

KONGUNADU ARTS AND SCIENCE COLLEGE
(AUTONOMOUS)
COIMBATORE - 641 029



DEPARTMENT OF BOTANY (UG)

CURRICULUM AND SCHEME OF EXAMINATIONS
(CBCS)
(2019 - 2020 and onwards)

KONGUNADU ARTS AND SCIENCE COLLEGE
(AUTONOMOUS)
COIMBATORE - 641 029

Vision:

Developing the total personality of every student in a holistic way by adhering to the principles of **Swami Vivekananda** and **Mahatma Gandhi**.

Mission:

- Imparting holistic and man-making education with emphasis on character, culture and value - moral and ethical.
- Designing the curriculum and offering courses that transform its students into value added skilled human resources.
- Constantly updating academic and management practices towards total quality management and promotion of quality in all spheres.
- Extending the best student support services by making them comprehensive and by evolving a curriculum relevant to student community and society at large.
- Taking steps to make education affordable and accessible by extending scholarships to the meritorious and economically disadvantaged students.
- Moulding the teachers in such a way that they become the role models in promoting Higher Education.

DEPARTMENT OF BOTANY

Vision:

- Disseminate the knowledge on plants and their utility to the society.
- To develop feasible strategies in plant sciences for obtaining sustainable benefits from them.

Mission:

- Designing the curriculum by frequently updating the syllabi according to the present need.
- Preparing the students with more aptitude, skill and leadership quality by educating them.
- Make the students as entrepreneurs in the plant based industries.
- Identification and encouragement to turn the students into eminent Scientists/ Laurels.

PROGRAMME OUTCOMES (PO)

PO1

- Botany has immense carrier potential in areas such as Taxonomy, Genetics, Biotechnology, Pharmaceuticals, Agriculture and Environmental Science.

PO2

- Students get an excellent opportunity to enrich scientific knowledge on botanical and ecological dimension of many plants and to study the species richness of the plant kingdom.

PO3

- Students were able to acquire knowledge and understand the range of plant diversity in terms of structure, function and environmental relationship from primitive to highly evolved plant groups of various life forms.

PO4

- Gain introductory experience on various biochemical pathways and their role in living systems

PO5

- Apply contextual knowledge on the importance of ethical environmental principles, norms and consequent responsibilities relevant to biodiversity conservation practice and sustainable use of plants.

PO6

- Address the socioeconomic challenges related to plant sciences and to disseminate knowledge on various aspects of medicinal plants and appropriate considerations on human health problems.

PO7

- Knowledge on conservation of natural bioresources and various other hotspots augment students to explore their therapeutic values economically, culturally and aesthetically.

PO8

- Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and development of the information to provide valid conclusions.

PROGRAMME SPECIFIC OUTCOMES (PSO)

PSO1

- Through taxonomy, students were aware about the local and scientific names, economic importance including the uses and variations among the different species of Angiosperms.

PSO2

- Students can able to apply and associate the knowledge acquired from the allied subjects viz; Zoology and Chemistry, to solve and arrive at conclusion through the interdisciplinary approach.

PSO3

- Plant physiology aids the students to enhance knowledge on pathways of metabolisms, transport and translocation of water and solutes together with a better understanding of regulation of growth, development and influence of environment.

PSO4

- Students will be able to acquire vast intellectual knowledge on the biology of fossils and living plants along with their relationships with their environment.

PSO5

- Study of floriculture and landscaping techniques aids the students to implement knowledge on the process of construction of gardens, lawn designs, topiary and on the frame work of their infrastructure facilities.

UBO1

KONGUNADU ARTS AND SCIENCE COLLEGE (AUTONOMOUS)

COIMBATORE – 641 029

Course Name: B.Sc., Botany

Curriculum and Scheme of Examination under CBCS

(Applicable to the students admitted during the Academic Year 2019-2020)

Semester	Part	Subject code	Title of the Paper	Instruction Hours / Cycle	Exam. Marks			Duration of Exam.(hours)	Credit
					CIA	ESE	Total		
I	I	19TML101	Part-I -Lang. -Tamil-I/Hindi-I/French -I / Malayalam -I/ Sanskrit-I	6	25	75	100	3	3
	II	19ENG101	Part - II - English - I	6	25	75	100	3	3
	III	19UBO101	C.P.1- Plant Diversity - I	7	25	75	100	3	5
		19UZO1A1	Allied -1 Zoology - I	5	20	55	75	3	4
			C.Pr.1 - Plant Diversity - I	2	-	-	-	-	-
			Allied Pr. Zoology - I	2	-	-	-	-	-
	IV	19EVS101	Environmental studies**	2	-	50	50	3	2
		Total	30	-	-		-		
II	I	19TML202	Part - I- Tamil-II /Hindi-II /French-II / Malayalam-II / Sanskrit - II	6	25	75	100	3	3
	II	19ENG202	Part- II- English - II	6	25	75	100	3	3
	III	19UBO202	C.P.2 - Plant Diversity - II	7	25	75	100	3	5
		19UZO2A2	Allied - 2 Zoology - II	5	20	55	75	3	4
		19UBO2CL	C.Pr.1 - Plant Diversity I & II	2	40	60	100	3	2
		19UZO2AL	Allied. Pr. Zoology - I & II	2	20	30	50	3	2
	IV	19VED201	Value Education - Moral and Ethics**	2	-	50	50	3	2
		Total	30	-	-		-		
III	I	19TML303	Part-I-Tamil-III /Hindi- III / French- III / Malayalam - III / Sanskrit - III	6	25	75	100	3	3
	II	19ENG303	Part - II -Lang. - English - III	6	25	75	100	3	3
	III	19UBO303	C.P. 3 - Anatomy, Embryology of Angiosperms and Microtechniques	5	25	75	100	3	4
		19UCH3A3	Allied - 3 - Chemistry - 1	5	20	55	75	3	4
			C. Pr. 2. - Anatomy, Embryology of Angiosperms and Microtechniques	2	-	-	-	-	-
			Allied - Pr. - Chemistry	2	-	-	-	-	-
	IV	19UGA3S1	Skill based subject -I General awareness	2	25	75	100	3	3
19TBT301/ 19TAT301/ 19UHR3N1		Basic Tamil* / Advanced Tamil**/ Non Major Elective - I**	2	-	75	75	3	2	
		Total	30	-	-		-		
IV	I	19TML404	Part-I-Tamil-IV / Hindi-IV / French - IV/ Malayalam - IV / Sanskrit - IV	6	25	75	100	3	3
	II	19ENG404	Part-- II -Lang - English IV	6	25	75	100	3	3

UBO2

	III	19UBO404	C.P.4- Biophysics and Biostatistics	5	25	75	100	3	4
		19UCH4A4	Allied 4 - Chemistry - 2	5	20	55	75	3	4
		19UBO4CM	C. Pr.2.- Anatomy, Embryology of Angiosperms, Microtechniques, Biophysics & Biostatistics	2	40	60	100	3	2
		19UCH4AL	Allied Pr. Chemistry	2	20	30	50	3	2
	IV	19UBO4S2	Skill based subject-II Horticulture	2	25	75	100	3	3
		19TBT401/ 19TAT402 19UWR4N2	Basic Tamil*/ Advanced Tamil**/ Non Major Elective-II **	2	-	75	75	3	2
		Total			30	-	-		-
V	III	19UBO505	C.P. 5 - Bioinstrumentation	4	25	75	100	3	4
		19UBO506	C.P. 6 - Taxonomy of Angiosperms and Economic Botany	4	25	75	100	3	5
		19UBO507	C.P.7 - Cytology, Genetics and Plant Breeding	4	25	75	100	3	5
		19UBO508	C.P. 8 - Plant Ecology, Phytogeography and Resource Conservation	4	25	75	100	3	5
		19UBO5E1	Elective - I	4	25	75	100	3	5
		19UBO5CN	C.Pr.3 – Bioinstrumentation, Cytology, Genetics and Plant Breeding,	4	40	60	100	3	2
			C.Pr. 4 - Taxonomy of Angiosperms, Economic Botany, Plant Ecology, Phytogeography and Resource Conservation	4	-	-	-	-	-
	IV	-	EDC - Extra Departmental course	2	25	75	100	3	3
-	19UBO5IT	Internship Training	Grade****						
	Total			30	-	-		-	
VI	III	19UBO609	C.P.9 – Biochemistry and Bioinformatics	6	25	75	100	3	4
		19UBO610	C.P.10 - Plant Physiology	6	25	75	100	3	5
		19UBO611	C.P.11- Microbiology and Plant Pathology	6	25	75	100	3	4
		19UBO6CO	C.Pr. 4- Taxonomy of Angiosperms, Economic Botany, Plant Ecology, Plant Phytogeography and Resource Conservation	-	40	60	100	3	2
		19UBO6CP	C. Pr. 5 – Biochemistry, Bioinformatics, Plant physiology, Microbiology and Plant Pathology	4	40	60	100	3	2
		19UBO6E2	Elective- II	4	25	75	100	3	5
		19BO6Z1	Project***	2	20	80	100	-	5
	IV	19UBO6S3	Skilled Based Subject III- Cultivation and Marketing of Medicinal Plants	2	25	75	100	3	3
		Total	30	-	-		-		
V	19NCC/NSS/ YRC /PYE101	Extension activity *	-	50	-	50	-	1	
Grand Total							3800		140

UBO3

Note :

- CBCS – Choice Based Credit system
CIA – Continuous Internal Assessment
ESE – End of Semester Examinations

@ Hindi/Malayalam/ French/ Sanskrit - 13HIN/MLM/FRN/SAN101 - 202

* - No End-of-Semester Examinations. Only Continuous Internal Assessment (CIA)

** - No Continuous Internal Assessment (CIA). Only End-of-Semester Examinations (ESE)

*** - Project Report - 60 marks; Viva-voce - 20 marks; Internal - 20 marks

**** - The students shall undergo an Internship training/field work for a minimum period of 2 weeks at the end of the fourth semester during summer vacation and submit the report in the fifth semester. The report will be evaluated for 100 marks along with the internal viva voce by the respective Faculty. According to their marks, the grades will be awarded as given below.

Marks %	Grade
85-100	O
70-84	D
60-69	A
50-59	B
40-49	C
<40	U (Reappear)

Major Elective Papers

(2 papers are to be chosen from the following 6 papers)

1. Forestry
2. Biotechnology
3. Food science
4. Seed biology
5. Pharmacognosy
6. Mushroom cultivation Technology

Non-Major Elective Papers

1. Human Rights
2. Women's Rights
3. Consumer affairs

Sub code & Title of the Extra Departmental Course (EDC)

19UBO5X1 - Medicinal Botany and Human Welfare

UBO4

List of Extension Activities:

1. National Cadet Corps (NCC)
2. National Service Scheme (NSS)
3. Youth Red Cross (YRC)
4. Physical Education (PYE)
5. Eco Club (ECC)
6. Red Ribbon Club (RRC)
7. Women Empowerment Cell (WEC)

Note: In core/allied subjects, no. of papers both theory and practical are included wherever applicable. However, the total credits and marks for core/allied subjects remain the same as stated below.

Tally Table:

S. No.	Part	Subject	Marks	Credits
1.	I	Language - Tamil/Hindi/Malayalam/ French/ Sanskrit	400	12
2.	II	English	400	12
3.	III	Core - Theory/Practical/Project	1700	65
		Allied	400	20
		Elective	200	10
4.	IV	Basic Tamil / Advanced Tamil (OR) Non-major electives	150	4
		Skill Based subject	300	9
		Environmental Studies	50	2
		Value Education	50	2
5.	V	Extra Departmental Course (EDC)	100	3
		Extension Activities	50	1
		Total	3800	140

- 25 % CIA is applicable to all subjects except JOC, COP and SWAYAM courses which are considered as extra credit courses.
- The students are advised to complete a **SWAYAM-MOOC** before the completion of the 5th semester and the course completed certificate should be submitted to the HOD. Two credits will be given to the candidates who have successfully completed.
- A **Field Trip** preferably relevant to the course should be undertaken every year.

UBO5

Certificate Course

- **Bonsai**

Semester	Subject Code	Title of the Paper	Instruction hours /cycle	Exam Marks			Duration of Exam (hours)	Credits
				CIA	ESE	Total		
	19CCB101	C.P.1- Introduction to Bonsai Principles and Techniques	2	25	75	100	3	2
	19CCB102	C.P.2- Ethics, Values and Marketing of Bonsai	2	25	75	100	3	2
	19CCB1CL	C.Pr.1. Bonsai Techniques	2	40	60	100	3	2
	19PDB2Z1	Project	2	20	80	100	3	2
		Grand Total	8			400		8

Components of Continuous Internal Assessment (CIA)

Components		Marks	Total
Theory			
CIA I	75	(75+75 = 150/10)	25
CIA II	75		
Assignment / Seminar		5	40
Attendance		5	
Practical			
CIA Practical		25	
Observation Notebook		10	20
Attendance		5	
Project			
Review		15	20
Regularity		5	

UBO6

BLOOM'S TAXONOMY BASED ASSESSMENT PATTERN

K1 - Remember; **K2** - Understanding; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate

+

1. Theory Examination - Part I, II & III

(i) CIA I & II and ESE: 75 Marks

Knowledge Level	Section	Marks	Description	Total
K1 Q1 to 10	A (Answer all)	10 x 1 = 10	MCQ	75
K2 Q11 to 15	B (Either or pattern)	5 x 5 = 25	Short Answers	
K3 & K4 Q16 to 20	C (Either or pattern)	5 x 8 = 40	Descriptive / Detailed	

(ii) CIA I & II and ESE: 55 Marks

Knowledge Level	Section	Marks	Description	Total
K1 Q1 to 10	A (Answer all)	10 x 1 = 10	MCQ	55
K2 Q11 to 15	B (Either or pattern)	5 x 3 = 15	Short Answers	
K3 & K4 Q16 to 20	C (Either or pattern)	5 x 6 = 30	Descriptive / Detailed	

2. Practical Examination:

Knowledge Level	Section	Marks	Total
K3	Experiments & Record Work	50	60
K4		10	
K5			

3. Project Viva Voce:

Knowledge Level	Section	Marks	Total
K3	Project Report & Viva voce	60	80
K4		20	
K5			

Programme Code: 05		Title: B.Sc., BOTANY		
Course Code: 19UBO101		Core Paper: 1 - PLANT DIVERSITY – I		
Batch 2019-2020	Semester I	Hours / Week 7	Total Hours 105	Credits 5

COURSE OBJECTIVES

- To acquire knowledge on evolution of Thallophytes and to know about the diversity patterns of lower life forms on earth.
- To understand the distribution, structure, reproduction and life cycle patterns of lower life forms like algae, fungi and lichens.
- To know the economic value of lower organisms.

COURSE OUTCOMES

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

K1	CO1	Differentiate and identify the algal species using algal pigments.
K2	CO2	Know about the distribution and mode of nutrition of fungal species.
K3	CO3	Gain thorough knowledge on the symbiotic nature of fungi associated with tree species and improves soil fertility.
K3	CO4	Apply their knowledge on the involvement of lichen as the indicators of pollution.

SYLLABUS

UNIT I

(21 hours)

Algae: Introduction and general characters; detailed study of habits, habitats and distribution of algae, algal pigments, outline classification of algae by Fritsch (1945). Detailed study of occurrence, thallus structure, reproduction and life cycle of Cyanophyceae - *Nostoc*, Chlorophyceae - *Volvox* and *Caulerpa*.

UNIT II

(21 hours)

Habit, habitats and distribution, thallus structure, reproduction and life cycle of Bacillariophyceae - *Diatom*; Phaeophyceae - *Sargassum*; Rhodophyceae - *Polysiphonia*. Economic importance of algae.

UNIT III

(21 hours)

Fungi: General characters, structure and reproduction of fungi. Outline classification of fungi by Alexopoulos and Mims (1979). Detailed study of habit, habitats and distribution, structure, reproduction and life cycles of Oomycetes - *Albugo*, Zygomycetes - *Pilobolous*.

UNIT IV

(21 hours)

Habit, habitats and distribution, thallus structure, reproduction and life cycles of Ascomycetes - *Saccharomyces*, Basidiomycetes - *Puccinia*, Deuteromycetes - *Cercospora*. Economic importance of fungi. Mycorrhizae and their significance.

UNIT V

(21 hours)

Lichens: Habits and habitats; Dual organisms, role of Phycobionts and Mycobionts. Outline classification of lichens by Alexopoulos and Mims (1979). Thallus anatomy and reproduction of Ascolichen. Economic importance of Lichens*.

* Self study

Teaching Methods

Quiz / Class discussion/Assignment

TEXT BOOKS

1. Gangulee, Das & Kar. (2001). College Botany Vol. II. New central Book agency Pvt. Ltd., Calcutta.
2. Sharma, O.P. (2002). Text book of Fungi. Tata McGraw-Hill Publications, New Delhi.
3. Vashishta, B.R. (1998). Fungi. S. Chand & Co., New Delhi.
4. Vashishta, B.R. (1998). The Algae. S. Chand & Co., New Delhi.

REFERENCES

1. Smith, G.M. (1955). Cryptogamic Botany. Algae and Fungi Vol. I M. Vadamalai media Pvt. Ltd. Bangalore.
2. Alexopoulos C.J & Mims. (1979). Introductory Mycology.
3. Chopra, C.L. (1982). Algae. S. Nagin & Co., New Delhi.
4. Fritsch, F.E. (1972). The structure and reproduction of Algae Vol. I & II.
5. Sharma, O.P. (1986). Text book of Algae. Tata McGraw - Hill Publications, New Delhi.

MAPPING

CO \ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	H	H	S	M
CO2	H	M	S	H	S
CO3	H	H	M	S	H
CO4	S	M	H	S	M

S - Strong

H - High

M - Medium

L - Low

SEMESTER I

PART IV - ENVIRONMENTAL STUDIES

Total Credits: 2

Total Hours: 30

Objectives:

- To inculcate knowledge and create awareness about ecological and environmental concepts, issues and solutions to environmental problems.
- To shape students into good “ecocitizens” thereby catering to global environmental needs.

UNIT I MULTIDISCIPLINARY NATURE OF ENVIRONMENT (6 hours)

Definition : scope and importance - Need for public awareness - Natural resources - Types of resources - Forest Resources - Water Resources - Mineral Resources - Food Resources - Energy Resources - Land Resources.

UNIT II ECOSYSTEMS (6 hours)

Concept of an ecosystem - Structure and functions of an ecosystem - Procedures, consumers and decomposers - Energy flow in the ecosystem - Ecological succession - Food chains, food web and ecological pyramids - Structure and function of the following ecosystem - Forest Ecosystem -Grassland Ecosystem - Desert Ecosystem - Aquatic Ecosystem.

UNIT III BIODIVERSITY AND ITS CONSERVATION (6hours)

Introduction - Definition - Genetic - Species and ecosystem diversity- Bio geographical classification of India - Value of biodiversity - Biodiversity at global, national and local levels - India as a mega - diversity Nation - Hot spot of biodiversity - Threats to biodiversity - Endangered and endemic species of India - Conservation of Biodiversity - insitu Conservation of Biodiversity - exsitu Conservation of Biodiversity

UNIT IV ENVIRONMENTAL POLLUTION (6 hours)

Definition - Causes, effects and control measures of : Air Pollution - Water Pollution - Soil Pollution - Marine Pollution - Noise Pollution - Thermal Pollution - Nuclear Pollution - Solid Waste Management: Causes, effects, control measures of urban and industrial wastes - Role of individual in prevention of pollution - Pollution case studies - domestic waste water, effluent from paper mill and dyeing, cement pollution - Disaster Management - Food, Drought, Earthquake, Tsunami, Cyclone and Landslide.

UNIT V SOCIAL ISSUES AND THE ENVIRONMENT**(6 hours)**

Sustainable Development - Urban problems related to energy - Water Conservation: Rain Water Harvesting and Watershed Management - Resettlement and rehabilitation of people, its problems and concerns, case studies Narmatha Valley Project - Environmental ethics, issues and possible solutions - Climate change, global warming, ozone layer depletion, acid rain, nuclear accidents and holocaust, case studies - Hiroshima and Nagasaki, Chernobyl - Consumerism and waste products - Environmental Protection Act - Air Pollution Act (Prevention and Control) - Water Pollution Act (Prevention and control) - Wild Life Protection Act - Forest Conservation Act - Issues involved in enforcement of environmental legislation - Public awareness - Human Population and the environment - Population Growth and Distribution - Population Explosion - Family Welfare Programme - Environment and Human Health - Human Rights - Value Education - HIV/ AIDS - Women and Child Welfare - Role of Information Technology in Environment and Human Health -.

***Self Study** (Questions may be asked from these topics also)

TEXT BOOKS

1. P.Arul, A Text Book of Environmental Studies, Environmental Agency, No 27, Nattar street, Velacherry main road, Velacheery, Chennai - 42, First Edition, Nov.2004.

REFERENCES

1. Purohit Shammi Agarwal, A text Book of Environmental Sciences, Publisher Mrs.Saraswati Prohit, Student Education , Behind Naswan Cinema Chopansi Road, Jodhpur.
2. Dr.Suresh and K.Dhameja, Environmental Sciences and Engineering , Publisher S.K.Kataria & Sons, 424/6, Guru Nanak Street, Vaisarak, Delhi -110 006.
3. J.Glynn Henry and Gary W Heinke, Environmental Science and Engineering, Prentice Hall of India Private Ltd., New Delhi - 110 001.

UBO11

Question Paper Pattern
(External only)

Duration: 3 hours

Total Marks : 50

Answer all Questions (5 x 10 = 50 Marks)

Essay type, either or type questions from each unit.

UBO12

19UBO202

Programme Code: 05		Title: B.Sc., BOTANY		
Course Code: 19UBO202		Core Paper: 2 - PLANT DIVERSITY - II		
Batch 2019-2020	Semester II	Hours / Week 7	Total Hours 105	Credits 5

COURSE OBJECTIVES

- To know about the diversity of Cryptogams and Phanerogams.
- To understand the life cycle pattern of Bryophytes, Pteridophytes and Gymnosperms.
- To study the fossil remains of plants belonging to various eras of Palaeobotany.

COURSE OUTCOMES

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

K1	CO1	Acquire knowledge on diversity among Bryophytes, Pteridophytes and Gymnosperms.
K2	CO2	Understand the internal structure and reproduction of Cryptogams and Phanerogams
K3	CO3	Apply the medicinal and economic knowledge of Bryophytes, Pteridophytes and Gymnosperms for the benefit of human welfare.
K3	CO4	Implement the knowledge on past evidences of fossils for the identification and also to determine the age of the fossil plants through radiocarbon dating.

SYLLABUS

UNIT I

(21 HOURS)

Bryophytes: Introduction and general characters of Bryophytes. Classification of Bryophytes (K.R. Sporne). Occurrence, structure, reproduction and life cycle of *Marchantia*[#], *Anthoceros*[#] and *Funaria*[#]. Economic importance of Bryophytes.

UNIT II

(21 HOURS)

Pteridophytes: Introduction and general characters of Pteridophytes. Classification of Pteridophytes (Riemer, 1954). Occurrence, structure, reproduction and life cycle of *Lycopodium*[#], *Selaginella*[#] and *Equisetum*[#].

UNIT III

(21 HOURS)

Occurrence, structure, reproduction and life cycle of *Ophioglossum*[#] and *Adiantum*[#]. Vascular organization and Stelar evolution in Pteridophytes. Apogamy and apospory. Economic importance of Pteridophytes*.

UNIT IV

(21 HOURS)

Gymnosperms: Introduction and general characters of Gymnosperms. Classification of Gymnosperms (Coulter & Chamberlain 1956). Detailed study of the structure and reproduction of *Cycas*[#] and *Gnetum*[#]. Economic importance of Gymnosperms.

UNIT V

(21 HOURS)

Palaeobotany: Geological time scale, fossilization and types. Radiocarbon dating. Study of the following fossils – *Rhynia*, *Lepidodendron*, *Lepidocarpon* and *Williamsonia*.

(Developmental studies are excluded)

* Self study

Teaching Methods

Powerpoint presentation/Seminar/Quiz/Discussion/Assignment

TEXT BOOKS

1. Gangulee, Das & Kar. (2001). College Botany Vol II. New central Book agency Pvt. Ltd. Calcutta.
2. Vashista, P.C. (1992). Pteridophyta. Chand & Co., New Delhi.
3. Pandey, B.P. (1981). Gymnosperms. Chand & Co., New Delhi.
4. Vashista, P.C., Sinha and Anil Kumar. (2008). Text book of Bryophytes. Chand & Co., New Delhi.
5. Shukla and Mishra. (1982). Essentials of Paleobotany. Vikas Publishing House, Pvt Ltd., New Delhi.

REFERENCES

1. Pandey, B.P. (1994). A Text book of Botany - Pteridophyta. Chand & Co. New Delhi.
2. Rashid. (1995). An introduction to Pteridophytes. Vikas Publishing House, Pvt. Ltd., New Delhi.
3. Sporne, K.R. (1980). Morphology of Pteridophytes -B.I. Publications, New Delhi
4. Smith, G.M. (1955). Cryptogamic Botany Vol. II. Tata McGraw Hill Publications, New Delhi.

MAPPING

CO \ PSO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	H	S	H	S	M
CO2	S	M	H	H	M
CO3	H	H	S	M	H
CO4	S	H	M	H	M

S - Strong

H - High

M - Medium

L - Low

Programme Code: 05		Title: B.Sc., BOTANY		
Course Code: 19UBO2CL		Core Practical: 1 - PLANT DIVERSITY - I & II		
Batch 2019-2020	Semester II	Hours / Week 2	Total Hours 30	Credits 2

COURSE OBJECTIVES

- To enable students to know about diversity of lower organisms.
- To understand the life cycle pattern of Bryophytes, Pteridophytes and Gymnosperms.
- To study the fossil remains of plants in the division of Palaeobotany.

COURSE OUTCOMES

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

K3	CO1	Explain the primitive and advanced Thallophytes.
K4	CO2	Analyze the internal organization of Cryptogams and Phanerogams.
K5	CO3	Examine the Mycorrhizal association in the roots of higher plants.

Core Practical: 2 -PLANT DIVERSITY - I & II

I. PLANT DIVERSITY - I

Structure and reproductive characters of the following:-

1. Algae

Nostoc
Volvox
Caulerpa
Diatoms
Sargassum
Polysiphonia

2. Fungi

Albugo
Pilobolous
Saccharomyces
Puccinia
Cercospora

3. Lichen Morphology - *Usnea*

4. Identification of Mycorrhizal spore in soil samples

II. PLANT DIVERSITY - II

Structure and reproductive characters of the following:-

Bryophytes*Marchantia**Anthoceros**Funaria***Pteridophytes***Lycopodium**Selaginella**Equisetum**Ophioglossum**Adiantum***Gymnosperms***Cycas**Gnetum***Palaeobotany***Rhynia**Lepidodendron**Lepidocarpon**Williamsonia***MAPPING**

CO \ PSO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	H	M	S	H
CO2	H	S	H	H	M
CO3	S	H	M	S	S

S - Strong**H** - High**M** - Medium**L** - Low

UBO16

19UBO2CL

**KONGUNADU ARTS AND SCIENCE COLLEGE (Autonomous)
COIMBATORE - 641 029**

UG MODEL QUESTION PAPER (PRACTICALS)

End semester Examination Question Paper Pattern

(For the candidates admitted from the academic year 2019-20 onwards)

Time: 3 Hours

Max. Marks: 60 Marks

BREAK UP OF MARKS

Core Practical: 2 - PLANT DIVERSITY - I & II

I. Micro-preparation	- 25 Marks
II. Identify the given specimen to its class and specify their general characters	- 04 Marks
III. Write the Systematic position of the given specimen	- 03 Marks
IV. Spotters (6 x 3)	- 18 Marks
Record	- 10 Marks
	<hr/>
TOTAL	- 60 Marks
	<hr/>

SEMESTER-II
PART-IV VALUE EDUCATION: MORAL AND ETHICS

Total Hours: 30

Total Credits: 2

OBJECTIVES:

- To impart the value education in every walk of life.
- To make them understand the relationship between Moral and Ethics.
- To impart the right attitude by practicing self introspection.
- To make them realize about their hidden power within them.
- To develop a knowledge for the steps of upliftment.
- To know about their goal of life.
- To make them understand the importance of yoga and meditation.
- To realize what is the real peace.
- To understand what are the ways to contribute peace to the whole world.
- To goad youth to reach excellence and reap success.

UNIT I **6hrs**
Introduction - Meaning of Moral and Ethics - Ethics and Culture - Aim of Education.

UNIT II **6hrs**
Swami Vivekananda - A Biography.

UNIT III **6hrs**
The Parliament of Religions - Teachings of Swami Vivekananda.

UNIT IV **6hrs**
Steps for Human Excellence.

UNIT V **6hrs**
Yoga & Meditation.

TEXT BOOKS

1. Value Base Education - Moral and Ethics - Published by Kongunadu Arts and Science College (Autonomous), First Edition, 2015.

REFERENCES

1. Easy steps to Yoga by Swami Vivekananda, A Divine Life Society Publication, 2000.

Question paper pattern
(External only)

Duration: 3 hrs

Total Marks: 50

Answer all Questions (5 x 10 = 50 Marks)

Essay type, either or type questions from each unit.

Programme Code : 05		Title: B.Sc., BOTANY		
Course code : 19UBO303		Core Paper: 3 – ANATOMY, EMBRYOLOGY OF ANGIOSPERMS AND MICROTECHNIQUES		
Batch 2019-2020	Semester III	Hours/Week 5	Total Hours 75	Credits 4

COURSE OBJECTIVES

1. To inculcate knowledge on the basics of tissues and anatomical features of plants.
2. To understand the key aspects of reproductive systems of flowering plants.
3. To learn the techniques of temporary microscopic slide preparations.

COURSE OUTCOME

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

K1	CO1	Know about the various developmental aspects of the plants.
K2	CO2	Compare and identify the structural differences existing among the vascular plants.
K3	CO3	Imply the embryological and anatomical knowledge to differentiate the plant taxa.
K3	CO4	Familiarize the basic skills on fixation, dehydration, infiltration and staining process of the specimens.

SYLLABUS

Unit I

(15 HOURS)

Scope and significance of plant anatomy; Apical organization: Origin and structure of primary meristem (Angiosperm), theories of apical organization, Primary thickening meristem in monocots, Reproductive apex in angiosperms. Epidermal tissue system : Stomata - types and functions; Trichomes - Types and functions, structure and functions of secretory trichomes in *Drosera* and *Nepenthes*, salt gland, collectors, floral and extrafloral nectarines, resin duct, oil glands and laticiferous (articulated and non-articulated).

Unit II

(15 HOURS)

Vascular cambium and cork cambium: Structure and function. Secondary xylem and phloem: Structure and functions. Anomalous secondary growth: *Acyranthus* and *Nyctanthus* (Dicot), Monocot - *Dracaena*. Wood: Porous, non-porous, patterns and distribution, physical, chemical and mechanical properties. Plant fibres - Distribution, structure and commercial importance of coir, jute and cotton.

Unit III

(15 HOURS)

Angiosperm life cycle*. Microsporangium: Structure and development of anther, wall of microsporangium, Tapetum - structure, types and functions, Pollen

morphology - NPC formula, pollen wall features, pollen kit. Megasporangium: Structure, types of ovule, ultrastructure of mature Embryosac (*Polygonum*).

Unit IV

(15 HOURS)

Fertilization: Double fertilization. Endosperm: Nuclear, Cellular, Helobial and Ruminant types, haustorial behavior of endosperm and function. Embryo: Embryogeny in Dicotyledons (Crucifer type) and Monocotyledons (Caryophyllad type). Polyembryony & Parthenocarpy: Classification, types and applications. Apomixis: types and significance.

Unit V

(15 HOURS)

Killing and Fixing: Principles and techniques of killing and fixing; Fixative reagents - Carnoy's fluid, FAA, Chromic acid fluids. Dehydration: Principles of dehydration; Dehydrating methods: Tertiary-butyl alcohol method, Alcohol-Xylol method. Embedding: Paraffin embedding. Sectioning: Free hand sections, Sectioning by Rotary microtome. Staining: Principles of staining; Techniques of staining - single staining (Haematoxylin), double staining (Safranin and Fast green method). Mounting: Mounting by DPX. Cleaning, labeling and storage of slides.

*** Self study**

TEACHING METHODS

Powerpoint presentation/Seminar/Quiz/Discussion/Assignment

TEXT BOOKS

1. Fahn, A. (1982). Plant Anatomy. (3rd edition). Pergamon Press, Oxford.
2. Pandey, B.P.1978. Plant Anatomy. Chand and Co, New Delhi.
3. Esau.K. (1985) - Anatomy of Seed Plants -John Willey
4. Singh, Pandey and Jain, (2007). Anatomy of Seed plants, Rastogi Publications. New Delhi.
5. S. S. Bhojwani, S. P. Bhatnagar, (1985). Embryology of Angiosperms, Vikas Publishing House, Noida.
6. Maheswari, P. (1950). Introduction to the embryology of Angiosperms. Vikas Publishing House, New Delhi.
7. Raghavan, V. (1997). Molecular Embryology of Flowering Plants. Cambridge University Press, Cambridge.

REFERENCES

1. De Roberties. (1989). Cell and Molecular Biology. Mc Graw Hill, New Delhi.
2. Annie Regland. (2000). Developmental Botany -Saras Publication, Kanyakumari
3. Fahn, A (1985). Plant Anatomy. Pergamon Press, Great Britain.
4. Esau, K. (1991). Plant Anatomy. Wiley Eastern Ltd. New Delhi. 7th Edition

UBO20

19UBO303

MAPPING

CO \ PSO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	H	H	M	H
CO2	H	H	M	S	M
CO3	S	H	S	H	H
CO4	H	S	H	M	M

S - Strong

H - High

M - Medium

L - Low

PART IV - III SEMESTER
SKILL BASED SUBJECT 1 - GENERAL AWARENESS (ONLINE)

Total Credits: 3

Total Hours: 30

Objectives

1. To acquire knowledge in relation to various competitive examinations.
2. To create awareness about an online examination which is being followed in competitive examinations.

UNIT I

(6 HOURS)

1. Tamil and other Literatures

Tamil, English, Christian and Muslim Literatures - Ancient Literature - Bakthi Literature - Epics - Medieval Literature - Modern Literature (Novel, Dramas, Short Stories, Modern Poetry).

2. Economics and Commerce

Basic Economics - Auditing - Management - Capital Market - Foreign Trade - Companies - Banking.

3. Social studies

Indian History - Inventions - Indian Poetry - Constitution - Judiciary - Languages - Literacy - Indian Geography - Lithosphere - Climate - Soil - Agriculture - Population.

UNIT II

(6 HOURS)

4. Numerical Aptitude

Objective Arithmetic : Number systems - probability - HCF and LCM of numbers* - decimal fractions - simplification - squareroots and cuberoots - average - percentage - profit and loss - ratio and proportion - time and work - simple interest - area, volume and surface area*.

5. Verbal Aptitude

Spot the odd one out - correct form of verb - preposition - find out the rightly spelt word - choose the correct meaning of idioms - synonyms and antonyms.

6. Abstract Reasoning

Logic Reasoning : Logic - statement - arguments - statement assumptions - Statement course of action - theme detection - deriving conclusion from passages.

Non - verbal Reasoning : Series - analogy - classification - analytical reasoning - mirror images - water images - paper folding - paper cutting - rule detection - grouping of identical figures.

UNIT III

(6 HOURS)

7. General Science and Technology

SCIENCE - Basic principles and concepts in Physics, Chemistry, Botany and Zoology.

TECHNOLOGY - Metallurgy, instrumentation, discoveries and inventions of techniques.

8. Computer Science

Historical evolution of computers - Computer applications - Data processing concepts - Computer codes and arithmetic - Hardware components - Data Structures.

9. Education

Development process of the learner - Principles of development (physical, social, emotional and intellectual) - Learning process - Teaching and teacher behaviour - Interaction analysis - Microteaching - Teacher as a leader - Motivation - Personality dimension - concept of mental health - Counselling.

UNIT IV

(6 HOURS)

10. Library and Information Science

Library and Information Science - Basics, Computer, Library Network and others like Research, Reprography etc.

11. Sports and Games

Athletics - Track Events - Field Events - Games - Indoor Games - Outdoor Games - General knowledge - Sport and Olympics - First Aid.

12. Current Affairs

State, Central and International affairs: Budgets - Politics - Sports - Education - Commerce and Industry - Inventions - Science and Technology - Currency - Agriculture - Movies - Guinness records - Awards - IT Industry - Space Research - Defence etc.

UNIT V

(6 HOURS)

13. National Cadet Corps (NCC)

Introduction to the Armed Forces (Army, Navy, Air Force) - Drill - Weapon Training - Map Reading - Civil Defence.

14. National Service Scheme (NSS)

History of NSS - History of Motto, Symbol, Badge - Aims and Objectives - Duties and Total Hours - Organisational and Administrative setup - History of voluntary organization - Regular activities - Special camp activities - Special programmes - awards - Important days.

15. Youth Red Cross (YRC)

History of International Red Cross - History of Indian Red Cross - History of Youth Red Cross - Main objectives of YRC - Emblem - Fundamental principles of Red Cross - Organizational Setup - Activities of Youth Red Cross - Role of different functionaries - Training programmes for YRC Program Officers - Training programme for YRC

Volunteers - YRC Song - Working Hours - General orientation - Special orientation - Program skill learning.

*** Self Study (Questions may be asked from these topics also)**

TEXT BOOKS

1. VBC 1 - General Awareness, Question Bank, Kongunadu Arts and Science College, Coimbatore - 29, 2006.
-

Question Paper Pattern

Max. Marks 100

End of Semester Examination (ESE)- On-Line Examination 75 Marks

1. 150 questions are to be given. Each question carries ½ mark.
2. In each unit, 30 questions are to be given, covering all the 5 units.

Continuous Internal Assessment (CIA) (through On-Line) 25 Marks

- a) Two Exams. 15 Marks
- b) Assignment** 5 Marks
- c) Attendance 5 Marks

** Each student has to submit an assignment in the topic Current Affairs area.

Programme Code: 05		Title: B.Sc., BOTANY		
Course Code: 19UBO404		Core Paper: 4 - BIOPHYSICS AND BIOSTATISTICS		
Batch 2019-2020	Semester IV	Hours / Week 5	Total Hours 75	Credits 4

COURSE OBJECTIVES

- To understand the nature of light.
- To learn the basic principles of biostatistics.
- To impart knowledge to solve the biological problems.

COURSE OUTCOMES

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

K1	CO1	Recognize the dual nature of the light and its reactions with the matter with reference to plants.
K2	CO2	Understand the basic concepts of thermodynamics.
K3	CO3	Impart knowledge on radioactivity and their effects on biological tissues.
K3	CO4	Apply the biostatistical formulae to solve the biological related problems.

SYLLABUS

UNIT I

(15 HOURS)

Biophysics: Introduction, scope and importance. Electromagnetic radiation and absorption. Excitation and de-excitation. Thermodynamic laws (enthalpy, entropy, free energy).

UNIT II

(15 HOURS)

Radioactivity and biological traces: alpha, beta and gamma radiations. Radioactive isotopes and half-life period. Ionization and detection - biological effects of ionizing radiation - uses of biological traces in metabolic studies. Autoradiography, Geiger- Muller and Scintillation counter.

UNIT III

(15 HOURS)

Biostatistics: - Definition, steps in statistics, data collection methods - sampling - census and sampling method, law of statistical regularities, law of inertia of large numbers. Essential of sampling and methods of sampling - probability of sampling - simple, random sampling, stratified random sampling, cluster sampling, non-probability sampling - judgment sampling, quota sampling and convenient sampling (theory only). Primary and secondary data.

UNIT IV**(15 HOURS)**

Classification of data and Frequency distribution-Simple, Discrete and Continuous series. Tabulation, graphical representation-Time series graph, Histogram and diagrammatic representation of data - Line, Bar and Pie diagram. Cartogram and Pictogram*.

UNIT V**(15 HOURS)**

Measures of central tendency - Mean [Arithmetic only] median and mode. Rounding off figures. Precision, accuracy and error. Dispersion or deviation-range, average deviation, variance, standard deviation and standard error. Test of significance- Chi-square test and t- test.

Self study*Teaching Methods**

Power point presentation/Seminar/Quiz/Discussion/Assignment

TEXT BOOKS

1. Palanichamy, S. (1986). Principles of biophysics. Paramount Publication, Palani.
2. Palanichamy, S & M. Manoharan. (1994). Statistical methods for biologists. Paramount Publication, Palani.
3. Arumugam, N. (2003). Basic concepts of Biostatistics. Saras Publications, Nagarcoil.
4. S.P. Gupta, S.P. (2001). Statistical methods. Sultan Chand & Sons, Educational Publishers, New Delhi.

REFERENCES

1. Salil Bose. (1981). Elementary biophysics - Part 1. Vija Printers, Madurai.
2. Khan, I.D. and A. Khanum. (1994). Fundamentals of Biostatistics. Mc Graw Hill, New Delhi.
3. Vasantha Pattabhi & N. Gautham. (2004). Bistatistics. Narosa Publishing House, Chennai.

MAPPING

CO \ PSO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	H	M	S	H
CO2	H	S	S	H	S
CO3	S	H	H	M	H
CO4	H	M	H	S	H

S - Strong**H - High****M - Medium****L - Low**

Programme Code : 05		Title : B.Sc., Botany		
Course code : 19UBO4CM		Core Practical: 2 - Anatomy, Embryology of Angiosperms, Microtechniques, Biophysics and Biostatistics		
Batch 2019 - 2020	Semester IV	Hours/Week 2	Total Hours 30	Credits 2

COURSE OBJECTIVES

- To learn about the special structures associated with the plants.
- To understand role of light in photosynthesis and solve the biological related problems.
- To know the role of fixatives and slide preparation techniques

COURSE OUTCOME

K3	CO1	Analyze various structures of the internal and external structures of the plants.
K4	CO2	Dissect different stages of embryos of <i>Tridax</i> plant.
K5	CO3	Evaluate the normal distribution pattern of a given population.

Core Practical: 2 - Anatomy, Embryology of Angiosperms, Microtechniques, Biophysics and Biostatistics

I. PLANT ANATOMY

1. To study the stomatal index and different types of stomata
2. Localization of laticiferous cells of any Apocynaceae and Asclepiadaceae members
3. Secretory trichomes in *Drosera* and *Nepenthes*
4. Plant fibres - Cotton
5. Anomalous secondary thickening - Dicot - *Nyctanthus*, *Achyranthes*. Monocot - *Dracaena*

II. EMBRYOLOGY OF ANGIOSPERMS

1. Dissection and display of any two stages of embryo in *Tridax*
2. Identification using permanent slides
 - i. T.S. of anther
 - ii. Morphology of pollen grains
 - iii. Types of ovules
 - iv. Ultrastructure of embryosome
 - v. Endosperm types
 - vi. Types of embryos
 - vii. Polyembryony

III. MICROTECHNIQUES

1. Preparation of temporary microslides
2. Composition of some fixatives - FAA and Carnoy's fluid
3. Rotary microtome

IV. BIOPHYSICS

1. Nature of EMR and Spectrum.
2. Diagrams of fluorescence, Phosphorescence, Delayed light emission, Autoradiography, Geiger-Muller counter and Scintillation counter.

V. BIOSTATISTICS

Simple problems in biostatistics:

- i. Mean
- ii. Median
- iii. Mode
- iv. Standard Deviation
- v. Standard Error
- vi. Chi-Square Test.
- vii. t- test

MAPPING

CO \ PSO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	H	M	H	H
CO2	H	M	H	S	M
CO3	S	H	M	H	H

S - Strong

H - High

M - Medium

L - Low

UBO28

19UBO4CM

**KONGUNADU ARTS AND SCIENCE COLLEGE (Autonomous)
COIMBATORE - 641 029**

UG MODEL QUESTION PAPER (PRACTICALS)

End semester Examination Question Paper Pattern

(For the candidates admitted from the academic year 2019-20 onwards)

Time: 3 Hours

Max. Marks: 60 Marks

BREAK UP OF MARKS

**Core Practical: 2 – Anatomy, Embryology of Angiosperms, Microtechniques,
Biophysics and Biostatistics**

I. Anatomy section (A & B)	- 24 Marks
II. Embryo dissection (C)	- 06 Marks
III. Biostatistics (D & E)	- 10 Marks
IV. Spotters	- 10 Marks
Record	- 10 Marks
	<hr/>
TOTAL	- 60 Marks
	<hr/>

Programme Code: 05		Title: B.Sc., BOTANY		
Course Code:19UBO4S2		Skill Based Subject: II - HORTICULTURE		
Batch 2019-2020	Semester IV	Hours / Week 2	Total Hours 30	Credits 3

COURSE OBJECTIVES

- To learn about the propagation methods of horticultural crops.
- To study the various types of gardening, landscaping and their management.
- To know about commercial floriculture and their significance.

COURSE OUTCOMES

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

K1	CO1	Describe various horticultural practices
K2	CO2	Understand solutions to develop a wide variety of plants through vegetative propagules.
K3	CO3	Develop bonsai plants using various techniques.
K3	CO4	Preserve food and vegetables using suitable techniques for the commercial uses throughout the year.

SYLLABUS

UNIT I

(6 HOURS)

Introduction to Horticulture - History, scope and divisions of Horticulture - Methods of vegetative propagation - cutting, layering, grafting and budding. Manures*: Organic - Pancha kavya preparation. Irrigation methods.

UNIT II

(6 HOURS)

Gardening - Types of gardens. Styles of garden - Formal and Informal. Garden components. Special types of garden - rock garden, kitchen garden. Sacred grooves. Lawn making, Terrarium and Bonsai techniques.

UNIT III

(6 HOURS)

Olericulture - Cultivation of vegetables - Bhendi and Tomato. **Pomology** - Cultivation of fruits - Banana and Grapes. Growth regulators in horticulture. Plant protection measures for horticultural crops. Bioinsecticides and Biopesticides.

UNIT IV

(6 HOURS)

Floriculture - Cultivation of flowers - Jasmine and Rose. Cut flowers and Flower arrangements. Cultivation of plantation crops - Tea and Cardamom. Basics of greenhouse design, different types of structures - glasshouse, shade net, poly tunnels.

UNIT V

(6 HOURS)

Extraction of Jasmine concrete and papain. Postharvest handling of fruits and vegetables. Preservation of fruits and vegetables. Cultivation of medicinal plants - *Gloriosa superba* and *Aloe vera*.

* **Self study**

Teaching Methods

Powerpoint presentation/Seminar/Quiz/Discussion/Assignment

TEXT BOOKS

1. George Aquach (2002). Horticulture - Principles and Practices.. Parson Education Ltd. Delhi
2. Kumar, N. (1999). An introduction to horticulture. Rajalakshmi Publication, Nagarcoil.
3. Bhattacharjee, S.K. (2006). Advances in Ornamental Horticulture. Pointer Publications, Jaipur.
4. Kumar N. (2006). Horticulture: Principles and practices. New India Publishing agency, New Delhi 88.

REFERENCES

1. Chaha, K.L. (2001). Handbook of horticulture. ICAR, New Delhi.
2. Edwin Biles. (2003). The complete book of gardening. Biotech book, New Delhi.
3. Singh, S.P. 1999. Advances in Horticulture and Forestry. Scientific Publishers, Jodhpur.
4. Sharma, V.K. (2004). Advances in Horticulture: Strategies, Production, Plant Protection and Value Addition - Deep and Deep Publications, New Delhi.
5. Desh Beer Singh and Poonam Wazir. (2002). Bonsai-An Art. Scientific Publishers, Jodhpur.

MAPPING

CO \ PSO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	H	S	S	H	M
CO2	S	H	M	H	H
CO3	H	S	H	M	S
CO4	S	H	M	H	M

S - Strong

H - High

M - Medium

L - Low

Programme Code: 05		Programme title: B.Sc., Botany		
Course Code: 19UBO505		Core Paper 5 – Bioinstrumentation		
Batch 2019-2020	Semester V	Hours / Week 4	Total Hours 60	Credits 4

Course Objectives

1. To seed the basic knowledge about instruments
2. To make students understand the applications of instruments in Botany
3. To train the students handle and maintain the instruments

Course Outcomes (CO)

K1	CO1	Students are trained to remember each and every topics by comparative studies
K2	CO2	Students are taught with models and audio visuals to understand the concept easily
K3	CO3	Direct applications and benefits of instruments are discussed with hands-on training to students
K4	CO4	Critical steps and important calculations are taught and asked the students to analyze the same

Syllabus

Unit I (12 Hours)

Principle, working mechanism, types and applications: pH meter, Microscopy - light and electron, Centrifugation, Autoclave and Laminar air flow chamber.

Unit II (12 Hours)

Principle, working mechanism and applications: Colorimetry*, UV-visible spectrophotometry, Fluorimetry and Flame photometry. Biophotometer and microplate reader.

Unit III (12 Hours)

Principle, working mechanism and applications: Paper chromatography*, Thin layer chromatography (TLC), Column chromatography, Ion exchange chromatography, Molecular exclusion chromatography, Affinity chromatography, High performance liquid chromatography (HPLC) and Gas chromatography (GC). Lyophilization.

Unit IV (12 Hours)

Principle, working mechanism and applications: Agarose gel electrophoresis (AGE), Polyacrylamide gel electrophoresis (PAGE), Immunoelectrophoresis, Capillary electrophoresis. PCR and its types and Gel documentation system.

Unit V

Distillation and its types, Soxhlet apparatus, Clevenger apparatus, Sonicator, Rotary vacuum evaporator and Magnetic stirrer.

***Self study**

Teaching Methods

Power point presentation/Seminar/Quiz/Discussion/Assignment

Text Books

1. Veerakumari, L. 2009. Bioinstrumentation. MJP Publishers, New Delhi, India
2. Sharma, B.K. 2005. Instrumental Methods of Chemical analysis. 24th Revised Edition, Goel Publishing House, Meerut.

Reference Books

1. Holme and Peck. 1998. Analytical Biochemistry, 3rd Edition, Pearson Education Ltd, Essex, England
2. Skoog and Leary. 1992. Principles of Instrumental analysis, 4th Edition. Saunder's College Publishing, New York.
3. Wilson, K. and Walker, J. 2000. Principles and Techniques of Practical Biochemistry, 5th edition, Cambridge University Press, Cambridge.
4. Handbook of Biomedical Instrumentation – R.S. Khandpur, Tata McGraw Hill
5. Gel Electrophoresis of Nucleic acids-A Practical approach. Rickwood D and BD Hames.

MAPPING

CO \ PSO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	H	H	H	H
CO2	H	S	H	M	H
CO3	H	M	S	H	H
CO4	H	M	S	H	S

S – Strong

H – High

M – Medium

L – Low

Programme Code: 05		Title: B.Sc., BOTANY		
Course Code:19UBO506		Core Paper: 6 - TAXONOMY OF ANGIOSPERMS AND ECONOMIC BOTANY		
Batch 2019-2020	Semester V	Hours / Week 4	Total Hours 60	Credits 5

COURSE OBJECTIVES

- To recognize the plant families of major flowering plants and their diagnostic features.
- To acquire basic knowledge on the principles of phylogeny and biosystematics.
- To familiarize knowledge on plants with immense economic values.

COURSE OUTCOMES

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

K1	CO1	Acquire better knowledge on plant identification.
K2	CO2	Understand nomenclature principles of flowering plants.
K3	CO3	Gain hands on experience on herbarium preparation techniques.
K3	CO4	Familiarize immense knowledge on economic importance of higher plants.

SYLLABUS

UNIT I

(12 HOURS)

Aims and objectives of taxonomy. Systems of classification - Natural (Bentham and Hooker), Phylogenetic (Engler & Prantl) and Modern (APG-IV). Merits and Demerits -Guidelines for the identification of plant specimen.

UNIT II

(12 HOURS)

Herbarium techniques and uses. National herbarium - CNH - Regional herbarium - MH. Botanical Survey of India. Nomenclature - ICN, Binomial - principles. Typification, Author citations, Effective and valid publication. Retention and rejection of names.

UNIT III

(12 HOURS)

Detailed study of the following families with reference to the Morphology, Taxonomy and their economic importance. Annonaceae, Capparidaceae, Rutaceae, Anacardiaceae, Leguminosae, Myrtaceae, Curcubitaceae, Apiaceae, Rubiaceae, Asteraceae, Sapotaceae and Apocynaceae.

UNIT IV

(12 HOURS)

Detailed study of the following families with reference to the Morphology, Taxonomy and their economic importance. Solanaceae, Acanthaceae, Verbenaceae, Lamiaceae, Amaranthaceae, Euphorbiaceae, Hydrocharitaceae, Zingiberaceae, Liliaceae, Arecaceae and Poaceae.

UNIT V

(12 HOURS)

Economic Botany- study of botany, cultivation and utilization of the following: Fiber yielding plants (cotton), sugar yielding plant (sugarcane) and food crops - (cereals - paddy and pulses - soybean). Spices and condiments (pepper and turmeric)*.

*** Self Study**

TEACHING METHODS

Seminar/Quiz/Assignment

TEXT BOOKS

1. Sharma, O.P. (1986). Modern taxonomy. Rastogi Publications, New Delhi.
2. Subramanyam, N.S. (1987). Modern Plant Taxonomy, Vikas Publishing House, New Delhi.
3. Sambamoorthy A.V and N.S. Subramanyam. (1989). A text book of Economic Botany. Wilay Easters, New Delhi.
4. Verma, V. (2006). A textbook of Economic Botany. Emky Publication, New Delhi.

REFERENCES

1. Singh, V. and D.K. Jain. (1997). Taxonomy of Angiosperms. Rastogi Publications, New Delhi.
2. Pandey, B.P.(1997). Taxonomy of Angiosperms. Chand & Co., New Delhi.
3. Jain, S.K. and R.R. Rao. (1977). A. Handbook of Field and Herbarium methods. Today and Tomorrow Publishers, New Delhi.
4. Henry, A.N. and Chandrabose. (1982). An aid to the international code of botanical nomenclature. BSI Calcutta.
5. Gurucharan Singh (2004). Plant systematic-theory and practices. Oxford and IBH publishers, New Delhi.

MAPPING

PSO CO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	H	S	M	H
CO2	S	M	H	S	S
CO3	H	H	M	H	S
CO4	S	H	S	M	H

S - Strong

H - High

M - Medium

L - Low

Programme Code: 05		Title: B.Sc., BOTANY		
Course Code: 19UBO507		Core Paper: 7 - CYTOLOGY, GENETICS & PLANT BREEDING		
Batch 2019-2020	Semester V	Hours / Week 4	Total Hours 60	Credits 5

COURSE OBJECTIVES

- To learn the cellular details, cell organelles and their functions.
- To acquire knowledge on genes and their interactions.
- To gain knowledge on plant breeding methods and crop improvement programmes.

COURSE OUTCOMES

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

K1	CO1	Familiarize structural organizations of cells and cellular mechanisms.
K2	CO2	Understand and explain scientific principles behind nature and function of genes and their process of inheritance.
K3	CO3	Apply the acquired knowledge on character exchanges among the individuals due to crossing over.
K3	CO4	Implement the plant breeding techniques for crop improvement.

SYLLABUS

UNIT I

(12 HOURS)

Ultra structure of plant cell*, Structure, chemical composition and functions of cell wall, Plasma membrane, Mitochondria, Endoplasmic reticulum, Golgi apparatus, Chloroplast, Ribosome, Nucleus and Chromosomes.

UNIT II

(12 HOURS)

DNA as a genetic material, structure, properties, replication of DNA (Conservative, semi-conservative and dispersive methods) and functions. RNA - types and functions. Cell division - Cell cycle, Amitosis, Mitosis & Meiosis and their significances.

UNIT III

(12 HOURS)

Genetics - field of genetics, Mendel's experiments, Mendel's laws of inheritance, monohybrid and dihybrid cross. Gene Interaction - Incomplete dominance, Codominance, Collaborator genes, Epistasis, Complementary genes, Duplicate genes and Lethal genes.

UNIT IV

(12 HOURS)

Multiple alleles. Linkage - Complete and incomplete, Crossing over - mechanism, kinds & controlling factors, Cytoplasmic inheritance in plants - male sterility in maize.

UNIT V

(12 HOURS)

Introduction and Objectives of Plant breeding, breeding methods - pureline selection, mass selection and clonal selection, Hybridization, Heterosis, National and international organizations for crop improvement, Achievements in crop improvement - Sugarcane and Cotton.

*Self study

Teaching Methods

Power Point presentation/Seminar/Quiz/Discussion/Assignment

TEXT BOOKS

1. Veerbala Rastogi. (1994). Text book of Genetics. National Press, Meerut.
2. Verma, P.S. & Agarwal V.K. (1983). Cytology. Chand & Co. New Delhi.
3. Gupta, P.K. & M.S. Swaminathan. (2000). Cytology, genetics and Evolution. Rastogi Publication, Meerut.
4. Arumugam, D.N. (1999). Cell Biology. Saras Publication, Nagarcoil.
5. Singh, B.D. (2000). Plant Breeding-Principles and Methods. Kalyani Publishers, New Delhi.

REFERENCES

1. De Roberties. (1989). Cell Biology. McGraw Hill Publication, New Delhi.
2. Chaudhari, H.K. (2005). Elementary principles of plant breeding (25th Ed.). Oxford & IBH Publishing Co. (P) Ltd., New Delhi.
3. Allard. (1960). Principles of plant breeding. John Wiley & Sons, New York.
4. Gardner, E.J., P. Snustad & D. Dobzzosky, (1995). Principles of Genetics.TATA Mc Graw Hill Company Ltd. New Delhi.
5. Gupta, P.K. (2004). Elements of genetics. FNA 2nd Edition.

MAPPING

CO \ PSO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	H	S	H	M	H
CO2	S	H	H	H	M
CO3	H	S	M	S	H
CO4	S	H	H	H	M

S - Strong

H - High

M - Medium

L - Low

Programme Code: 05		Title: B.Sc., BOTANY		
Course Code: 19UBO508		Core Paper: 8 - PLANT ECOLOGY, PHYTOGEOGRAPHY AND RESOURCE CONSERVATION		
Batch 2019-2020	Semester V	Hours / Week 4	Total Hours 60	Credits 5

COURSE OBJECTIVES

- To understand the principles of ecosystem.
- To acquire basic knowledge about community succession
- To ensure knowledge on resource conservation.

COURSE OUTCOMES

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

K1	CO1	Pertain knowledge on principle factors controlling the environment.
K2	CO2	Understand the distribution of plant species across the country.
K3	CO3	Assess the natural vegetational structures of the given geographical locations.
K3	CO4	Explore knowledge on natural resources available for the benefit of mankind.

SYLLABUS

UNIT I

(12 HOURS)

Principles of Ecology. Climatic factors - role and importance of light, temperature, wind and rainfall on the growth of plants. Edaphic factors, Biotic factors - Communities -Characters and methods of studying plant communities (quadrat and transect methods alone).

UNIT II

(12 HOURS)

Community succession - Kinds and causes. Structural and functional changes in communities (Hydrosere and Xerosere-Lithosere). Climax concept. Morphological and anatomical adaptations of Hydrophytes, Xerophytes, Halophytes and Epiphytes.

UNIT III

(12 HOURS)

Ecosystem - Basic structure and functions: Pollution - causes and possible control measures of air, water, soil, noise and radioactive pollutions. Plants - indicator of pollution. Disaster Management.

UNIT IV

(12 HOURS)

Phytogeographical realms of world. Origin of cultivated plants. Botanical regions of India. Continental drift. Age and area hypothesis, theory of Island biogeography, endemism, plant distribution, migration and barriers.

UNIT V

(12 HOURS)

Resource conservation - types of resources, conservation of soil, water, agriculture resources, range, forest and freshwater bodies. Case study* - Project Tiger and Biosphere reserves - Nilgiri Biosphere Reserve (NBR).

*Self study

Teaching Methods

Power Point presentation/Seminar/Quiz/Discussion/Assignment

TEXT BOOKS

1. Sharma, P.D. (2000). Ecology and Environment. Rastogi Publications, New Delhi
2. Shukla. R.S. and P. S. Chandal. (2000). Plant Ecology and soil science. Chand & Co. Ltd., New Delhi.
3. Vasishta, P.C. (1993). Plant Ecology. II Edition. Vishal Publications.
4. Verma and Agarwal. (1998). Principles of Ecology, Chand & Co. Ltd., New Delhi.

REFERENCES

1. Ambasht R.S. (1992). Text book of Plant Ecology, Students and Friends & Co. Varanashi.
2. Schimper, A.F. (1960). Plant geography. Lubrecht & Cramer Ltd., New York.
3. Richard, S. Ostfeld and William H. Schlesinger. (2011). The year in Ecology and conservation Biology, Willey - Blackwell Publications.

MAPPING

CO \ PSO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	H	M	H	S
CO2	H	H	S	M	H
CO3	S	M	H	H	M
CO4	H	H	H	M	S

S - Strong

H - High

M - Medium

L - Low

Programme Code: 05		Title : B.Sc., BOTANY		
Course code : 19UBO5CN		Core Practical: 3 – BIOINSTRUMENTATION, CYTOLOGY, GENETICS AND PLANT BREEDING		
Batch 2019-2020	Semester V	Hours/Week 4	Total Hours 60	Credits 2

COURSE OBJECTIVES

- To insist basic knowledge on the instruments
- To learn principles and applications of instruments
- To provide hands-on techniques on instruments
- To study the cellular details, genetic constitution and plant breeding techniques.

COURSE OUTCOMES

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

K3	CO1	Apply knowledge on handling and troubleshooting of instruments.
K4	CO2	Examine the various parts and functional units of instruments.
K5	CO3	Analyze the progress of cell division and their significance for the manipulation of higher yielding crop plants

I. BIOINSTRUMENTATION

- I. Analyze the pH of samples (soil, water and plant extract)
- II. Colorimetry
- III. UV – Visible spectrophotometry (Absorption and UV spectrum)
- IV. Separation of pigments by Thin Layer Chromatography
- V. Soxhlet apparatus, Clevenger apparatus
- VI. Column Chromatography
- VII. Centrifugation
- VIII. HPLC
- IX. Agarose gel electrophoresis
- X. PCR

II. CYTOLOGY, GENETICS & PLANT BREEDING

1. Study of cell wall structure and cell organelles (plasma membrane, mitochondria, ER, golgi apparatus, chloroplast, ribosomes, nucleus and chromosomes) through slides and photographs
2. Study of mitosis using onion roots
3. Study of meiosis using *Rheo* flower buds
4. Simple problems in genetics (Monohybrid and Dihybrid cross, Incomplete dominance, Codominance, Collaborator genes, Epistasis, Complementary genes, Duplicate genes and Lethal genes)
5. Selection, mass selection and clonal propagation methods.

UBO40

6. Emasculation technique

19UBO5CN

MAPPING

CO \ PSO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	H	S	H	M	H
CO2	S	M	S	M	H
CO3	H	S	S	H	M

S - Strong

H - High

M - Medium

L - Low

UBO41

KONGUNADU ARTS AND SCIENCE COLLEGE (Autonomous)

COIMBATORE - 641 029

UG MODEL QUESTION PAPER (PRACTICALS)

End Semester Examination Question Paper Pattern

(For the candidates admitted from the academic year 2019-20 onwards)

Time: 3 Hours

Max. Marks: 60 Marks

BREAK UP OF MARKS

Core Practical: 3 – Bioinstrumentation, Cytology, Genetics and Plant breeding

I. Bioinstrumentation (A & B)	- 20 Marks
II. Mitosis and Meiosis (C & D)	- 05 Marks
III. Genetic problem	- 15 Marks
IV. Spotters	- 10 Marks
Record	- 10 Marks

TOTAL	- 60 Marks

Programme Code: 05		Title: B.Sc., BOTANY		
Course Code: 19UBO609		Core Paper: 9 – BIOCHEMISTRY AND BIOINFORMATICS		
Batch 2019-2020	Semester VI	Hours / Week 6	Total Hours 90	Credits 4

COURSE OBJECTIVES

- To study the structure of atom and chemical bonds
- To learn the metabolism of chemical reactions in a cell
- To know how to create the databases.

COURSE OUTCOMES

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

K1	CO1	Gain knowledge on chemical bonds, atoms and molecules.
K2	CO2	Understand the chemical structure of macro molecules.
K3	CO3	Acquire the knowledge on the components of computer and usage of biological databases.
K3	CO4	Identify the structures of various biomolecules using biomolecular visualization techniques.

SYLLABUS

UNIT I

(19 Hours)

Introduction to acids, base, pH and buffers and salts. Strong acid and weak acids and salts, colloids. Handerson - Hasselbach equation. Buffers-definition, chemical composition, requirements, mechanism of buffer action, water - forms - structure and properties.

UNIT II

(19 Hours)

Carbohydrates - classification, monosaccharides-structure (glucose), open chain and cyclic (or) ring structure. Biological functions. Oligosaccharides (sucrose) - glycosidic linkages and biological functions. Polysaccharides (cellulose). **Lipids**-classification, structure, properties and functions. Fatty acids - saturated and unsaturated.

UNIT III

(19 Hours)

Amino acids and proteins: Amino acids - classification, structure, properties and biosynthesis. Proteins - classification, structure - primary, secondary, tertiary and quaternary structures.

UNIT IV

(19 Hours)

Introduction to Bioinformatics. Regulation of gene expression in Prokaryotes and Eukaryotes. Biological databases, importance and classification. Gene finding methods.

UNIT V**(19 Hours)**

Sequence alignment, evolutionary basis of sequence alignment, global Vs local alignment, searching for similarities using scoring matrices and gap penalty. Biomolecular visualization, phylogenetic analysis and computer aided drug designing.

Self study*Teaching Methods**

Power Point presentation/Seminar/Quiz/Discussion/Assignment

TEXT BOOKS

1. H. S. Srivastava, (1993). Elements of Biochemistry. Rastogi Publications, Meerut.
2. Jain, J.L. (2002). Fundamentals of Biochemistry. S. Chand & Co. New Delhi
3. Mani, Kand N. Vijayaraj. 2002. Bioinformatics for beginners. Kalaikathir Achakam, Coimabtoe.
4. David W. Mount. 2001. Bioinformatics sequence and Genome analysis, Cold spring Harber Laboratory press.
5. Narayanan L.M., Dulsy Fathima, K.Nallasingam, R.P. Meyyan Pillai, N.Arumugam, S.Prasanna Kumar. (2010). Biochemistry. Saras Publication

REFERENCES

1. Weel, J.H. (1990). General Biochemistry. Wiley Eastern Ltd.
2. Albert L. Lehninger. (2002). Principles of Biochemistry. ICAR, Delhi.
3. Satyanarayana, V. (2005). Essentials of Biochemistry. Arunabha Sen & Allied Pvt., Ltd
4. A.D. Baxeains and B.J. Franchis (Eds.). 1998. Bioinformatics- A practical guide to the analyzing of gene protein. Joha Wiley and Sons.
5. Smart. M. Brown. 2000. Bioinformatics. A biologists guide to bio-computing and the internet. E.aton. Publishing co.

MAPPING

CO \ PSO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	H	S	H	M	H
CO2	S	H	M	H	S
CO3	H	H	S	M	H
CO4	S	M	H	H	M

S - Strong

H - High

M - Medium

L - Low

Programme Code: 05		Title : B.Sc., BOTANY		
Course code : 19UBO610		Core Paper: 10 - PLANT PHYSIOLOGY		
Batch 2019-2020	Semester VI	Hours/Week 6	Total Hours 90	Credits 5

COURSE OBJECTIVES

- To study the structure of atoms and chemical bonds.
- To know the secondary metabolites in plants.
- To study about water potential and its components.

COURSE OUTCOME

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

K1	CO1	Gain the knowledge on the relationship of complementary metabolic process in energy acquisition.
K2	CO2	Understand the water potential and its effects on cellular functions.
K3	CO3	Apply the knowledge on physiological mechanisms of growth regulators in plants.
K3	CO4	Demonstrate detailed understanding of the physiological mechanisms involved in the uptake and transport of water.

SYLLABUS

UNIT I

(19 HOURS)

Plant - water relationship - structure, properties and biological significance of water, water potential and its components, physical forces involved in absorption of water - diffusion, osmosis, imbibition. Absorption of water - mechanism and affecting factors. Absorption of minerals - mechanism (Active and Passive).

UNIT II

(19 HOURS)

Ascent of sap - path and mechanism; Translocation of organic solutes - directions, path, mechanism, assimilates partitioning and controlling factors. Transpiration - kinds, mechanism of stomatal transpiration, significance and factors affecting stomatal movement.

UNIT III

(19 HOURS)

Photosynthesis - pigment system (PS-I & II), Mechanism - Light reaction, Dark reaction - Calvin cycle, Hatch and Slack pathway and CAM pathway, Factors controlling photosynthesis. **Respiration**- Glycolysis, Anaerobic (Fermentation) and aerobic (Krebs cycle) and ATP synthesis. Factors influencing respiration.

UNIT IV**(19 HOURS)**

Nitrogen metabolism - Nitrogen cycle, Biological Nitrogen Fixation - Symbiotic and Non- Symbiotic. Formation of root nodules in leguminous plants, role of nitrogenase enzyme and Leg-hemoglobin. Factors controlling biological nitrogen fixation.

UNIT V**(19 HOURS)**

Plant growth regulatory substances - Distribution, biosynthesis and physiological effects of Auxins, Gibberellins, Cytokinin, Ethylene and Abscissic acid. Physiology of flowering: Photoperiodism - Phytochrome, Vernalization. Seed dormancy*.

*Self study

TEACHING METHODS

Power point presentation/Seminar/Quiz/Discussion/Assignment

TEXT BOOKS

1. Jain, V.K. (1993). Fundamentals of plant physiology. S. Chand & Co. New Delhi
2. Verma, S.K. (1999). A textbook of Plant physiology. S. Chand & Co. New Delhi
3. Annie Ragland, Rajkumar, Rajaatnam and Jayakumar. (2007). Plant Physiology. Saras Publications, Nagargoil.
4. Chopra. (1995). A text book of Plant Physiology. EMKAY Publications, New Delhi.

REFERENCES

1. Noggle and Fritz. (1992). Introductory plant physiology. Prentice Hall of India. Pvt. Ltd. New Delhi.
2. Malik. (2002). Plant physiology. Kalyani Publishers, New Delhi.
3. Devilin, (1986). Plant physiology. CBS Publishers and distributors, New Delhi.

MAPPING

CO \ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	H	M	H	M
CO2	H	H	S	M	H
CO3	S	M	H	H	S
CO4	H	S	S	M	H

S - Strong

H - High

M - Medium

L - Low

Programme Code: 05		Title: B.Sc., BOTANY		
Course Code: 19UBO611		Core Paper: 11 - MICROBIOLOGY AND PLANT PATHOLOGY		
Batch 2019-2020	Semester VI	Hours / Week 6	Total Hours 90	Credits 4

COURSE OBJECTIVES

- To know the major groups of microbes.
- To understand the exploitation of microbes in industries.
- To learn the different pathogenic organisms of plants causing various diseases.

COURSE OUTCOMES

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

K1	CO1	Acquire knowledge on the role of prokaryotic organisms.
K2	CO2	Understand the use of microbes in industries for the welfare of mankind.
K3	CO3	Apply the knowledge on microbial technology for the production of antibiotics.
K3	CO4	Implement knowledge on management of plant diseases to increase crop yield.

SYLLABUS

UNIT I

(19 Hours)

Introduction to microbiology - Historical account, Scope of microbiology, major groups, and classification - five kingdom concept. Eukaryotic organisms. Bacterial morphology, classification (Bergey's manual of Bacteriology) ultrastructure, reproduction - conjugation, transformation and transduction.

UNIT II

(19 Hours)

General characters of viruses, classification of plant viruses. Viral replication - Lytic and lysogenic cycles. Morphology of Bacteriophage (T₂ and T₄). Fermentation - Aerobic and anaerobic fermentation (outline). Industrial production and applications of ethanol, penicillin and vinegar.

UNIT III

(19 Hours)

Food microbiology - Milk and milk products (yoghurt and cheese) - physical and chemical composition, pasteurization, Microbial flora of fresh food, microbial examination of poisoning (Botulism).

UNIT IV

(19 Hours)

Introduction, definition and classification of diseases, organisms and causal factors responsible for plant diseases. Methods of studying plant diseases. Defence mechanism in plants. Integrated disease management. Secondary assimilatory response.

UNIT V

(19 Hours)

Symptoms, causative organisms, life cycle and control measures. Virus - Tobacco Mosaic disease* and Cucumber Mosaic disease; Bacteria - Citrus canker, Rice bacterial blight disease; Fungi - Tikka disease of ground nut and Red rot of sugarcane.

* Self study

Teaching Methods

Power point presentation/Seminar/Quiz/Discussion/Assignment

TEXT BOOKS

1. Pelezar, M.J. Reid, R.D. and E.C.S. Chan, (1983). Microbiology, Tata Mc Graw Hill,
2. , Paul A. Ketchum, (1988) Microbiology John Wiley and Sons., USA.
3. Read A. Prescott and Dunns, (1983). Industrial Microbiology, AUS Publishing,
4. S.S. Purohit, (1994). Microbiology, Fundamentals and applications
5. Pandey, B.P. (1982). A text book of Plant Pathology, Pathogen and Plant Diseases. S. Chand and Co. Ltd., New Delhi.

REFERENCES

1. Ed. D.S. Chahal, (1991). Food, Feed and Fuel from Biomass, Oxford & IBH, Publishing Co. Pvt. Ltd., New Delhi.
2. Richard G. Burns and J. Howard Slater, (1982). Experimental Microbial Ecology, Black Well Scientific Publications, Oxford.
3. Casido L.E and J.R. Willey, (1968). Industrial Microbiology, Eastern Ltd., ISBN,
4. Jay, J.M. Ed. (1983). Modern Food Microbiology, CBS. Publishers, Delhi.
5. Schiesel, H.B. (1993). General microbiology, 6th Edition, Cambridge University Press.
6. Steindrans, KH, (1983). Hand Books of Indigenous fermented food parcel. Edition Inc, New York,
7. Wintrien, G.M. and M.D. Lechtman, (1976). Microbiology, 3rd Edition, Macmillan Publishing Co. London.
8. Rangaswamy, G. (1972). Diseases of crop plants in India. Prentice Hall of India. Pvt., Ltd., New Jersey.

MAPPING

PSO CO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	H	S	H	M	H
CO2	S	H	S	H	M
CO3	H	H	M	S	H
CO4	S	S	H	H	M

S - Strong

H - High

M - Medium

L - Low

Programme Code: 05		Title : B.Sc., BOTANY		
Course code : 19UBO6CO		Core Practical: 4 - Taxonomy of Angiosperms, Economic Botany, Plant Ecology, Plant Phytogeography and Resource Conservation		
Batch 2019 - 2020	Semester VI	Hours/Week 4	Total Hours 60	Credits 2

COURSE OBJECTIVES

- To learn the morphological, taxonomical and economic values of the plants.
- To impart knowledge on the determination of types of vegetations using quantitative ecological characters.
- To study the different types of eco-system

COURSE OUTCOMES

K3	CO1	Apply knowledge to segregate species variation using dichotomous keys.
K4	CO2	Analyze the major phytogeographical zone of India
K5	CO3	Determine the distribution of vegetations in a given habitat using various quadrat methods.

Core Practical: 4 - Taxonomy of Angiosperms, Economic Botany, Plant Ecology, Plant Phytogeography and Resource Conservation

I. TAXONOMY OF ANGIOSPERMS & ECONOMIC BOTANY

1. Identification of plant specimens with reference to their families prescribed in the syllabus following Bentham & Hookers system of classification
2. Identification of economically important products with reference to their plant name and family
3. Technical description of plant parts, including floral parts L.S. of flower, floral diagram and floral formula with reference to the families mentioned in the theory
4. Field visit to nearby floristic regions for the study of flora
5. Submission of 25 herbarium sheets (local plants) with field notes for internal and external valuation

II. PLANT ECOLOGY, PHYTOGEOGRAPHY & RESOURCE CONSERVATION

1. Quadrat - determination of frequency and density of vegetation in the surrounding areas of college premises
2. Line transects - frequency determination of vegetation in the surrounding areas of college premises
3. Belt transects - frequency determination of vegetation in the surrounding areas of college premises
4. Observation of adaptive morphological and anatomical features of xerophytes hydrophytes, halophytes and epiphytes
5. Ecosystems (pond, forest and grasslands)
Community succession patterns - hydrosere and lithosere
6. Global Positioning System (GPS)
7. Locate major Phytogeographical zones of India using photographs

MAPPING

CO \ PSO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	M	S	H	S
CO2	H	H	H	M	H
CO3	S	M	H	S	M

S - Strong

H - High

M - Medium

L - Low

KONGUNADU ARTS AND SCIENCE COLLEGE (Autonomous)

COIMBATORE - 641 029

UG MODEL QUESTION PAPER (PRACTICALS)

End semester Examination Question Paper Pattern

(For the candidates admitted from the academic year 2019-20 onwards)

Time: 3 Hours

Max. Marks: 60 Marks

BREAK UP OF MARKS

**Core Practical: 4 - Taxonomy of Angiosperms, Economic Botany, Plant Ecology,
Plant Phytogeography and Resource Conservation**

I. Family description	- 08 Marks
II. Economic Botany	- 04 Marks
III. Phytogeography	- 05 Marks
IV. Plant ecology	- 05 Marks
V. Ecology experiment	- 08 Marks
VI. Spotters	- 15 Marks
VII. Herbarium	- 05 Marks
Record	- 10 Marks

TOTAL	- 60 Marks

Programme Code: 05		Title : B.Sc., BOTANY		
Course code : 19UBO6CP		Core Practical: 5 – BIOCHEMISTRY, BIOINFORMATICS, PLANT PHYSIOLOGY, MICROBIOLOGY AND PLANT PATHOLOGY		
Batch 2019-2020	Semester VI	Hours/Week 4	Total Hours 60	Credits 2

COURSE OBJECTIVES

- To acquire skills on handling of the instruments.
- To learn sequence and structure of genes and protein molecules.
- To learn metabolic process of the plants.

COURSE OUTCOMES

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

K3	CO1	Apply knowledge on instrumentation techniques.
K4	CO2	Analyze secondary structure predictions of any protein molecules using appropriate biological software.
K5	CO3	Examine the various physiological activities of the plants.

LIST OF PRACTICALS

I. BIOCHEMISTRY

1. Estimation of Carbohydrate by Anthrone method
2. Estimations of aminoacids by Ninhydrin method.
3. Estimation of protein by Lowry's method.
4. Estimation of Vitamin C
5. Preparation of Phosphate Buffers.
6. Separation of secondary metabolite through Column chromatography (Plant pigments).
7. Quantification and separation of Lipids.

II. BIOINFORMATICS

1. Protein structure prediction using GOR-IV
2. Protein structure prediction using SOPMA
3. Phylogenetic analysis using Clustal-X
4. Bio-Molecular Visualization using RASMOL

III. PLANT PHYSIOLOGY

1. Determination of osmotic pressure of cell sap of onion/*Rheo* leaf.
2. Separation of plant pigments by paper chromatography.
3. Measurement of oxygen evolution using different light intensities using Wilmott's bubbler.
4. Determination of photosynthetic rate in water plants under different CO₂ concentration.
5. Measurement of rate of respiration using flower buds/ germinated seeds with simple respiroscope.
6. Effect of light intensity on transpiration using Ganong's photometer.
7. Determination of absorption and transpiration ratio in plants.
8. Nitrification in soil.
9. Solution culture.
10. Effect of Auxins in apical dominance
11. Effect of Gibberellins in shoot elongation
12. Arc auxanometer

IV. MICROBIOLOGY

1. Isolation of microbes by serial dilution and pour plate / spread plate techniques from soil.
2. Preparation of culture media for bacteria and fungi.
3. Differential staining of bacteria using Gram stain.
4. Antimicrobial assay - disc - diffusion / agar well method
5. Preparation and quantification of ethanol content in wine.

V. PLANT PATHOLOGY**Plant diseases**

- i. Virus - Tobacco Mosaic disease & Cucumber Mosaic disease.
- ii. Bacteria - Citrus canker & Rice bacterial blight disease.
- iii. Fungi - Tikka disease of ground nut & Red rot of sugarcane.

MAPPING

CO \ PSO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	H	M	S	H
CO2	S	S	S	H	M
CO3	H	H	M	H	S

S - Strong

H - High

M - Medium

L - Low

**KONGUNADU ARTS AND SCIENCE COLLEGE (Autonomous)
COIMBATORE - 641 029**

UG MODEL QUESTION PAPER (PRACTICALS)

End Semester Examination Question Paper Pattern

(For the candidates admitted from the academic year 2019-20 onwards)

Time: 3 Hours

Max. Marks: 60 Marks

BREAK UP OF MARKS

**CORE PRACTICAL: 5 – BIOCHEMISTR, BIOINFORMATICS, PLANT
PHYSIOLOGY, MICROBIOLOGY AND PLANT PATHOLOGY**

I. Biochemistry	- 10 Marks
II. Bioinformatics	- 05 Marks
III. Physiology experiment	- 10 Marks
IV. Microbiology	- 05 Marks
V. Plant Pathology	- 05 Marks
V. Spotters (5 × 3)	- 15 Marks
Record	- 10 Marks
	<hr/>
TOTAL	- 60 Marks
	<hr/>

Programme Code: 05		Title: B.Sc., BOTANY		
Course Code:19UBO6S3		Skill Based Subject: III - CULTIVATION AND MARKETING OF MEDICINAL PLANTS		
Batch 2019-2020	Semester VI	Hours / Week 2	Total Hours 30	Credits 3

COURSE OBJECTIVES

- To promote conservation strategies recommended by various agencies.
- To understand the medicinal values of various parts of the medicinal plants.
- To understand the present scenario on marketing of medicinal plants.

COURSE OUTCOMES

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

K1	CO1	Recognize <i>in situ</i> and <i>ex situ</i> conservation of various medicinal plants.
K2	CO2	Create awareness for utilization of herbal medicines for home remedies.
K3	CO3	Increase public awareness about the efficacies of herbal drugs and their intellectual property rights.
K3	CO4	Implement suitable methods for the cultivation of more and more wild indigenous and endemic medicinal plants.

SYLLABUS

UNIT I

(6 HOURS)

Scope and importance of medicinal plants. Conservation of medicinal plants - *In situ* and *ex situ*. Medicinal Plants- Present and future status. Present scenario in India.

UNIT II

(6 HOURS)

Role of conservation of medicinal plants by Indian Council of Agriculture Research, and National Medicinal Plants Board. Intellectual Property Rights (IPR) and their applications.

UNIT III

(6 HOURS)

A general account on the methodology of cultivation, therapeutic uses of plants. Rhizome - *Curcuma longa*, Root- *Asparagus racemosus* Twigs - *Adathoda vasica*,

UNIT IV

(6 HOURS)

Cultivation of Medicinal Plants: Leaves- *Andrographis paniculata*. Bark - *Cinchona officinalis*, Flower bud- *Syzygium caryophyllatum* - Fruits- *Phyllanthus emblica*, Seed - *Gloriosa superba*.

UNIT V**(6 HOURS)**

Marketing Scenario of Medicinal Plants - Domestic Market, Global Market, Export: Standard and Quality control (Constraints). Future strategy for Medicinal plants*.

***Self study**

Teaching Methods

Powerpoint presentation/Seminar/Quiz/Discussion/Assignment

TEXT BOOKS

1. Purohit, S.S and S.P. Vyas (2005). Medicinal Plant Cultivation. A Scientific Approach. Agrobios Publishers, Jodhpur, India.
2. G. E. Treases and W. G. Evans. (1983).Pharmacognosy Bailliare, Tindall Esaibolarna.

REFERENCES

1. D.N. Guha Bakshi, P. Sensarma, DC pal, (2001). A lexicon of medicinal plants in India. Vol. II. Naya Prakash, Calcutta.
2. S. Thirugnanam (2003). Mooligai maruthuvam, Selvi Pathipagam, Trichy.
3. R.S. Satoskar, S.D. Bhanalarkar, S.S. Ainapure. (2002) Pharmacology, Pharmacotherapy - popular Prakasam, Mumbai.
4. Anil K. Dhiman, (2003). Sacred plants and their medicinal uses - Daya Publishing House, New Delhi.
5. H. Panda, (2001). Essential oils- hand book, national Institute of Industrial Research, New Delhi.
6. H. Panda, (2001) Hand book of herbal medicines. Asia Pacific Business Press, New Delhi.

MAPPING

CO \ PSO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	H	H	M	S
CO2	H	S	H	M	S
CO3	H	H	M	S	H
CO4	S	M	S	M	H

S - Strong

H - High

M - Medium

L - Low

Programme Code: 05		Title: B.Sc., BOTANY		
Course Code: 19UBO6Z1		PROJECT WORK & VIVA - VOCE		
Batch 2019-2020	Semester VI	Hours / Week 2	Total Hours 30	Credits 5

COURSE OBJECTIVES

- To know the practical problems in various fields of Botany.
- To understand to collect the related data in the selected fields.
- To apply suitable skill to solve the selected problems through proper execution.

COURSE OUTCOME

On successful completion of the project work, the students will be able to

K3	CO1	Applying theoretical knowledge in lab oriented experiments.
K4	CO2	Analyzing the importance of project while collecting the necessary data.
K5	CO3	Evaluating variations between the theories and the experiments.
K5	CO4	Executing appropriate methods to get the correct interpretation to present the results.

Group project work will be allotted to a group of students under the supervision and guidance of the Faculty members during the VI Semester. Project works will be given based on the field of Specializations of the supervisors under whom the students are allotted. Students will be allotted based on the lot system. The fields of specialization are Systematic Botany, Microbiology and Plant Pathology, Medicobotany, Ecology and Conservation Biology. The students shall do their projects under their supervisors and submit at the end of the VI Semester. Both the Internal and External Examiners shall jointly evaluate the project works submitted by the students and marks will be awarded on the basis as mentioned below.

Guidelines to the Distribution of Marks:

CIA	Project Review	15	20
	Regularity	5	
ESE	Project Report Present	60	80
	Viva – Voce	20	
Grand Total			100

MAPPING

PSO CO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	H	H	S	M	S
CO2	S	S	H	S	H
CO3	S	H	S	H	S

S - Strong

H - High

M - Medium

L - Low

UB058

ELECTIVE PAPERS

UB059

Programme Code: 05	Title: B.Sc., BOTANY		
	Major Elective: 1 - FORESTRY		
Batch 2019-2020	Hours / Week 4	Total Hours 60	Credits 5

COURSE OBJECTIVES

- To understand the basic concepts of forest and their distribution types.
- To acquire knowledge on forest resources and their utilization.
- To gain knowledge on laws of conservation of forests.

COURSE OUTCOMES

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

K1	CO1	Recognize the importance of forest produce to mankind.
K2	CO2	Understand the economic value of forest and their importance to the society.
K3	CO3	Reclamation of wastelands with suitable tree species.
K3	CO4	Implement the economic benefits of trees in day to day life

SYLLABUS

UNIT I

(12 Hours)

Introduction to Forests: General introduction to forests, Natural, man-made forest. Classification of forest (Chambian and Seth, 1968). Tropical, subtropical, temperate, evergreen, semi-ever green and deciduous forests. Mangrove forests-species, Vivipary germination.

UNIT II

(12 Hours)

Silviculture - concept, scope; clear felling, uniform shelter, wood selection, coppice. Conservation systems - *In vitro* and *In vivo*. Silviculture of some of the economically important species in India- *Casuarina*, *Dalbergia sisso* and *Tectona grandis*.

UNIT III

(12 Hours)

Social and Agro forestry. Selection of species and role of multipurpose trees. food, fodder, energy and avenue plantation. Sacred grooves - definition and importance. Significance of sacred trees - *Terminalia arjuna*, *Aegle marmelos* and *Prosopis cineraria*.

UNIT IV

(12 Hours)

Introduction to forest laws: Forest laws, necessity, General principles, Indian forest act, 1927, Forest conservation act, 1980, Indian forest law, 1988, Wild life protection act, 1972 and their amendments, endangered species act, 1982.

UBO60

UNIT V

(12 Hours)

Plants as sources for food, fodder, fibres, spices, beverages, drugs, narcotics, insecticides, timber, gums, resins and dyes. Latex, cellulose Starch. Ethnobotany in human welfare*, Major Botanical garden - Kew.

*Self study

Teaching Methods

Power Point presentation/Seminar/Quiz/Discussion/Assignment

TEXT BOOKS

1. Sagreiya, K.P. (1994). Forests and Forestry (Revised by S.S. Negi). National book trust. New Delhi.
2. Tribhawan Mehta, (1981). A handbook of forest utilization. Periodical Expert Book Agency, New Delhi.

REFERENCES

1. Kollmann and Cote (1988). Wood Science and Technology. Vol.I & II Springer verlag.
2. Sharma, P.D. (2004). Ecology and Environment. Rastogi Publications, Meerut
3. Singh, M.P. and Vinita Vishwakarma. (1997). Forest Environment and Biodiversity. Daya Publishing House, New Delhi
4. Tiwari.K.M. (1983). Social forestry in India.
5. Gray L. Rolfe, Johan, M. Edgington, I. Irving Holland and Gayle C. Fortenberry. (2005). Forests and Forestry. International book distributing Co., Lucknow.
6. B.S.Chundawat & S.K. Gautams. (1996). Textbook of Agroforestry. Oxford and IBH Publishnig Co., Pvt. Ltd., Kolkatta
7. Anil Kumar Dhiman. (2003). Sacred Plants and their medicinal uses. Daya publishing house, New Delhi.
8. Bedell, P.E. (1998). Seed Science & Technology. Allied Publishers Ltd.

MAPPING

CO \ PSO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	H	M	H	S
CO2	H	H	S	M	S
CO3	S	M	H	H	H
CO4	H	S	H	H	M

S - Strong

H - High

M - Medium

L - Low

UBO61

Programme Code: 05	Title: B.Sc., BOTANY		
	Major Elective: 2 - BIOTECHNOLOGY		
Batch 2019-2020	Hours / Week 4	Total Hours 60	Credits 5

COURSE OBJECTIVES

- To familiarize the fundamental principles of biotechnology
- To obtain knowledge on various developments and potential applications of gene cloning technology.
- To know the basic principles employed for the production of genetically modified foods

COURSE OUTCOMES

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

K1	CO1	Students can gain the basic concepts of biotechnology
K2	CO2	Students can understand the role and importance of biotechnological tools for the production of bioproducts.
K3	CO3	Basic skills and techniques related to gene cloning for the development of transgenic plants may be understood
K3	CO4	Adoption of conservation strategies through micropropagation techniques and to protect RET listed plant species.

SYLLABUS

UNIT I

(12 HOURS)

Introduction to Biotechnology: Brief history and important milestones. Plant tissue culture: sterilization of medium, glassware, instruments, plant material, composition of culture media and inoculation, subculture, rooting and hardening.

UNIT II

(12 HOURS)

Culture protocols: Methods and applications of tissue culture: shoot tip and meristem culture, synthetic seed production, embryo culture, *In vitro* mutagenesis, protoplast isolation, culture and regeneration, somatic cell hybridization- cybrids
In vitro secondary metabolite production: cell immobilization and bioreactors, *in vitro* production of haploids: anther and pollen culture, somaclonal variation and applications of plant tissue culture*.

UNIT III

(12 HOURS)

Genetic engineering: Brief history, scope and importance Isolation and purification of Nucleic Acids-Agarose Gel Electrophoresis and its variants - Southern, Northern and South-Western blotting techniques - Principles and techniques of nucleic acid hybridization - Polymerase Chain Reaction: Variations and advancements. Enzymes in Molecular Biology: Nucleases, Restriction endonucleases, DNA Ligases, topoisomerases, gyrases, methylases, other modifying enzymes – Bacterial Transformation: Principles and methods

UBO62

UNIT IV

(12 HOURS)

Vectors for gene cloning: general properties of a vector, Plasmids, Bacteriophages, Phagemids, Cosmids - Artificial Chromosomes: PAC, BAC, YAC. **Tools and techniques:** agarose gel electrophoresis, types and working principles of PCR, DNA finger printing, Southern blotting and ELISA

UNIT V

(12 HOURS)

Microbial biotechnology: Biofertilizers - Advantages, mass cultivation and application techniques of *Rhizobium* and *Azospirillum*. Blue green algae (*Nostoc*), Phosphobacteria, *Azolla* and VAM. **Environmental biotechnology:** Wastewater treatment, recycling water for food and feed. Treatment of paper and distillery effluents - oxidation ponds. Source of alternate fuel - biomass and bioenergy production of biogas and its advantage. Photo biological production of hydrogen. Petrochemical plants.

*Self study

Teaching Methods

Power Point presentation/Seminar/Quiz/Discussion/Assignment

TEXT BOOKS

1. Dubey. R.C. (1996). A Text Book of Biotechnology. Rastogi Publications, Meerut.
2. Kumaresan, V.K. (2003). Biotechnology. Saras Publications, Kanyakumari
3. Ignacimuthu, S. (1996). Applied Plant Biotechnology. Tata McGraw Hill Publishing Company Ltd., New Delhi.
4. Ignacimuthu, S. (1996). Basic Biotechnology. 1996. Tata McGraw Hill Publishing Company Ltd., New Delhi.
5. Ignacimuthu, S. (1997). Plant Biotechnology. Tata McGraw Hill Publishing Company Ltd., New Delhi.

REFERENCES

1. Primrose. S.B., Twyman R.M., Old. R.W. (2001) **Principles of Gene Manipulation. Blackwell Science Limited**
2. Gupta, P.K. (2004). Elements of Biotechnology, 2004. Rastogi Publications, Meerut.
3. Chhatwal. (1995). Text book of Biotechnology. Anmol Publications Pvt. Ltd., New Delhi.

MAPPING

PSO CO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	H	M	H	M
CO2	S	M	H	S	H
CO3	H	S	H	M	S
CO4	H	H	M	H	M

S - Strong

H - High

M - Medium

L - Low

UBO63

Programme Code: 05	Title: B.Sc., BOTANY		
	Major Elective: 3 - FOOD SCIENCE		
Batch 2019-2020	Hours / Week 4	Total Hours 60	Credits 5

COURSE OBJECTIVES

- To know about the food groups.
- To understand the food processing technology.
- To analyze and communicate food issues.

COURSE OUTCOMES

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

K1	CO1	Acquire manufacturing processes and technologies used in the production of food products.
K2	CO2	Understand the knowledge on the process of food product development and their environmental consideration.
K3	CO3	Explain the functional properties of food in human nutrition.
K3	CO4	Develop skills in researching, analyzing and communicating food issues.

SYLLABUS

UNIT I

(12 Hours)

Food groups: basic groups- basic four, five and seven, food in relation to health. Preliminary preparation of food- cleaning, cleaning, peeling, stinging, cutting and grating, soaking, marinating, sprouting, fermenting, grinding, drying and filtering their advantages and disadvantages.

UNIT II

(12 Hours)

Cereals and cereal products, structure and composition and nutritive value of cereals - wheat and wheat products; fermented and unfermented products.

UNIT III

(12 Hours)

Biotechnology in food - biofertilization, nutraceuticals, space food. Fruits and vegetables - classification, composition and nutritive value. Milk & milk products* - processing, clarification, pasteurization and homogenization. Tea processing and marketing.

UNIT IV

(12 Hours)

Food preservation by high and low temperatures- outline. Preservation by high osmotic pressure, high concentration of sugar, jam and jelly preparation. High concentration of salts. Principles and preparation of pickles- preservation by dehydration. Principles and methods of drying such as freeze drying, sun drying, mechanical driers - spray drying and foam mat drying and by smoking.

UBO64

UNIT V

(12 Hours)

Packing of food- classification of package, materials used for packing, active food packing, packing of fruits and vegetables. Nutrition labeling - guiding principles, codex Guidelines. Some recent development on the food labeling front in India.

*Self study

Teaching Methods

Power Point presentation/Seminar/Quiz/Discussion/Assignment

TEXT BOOKS

1. Srilakshmi, B. (2003). Food science. New Age International Pvt. Ltd.
2. James, M. Jay. (1987). Modern Food Microbiology. CBS, Mylapore, Chennai.

REFERENCES

1. Subbulakeshmi, G. (2003). Food processing and preservation. New Age International Pvt. Ltd.
2. Srilakshmi, B. (2005). Food and Health. National Institute of Nutrition, ICMR, Hyderabad.
3. Janet, D Ward and T. Larry. (2002). Principles of Food Science. Good Heart, Wilcox, Illinois.

MAPPING

CO \ PSO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	H	H	M	S
CO2	S	S	H	S	M
CO3	H	M	H	M	H
CO4	H	H	M	H	M

S - Strong

H - High

M - Medium

L - Low

UBO65

Programme Code: 05	Title: B.Sc., BOTANY		
	Major Elective: 4 - SEED BIOLOGY		
Batch 2019-2020	Hours / Week 4	Total Hours 60	Credits 5

COURSE OBJECTIVES

- To study the structure of angiospermic seeds
- To analyze various products produced by the seeds.
- To examine the germination capacity of the seeds.

COURSE OUTCOMES

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

K1	CO1	Recognize the chemical and physical properties of seeds.
K2	CO2	Understand the factors responsible for seed germination.
K3	CO3	Apply the various methods of processing of seeds for storage.
K3	CO4	Implement knowledge to break the seed dormancy and to enhance the plant growth.

SYLLABUS

UNIT- I

(12 Hours)

Scope of seed biology - Structure of monocot and dicot seeds / grains. Albuminous (endospermic) and ex-albuminous (non-endospermic) seeds. Chemical composition - cereals (Paddy) - Oil seed (Castor) - Fibre (Cotton) and Pulses (Bean).

UNIT- II

(12 Hours)

Seed germination: Factors affecting germination. Methods of germination test (using paper, sand and soil) - Seed viability (Tetrazolium test), vigour (Direct and Indirect test). Concept of seed vigour.

UNIT- III

(12 Hours)

Seed drying, Process and Equipments. Methods of moisture determination of seed. Seed cleaning and upgrading - Equipments involved. Seed testing and quality control.

UNIT- IV

(12 Hours)

Seed dormancy: Primary and Secondary dormancy - significance - Factors involved - methods used to break dormancy*.

UBO66

UNIT- V

(12 Hours)

Seed treatment - methods of seed treatment, seed treating formulations and equipments, seed disinfestations, identification of treated seeds; Pelleting and their significance, packaging, bagging and labeling, storage and marketing.

*Self study

Teaching Methods

Power Point presentation/Seminar/Quiz/Discussion/Assignment

TEXTBOOKS

1. Agarwal R. L. (1982). Seed Technology -. Oxford and IBH Publishing Company, New Delhi.
2. Bewley, J.D and M. Black (1978). Seed Biology Vol. I & II Academic press, New York

REFERENCES

1. Bewley, J.D and M. Black. (1985). (Eds.) Seeds; Physiology of development and germination Plenum Press: New York.
2. Murray, D.R. (1984). (Ed.) Seed physiology. Vol. I & II Academic Press: Sydney - New York- London
3. Khan, A.A. (Latest Edition) (Ed.). The Physiology and Biochemistry of seed Dormancy and germination. North-Holland Publishing Company: Amsterdam-New York- Oxford.
4. Mehta S.L. Lodha, M.L. and Sane P.V. (1993). (Eds.) Recent advances in Plant Biochemistry. Publication and information division ICAR, New Delhi.

MAPPING

CO \ PSO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	H	M	S	M	S
CO2	S	S	H	H	S
CO3	H	S	H	M	H
CO4	H	H	M	S	H

S - Strong

H - High

M - Medium

L - Low

UBO67

Programme Code: 05	Title: B.Sc., BOTANY		
	Major Elective: 5 - PHARMACOGNOSY		
Batch 2019-2020	Hours / Week 4	Total Hours 60	Credits 5

COURSE OBJECTIVES

- To study the drug development from medicinal plants.
- To understand the traditional systems of medicines like Ayurveda, Siddha & Unani.
- To know the pharmacological actions of plant drugs.

COURSE OUTCOME

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

K1	CO1	Acquire knowledge on the therapeutic uses of plant drugs.
K2	CO2	Understand the traditional and modern system of medicine.
K3	CO3	Relates physiological action of various plant drugs.
K3	CO4	Recognize route of drug administration and its pharmaceutical dosage forms.

SYLLABUS

UNIT I

(12 Hours)

Definition, history and scope of Pharmacognosy. Study of various system of classification of drugs. Traditional system of medicines (AYUSH - Ayurveda Siddha, Unani and Homeopathy).

UNIT II

(12 Hours)

A general survey of biological sources, Geographical sources and cell cultures in the production of drugs. Factors involved in the production of drugs.

UNIT III

(12 Hours)

Pharmacological action of plant drugs - act on central nervous system- Lysergic acid Diethylomids, cannabis, Cocaine and reserpine. Action on heart muscles - Digitalis, Quinidine, Papaverine and Ergotamine.

UNIT IV

(12 Hours)

Drugs of plant origin - Phytochemical tests and application of plant derived Phenols, Resins, alkaloids, flavonoids, terpenoid, steroids, Glycosides and Vitamins. A general procedure for separation of the compounds by TLC technique.

UBO68

UNIT V

(12 Hours)

Organized natural products - wood and bark. Quassia and *Cinchona*. Leaves and Flowers - Adhathoda and clove Seed and fruits- Fennel, Nutmeg. Unorganized products - Acacia gum and Castor oil*.

*Self study

Teaching Methods

Power Point presentation/Seminar/Quiz/Discussion/Assignment

TEXT BOOKS

1. Trease G.E. and W. C Evans (1983) Pharmacognosy, ELBS, Britain
2. Medical microbiology (1983) Churchill Livingstone ELBS Britain.

REFERENCES

1. Hocking, G.M. (1955). A dictionary of terms used in Pharmacognosy, Spring Field.
2. Ballow M. H. (1969). Marine Pharmacology, Williams and Wilkins.
3. Chopra, R.N, Badhwa, R. L and Ghosh, S. (1965). Poisonous plants of India Govt. of India Press.

MAPPING

CO \ PSO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	H	S	H	M
CO2	S	H	M	S	H
CO3	H	S	H	M	S
CO4	H	M	H	H	M

S - Strong

H - High

M - Medium

L - Low

UBO69

Programme Code: 05	Title: B.Sc., BOTANY		
	Major Elective 6 - MUSHROOM CULTIVATION TECHNOLOGY		
Batch 2019-2020	Hours / Week 4	Total Hours 60	Credits 5

COURSE OBJECTIVES

- To understand the Importance of mushrooms.
- To learn the methodology involved in mushroom cultivation.
- To know the disease management.

COURSE OUTCOMES

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

K1	CO1	Recognize the nutritive, medicinal and food values of mushrooms.
K2	CO2	Determine suitable climate and cultivation techniques for different mushrooms.
K3	CO3	Relate knowledge on designing farming houses for various mushrooms.
K3	CO4	Apply knowledge on processing and storage for better marketing.

SYLLABUS

UNIT I

(12 HOURS)

Mushroom an Introduction - Importance, Identification and classification of Mushrooms. Food value and composition, Medicinal value of Mushrooms, Mushrooms Nutraceutical, Medicine of Mushrooms, Identification of Mushrooms, Poisonous Mushroom, Classification of edible mushroom*.

UNIT II

(12 HOURS)

Systematic position, morphology and life cycle of white button mushroom (*Agaricus bisporus*). Cultivation- farm designing, spawn preparation- Spawn production Technology, Preparation of the planting spawn from master spawn, Multiplication of spawn from Mass culture and harvesting.

UNIT III

(12 HOURS)

Systematic position, morphology and life cycle of oyster mushroom (*Pleurotus sajor-caju*). Cultivation- farm designing, spawn preparation- Spawn production Technology, Preparation of the planting spawn from master spawn, Multiplication of spawn from Mass culture and harvesting.

UNIT IV

(12 HOURS)

Systematic position, morphology and life cycle of paddy straw mushroom (*Volvariella* Sp.). Cultivation- farm designing, spawn preparation- Spawn production Technology, Preparation of the planting spawn from master spawn, Multiplication of spawn from Mass culture and harvesting.

UBO70

UNIT V

(12 HOURS)

Common fungal and bacterial diseases of button, oyster and paddy straw mushrooms and their control measures. Post harvesting techniques- packaging, transport, short term and long term storage of mushrooms (canning, drying, freeze drying, sun drying and pickling).

*Self study

Teaching Methods

Powerpoint presentation/Seminar/Quiz/Discussion/Assignment

TEXTBOOKS:

1. Reeti Singh and U.C. Singh (2005). Modern mushroom cultivation, Agrobios India, Jodhpur.
2. Kumaresan, V. (2001). Biotechnology, Saras-publication, Nagarcoil.
3. Gupta, P.K. (2004). Elements of biotechnology, Rastogi publication, Meerut.

REFERENCES:

1. Singh, B.D. (2002). Biotechnology. Kalyani Publishers, New Delhi.
2. Kaul, T.N. (2001). Biology and conservation of Mushrooms. Oxford & IBH Publishing Company Pvt. Ltd. New Delhi.
3. Giovanni Pacioni.(1985). Mushrooms and Toadstools. Mac Donald & Co. Ltd., London.
4. Pandey, B.P. (1996). A text book of fungi. Chand & Co., New Delhi.

MAPPING

CO \ PSO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	M	H	M	S
CO2	H	S	M	S	H
CO3	S	S	H	M	H
CO4	M	H	S	H	S

S - Strong

H - High

M - Medium

L - Low

UB071

ALLIED PAPER

Programme Code: 05		For B.Sc., ZOOLOGY		
Course Code: 19UBO1A1		Allied-1 Botany: 1 (PHYCOLOGY, MYCOLOGY, PLANT PATHOLOGY, BRYOPHYTES, PTERIDOPHYTES & GYMNOSPERMS) (FOR ZOOLOGY STUDENTS)		
Batch 2019-2020	Semester I	Hours / Week 5	Total Hours 75	Credits 4

COURSE OBJECTIVES

- To study the classification of Cryptogams & Gymnosperms.
- To learn the structure and life cycle patterns of primitive to advanced life forms.
- To impart knowledge on the economic values of plants.

COURSE OUTCOMES

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

K1	CO1	Gain knowledge on disease causing microorganisms.
K2	CO2	Understand the life cycle patterns of Cryptogams and Gymnosperms.
K3	CO3	Explore the economic importance of lower life forms.
K3	CO4	Apply their knowledge to identify plant diseases and their control measures.

SYLLABUS

UNIT I (15 HOURS)

Phycology: Classification by Fritsch (1945) (outline only), Structure, Reproduction and life cycle of the following Genus: *Oscillatoria*, *Caulerpa*, and *Chara*. Economic importance of algae (briefly).

UNIT II (15 HOURS)

Mycology and Plant Pathology: Classification by Alexopoulos and Mims (1979) (outline only), Structure, Reproduction and Life cycle of the following Genus: *Albugo* and *Agaricus*. Tikka disease of ground nut and Citrus canker. Economic importance of Fungi.

UNIT III (15 HOURS)

Bryophytes: Classification by Smith (1955) (outline only), Structure, Reproduction and Life cycle of *Marchantia* and *Funaria*. Economic importance of Bryophytes.

UNIT IV**(15 HOURS)**

Pteridophytes: Classification by Riemers (1954) (outline only), Structure, Reproduction and Life cycle of *Lycopodium* and *Adiantum*. Economic importance of Pteridophytes.

UNIT V**(15 HOURS)**

Gymnosperms: Classification by K.R. Sporne (1962) (outline only), Structure, Reproduction and Life cycle of *Cycas* and *Gnetum*. Economic importance of Gymnosperms*

*Self study

Teaching Methods

Power Point presentation/Seminar/Quiz/Discussion/Assignment

TEXTBOOKS

1. Gangulee, Das & Kar. (2001). College Botany Vol II. New central Book agency Pvt. Ltd. Calcutta.
2. Pandey, B.P. (1994). A Text book of Botany - Pteridophyta. Chand & Co. New Delhi.

REFERENCES

1. Vashishta, B.R. (1998). The Algae.S. Chand & Co., New Delhi.
2. Vashishta, B.R. (1998). Fungi. S. Chand & Co., New Delhi.
3. Vashista, P.C., Sinha and Anil Kumar. (2008). Text book of Bryophytes. Chand & Co., New Delhi.
4. Vashista, P.C. (1992). Pteridophyta. Chand & Co., New Delhi.
5. Pandey, B.P. (1981). Gymnosperms. Chand & Co., New Delhi.
6. Gilbert M Smith (1951). Manual of Phycology.

MAPPING

PSO CO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	M	S	H	H
CO2	S	S	H	M	S
CO3	H	H	M	S	M
CO4	S	M	S	H	H

S - Strong

H - High

M - Medium

L - Low

Programme Code: 05		For B.Sc., ZOOLOGY		
Course Code: 19UBO2A2		Allied-2 Botany: 2 (ANATOMY, EMBRYOLOGY, TAXONOMY OF ANGIOSPERMS, PHYSIOLOGY AND ENVIRONMENTAL BOTANY) (FOR ZOOLOGY STUDENTS)		
Batch 2019-2020	Semester II	Hours / Week 5	Total Hours 75	Credits 4

COURSE OBJECTIVES

- To differentiate the anatomical and reproductive features of monocot and dicots.
- To acquire knowledge on the classification and nomenclature of Angiosperms.
- To understand physiological process and metabolism in plants.

COURSE OUTCOMES

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

K1	CO1	Recognize structural organization and morphological variations among the Angiospermic taxa.
K2	CO2	Understand the use of keys and manuals for identifying any unknown plants at species level.
K3	CO3	Application of micronutrients and growth regulators for the development of plants.
K3	CO4	Explore knowledge on ecosystems, environmental pollution and soil conservation strategies.

SYLLABUS

UNIT I

(15 HOURS)

Anatomy: Scope and significance of plant anatomy. A brief account of meristems and tissues (simple and complex tissue). Primary structure of dicot and monocot stem and root.

UNIT II

(15 HOURS)

Embryology: Microsporogenesis. Development of Male gametophyte, Megasporogenesis, Development of female gametophyte (*Polygonum* type). Structure of mature embryo sac. Type of embryo sac - *Polygonum* type (8 nucleus) and *Oenothera* type (4 nucleus). Types of endosperms. Development of Dicot embryo (*Capsella* type).

UNIT III

(15 HOURS)

Taxonomy of Angiosperms: Bentham and Hooker's classification (outline only). Study of the following families with their economic importance- Annonaceae, Cucurbitaceae, Asteraceae, Apocyanaceae, Lamiaceae, Amarantaceae, Liliaceae and Poaceae. Herbarium techniques.

UNIT IV**(15 HOURS)**

Physiology: Water relationships of plants. Osmosis, absorption of water, absorption of ions. Photosynthesis: Photosynthetic apparatus, primary photochemical reaction, path of carbon (Calvin cycle). Respiration: Glycolysis and Krebs's cycle. Phytohormones: auxins and cytokinins.

UNIT V**(15 HOURS)**

Environmental Botany: Scope and significance of environmental studies. Structure and functions of ecosystems. Vegetational types of Southern India. Pollution - Air*, water and noise. Soil conservation methods.

Self study*Teaching Methods**

Power Point presentation/Seminar/Quiz/Discussion/Assignment

TEXTBOOKS

1. Gangulee H C Das, K S Dutta CT (1986). College Botany Vol. - I AIU publications. New Delhi
2. Gangulee and Kar, A K. (1986). College Botany Vol. - II. AIU Publications. New Delhi

REFERENCE BOOKS

1. Pandey, B.P. (1997). Taxonomy of Angiosperms. Chand & Co., New Delhi.
2. Jain, V.K. (1993). Fundamentals of plant physiology. S. Chand & Co. New Delhi
3. Shukla. R.S. and P. S. Chandal. (2000). Plant Ecology and soil science. Chand & Co. Ltd., New Delhi.
4. Bhojwani & Bhatnager. (1977). The embryology of angiosperms. Vikas Publishing House, New Delhi
5. Pandey, B.P. (1978). Plant Anatomy. Chand and Co, New Delhi.
6. Maheswari P (1950). An introduction to the embryology of Angiosperms. McGraw Hill.

MAPPING

CO \ PSO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	H	S	M	H	H
CO2	S	H	H	M	S
CO3	H	M	S	H	M
CO4	S	H	M	S	H

S - Strong

H - High

M - Medium

L - Low

Programme Code: 05		For B.Sc., ZOOLOGY		
Course code : 19UBO2AL		ALLIED PRACTICAL BOTANY- I & II		
Batch 2019 - 2020	Semester II	Hours/Week 2	Total Hours 30	Credits 2

COURSE OBJECTIVES

- To acquire knowledge on the morphological and anatomical features of vascular plants.
- To learn the basic concepts and principles of ecosystem.
- To create basic skills on biosystematics and herbarium preparation techniques.

COURSE OUTCOMES

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

K3	CO1	Apply knowledge on the identification of lower life forms.
K4	CO2	Analyze various diseases and their impact on crop plants
K5	CO3	Examine physiological process that occur in plant life .

LIST OF PRACTICALS

ALLIED PR. BOTANY - I

- Phycology:** Structure and the reproduction of the following:
 - Oscillatoria*
 - Caulerpa*
 - Chara*
- Mycology**
 - Albugo*
 - Agaricus*
- Plant pathology:** Symptoms, causative organisms and control measures of
 - Tikka disease of Groundnut
 - Citrus canker
- Bryophytes**
 - Marchantia*
 - Funaria*
- Pteridophytes**
 - Lycopodium*
 - Adiantum*
- Gymnosperms**
 - Cycas*
 - Gnetum*

ALLIED PR. BOTANY - II**1. Anatomy**

1. Primary and secondary structure of Dicot stem and root
2. Primary structure of monocot stem and root.

2. Embryology

1. T.S. of mature anther
2. Types of the endosperm

3. Taxonomy of Angiosperms:

1. Study of the Morphology and systematic position of plant families mention in theory

4. Physiology

1. Osmosis, O₂ evolution during photosynthesis

5. Environmental Botany

1. Aquatic and terrestrial ecosystem.

MAPPING

PSO CO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	H	S	M	H	H
CO2	S	H	H	M	S
CO3	H	M	S	H	M

S - Strong

H - High

M - Medium

L - Low

UBO78

19UBO2AL

**KONGUNADU ARTS AND SCIENCE COLLEGE (Autonomous)
COIMBATORE - 641 029**

UG MODEL QUESTION PAPER (PRACTICALS)

End semester Examination Question Paper Pattern

(For the candidates admitted from the academic year 2019-20 onwards)

Time: 3 Hours

Max. Marks: 30 Marks

BREAK UP OF MARKS

ALLIED PRACTICAL BOTANY - I & II

I. Algae and Bryophytes	- 04 Marks
II. Pteridophytes/Gymnosperm	- 06 Marks
III. Anatomy section	- 04 Marks
IV. Taxonomy	- 04 Marks
IV. Physiology setup	- 03 Marks
V. Spotters	- 04 Marks
Record	- 05 Marks
TOTAL	- 30 Marks

UB079

**EXTRA DEPARTMENTAL COURSE
(EDC) PAPER**

UBO80

19UBO5X1

Programme Code: 05		For UG STUDENTS		
Course Code: 19UBO5X1		Extra Departmental Course (EDC) - MEDICINAL BOTANY AND HUMAN WELFARE		
Batch 2019-2020	Semester V	Hours / Week 2	Total Hours 30	Credits 3

COURSE OBJECTIVES

- To study the Indian system of traditional medicine.
- To gain knowledge on pharmacognosy of medicinal plants.
- To familiarize cultivation technologies of medicinal plants.

COURSE OUTCOMES

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

K1	CO1	Recognize crude drugs used in traditional system of medicine.
K2	CO2	Understand the therapeutic potential of crude drugs.
K3	CO3	Apply the knowledge in the cultivation practices of medicinal plants.
K3	CO4	Implement knowledge in identifying novel drug leads against allopathic medicine.

SYLLABUS

UNIT-I

(6 Hours)

Indian systems of medicine - AYUSH (Ayurvedha, Unani, Siddha and Homeopathy). Classification of crude drugs and evaluation of drugs. Drug adulteration.

UNIT-II

(6 Hours)

Morphological and histological studies Chemical constituents. Therapeutic and other pharmaceutical uses of bark - *Cinchona*, Leaves - *Adathoda* and Flower-*clove*.

UNIT-III

(6 Hours)

Fruits and seeds - Gooseberry and poppy seeds, Underground stem-ginger- Unorganized drugs. Gum - Gugul, Resin - *Ferula*, Fixed oil- Castor oil.

UNIT-IV

(6 Hours)

A brief account of the following: Drugs acting on the central nervous system, Drugs used in the disorders of the gastro-intestinal tract and Cardio vascular drugs.

UNIT-V**(6 Hours)**

Botanical features, medicinal uses and cultivation of medicinal plants - *Emblica*, *Gloriosa* and *Rauwolfia**

Self study*Teaching Methods**

Power Point presentation/Seminar/Quiz/Discussion/Assignment

TEXT BOOK

1. Trease and Evans. (1978). Pharmacognosy, Baillere Tindall London.
2. T.E.Wallis. (2005). Text book of Pharmacognosy Fifth Edition. Publishers- CBS publishers and distributions Delhi.

REFERENCES

1. S.S Handa and V.K. Kapoor. (1989). Pharmacognosy, Second Edition. Publishers- CBS Publishers and Distributors, Delhi.
2. Kumar N.C. (1993). An introduction to Medical Botany and Pharmacognosy, Emky Publications, New Delhi.
3. Supriya Kumar B. (2005). Hand Book of Medicinal Plants, Pointers Publishers, Jaipur.
4. Kokate C.K., A.Purohit and S.R. Gokhale. (2002). Pharmacognosy, 13th Edition Publishers Nirali Prakashan. Pune.

MAPPING

CO \ PSO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	H	H	M	S	H
CO2	S	M	S	H	M
CO3	H	S	M	H	H
CO4	S	H	S	H	M

S - Strong

H - High

M - Medium

L - Low

UB082

NON-MAJOR ELECTIVE

Programme Code : 05	Title: B.Sc., BOTANY		
	Non- Major Elective 1 – HUMAN RIGHTS		
Batch 2019-2020	Hours/Week 2	Total Hours 30	Credits 2

Course Objectives

1. To prepare for responsible citizenship with awareness of the relationship between Human Rights, democracy and development.
2. To impart education on national and international regime on Human Rights.
3. To sensitive students to human suffering and promotion of human life with dignity.
4. To develop skills on human rights advocacy
5. To appreciate the relationship between rights and duties
6. To foster respect for tolerance and compassion for all living creature.

UNIT I

Definition, Meaning, Concept ,Theories and Kinds of Human Rights- Evaluation and Protection of Human Rights in India- Development of Human Rights under the United Nations.

UNIT II

United Nations Charter and Human Rights - U.N.Commission on Human Rights- Universal Declaration of Human Rights - International Covenant on

- Civil & Political Rights
- Economic, Social and Cultural Rights

UNIT III

Human Rights and Fundamental Rights (Constitution) - Enactments regarding Human Rights Laws in India - National Human Rights Commission and State Human Rights Commission.

UNIT IV

Aged persons and their Human Rights - Human Rights of Persons with Disabilities - Tribal Human Rights in India - Three Generation Human Rights.

UNIT V

Rights of Women, Child, Refugees and Minorities - Media and Human Rights - NGO's in protection of Human Rights - Right to Election

TEXT BOOKS

1. Human Rights Compiled by Dr. V. Sugantha, Kongunadu Arts and Science College, Coimbatore -29.

REFERENCES

1. Human Rights, Jaganathan,MA., MBA., MMM., ML., ML., Humanitarian Law and J.P.Arjun Proprietor,Usha Jaganathan Refugee Law law series, 1st floor, Narmatha Nanthi Street, Magathma Gandhi Nagar, Madurai - 625014.
2. Promoting Women's Rights Publisher : United Nations. As Human Rights New York., 1999.

Question Paper Pattern

(External only)

Duration: 3 hrs

Max: 75 marks

Section A (5x5=25)

Short notes

Either - Or/ Type - Question from each unit

Section B (5x10=50)

Essay type

Either - Or/ Type - Question from each unit

Programme Code : 05	Title: B.Sc., BOTANY		
	Non- Major Elective II – WOMEN’S RIGHTS		
Batch 2019-2020	Hours/Week 2	Total Hours 30	Credits 2

COURSE OBJECTIVES

- To know about the laws enacted to protect women against violence.
- To impart awareness about the hurdles faced by women.
- To develop a knowledge about the status of all forms of women to access to justice.
- To create awareness about women’s rights.
- To know about laws and norms pertaining to protection of women.
- To understand the articles which enables the women’s rights.
- To understand the Special Women Welfare laws.
- To realize how the violence against women puts an undue burden on health care services.

Unit I**6hrs****Laws, Legal System & Change**

Definition- Constitutional law, CEDAW and international human rights-law and norms-laws and social context-constitutional and legal frame.

Unit II**6hrs****Politics of Land and Gender in INDIA**

Introduction-faces of poverty-land as productive resources-locating identities women’s claim to land -rights of properties-case studies.

Unit III**6hrs****Women’s Rights: Access to Justices**

Introduction-criminal law-crime agent women-domestic violence-dowry related harassment and dowry deaths-molestation-sexual abuse and rape-loopholes in practice-laws enforcement agency.

Unit IV**6hrs****Women’s Right**

Violence against-women-domestic violence-the protection of women from domestic violence act, 2005-The Marriage Validation Act, 1953-The Hindu Widow Re-marriage Act, 1956 - The Dowry Prohibition Act, 1961.

Unit V

6hrs

Special Women Welfare Laws

Sexual harassment at work place-rape and indecent representation-the indecent representation act, 1956-acts enacted for women development and empowerment-role of rape crisis center.

Book for study: Published by Kongunadu Arts & Science College, 2011.

Books for reference:

1. Good Women do not Inherit land Nitya Rao, Social Science Press and Orient Blackswan (2008).
2. Knowing Our Rights An Impart for Kali for Women (2006). International solidarity network.
3. Women Rights P.D.Kaushik, Bookwell Publications (2007).
4. Violence Protective Measures for Aruna Goal, Women Development and Empowerment Deep and Deep Publications Pvt. (2004).
5. Gender Justice Monika Chawla, Deep and Deep Publications Pvt. (2006).
6. Domestic Violence Against Women Preeti Mishra, Deep and Deep Publication, Pvt. (2007).
7. Violence against Women Clair M. Renzetti, Jeffrey L. Edleson, Raquel Kennedy Bergen, Sage Publications (2001).

Question paper pattern

(External Only)

Duration: 3 hrs

Max: 75 Marks

Section A (5 x 5=25)

Short notes

Either - or / type - question from each unit.

Section B (5 x 10=50)

Essay type

Either - or / type - question from each unit.

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Programme Code : 05	Title: B.Sc., BOTANY		
	Non- Major Elective III – Consumer Affairs		
Batch 2019-2020	Hours/Week 2	Total Hours 30	Credits 2

Course Objectives

1. To familiarize the students with their rights and responsibilities as a consumer.
2. To understand the procedure of redress of consumer complaints, and the role of different agencies in establishing product and service standards.
3. To have a handle the business firms' interface with consumers and the consumer related regulatory and business environment.

UNIT I

(6 Hours)

Conceptual Framework - Consumer and Markets: Concept of Consumer, Nature of markets: Liberalization and Globalization of markets with special reference to Indian Consumer Markets, E-Commerce with reference to Indian Market, Concept of Price in Retail and Wholesale, Maximum Retail Price (MRP), Fair Price, GST, labeling and packaging along with relevant laws, Legal Metrology. Experiencing and Voicing Dissatisfaction: Consumer buying process, Consumer Satisfaction/dissatisfaction-Grievances-complaint, Consumer Complaining Behaviour: Alternatives available to Dissatisfied Consumers; Complaint Handling Process: ISO 10000 suite

UNIT II

(6 Hours)

The Consumer Protection Law in India - Objectives and Basic Concepts: Consumer rights and UN Guidelines on consumer protection, Consumer goods, defect in goods, spurious goods and services, service, deficiency in service, unfair trade practice, restrictive trade practice.

Organizational set-up under the Consumer Protection Act: Advisory Bodies: Consumer Protection Councils at the Central, State and District Levels; Adjudicatory Bodies: District Forums, State Commissions, National Commission: Their Composition, Powers, and Jurisdiction (Pecuniary and Territorial), Role of Supreme Court under the CPA with important case law.

UNIT III

(6 Hours)

Grievance Redressal Mechanism under the Indian Consumer Protection Law - Who can file a complaint? Grounds of filing a complaint; Limitation period; Procedure for filing and hearing of a complaint; Disposal of cases, Relief/Remedy available; Temporary Injunction, Enforcement of order, Appeal, frivolous and vexatious complaints; Offences and penalties.

Leading Cases decided under Consumer Protection law by Supreme Court/National Commission: Medical Negligence; Banking; Insurance; Housing & Real Estate; Electricity and Telecom Services; Education; Defective Products; Unfair Trade Practices.

UNIT IV

(6 Hours)

Role of Industry Regulators in Consumer Protection

- i. Banking: RBI and Banking Ombudsman
- ii. Insurance: IRDA and Insurance Ombudsman
- iii. Telecommunication: TRAI
- iv. Food Products: FSSAI
- v. Electricity Supply: Electricity Regulatory Commission
- vi. Real Estate Regulatory Authority

UNIT V

(6 Hours)

Contemporary Issues in Consumer Affairs - Consumer Movement in India: Evolution of Consumer Movement in India, Formation of consumer organizations and their role in consumer protection, Misleading Advertisements and sustainable consumption, National Consumer Helpline, Comparative Product testing, Sustainable consumption and energy ratings. Quality and Standardization: Voluntary and Mandatory standards; Role of BIS, Indian Standards Mark (ISI), Ag-mark, Hallmarking, Licensing and Surveillance; Role of International Standards: ISO an Overview.

Note: Unit 2 and 3 refers to the Consumer Protection Act, 1986. Any change in law would be added appropriately after the new law is notified.

Suggested Readings:

1. Khanna, Sri Ram, Savita Hanspal, Sheetal Kapoor, and H.K. Awasthi. (2007) Consumer Affairs, Universities Press.
2. Choudhary, Ram Naresh Prasad (2005). Consumer Protection Law Provisions and Procedure, Deep and Deep Publications Pvt Ltd.
3. G. Ganesan and M. Sumathy. (2012). Globalisation and Consumerism: Issues and Challenges, Regal Publications
4. Suresh Misra and Sapna Chadah (2012). Consumer Protection in India: Issues and Concerns, IIPA, New Delhi
5. Rajyalaxmi Rao (2012), Consumer is King, Universal Law Publishing Company
6. Girimaji, Pushpa (2002). Consumer Right for Everyone Penguin Books.
7. E-books :- www.consumereducation.in
8. Empowering Consumers e-book, www.consumeraffairs.nic.in
9. ebook, www.bis.org
10. The Consumer Protection Act, 1986 and its later versions.

UBO90

CERTIFICATE COURSE - BONSAI

Programme Code: 05	Title: CERTIFICATE COURSE - BONSAI		
Course Code: 19CCB101	C.P. 1. INTRODUCTION TO BONSAI PRINCIPLES AND TECHNIQUES		
Batch 2019-2020	Hours / Week 2	Total Hours 30	Credits 2

COURSE OBJECTIVES

- To know the latest development in the field of Bonsai.
- To develop skills in the area of designing, styles and making of bonsai.
- To create knowledge on self employment through and entrepreneur skills.

COURSE OUTCOMES

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

K1	CO1	Recognize about preliminary techniques about Bonsai.
K2	CO2	Understand the necessary skills to take care and maintain a Bonsai plant.
K3	CO3	Apply knowledge on Bonsai cultivation and marketing.
K3	CO4	Implement the acquired knowledge on commercial applications Bonsai

SYLLABUS

UNIT I: (6 hours)

Introduction - History, aim, scope and importance of Bonsai - Identification and collection of suitable plants for bonsai making.

UNIT II: (6 hours)

Tools, containers, wiring and preparation of media. Designing, Styles and making of bonsai. Training and pruning techniques in bonsai. Irrigation, pest and disease management.

UNIT III: (6 hours)

Styles of Bonsai - Upright Style, Formal Upright, Informal Upright Style, Slanting Style Windswept Style, Broom Style.

UNIT IV: (6 hours)

Cascade Styles of Bonsai - Semi Cascade Style, Formal Cascade Style, Informal or Vertical Cascade Style, Displaying Cascade Style Bonsai.

UNIT V:**(6 hours)**

Multiple tree styles of Bonsai - Two-Tree and Twin Trunk Style Bonsai. Forest Style Bonsai*. Bonsai with Special Characteristics.

*** Self study****Teaching Methods**

Power Point presentation/Seminar/Discussion/Assignment

TEXT BOOKS

1. Paul Lesniewicz., 1994. Bonsai in your home. Sterling publishing Co, New York.
2. Randhawa, G.S., and Amitabha Mukhopadhyay, 2000. Floriculture in India, Allied publishers, India.

REFERENCES

1. Roy Edwin Biles, (2003). The complete Book of Gardening. Biotech Books, Delhi - 35.
2. Bhattacharjee, S.K. (2006). Advances in Ornamental Horticulture. Pointer Publication, Jaipur.
3. Doesh Beer Singh and Poonam Wazir, (2002). Bonsai - An art. Scientific Publishers, Jodhpur.

MAPPING

CO \ PSO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	H	H	M	H
CO2	S	M	H	H	M
CO3	H	S	M	H	H
CO4	S	H	M	S	M

S - Strong**H - High****M - Medium****L - Low**

Programme Code: 05	Title: CERTIFICATE COURSE - BONSAI		
Course Code: 19CCB102	C.P. 2. ETHICS, VALUES AND MARKETING OF BONSAI		
Batch 2019-2020	Hours / Week 2	Total Hours 30	Credits 2

COURSE OBJECTIVES

- To know the ethical value of bonsai
- To understand the common and special types of bonsai.
- To recognize the marketing potential of bonsai in India

COURSE OUTCOMES

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

K1	CO1	Recognize the traditions and rituals values of bonsai
K2	CO2	Understand the types of commercial and aesthetic types of bonsai
K3	CO3	Implement knowledge on marketing practice of bonsai
K3	CO4	Describe the economic value of bonsai

SYLLABUS

UNIT I: (6 hours)

Bonsai rules, traditions and rituals - Respect for Nature and conservation - Miniature Bonsai - Developing Miniature Bonsai, Containers and Soil for Miniature Bonsai, Care and Maintenance.

UNIT II: (6 hours)

Special techniques in Bonsai - Driftwood Style, Selecting Material for Driftwood Style Bonsai, Creating Driftwood Style Bonsai and Dead Wood on Bonsai. Root over rock bonsai.

UNIT III: (6 hours)

Collecting, refining and displaying Bonsai - Sources of Material for Bonsai, Collecting Material from the Ground, Buying Material, Propagating Bonsai Material by, Seeds, Cuttings, Dividing, Grafting and Layering.

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19CCB102

UNIT IV:

(6 hours)

Refining Bonsai, Review the Basic Styles*, Species, Roots, Trunk, Branches and Foliage, Container, Soil and Displaying. Displaying in a Private Collection, Displaying in a Public Exhibit.

UNIT V:

(6 hours)

Economic importance of Bonsai in tribal livelihood - marketing of Bonsai in ecotourism places. Bonsai - Rehabilitation prospects.

*** Self study**

Teaching Methods

Power Point presentation/Seminar/Discussion/Assignment

Text books

1. Chadha, K.L., 2001. Handbook of horticulture. ICAR, New Delhi.
2. Bhattacharjee, S.K., 2004. Landscape gardening and design with plants. Aavishkar Publishers and Distributors, Jaipur, India.

MAPPING

CO \ PSO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	H	H	M	H
CO2	S	M	H	H	M
CO3	H	S	M	H	H
CO4	S	H	M	S	M

S - Strong

H - High

M - Medium

L - Low

Programme Code: 05		Title: CERTIFICATE COURSE - BONSAI		
Course Code: 19CCB1CL		C.Pr.1. Bonsai Techniques		
Batch 2019-2020	Semester I	Hours / Week 2	Total Hours 30	Credits 2

COURSE OBJECTIVES

- To identify the wild plants species for bonsai making.
- To select the suitable tools for bonsai making.
- To prepare the bonsai of market value.

COURSE OUTCOMES

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

K3	CO1	Understand the programmes being carried out to conserve species through bonsai techniques
K4	CO2	Investigate the current status of bonsai .
K5	CO3	Implement the acquired knowledge on commercial applications of Bonsai

LIST OF PRACTICALS

1. Identification of Plants suitable for making bonsai
2. Identification of tools for making bonsai (Repotting, pruning tools)
3. Role of fertilizer and its importance for bonsai making (organic and inorganic)
4. Selection of the suitable plants to make different styles of bonsai
5. To acquire knowledge on special styles in bonsai (Bonsai on Rock and Root over bonasi)

MAPPING

CO \ PSO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	H	S	M	S
CO2	S	M	H	S	H
CO3	H	H	M	H	H

S - Strong

H - High

M - Medium

L - Low

UBO96

19CCB1CL

KONGUNADU ARTS AND SCIENCE COLLEGE (Autonomous)
COIMBATORE - 641 029

CERTIFICATE COURSE QUESTION PAPER (PRACTICALS)
End semester Examination Question Paper Pattern
(For the candidates admitted from the academic year 2019-20 onwards)

Time: 3 Hours
Marks

Max. Marks: 100

BREAK UP OF MARKS

- | | |
|--|------------------|
| A. Identification of Plants suitable for making bonsai | -15 Marks |
| B. Identification of tools for making bonsai | -15 Marks |
| C. Cutting, Wiring and Pruning techniques | -20 Marks |
| D. Role of fertilizer and its importance for bonsai making | - 5 Marks |
| E. Styles of bonsai | -15 Marks |
| F. Set-up Root over Rock | -10 Marks |

Record **- 20 Marks**

TOTAL -----
- 100 Marks
