **J** - Ecology – Food Chain / Food Web / Ecological Pyramid/

Halophyte / Epiphyte

K - Ecology - Phytogeographical Regions of India/ Continental drift

2 x 3 = 6

45

Herbarium **5**

Record **10**

Total60

VELLALAR COLLEGE FOR WOMEN (AUTONOMOUS), ERODE

B.Sc., DEGREE PRACTICAL EXAMINATION

Model Question Paper Pattern

Core Practical – IV

Plant Physiology, Phytochemistry, Biotechnology - Concepts and Techniques, Applied Biotechnology & Fundamentals of Computer and Bioinformatics

Hrs. : 3 **Sub. Code : 16BOUCP04**

Max. Marks : CIA – 40; ESE - 60 **Credits : 4**

I. Take slip from the lot **A** & **B.**Write down the requirements for the experiments given in the slip. Write the procedure and set up the experiments. Leave the set up for valuation. **20**

II. Comment on the given set up **C**& **D10**

III. Write down the algorithm for the given practical **E5**

IV. Write notes on **F, G H, I**&**J 15**

50

Record **10**

Total **60**

PRACTICAL – IV

SCHEME OF VALUATION

I. **A** - Physiology — Procedure **- 3**

B - Biochemistry — Data, inference & Results **- 5**

Set up **- 2**

2 x 10 = 20

II. **C** - Physiology set up

D – Biochemistry set up

(Demonstration Experiments) **2 x 5 =10**

III. **E** - Algorithm of M.S Word / M.S Excel / M.S Power point **5**

IV. **F** - PCR / Gene transfer methods /Vectors

G - Biofertilizers -Azospirillum / Azolla

H - MS medium

I - Blotting techniques – Western / Southern

J - Computer (Mouse, Key board, CPU, Monitor) **5 x 3 = 15**

50

Record **10**

Total **60**

VELLALAR COLLEGE FOR WOMEN (AUTONOMOUS), ERODE

B.Sc., DEGREE PRACTICAL EXAMINATION,

Model Question Paper Pattern

Elective Practical – I

Applied Microbiology and Horticulture and Plant breeding

Hrs. : 3 **Sub. Code : 16BOUEP01**

Max. Marks : CIA – 40; ESE - 60 **Credits : 3**

I. Stain the bacterial culture **A** by Gram staining method and identify the type of bacteria. Write the procedure and submit the slide for valuation. **8**

II. Assess the quality of Milk in **B8**

III. Take slip from the lot **C** & **D.** Write down the procedure. **10**

III. Write notes on **E, F, G, H, I** & **J24**

50

Record **10**

Total **60**

ELECTIVE PRACTICAL – I

PAPER I & II
SCHEME OF VALUATION

I.	**A** – Gram staining	Procedure	4	
		Identification	1	
		Slide	2	
		Sketch	1	**8**
II.	**B –** Quality of Milk			
		Identification	1	
		Sketch	1	
		Procedure	4	
		Result	2	**8**
III.	**C** &**D** – Horticulture	Procedure	3	
		Setup	1	
		Sketch	1	**2 x 5= 10**

IV. **E,F** &**G** – Microbiology - Autoclave / Hot air oven / Laminar Airflow / MBR test
H – Horticulture – Gardening / Flower arrangement
I - Plant breeding
J - Culture medium / Agar streak / Agar slant/ Antibacterial activity

Identification	1		
Diagram	1		
Notes	2		**6 x 4 = 24**
			50
		Record	**10**
		Total	**60**

PG & RESEARCH DEPARTMENT OF BOTANY
B. Sc., Botany

Question Paper Pattern

CORE AND ELECTIVE PAPERS

Duration: 3.00 hrs **Marks: 75**

Section – A **(10 × 1 = 10 marks)**

Multiple Choice Questions – 10 (Two from each unit) (Q. No 1 – 10)

Section – B **(5 × 5 = 25 marks)**

Answer all the Questions(Either or pattern)

Two Question from each unit (Q. No 11 – 15)

Section – C **(5 × 8 = 40 marks)**

Answer **five** out of **eight** Questions

At least **One** Question from each unit (Q. No 16 – 23)

ALLIED PAPERS

Question paper pattern similar to core paper. Mark distribution as follows.

Section - A **(10 × 1 = 10 marks)**

Section Section – B **(5 × 3 = 15 marks)**

Section – C **(5 × 6 = 30 marks)**

SKILL BASED SUBJECTS

Paper- II Online Examination **60 Marks.** Internal evaluation **40 Marks.** **= 100 marks**

Paper I, III, IV **Five** Questions out of **Eight(5 × 15 = 75 marks)**

SELF LEARNING PAPERS AND NON MAJOR ELECTIVE

Five Questions out of **Eight(5 × 20 = 100 marks)**

Self learning GK- Paper- Online evaluation – **100 Marks**

SELF LEARNING SUBJECT

Paper – III

PRESERVATION TECHNIQUES

Sub.Code : 13BOUSL03

Max. Marks : ESE - 100 **Credits:5**

Objectives: To study the importance of food and preservation techniques. To discern the microbes used in food products. To analyse the disease causing organisms.

UNIT – I

Food spoilage and preservation processes – Intrinsic factors- extrinsic factor- food preservation alternatives.

UNIT – II

Diseases and foods – food borne diseases and water borne diseases.

UNIT – III

Fruit preservation techniques – Fresh fruits and fruit products.

UNIT – IV

Vegetable preservation techniques – Pickles- dry products.

UNIT – V

Microbiology of fermented foods - Dairy products - meat- fish and alcoholic beverages (wine).

TEXT BOOKS:

1. **Power, C.B.,** "M*icrobiology",* Vol. II, Himalayan Publishing House, Mumbai, First Edition,1996.

2.**Manibhushan Rao, K.,"***Text book of Horticulture",* Macmillan India Ltd., Madras, 1995.

REFERENCE BOOKS:

1. **Giridharital, Siddappa, G.S.** and **Tandon G.L.,"***Preservation of Fruits and Vegetables"* CFTRI, Mysore, 2001.

2. **Manorajan Kalia &Sangita** **"***Food, Food preservation and Processing"* Department of Food Science and Nutrition, College of Home Science. Himachal Pradesh, Agri University, Palampur, 2000.

3. **Prescott & Klein**, " *Microbiology",* AUS Publishing, New Delhi, First Edition, 1983.