KONGUNADU ARTS AND SCIENCE COLLEGE
(Autonomous)
Coimbatore – 641 029

DEPARTMENT OF BOTANY
CURRICULUM AND SCHEME OF EXAMINATIONS (CBCS)
(APPILICABLE TO STUDENTS DURING THE ACADEMIC YEAR 2018-2019 AND ONWARDS)

Semester	Part	Subject code	Title of the Paper	Instruction Hours / Cycle	Exam. Marks			Duration of Exam.(hours)	Credit
					CIA	ESE	Total		
I	I	**18TML101**	**Part-I -Lang. -Tamil-I** /Hindi-I/French -I / Malayalam -I/ Sanskrit-I	6	25	75	**100**	3	**3**
	II	**18ENG101**	**Part - II** - English - I	6	25	75	**100**	3	**3**
	III	**19UBO101**	**C.P.1-** Plant Diversity - I	7	25	75	**100**	3	**5**
		18UZO1A1	**Allied -1** Zoology - I	5	20	55	**75**	3	**4**
			C.Pr.1 - Plant Diversity - I	2	-	-	**-**	-	**-**
			Allied Pr. Zoology - I	2	-	-	**-**	-	**-**
	IV	**18EVS101**	Environmental studies**	2	-	50	**50**	3	**2**
			Total	**30**			**425**		**17**
II	I	**18TML202**	**Part - I- Tamil-II** /Hindi-II /French-II / Malayalam-II / Sanskrit - II	6	25	75	**100**	3	**3**
	II	**18ENG202**	**Part- II-** English - II	6	25	75	**100**	3	**3**
	III	**19UBO202**	**C.P.2** - Plant Diversity - II	7	25	75	**100**	3	**5**
		18UZO2A2	**Allied - 2** Zoology - II	5	20	55	**75**	3	**4**
		19UBO2CL	**C.Pr.1** - Plant Diversity I & II	2	40	60	**100**	3	**2**
		18UZO2AL	**Allied. Pr.** Zoology - I & II	2	20	30	**50**	3	**2**
	IV	**18VED201**	Value Education - Moral and Ethics**	2	-	50	**50**	3	**2**
			Total	**30**			**575**		**21**
III	I	**18TML303**	**Part-I-Tamil-III** /Hindi- III / French-III / Malayalam - III / Sanskrit - III	6	25	75	**100**	3	**3**
	II	**18ENG303**	**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**
		18UCH3A3	**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	**18UGA3S1**	Skill based subject -I General awareness	2	25	75	**100**	3	**3**
		18TBT301/ 18TAT301/ 18UHR3N1	Basic Tamil* / Advanced Tamil**/ Non Major Elective - Human Rights**	2	-	75	**75**	3	**2**
			Total	**30**			**550**		**19**

UBO2

IV	I	**18TML404**	**Part-I-Tamil-IV** / Hindi-IV / French - IV/ Malayalam - IV / Sanskrit - IV	6	25	75	**100**	3	**3**
	II	**18ENG404**	**Part-- II -Lang** - English IV	6	25	75	**100**	3	**3**
	III	**19UBO404**	**C.P.4**- Biophysics and Biostatistics	5	25	75	**100**	3	**4**
		18UCH4A4	**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**
		18UCH4AL	**Allied Pr.** Chemistry	2	20	30	**50**	3	**2**
	IV	**19UBO4S2**	Skill based subject-II Horticulture	2	25	75	**100**	3	**3**
		18TBT401/ 18TAT402 18UWR4N2	Basic Tamil*/ Advanced Tamil**/ Non Major Elective – Women's Rights**	2	-	75	**75**	3	**2**
			Total	**30**			**700**		**23**
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**
		18UBO5E1	**Elective - I**	4	25	75	**100**	3	**5**
		19UBO5CN	**C.Pr.3** - Bioinstrumentation	4	40	60	**100**	3	**2**
			C.Pr. 4 - Taxonomy of Angiosperms, Economic Botany, Cytology, Genetics, Plant Breeding, Plant Ecology, Phytogeography and Resource Conservation	4	-	-	-	-	-
	IV	**18UZO5X1/ 18UBC5X1/ 18UBT5X1**	EDC - Extra Departmental course	2	25	75	**100**	3	**3**
		18UBO5IT	Internship Training	**Grade******					
			Total	**30**			**700**		**29**
VI	III	**19UBO609**	**C.P.9** - Biochemistry	6	25	75	**100**	3	**4**
		18UBO610	**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, Cytology, Genetics, Plant Breeding, Plant Ecology, Plant Phytogeography and Resource Conservation	-	40	60	**100**	3	**2**
		19UBO6CP	**C. Pr. 5** - Biochemistry, Plant physiology, Microbiology and Plant Pathology	4	40	60	**100**	3	**2**
		19UBO6E2	**Elective- II**	5	25	75	**100**	3	**5**
		18UBO6Z1	Project***		20	80	**100**	-	**5**
		18UBO6S4	**Skill based Subject-III-** Cultivation and Marketing of Medicinal plants	3	25	75	**100**	3	**3**

		18NCC/NSS/ YRC /PYE101	Extension activity *	-	50	-	**50**	-	**1**
	Total			**30**			**850**		**31**
Grand Total				**180**			**3800**		**140**

@ 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. **Medicinal plants**

Non-Major Elective Papers

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

List of Extra Departmental Course (EDC) papers

S. No.	Subject code	Title of the paper	Offering Department
1.	16UZO5X1	Ornamental Fishery Technology	Zoology
2.	17UBC5X1	Diagnostic Biochemistry	Biochemistry
3.	16UBT5X1	Life Style Biotechnology	Biotechnology

Note: In core/allied subjects, Number 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 elective	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**

Note :

- CBCS - Choice Based Credit System
- CIA - Continuous Internal Assessment
- ESE - End of Semester Examinations
- 25 % CIA is applicable to all theory subjects except JOC, COP and Diploma Courses, which are considered as extra credit courses.

Certificate Course

- **Bonsai**

Semester	Subject Code	Title of the Paper	Instruction hours /cycle	Exam Marks			Duration of Exam (hours)	Credits
				CIA	ESE	Total		
	18CCB101	**C.P.1- Introduction to Bonsai Principles and Techniques**	2	25	75	**100**	3	**2**
	18CCB102	**C.P.2- Ethics, Values and Marketing of Bonsai**	2	25	75	**100**	3	**2**
	18CCB1CL	**C.Pr.1. Bonsai Techniques**	2	40	60	**100**	3	**2**
	18PDB2Z1	**Project**	2	20	80	**100**	3	**2**
		Grand Total	**8**			**400**		**8**

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			

UBO7

Components of Continuous Internal Assessment (CIA)

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

19UBO4S2

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**, s**cope 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.

19UBO4S2

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

PSO / CO	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

19UBO506

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** **7**	**Total Hours** **105**	**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	Familarize immense knowledge on economic importance of higher plants.

SYLLABUS

UNIT I **(21 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 **(21 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 **(21 HOURS)**

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

UNIT IV **(21 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.

19UBO506

UNIT V **(21 HOURS)**

Economic Botany- study of botany, cultivation and utilization of the following: Fiber yielding plants (cotton and jute), 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

19UBO508

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.

19UBO508

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

PSO / CO	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

19UBO6CO

Programme Code: 05		**Title : B.Sc., BOTANY**		
Course code : 19UBO6CO		**Core Practical: 4 - Taxonomy of Angiosperms, Economic Botany, Cytology, Genetics, Plant Breeding, 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 study the cellular details, genetic constitution and breeding techniques.
- To impart knowledge on the determination of types of vegetations using quantitative ecological characters.

COURSE OUTCOMES

K3	CO1	Apply knowledge to segregate species variation using dichotomous keys.
K4	CO2	Analyze the progress of cell divisions and their significance for the manipulation of higher yielding crop plants.
K5	CO3	Determine the distribution of vegetations in a given habitat using various quadrat methods.

Core Practical: 4 - Taxonomy of Angiosperms, Economic Botany, Cytology, Genetics, Plant Breeding, 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

19UBO6CO

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. Demonstration of selection, mass selection and clonal propagations
6. Emasculation technique

III. 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. Demonstration of ecosystems (pond, forest and grasslands)
6. Demonstration of community succession patterns - hydrosere and lithosere
7. Global Positioning System (GPS) - Demonstration only
8. Locate major Phytogeographical zones of India using photographs

MAPPING

PSO / CO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	M	S	H	S

UBO55

CO2	H	H	H	M	H
CO3	S	M	H	S	M

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

18UBO6S3

Programme Code: 05		**Title: B.Sc., BOTANY**		
Course Code:18UBO6S3		**Skill Based Subject: III - CULTIVATION AND MARKETING OF MEDICINAL PLANTS**		
Batch 2018-2019	**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 *in situ* and *ex situ* 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*.

18UBO6S3

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).Pharmocognosy 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, Pharmaco Therapeutics - 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

PSO / CO	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

UBO76

Programme Code: 05	Title: B.Sc., BOTANY		
	Major Elective: 6 - MEDICINAL PLANTS		
Batch **2018-2019**	**Hours / Week** **4**	**Total Hours** **60**	**Credits** **5**

COURSE OBJECTIVES

- To obtain knowledge on the various secondary metabolites in medicinal plants
- To acquire knowledge on the geographical sources of drugs and their classification.
- To analyze the cultivation and trading practices of medicinal plants.

COURSE OUTCOME

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

K1	CO1	Describe the various categories of plant drugs.
K2	CO2	Explore ethnobotanical knowledge of plants through traditional indigenous approaches.
K3	CO3	Interrelate indigenous medicinal plants for the endemic ailments of local habitats.
K3	CO4	Extend the acquired knowledge for cultivation and marketing of medicinal plants.

SYLLABUS

UNIT I **(12 Hours)**

Ethnobotany - definition - categories - major tribes of southern India - regional studies - ethno-medicinal plants - wild food plants - socio-economic status. Conservation of medicinal plants (*in situ*, *ex situ*, sacred grooves).

UNIT II **(12 Hours)**

Pharmocognosy- definition and scope - the ancient and modern science (AYUSH - Ayurveda, Unani, Siddha and Homeopathy), classification of vegetable drugs, identification of drugs (Taxonomical, anatomical, fluorescence, chemicals, organoleptic and microscopic).

UNIT III **(12 Hours)**

Sources of vegetable drugs - biological geographical and cultural. Production of vegetable drugs - role of growth regulators. Deterioration of drugs and their control measures - adulteration of drugs.

UNIT IV **(12 Hours)**

Importance and significance of flavonoids and alkaloids, vitamins, hormones. Pesticides and antibiotics of plant origin.

UNIT V **(12 Hours)**

Cultivation and trading of medicinal and aromatic plants - *Rauwolfia serpentina, Carica papaya*, Cymbopogon martini, Aloe vera, Catharanthus roseus, Chrysanthemum cinnerarifolium* and *Phyllanthus emblica.*

***Self study**

Teaching Methods

Power Point presentation/Seminar/Quiz/Discussion/Assignment

TEXTBOOKS

1. Trease G.e. and Evans, W.C. (1978). Pharmocognosy. Bailliere Trinda, London.
2. Shah, C.S. and J.S. Qudry. (1995). A textbook Pharmocognosy. Prakasam Publishers, Ahamadabad.
3. Purohit, S.S. (1989). Medicinal plants cultivation - a scientific approach. Scientific Publishers, Jodhpur.
4. Jain, S.K. (1981). Glimpses of Indian Ethnobotany. Oxford and IBH, New Delhi.

REFERENCES

1. Anonymous. (1970). The Pharmacopoeia of India. Govt. of India, New Delhi.
2. Jain. S.K. (Ed.). (1996). Ethnobotany in human welfare. Deep. Pub. New Delhi
3. Nadkarni, K.M. (1954). Indian Materia Medica. Karnataka Printing press, Bombay
4. Wallis, T.E. (1985). Text Book of Pharmocognosy (5th Ed). CBS Pub. Distributors. Bhola North nagar, New Delhi - 110 032.
5. Jain, S.K. (1990). Contribution Indian Ethnobotany. Scientific Publishers, Jodhpur.
6. Jothiprakash, E.J. (2006). Medicinal Botany and Pharmocognosy. Emky Publications, 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	S	H	M	H
CO4	H	M	H	H	M

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

19UBO2A2

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 105**	**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 **(21 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 **(21 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 **(21 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.

19UBO2A2

UNIT IV **(21 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 **(21 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

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
CO4	S	H	M	S	H

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

19UBO5X1

Programme Code: 05		**For B.Sc., ZOOLOGY, BIOCHEMISTRY AND BIOTECHNOLOGY**		
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.

19UBO5X1

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

PSO / CO	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