

KONGUNADU ARTS AND SCIENCE COLLEGE (AUTONOMOUS)
COIMBATORE - 641 029
B.Sc. BOTANY
Curriculum & Scheme of Examination under CBCS
(APPLICABLE TO STUDENTS ADMITTED FROM THE ACADEMIC YEAR (2014-2015))

Semester	Part	Subject code	Title of the Paper	Instruction Hours / Cycle	Exam. Marks			Duration of Exam.(hours)	Credit
					CIA	ESE	Total		
I	I	13TML101	Part-I -Lang -Tamil-I /Hindi-I /French -I / Malayalam – I / Sanskrit - I	6	25	75	100	3	3
	II	13ENG101	Part – II - English - I	6	25	75	100	3	3
	III	13UBO101	C.P.1- Plant Diversity-I (Algae, Fungi, Bacteria, Lichens & Plant Pathology)	5	25	75	100	3	4
		13UZO1A1	Allied -1 Zoology – I	7	20	55	75	3	4
			C.Pr.1 - Plant Diversity – I	2	-	-	-	-	-
		13UZO1A1	Allied Pr. Zoology – 1	2	-	-	-	-	-
	IV	12EVS101	Environmental studies**	2	-	50	50	3	2
II	I	13TML202	Part – I- Tamil–II /Hindi–II /French–II / Malayalam-II / Sanskrit - II	6	25	75	100	3	3
	II	13ENG202	Part- II- English - II	6	25	75	100	3	3
	III	14UBO202	C.P.2-Plant Diversity-II (Bryophytes, Pteridophytes, Gymnosperms & Paleobotany)	7	25	75	100	3	4
		13UZO2A2	Allied - 2 Zoology - 2	5	20	55	75	3	4
		14UBO2CL	C.Pr.1 - Plant Diversity – 1 & II	2	40	60	100	3	2
		13UZO2AL	Allied. Pr. Zoology	2	20	30	50	3	2
	IV	13VED201	Value Education Moral and Ethics**	2	-	50	50	3	2
III	I	13TML303	Part–I–Tamil–III /Hindi- III / French- III / Malayalam – III / Sanskrit - III	6	25	75	100	3	3
	II	13ENG303	Part – II -Lang – English - III	6	25	75	100	3	3
	III	14UBO303	C.P. 3 - Anatomy and Embryology of Angiosperms.	5	25	75	100	3	4
		13UCHOA1	Allied – 3 – Chemistry - 1	5	20	55	75	3	4
		13UBO4CM	C. Pr. 2 - Anatomy and Embryology of Angiosperms	2	-	-	-	-	-
		13UCHOA2	Allied – Pr. – Chemistry	2	-	-	-	-	-
	IV	13UGA3S1	Skill based subject –I General awareness	2	25	75	100	3	3
IV		13TBT301/ 13TAT301/ 13UHR3N1	Basic Tamil* / Advanced Tamil**/ Non Major Elective – Human Rights**	2	-	75	75	3	2
	I	13TML404	Part-I–Tamil–IV / Hindi-IV / French - IV/ Malayalam – IV / Sanskrit - IV	6	25	75	100	3	3
	II	13ENG404	Part– II -Lang – English IV	6	25	75	100	3	3
	III	14UBO404	C.P.4- Biostatistics and Biophysics	5	25	75	100	3	4

V	III	13UCHOA2	Allied 4 – Chemistry - 2	5	20	55	75	3	4
		14UBO4CM	C. Pr. 2 – Anatomy & Embryology / Biostatistics & Biophysics	2	40	60	100	3	2
		13UCH4AL	Allied Pr. Chemistry.	2	20	30	50	3	2
	IV	14UBO4S2	Skill based subject-II Tissue culture concept and applications	2	25	75	100	3	3
		13TBT401/ 13TAT402 13UWR4N2	Basic Tamil*/ Advanced Tamil**/ Non Major Elective – Women Rights**	2	-	75	75	3	2
		14UBO505	C.P. 5 – Fundamentals of Computer and Bioinformatics	4	25	75	100	3	4
	III	14UBO506	C.P. 6 - Taxonomy of Angiosperms & Economic Botany	5	25	75	100	3	5
		13UBO507	C.P.7 - Cytology, Genetics and Plant Breeding.	4	25	75	100	3	5
		13UBO508	C.P. 8 - Plant Ecology, Phyto Geography and Resource Conservation	4	25	75	100	3	5
		14UBO5E1	Elective – I. Forestry	3	25	75	100	3	5
		14UBO5CN	C.Pr.3 – Fundamentals of Computer and Bioinformatics	4	40	60	100	3	2
		12UBO6CO	C.Pr. 4 - Taxonomy of Angiosperms, Economic Botany, Cytology, Genetics and Plant Breeding, Plant Ecology, Plant Geography and Resource Conservation	4	-	-	-	-	-
	IV	13UBO5S3	Skill based subject- III- Mushroom cultivation and Marketing	2	25	75	100	3	3
		14UBO5IT	Internship Training	Grade****					
VI	III	13UBO609	C.P.9 - Horticulture	5	25	75	100	3	5
		13UBO610	C.P.10- Biochemistry	5	25	75	100	3	5
		14UBO611	C.P.11- Plant Physiology	5	25	75	100	3	5
		13UBO6CO	C.Pr. 4- Taxonomy of Angiosperms, Economic Botany, Cytology, Genetics and Plant Breeding, Plant Ecology, Plant Geography and Resource Conservation		40	60	100	3	2
		12UBO6CP	C. Pr. 5 – Horticulture, Biochemistry and Plant physiology	4	40	60	100	3	2
		13UBO6E2	Elective- II – Biotechnology	5	25	75	100	3	5
		14UBO6Z1	Project***	4	20	80	100	-	5
		12UBO6S4	Skill based Subject-IV- Cultivation and Marketing of Medicinal plants	2	25	75	100	3	3
		13NCC/NSS/ YRC/PYE101	Extension activity *	-	50	-	50	-	1

@ 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)

Major Elective Papers

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

- 1. Forestry**
- 2. Medicinal plants**
- 3. Food science**
- 4. Fundamentals of Microbiology**
- 5. Biotechnology**
- 6. Pharmacognosy**

Non-Major Elective Papers

- 1. Human Rights**
- 2. Women's Rights**

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.

Note :

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

25 % CIA is applicable to all subjects except JOC, COP and Diploma Courses, which are considered as extra credit courses.

Tally Table (UG)

	Subject groups	Total Marks	Total Credit points
Part – I	Tamil Paper – 1 to IV	400	12
Part – II	English Paper – 1 – IV	400	12
Main Paper III	Core Paper – 1 to 11	1100 (1600)	60
	Core Practical – 1 to 5	500	
	Allied Paper Zoology 1 to 2	150	10
	Zoology Practical	50	
	Allied Paper – II Chemistry 1 to 2	150	10
	Allied Chemistry Practical	50	
	Major Electives	300	15
IV	Skill Based Courses	400	12
	Basic Tamil/ Advanced Tamil/ Non Major Elective	150	4
	Environmental Studies	50	2
	Value Education	50	2
V	Extension activities	50	1
	Grand Total	3800	140

JOC, COP, Extra diploma and PG diploma courses are offered to the students admitted during the academic year **2013-2014** and will be considered as extra credit courses.

C.P.1- PLANT DIVERSITY – I**(Algae, Fungi, Bacteria, Lichens and Plant Pathology)****Objectives**

- To study the pathogenic microorganisms causing various plant diseases.
- To know the primitive plants of the earth.
- To know the classification of algae based on the pigment system in plants.

Total hours: 75 Credit: 4**UNIT I****(15 HOURS)**

Algae -General characters of Algae. Outline classification (Fritsch, 1945). Detailed study of occurrence, thallus structure, reproduction and life cycle of **Cyanophyceae** – *Nostoc*, **Chlorophyceae** – *Volvox*, *Caulerpa*.

UNIT II**(15 HOURS)**

Occurrence thallus structure and reproduction of Bacillariophyceae – Diatoms. Occurrence, thallus structure, reproduction and life cycle of Phaeophyceae - *Sargassum*, Rhodophyceae – *Polysiphonia*. Economic importance of Algae.

UNIT III**(15 HOURS)**

Fungi -General characters of the fungi. Out line classification (Alexopoulos and Mims, 1979) Detailed study of occurrence, structure, reproduction and life cycle of *Albugo*, *Rhizopus* and *Saccharomyces*. *Lycoperdon*, *Penicillium*, Economic importance of fungi.

UNIT IV**(15 HOURS)**

Bacteria – Classification, Morphology, Ultrastructure and Economic importance of Bacteria. **Lichens**: Phycobionts and mycobionts. Morphology, anatomy of thallus and reproduction of Ascolichen. Economic importance of Lichen.

UNIT V**(15 HOURS)**

Pathology – Introduction, definition and classification of diseases. Symptoms, Causative organisms and Control measures of Tobacco Mosaic Virus diseases, Tikka disease of groundnut and Citrus canker.

TEXTBOOKS

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 Mc Graw – Hill Publications, New Delhi.
3. Michael. J. Pelczar, J.R, E.C.S. Chan, Noel R. Krieg and Merna Foss Pelczar Microbiology 1993. Tata McGraw – Hill Publishing Company Limited. 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. Vashishta, B.R. 1998. Fungi. S. Chand & Co., New Delhi.
4. Vashishta, B.R. 1998. The Algae. S. Chand & Co., New Delhi.
5. Chopra, C.L. 1982. Algae. S. Nagin & Co., New Delhi.
6. Fritsch, F.E- 1972. The structure and reproduction of Algae Vol. I & II.
7. Watson.1974. Structure and life cycle of Bryophytes. B.I. Publications, New Delhi.
8. Sharma, O.P. 1986. Text book of Algae. Tata Mc Graw – Hill Publications, New Delhi

UBO-2
SEMESTER II
C.P. 2 PLANT DIVERSITY-II

14UBO202

(Bryophytes, Pteridophytes, Gymnosperms, and Paleobotany)

Objectives:

- To understand the life cycle patterns of Bryophytes, Pteridophytes and Gymnosperms
- To study the dead remains of the plants in the division of Paleobotany.

Total hours: 75 Credit: 4

UNIT I (15 HOURS)

Bryophytes: Classification of Bryophytes (K.R. Sporne). Occurrence, Structure, Reproduction and Life cycle of *Marchantia*, *Anthoceros* and *Funaria* - Economic importance of Bryophytes.

UNIT II (15 HOURS)

Pteridophytes: Classification of Pteridophytes (Riemer). Occurrence, Structure, Reproduction and Life cycle of *Lycopodium*. Stelar variation. Apogamy and Apospory.

UNIT III (15 HOURS)

Occurrence, Structure, Reproduction and Life cycle of *Selaginella*, *Equisetum* and *Adiantum*.

UNIT IV (15 HOURS)

Gymnosperms: Classification of Gymnosperms (K.R. Sporne). Detailed study of the structure and reproduction of *Cycas* and *Gnetum*. Economic importance of gymnosperms.

UNIT V (15 HOURS)

Paleobotany: Geological time scale, Fossilization and kinds of fossils. Radiocarbon dating. Study of the following fossils. *Rhynia*, *Lepidodendron*, *Lepidocarpon* and *Williamsonia*.

TEXTBOOKS

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 Mc Graw Hill Publications, New Delhi.

Total hours: 30 Credit: 2

C. Pr. I LIST OF PRACTICALS FOR

C.P. 1- PLANT DIVERSITY - I

1. **Algae:** Internal and reproductive structures of the following:-
Nostoc
Volvox
Caulerpa
Diatoms
Sargassum
Polysiphonia.
2. **Fungi:** Structure and reproduction of the following:-
Albugo
Rhizopus
Saccharomyces
Penicillium
Lycoperdon
Cercospora.
3. **Lichen:** Structure and reproduction of the *Usnea*.
4. **Pathology:** Symptoms, causative organisms and control measures of
TMV disease
Tikka disease of Groundnut and
Citrus canker.

C.P. 2- PLANT DIVERSITY - II

Structure and reproduction of the following:-

Bryophytes

Marchantia
Anthoceros and
Funaria.

Pteridophytes

Lycopodium
Selaginella
Equisetum and
Adiantum.

Gymnosperms

Cycas and *Gnetum*.

Paleobotany

Rhynia
Lepidodendron
Lepidocarpon and
Williamsonia.

UBO-5

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 2013-14 onwards)

Time: 3 Hours

Max. Marks: 60 Marks

BREAK UP OF MARKS

PRACTICAL – I

I. Micro-preparation	- 24 Marks
II. Spotters (6 x 3)	- 18 Marks
III. Plant systematic position	- 04 Marks
IV. Plant pathology	- 04 Marks
Submission of record	- 10 Marks

TOTAL	- 60 Marks

C.P.3 - ANATOMY AND EMBRYOLOGY OF ANGIOSPERMS

Objectives

- To study the internal structure of various plants.
- To know the reproductive system of flowering plants (Angiosperms).

Total hours: 75 Credit: 4

UNIT I

(15 HOURS)

Apical meristems- Vegetative shoot apex and root apex (Angiosperm) – Theories
Structure and functions of simple tissues- Parenchyma, Collenchyma, and
Sclerenchyma.

UNIT II

(15 HOURS)

Structure and functions of complex tissues - Xylem, Phloem and Cambium.
Primary structure of monocot and dicot stem, root and leaves.

UNIT III

(15 HOURS)

Secondary thickening in dicot stem and root. Anomalous secondary thickening in
Achyranthes, *Boerhavia*, *Nyctanthus* and *Dracaena* stem.

UNIT IV

(15 HOURS)

Structure of microsporangium. Tapetum- structure, types and functions. Structure
of female gametophytes - (*Polygonum* and *Peperomia*). Structure and types of
ovule. Double fertilization. Endosperm- types, structure and functions (nuclear,
cellular, helobial, ruminate).

UNIT V

(15 HOURS)

Embryo- Structure and development of dicot embryo (*Capsella* type) and
monocot embryo (*Najas*). Polyembryony- Classification and significance.
Polyembryony, Parthenocarpy.

TEXTBOOKS

1. Singh, Pandey and Jain, 2007. Anatomy of Seed plants, Rastogi Publications. New Delhi.
2. S. S.Bhojwani, S. P. Bhatnagar, 1985. Embryology of Angiosperms, Vikas Publishing House, Noida.
3. Pandey, B.P.1978. Plant Anatomy. Chand and Co, New Delhi.
4. Maheswari, P. 1950. Introduction to the embryology of Angiosperms. Vikas Publishing House, New Delhi.

REFERENCE

1. De Roberties. 1989. Cell and Molecular Biology. Mc Graw Hill, New Delhi.
2. Annie Regland. 2000. Developmental Botany –Saras Publication, Kanyakumari
3. Fahn, A1985. Plant Anatomy. Pergamon Press, Great Britain.
4. Esau, K. 1991. Plant Anatomy. Wiley Eastern Ltd. New Delhi. 7th Edition

C. P.4 - BIOSTATISTICS AND BIOPHYSICS**Objectives**

- To understand the interaction of plants with light.
- To find solutions by solving the biological problems.

Total hours: 75 Credit: 4

UNIT I**(15 HOURS)**

Biostatistics: – Definition, Four steps in statistics, Data collection methods - Sampling – census and sampling method, law of statistical regularities, law of inertia of large numbers, essential of sampling, 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 data and secondary data.

UNIT II**(15 HOURS)**

Classification of data and Frequency distribution. Tabulation, graphic and diagrammatic representation of data.

UNIT III**(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.

UNIT IV**(15 HOURS)**

Biophysics: - Electromagnetic radiation - nature, absorption, interaction with matter, role of electrons in absorption of light, electron multiplicity. Excitation, de-excitation & path of de-excited electrons.

UNIT V**(15 HOURS)**

Study of radioactivity – alpha, beta and gamma radiations. Radioactive isotopes and half-life period. Ionization and detection – autoradiography, Geiger- Muller counter and Scintillation counter.

TEXTBOOKS

1. Palanichamy, S. 1986. Principle 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.

C.Pr. 2 – LIST OF PRACTICALS FOR

C.P.3 - ANATOMY AND EMBRYOLOGY OF ANGIOSPERMS

Total hours: 60 Credit: 2

1. Primary structure of Stem, Root and Leaf.
2. Secondary structure of Stem, Root and Leaf.
3. Secondary thickening of Stem and Root.
4. Anomalous secondary thickening – *Boerhaavia*, *Nyctanthus*, *Dracaena* and *Achyranthes*.
6. T.S of anther - various stages.
7. Types of Endosperm.
8. Embryo mounting: *Tridax*

C. P.4 - BIOSTATISTICS AND BIOPHYSICS

Biostatistics: Simple problems in biostatistics.

- a) Mean
- b) Median
- c) Mode
- d) Standard Deviation
- e) Standard Error
- f) Chi-Square Test.
- g) T – test

Biophysics

1. Demonstration of Nature of EMR and Spectrum.
2. Diagrams of fluorescence, phosphorescence, delayed light emission, autoradiography, Geiger-Muller counter and Scintillation counter.

UBO-9

KONGUNADU ARTS AND SCIENCE COLLEGE (Autonomous)

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UG MODEL QUESTION PAPER (PRACTICALS)

End semester Examination Question Paper Pattern

(For the candidates admitted from the academic year 2013-14 onwards)

Time: 3 Hours

Max. Marks: 60 Marks

BREAK UP OF MARKS

PRACTICAL – II

I. Anatomy section	- 24 Marks
II. Biostatistics	- 10 Marks
III. Embryo dissection	- 06 Marks
IV. Spotters (5 × 2)	- 10 Marks
Submission of record	- 10 Marks
	<hr/>
TOTAL	- 60 Marks
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C.P. 5 – FUNDAMENTALS OF COMPUTER AND BIOINFORMATICS**Objectives**

- To understand how biological informations get manipulated in systems.
- To know the creation of biological databases, availability of biological informations and handling tools.

Total hours: 60 Credit: 4

UNIT I**(12 HOURS)**

Introduction to computer- components of computer – capabilities of computer – hardware – software – classification of software. Language – machine language – high level language- compilers, translators. Operating systems / DOS / windows.

UNIT II**(12 HOURS)**

Computer architecture, number system, memory units, auxiliary storage devices, input and output devices. Internet – WWW, E-mail, Browser and search engines.

UNIT III**(12 HOURS)**

Windows- 2007 an overview – MS-Word - creation of documents and tables, MS-Excel- preparation of workbook and charts, MS-PowerPoint – features and slide presentation. MS-ACCESS- Creating and Querying a Database. Database languages, database independence and database administrator. Data warehousing and data mining.

UNIT IV**(12 HOURS)**

Introduction to Bioinformatics. Regulation of gene expression in Prokaryotes and Eukaryotes. Protein synthesis. Biological databases, importance and classification (Outline only). Gene finding methods.

UNIT V**(12 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.

TEXTBOOKS

1. Mani, K and N. Vijayaraj. 2002. Bioinformatics for beginners. Kalaikathir Achakam, Coimbatore.
2. David W. Mount. 2001. Bioinformatics -Sequence and Genome analysis. Cold Spring Harbor Laboratory Press.
3. Rajaraman, V. 2004. Fundamentals of computer. Prentice Hall of India Pvt Ltd.

REFERENCES

1. A.D. Baxevanis and B.J.Francis (Eds.). 1998. Bio-informatics – A practical guide to the analyzing of gene protein. John Wiley and sons.
2. Stuart M. Brown. 2000. Bioinformatics- A biologists guide to bio computing and the internet. Eaton Publishing Co.
3. Arthor M. Lesk. 2002. Introduction to Bioinformatics. Oxford University Press, UK.
4. T.K. Attwood and Parry-Smith 2007. Introduction to bioinformatics. Samiron Phukan Dorling Kinders India, Pvt., Ltd.

C.P.6. - TAXONOMY OF ANGIOSPERMS AND ECONOMIC BOTANY**Objectives**

- To analyze the classification and description of flowering plants.
- To study about the cultivation and economic uses of Paddy, Cotton and Sugarcane.

Total hours: 75 Credit: 5

UNIT I**(15 HOURS)**

Aims and objectives of taxonomy. Systems of classification – Natural (Bentham and Hooker), Phylogenetic (Engler & Prantl) and Modern (Takhtajan). Merits and Demerits –Guidelines to the identification of plant specimen.

UNIT II**(15 HOURS)**

Herbarium techniques and uses, National herbarium- CNH - Regional herbarium –MH. Botanical Survey of India. Nomenclature - Binomial, ICBN- principles. Typication, Author citation, Effective and valid publication. Rejection of names.

UNIT III**(15 HOURS)**

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

UNIT IV**(15 HOURS)**

Asclepiadaceae, Solanaceae, Acanthaceae, Scrophulariaceae, Verbenaceae, Lamiaceae, Amaranthaceae, Euphorbiaceae, Orchidaceae, Zingiberaceae, Liliaceae, Arecaceae and Poaceae.

UNIT V**(15 HOURS)**

Economic Botany- study of botany, cultivation and utilization of the following with reference to Tamil Nadu. Fiber yielding plant (cotton), sugar yielding plant (sugarcane) and food crops – (Cereals - Paddy and Pulses - Soyabean). Spices and condiments (chillies and turmeric).

TEXTBOOKS

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.

C. P. 7. CYTOLOGY, GENETICS & PLANT BREEDING**Objectives**

- To study the cell structure and cell organelles.
- To know about the genes and gene interaction.
- To know the methods of plant breeding and crop improvement.

Total hours: 60 Credit: 5

UNIT I**(12 HOURS)**

Structure and function of cell wall, Plasma membrane (Fluid Mosaic Model only) Mitochondria, Chloroplast, Nucleus, Mitosis & Meiosis. Ultra structure of chromosome. Concept and components of a Gene.

UNIT II**(12 HOURS)**

Mendel's laws of inheritance – Mendel's experiments – monohybrid cross, dihybrid cross. Interaction of genes – incomplete dominance, lethal genes, complementary genes, epistasis and duplicate genes.

UNIT III**(12 HOURS)**

Multiple alleles - Blood groups in man. Linkages and crossing over, Cytoplasmic inheritance in plants – male sterility in Maize

UNIT IV**(12 HOURS)**

DNA as a genetic material. DNA Structure, function, replication, genetic code. Mutation - Types of mutation & mutagens.

UNIT V**(12 HOURS)**

Objectives of Plant breeding, breeding methods - pureline & clonal hybridization. Heterosis. Achievements in crop improvement -Sugarcane and Cotton.

TEXTBOOKS

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. Dobzonsky, 1995. Principles of Genetics.TATA Mc Graw Hill Company Ltd. New Delhi.
5. Gupta, P.K. 2004. Elements of genetics. FNA 2nd Edition.

UBO-13
SEMESTER V
C.P. 8. – PLANT ECOLOGY, PHYTOGEOGRAPHY AND RESOURCE
CONSERVATION
13UBO508

Objectives

- To understand the ecosystem organization.
- To have the knowledge on resources available for the benefit of mankind.

Total hours: 60 Credit: 5

UNIT I (12 HOURS)

Principles of Ecology. Climatic factors- role and importance of light, temperature, wind and rainfall on the growth of plants. Biotic factors – Communities - Characters and methods of studying plant communities.

UNIT II (12 HOURS)

Community succession - Kinds and causes. Morphological and anatomical adaptations of Hydrophytes, Xerophytes and Halophytes – structural and functional changes in communities. Climax concept.

UNIT III (12 HOURS)

Ecosystem – Basic structure and functions: Pollution – causes and possible control measures of air, water, soil and noise pollutions and biological waste management.

UNIT IV (12 HOURS)

Phytogeographical belts of world. Origin of cultivated plants. Botanical regions of India. Continental drift. Age and area hypothesis, endemism, plant migration and barriers.

UNIT V (12 HOURS)

Resource conservation – types of resources, conservation of soil, water, agriculture resources, range, forest and freshwater bodies.

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. The year in Ecology and conservation Biology, 2011. Willey – Blackwell Publications.

C.Pr. 3- FUNDAMENTALS OF COMPUTER AND BIOINFORMATICS

LIST OF PRACTICALS

Total hours: 60 Credit: 2

1. Creating, editing and printing a document in Ms-Word.
2. Creating, editing and printing a table in MS-word.
3. Data entry and chart preparation using Ms-Excel.
4. Creating a presentation in Ms-PowerPoint.
5. Creating and querying the database using MS-ACCESS.
6. Gene prediction using GenMark (HMM).
7. Similarity search using BLASTs.
8. Protein structure prediction using GOR-IV.
9. Phylogenetic analysis using Clustal-X.
10. Bio-Molecular Visualization using RASMOL.

UBO-15

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 2013-14 onwards)

Time: 3 Hours

Max. Marks: 60 Marks

BREAK UP OF MARKS

PRACTICAL – III

I. Writting Algorithms for A & B (15 + 15)	- 30 Marks
II. Results for A & B (08 + 08)	- 16 Marks
III. Viva-voce for A & B (02 + 02)	- 04 Marks
Submission of record	- 10 Marks
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TOTAL	- 60 Marks
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C.Pr. 4 - LIST OF PRACTICALS FOR

C.P. 6 - TAXONOMY OF ANGIOSPERMS AND ECONOMIC BOTANY

Total hours: 90 Credit: 2

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 LS of flower, floral diagram and floral formula with reference to the families mentioned in the theory.
4. Field visit to nearby floristic regions to study of the flora.
5. Submission of 25 herbarium sheets (local plants) with field notes for internal and external valuation

C.P. 7- CYTOLOGY, GENETICS & PLANT BREEDING

1. Study of cell organelles through slides and photographs.
Structure of cell wall, Plasma membrane, Mitochondria, chloroplast, Nucleus.
2. Study of mitosis using onion roots.
3. Study of meiosis using *Rheo* flower buds.
4. Simple problems in genetics.

**C.P. 8- PLANT ECOLOGY, PHYTOGEOGRAPHY AND RESOURCE
CONSERVATION**

1. Line transects – frequency determination in the vegetation of college campus.
2. Belt transect – frequency determination in the vegetation of college campus
3. Quadrat – determination of frequency and density in the vegetation of college campus
Observation of adaptation features morphological and anatomical in xerophytes
hydrophytes, halophytes and epiphytes
5. Charts – Ecosystem – Pond, forest, grasslands, hydrosere and lithosere.
6. Phytogeographical regions of India.

UBO-17

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 2013-14 onwards)

Time: 3 Hours

Max. Marks: 60 Marks

BREAK UP OF MARKS

PRACTICAL – IV

I. Family description	- 05 Marks
II. Phytogeography	- 05 Marks
III. Meiosis/Mitosis	- 05 Marks
IV. Plant ecology	- 05 Marks
V. Ecology experiment	- 07 Marks
IV. Genetics problem	- 04 Marks
IV. Spotters (7 × 2)	- 14 Marks
VII. Herbarium	- 05 Marks
Submission of record	- 10 Marks
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TOTAL	- 60 Marks
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C.P. 9- HORTICULTURE**Objectives**

- To learn about the propagation methods of horticulture plants.
- To study about the gardening and its maintenance.
- To know about commercial floriculture and flower arrangement.

Total hours: 60 Credit: 5

UNIT I**(12 HOURS)**

History, scope and divisions of Horticulture-Methods of vegetative propagation - cutting, layering, grafting and budding. Manures: organic- Pancha kavya, and inorganic. Irrigation.

UNIT II**(12 HOURS)**

Gardening – Types of gardens - Indoor garden and kitchen garden. Garden components - lawn making, glass house, rockery, water garden, topiary and Terrarium culture.

UNIT III**(12 HOURS)**

Production technology - Cultivation of vegetables – Bhendi and Tomato. Cultivation of fruits - Banana and Grapes. Growth regulators in horticulture. Plant protection measures for horticultural crops.

UNIT IV**(12 HOURS)**

Cultivation of flowers – Jasmine and Rose, Cultivation of plantation crops – Tea and Cardamom. Cultivation of medicinal plants – *Gloriosa superba* and *Aloe vera*.

UNIT V**(12 HOURS)**

Extraction of Jasmine concrete and papain. Preservation of fruits and vegetables, Cut flowers - Flower arrangement and Bonsai.

TEXTBOOKS

1. Horticulture – Principles and Practices. George Aquach-2002. 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.

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.
6. George Acquah, 2002. Horticulture- principles and practices, Person Education Ltd., Delhi.

UBO-19
SEMESTER – VI
C.P.10 - BIOCHEMISTRY

13UBO610

Objectives

- To study the structure of atom and chemical bonds.
- Metabolism of chemical reactions in cell
- To understand the biochemical techniques.

Total hours: 75 Credit: 5

UNIT I **(15 HOURS)**

Basic concept of Atoms and molecules; types of bonding; primary chemical bonds – covalent, hydrogen bonds, isotopes and isomerism. Acids, base, solutions, colloids, pH and buffer systems.

UNIT II **(15 HOURS)**

Structure and classification of carbohydrates: (Monosaccharides, Oligosaccharides, Polysaccharides), Biological functions of carbohydrates. **Lipids:** simple & compound lipids, sterols and Fatty acids.

UNIT – III **(15 HOURS)**

Proteins: Classification, properties, primary, secondary, and tertiary and quaternary structures (only outline). Amino acids: Structure, Classification, properties, isoelectrical point and Zwitter ions – isomerism.

UNIT – IV **(15 HOURS)**

Enzymes: Definition and Concept; Structure, properties and mode of action factors affecting enzyme actions. (Sensu Devlin). Chemistry and functions of Nucleic acids (DNA & RNA) and Nucleo proteins.

UNIT – V **(15 HOURS)**

Biochemical techniques: Chromatography - Paper and Thinlayer, Colorimetry and Spectrophotometry- UV – VIS, Infrared – Single beam and Double beam Electrophoresis – AGE and PAGE and Polarimetry.

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. Veerakumari, L. 2009. Bioinstrumentation. MJP Publishers
4. L.M. Narayanan, 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. Principles of Biochemistry. ICAR, Delhi.
3. L. Stryer, 2002, Biochemistry, W.H. Freeman.
4. Satyanarayana, V. 2005. Essentials of Biochemistry. Arunabha Sen & Allied Pvt., Ltd

C.P.11- PLANT PHYSIOLOGY

Objectives

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

Total hours: 75 Credit: 5

UNIT I

(15 HOURS)

Water, its biological significance, water relationships, osmosis, permeability, diffusion, chemical potential. Water potential, matric potential, pressure potential.

UNIT II

(15 HOURS)

Ascent of sap – path & mechanism of cohesion theory, Translocation of solutes. Transpiration – its kinds and significance and factors physiology of stomatal movement.

UNIT III

(15 HOURS)

Photosynthesis – pigment system Light and Dark reaction (C₃ & C₄ pathway). Respiration - Aerobic & Anaerobic, Glycolysis and Krebs cycle.

UNIT IV

(15 HOURS)

Nitrogen metabolism, Nitrogen cycle and Biological Nitrogen Fixation – Symbiotic and Non- Symbiotic. Synthesis of amino acids.

UNIT V

(15 HOURS)

Plant growth and development, Growth regulators- auxins, gibberellins, Kinetins, ethylene and ABA. Physiology of flowering – Photoperiodism, [Vernalization](#).

TEXTBOOKS

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, Nagarcoil.
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. Satyanarayana, V. 2005. Essentials of Biochemistry. Arunabha Sen & Allied Pvt., Ltd.
4. Devilin, 1986. Plant physiology. CBS Publishers and distributors, New Delhi.

UBO-21

SEMESTER VII

12UBO6CP

C.Pr. 5- LIST OF PRACTICALS FOR

Total hours: 60

Credit: 2

C.P. 9 – HORTICULTURE

1. Demonstrations of vegetative methods of propagation
2. Flower arrangement with cut flowers.

C.P. 10 – BIOCHEMISTRY

1. Demonstrations of pH meter, spectrometer and centrifuge.
2. Estimation of carbohydrate, protein and amino acids
3. Paper Chromatography and Thin Layer Chromatography.

C.P.11 – PLANT PHYSIOLOGY

1. Determination of osmotic pressure of cell sap of the given specimen – *Rheo* leaf.
2. Rate of respiration in flower buds/ germinated seeds using simple respiroscope.
3. Separation of leaf pigments by paper chromatography.
4. Measurement of the rate of photosynthesis under varying condition of CO_2 concentration.
5. Effect of light intensity on O_2 evolution during photosynthesis.
6. Determining the rate of transpiration using Ganong's photometer (demonstration only).
7. Determination of water absorption and transpiration ratio (Demonstration only).
8. Nitrification in soil (Demonstration only).
9. Manometric determination of R.Q.

UBO-22

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 2013-14 onwards)

Time: 3 Hours

Max. Marks: 60 Marks

BREAK UP OF MARKS

PRACTICAL – V

I. Physiology major experiment	- 15 Marks
II. Physiology setup	- 05 Marks
III. Horticulture	- 10 Marks
IV. Biochemistry	- 10 Marks
IV. Spotters (5 × 2)	- 10 Marks
Submission of record	- 10 Marks
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TOTAL	- 60 Marks
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**UBO-23
SEMESTER I**

13UZO1A1

Allied-A Botany - 1

(Phycology, Mycology, Plant Pathology, Bryophytes, Pteridophytes & Gymnosperms)

Objectives

- To know the classification of Cryptogams & Phanerogams.
- To study the structure and life cycle patterns of primitive to advanced organisms.
- To know the Economic important values of Algae and Fungi.

Total hours: 105 Credit: 4

UNIT I (21 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 (21 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 (21 HOURS)

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

UNIT IV (21 HOURS)

Pteridophytes: Classification by Smith (1955) (outline only), Structure, Reproduction and Life cycle of the following Genus: *Lycopodium* and *Dicranopteris*.

UNIT V (21 HOURS)

Gymnosperms: Classification by Pilger and Melchior (1956) (outline only), Structure, Reproduction and Life cycle of the following Genus: *Cycas* and *Gnetum*.

UBO-24

SEMESTER II

13UZO2A2

Allied-A Botany- 2

(Anatomy, Embryology, Taxonomy of Angiosperms, Physiology and Environmental Botany)

Objectives

- To know the internal structures and reproductive systems of various plant.
- To study about the classification and nomenclature of Angiosperms.
- To understand the interaction of plants with water and Photosynthesis process.
- To know the value of ecosystem and soil conservation.

Total hours: 105 Credit: 4

UNIT I

(21 HOURS)

Anatomy: A brief account of Meristems and Tissues. Primary structure of dicot and monocot stem and root.

UNIT II

(21 HOURS)

Embryology: Microsporogenesis. Development of Male gametophyte, Megaspores, Development of female gametophyte (Polygonum type). Structure of mature embryo sac. A brief account of types of Endosperms. Development of Dicot embryo (Crucifer type).

UNIT III

(21 HOURS)

Taxonomy of angiosperms: Bentham and Hooker's classification. Study of the following families with their economic importance. Annonaceae, Cucurbitaceae, Asclepiadaceae, Amarantaceae, Liliaceae and Poaceae.

UNIT IV

(21 HOURS)

Physiology: Water relationships of plants. Osmosis, passive and active absorption of ions. Photosynthesis: Photosynthetic apparatus, primary photochemical reaction, path of carbon. (Calvin cycle). Respiratory: substrates, Glycolysis, Krebs's cycle, Phytohormones- auxins and Cytokinins.

UNIT V

(21 HOURS)

Environmental Botany: Structure and functions of ecosystems. Vegetation types of Southern India. Pollution – Air and Water. Soil conservation.

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 FOR PAPER I & II

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.

**UBO-25
SEMESTER II**

13UZO2AL

Allied Pr. Zoology

Total hours: 60 Credit: 2

LIST OF PRACTICALS

Allied – A Pr. Botany - 1

1. **Phycology:** Structure and the reproduction of the following:
Oscillatoria
Caulerpa
Chara.
2. **A. Mycology**
Albugo
Agaricus.
B. Plant pathology: Symptoms, causative organisms and control measures of
Tikka disease of Groundnut
Citrus canker.
3. **Bryophytes**
Marchantia
Funaria.
4. **Pteridophytes**
Lycopodium
Dyranopteris.
5. **Gymnosperms**
Cycas

Allied – A Pr. Botany - 2

1. **Anatomy**
 1. Primary and secondary structure of Dicot stems and roots.
 2. Primary structure of monocot stem and root.
2. **Embryology**
 1. Microsporogenesis
 2. Types of the endosperm.
3. **Taxonomy of Angiosperms:** Study of the Morphology and Taxonomy of mentioned in the theory.
4. **Physiology**
Osmosis, O₂ evolution during photosynthesis- demonstration only
5. **Environmental Botany**
 - 1) Aquatic and terrestrial ecosystem.

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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 2013-14 onwards)

Time: 3 Hours

Max. Marks: 60 Marks

BREAK UP OF MARKS

ALLIED PRACTICAL

I. Algae and Bryophytes	- 04 Marks
II. Pteridophytes/Gymnosperm	- 06 Marks
III. Anatomy section	- 04 Marks
IV. Taxonomy	- 04 Marks
IV. Spotters (2 × 2)	- 04 Marks
V. Physiology setup	- 03 Marks
Submission of record	- 05 Marks

Elective - 1- FORESTRY**Objectives**

- To understand the importance and value of trees in urban and community settings, and to know the factors affecting their health and survival.
- To understand the economic value of forests and know many of the products they provide to people and society.

Total hours: 45 Credit: 5

UNIT I**(9 HOURS)**

General introduction to forests- Natural and man made; Tropical, temperate, evergreen, semi ever green and deciduous forests.

UNIT II:**(9 HOURS)**

Silviculture – concept, scope; clear felling, uniform shelter, wood selection, coppice and conservation systems. Silviculture of some of the economically important species in India- *Eucalyptus* and *Dalbergia sisso*.

UNIT III**(9 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* and *Aegle marmelos*.

UNIT IV**(9 HOURS)**

Forest laws, necessity, General principles, Indian forest act 1927, Forest conservation act 1980, Wild life protection act 1972 and their amendments.

UNIT V**(9 HOURS)**

Forest resources and utilization. Definition and scope (brief outline). Major forest products - Timber- teak, Pulp wood - bamboo. Non-timber forest products (NTFPS)-Fruits, honey, Gums, resins, medicinal plants and canes – Marketing.

TEXTBOOKS

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.
3. Sharma, P.D. 2004. Ecology and Environment 2004. Rastogi Publications, Meerut
4. Tiwari.K.M. 1983. Social forestry in India.

REFERENCES

1. Kollmann and Cote 1988. Wood Science and Technology. Vol.I & II Springer verlag.
2. Singh, M.P. and Vinita Vishwakarma.1997. Forest Environment and Biodiversity. Daya Publishing House, New Delhi
3. Gray L.Rolfe, Johan, M. Edging Ton, I. Irving Holland and Gayle C. Fortenberry. 2005. Forests and Forestry. International book distributing Co., Lucknow.
4. B.S.Chundawat & S.K. Gautams-1996. Textbook of Agroforestry. Oxford and IBH Publishing Co., Pvt. Ltd., Kolkatta

UBO-28
SEMESTER V
Elective -1- MEDICINAL PLANTS

13UBO5E1

Objectives

- To study the secondary metabolites in medicinal plants
- To analyze the cultivation and trading of medicinal plants.

Total hours: 45

Credit: 5

UNIT I

(9 HOURS)

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

UNIT II

(9 HOURS)

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

UNIT III

(9 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

(9 HOURS)

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

UNIT V

(9 HOURS)

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

TEXTBOOKS

1. Trease G.e. and Evans, W.C. 1978. Pharmacognosy. Bailliere Trinda, London.
2. Shah, C.S. and J.S. Qudry. 1995. A textbook Pharmacognosy. 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 Pharmacognosy (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 Pharmacognosy. Emky Publications, New Delhi.

UBO-29
SEMESTER- VI

13UBO6E2

Elective -2 – FOOD SCIENCE

Objectives

- To know about the food groups.
- To understand the food processing technology.

Total hours: 75

Credit: 5

UNIT I

(15 HOURS)

Food groups: basic groups- basic four, five and seven, food inn 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

(15 HOURS)

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

UNIT III

(15 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

(15 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.

UNIT V

(15 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

TEXTBOOKS

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.

Elective - 2- BIOTECHNOLOGY**Objectives**

- To know the principles employed in the production of bioproducts.
- To have the comprehensive understanding about the tools available for the production of biogoods.

Total hours: 75**Credit: 5****UNIT I****(15 HOURS)**

History, scope, importance and basic branches. Genetic engineering - gene cloning procedure, isolation of specific genes, Enzymes used in gene cloning - polymerases, restriction endonucleases, ligases and reverse transcriptase.

UNIT II**(15 HOURS)**

Vectors for gene cloning - plasmids, phages, cosmids, BAC and YAC. Gene cloning in *Agrobacterium*.. Methods of direct gene transfer - electroporation, micro injection and liposomes mediated DNA delivery. Genetically Engineered Microorganisms-Insulin producing *E. coli*.

UNIT III**(15 HOURS)**

Basic techniques and working principles of PCR, and DNA finger printing techniques. Blotting techniques - Southern, Northern and Western, agarose gel electrophoresis; Monoclonal Antibodies.

UNIT IV**(15 HOURS)**

Biofertilizers – Advantages, mass cultivation and application techniques of *Rhizobium*, and *Azospirillum*. Blue green algae (*Nostoc*), Phosphobacteria, *Azolla* and VAM.

UNIT V**(15 HOURS)**

Wastewater treatment, recycling water for food and feed. Treatments 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.

TEXTBOOKS

1. Dubey. R.C. 1996. A Text Book of Biotechnology. Rastogi Publications, Meerut.
2. Kumaresan, V.K. Biotechnology. 2003. Saras Publications, Kanyakumari.

REFERENCES

1. Ignacimuthu, S. 1996. Applied Plant Biotechnology. Tata McGraw Hill Publishing Company Ltd., New Delhi.
2. Ignacimuthu, S. 1996. Basic Biotechnology. 1996. Tata McGraw Hill Publishing Company Ltd., New Delhi.
3. Ignacimuthu, S. 1997. – Plant Biotechnology. Tata McGraw Hill Publishing Company Ltd., New Delhi.
4. Gupta, P.K. 2004. Elements of Biotechnology, 2004. Rastogi Publications, Meerut.
5. Chhatwal. 1995. Text book of biotechnology. Anmol Publications Pvt. Ltd., New Delhi.

Elective-3 – PHARMACOGNOSY**Objectives**

- To study the drug development from plants.
- To understand the traditional systems of medicines like Ayurveda, Siddha & Unani.

Total hours: 75**Credit: 5****UNIT I****(15 HOURS)**

Definition History and scope of Pharmacognosy. Study of various system of classification of drugs. Traditional system of medicines (Siddha, Ayurveda and Unani).

UNIT II**(15 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**(15 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**15 HOURS)**

Kinds of drugs of plant origin. Phenols, Resins, Alkaloids and Vitamins.

UNIT V**(15 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, castor oil

TEXT BOOKS

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

REFERENCES

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

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SEMESTER IV

14UBO4S2

Skill Based Subject - II- PLANT TISSUE CULTURE – CONCEPTS AND APPLICATIONS

Objectives:

- To reproduce the rare endemic & endangered plants from tissue culture techniques.
- To gain the theoretical knowledge on gene manipulation for the manufacturing of biogoods.

Total hours: 30

Credit: 3

UNIT I

(6 HOURS)

Conventional plant breeding methods – Selection – Mass, Pure line, Pedigree, Hybridization and Mutation. Tissue culture – concepts and applications.

UNIT II

(6 HOURS)

Organization of tissue culture lab- Medium preparation - MS and White's media. Sterilization techniques, Micro propagation – callus, suspension culture and hardening.

UNIT III

(6 HOURS)

Somaclonal variation, somatic embryogenesis, embryo culture, protoplast isolation and fusion, somatic hybridization- hybrids and artificial seeds.

UNIT IV

(6 HOURS)

Haploid plants – anther culture, pollen culture, Ti, Ri plasmids and T-DNA-structure. Use of Ti and Ri vectors.

UNIT V

(6 HOURS)

Transgenic plants – methods of gene transfer – physical methods – *Agrobacterium* mediated gene transfer and virus mediated gene transfer. Transgenic in crop improvement – resistance to biotic stresses and abiotic stresses.

TEXTBOOKS

1. Gupta, P.K. 1996. Elements of Biotechnology. Rastogi Publications, Meerat.
2. Kumaresan, V.K. Biotechnology. 2003. Saras Publications, Kanyakumari.
3. Razdon, M.K. 2003. Plant Tissue Culture. Oxford and IBH Publishing Co. (P) Ltd., New Delhi.

REFERENCES

1. Chawla, H.S. 1998. Biotechnology in crop improvement by International Book Distributors, Dehra Dun.
2. H.K. Choudhri, H.K. 2005. Elementary principles of Plant Breeding. Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi.
3. Chawla, H.S. 2002. Introduction to Plant Biotechnology. Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi.

Skill Based Subject – III – MUSHROOM CULTIVATION AND MARKETING

Objectives

- To know the techniques available for Mushroom Cultivation and Marketing.
- The ultimate goal is to develop an easy and efficient method to grow tropical edible mushrooms by using locally available substrates and popularize mushroom cultivation among local people thereby helping them in attaining good health and providing opportunity for income generation.

Total hours: 30

Credit: 3

UNIT I

(6 HOURS)

History and introduction. Systematic position, morphology, distribution, structure, reproduction, and life cycle of *Agaricus* and *Pleurotus*.

UNIT II

(6 HOURS)

Nutritional value, medicinal value and advantages – types – milky, button and poisonous mushrooms.

UNIT III

(6 HOURS)

Cultivation: Paddy straw mushroom – substrate, spawn making. Methods – Bed method, Polythene bag method. Field cultivation, Oyster mushroom cultivation – substrates spawning. Pretreatment of substrate spawning. Maintenance of mushroom. Cultivation of white button mushroom – spawn, composting, spawning, harvesting.

UNIT IV

(6 HOURS)

Disease-Bacterial and fungal diseases and common pests, prevention and control measures. Processing- blanching, steeping, sun drying, canning, pickling and freeze drying. Storage – short term and long term storage.

UNIT V

(6 HOURS)

Common Indian mushrooms. Production level, economic return, foreign exchange from mushroom cultivation countries and international trade.

TEXTBOOKS

1. Kumaresan, V. 2001. Biotechnology. Saras-publication, Nagarcoil.
2. Gupta, P.K. 2004. Elements of biotechnology. Rastogi publication, Meerut.
3. Singh, B.D. 2002. Biotechnology. Kalyani Publishers, New Delhi.
4. Pandey, B.P. 1996. A text book of fungi. Chand & Co., New Delhi.

REFERENCES

1. Alexopoulos, C.J. and C.W. Mims. 1985. Introductory Mycology. Wiley Easternlin.
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.

Skill Based Subject –IV - CULTIVATION AND MARKETING OF MEDICINAL PLANTS

Objectives

- To promote and undertake research, development and extension services in the field of medicinal crop plants.
- To understand the medicinal values marketing and their importance in Pharmaceutical industries.

Total hours: 30 Credit: 3

UNIT I

(6 HOURS)

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

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, Root- *Asparagus racemosus* Twigs- *Adathoda vasica*,

UNIT IV

(6 HOURS)

Cultivation of Medicinal Plants: Leaves- *Aloe vera*, and *Eucalyptus*. Bark - *Cinchona, cinnamon*. Flower bud- *Schiziyium*. Fruits- *Phyllanthus emblica*. Seeds- *Gloriosa superba*.

UNIT V

(6 HOURS)

Marketing Scenario of Medicinal Plants – Domestic Market, Global Market, and Export. Standard and Quality control (Constraints). New Hopes for Herbal Market and Challenges Ahead. Future strategy for Medicinal plants.

TEXT BOOK

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. Pharmacognosy Bailliere, Tindall Esaibolarna. 1983.

REFERENCES

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

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KONGUNADU ARTS AND SCIENCE COLLEGE (Autonomous)
COIMBATORE – 641 029
UG / PG MODEL QUESTION PAPER (THEORY)

End semester Examination Question Paper Pattern
(For the candidates admitted from the academic year 2013-14 onwards)

Time: 3 Hours

Marks: 75 Marks

Answer all the following questions

SECTION – A **(10 × 1 = 10)**

(10 questions)

(Two questions from each UNIT. Questions shall be in the form of Multiple Choices)

SECTION – B **(5 × 5 = 25)**

Five questions either or type
(One question from each UNIT)

SECTION – C **(5 × 8 = 40)**

Five questions either or type
(One question from each UNIT)

TOTAL **75 Marks**

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SEMESTER VI
PROJECT WORK AND VIVA-VOCE
MARKS DISTRIBUTION

14UBO6Z1

	Marks
Project Report	60
Viva-Voce	20
Internal	20
Total	100