

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI - 600 086
B.Sc. DEGREE : BRANCH V. A. - PLANT BIOLOGY AND PLANT BIOTECHNOLOGY
COURSES OF STUDY OFFERED
 (Effective from the academic year 2011 - 2012)
CHOICE BASED CREDIT SYSTEM

Subject Code	Title of Course	Credits	Total Hours			Exam Hours	Marks		
			Lecture Hours (L)	Tutorial Hours (T)	Practical Hours (P)		Continuous Assessment	End Semester	Maximum
Semester - 1									
11BT/MC/AF14	Algae, Fungi and Lichens	4	4	1	0	3	50	50	100
11BT/MC/FB14	Algal and Fungal Biotechnology	4	4	1	0	3	50	50	100
11BT/MC/P112	Algae, Fungi and Lichens - Practicals	2	0	0	3	3	50	50	100
Allied Core Offered to the Department of Zoology									
11BT/AC/GB13	General Botany - I	3	3	0	0	3	50	50	100
11BT/AC/P111	General Botany - I Practical	1	0	0	2	2	50	50	100
Semester - 2									
11BT/MC/BP24	Bryophytes, Pteridophytes and Gymnosperms	4	4	1	0	3	50	50	100
11BT/MC/P222	Bryophytes, Pteridophytes and Gymnosperms - Practicals	2	0	0	3	3	50	50	100
11BT/ME/HC23	Horticulture (Skill Development Course)	3	3	1	0	3	50	50	100
OR									
11BT/ME/FH23	Food Microbiology, Sanitation and Hygiene	3	3	0	1	3	50	50	100
Allied Core Offered to the Department of Zoology									
11BT/AC/GB23	General Botany - II	3	3	0	0	3	50	50	100
11BT/AC/P221	General Botany - II Practical	1	0	0	2	2	50	50	100
11BT/GC/ES22	Environmental Studies	2	2	0	0	-	50	-	100
Semester - 3									
11BT/MC/TE34	Taxonomy of Angiosperms and Economic Botany	4	4	1	0	3	50	50	100
11BT/MC/PE33	Phytotherapy and Ethnobotany	3	3	1	0	3	50	50	100
11BT/MC/P332	Taxonomy of Angiosperms and Economic Botany - Practicals	2	0	0	3	3	50	50	100
Semester - 4									
11BT/MC/AE44	Anatomy and Embryology of Angiosperms	4	4	1	0	3	50	50	100
11BT/MC/P442	Anatomy and Embryology of Angiosperms - Practicals	2	0	0	3	3	50	50	100
11BT/SL/PP42	Plants and People	2	2	0	0	-	50	-	100

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI - 600 086
B.Sc. DEGREE : BRANCH V. A. - PLANT BIOLOGY AND PLANT BIOTECHNOLOGY
COURSES OF STUDY OFFERED
 (Effective from the academic year 2011 - 2012)
CHOICE BASED CREDIT SYSTEM

Semester - 5									
11BT/MC/CB54	Cell Biology	4	4	1	0	3	50	50	100
11BT/MC/MB54	Microbiology	4	4	1	0	3	50	50	100
11BT/MC/EE54	Ecology and Environmental Biotechnology	4	4	1	0	3	50	50	100
11BT/MC/P553	Cell Biology, Microbiology, Ecology and Environmental Biotechnology - Practicals	3	0	0	6	3	50	50	100
11BT/ME/BI53	Bioinstrumentation	3	3	1	0	3	50	50	100
OR									
11BT/ME/FN53	Fruit Preservation and Nutrition (Skill Development Course)	3	3	1	0	3	50	50	100
Semester - 6									
11BT/MC/PP64	Plant Physiology	4	4	1	0	3	50	50	100
11BT/MC/ML64	Molecular Biology	4	4	1	0	3	50	50	100
11BT/MC/GG64	Genetics and Genetic Engineering	4	4	1	0	3	50	50	100
11BT/MC/AB64	Applied Biotechnology	4	4	1	0	3	50	50	100
11BT/MC/P662	Plant Physiology, Genetics and Genetic Engineering, and Applied Biotechnology - Practicals	2	0	0	4	3	50	50	100
General Elective Courses									
11BT/GE/HT32	Herbal Therapy	2	2	0	0	-	50	-	100
11BT/GE/FP32	Fruit Preservation	2	2	0	0	-	50	-	100
11BT/GE/FH44	Fundamentals of Horticulture	4	4	0	0	3	50	50	100
11BT/GE/WM44	Waste Management	4	4	0	0	3	50	50	100
11BT/GE/PL44	Plants in Everyday Life	4	4	0	0	3	50	50	100
Independent Elective Courses									
11BT/UI/FR23	Forestry	3	-	-	-	3	-	50	100

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI – 600 086

B.Sc. DEGREE: BRANCH V.A. PLANT BIOLOGY AND PLANT BIOTECHNOLOGY

SYLLABUS

(Effective from the academic year 2011 – 2012)

ALGAE, FUNGI AND LICHENS

CODE: 11BT/MC/AF 14

CREDITS: 4

L T P: 4 1 0

TOTAL TEACHING HOURS: 65

OBJECTIVES

- To enable students know the diverse assemblage of lower plants.
- To learn the life cycle patterns of lower plants.

ALGAE

Unit 1 (10 Hrs)

- 1.1. Classification of Algae (Bold and Wynne, 1978)
- 1.2. Characteristics of Algal Divisions

Unit 2 (24 Hrs)

Detailed study of the thallus organization, reproduction and life cycle pattern of the following forms (no development)

- 2.1. Cyanochloronta - *Nostoc*
- 2.2. Chlorophycophyta - *Volvox*, *Ulva*, *Caulerpa* and *Cladophora*.
- 2.3. Charophyta - *Chara*
- 2.4. Phaeophycophyta - *Sargassum*
- 2.5. Rhodophycophyta - *Polysiphonia*

FUNGI

Unit 3 (8 Hrs)

- 3.1. Classification of Fungi (Alexopoulos and Mims, 1979)
- 3.2. Characteristics of major fungal classes.

Unit 4 (18 Hrs)

Detailed study of the thallus organization, reproduction and life cycle pattern of the following forms (no development)

- 4.1. Chytridiomycetes - *Synchytrium*
- 4.2. Plasmodiophoromycetes - *Plasmodiophora*
- 4.3. Oomycetes - *Albugo*
- 4.4. Ascomycetes - *Aspergillus* and *Peziza*
- 4.5. Basidiomycetes - *Polyporus* and *Puccinia*
- 4.6. Deuteromycetes - *Cercospora*

LICHENS

Unit 5

(5 Hrs)

5.1. Lichens: Types, Structure, Reproduction and importance.

TEXT BOOKS

Sharma, O.P. Text book of Algae. New Delhi: Tata McGraw - Hill Publishing Co.Ltd., 1986

Sharma, O.P., Text book of Fungi. New Delhi: Tata McGraw - Hill Publishing Co.Ltd., 1986

BOOKS FOR REFERENCE

Alexopoulos, C. J. Introductory Mycology. New York: John Wiley and Sons Inc., 1962

Bold, H. C. and M.J.Wynne, Introduction to Algae. New Delhi: Prentice Hall of India Pvt. Ltd., 1979

Bold, H.C , Morphology of Plants. New York : Harper & Row Publishers, 1973

Chapman, V. J. and Chapman D. J. The Algae, London: Macmillan & Co., 1973

Dube. H.C. A Text Book of Fungi, Bacteria and Viruses. New Delhi: Vikas Publishing House, 1985.

Ingold, C. T. Biology of Fungi. London: Hutchinson Educational Ltd., 1993.

Misra, A. and Agarwal A. A. Lichens- A Preliminary Text. London: Oxford and IBH Publishing Co, 1978.

Morris, I. An Introduction to Algae. London: Hutchinson University Library, 1967.

Sharma, P.D., Fungi and Allied Organism. New Delhi: Narosa Publishers, 2005.

Smith, G.M. Manual of Phycology. New York: McGraw-Hill Publishing Co., 1955

END SEMESTER EXAMINATION

Total Marks: 100

Duration: 3 Hours

QUESTION PAPER PATTERN

Section A – 18 x 1 = 18 marks (All 18 questions to be answered)

6 x 3 = 18 marks (6 out of 9 questions to be answered)

Section B – 4 x 6 = 24 marks (4 out of 6 questions to be answered in 200 words each)

Section C – 2 x 20 = 40 marks (2 out of 4 questions to be answered in 1000 words each)

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI – 600 086

B.Sc. DEGREE: BRANCH V. A. PLANT BIOLOGY AND PLANT BIOTECHNOLOGY

SYLLABUS

(Effective from the academic year 2011 – 2012)

ALGAL AND FUNGAL BIOTECHNOLOGY

CODE: 11BT/MC/FB 14

CREDITS: 4

L T P: 4 1 0

TOTAL TECHING HOURS: 65

OBJECTIVES

- To gain an insight into the applied aspects of Algology and Mycology.
- To give an experiential learning to the students in the technological applications of Algae and Fungi.
- Sensitise students on the commercial feasibility of Algology and Mycology.

Algal Biotechnology

Unit 1 (15 Hrs)

Introduction

- 1.2. Mass cultivation of *Spirulina*: Nutraceutical and Pharmaceutical applications
- 1.3. Agarophytes-Agar Agar, Alginophytes - Algin and Carrageenophytes-Carrageenan
- 1.4. Preparation of Agar, Alginate beads- Immobilization techniques (Demonstration only)

Unit 2 (15 Hrs)

- 2.1. Cultivation of *Nostoc / Anabaena* and extraction of pigments(practical).
- 2.2. Algal Biofertilizer: Carrier based and Liquid seaweed fertilizer (LSF) Methodology and applications.
- 2.3. Antimicrobial activity of a few Marine and Fresh water algal extracts (Demonstration only)
- 2.4. Algae in bioremediation and waste water treatment: Industrial effluent and Domestic waste.
- 2.5. Algal biofuel

Fungal Biotechnology

Unit 3 (15 Hrs)

- 3.1. Mushrooms: Morphology, Types - *Pleurotus sp.*, *Agaricus sp.* and *Volvariella sp.* Identification of edible and poisonous mushrooms, Nutritive value
- 3.2. Cultivation – *Pleurotus sp. and Agaricus sp.* -Isolation, Spawn production, Growth Media, Spawn running, Harvest and uses.
- 3.3. Mushroom cultivation - *Pleurotus sp.* (Practical)

Unit 4 **(15 Hrs)**

- 4.1. Antibiotics: Penicillin - Strain Selection, Media, Fermentation, Harvest, Recovery and Uses.
- 4.2. Organic acid: Citric acid - Production, Recovery and Industrial applications.
- 4.3. Growth of *Penicillium* sp. (Practical)
- 4.4. Citric acid preparation. (Practical)

Mycorrhiza

Unit 5 **(5Hrs)**

- 5.1. Morphology and types
- 5.2. Application in forestry

BOOKS FOR REFERENCE

Bold, H.C. and M.J.Wynne, Introduction to Algae. New Delhi: Prentice Hall of India Pvt. Ltd., 1979.

Dhawan, V., Biotechnology for Food and Nutritional Security. India: TERI, 2004.

Ingold, C.T., Biology of Fungi, London: Hutchinson Educational Ltd., 1993.

Nair, L.N., Topics in Mycology and Pathology. India: New Central Book Agency Pvt., Ltd. Kolkata, 2007.

Patel, A.H., Industrial Microbiology. New Delhi: Macmillan India Limited, 1999.

Prescott and Dunn. Industrial Microbiology. USA: The AVI Publishing Co., Inc., 1987.

END SEMESTER EXAMINATION

Total Marks: 100

Duration: 3 Hours

QUESTION PAPER PATTERN

Section A – 18 x 1 = 18 marks (All 18 questions to be answered)

6 x 3 = 18 marks (6 out of 9 questions to be answered)

Section B – 4 x 6 = 24 marks (4 out of 6 questions to be answered in 200 words each)

Section C – 2 x 20 = 40 marks (2 out of 4 questions to be answered in 1000 words each)

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI – 600 086

B.Sc. DEGREE: BRANCH V. A. PLANT BIOLOGY AND PLANT BIOTECHNOLOGY

SYLLABUS

(Effective from the academic year 2011 – 2012)

ALGAE, FUNGI AND LICHENS - PRACTICALS

CODE: 11BT/MC/P1 12

CREDITS: 2

L T P: 0 0 3

TOTAL HOURS: 39

ALGAE

Study of the forms mentioned in the theory syllabus.

Visit to places of phycological importance.

Herbarium - Algal specimens (minimum 3 sheets) to be submitted at the time of examination.

FUNGI

Study of the forms mentioned in the theory syllabus.

Herbarium - Fungal disease plants (minimum 2 sheets) to be submitted at the time of examination.

LICHENS

A general study of various types of Lichens.

END SEMESTER EXAMINATION

PATTERN OF EVALUATION

Duration: 3 hrs

Marks: 50

- | | |
|--|------------|
| 1. Sectioning, Drawing, identification with reasons (1 algae, 1 fungi) | 2 x 7 = 14 |
| 2. Spotters (4) | 4 x 4 = 16 |
| 3. Algal Mixture | 5 |
| 4. Spot at sight | 10 |
| 5. Herbarium (Algae – 3, fungi – 2) | 5 |

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI – 600 086

**Allied Core Offered by the Department of Botany
to students of Advanced Zoology and Biotechnology**

SYLLABUS

(Effective from the academic year 2011 – 2012)

GENERAL BOTANY – I

CODE: 11BT/AC/GB 13

CREDITS: 3

L T P: 3 0 0

TOTAL TEACHING HOURS: 39

OBJECTIVES

- To gain knowledge on the salient features of few families and to know their economic importance.
- To understand the structural details of the simplest groups of the plant kingdom.

Unit 1 (12 Hrs)

Taxonomy

- 1.1. A general outline of Bentham and Hooker's classification
- 1.2. A study of the salient features of the following families and their economic importance
 - a. Annonaceae b. Cucurbitaceae
 - c. Apocynaceae d. Lamiaceae
 - e. Amaranthaceae f. Arecaceae

Unit 2 (7 Hrs)

Anatomy

- 2.1. Secondary growth in typical dicot stem and root
- 2.2. Anomalous structure of *Nyctanthus* and *Boerhaavia*

Unit 3 (15 Hrs)

Algology and Mycology

- 3.1. Salient features of the characteristic features of Algae
- 3.2. A detailed study of the life cycle of the following algae (no development)
 - a. *Nostoc* b. *Chara* c. *Sargassum*.
- 3.3. Salient features of the characteristic features of Fungi
- 3.4. A detailed study of the life cycle of the following fungi (no development)
 - a. *Rhizopus* b. *Aspergillus* c. *Polyporus*

Unit 4 (5 Hrs)

Plant Pathology

- 4.1 A study of the causal organism, symptoms and control measures of the following plant diseases: Citrus Canker and Tikka Disease of Groundnut

TEXT BOOK

Rao, K. N., and R.V.Narayanaswamy, Ancillary Botany. Madras: S.Vishwanathan Printers and Pub., 1986

BOOKS FOR REFERENCE

Sharma,O.P. Text book of Algae. New Delhi: Tata McGraw - Hill Publishing Co. Ltd 1986.

Sharma,O.P. Text book of Fungi, New Delhi: Tata McGraw - Hill Publishing Co.Ltd. 1986.

Singh, V., P.C.Pande and D.K.Jain: Anatomy of Seed Plants. India: Rastogi Publications, Meerut, 1996.

END SEMESTER EXAMINATION

Total Marks: 100

Duration: 3 Hours

QUESTION PAPER PATTERN

Section A – Objective questions 18 x 1 = 18 marks

Short Paragraph 6 x 3 = 18 marks (6 out of 9)

Section B – 4 x 6 = 24 marks (4 out of 6 questions to be answered in 200 words each)

Section C – 2x 20 = 40 marks (2 out of 4 questions to be answered in 1000 words each)

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI – 600 086

**Allied Core Offered by the Department of Botany
to students of Advanced Zoology and Biotechnology**

SYLLABUS

(Effective from the academic year 2011 – 2012)

GENERAL BOTANY – I PRACTICAL

CODE:11 BT/AC/P1 11

CREDIT: 1

L T P: 0 0 2

TOTAL HOURS: 26

Unit 1

Taxonomy

Description in technical terms of plants belonging to the families mentioned in the syllabus.

Dissection of flowers, observation and sketching of floral parts, construction of floral diagram and floral formula

Unit 2

Anatomy

Preparation of suitable sections of angiosperm material included in the Syllabus and their interpretation

Unit 3

Algology and Mycology

Identification, observation and sketching of types included in the syllabus

Unit 4

Plant Pathology

Citrus canker, Tikka disease

END SEMESTER EXAMINATION

PATTERN OF EVALUATION

Duration: 2 hrs

Marks: 50

1. Taxonomy – Description (1)	10
2. Anatomy – Sectioning & Identification (1)	10
3. Spotters (5) – 5 x 5	25
4. Pathology specimen	5

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI – 600 086

**Independent Elective Course Offered by Department of Botany
for
B A. / B.Sc. / B.Com Degree Programmes**

SYLLABUS

(Effective from the academic year 2011 – 2012)

FORESTRY

CODE: 11BT/UI/FR 23

CREDITS: 3

OBJECTIVES

- To enable the student to acquire knowledge on the wealth of forests of India.
- To impart knowledge and develop understanding on biodiversity, conservation and agroforestry.

Unit 1: Forest types

- 1.1. Major forest types in India with special reference to Tamil Nadu
- 1.2. Occurrence and Distribution
- 1.3. Forests as centers of Biodiversity
- 1.4. Biodiversity Hotspots

Unit 2 : Protection Forestry

- 2.1. conservation- *in situ* and *ex situ*.
- 2.2. Natural forest policy, Forest conservation act
- 2.3. National sanctuaries, National parks and Biosphere reserves
- 2.4. Role of people: Chipko movement

Unit 3: Commercial Forestry

- 3.1. Forests as sources of timber
- 3.2. Nonwood forest products: fodder, food, oil, fiber, paper and medicine.

Unit 4: Social Forestry

- 4.1. Agroforestry- Afforestation and reforestation programmes
- 4.2. Ecological benefit
- 4.3. Deforestation: causes and consequences
- 4.5. Plantation forestry

Unit 5: Silviculture

- 5.1. Artificial and natural regeneration of some important forest plants: Teak and Casurina
- 5.2. Forest education and management.

BOOKS FOR REFERENCE

- Bruce Alan. Forest products biotechnology. Taylor & Francois. 2005
- Jha,L.K . Forestry for the people. New Delhi: Ashish publishers. 1994.
- Powell, Baden B.H. Manual of Forest Law. New Delhi: Biotech books. 2004.
- Puri,G S . Forest Ecology. New Delhi : Oxford & IBH. 1986.
- Raju R.A. Forest Wealth of India. New Delhi: Today & Tomorrow. 1986.
- Sharma P.D.Ecology and Environment. Meerut: Rastogi Publications. 1997.
- Shukla R.S. Forestry for Tribal Development. New Delhi:.Wheeler. 1997.
- Vyas, G P D. Community Forestry. Agrobios. 2006.

END SEMESTER EXAMINATION

Total Marks: 100
Hours

Duration: 3

QUESTION PAPER PATTERN

Section A –10 X 3 = 30 marks (10 out of 13 questions to be answered in 50 words)

Section B – 5x 6 = 30 marks (5 out of 8 questions to be answered in 200 words each)

Section C – 2 x 20 = 40 marks (2 out of 4 questions to be answered in 1000 words each)

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI – 600 086

**Allied Core Offered by the Department of Botany
to students of Advanced Zoology and Biotechnology**

SYLLABUS

(Effective from the academic year 2011 – 2012)

GENERAL BOTANY – II

CODE:11 BT/AC/GB 23

CREDITS: 3

L T P: 3 0 0

TOTAL TEACHING HOURS: 39

OBJECTIVES

- To enable the students to understand the physiological activities occurring in plants.
- To impart basic knowledge on the structure, organization, reproduction and life cycle of lower plants.

Unit 1

(12 Hrs)

Physiology

- 1.1. Photosynthesis - Light Reaction: Red drop, Emerson enhancement effect, pigment system I and II, phosphorescence, Fluorescence, cyclic and non cyclic photo phosphorylation. Dark Reaction: C₃ and C₄
- 1.2. Respiration – Aerobic: Glycolysis, Krebs cycle, Organization of the respiratory chain, electron transport pathway and oxidative phosphorylation. Anaerobic fermentation.
- 1.3. Growth Hormones - Auxins, Gibberellins, Cytokinins, ABA and Ethylene- Practical applications

Unit 2

(14 Hrs)

Bryophyta , Pteridophyta and Gymnospermae

- 2.1. Salient features of Bryophyta ,Pteridophyta and Gymnospermae
- 2.2. A detailed study of the life cycle (no development) of *Funaria*.
- 2.3. A detailed study of the life-cycle (no development) of *Adiantum*
- 2.4 A detailed study of the life-cycle (no development) of *Cycas*

Unit 3

(7Hrs)

Applied Botany I

- 3.1. Bonsai technique
- 3.2. Cut flower, flower arrangement: Fresh and dry

Unit 4

(6 Hrs)

Applied Botany II

4.1. Principles of Plant tissue culture

4.2. Oyster Mushroom cultivation

TEXT BOOK

Rao, K. N., and Narayanaswamy, R.V. Outlines of Botany. Madras: S.Viswanathan Printers and Pub. 1986.

BOOKS FOR REFERENCE

Verma, S.K. Plant Physiology and Biochemistry. New Delhi: S Chand and Company Ltd.2000.

Sinha,R.K. Modern Plant Physiology. New Delhi: Narosa Publishing House.2006.

Kumar, N. Introduction to Horticulture. Nagercoil: Rohini Agencies.1980.

Janick, J. Horticultural Science, (3rd Ed.). New Delhi: Surgeet Publications.1982

Verma. V.Text Book of Plant Physiology. New Delhi: Emkay Publications.1989.

Vidyarthi, R.D. Text Book of Botany. New Delhi: S.Chand and Co.Ltd. 1992.

END SEMESTER EXAMINATION

Total Marks: 100

Duration: 3 Hours

QUESTION PAPER PATTERN

Section A – Objective questions 18 x 1 = 18 marks

Short Paragraph 6 x 3 = 18 marks (6 out of 9)

Section B – 4 x 6 = 24 marks (4 out of 6 questions to be answered in 200 words each)

Section C – 2x 20 = 40 marks (2 out of 4 questions to be answered in 1000 words each)

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI – 600 086

**Allied Core Offered by the Department of Botany
to the students of Advanced Zoology and Biotechnology**

SYLLABUS

(Effective from the academic year 2011 – 2012)

GENERAL BOTANY – II PRACTICAL

CODE: 11BT/AC/P221

CREDIT: 1

L T P: 0 0 2

TOTAL HOURS: 26

Unit 1

Physiology

Physiological experiments included in the syllabus – Observation and interpretation.

Individual experiments:

1. Rate of photosynthesis with varying intensity and quality of light
2. Rate of respiration using respiroscope

Unit 2

Bryophyta

Identification, observation and sketching of type included in the syllabus

Pteridophyta and Gymnospermae

Preparation of suitable sections of forms included in the syllabus and their interpretation.

END SEMESTER EXAMINATION

PATTERN OF EVALUATION

Duration: 2hrs

Marks: 50

- | | | |
|----|--|----|
| 1. | Pteridophyte and Gymnosperm (1 each)
Sectioning & Identification (2 x 10) | 20 |
| 2. | Individual experiment : Physiology | 10 |
| 3. | Spotters (5) – 5 x 4 | 20 |

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI – 600 086

B.A. / B.Sc. / B.Com / B.C.A. / B.V.A. / B.S.W. DEGREE

SYLLABUS

(Effective from the Academic Year 2011 – 2012)

ENVIRONMENTAL STUDIES

CODE : 11__ /GC/ES 12

CREDIT : 2

L T P : 2 0 0

TOTAL TEACHING HOUR : 26

OBJECTIVES OF THE COURSE

- To create an awareness about Current environmental issues
- To educate the students about conservation and management of natural resources
- To make the students ecosensitive and ecofriendly.

Unit 1 (6 Hrs)

Introduction

- 1.1 Components of the environment – Classification and characteristics of resources – Renewable and non – renewable resources
- 1.2 Need for Public awareness in conservation of natural resources
- 1.3 Energy Flow in ecosystems – aquatic and terrestrial – food chain and food web.

Unit 2 (10 Hrs)

Pollution and Socio Economic Aspects of the Environment

- 2.1. Types of pollution – Air, Water, Solid Waste, Noise
- 2.2. Problems - green house effect – depletion of the ozone layer – climate change
- 2.3. Bio diversity - Definition - Loss of bio diversity – Threats to biodiversity and Conservation of biodiversity.
- 2.4. Human behaviour: - Population – urbanization – poverty (as cause and result of pollution and degradation)
- 2.5. Technology: - Agriculture and industry – deforestation. Use, Misuse and Abuse of the resources
- 2.6. Effects and consequences of environmental problems.

Unit 3 (10 Hrs)

Sustainable Development, Remedies and Policy Implications

- 3.1 Environmental disasters natural and human made – Bhopal gas Tragedy – Chernobyl Accident – Fukushima Nuclear Crisis - Gulf War – Love Canal Episode – Tsunami – Volcanic eruptions.
- 3.2 Methods evolved to measure and check environmental degradation and pollution – carbon footprint, carbon credit, ecological footprint, and ecological shadow.
- 3.3 Environmental movements in India – Chipko movement, Narmada bachao Andolan, Sethu Samudram Project
- 3.4 Environmental Acts – Policy measures with respect to India.

3.5 International environmental agreement – Stockholm Conference – Montreal protocol – RIO Meet – Kyoto Conference – UN conference on Climate change (Copenhagen)

Field visit

Eco initiatives at the campus : Garbage segregation and Vermicomposting – Graywater recycling – Rainwater harvesting – Solar powered lights – Bio diversity.

TEXT BOOK

Bharucha, E., Textbook of Environmental Studies, (1st edition), Hyderabad, Universities Press, 2005.

BOOKS FOR REFERENCE

Ignacimuthu, S. Environmental Awareness and Protection, New Delhi., Phoenic Publishing House, 1997.

Jadhav, H and V. M. Bhosale. Environmental Protection and Laws, New Delhi, Himalaya Publication House, 1995.

Odum, E.P. Fundamentals of Ecology, W.B. Sauders Co., U.S.A. 1971.

Mies, M. and V. Shiva. Ecofeminism, London. Zed Books, 1989.

Singh, H.R., Environmental Biology, (1st edition), New Delhi, S.Chand and Co., Ltd., 2005.

PATTERN OF EVALUATION (Totally Internal)

CONTINUOUS ASSESSMENT (CA): One Hour Test – 25 Marks
One Component – 25 Marks

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI - 600 086

B.Sc. DEGREE: BRANCH V.A. PLANT BIOLOGY AND PLANT BIOTECHNOLOGY

SYLLABUS

(Effective from the academic year 2011 - 2012)

FOOD MICROBIOLOGY, SANITATION AND HYGIENE

CODE : 11BT/ME/FH 23

CREDITS : 3

L T P : 3 0 1

TOTAL TEACHING HOURS : 52

OBJECTIVES OF THE COURSE

- To provide a broad based education about the microbiological aspects of food.
- To impart skill oriented training on food microbiology and enhancing the practical knowledge through experiential learning
- To impart knowledge about the sources and transmission of food contamination and the effects of spoilage.
- To highlight the importance of hygiene, sanitation and safe food storage.

Unit 1 (12 Hrs)

Introduction

- 1.1 General characteristics-Bacteria, Fungi.
- 1.2 Instruments in microbiology – Lab work
- 1.3 Grams staining – Lab work

Unit 2 (6 Hrs)

Micro-organisms

- 2.1 Microbial growth – growth curve of bacteria
- 2.2 Effect of environmental factors on growth of micro-organisms: pH, oxygen availability, temperature

Unit 3 (20Hrs)

Food contamination and spoilage

- 3.1 Cereals
- 3.2 Vegetables and fruits
- 3.3 Milk - Methylene blue reduction test— Lab work
- 3.4 Culture techniques – determination of microbial load in various food using the following techniques- serial dilution, pour plate, streak, slant, stab – Lab work

Unit 4 (8 Hrs)

Hygiene

- 4.1. Importance of personal hygiene of food handler- habits- clothes, illness
- 4.2.Cleaning methods: Sterilisation and disinfection- use of chemicals and heat
- 4.3. Food borne illness: Bacteria - *Clostridium* and *Salmonella*
- 4.4. Safety in food storage, handling and preparation-safety of leftover food.

Unit 5 (6Hrs)

Sanitation

- 5.1 Kitchen design equipment and systems.

5.2 Structure and layout of food premises.

TEXT BOOKS

Frazier, W.C. **Food Microbiology**. New York: McGraw Hill Publications. 1988

Hobbs, B.C., and Gilbert, R.J. Food Poisoning and Food Hygiene. New York: The English Language Book Society and Edward Arnold Publishers Limited. 1978

BOOKS FOR REFERENCE

Jacob, M. Safe Food Handling. Geneva: A training guide for Manager, WHO.1990.

James M. Jay. Modern Food Microbiology. New Delhi : CBS Publishers.1989.

Pelczar, H.J. and Robert, D. Microbiology. New York: McGraw Hill, New York.1968

Norman G. Marriot. Principles of Food Sanitation. Connecticut. AVI Publishing Co., Inc., 1969.

END SEMESTER EXAMINATION

PATTERN OF EVALUATION

Theory : 50 marks + Practicals : 50 marks

Theory :

Total Marks: 50

Duration: 1 ½ Hours

Section A: 10x2=20 marks (all questions to be answered)

Section B: 4x5=20 marks (4 out of 6 questions to be answered)

Section C: 1x 10 = 10 marks (1 out of 2 questions to be answered)

Lab work:

Max marks: 50 marks

Duration: 1 ½ hours

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI – 600 086

B.Sc. DEGREE: BRANCH V.A. PLANT BIOLOGY AND PLANT BIOTECHNOLOGY

SYLLABUS

(Effective from the academic year 2011 – 2012)

HORTICULTURE

CODE: 11BT/ME/HC 23

CREDITS: 3

L T P: 3 1 0

TOTAL TEACHING HOURS: 52

OBJECTIVES

- To enable the students to be self-reliant and to develop their entrepreneurial skills.
- To enhance their practical skills through experiential learning.

Unit 1 (10 Hrs)

- 1.1. Introduction: aim and scope.
- 1.2. Classification of horticultural plants
- 1.3. Garden implements and gardening operations.
- 1.4. Vegetative Propagation: Layering, Grafting and Budding.
- 1.5. Vegetative Propagating Methods: Cutting/ Layering/ Grafting (Practicals)

Unit 2 (12 Hrs)

- 2.1. Cultural Practice - Propagation, Planting and Harvesting of the following Plants
 - 2.1.1. Fruits: Mango, Banana, and Guava
 - 2.1.2. Vegetable Crops: Onion, Potato, Brinjal and Lady's finger.

Unit 3 (14 Hrs)

- 3.1. Techniques of growing Plants in Pot: Types of Pots, Potting and Repotting.
- 3.2. Potting / Pot culture (growing annuals)- Practical
- 3.3. Hanging basket
- 3.4. Kitchen garden – Layout: Theory and practical
- 3.5. Market garden and Truck garden.
- 3.6. Rock garden and Terrace garden.
- 3.7. Vegetable forcing

Unit 4 (8 Hrs)

- 4.1. Lawn making and its maintenance
- 4.2. Cut Flowers, Flower arrangement: Fresh and Dry – Theory and Practical

Unit 5**(8 Hrs)**

- 5.1. Bonsai: Theory and practical
- 5.2. Terrarium: Theory and practical

TEXT BOOK

Kumar, N. Introduction to Horticulture. Nagercoil: Rohini Agencies.1980.

BOOKS FOR REFERENCE

Chauhan, D.V.S. Vegetable Production in India. Agra: Ram Prasad Sons. 1968

Edmund, J.B., T.L.Senn, F.S.Andrews and R.G.Halfacre. Fundamentals of Horticulture, (4th Ed.). London: Tata McGraw Hill Pub.Co. 1994.

George Acquaaah. Horticulture Principles and practices,(4thEd.). London: PHI Learning Private Limited.2009

Gopalswamy Iyengar, K.S. Complete Gardening in India. Bangalore: Kalyan Press.1970.

Janick, J. Horticultural Science, (3rd Ed.). New Delhi: Surgeet Publications.1962

Naik, K.C. South Indian Fruits and their Culture. Madras: P.Varadharaj and Co. 1968

Randhawa, G.S. Ornamental Horticulture in India, Today and Tomorrow. New Delhi: Printers and Publishers.1980.

Yawalkar, K.S.Vegetable Crops of India. Nagpur: Agri -Horticultural Publishing House.1961.

END SEMESTER EXAMINATION**Total Marks: 100****Duration: 3 Hours****QUESTION PAPER PATTERN**

Section A – 18 x 1 = 18 marks (All 18 questions to be answered)

6 x 3 = 18 marks (6 out of 9 questions to be answered)

Section B – 4 x 6 = 24 marks (4 out of 6 questions to be answered in 200 words each)

Section C – 2 x 20 = 40 marks (2 out of 4 questions to be answered in 1000 words each)

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI – 600 086

B.Sc. DEGREE: BRANCH V. A. PLANT BIOLOGY AND PLANT BIOTECHNOLOGY

SYLLABUS

(Effective from the academic year 2011 – 2012)

BRYOPHYTES, PTERIDOPHYTES AND GYMNOSPERMS

CODE: 11BT/MC/BP 24

CREDITS: 4

L T P: 4 1 0

TOTAL TEACHING HOURS: 65

OBJECTIVES

- To learn the classification, structure, organization, reproduction and life cycles of lower vascular plants.
- To analyse the primitive and advanced features of the living and fossil forms.

Unit 1 (12 Hrs)

Classification and Characteristics

- 1.1. Classification of of Bryophyta (Proskauer, 1957) and characteristic features of following classes: Hepaticopsida, Anthocerotopsida, Bryopsida
- 1.2. Classification of Pteridophyta (Reimers, 1951) and characteristic features of the following classes: Lycopsidea, Sphenopsida and Pteropsida
- 1.3. Classification of Gymnospermae (Bierhorst, 1971) and characteristic features of the following classes: Cycadopsida and Gnetopsida.

Unit 2 (15 Hrs)

Bryophyta

- 2.1. A detailed study of the thallus structure, anatomy and reproduction of the following (no development): Hepaticopsida – *Porella*, Anthocerotopsida – *Anthoceros*, Bryopsida - *Polytrichum*

Unit 3 (15 Hrs)

Pteridophyta

- 3.1. A detailed study of the plant body, anatomy and reproduction of the following (no development): Lycopsidea – *Lycopodium*, Sphenopsida – *Equisetum*, Filices - *Marsilea*

Unit 4 (8 Hrs)

Fossil Forms

- 4.1. Fossil forms - Pteridophyta: *Lepidodendron*, *Stigmaria*, *Lepidostrobus* and *Lepidocarpon*
Gymnospermae: *Williamsonia*

Unit 5

(15 Hrs)

Gymnospermae

5.1.A detailed study of the plant body, anatomy and reproduction of the following (no development): Cycadopsida – *Cycas* and Gnetopsida – *Gnetum*

TEXT BOOK

Pandey,S.N., P.S Trivedi and A Misra. A Textbook of Botany Vol II- Bryophytes, Pteridophytes and Gymnosperms (11th Eds) New Delhi: Vikas Publishing House Pvt.Ltd. 1999

BOOKS FOR REFERENCE

BRYOPHYTA

Smith,G.M. Cryptogamic Botany Vol II. London: McGraw Hill Publishing Co. 1995

Srivastava, H.N. Bryophytes. India: Pradeep Publishers. 2007

Watson,E.V. The structure and Life of Bryophytes. London: Hutchinson University Library. 1968.

PTERIDOPHYTA

Eames, A.J. Morphology of Vascular Plants. New Delhi: Tata McGraw Hill Pub.Co. 1999

Smith,G.M. Cryptogamic Botany,-Vol.II. London: McGraw Hill Publishing Co. 1999.

Sporne, K.R. Morphology of Pteridophytes. New Delhi: B.I. Publications, 1980.

GYMNOSPERMS

Chamberlain,C.J.Gymnosperms - Structure and Evolution. New Delhi: CBS.1980.

Coulter, J.M.and C.J.Chamberlain. Morphology of Gymnosperms. Allahabad:Central Book Depot.1960.

Srivastava, H.N. Gymnosperms. India: Pradeep Publishers. 2004.

END SEMESTER EXAMINATION

Total Marks: 100

Duration: 3 Hours

QUESTION PAPER PATTERN

Section A – 18 x 1 = 18 marks (All 18 questions to be answered)

6 x 3 = 18 marks (6 out of 9 questions to be answered)

Section B – 4 x 6 = 24 marks (4 out of 6 questions to be answered in 200 words each)

Section C – 2 x 20 = 40 marks (2 out of 4 questions to be answered in 1000 words each)

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI – 600 086

**B.Sc. DEGREE: BRANCH V. A. PLANT BIOLOGY AND PLANT
BIOTECHNOLOGY**

SYLLABUS

(Effective from the academic year 2011 – 2012)

BRYOPHYTES, PTERIDOPHYTES AND GYMNOSPERMS - PRACTICALS

CODE: 11BT/MC/P2 22

CREDITS: 2

L T P: 0 0 3

TOTAL HOURS: 39

BRYOPHYTA

Study of the forms mentioned in the theory syllabus.

PTERIDOPHYTA

Study of the forms mentioned in the theory syllabus.

GYMNOSPERMAE

Study of the forms mentioned in the theory syllabus.

END SEMESTER EXAMINATION

Total Marks: 50

Duration: 3 Hours

PATTERN OF EVALUATION

- | | |
|---|------------|
| 1. Sectioning, Drawing, Identification with reasons | 3 x 8 = 24 |
| 2. Spotters (4) | 4 x 5 = 20 |
| 3. Spot at sight (3) | 3 x 2 = 6 |

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI – 600 086

B.Sc. DEGREE: BRANCH V. A. PLANT BIOLOGY AND PLANT BIOTECHNOLOGY

SYLLABUS

(Effective from the academic year 2011 – 2012)

TAXONOMY OF ANGIOSPERMS AND ECONOMIC BOTANY - PRACTICALS

CODE: 11BT/MC/P332

CREDITS: 2

L T P: 0 0 3

TOTAL HOURS: 39

TAXONOMY OF ANGIOSPERMS

Laboratory sessions will consist of working with fresh materials to illustrate descriptive terminology, derivation and salient features of plant families – floral analysis (2 material / family).

A plant collection of 10 plants belonging to at least 10 different families – Herbarium to be submitted for the End semester examination.

Use of dichotomous key in the classification of the given specimens.

ECONOMIC BOTANY

Economically important products of families mentioned in Unit 4 and Unit 5 of the theory syllabus.

Submission of 5 economically important products with information on binomial, vernacular name and nature of product.

END SEMESTER EXAMINATION

Total Marks: 50

Duration: 3 Hours

PATTERN OF EVALUATION

1. Family Identification	2 x 4 = 8
2. Description, Drawing & Dissection	1 x 12 = 12
3. Key Preparation	5
4. Spot at sight	20
5. Herbarium	5

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI – 600 086

B.Sc. DEGREE: BRANCH V.A. PLANT BIOLOGY AND PLANT BIOTECHNOLOGY

SYLLABUS

(Effective from the academic year 2011 – 2012)

PHYTOTHERAPY AND ETHNOBOTANY

CODE: 11BT/MC/PE 33

CREDITS: 3

L T P: 3 1 0

TOTAL TEACHING HOURS: 52

OBJECTIVES

- To create awareness on the indigenous medicinal systems and tribal traditional practices.
- To learn the therapeutic property of plants through preparation of herbal medicines.

Unit 1

(14 Hrs)

Origin of herbs in health care

- 1.1. Basic principles of Ayurveda and Siddha: Panchamahabhutas, Tridhosha Concept, Malas, Agni, Prakruti.
- 1.2. Drug preparation: Ashwam, Arishtam, Taila, Churnam, Leghyam, Bhasmam, Infusion and Decoction, Poultice: Salves, Compresses, Mouthwash.
- 1.3. Adulteration, Detection and Standardization of drugs.
- 1.4. Preparation of the following (Practical) Ayurveda / Siddha Medicines for common ailments: Infusion and Decoction, Poultice, Salves and Creams, Mouth wash and Herbal tooth powder, Tailam, Churnam and Leghyam
- 1.5. Microscopic and qualitative analysis of herbal drug (Churnam) (Practical).

Unit 2

(18 Hrs)

Pharmacognosy

Vernacular name, Binomial, Family, Active principle, Morphology of the useful part, and Medicinal Uses of the following:

- 2.1. Roots : *Asparagus racemosus*; *Rauwolfia serpentina*.
- 2.2. Underground stem : *Zingiber officinalis*, *Curcuma longa* and *Allium cepa*.
- 2.3. Leaves : *Ocimum sp.*, *Tylophora asthmatica*, *Catharanthus roseus* and *Aloe vera*.
- 2.3. Flowers : *Hibiscus rosa-sinensis* and *Datura stramonium*.
- 2.4. Fruits : *Piper longum*, *Terminalia bellerica*, *Terminalia chebula* and *Emblica officinalis*.
- 2.5. Seeds : *Strychnos nuxvomica* and *Trigonella foenum-graceum*.
- 2.6. Bark : *Cinnamomum zeylanicum*
- 2.7. Whole plant : *Azadirachta indica*, *Eclipta alba*, *Acalypha indica* and *Phyllanthus amarus*.

Unit 3 (8 Hrs)

Ethnobotany

- 3.1. Ethnobotany : Definition and scope
- 3.2. Methodologies of Ethnobotanical research, Fieldwork, Literature, Herbaria and Musea.
- 3.3. Ethnobotany and health care.
- 3.4. Ethnobotanical studies of Toda and Irula Tribes.
- 3.5. Tribal food and medicine

Unit 4

Sacred Groves (5 Hrs)

- 4.1. Traditional way of conserving plant diversity
- 4.2. Ex situ conservation: field gene banks and seed banks.
- 4.3. In situ conservation
- 4.4. Biodiversity: uses and conservation

Unit 5 (7 Hrs)

Ayurveda and beauty

- 5.1. Role of Dhatu in physical beauty and daily routine to enhance beauty.
- 5.2. Essential oils and Salads.
- 5.3. Facial and hair care using herbal products (Demonstration)

BOOKS FOR REFERENCE

Das, S.N. Medicinal Plants for Health and Wealth. New Delhi: Agrotech. 2006

Dash, V.B. Ayurvedic Treatment for Common Diseases. New Delhi: Konark Publishers Pvt. Ltd., New Delhi. 1978.

Dash, V.B. Fundamental of Ayurvedic Medicine. New Delhi: Konark Publishers Pvt. Ltd. 1989.

Dastur, J.F. Medicinal plants of India and Pakistan. New Delhi: D.B.Taraporewala Sons and Co. Pvt. Ltd.1988.

Duke, J.A. Handbook on Medicinal Herbs. London: CRC Press.2002

Froog, S. Medicinal Plants - Field and Laboratory Manual. New York: International Book Distributors. 2005.

Grewalr, R.C. Medicinal Plants. Cambridge: Harvard Univ. Press.2000

Hanson, B.A. Understanding Medicinal Plants, their chemistry and therapeutic action. New York: The Haworth Press Inc. 2005

ICMR. Quality Standards of Indian Medicinal Plants, (Vols. I, II, III, & IV). New Delhi.: ICMR Publishers.2006

Jaibala, S. and G.Balakrishnan. A Hand Book of Common Remedies based on Siddha System of Indian Medicine. Madras.: St.Louis institute Press.1975.

Jain, S.K. Contribution to Ethnobotany. India: Scientific Publishers.1997

Kapoor, L.D. Handbook of Ayurvedic Medicinal Plants. India: CRC Press.2001.

Prajapati, N.D. and S.S.Purohit. Agro's Color Atlas of Medicinal Plants. Jodhpur: Agrobios.2006.

Rastogi, R.P. Compendium of Indian Medicinal Plants, Vols. I, II, III and IV. New Delhi: Central Drug Research Institute Publication and Information Directorate.1988

Reddy, K.J., B.Bahadur, B.Bhadriah and M.L.N.Rao. Advances in Medicinal Plants. New Delhi: Universities Press. 2007

Saha, N.N. Herbal Remedies. New Delhi: Universal Publication.1981.

Trivedi, P.C. Medicinal Plants: Ethnobotanical Approach. Jodhpur: Agrobios. 2006

END SEMESTER EXAMINATION

Total Marks: 100

Duration: 3 Hours

QUESTION PAPER PATTERN

Section A – 18 x 1 = 18 marks (All 18 questions to be answered)

6 x 3 = 18 marks (6 out of 9 questions to be answered)

Section B – 4 x 6 = 24 marks (4 out of 6 questions to be answered in 200 words each)

Section C – 2 x 20 = 40 marks (2 out of 4 questions to be answered in 1000 words each)

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI – 600 086
B.Sc. DEGREE: BRANCH V. A. PLANT BIOLOGY AND PLANT
BIOTECHNOLOGY
SYLLABUS

(Effective from the academic year 2011– 2012)

TAXONOMY OF ANGIOSPERMS AND ECONOMIC BOTANY

CODE: 11BT/MC/TE 34

CREDITS: 4

L T P: 4 1 0

TOTAL TEACHING HOURS: 65

OBJECTIVES

- To learn the vegetative and reproductive features of a few families.
- To be able to construct keys for identification of flowering plants for the families under study
- To identify some of the common flowering plants of Tamil Nadu through the use of floras.

TAXONOMY OF ANGIOSPERMS

- Unit 1** (10 Hrs)
- 1.1 Importance of taxonomy
 - 1.2 Classification - Artificial, Natural and Phylogenetic system of classification.
 - 1.3 Detailed study of Bentham and Hooker's classification - Merits and Demerits.
 - 1.4 Taxonomic keys - use of dichotomous keys.
- Unit 2** (5 Hrs)
- 2.1. Plant nomenclature: Binomial and Polynomial
 - 2.2. ICBN, Typification, Effective and Valid Publications, Author Citation, Choice of names and Rejection of names.
- Unit 3** (5 Hrs)
- 3.1. Herbarium Techniques: collection, pressing, drying, poisoning, mounting and preservation of plant specimens.
 - 3.2. Botanical Gardens and some important herbaria.
- Unit 4** (35 Hrs)
- Detailed study of the diagnostic characteristics and economic importance of the following families.
- Dicotyledones
- 4.1. Polypetalae - Annonaceae, Nymphaeaceae, Rutaceae, Fabaceae (including the subfamilies), Cucurbitaceae and Apiaceae.
 - 4.2. Gamopetalae - Rubiaceae, Apocynaceae, Asclepiadaceae, Convolvulaceae, Solanaceae, Acanthaceae and Lamiaceae.
 - 4.3. Monochlamydeae - Amaranthaceae, Euphorbiaceae
 - 4.4. Monocotyledones -Orchidaceae, Arecaceae and Poaceae

ECONOMIC BOTANY

Unit 5

(10 Hrs)

A brief study of the economic products: botanical name, common name, family, uses and morphology of the useful part of any five plants of the following: -

- 5.1. Fibre and Fibre yielding plants.
- 5.2. Tannins and dyes.
- 5.3. Gums and Resins.
- 5.4. Spices and Condiments.
- 5.5. Fumitories and Masticatories.

TEXT BOOKS

Singh.V. and D.K. Jain. Taxonomy of Angiosperms. Meerut: Rastogi Publications.1989.

Verma.V. A Text Book of Economic Botany. London: Cambridge University Press. 1989.

BOOKS FOR REFERENCE

Gamble,J.S. Flora of the Presidency of Madras, Vol. II. New Delhi: Jayyed Press, Ballimaran.1956.

Hill, A.F. Economic Botany. New York Tata McGraw-Hill Publishing Co. 1969.

Jeffrey, C. An introduction to Plant Taxonomy. London: Cambridge University Press.1982.

Lawrence, George.H.M. Taxonomy of Vascular Plants. New Delhi: Oxford IBH Publishing Co., New Delhi. 1987.

Mondal, A.K. Advanced Plant Taxonomy. India: New Central Book Agency Pvt. Ltd., Kolkata.2005

Naik, V.N. Taxonomy of Angiosperms. New York: Tata McGraw-Hill Publishing Co. 1984.

Rendle, A.B. Classification of Flowering Plants, Vol.I & II. London: Cambridge University Press. 1980

Sambarmurthy, A.U.S.S. Economic Botany of Crop Plants. India: Asiatech. Publishers. 2000.

Subramanyam, N.S. Modern Plant Taxonomy (1st Ed.). New Delhi: Vikas Publishing House Pvt., Ltd. 1995

END SEMESTER EXAMINATION

Total Marks: 100

Duration: 3 Hours

QUESTION PAPER PATTERN

Section A – 18 x 1 = 18 marks (All 18 questions to be answered)

6 x 3 = 18 marks (6 out of 9 questions to be answered)

Section B – 4 x 6 = 24 marks (4 out of 6 questions to be answered in 200 words each)

Section C – 2 x 20 = 40 marks (2 out of 4 questions to be answered in 1000 words each)

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI – 600 086

**General Elective Course Offered by Department of Botany for
B A. / B.Sc. / B.Com. Degree Programmes**

SYLLABUS

(Effective from the academic year 2011 – 2012)

FRUIT PRESERVATION

CODE: 11BT/GE/FP 32

CREDITS: 2

L T P: 2 0 0

TOTAL HOURS: 26

OBJECTIVES

- To enable students to develop skills related to preservation of fruits.
- To give students practical training in the preparation and preservation of different fruit products.

Unit 1

Introduction

(4 Hrs)

- 1.1. Principles of Food Preservation
- 1.2. Types of spoilage
- 1.3. Factors promoting spoilage

Unit 2

(10 Hrs)

Methods and Techniques of Fruit Preservation

- 2.1 Methods: Refrigeration, Freezing, Canning, Dehydration and Chemical Preservatives.
- 2.2 Techniques: Proportion of ingredients, Selection of fruits, Estimation tests, Filling and bottling of products and precautions

Unit 3

(12 Hrs)

Preparation of products preserved in sugar and salt

- 3.1. Sugar: Lime syrup, Grape crush, Orange squash, Mixed fruit jam, Guava jelly, Ginger preserve and Tutti fruity
- 3.2. Salt: Tomato chutney and Mixed vegetable pickle

BOOKS FOR REFERENCE

Blank, F.C. Handbook of Food and Nutrition. Agrobios Publishers, Jodhpur. 2000.

Frazier, W.C. and West Hoff, D.C. Food Microbiology (4th Ed.) New Delhi: Tata McGraw Hill Publishing Co., Ltd. 2001.

Kulshrestha, S. K. Food Preservation. New Delhi: Vikas Publishing House. 1994.

Ramakrishnan, S. Nutritional Biochemistry. T.R. Publications. 1996.

Scenetra, R. Food Science and Nutrition. Oxford Univ. Press. 1997.

Swaminathan, M. Handbook of Food Science and Experimental Foods. Bangalore: The Bangalore Printing and Publishing Co., Ltd. 1992.

PATTERN OF EVALUATION (Totally Internal)

CONTINUOUS ASSESSMENT (CA): 1 hr Test – 25 Marks

One Component – 25 Marks

This will be converted to 100 marks by Controller of Examination

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI – 600 086

**General Elective Course Offered by Department of Botany for
B A. / B.Sc. / B.Com. Degree Programmes**

SYLLABUS

(Effective from the academic year 2011 – 2012)

HERBAL THERAPY

CODE: 11BT/GE/HT 32

CREDITS: 2

L T P: 2 0 0

TOTAL HOURS: 26

OBJECTIVE

- To enable students to acquire knowledge of common medicinal plants, with special reference to their availability and therapeutic value.

Unit 1 (9 Hrs)

Indian Systems of Medicine

- 1.1. Introduction: Ayurveda, Siddha and Unani.
- 1.2. Basic Principles of Ayurveda: Panchamahabhutas, Tridhosha concept and Malas.
- 1.3. Preparation of Ayurvedic and Siddha medicine.
Ayurveda: Svarasa (Juice); Churna (powder); Kalka (paste); Kashaya (Decoction and Infusion) and Bhasma.
Siddha: Lavanam, Pashanam, Loham, Rasam and Gandhakam.

Unit 2 (8 Hrs)

Herbs and Therapeutics

- 2.1. Herbal remedies for some common ailments: Diarrhoea, Ulcer, Cold, Asthma, Fever, Hypertension, Jaundice, Chickenpox, Diabetes, Menstrual disorders, Bites and Stings.
- 2.2. General health tonics and Salads.
- 2.3. Preparations of Ayurvedic medicines: Churnam, Decoction, Leghyam, Tailam and Skin cream (Practical)

Unit 3 (9 Hrs)

Skin and Hair care

- 3.1. Herbal care for facial skin: Herbal face pack for dry, oily and normal skin.
- 3.2. Herbal remedy for pimples, acnes, black heads, corns, warts and boils.
- 3.3. Herbal remedy for dandruff, premature greying and loss of hair.
- 3.4. Hair washes and herbal hair tonics.
- 3.5. Demonstration of facial and hair care.

BOOKS FOR REFERENCE

Dastur, J.F. Medicinal plants of India and Pakistan. New Delhi: D.B.Taraporewala Sons and Co. Pvt. Ltd.1988.

Duke, J.A. Handbook on Medicinal Herbs. London: CRC Press.2002

Hans, R.H. Ayurveda the Gentle Health System. New Delhi: Motilal Banarsidass Publishers. 1994.

Jaibala,S. and G. Balakrishnan. A Hand Book of Common Remedies Based on Siddha System of Indian Medicine. St. Louis Institute Press. 1994.

Judith H.Morrison. The Book of Ayurveda, A guide to personal wellbeing. London: Gaia Books Ltd.1994.

Pieronia, A. and Price, L.L. Eating and Healing: Traditional food as Medicine.2006.

Kapoor, L.D. Handbook of Ayurvedic Medicinal Plants. India: CRC Press.2001.

Prajapati, N.D. and S.S.Purohit. Agro's Color Atlas of Medicinal Plants. Jodhpur: Agrobios.2006

Reddy, K.J., B.Bahadur, B.Bhadriah and M.L.N.Rao. Advances in Medicinal Plants. New Delhi: Universities Press. 2007

Saha, N.N. Herbal Remedies. New Delhi: Universal Publication.1981.

PATTERN OF EVALUATION (Totally Internal)

CONTINUOUS ASSESSMENT (CA): 1 hr Test – 25 Marks

One Component – 25 Marks

This will be converted to 100 marks by Controller of Examination

STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI- 600 086

B.Sc. DEGREE: BRANCH V.A. PLANT BIOLOGY AND PLANT BIOTECHNOLOGY

SYLLABUS

(Effective from the academic year 2011 – 2012)

ANATOMY AND EMBRYOLOGY OF ANGIOSPERMS

CODE: 11BT/MC/AE 44

CREDITS: 4

L T P: 4 1 0

TOTAL TEACHING HOURS: 65

OBJECTIVES

- To enable the students to have a basic knowledge of the structure, organisation, differentiation, function and interrelationship of cells and tissues of the plant body
- To focus on the importance of reproductive biology of plants.

ANATOMY

Unit 1 (10 Hrs)

- 1.1. Meristem: Classification, Organisation of shoot apex and root apex.
- 1.2. Lateral meristem: Vascular cambium - structure and formation.
- 1.3. Cork Cambium: Periderm - Phellem, Phellogen and Phelloderm, Development, Location, Morphology of Bark, Commercial Bark, Protective tissues of monocot and Lenticels.

Unit 2 (10 Hrs)

- 2.1. Secondary xylem: Vessels, Tracheids, Wood parenchyma and rays, Sap wood, Heartwood, Annual rings, Dendrochronology, Compression wood and Tension wood
- 2.2. Secondary phloem: Sieve tubes, Companion cells, Phloem parenchyma and Fibres.

Unit 3 (18 Hrs)

- 3.1. Primary structure of stem and root.
- 3.2. Secondary growth of normal dicot root and dicot stem.
- 3.3. Anomalous growth: Primary and Secondary structures.
- 3.4. Primary thickening meristem in monocots.
- 3.5. Anomalous secondary thickening in monocot stem - *Dracaena*.

Unit 4 (10 Hrs)

- 4.1. Nodal Anatomy - Unilacunar, trilacunar and multilacunar nodes.
- 4.2. Leaf - Internal structure of Isobilateral dicot, Isobilateral and Centric monocot leaf.
- 4.3. Leaf abscission.
- 4.4. Epidermis: epidermal appendages and stomatal types

EMBRYOLOGY

Unit 5 (17 Hrs)

- 5.1. Microsporangium: Microsporogenesis - Male gametophyte
- 5.2. Megasporangium: Megasporogenesis - Female gametophyte -
Monosporic (*Polygonum*), Bisporic (*Allium*) and Tetrasporic
(*Peperomia*)
- 5.3. Double fertilization.
- 5.4. Endosperm - Types and functions.
- 5.5 Embryo - Development of Dicot embryo - *Capsella*
- Development of Monocot embryo - *Luzula forsteri*
- 5.6. Apomixis

TEXT BOOKS

Bhojwani, S.S and S.P.Bhatnagar . Embryology of Angiosperms. New Delhi: Vikas Publishing House (Rt.) Ltd. 1986.

Singh, V., P.C.Pande and D.K.Jain. Anatomy of Seed Plants, India: Rastogi Publications, Meerut.1986.

BOOKS FOR REFERENCE

Cutler, D.F. Applied Plant Anatomy. New York: Longman, Green and Co

Cutter, E.G. Plant Anatomy (2nd Ed.), Part I. The English Language Book Society and Edward Arnold (Publishers) Ltd. London.1978.

Esau K. Anatomy of Seed Plants, (2nd Ed.) New York: Wiley Eastern Ltd. 1972.

Fahn,A. Plant Anatomy. London: Pergamon Press. 1970.

Vashista, P.C. Plant Anatomy for Under Graduate Students. New Delhi: Pradeep Publications. 1970.

END SEMESTER EXAMINATION

Total Marks: 100

Duration: 3 Hours

QUESTION PAPER PATTERN

Section A – 18 x 1 = 18 marks (All 18 questions to be answered)

6 x 3 = 18 marks (6 out of 9 questions to be answered)

Section B – 4 x 6 = 24 marks (4 out of 6 questions to be answered in 200 words each)

Section C – 2 x 20 = 40 marks (2 out of 4 questions to be answered in 1000 words each)

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI – 600 086

B.Sc. DEGREE: BRANCH V. A. PLANT BIOLOGY AND PLANT BIOTECHNOLOGY

SYLLABUS

(Effective from the academic year 2011 – 2012)

ANATOMY AND EMBRYOLOGY OF ANGIOSPERMS - PRACTICALS

CODE: 11BT/MC/P442

CREDITS: 2

L T P: 0 0 3

TOTAL HOURS: 39

PLANT ANATOMY

A study of the anatomy of the following:

Primary structure: Dicot stem- *Helianthus*

Dicot root - *Cicer*

Monocot root- *Canna*

Monocot stem- Maize

Secondary structure: Dicot Stem - *Helianthus*

Dicot Root - *Moringa*

Leaf: Isobilateral - Dicot - *Nerium*

Monocot - *Grass*

Centric - Monocot - *Allium*

Stomatal types: Dicot

Anomalous Structure:

Primary: *Nyctanthus*
Boerhaavia

Secondary: *Bignonia*
Bougainvillea
Leptadenia
Dracaena

Nodal Anatomy: Unilacunar, Trilacunar and Multilacunar nodes (diagrammatic sketch only)

EMBRYOLOGY

A study of the following:

1. T.S of young anther and mature anther
2. Pollen morphology
3. Binucleate and tetranucleate embryo sacs
4. Stages of Dicot embryo development
5. L.S. of mature monocot embryo
6. Endosperm - nuclear, cellular and ruminant
7. Embryo dissection - *Tridax*

END SEMESTER EXAMINATION

Total Marks: 50

Duration: 3 Hours

PATTERN OF EVALUATION

Sectioning, Drawing, Identification with reasons	3 x 8 = 24
Embryo Dissection	6
Spotters (2 Anatomy, 2 Embryology)	4 x 5 = 20

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI – 600 086

**General Elective Course Offered by Department of Botany for
B A. / B.Sc. / B.Com Degree Programmes**

SYLLABUS

(Effective from the academic year 2011 – 2012)

FUNDAMENTALS OF HORTICULTURE

CODE: 11BT/GE/FH 44

CREDITS: 4

L T P: 4 0 0

TOTAL TEACHING HOURS: 52

OBJECTIVES

- To enable the students to be self-reliant and to develop their entrepreneurial skills.
- To enhance their practical skills through experiential learning.

Unit 1 (8 Hrs)

- 1.1. Introduction: Divisions of horticulture
- 1.2. History of Gardening - some famous gardens in India
- 1.3. Types of Gardens: Indoor, Public and Kitchen garden

Unit 2 (12 Hrs)

- 2.1. Pot cultures: Selection of pots, potting, repotting and potting mixtures (any two), Demonstration: Potting
- 2.2. Vegetative propagation: Layering, Cutting, Grafting.
- 2.3. Demonstration: Layering, Cutting, Grafting (Demonstration Practical)

Unit 3 (7 Hrs)

- 3.1. Gardening operations: Planting, Transplanting, Pinching, Disbudding, Defoliation, Staking, Pruning, Watering, Mulching, and Topiary.
- 3.2. Ornamental garden and its parts.

Unit 4 (15 Hrs)

- 4.1. Lawn and Lawn making
- 4.2. Rockery
- 4.3. Terrarium: Theory (Demonstration Practical)
- 4.4. Bonsai: Theory (Demonstration Practical)

Unit 5 (10 Hrs)

- 5.1. Commercial Floriculture: Economic flowers - Jasmine and Rose.
- 5.2. Cut flowers, importance and methods to prolong vase life.
- 5.3. Flower arrangement - Fresh and Dry
- 5.4. Flower arrangement - Fresh and Dry (practical)

TEXT BOOK

Kumar, N. Introduction to Horticulture. Nagercoil: Rohini Agencies.1980.

BOOKS FOR REFERENCE

Chauhan, D.V.S. Vegetable Production in India. Agra: Ram Prasad Sons. 1968

Edmund, J.B., T.L.Senn, F.S.Andrews and R.G.Halfacre. Fundamentals of Horticulture, (4th Ed.). London: Tata McGraw Hill Pub.Co. 1994.

George Acquaaah. Horticulture Principles and practices,(4thEd.). London: PHI Learning Private Limited.2009

Gopalswamy Iyengar, K.S. Complete Gardening in India. Bangalore: Kalyan Press.1970.

Janick, J. Horticultural Science, (3rd Ed.). New Delhi: Surgeet Publications.1962

Naik, K.C. South Indian Fruits and their Culture. Madras: P.Varadharaj and Co. 1968

Randhawa, G.S. Ornamental Horticulture in India, Today and Tomorrow. New Delhi: Printers and Publishers.1980.

Yawalkar, K.S.Vegetable Crops of India. Nagpur: Agri -Horticultural Publishing House.1961.

END SEMESTER EXAMINATION

Total marks: 100

Duration: 3 hrs

QUESTION PAPER PATTERN

Section A – 10X1 = 10 marks

10 X3 = 30 marks (10 out of 12 questions to be answered in 50 words)

Section B –5 X 6= 30 marks (3 out of 5 questions to be answered in 200 words each)

Section C – 2 x 15 = 30 marks (1 out of 2 questions to be answered in 800 words each)

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI – 600 086

General Elective Course Offered by Department of Botany for
B A. / B.Sc. / B.Com Degree Programmes

SYLLABUS

(Effective from the academic year 2011 – 2012)

PLANTS IN EVERYDAY LIFE

CODE: 11BT/GE/PL44

CREDITS: 4

L T P: 4 0 0

TOTAL TEACHING HOURS: 52

OBJECTIVES

- To create an awareness of the importance of plants to the human need.
- To gain basic knowledge on biodiversity and its usefulness to man.

- Unit 1 (10 Hrs)**
Fibre and Fibre yielding plants: (Common Name, Morphology of the useful part and Uses of the following)
1.1. Textile Fibres - Cotton and Jute.
1.2. Hard Fibres - Coir.
1.3. Filling Fibres - Kapok
- Unit 2 (10 Hrs)**
Tannins and Dyes: (Common Name, Morphology of the useful part and Uses of the following)
2.1. Tannins: Bark - Hemlock, Oak, and Wattle.
2.2. Dyes: Wood - Log Wood, Leaves - Indigo and Henna, Flowers - Safflower, Saffron, Seeds - Annatto.
- Unit 3 (10 Hrs)**
Gums and Resins: (Common Name, Morphology of the useful part and Uses of the following)
3.1. Gums : Gum Arabic, Gum Tragacanth and Asafoetida.
3.2. Resins: Amber, Lacquer, Shellac, Turpentine and Myrrh.
- Unit 4 (10 Hrs)**
Essential oils
4.1. Perfume oils - Roses, *Geranium*, *Calamus*, Grass oils (Oil of *Citronella*, Lemon Grass Oil, Oil of Vetiver), Lavender and Jasmine.
4.2. Camphor

Unit 5**(12 Hrs)****Medicinal plants**

Drugs obtained from:

- 5.1. Root - Ginseng, *Colchicum*.
- 5.2. Bark - Quinine
- 5.3. Stem - Ephedrine, Ginger
- 5.4. Leaves - *Aloe*, *Belladonna*, *Senna*, *Eucalyptus*, Coriander and Mint
- 5.5. Bulb - Onion, Garlic

BOOKS FOR REFERENCE

Das, S.N. Medicinal Plants for Health and Wealth. Delhi: Agrotech. 2006.

Hill, A.F. Economic Botany. New Delhi: Tata McGraw - Hill Publishing Co. 1952.

Kumar, N. Introduction to Spices, Plantation Crops and medicinal Plants. Nagercoil.: Rajalakshmi Publishers. 1952.

Pandey, B.P. and Anitha. Economic Botany. New Delhi: S. Chand and Co. 1952.

Sambarmurthy, A.U.S.S. Economic Botany of Crop Plants. Asiatech Publishers. 2005.

Sundararajan, S. Morphology and Economic Botany of Angiosperms, New Delhi Anmol. 2005.

END SEMESTER EXAMINATION**Total marks: 100****Duration: 3 hrs****QUESTION PAPER PATTERN****Section A** – 10X1 = 10 marks

10 X3 = 30 marks (10 out of 12 questions to be answered in 50 words)

Section B – 5 X 6 = 30 marks (3 out of 5 questions to be answered in 200 words each)**Section C** – 2 x 15 = 30 marks (1 out of 2 questions to be answered in 800 words each)

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI – 600 086

**General Elective Course Offered by Department of Botany for
B A. / B.Sc. / B.Com. Degree Programmes**

SYLLABUS

(Effective from the academic year 2011 – 2012)

WASTE MANAGEMENT

CODE: 11BT/GE/WM44

CREDITS: 4

L T P: 4 0 0

TOTAL TEACHING HOURS: 52

OBJECTIVES

- To create an awareness of the wastes that can accumulate, its hazards and management of solid and liquid wastes.
- To gain insight as to how waste can be converted into eco-friendly organic manure.

Unit 1 (5 Hrs)

Introduction

- 1.1. Wastes: Solid and Liquid wastes,
- 1.2. Waste generation and sources - Municipal, Kitchen, Garden, Agricultural and Industrial.

Unit 2 (16 Hrs)

Recycling of wastes

- 2.1. Composting - Principles, process and factors affecting composting.
- 2.2. Composting - Biodung method (practical)
- 2.3. Vermiculture Biotechnology: Types of earthworms, Culturing of earthworms, Vermibed maintenance.
- 2.4. Vermicomposting: Principle and process.
- 2.5. Types of Vermicomposting - Heap method and Pit method: Theory and practical

Unit 3 (10 Hrs)

Sewage Disposal

- 3.1. Primary Treatment.
- 3.2. Secondary Treatment
 - 3.2.1. Aerobic - Septic tanks, Trickling filters and Oxidation pond
 - 3.2.2. Anaerobic - Sludge digestion.
 - 3.2.3. Tertiary treatment - Chemical, Ozone and Reverse Osmosis

Unit 4 (15 Hrs)

Biomonitoring of Water quality and Water purification

- 4.1. Test for water purity - Coliform Test and Membrane Filter Technique.

- 4.2. Testing for purity of water - Coliform Test, Physical Analysis of water - pH, Color, Turbidity, TDS, Chemical Analysis of water - Salinity, Hardness and Nitrate content (Practical)
- 4.3. Water Treatment - Steps involved in Water Treatment in a typical water purification plant.

Unit 5 **(6 Hrs)**
Transformation of wastes
5.1. Recycling of paper
5.2. E-waste

TEXT BOOK

Purohit, S.S. A Textbook of Environmental Sciences. Student Edition Publishers. 2004.

BOOKS FOR REFERENCE

Gupta, P.K. Vermicomposting for Sustainable Agriculture. India: Agrobios. 2004.

Ismail, S.A., Vermicology – The Biology of Earthworms, Orient Longman. 1996

Kumar, H.D. Environmental Pollution. M.D. Publications. 2004.

NIIR Board. Modern Technology of Waste Management, Asia Pacific.2004.

Rachel, M.A. Analysis of Waste Water for use in Agriculture, (WHO). 1996.

Sathe, T.V. Vermiculture and Organic Farming. Daya Publishers. 2004.

END SEMESTER EXAMINATION

Total marks: 100

Duration: 3 hrs

QUESTION PAPER PATTERN

Section A – 10X1 = 10 marks

10 X3 = 30 marks (10 out of 12 questions to be answered in 50 words)

Section B –5 X 6= 30 marks (3 out of 5 questions to be answered in 200 words each)

Section C – 2 x 15 = 30 marks (1 out of 2 questions to be answered in 800 words each)

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI - 600 086
General Elective Course Offered by Department of Sociology, Botany and Zoology for
B.A. / B.Sc. / B.Com. Degree

SYLLABUS

(Effective from the academic year 2010 – 2011)

ETHNOBIOLOGY

CODE: SC/GE/EB 44

CREDITS: 4

L T S: 4 0 0

TOTAL TEACHING HOURS: 52

OBJECTIVES OF THE COURSE

- To become familiar with the nature of ethnobiological knowledge
- To gain an understanding of the diversity of approaches to plant resources among different human groups, and of fundamental significance of plants for foods, medicines, and in technology among peoples of different cultures.
- To gain an understanding of the rich cultural knowledge that human societies have about animals
- To gain understanding of the relationship to the environment that characterize different human societies.
- To engage in critical analysis of contemporary issues of conservation of traditional resources, the effects of globalization and issues surrounding intellectual property of traditional and local peoples in the global market place.

Unit 1 (10 Hrs)

Introduction

- 1.1 Introduction to Ethnology – Culture – Processes of Culture – Diffusion, Acculturation, Assimilation – Components of Culture – Traditions, Norms, Folkways, Mores, Conventions, Values and Beliefs.
- 1.2 Introduction to Ethnobiology
- 1.3 Ethnobiology

Unit 2 (10 Hrs)

Ethnobotany

- 2.1 Plants as Foods
- 2.2 Plants as Medicines
- 2.3 Plants for Technology

Unit 3 (12 Hrs)

Ethnozoology – Ethnozoological life forms.

- 3.1 Ethnoentomology – insects in medicine – Entomophagy
- 3.2 Frogs in popular culture – Salamanders in mythology – toad licking.
- 3.3 Ethnoherpetology – Serpent symbolism – herpetofauna used for food and medicine
- 3.4 Ethnoornithology – birds used for food, medicine and personal adornment and in rituals – Ethnoornithology and conservation
- 3.5 Mammals – used for food and medicine.

Unit 4 (12 Hrs)

Traditional Cultural Institutions

- 4.1 Marriage : Forms of marriage: Monogamy, Polygamy, Polygyny and Polyandry.
- 4.2 Kinship: Kinship terms, classificatory and descriptive system of Kinship, Kinship usages.
- 4.3 Family: Types, Functions, Patterns of residence, patterns of descent and authority, patterns of inheritance.
- 4.4 Religion: Definition of religion, Religion beliefs and practices: Magic, sorcery, Difference between magic, religion, totem and taboo.
- 4.5 Theories: Animism, Manaism and Naturalism, Functional theory of religion – Totemism, Sacred and Profane.

Unit 5

(8 Hrs)

Ecological Knowledge and Contemporary Issues

- 5.1 Ethno Genetics – cloning, issues of identity and discrimination, Ethnogenetics and Nationalism, Traditional Ecological knowledge and Traditional Environmental Management.
- 5.2 Contemporary Issues: Traditional Cultures, Resource Management and Conservation, and Traditional Knowledge and Intellectual Property.

BOOKS FOR REFERENCE

Belas, R. and Hoijer. Introduction to Anthropology. New Delhi: Mac Millan. 1997.

Berlin, Brent. Ethnobiological Classification: Principles of Categorization of Plants and Animals in Traditional Societies. Princeton University Press. 1992.

Carol R. Ember, Melvin Ember. Anthropology – A Brief Introduction. Prentice Hall, New Jersey. 1992.

Cotton, C.M. Ethnobotany, Principles and Applications. John Wiley and Sons. 1996.

Ellen, R. Ethnobiology and The Science of Humankind. Oxford: Blackwell. 2006.

Hansen, Stephen and VanFleet, Justin. Traditional Knowledge and Intellectual Property : A Handbook on Issues and Options for Traditional Knowledge Holders in Protecting their Intellectual Property and Maintaining Biological Diversity, Washington: American Association for the Advancement of Science (AAAS). 2007.

Indraneil Dass. The Serpent's Tongue : A Contribution to the Ethnoherpetology of India and adjacent countries. Chimaira Publications. 2008.

Minnis, P.E. Ethnobotany: A reader. Norman: University of Oklahoma Press. 2007.

CONTINUOUS ASSESSMENT (CA) : 1 Hour Test – 25 Marks
One Component – 25 Marks

END SEMESTER EXAMINATION: 2 Hours Test – 50 Marks

QUESTION PAPER PATTERN:

Section A – 5 x 2 = 10 marks (Answer all 5 questions in 50 words each)

Section B – 5 x 5 = 25 marks (5 out of 8 questions to be answered in 200 words each)

Section C – 1 x 15 = 15 marks (1 out of 2 questions to be answered in 750 words)

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI – 600 086

B.Sc. DEGREE: BRANCH V.A. PLANT BIOLOGY AND PLANT BIOTECHNOLOGY

SYLLABUS

(Effective from the academic year 2011 – 2012)

CELL BIOLOGY

CODE: 11BT/MC/CB 54

CREDITS: 4

L T P: 4 1 0

TOTAL TEACHING HOURS: 65

OBJECTIVES

- To gain an insight into the cellular and molecular aspects of the plant cell.
- To provide a better understanding about the structure and function of the cell.

Unit 1 (10 Hrs)

Introduction

- 1.1. Cell Theory: A brief study of the relationship of cytology with other biological sciences.
- 1.2. Cell wall
- 1.3. Cell Membrane: Chemical composition, Molecular organization of the cell membrane and molecular models and biogenesis

Unit 2 (20 Hrs)

Cell Organelles

- 2.1. Endoplasmic Reticulum: Morphology, SER and RER, Chemistry of ER membrane - origin and functions
- 2.2. Golgi apparatus: Ultrastructure, origin and functions
- 2.3. Mitochondria and Chloroplast: Ultrastructure, DNA and Biogenesis
- 2.4. Microtubules: occurrence, structure, chemical composition, function and organization of microtubules in cilia and flagella

Unit 3 (15 Hrs)

Nucleus

- 3.1. Nuclear organization: Nuclear membrane, Nucleolus. Chromosomes- structure and chemistry, Nucleosomes, Chromatin - Heterochromatin and Euchromatin, Giant Chromosomes - Lampbrush, Polytene; Chromosome identification-banding technique.
- 3.2. DNA structure - DNA supercoiling – Histones – Nonhistones.

Unit 4 (10Hrs)

DNA Replication and Repair

- 4.1. Modes of Replication - Conservative and Semiconservative.
- 4.2. DNA Replication - initiation, replication forks, leading strand and Lagging strand synthesis; proteins involved in replication.
- 4.3. DNA Repair: Direct repair - photoreactivation

Unit 5**(10 Hrs)**

- 5.1 Cell cycle - Mitosis and Meiosis
- 5.2 Model plants in research: *Arabidopsis thaliana*

TEXT BOOKS

Verma P.S and K.Agarwal , (1988) **Cytology**, Chand and Co, Ltd., New Delhi.

BOOKS FOR REFERENCE

Benjamin, L. Genes IX, New York: Oxford University Press and Cell Press, 2008.

Bruce Alberts. Essentials of Cell Biology. New York: Garland Science. 2008.

David P.Clark. Molecular Biology. New York: Elsevier Academic Press.2005.

De Robertis, E.D.P, and E.M.F.De Robertis. Cell and Molecular Biology, (6th Ed.)
Philadelphia: W.B.Saunders College. 2007.

Geoffrey, M.Cooper and Robert, E.Hausman. **The Cell**, (4th Ed.), USA : ASM Press,
Washington D.C.2007.

Karp.G. Cell and Molecular Biology. New York: John Wiley & Sons, Inc.. 2007.

Polard.F.D., W.C.Earnshaw and J.L.Schwartz. Cell Biology. Philadelphia: Saunders,
Elsevier. 2008.

Wolfe, S.L. Molecular and Cellular Biology. USA: Wadsworth Publishing. 1999.

END SEMESTER EXAMINATION**Total Marks: 100****Duration: 3 Hours****QUESTION PAPER PATTERN**

Section A – 18 x 1 = 18 marks (All 18 questions to be answered)

6 x 3 = 18 marks (6 out of 9 questions to be answered)

Section B – 4 x 6 = 24 marks (4 out of 6 questions to be answered in 200 words each)

Section C – 2 x 20 = 40 marks (2 out of 4 questions to be answered in 1000 words each)

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI – 600 086

B.Sc. DEGREE: BRANCH V. A. PLANT BIOLOGY AND PLANT BIOTECHNOLOGY

SYLLABUS

(Effective from the academic year 2011– 2012)

ECOLOGY AND ENVIRONMENTAL BIOTECHNOLOGY

CODE: 11BT/MC/EE 54

CREDITS: 4

L T P: 4 1 0

TOTAL TEACHING HOURS: 65

OBJECTIVES

- To give a basic idea and to create awareness on ecological concepts.
- To emphasize the importance of an environmentally sound and sustainable development.
- To highlight the significance of health hazards caused by toxic chemicals released in the environment.
- To focus on the use of biological organisms as agents of monitoring toxicity and remedy.

Unit 1 (10 Hrs)

Ecosystem

- 1.1. Concepts, components, kinds and structure.
- 1.2. Ecological pyramids, Energy flow, Food chain, Food web and Homeostasis.

Unit 2 (16 Hrs)

Plant Communities

- 2.1. Qualitative analysis - Floristic composition, Stratification, Periodicity, Life forms - Raunkaier's Biological Spectrum.
- 2.2. Quantitative analysis: Density, Cover, Abundance, Frequency, Dominance, Index of dominance, Index of similarity between 2 samples, Indices of species diversity, Shanon's index of general diversity.
- 2.3. Sampling of population - Quadrat, Transect, Loop and Point method.

Unit 3 (15 Hrs)

Environmental Toxicology

- 3.1. Biomagnification and Bioaccumulation.
- 3.2. Biotransformation - DDT.
- 3.3. Testing methods of Toxicity: Acute, Subacute, Chronic and Special tests.

Unit 4 (12 Hrs)

Biomonitoring

- 4.1. Biodegradation of Xenobiotics using microbes

- 4.2. Types of Bioremediation: *in situ* and *ex situ*, Phytoremediation
- 4.3. Biosensors and Bioindicators
- 4.4. Bioleaching

Unit 5 (12 Hrs)

Environmental Impact Assessment (EIA)

- 5.1. Stages of EIA.
 - i. Environmental Quality assessment and monitoring.
 - ii. Hazard identification and assessment
 - iii. Exposure assessment
 - iv. Environmental risk assessment
 - v. Risk Characterisation

TEXT BOOKS

Sharma P. D. Environmental Biology and Toxicology. India: Rastogi Publications. 2003.

Sharma P. D. Ecology and Environment. India: Rastogi Publications. 2009.

BOOKS FOR REFERENCE

Alan Scragg. Environmental Biotechnology, 2nd edition. New York: Oxford University Press. 2007.

Deepender, B. Environment and Ecology. Jaipur: Printwell Publishers. 1996.

Levinton, J.S. Marine Biology, Function, Biodiversity and Ecology. New York: Oxford University Press. 2001.

Ludwig, J.A., (1989), **Statistical Ecology**, John Wiley and Sons, New York.

Puri, G.S., (1996), **Forest Ecology**, Oxford and IBH. New Delhi.

Santra, S.C., (2005), **Environmental Science**, New Central Book Agency Pvt. Ltd., Kolkata, India.

Verma, P.S., (2000), **Environmental Biology and Principles of Ecology**, S.Chand Publishers, India

END SEMESTER EXAMINATION

Total Marks: 100

Duration: 3 Hours

QUESTION PAPER PATTERN

Section A – 18 x 1 = 18 marks (All 10 questions to be answered)

6 x 3 = 18 marks (6 out of 9 questions to be answered)

Section B – 4 x 6 = 24 marks (4 out of 6 questions to be answered in 200 words each)

Section C – 2 x 20 = 40 marks (2 out of 4 questions to be answered in 1000 words each)

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI – 600 086

B.Sc. DEGREE: BRANCH V.A. PLANT BIOLOGY AND PLANT BIOTECHNOLOGY

SYLLABUS

(Effective from the academic year 2011 – 2012)

MICROBIOLOGY

CODE: 11BT/MC/MB 54

CREDITS: 4

L T P: 4 1 0

TOTAL TEACHING HOURS: 65

OBJECTIVE

- To provide an understanding of microorganisms and their contributions to everyday processes like nutrient cycling, water purification and waste disposal.

Unit 1 (4 Hrs)

History of Microbiology

- 1.1. Germ Theory of disease, Vaccination, Koch's Postulates, Whittaker's Five Kingdom Theory.

Unit 2 (14 Hrs)

Bacteria

- 2.1. Classification (Bergey's Manual), Outlines of major groups only.
- 2.2. Morphology, Growth, Control and Endospore formation.
- 2.3. Genetic Recombination: conjugation, transformation and transduction.

Unit 3 (15 Hrs)

Viruses

- 3.1. General properties of viruses.
- 3.2. Cultivation, purification and assay (Plaques formation).
- 3.3. Structure: Virion size, helical capsid, icosahedral capsid and viral envelope.
- 3.4. Replication: Bacteriophages (Lytic and Lysogenic cycles), plant virus (Tobacco mosaic virus) and animal virus (Herpes simplex virus and retro virus).
- 3.5. Prions, viroids and virusoids.

Unit 4 (20 Hrs)

Soil Microbiology

- 4.1 Rhizosphere
- 4.2 Distribution, Taxonomy and Functions of Bacteria, Actinomycetes, Fungi, Algae and Protozoa.
- 4.3 Biogeochemical Cycle: Nitrogen, sulphur, phosphorous and carbon.
- 4.4 Arbuscular Mycorrhiza- Applications
- 4.5 Nematophagous fungus
- 4.6 Bacterial and Viral insecticide

Unit 5**(12 Hrs)****Microbiology of Water and Air**

- 5.1. Microbiology of domestic water and sewage.
- 5.2. Purification of drinking water.
- 5.3. Sewage treatment and disposal.
- 5.4. Distribution and sources of air borne organisms.
- 5.5. Enumeration of microorganisms in air - sampling techniques.

TEXT BOOK

Powar, C.B., and H.F.Daginawala, (1991), General Microbiology - Vol. II, Himalaya Publishing House, Mumbai.

BOOKS FOR REFERENCE

Atlas, R.M., Microbial Ecology, India, Kalaikathir Achagam, 1998.

Hogg, S., Essentials Microbiology, England, John Wiley and Sons Limited, 2005.

Ismail, S.A., Vermicology – The Biology of Earthworms, Orient Longman. 1996

Maier, R.M., I.L. Pepper and C.P. Gerba, Environmental Microbiology, U.S.A., Academic Press, 2006.

Parry, J.Thelma, Pawsey and K.Rosa, Principles of Microbiology, London, Hutchinson and Co. Pvt. Ltd., 1984.

Pelczar, J.Michael, (Jr.), D.Reid, Roger, E.C.S.Chan and Kreig, Microbiology, (5th Edition), New Delhi, Tata McGraw - Hill Publishing Co. Ltd., 1993.

Presscot, L.M., P.H. John and D.A. Klein, Microbiology, U.S.A., W.M. Brown Publishers, 2005.

Tortora, G.J., Microbiology. An Introduction, California, Benjamin Cummings Publishing Co., Inc., 2004.

Volk, A.Wesley, and M.F.Wheeler, Basic Microbiology, U.S.A., J.B.Lippincott & Co., Philadelphia, 1980.

END SEMESTER EXAMINATION**Total Marks: 100****Duration: 3 Hours****QUESTION PAPER PATTERN**

Section A – 18 x 1 = 18 marks (All 18 questions to be answered)

6 x 3 = 18 marks (6 out of 9 questions to be answered)

Section B – 4 x 6 = 24 marks (4 out of 6 questions to be answered in 200 words each)

Section C – 2 x 20 = 40 marks (2 out of 4 questions to be answered in 1000 words each)

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI – 600 086

B.Sc. DEGREE: BRANCH V.A. PLANT BIOLOGY AND PLANT BIOTECHNOLOGY

SYLLABUS

(Effective from the academic year 2011 – 2012)

CELL BIOLOGY, MICROBIOLOGY, ECOLOGY AND ENVIRONMENTAL BIOTECHNOLOGY - PRACTICALS

CODE: 11BT/MC/P553

CREDITS: 3

L T P: 0 0 6

TOTAL HOURS: 78

CELL BIOLOGY (26 Hrs)

1. Identification of various cell organelles through photomicrographs
2. Smear and Squash techniques
3. Histochemistry: Methods to identify cellulose, lignin, protein, sugar, starch, lipids, nucleic acids
4. Ergastic substances: Druses, Raphides and Cystolith

MICROBIOLOGY (26 Hrs)

1. Demonstration of the working and use of Autoclave, Hot Air Oven, Water bath and Laminar air flow.
2. Inoculation techniques: Slant, Pour plate, Streak plate, Stab.
3. Preparation of Nutrient media and Broth.
4. Isolation of Bacteria or Fungi from soil on various media: Enrichment, Selective and Differential media.
5. Gram staining
6. Antimicrobial property using antibiotic discs / turmeric

Demonstration Experiments:

1. Effect of temperature and pH on bacterial growth.
2. Motility test.
3. Tests for Coliform.
4. Estimation of BOD.
5. Vermitechnology
6. Methylene Blue Reductase test
7. Wine production and estimation of lactic acid.

ECOLOGY AND ENVIRONMENTAL BIOTECHNOLOGY (26 Hrs)

1. Construction of Quadrat, Belt and Line Transect - Calculation of Frequency, Percentage, Density and Abundance.
2. Effect of toxic substances (chemicals) on mitogenic property of onion root.
3. Morphological and structural adaptations of Hydrophytes, Xerophytes and Halophytes (any one in each category)

END SEMESTER EXAMINATION

Total Marks: 50

Duration: 3 Hours

PATTERN OF EVALUATION

1. Cell Biology (Squash)	7
2. Microbiology – Inoculation	7
Gram's staining	7
3. Ecology – Quadrat / transect	7
Sectioning	7
4. Spotters (3 x 5)	15

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI – 600 086

B.Sc. DEGREE: BRANCH V.A. PLANT BIOLOGY AND PLANT BIOTECHNOLOGY

SYLLABUS

(Effective from the academic year 2011 – 2012)

BIOINSTRUMENTATION

CODE: 11BT/ME/BI 53

CREDITS: 3

L T P: 3 1 0

TOTAL HOURS: 52

OBJECTIVES

- To provide a basic knowledge of the working principles of the instruments used in biological research.
- To become proficient in handling instruments through practical experiments.

Unit 1 (12Hrs)

Quantitative Analysis

- 1.1. pH Meter - Construction and Application
- 1.2. Colorimetry: Beer-Lambert's law, Single beam.
- 1.3. Spectrophotometry - UV-Visible Spectroscopy, Basic Principle, Instrumentation, Single and Double beam Spectrophotometers (Block diagrams only)
- 1.4. Estimation of protein using Spectrophotometer (practical).

Unit 2 (11 Hrs)

Separation Techniques.

- 2.1. Chromatography - Principles, techniques and application of TLC, Column, and HPLC.
- 2.2. Electrophoresis: Principles, techniques and applications of Agarose, PAGE
- 2.3. Demonstration: Separation of proteins by electrophoresis (Practical)

Unit 3 (7 Hrs)

Centrifugation.

- 3.1. Centrifuge: Principle, Unit of measurement and Instrumentation.
- 3.2. Types: Bench, Ultracentrifuge, Analytical and Microfuge.
- 3.3. Density gradient and differential centrifugation.
- 3.4. Centrifuge-Isolation of chloroplast (practical)

Unit 4 (12 Hrs)

Light Microscopy

- 4.1. Light Microscope and Micrometry
 - 4.1.1. Preparation of specimen for Light Microscope: Fixatives (FAA and Carnoy's fluid) dehydration, infiltration, preparation of paraffin block, Microtomes -Rotary, Progressive and Counter staining; single and double staining schedules.
- 4.2. Polarizing and Phase Contrast Microscope

Unit 5**(10 Hrs)****Electron Microscopy**

5.1. Transmission Electron Microscopy

Preparation of specimen for TEM: Fixatives - Glutaraldehyde and Osmium tetroxide; Embedding - Spurr, Epon, BEEM capsules, Ultramicrotomy; Knives - glass and diamond; specimen support -grid, Staining - Positive and Negative staining.

5.2. Scanning Electron Microscopy

Preparation of specimen for SEM: Fixing, Critical Point Drying, Freeze Drying, Freeze fracture replication, Freeze etching, Specimen coating - Sputter Coating, Shadow Casting.

BOOKS FOR REFERENCE

Asokan P. Basics of Analytical Biochemistry. Tamil Nadu: Chima Publication.2001.

Bozzola, John,J. and D.Russel Lonnie. Electron Microscopy -Principles and Techniques for Biologist. New York : Jones and Bartlett Publishers.1992.

Harborne,J.B. Phytochemical Method. London: Chapman and Hall. 1993.

Jayaraman,J. Techniques in Biology - A College level study. New Delhi: Wiley Eastern Ltd. 1985.

Jensen,W.A. Botanical Histochemistry. New Delhi: TataGraw-Hill Pub.Co.1962.

Plummer, D.T. An Introduction to Practical Biochemistry. New Delhi: Tata McGraw-Hill Publishing Company. 1985.

Sass, J.E. Botanical Microtechnique. USA: Ames, Iowa.1985.

END SEMESTER EXAMINATION**Total Marks: 100****Duration: 3 Hours****QUESTION PAPER PATTERN**

Section A – 18 x 1 = 18 marks (All 18 questions to be answered)

6 x 3 = 18 marks (6 out of 9 questions to be answered)

Section B – 4 x 6 = 24 marks (4 out of 6 questions to be answered in 200 words each)

Section C – 2 x 20 = 40 marks (2 out of 4 questions to be answered in 1000 words each)

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI – 600 086

B.Sc. DEGREE: BRANCH V. A. PLANT BIOLOGY AND PLANT BIOTECHNOLOGY

SYLLABUS

(Effective from the academic year 2011 – 2012)

FRUIT PRESERVATION AND NUTRITION

CODE: 11BT/ME/FN 53

CREDITS: 3

L T P: 3 1 0

TOTAL HOURS: 52

OBJECTIVES

- To enable students to understand the nutritional value and principles involved in the spoilage and preservation of fruits and vegetables.
- To give students practical training in the preservation of fruits and vegetables.

Unit 1 (9Hrs)

Principles and Methods of Preservation

- 1.1. High Temperature
- 1.2. Low Temperature
- 1.3. Drying :
- 1.4. Canning and Bottling
- 1.5. Radiation
- 1.6. Chemical Preservative

Unit 2 (8 Hrs)

Nutrition and health

- 2.1 Basic five food groups
- 2.2. Nutrition in fruits and vegetables:
Minerals (Ca, Mg, Fe and Zn): Sources and functions
Vitamins: Sources and functions
Proteins (Soyabean and Cowpea)
Antioxidants (Tomato and Capsicum- red)

Unit 3 (15 Hrs)

Canning

- 3.1. Canning of Fruits: Apple, Banana, Mango and Pineapple.
- 3.2. Canning of Vegetables: Bean, Carrot, Peas and Tomato.
- 3.3. Preparation of Lime syrup, Grape crush, Mango squash, and Pineapple syrup

Unit 4 (12 Hrs)

Fermented Beverages

- 4.1. Principles of Fermentation
- 4.2. Preparation of Grape wine, Cider and Vinegar
- 4.3. Preparation of Fermented products - Wine (practical)

Unit 5**(8 Hrs)****Principle, Chemistry and Preparation of Pectin**

- 5.1. Factors affecting Jelly preparation
- 5.2. Preparation of Guava, Apple and Orange Jelly
- 5.3. Preparation of Preserves and Candies: Jam, Jelly, Marmalade, Tutti-fruity and Ginger preserve and candied peel (practical).
- 5.4. Preparation of mixed vegetable pickle.

BOOKS FOR REFERENCE

Blank, F.C., Handbook of Food and Nutrition, India., Agrobios Publishers, 2000.

Frazier, W.C. and D.C. West Hoff, Food Microbiology, (4th Ed.), New Delhi, Tata McGraw Hill Publishing Co., Ltd., 1995.

Home scale - Processing and Preservation Fruits and Vegetables, (1996), Mysore, Central Food Technological Research Institute, 1996.

Kulshrestha, S. K. Food Preservation, New Delhi, Vikas Publishing House, 1994.

Muller, H.G., (1998), Nutrition and Food Processing, India, Avi. Pub. 1998.

Ramakrishnan, S., Nutritional Biochemistry, India, T.R.Publications, 1996.

Scenetra, R., Food Science and Nutrition, New Delhi, Oxford Univ. Press, 2007.

Swaminathan, M., Handbook of Food Science and Experimental Foods, Bangalore, The Bangalore Printing and Publishing Co., Ltd., 1992.

END SEMESTER EXAMINATION

Total Marks: 100

Duration: 3 Hours

QUESTION PAPER PATTERN

Section A – 18 x 1 = 18 marks (All 18 questions to be answered)

6 x 3 = 18 marks (6 out of 9 questions to be answered)

Section B – 4 x 6 = 24 marks (4 out of 6 questions to be answered in 200 words each)

Section C – 2 x 20 = 40 marks (2 out of 4 questions to be answered in 1000 words each)

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI – 600 086

B.Sc. DEGREE: BRANCH V.A. PLANT BIOLOGY AND PLANT BIOTECHNOLOGY

SYLLABUS

(Effective from the academic year 2011 – 2012)

APPLIED BIOTECHNOLOGY

CODE: 11BT/MC/AB 64

CREDITS: 4

L T P: 4 1 0

TOTAL TEACHING HOURS: 65

OBJECTIVE

- To provide basic information on the importance of biotechnology in the field of tissue culture and its importance in health care, energy and environment.

Unit 1 (20 Hrs)

Tissue culture

- 1.1. Totipotency, Culture techniques: Equipment, Media, Explant, Callus formation, Organogenesis.
- 1.2. Root culture, Shoot culture, Anther and Pollen culture.
- 1.3. Cell culture, Protoplast culture: Isolation, Culture and Regeneration.
- 1.4. Somaclonal Variation.
- 1.5. Somatic hybridization and Cybrid: Spontaneous and Induced fusion, Identification and Selection of hybrid cells.
- 1.6. Applications: Horticulture, Pharmaceutical industry.

Unit 2 (10 Hrs)

Conventional and Modern Plant Breeding Methods

- 2.1. Selection - Pureline and Clonal
- 2.2. Hybridization
- 2.3. Mutation Breeding
- 2.4. Marker Assisted Selection (MAS), Marker Assisted Breeding (MAB): Basic concepts only

Unit 3 (10 Hrs)

Biotechnology in Agriculture

- 3.1. Transgenic plants for crop improvement: Herbicide resistance, Insect resistance, resistance against viral, bacterial and fungal pathogens.
- 3.2. Transgenic plants - Edible vaccines. Transgenic plants as recombinant protein production systems, Choice of plant species for recombinant vaccine production
- 3.3. Biofertilizers

Unit 4 (5 Hrs)

Biofuels

- 4.1. Bioethanol.
- 4.2. Biohydrogen and Gobargas.
- 4.3. Biodiesel: Petroplants.

Unit 5 (20 Hrs)

Fermentation Technology

- 5.1. Fermentation - Media, Equipment, Inoculum.
- 5.2. Scale up and down stream processing.
- 5.3. Dairy - Cheese (Cheddar, Camembert and Roquefort)
- Bakery - Bread
- Beverages - Wine types and Beer
- Enzyme - Amylase
- Vitamin - B₁₂

TEXT BOOK

Gupta, P.K. Plant Biotechnology. India : Rastogi Publications. 2010.
Satyanarayana. U. Biotechnology. India: Books and Allied Publishers Ltd. 2008.

BOOKS FOR REFERENCE

Glick, B.R., and J.J.Pasternak. Molecular Biotechnology - Principles and Applications of Recombinant DNA. New Delhi: Panima Publishing Corporation. 1994.

Kalyan Kumar De. An introduction to plant tissue culture. Kokatta: New Central Book Agency. 2000.

Narayanaswamy, S. Plant Cell and Tissue Culture. New Delhi: Tata McGraw Hill Publishing Company Ltd. 1994.

Patel, A.H. Industrial Microbiology. New Delhi: Macmillan India Limited. 1990.

Prescott and Dunn. Industrial Microbiology. USA: The AVI Publishing Co., Inc. 1997.

Purohit, S, S. and S. K.Mathur. Biotechnology - Fundamentals and Applications, (3rd Ed.), Agrobios. 2000.

Purohit, S.S. Agricultural Biotechnology. New Delhi: Agro Botanica. 2000.

Waston, J.D., M.Gilman, J.Witkowski and M.Zoller. Recombinant DNA, (2nd Ed.). New York: Scientific American Books.1990.

END SEMESTER EXAMINATION

Total Marks: 100

Duration: 3 Hours

QUESTION PAPER PATTERN

Section A – 18 x 1 = 18 marks (All 18 questions to be answered)

6 x 3 = 18 marks (6 out of 9 questions to be answered)

Section B – 4 x 6 = 24 marks (4 out of 6 questions to be answered in 200 words each)

Section C – 2 x 20 = 40 marks (2 out of 4 questions to be answered in 1000 words each)

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI – 600 086

B.Sc. DEGREE: BRANCH V.A. PLANT BIOLOGY AND PLANT BIOTECHNOLOGY

SYLLABUS

(Effective from the academic year (2011– 2012))

GENETICS AND GENETIC ENGINEERING

CODE: 11BT/MC/GG 64

CREDITS: 4

L T P: 4 1 0

TOTAL TEACHING HOURS: 65

OBJECTIVES

- To re-enforce the importance and value of Mendelian Genetics.
- To create analytical thinking for solving problems.
- To give the students knowledge of the techniques and applications of gene manipulation.

Unit 1 (15 Hrs)

Brief history and basic concepts of genetics

- 1.1. Mendelian Genetics
- 1.2. Gene interactions: Incomplete dominance and Co-dominance, Dominant and Recessive Epistasis, Inhibitory, Complementary, Additive and Duplicate genes.
- 1.3. Multiple Gene Inheritance - Skin colour in man and Ear length in *Maize*
- 1.4. Multiple allele - Human blood groups and Rh factor.

Unit 2 (15 Hrs)

Sex linkage and sex influenced inheritance

- 2.1. Linkage and crossing over; Mapping in Eukaryotes and Bacteria
- 2.2. Extra chromosomal Inheritance; Cytoplasmic inheritance - Plastid inheritance
- 2.3. Sex determination in Humans and *Drosophila*, Sex linked inheritance in man: Color blindness and Hemophilia.

Unit 3 (16 Hrs)

Genetic Engineering

- 3.1. Introduction to Genetic Engineering.
- 3.2. Techniques: Restriction Endonucleases, Ligation, Adapters and Linkers.
- 3.3. Cloning Vectors: YAC and BAC.
- 3.4. Gene Libraries, cDNA Libraries
- 3.5. Hybridization - Southern, Northern and Western Blotting.

Unit 4 (14 Hrs)

Genetic Engineering in plants

- 4.1. Target cells for Transformation
- 4.2. Gene transfer technique using *Agrobacterium*
- 4.3. Physical delivery methods: PEG stimulated, Microinjection and Macroinjection, Microprojectile (Particle gun), Electroporation, Silicon carbide.

Unit 5**(5 Hrs)****Bioethical issues**

5.1. GM plants.-Bt brinjal, Bt cotton ,Golden rice

TEXT BOOKSGupta, P.K. Genetics, (2nd ed.), Meerut: Rastogi Publications.1992.Verma, P.S and Agarwal, V.K. Cell Biology, genetics, molecular biology, evolution and ecology. New Delhi : S.Chand and Company Ltd. 2007.**BOOKS FOR REFERENCE**Benjamin, L. Genes IX. New York: Oxford University Press and Cell Press. 2009Burns, G.W. and P.J.Botline, (1989), **The Science of Genetics - An Introduction to Heredity**, Macmillan Publishing Co. Inc. New York, USA.Dale, Jeremy W., and Malcolm Von Schantz, (2002), **From Genes to Genomes, - Concepts, and Applications of DNA Technology**, John Wiley and Sons Ltd. UK.Freifelder, D. Molecular Biology (2nd Ed.). Boston: Jones and Barlett Publishers Inc., Boston.1987.Glick, B.R., and J.J.Pasternak. Molecular Biotechnology - Principles and Applications of Recombinant DNA. New Delhi: Panima Publishing Corporation. 1994.Hartwell, H.Leland, Leroy Hood, Michael Goldberg, et al. (2000), **Genetics: From Genes to Genomes**, McGraw Hill Higher Education, USA.Purohit, S, S. and S. K.Mathur. Biotechnology - Fundamentals and Applications, (3rd Ed.), Agrobios. 2000.Snustad, D.P. and M.J.Simmons, (2006), **Principles of Genetics**, (4th Ed.), John Willey and Sons, USA.Watson, J.D., M.Gilman, J.Witkowski and M.Zoller, (1992), **Recombinant DNA**, (2nd Ed.), Scientific American Books, New York, USA.**END SEMESTER EXAMINATION**

Total Marks: 100

Duration: 3 Hours

QUESTION PAPER PATTERN**Section A** – 18 x 1 = 18 marks (All 18 questions to be answered)

6 x 3 = 18 marks (6 out of 9 questions to be answered)

Section B – 4 x 6 = 24 marks (4 out of 6 questions to be answered in 200 words each)**Section C** – 2 x 20 = 40 marks (2 out of 4 questions to be answered in 1000 words each)

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI – 600 086

B.Sc. DEGREE: BRANCH V.A. PLANT BIOLOGY AND PLANT BIOTECHNOLOGY

SYLLABUS

(Effective from the academic year 2011 – 2012)

MOLECULAR BIOLOGY

CODE: 11BT/MC/ML 64

CREDITS: 4

L T P: 4 1 0

TOTAL TEACHING HOURS: 65

OBJECTIVE

- To gain an insight into the molecular structure, regulation and functioning of the nucleic acids.

Unit 1 (15 Hrs)

Nucleic acids - structure and function in a cell

- 1.1 DNA and RNA as genetic material.
- 1.2 Mutations - Point mutations, deletions and insertions
- 1.3 DNA - chemistry of the double helix - types of DNA, Chargaff's rule, DNA size, fragility, Denaturation, Renaturation. Forms of DNA in a cell - Circular, Super helical and Linear DNA.
- 1.4 Molecular structure of three classes of RNA (mRNA, rRNA, tRNA)

Unit 2 (15 Hrs)

Transcription

- 2.1. Central dogma - Transcription, translation
- 2.2. Concept of Gene as a unit of expression - Eukaryotic and Prokaryotic
- 2.3. Transcription of Prokaryotic genes: Initiation, Elongation and termination.
- 2.4. Processing of eukaryotic mRNA - Capping, Splicing and Poly Adenylation

Unit 3 (15 Hrs)

Translation

- 3.1. Genetic Code - triplet codon for Protein Synthesis
- 3.2. Mechanism of Translation - initiation, elongation and termination

Unit 4 (10 Hrs)

Gene Regulation

- 4.1. Prokaryotic regulation: Operon concept - lac, trp and ara operon.
- 4.2. Eukaryotic regulation: Genetic imprinting.

Unit 5 (10 Hrs)

Cell Signalling

- 5.1. Signalling Molecules and their receptors, Functions of cell surface receptors
- 5.2. Pathways - MAP Kinase

TEXT BOOK

Rastogi S. Cell and Molecular Biology. New Age International Pvt Ltd. 1998.

BOOKS FOR REFERENCE

Benjamin, L. Genes IX. New York: Oxford University Press and Cell Press. 2009

Bruce Alberts. Molecular Biology of the cell (5th Ed.). Garland Publishing. 2007

David P.Clark. Molecular Biology.Elsevier Academic Press. 2005.

De Robertis, E.D.P, and E.M.F.De Robertis. Cell and Molecular Biology, (6th Ed)
Philadelphia: W.B.Saunders College. 2004.

Freifelder, D. Molecular Biology (2nd Ed.). Boston: Jones and Barlett Publishers Inc.,
Boston.1987.

Geoffrey, M.Cooper and E.H.Robert. The Cell, (4th Ed.). Washington D.C.: ASM Press,
Washington. 2004

Wolfe, S.L. Molecular and Cellular Biology. Wadsworth Publishing, USA. 1998.

END SEMESTER EXAMINATION

Total Marks: 100

Duration: 3 Hours

QUESTION PAPER PATTERN

Section A – 18 x 1 = 18 marks (All 18 questions to be answered)

6 x 3 = 18 marks (6 out of 9 questions to be answered)

Section B – 4 x 6 = 24 marks (4 out of 6 questions to be answered in 200 words each)

Section C – 2 x 20 = 40 marks (2 out of 4 questions to be answered in 1000 words each)

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI – 600 086

**B.Sc. DEGREE: BRANCH V.A. PLANT BIOLOGY AND
PLANT BIOTECHNOLOGY**

SYLLABUS

(Effective from the academic year (2011– 2012))

**PLANT PHYSIOLOGY, GENETICS AND GENETIC ENGINEERING, AND
APPLIED BIOTECHNOLOGY - PRACTICALS**

CODE: 11BT/MC/P6 62

CREDITS: 2

L T P: 0 0 4

TOTAL HOURS: 52

PLANT PHYSIOLOGY

(26 Hrs)

1. Determination of osmotic pressure
2. Determination of the rate of respiration using Ganong's Respiroscope
3. Effect of quality of light and CO₂ concentration on the rate of photosynthesis
4. Separation of chlorophyll pigments by paper chromatography
5. Demonstration of Peroxidase activity.
6. Effect of environmental factors on transpiration - light and wind.

DEMONSTRATION EXPERIMENTS

1. Colorimetric estimation of Nitrate reductase.
2. Effect of Auxin on root formation.
3. Demonstration of Hill reaction.
4. Estimation of oil content of *Brassica* seed by Soxhlet method.

**GENETICS AND GENETIC ENGINEERING, AND
APPLIED BIOTECHNOLOGY**

(26 Hrs)

1. Problems based on interaction of genes and gene mapping
2. Life cycle of *Drosophila* (culture studies)
3. Extraction of DNA from Onion cells.
4. Demonstration: Plasmid DNA - Electrophoresis, Restriction enzyme
5. Tissue culture techniques - Apical meristem, Anther and Embryo culture.

END SEMESTER EXAMINATION

Total Marks: 50

Duration: 3 Hours

PATTERN OF EVALUATION

1. Physiology – Expt. Set up (individual)	10
2. Genetics – Problems	10
3. Tissue culture – inoculation	10
4. Spotters – Physiology (1) Genetic Eng. (2) Applied Biotech (1)	4 x 5 20

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI – 600 086

B.Sc. DEGREE: BRANCH V.A. PLANT BIOLOGY AND PLANT BIOTECHNOLOGY

SYLLABUS

(Effective from the academic year 2011 – 2012)

PLANT PHYSIOLOGY

CODE: 11BT/MC/PP 64

CREDITS: 4

L T P: 4 1 0

TOTAL TEACHING HOURS: 65

OBJECTIVES

- To gain a comprehensive knowledge of the physiological and biochemical pathways involved in the functioning of the plant.
- To enable the students to understand the practical application in relation to agriculture and horticulture.

Unit 1 (15 Hrs)

Water Relations in Plants

- 1.1. Water potential: Definition and components, Measurement and relation of water potential in an idealized, flaccid and turgid cell.
- 1.2. Transpiration: Definition, Significance and Mechanism of stomatal transpiration, Starch - Sugar interconversion, synthesis of organic acid in guard cells, ATP driven H^+ and K^+ exchange pump, Role of ABA in stomatal opening and closure.
- 1.3. Water movement across the root and xylem - active and passive absorption.

Unit 2 (12 Hrs)

Mineral nutrition.

- 2.1. Macronutrients and Micronutrients (Manganese, Zinc, Copper, Molybdenum and Boron)
- 2.2. Mechanism of mineral salt absorption: Theories; Donnan equilibrium; Carrier concept and Cytochrome pump theory.
- 2.3. Transport of organic solutes: Phloem loading and unloading.
- 2.4. Sources of Nitrogen, Biochemistry of nitrogen fixation, Nitrate and Nitrite reduction, Assimilation of Nitrite and Ammonium ions.

Unit 3 (13 Hrs)

Photosynthesis

- 3.1. Principles of light absorption by plants, Photosystem I and II: composition, function, location in thylakoids and Photophosphorylation reactions.
- 3.2. CO_2 assimilation pathway: C_3 , C_4 cycles and CAM, Photorespiration, Factors influencing photosynthesis.

Unit 4 (13 Hrs)

Respiration

- 4.1. Respiratory quotient, Fermentation and Anaerobic processes.

- 4.2. Glycolysis, Substrate level Phosphorylation, Entner - Doudroff pathway, Glyoxylate cycle.
- 4.3. Krebs cycle, Electron flow components, Electron transport pathway, Oxidative phosphorylation and Cyanide resistant pathway.

Unit 5 (12 Hrs)

Growth and phytohormones.

- 5.1. Growth: kinetics and growth curve
- 5.2. Chemical nature, Bioassay (one only), Physiological effect and practical applications of the following Phytohormones: Auxin, ABA, Cytokinin, Gibberellic acid and Ethylene.
- 5.3. Photoperiodism, Florigen concept and Vernalization

TEXT BOOKS

Mukherji, S. and A.K.Ghosh. Plant Physiology. Kolkatta: New Central Book Agency (P) Ltd.2004.

Sinha,R.K. Modern Plant Physiology. New Delhi: Narosa Publishing House. 2006.

Verma. V. Text Book of Plant Physiology. New Delhi: Emkay Publications. 1989.

BOOKS FOR REFERENCE

Bidwell, R.G.S. Plant Physiology, (2nd Ed.). New York: Macmillan Publications Co.1983.

Devlin. R.M. Plant Physiology, (3rd Ed.). New Delhi: Affiliated East West press. 1983.

Malcom Wilkins.B. Advanced Plant Physiology. England: ELBS/Longman Ed. 1968

Noggle, G. Ray and G.J.Fritz. Introductory Plant Physiology. New Delhi: CBS Publishers and Distributors. 1998.

Salisbury, F.B., and C.Ross.**Plant Physiology**. New Delhi: Prentice Hall. 2004.

Taiz,L and E.Zeiger. Plant Physiology. New Delhi: Panima Publishing Corporation.2004.

Weston, G.D. Crop Physiology – Biotechnology. London: Butterworth - Heinemann Ltd. Oxford. 1994.

END SEMESTER EXAMINATION

Total Marks: 100

Duration: 3 Hours

QUESTION PAPER PATTERN

Section A – 18 x 1 = 18 marks (All 18 questions to be answered)

6 x 3 = 18 marks (6 out of 9 questions to be answered)

Section B – 4 x 6 = 24 marks (4 out of 6 questions to be answered in 200 words each)

Section C – 2 x 20 = 40 marks (2 out of 4 questions to be answered in 1000 words each)