

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

**Bachelor of Science in Botany**

**2017 - 2018 Onwards**

**Course Content and Scheme of Examinations (CBCS Pattern)**

**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	15TAMU101/ 14HINU101	Tamil / Hindi	6	3	25	75	100	3
II	Language II	17ENLU101	English	6	3	25	75	100	3
III	Core	16BOUC101	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	16ZOUA101	Zoology - Paper I	4	3	20	55	75	4
			Practical - I Paper I	3					
IV	Foundation course	09FOCU1ES	Environmental studies	2	3		100	100	2
<b>Total</b>								<b>475</b>	<b>16</b>

**Semester II**

I	Language I	15TAMU202/ 14HINU202	Tamil /Hindi	6	3	25	75	100	3
II	Language II	17ENLU202	English	6	3	25	75	100	3
III	Core	16BOUC202	Paper II Plant Diversity II Bryophytes, Pteridophytes, Gymnosperms & Palaeo Botany	6	3	25	75	100	4
			Practical - I Paper II	3					
	Allied I	17BOUCP01	Practical - I (Exam) Paper I & II		3	40	60	100	4
		16ZOUA202	Zoology Paper II	4	3	20	55	75	4
			Practical - I Paper II	3					
		17ZOUAP01	Practical - I (Exam) Paper I & II		3	20	30	50	2
IV	Value Education	14VEDU2HR	Value Education and Human Rights	2	3		100	100	2
<b>Total</b>								<b>625</b>	<b>22</b>

**SEMESTER - I**

**CORE PAPER I**

**PLANT DIVERSITY – I ALGAE, FUNGI, LICHENS, BACTERIA, VIRUS AND PLANT PATHOLOGY**

**Instructional Hrs. : 90**

**Sub.Code : 16BOUC101**

**Max. Marks :CIA – 25; ESE - 75**

**Credits : 4**

**Objectives :** To know the classification of primitive plants, vegetative and reproductive structures and economic importance of Algae, Fungi and Microorganisms. To know some specific diseases seen in plants and their control measures.

**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 18 Hrs.**

Structure - Reproduction and Life cycle of Diatoms – Pennate and Centric – Ectocarpus- 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 - Peziza - Puccinia and Agaricus.

**UNIT – IV 18 Hrs.**

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<sub>4</sub>). Plant Diseases: Bunchy top of banana – Tikka disease - Blight disease of paddy (symptoms - causal organisms and control measures).

**Note : Bold and *Italics* denote self study Topics**

## **PRACTICALS :**

1. Demonstration of simple microscopes – dissection and compound

2. Demonstration of sectioning, staining and mounting

3. Study of the types mentioned below:

**Algae** - Anabaena – Chlamydomonas – Volvox – Oedogonium - Caulerpa –Chara - Diatoms – Pennate and Centric – Ectocarpus - Dictyota – Polysiphonia

**Fungi** - Albugo – Rhizopus – Saccharomyces -Aspergillus - Peziza - Puccinia – Agaricus - Lycoperdon- Cercospora – Fusarium – Alternaria- Lichens- Bacteria - Virus

**Plant Diseases** - Bunchy top of banana – Tikka disease- Blight disease of paddy

## **TEXT BOOKS :**

1. **Vashishta, B.R.**, “*Botany for Degree Students –Algae*”, S. Chand & Co., New Delhi, Revised Edition, 2004.
2. **Vashishta, B.R.**, “*Botany for Degree Students – Fungi*”, S. Chand & Co., New Delhi, Revised Edition, 2003.
3. **Pandey, B.P.**, “*Plant Pathology*”,S. Chand & Co., New Delhi, Revised Edition, 2003.

## **REFERENCE BOOKS :**

1. **Srivastava, H.N.**, “*Fungi*”, Pradeep Publications, Jalandhar (India), New Millennium Edition, 2004.2.
2. **Sethi, I.K., and Walia, S.K.**, “*Textbook of Fungi and their Allies*”, Macmillan Publishers India Ltd. 2011.
3. **Johri, R.M., Latha, S. and Tyagi, K.** “*A Textbook of Fungi*” Dominant Publishers and Distributors Pvt. Ltd. New Delhi, 20116.
4. **Mehrotra, R.S.**, “*Plant Pathology*”, Tata Mc Graw Hill Publishing Company Ltd. , New Delhi,1996.
5. **Bilgrimi, K.S. and Dube, H.C.**,“*A text book of Modern Plant Pathology*”, Vikas Publishing House, PVT., LTD., Kanpur,1980.

## SEMESTER - I

### Foundation Course - ENVIRONMENTAL STUDIES

**Instructional Hrs. : 30**

**Sub. Code : 09FOCU1ES**

**Max. Marks : ESE - 100**

**Credits : 2**

**Objectives :** To study the science of environment. It is the prime duty of the human to provide a better and clean environment for the generation to come.

#### **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.

**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 protection Act - air- water- wildlife- forest- Issues involved in enforcement of environmental legislation and Public awareness.

**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.

**REFERENCE BOOK :**

1. **Professor Ranganathan, S., et al.**, “*Environmental studies*”, Publication Division, Bharathiar University, Coimbatore, First Edition, 2004.

## SEMESTER - II

### Core Paper II - PLANT DIVERSITY - II

#### BRYOPHYTES, PTERIDOPHYTES, GYMNOSPERMS AND PALAEOBOTANY

**Instructional Hrs. : 90**

**Sub.Code : 16BOUC202**

**Max. Marks : CIA – 25; ESE - 75**

**Credits : 4**

**Objectives:** To study the classification, morphology, anatomy and reproduction of some forms of Bryophytes, Pteridophytes and Gymnosperms.

To study the Geological time scale and some kinds of fossils.

#### UNIT – I

**18 Hrs.**

**Bryophytes** - Classification of Bryophytes (Reimer's, 1954- Outline only) Structure and Reproduction of *Marchantia*- Porella- Anthoceros and Funaria - Economic Importance of Bryophytes.

#### UNIT – II

**18 Hrs.**

**Pteridophytes** - Classification of Pteridophytes (Sporne, 1962 - Outline only) Stelar evolution- Structure and Reproduction of *Psilotum*- Lycopodium- Selaginella and Equisetum.

#### UNIT – III

**18 Hrs.**

Structure and Reproduction of *Ophioglossum*- Adiantum - Marsilea- Heterospory and Seed Habit.

#### UNIT - IV

**18 Hrs.**

**Gymnosperms** - Classification of Gymnosperms (Sporne, 1965- Outline only) Structure and Reproduction of Cycas- and Gnetum. 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.

**Note : Bold and *Italics* denote self study topics**

### **PRACTICALS :**

Study of the types mentioned below

**Bryophytes** - Marchantia, Porella, Anthoceros and Funaria

**Pteridophytes** - Lycopodium, Selaginella, Equisetum, Ophioglossum, Adiantum, Marsilea.

**Gymnosperms** - Cycas and Gnetum

**Palaeobotany** -Lepidodendron, Lepidophyllum ,Lepidocarpon ,Calamites and Williamsonia.

### **TEXT BOOKS :**

1. **Vashishta, B.R.,Sinha,A.K. and Adarshkumar**, “*Botany for degree students – Bryophyta*”, S. Chand & Company Ltd., New Delhi, Revised Edition, 2008.
2. **Vashishta, P.C.,Sinha,A.K. and Anilkumar**, “*Botany for degree students - Pteridophyta*”, S. Chand & Company Ltd., New Delhi, Revised Ninth Edition, 2005.
3. **Vasishtha, P.C., Sinha,A.K. and Anilkumar**, “*Botany for Degree Students – Gymnosperms*”. S.Chand& Co., New Delhi, 2006.

### **REFERENCE BOOKS :**

1. **Peter George**, “ *Introduction to Palaeobotany*”, Rajat Publications, New Delhi, First Edition, 2008.
2. **Sporne, K.R.**, “ *The Morphology of Pteridophytes*”, B. I Publications, NewDelhi, 1967.
3. **Foster,A. S. and Gifford, E. M.** Comparative Morphology of Vascular Plants. W.H. Freeman and Co.,1973.
4. **Watson,E.V.**,“*Structure and life of Bryophytes,*” Hutchinson & Co Ltd, 2003.
5. **Frank Cavers**, “*The interrelationship of the Bryophyta*” S.R. Technico Book House, Patna.2003.

## SEMESTER – II

### FOUNDATION COURSE- A VALUE EDUCATION AND HUMAN RIGHTS

**Instructional Hours: 30**

**Paper Code:14VEDU2HR**

**Max Marks: 100**

**Credits:2**

**Objectives:** On successful completion of the course, the students should have understood the significance of human values and the rights.

#### UNIT- I

**5hrs.**

Aim of Value Education –Concept of Human Values-Types of Values- Components of value education - Personal Development :*Character formation towards positive personality*-National Values.

#### UNIT- II

**5hrs.**

Concept and theories of Human Rights – *Classifications of Human Rights* – Universal Declaration of Human Rights- International Covenant on civil and political rights – International covenant on Economic, Social and Cultural Rights.

#### UNIT- III

**10hrs.**

Rights Guaranteed by Indian Constitution - Constitutional vision of freedom: Fundamental Rights – *Fundamental duties*- Constitutional vision of Justice: Directive Principles of State policy.

#### UNIT- IV

**5hrs.**

Human Rights Issues: Gender Discrimination-*Domestic violence*-Child Labour-Bonded Labour

#### UNIT- V

**5hrs.**

Human Rights Enforcements : National Human Rights Commission – State Human Rights Commission – Human Rights Courts – Role of NGO's : Amnesty International, Asia Watch – *Peoples Union for Liberties(PUCL)*, Peoples Union for Democratic Rights (PUDR).

**Note: Bold and Italics denote self study topics**



**Books for Reference:**

1. Mugammad Naqi, *Modern Value Education*, Anmol Publications Pvt Ltd, New Delhi, 2007
2. Shrimali L.L, *A Search for Values in Indian Education*, Vikas Publishers, Delhi, 1974.
3. Acharya. N.K, *The Constitution of India*, Asia Law House, Hyderabad, 2011.
4. Misra R., "*Human Rights*" Sumit Enterprises, New Delhi, First Edition, 2005.
5. Nirmal S.J, "*Human Rights in India*", Oxford University Press, New Delhi, 2000.
6. Durgadas Basu, *Human Rights in Constitutional Law*, Prentice Hall of India, 1994.
7. Bajwa G.S., *Human Rights in India*, Anmol Publications, New Delhi, 1995.

**VELLALAR COLLEGE FOR WOMEN (AUTONOMOUS), ERODE**

**B.Sc., DEGREE PRACTICAL EXAMINATION,**

**Model Question Paper Pattern**

**Core Practical –I**

**ALGAE, FUNGI, LICHENS, BACTERIA, VIRUS, PLANT PATHOLOGY,  
BRYOPHYTES, PTERIDOPHYTES, GYMNOSPERMS AND PALAEOBOTANY**

**Hrs. : 3**

**Sub.Code : 16BOUCP01**

**Max. Marks : CIA – 40; ESE - 60**

**Credits : 4**

I. Make suitable micropreparations of <b>A, B, C</b> and <b>D</b> . Draw labelled Sketches. Identify with reasons and submit the slides for valuation	4 x 5 = 20
II. Analyze the algal mixture <b>E</b> and identify any two genera with reasons	2 x 4 = 8
III. Identify, draw diagrams and write notes on <b>F, G, H,</b> and <b>I</b>	4 x 4 = 16
IV. Identify the disease, write symptoms, causal organism and control measures of <b>J</b>	6
	-----
	50
	Record 10
	-----
Total	60
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**PRACTICAL – I**  
**SCHEME OF VALUATION**

I.	A – Fungi	Identification	- 1	
	B – Bryophyte	Slide	- 1	
	C - Pteridophyte	Sketch	- 1	
	D – Gymnosperm	Reasons	- 2	
				4 x 5 = 20
II.	E – Algal mixture	Identification	- 1	
		Sketch	- 1	
		Notes	- 2	
				2 x 4 = 8
III.	F- Algae / Fungi / Pteridophytes / Bryophytes	Identification	- 1	
	G - Lichen	Sketch	- 1	
	H- Bacteria / Virus	Notes	- 2	
	I -Palaeobotany			4 x 4 = 16
IV.	J - Plant pathology	Identification	- 1	
		Symptoms	- 2	
		Causal organism	- 1	
		Control measures	- 2	
				1 x 6 = 6
				----- 50
				Record 10
				----- Total 60 -----

## SEMESTER - I

### ALLIED BOTANY - PAPER - I

Instructional Hrs. : 60

Sub.Code : 16BOUA101

Max. Marks : CIA – 20; ESE - 55

Credits : 4

**Objectives :** To know the vegetative and reproductive structures of various types of Algae, Fungi, Bryophytes, Pteridophytes and Gymnosperms. To identify the families of the plants, economically important plants, plant products and the bioprocess technology and their applications.

#### UNIT-I

12 Hrs.

Structure and Reproduction of Bacteria and *Bacteriophage* (T<sub>4</sub>). Plant Disease: Tikka Disease (symptoms- causal organisms and control measures).

#### UNIT-II

12 Hrs.

**Thallophyta** - Structure- Reproduction and Life cycle of the following – Nostoc – *Chlorella*- Dictyota – Albugo, Saccharomyces, Polyporus and Cercospora.

#### UNIT –III

12 Hrs.

**Bryophyta- Pteridophyta- Gymnosperm** - 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 importance* of Anonaceae – Rubiaceae – Cucurbitaceae, Acanthaceae, Amarantaceae and Poaceae.

#### UNIT –V

12 Hrs.

**Applied Botany** - Single cell protein - *Spirulina*. Mushroom Cultivation – Oyster - Biofertilizer – Rhizobium.

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

## **PRACTICALS :**

Study of the types mentioned above

## **TEXT BOOKS:**

1. **Kumaresan, V.**, “*Biotechnology*”, Saras Publication, Nagercoil, Kanyakumari Dt., Revised Edition, 2009.
2. **Muneeswaran, A.**, “*Text book of Botany*”, Sun Publication, Madurai, 1990.
3. **Narayanaswami, R.V.& Rao, K.N.**, “*Outlines of Botany*”, S. Viswanathan Printers & Publishers, Madras, New Edition, 1979.
4. **Pandey, B.P.**, “*Economic Botany*”, S. Chand & Company, New Delhi, Revised Edition, 2004.
5. **Srivastava, H.N.**, “*Fungi*”, Pradeep publications, Jalandhar ( India), New Millennium Edition, 2004.
6. **Vashishta, B.R.**, “*Botany for Degree Students – Algae*”, S. Chand & Co., New Delhi, Revised Edition, 2004.
7. **Vashishta, B.R., Sinha, A.K. and Adarshkumar**, “*Botany for Degree students – Bryophyta*”, S. Chand & Company Ltd., New Delhi, Revised Edition, 2008.
8. **Vasishta, P.C., Sinha, A.K. and Anilkumar**, “*Botany for Degree Students – Gymnosperms*”. S.Chand& Co., New Delhi. 2006
9. **Vashishta, P.C., Sinha, A.K. and Anilkumar**, “*Botany for Degree students - Pteridophyta*”, S. Chand & Company Ltd., New Delhi, Revised Ninth Edition, 2005.

## **REFERENCE BOOKS:**

1. **Sporne, K.R.**, “*The Morphology of Pteridophytes*”, B. I Publications, New Delhi, 1967.
2. **Foster, A. S. and Gifford, E. M.** Comparative Morphology of Vascular Plants. W.H. Freeman and Co., 1973.
3. **Frank Cavers**, “*The interrelationship of the Bryophyta*” S.R. Technico Book House, Patna. 2003.

## SEMESTER - II

### ALLIED BOTANY - PAPER - II

Instructional Hrs. : 60

Sub.Code : 16BOUA202

Max. Marks : CIA – 20; ESE - 55

Credits : 4

**Objectives :** To study the histology, ecological adaptations and physiology of plants. To

study the horticultural techniques. To gain the knowledge about medicinal plants.

#### UNIT-I

12 Hrs.

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

#### UNIT –II

12Hrs.

**Ecology** - Ecosystem – Structure (Biotic and Abiotic) and functions - 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*(outline only)

#### UNIT-IV

12 Hrs.

**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*.

**Note :** Bold and *Italics* denote self study topics

## **PRACTICALS :**

Study of the types mentioned above

## **TEXT BOOKS:**

1. **Kumaresan, V.**, “ *Horticulture*”, Saras Publication, Nagercoil, Kanyakumari Dt., First Edition, 2008.
2. **Muneeswaran, A.**, “*Text book of Botany*”, Sun Publication, Madurai, 1990.
3. **Pandey, B.P.**, “ Plant Anatomy”, S. Chand & Company Ltd., New Delhi, Revised Edition, 2004.

## **REFERENCE BOOKS:**

1. **Kokate, C.K, Purohit, A and Gokhal, S.R.**, “*Pharmacognosy*”, NiraliPrakashan, Pune, 43<sup>rd</sup> Edition, 2009.
2. **Handa, S.S and Kapoor, V.K.**, “*Pharmacognosy*”, Vallabh Prakashan, Delhi, Revised Edition, 1993.

**VELLALAR COLLEGE FOR WOMEN (AUTONOMOUS), ERODE**

**B.Sc., DEGREE PRACTICAL EXAMINATION,**

**Model Question Paper Pattern**

**Allied Botany Practical**

**ALLIED BOTANY**

**Hrs. : 3**

**Sub.Code : 16BOUAP01**

**Max. Marks : CIA – 20; ESE - 30**

**Credits : 2**

I. Assign the specimen **A** to its family and describe it technically.

Draw the diagrams 3

II. Comment on **B** with its medicinal value. 2

III. Cut transverse section of **C** and **D**. Draw labelled sketches and identify

giving reasons. Submit the slides for valuation. 2 x 3 = 6

IV. Draw labelled sketches, identify and give reasons **E, F, G, H, I** and **J** . 6 x 2 = 12

V. Comment on the setup **K**. Draw labelled sketch 2

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25  
Record 5  
-----  
Total 30  
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**PRACTICAL – I**  
**SCHEME OF VALUATION**

IA - Taxonomy	Family	- 1	1x 3 = 3
	Description	- 1	
	Diagram	- 1	
IIB- Medicinal Botany			1x 2 = 2
III C – Pteridophyte / Gymnosperm	Slide	-1	
	Identification	- 1	
D – Anatomy	Diagram & Reason	- 1	2 x 3 = 6
IV. E- Bacteria/Virus	Identification	- $\frac{1}{2}$	
F - Algae / Fungi	Diagram	- $\frac{1}{2}$	
G - Bryophyte / Pteridophyte	Reason	- 1	
H - Gymnosperm / Tissues			
I - Horticulture / Applied Botany			
J - Ecology/ Plant Pathology			6 x 2 = 12
V. K - Plant physiology	Diagram	- 1	
	Comment	- 1	1 x 2 = 2
			----- 25
			Record        5
			----- Total            30 -----

**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			
<b>Total</b>								<b>575</b>	<b>19</b>

**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
	Allied II	11CHUA002	Chemistry - Paper II	5	3	20	55	75	4
Practical - II Paper II			2						

		15CHUAP01	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									

<b>Vellalar College for Women (Autonomous), Erode - 12.</b>		
<b>Bachelor of Science in Botany</b>		
<b>2015- 2016 Onwards</b>		
<b>Course Content and Scheme of Examinations (CBCS Pattern)</b>		
<b>SKILL BASED SUBJECTS</b>		
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)
<b>BASIC TAMIL / ADVANCED TAMIL/ NON MAJOR ELECTIVES</b>		
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		
<b>SELF LEARNING SUBJECT</b>		
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 Ruminant -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, 43<sup>rd</sup> 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., 2<sup>nd</sup> 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 gardening for common people”, Dominant publications and distributors, 2011.

## SEMESTER - IV

### Core Paper- IV

#### CELL BIOLOGY AND PLANT TISSUE CULTURE

**Instructional Hrs: 60 Sub. 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 Replication of DNA. Structure and types 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, Kanyakumari 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- Food Industry - 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 manuring and 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 Acquah,** “*Horticulture Principles and practices*”, Prentice-Hall of India PrivateLtd., 2<sup>nd</sup> 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

1 x 5 = 5

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

1 x 6 = 6

IV. Identify **E, F, G, H** and **I**. Draw sketches and write notes.

5 x 5 = 25

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50

Record 10

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Total 60  
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## PRACTICAL – II

### SCHEME OF VALUATION

I.	A – Anatomy – Primary/Secondary Structure	Identification	-	1	
	B – Anatomy – Anomalous secondary growth	Slide	-	2	
		Sketch	-	2	
		Reasons	-	2	
					$2 \times 7 = 14$
II.	C – Embryo Mounting	Identification	-	1	
		Slide	-	2	
		Sketch	-	1	
		Reasons	-	1	
					$1 \times 5 = 5$
III.	D – Mitosis	Identification	-	1	
		Slide	-	2	
		Sketch	-	1	
		Reasons	-	2	
					$1 \times 6 = 6$
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				$5 \times 5 = 25$
					-----
					50
		Record			10
					-----
		Total			60
					-----

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

**Bachelor of Science in Botany**

**2014 - 2015 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	13BOUC505	Paper V Taxonomy of Angiosperms & Economic Botany	5	3	25	75	100	4
		13BOUC506	Paper VI Plant Physiology	5	3	25	75	100	4
		13BOUC507	Paper VII Phytochemistry	4	3	25	75	100	4
			Practical- III Papers V, VIII & IX	7					
	Elective I	13BOUE501	Paper I Applied Microbiology	3	3	25	75	100	4
	Elective II	13BOUE502	Paper II Fundamentals of Computer & Bioinformatics	3	3	25	75	100	4
IV	Skill Based Subject III	13BOUS503		3	3	25	75	100	3
Total								600	23

**Semester VI**

III	Core	13BOUC608	Paper VIII Ecology & Phytogeography	4	3	25	75	100	4
		13BOUC609	Paper IX Genetics, Plant Breeding & Biostatistics	4	3	25	75	100	4
		13BOUC610	Paper X Biotechnology I - Concepts & Techniques	4	3	25	75	100	4
		13BOUC611	Paper XI Biotechnology II – Applied Biotechnology	4	3	25	75	100	4
		13BOUC612	Paper - XII Horticulture	4	3	25	75	100	4
			Practical –IV Papers VI, VII, X & XI	6					
			Elective Practical-I Paper I & II	2					
		13BOUCP03	Practical -III Papers V, VIII & IX (Exam)		3	40	60	100	4
		13BOUCP04	Practical- IV Papers VI, VII, X & XI (Exam)		3	40	60	100	4
		13BOUEP01	Elective Practical-I Paper I & II (Exam)		3	40	60	100	4
IV	Skill Based Subject IV	13BOUS604		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

## SEMESTER – V

### Core Paper V - TAXONOMY OF ANGIOSPERMS AND ECONOMIC BOTANY

**Ins. Hrs. : 75**

**Sub. Code : 15BOUC505**

**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- Curcubitaceae- Apiaceae.

#### **UNIT – IV**

**15 Hrs.**

Rubiaceae-Asclepiadaceae-Convulvulaceae-Scrophulariaceae-Acanthaceae-Verbenaceae-*Lamiaceae*.

#### **UNIT - V**

**15 Hrs.**

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

**Note :** *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**, “*Taxonomy of 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 : 15BOUC506

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 and mineral salts.

**UNIT - II** **15 Hrs.**

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

**UNIT - III** **15 Hrs.**

**Photosynthesis** – Photosynthetic apparatus and *pigments*- pigment system, Light reaction and photosynthetic electron transport system– Carbon fixation : C<sub>3</sub>,C<sub>4</sub> 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- Phytochrome- Plant movements -physiology of seed germination and seed dormancy.

*Note : 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 : 15BOUC507**

**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 bonds- Hydrogen bonds- Acids and Bases- Solutions- pH and *Buffer system*.

#### **UNIT- II**

**12 Hrs.**

**Biomolecules** - Outline of structure- Classification and properties 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 – Centrifuge - Colorimetry- Spectrometry and Chromatography – Paper and *Thin layer*.

**Note :** *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<sub>2</sub> concentration.
3. Effect of light intensity on O<sub>2</sub> evolution during photosynthesis
4. Determining the rate of transpiration using transpiration 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 Starch - Anthrone Method

#### **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

#### **Spotters**

pH Meter- Centrifuge- Colorimeter- Spectrophotometer

#### **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 : 15BOUE501

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 Continuous culture-Fermentation media– Sterilization - methods of sterilization – physical and chemical sterilization- Advantages.

#### UNIT – II

9 Hrs.

**Soil Microbiology-** Types of microorganism in soil- Functions of microorganism in soil- Microorganism and plant growth- Factors affecting microbial growth. Air microbiology – Role of Microorganism in air- *Methods of purification.*

#### 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 and Composting methods –Indore, Bangalore and 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<sub>12</sub>- *Glutamic acids*– Citric acid.

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

## **PRACTICALS :**

1. Gram staining
2. Sterilization Techniques
3. Preparation of culture media for bacteria and fungi
4. Preparation of agar streak
5. Antibacterial activity
6. Enumeration of bacterial colonies from soil by serial dilution method
7. Enumeration of bacterial colonies from Air
8. Biological waste treatment of water
9. Microbial flora of fresh food

## **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.

**SEMESTER –V**  
**Elective II - HORTICULTURE AND PLANT BREEDING**

**Instructional Hrs: 45 Sub. Code: 15BOUE502**

**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 - I 9 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, pots, *potting and repotting*

**UNIT - II 9 Hrs.**

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

**UNIT - III 9 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 - IV 9 Hrs.**

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

**UNIT - V 9 Hrs.**

**Plant breeding -** Objectives -Conventional methods – Introduction, Selection – Mass, Pure and clonal, Hybridization Techniques- Types, *Heterosis and hybrid vigour*.

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

**PRACTICALS:**

1. Demonstration of vegetative propagation methods.

2. Flower arrangements.
3. Types of garden – kitchen garden, green house
4. Hybridization techniques

#### **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., 2<sup>nd</sup> 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.**, “*Principles of plant breeding*”, John Wiley & sons, INC. Singapore, 2000.
6. **Singh, J. R.**, “*Plant breeding principles and methods*”, Kalyani Publishers, Ludiana, Seventh Edition, 2008.

## SEMESTER - V

### Skill Based Subject III - HERBAL BOTANY

**Instructional Hrs. : 45**

**Sub. Code : 15BOUS503**

**Max. Marks : CIA – 25; ESE - 75**

**Credits : 3**

**Objectives:** To study the application of medicinal plants. To study the remedial plants for common diseases.

#### **UNIT – I**

**9 Hrs.**

Importance and relevance of Herbal drugs in Indian system of medicine. Ethnobotany – abstract relationship – *Tribal communities in Tamil Nadu*.

#### **UNIT – II**

**9 Hrs.**

Remedial plants for Cancer, Heart diseases, Urinary disease, Diabetes and *Iron deficiency*.

#### **UNIT – III**

**9 Hrs.**

Remedial plants for Gastro intestinal problems, Skin diseases, Arthritis, Pulmonary problems and *Anaemia*.

#### **UNIT – IV**

**9 Hrs.**

Poisonous plants, Hallucinogens, Teratogens, *Allergens*, Stimulant and Depressant.

#### **UNIT – V**

**9 Hrs.**

Plants for Body care - Bath oil, Hair oil, Shampoo, *Herbal Perfumes*.

**Note :Italics denote Self Study Topics**

## **TEXT BOOKS:**

1. **Arumugam, K.R. and Muruges, N.**, “*Text Book of Pharmacognosy*”, Sathya Publishers, Madurai, Reprinted, 2008.
2. **Panda, H.**, “Herbal Cosmetics” -Handbook, Asia Pacific Business Press Inc. Delhi.
3. **Anbzhakan, S.**, “*Principles of Plant Systematics and Medical Botany*”, NalankilliPathippagam, First Edition, 2009.

## **REFERENCE BOOKS:**

1. **Handa, S.S. and Kapoor, V.K.**, “*Pharmacognosy*”, Vallabh Prakashan, Delhi, Second Edition, 2003.
2. **Kokate, C.K, Purohit, A and Gokhale, S.R.**, “*Pharmacognosy*”, NiraliPrakashan, Pune, 43<sup>rd</sup> Edition, 2009.
3. **Wallis, T.E.**, “*Text book of Pharmacognosy*”, CBS publishers and distributors, Delhi, First Edition, 1985.

## SEMESTER –VI

### Core Paper VIII - ECOLOGY AND PHYTOGEOGRAPHY

Ins. Hrs. : 60

Sub. Code : 15BOUC608

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 Carbon* 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 :** *Italics* denote Self Study Topics

## **PRACTICALS:**

1. Study of morphological and anatomical adaptations of hydrophytes, xerophytes, including halophytes and mesophytes using representative samples.
2. Determination of frequency and density constituent of plant species in a terrestrial community through Quadrat and Transect (line, belt).
3. Phytogeographical regions of India.

## **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. andSambamurthy, 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 : 15BOUC609

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.

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

#### UNIT- II

12 Hrs.

**Classical Genetics** - Linkages and Crossing over - multiple alleles - blood groups in man -- Sex determination in plants and in *Drosophila* - *Meiosis*.

#### 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.

**Mutation and Gene Regulation**– Types of mutation - Somatic mutation- Physical and chemical mutagens – Polyploidy - genetic code - gene regulation in prokaryotes – *Operon concept*

#### UNIT- V

12 Hrs.

**Biostatistics** – Collection of data - Sampling types - Measures of Central tendency - *Arithmetic Mean*- Median. Measures of Dispersion- Range- Coefficient of Range- Standard deviation and Standard error (only theory).

**Note** : *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**, “*Principles of 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 : 15BOUC610

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** – Biotechnology and its branches - History –Traditional, Modern Biotechnology- Scope- Biotechnology and Global trends - Gene Bank and Plant conservation- Enzymes used in gene cloning – Restriction enzymes, Polymerases, Ligases and *Reverse transcriptase*.

**UNIT- II** **12 Hrs.**

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

**UNIT- III** **12 Hrs.**

**Gene transfer Methods** - Direct gene transfer methods- Electrophoration, *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 : 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.**,” *Bitechnology 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 : 15BOUC611

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.

*Note : Italics denote Self Study Topics*

## **PRACTICALS:**

1. Cultivation of *Pleurotussajor-caju* and *Agaricusbisporous*
2. Culture of Yeast and *Azolla*.
3. Demonstration of Biofertilizers – *Azospirillum*- *Rhizobium*- VAM – *Phosphobacteria*- Slides or photographs.
4. Blotting techniques – Southern/ Western - Photographs.
5. Petrochemical plants – Materials / Photographs
6. 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 Biological 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 : 15BOUC612

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 ( Domine IP) - Net Browser- search engine - *News groups.*

**UNIT – IV** **12 Hrs.**

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

**UNIT – V** **12 Hrs.**

**Sequence analysis** – Similarity Search - Phylogenetic analysis - Protein Prediction –*Drug Designing.* Biomolecular visualization.

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

## **PRACTICALS:**

### **Spotters**

1. MS - word.
2. Microsoft Excel.
3. Power point presentation
4. Web browsing.
5. E-mailing.
6. Gene finding.
7. Biomolecular visualization

### **TEXT BOOKS :**

1. **Mani, K., and Vijayaraj, N,** “*Bioinformatics for beginners*”. Kalaikathir Achchagam, 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,** “*Emerging trends in Bioinformatics*”, Ukaaz Publications, First Edition, Hyderabad, 2002.



## SEMESTER - VI

### Skill Based Subject IV - MUSHROOM TECHNOLOGY

Ins. Hrs. 45

Sub. Code: 15 BOUS604

Max. Marks: CIA 25; ESE - 75

Credits: 3

**Objectives:** To exploit and cultivate non – traditional food resource rich in protein. To make a substantial breakthrough to meet the food deficit. To discern the nutritional and medicinal value of mushrooms.

#### UNIT – I

9 Hrs.

**Mushrooms** - Species of edible mushroom and inedible mushroom. *Morphology of Edible Mushrooms* - Importance of mushroom cultivation.- Production of spawn.

#### UNIT – II

9 Hrs.

**Mushroom Cultivation** - White button mushroom- Oyster Mushroom, *Milky mushroom*- Giant mushroom.

#### UNIT – III

9 Hrs.

Paddy straw mushroom - *Black ear mushroom* - Silver ear mushroom -winter mushroom.

#### UNIT – IV

9 Hrs.

**Post harvest technology** - Short term Preservation – Long term Preservation -*Food preparation*.

#### UNIT – V

9 Hrs.

**Diseases management and Uses** - Management of diseases, Pests , weed and fungal attacks-  
*Nutritional value* - Medicinal Value of Mushroom

**Note :** *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.

## **REFERENCE BOOKS:**

1. **Nita Bahl**, “*Handbook on Mushrooms*”, Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi & Kolkata, 2002.
2. **Robin Gogoi, YellaRathaiah and Tasvina Rahman Borah**, “*Mushroom cultivation Technology*”, Scientific Publishers, India, 2006.
3. **Subrata Biswas, Datta, M, and Ngachan, S.V.** “*Mushrooms – A manual for Cultivation*”, PHI Learning Pvt. Ltd.. 2012.

**VELLALAR COLLEGE FOR WOMEN (AUTONOMOUS), ERODE**

**B.Sc., DEGREE PRACTICAL EXAMINATION,**

**Model Question Paper Pattern**

**Core Practical – III      Papers V, VIII & IX**

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

**Hrs. : 3**

**Sub.Code : 15BOUCP03**

**Max. Marks : CIA – 40; ESE - 60**

**Credits : 4**

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

## PRACTICAL – III

### SCHEME OF VALUATION

I. A - Taxonomy	Identification	2	
	Reasons	4	<b>6</b>
II. B - Taxonomy	Sketches	2	
	Floral Diagram	1	
	Floral Formula	1	
	Description	2	<b>6</b>
III. C - Ecology - Xerophytes / Hydrophytes	Habitat	1	
	Adaptation	2	
	Sketches	1	<b>4</b>
IV. D - Quadrat /Belt /Line	Identification	1	
	Data	3	
	Inference	2	<b>6</b>
V. E, F &G - Economic Botany	Family	1	
	Genus, Species	1	
	Morphology of useful part 1		<b>3 x 3 = 9</b>
VI. H &I - Genetics Problems / Biostatistics			<b>2 x 4 = 8</b>
VII. J - Phytogeographical Regions of India/Continental drift			
K - Ecology - Halophyte / Epiphyte			<b>2 x 3 = 6</b>
			-----
			<b>45</b>
		Record	<b>10</b>
		Herbarium	<b>5</b>
			-----
		<b>Total</b>	<b>60</b>
			-----

**VELLALAR COLLEGE FOR WOMEN (AUTONOMOUS), ERODE**

**B.Sc., DEGREE PRACTICAL EXAMINATION**

**Model Question Paper Pattern**

**Core Practical – IV**

**Papers VI, VII, X, XI& XII**

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

**Hrs. : 3**

**Sub. Code : 15 BOUCP04**

**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& D** **10**

- III. Write down the algorithm for the given practical **E** **5**

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

**50**

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Record **10**

-----  
Total **60**  
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**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 - Biochemistry / Physiology

G Biofertilizers -Azospirillum / Azolla

H - MS medium

I - Blotting techniques – Western / Southern

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

	-----
	<b>50</b>
Record	<b>10</b>
	-----
Total	<b>60</b>
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**VELLALAR COLLEGE FOR WOMEN (AUTONOMOUS), ERODE**

**B.Sc., DEGREE PRACTICAL EXAMINATION,**

**Model Question Paper Pattern**

**Elective Practical – I**

**PAPER I & II**

**Applied Microbiology and Horticulture and Plant breeding**

**Hrs. : 3**

**Sub. Code : 15BOUEP01**

**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. **10**
- II. Take slip from the lot **B & C**. Write down the procedure. **20**
- III. Write notes on **D, E, F, G & H**. **20**
- 
- 50**
- Record **10**

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Total **60**  
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**ELECTIVE PRACTICAL – I**

**PAPER I & II**

**SCHEME OF VALUATION**

<b>I.</b>	<b>A – Gram staining</b>	Procedure	6	
		Identification	1	
		Slide	2	
		Sketch	1	<b>10</b>
<b>II.</b>	<b>B &amp; C – Horticulture</b>	Procedure	5	
		Setup	2	
		Sketch	3	<b>2 x 10 = 20</b>
<b>III.</b>	<b>D, E &amp; F – Microbiology - Autoclave / Hot air oven / Inoculation needle / Laminar Airflow / Culture medium/ Agar streak</b>			
		<b>G – Horticulture – Gardening / Flower arrangement</b>		
		<b>H - Plant breeding</b>		
		Identification	1	
		Diagram	1	
		Notes	2	<b>5 x 4 = 20</b>
				-----
				<b>50</b>
		Record	<b>10</b>	
				-----
		Total	<b>60</b>	

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**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)

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**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)**

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**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**)

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**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.**, “*Microbiology*”, 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.