

SRI KALISWARI COLLEGE, SIVAKASI

**(An Autonomous Institution Affiliated to Madurai Kamaraj University, Madurai and
Re- accredited with 'A' Grade (CGPA 3.30) by NAAC)**



Programme Scheme, Scheme of Examinations and Syllabi

(with effect from June 2015)

Department of Biotechnology and Botany

(PG Programme)

Programme Outcome (PO) for Postgraduate Programmes

Knowledge

PO 1 : Acquisition of advanced knowledge for higher studies and research.

PO 2: Synthesis of knowledge and critical thinking

Skills

PO 1 : Life Skills and Skills for contribution to nation building.

PO 2: Acquisition of specialized skills for entrepreneurship/employability.

Attitude

PO 1: Acquisition of professional ethics and human values.

PO 2 : National Integration and Social Commitment to Society.

Programme Specific Outcome (PSO) for Postgraduate Programmes

Knowledge: Core Course of botany improves their knowledge and understanding of the subject.

Skill Development: Training in taxonomy of angiosperms, Plant pathology and Plant physiology improves practical skills in botany.

Higher level ability: A Six month project helps to develop research aspects of botany.

Progression to higher studies: In-depth knowledge on Angiosperms, Algae&Bryophytes, Herbal botany, Plant breeding, Pteridophytes, Gymnosperms& Plant pathology equip the students to go for higher studies.

Entrepreneurship and Employment: Knowledge on Mushroom cultivation, Herbal botany and Plant ecology has ample employment opportunities.

SRI KALISWARICOLLEGE (AUTONOMOUS), SIVAKASI.
DEPARTMENT OF BOTANY
PG PROGRAMME
CHOICE BASED CREDIT SYSTEM (CBCS)
M.Sc., BOTANY (2017 – 19) Semester pattern
REGULATIONS
Curriculum Pattern

Course Code	Course Name	Hou rs	Credit s
Semester I			
17PBYC11	Core I : Taxonomy of Angiosperms	6	5
17PBYC12	Core II : Developmental Botany	6	5
17PBYC13	Core III : Instrumentation and Biotechniques	6	5
	Core IV : Practical I Lab in taxonomy of Angiosperms,	6	4
17PBYC1P	Developmental Botany, Instrumentation and	6	4
17PBYO11	Biotechniques		
	Subject Elective I: Herbal Botany		
	Total	30	23
Semester II			
17PBYC21	Core V : Plant Diversity (Algae,Fungi and Lichens, Bryophytes , Pteridophytes and Gymnosperms)	6	5
17PBYC22	Core VI : Cell and Molecular Biology	6	5
17PBYC23	Core VII : Bioinformatics and Biostatistics and Plant biotechnology	6	5
		6	4
17PBYC2P	Core VIII : Practical II –Lab in Plant Diversity,Cell and	6	4
17PBYO21	Molecular biology,Bioinformatics,Biostatistics and Plant Biotechnology		
	Subject Elective II : Biodiversity and Conservation		
	Total	30	23
Semester III			
17PBYC31	Core IX : Microbiology and Plant pathology	6	5
17PBYC32	Core X : Genetics and Evolution	6	5
17PBYC33	Core XI : Biochemistry	6	5
17PBYC3P	Core XII : Practical III Lab in Microbiology and Plant Pathology,Genetics and Evolution and Biochemistry	6	4
		6	4
17PBYN31	Non Major Elective : Mushroom Cultivation		
	Total	30	24
Semester IV			
17PBYC41	Core XIII :Plant Physiology	6	5
17PBYC42	Core XIV : Plant Ecology	6	5
17PBYC4P	Core XVI :Practical IV Lab in Plant Physiology and		
17PBYJ41	Plant Ecology	6	4
	Project	12	6

	Total	30	20
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SRI KALISWARI COLLEGE (Autonomous), SIVAKASI
M.Sc. Degree Course in Botany
SEMESTER - I CORE PAPER - I
TAXONOMY OF ANGIOSPERMS AND ECONOMIC BOTANY

Contact hours per week: 6

Contact hours per semester : 90

Credits : 5

OBJECTIVES

To enable the students to

- understand the different systems of classification
- know the procedure involved in nomenclature
- study the morphology of modified plant parts in the families of Angiosperms
- know the economic importance of families of Angiosperms
- be familiar with the various commercial products of plant origin

Course Outcome:

- Develop sufficient background to plant classification
- Create Awareness on plant nomenclature
- Gain In depth knowledge in the plant morphology
- Understand the importance families of angiosperms
- Acquire Basic knowledge on various commercial products of plant origin
- Familiar with monocotyledons flowers

UNIT - I

Systems of classification: Artificial system: Linnaeus: Natural system de Candolle, Bentham & Hooker: Phylogenetic system: Engler and Prantl, Hutchinson and Takhtajan. ICBN. Herbarium and its potential role in teaching and research.

(18 Hours)

UNIT - II

International Code of Botanical Nomenclature- Outline, principle of priority, Types and typification – Principles of priority and their limitation, Effective and valid publication, citation, Retention and Rejection of names.

(18 Hours)

UNIT - III

The study of the following families with special reference to the morphology of modified plant parts and economic importance:

Annonaceae, Mimosaceae, Brassicaceae, Sterculiaceae, Rutaceae, Meliaceae, Caesalpiniaceae, Myrtaceae, Cucurbitaceae, Apiaceae, Rubiaceae and Asteraceae.

(18 Hours)

UNIT - IV

The study of the following families with special reference to the morphology of modified plant parts and economic importance:

Apocynaceae, Asclepiadaceae, Solanaceae, Acanthaceae, Lamiaceae, Amaranthaceae, Euphorbiaceae, Orchidaceae, Cannaceae, Amaryllidaceae, Liliaceae and Poaceae.

(18 Hours)

UNIT - V

Brief study of following economic produces with special reference to the botanical name, family, morphology and uses of :

- Cereals : Paddy, Sorghum, Wheat and Maize
- Millet : Pearl millet and finger millet
- Pulses : Red gram, Bengal gram, Horse Gram and Garden pea
- Fruits : Mango, Apple, Grapes, Pine apple, Jack fruit and Pomegranate
- Nuts : Cashew nut, Ground nut and Almond
- Beverage : Coffee, Tea and Cocoa
- Narcotics : Tobacco and Ganja
- Spices and
Condiments : Ginger, Cardamom, Clove, Pepper and Cinnamon
- Fibres : Cotton and Jute
- Latex : Rubber
- Dyes : Haematoxylin and Indigo
- Tannins : Myrobalan
- Resin and Gums: Canada Balsam, Turpentine and Gum arabic
- Oil : Sandal oil, Coconut oil and Sesamum oil

(18 Hours)

TEXT BOOKS

1. Sharma, O.P. "Plant Taxonomy," Second Edition, Tata Mc Graw Hill and Co., New Delhi, 2010.
2. Pandey, B.P. "Economic Botany," Sixth Edition, S. Chand and Co., New Delhi, 2010.

REFERENCE BOOKS

1. Simpson, M.G. "Plant Systematics", Academic Press, London, 2002.
2. Verma, V., "A Text Book of Economic Botany", Ane Books Pvt.Ltd., NewDelhi, 2009.
3. Pulliah, T., "Taxonomy of Angiosperms", Third Edition., Regency Publication, NewDelhi, 2007
4. Bhattacharyya, B., "Systematic Botany", Fourth Edition, Narosa Publishing House, NewDelhi, 2006.
5. Santra, S.C., Chatterjee, T.P. and Das, A.P. "College Botany", New Central Book Agency Ltd. Kolkatta, 2007.

SRI KALISWARI COLLEGE (Autonomous), SIVAKASI
M.Sc. Degree Course in Botany
Choice Based Credit System
SEMESTER - I CORE PAPER - II
PLANT ANATOMY AND EMBRYOLOGY OF ANGIOSPERMS
(For those admitted in June 2017 and later)

Contact hours per week: 6

Contact hours per semester : 90
Credits : 5

OBJECTIVES

To enable the students to

- study the internal structure of stem and root
- understand the structure of leaf, node and stomata
- understand the process of formation of male and female sexual representatives,
- understand the mechanism of fertilization in angiosperms.
- know the process of development of embryo and endosperms

Course Outcome:

- Understand the internal and external structure of plants
- Acquire Basic knowledge on Anomalous secondary thickening
- Familiar with nodal anatomy
- Develop sufficient background on plant embryology
- Create Awareness on polyembryony
- Gain In depth knowledge pollination and reproduction

UNIT – I

Internal structure of stem and root: Young normal dicot stem and root – monocot stem and root. Secondary thickening in normal dicot stem and root. Anomalous secondary thickening in Boerhaavia, Achyranthus and Dracaena stem.

(18 Hours)

UNIT – II

Anatomy of leaf and node : dorsiventral and isobilateral leaf- kranz tissue – nodal anatomy of unilacunar (Justicia), trilacunar (Azadirachta) and Multilacunar (Aralium) nodes. Stomata - types and function.

(18 Hours)

UNIT - III

Microsporophyte - Anther development and microsporogenesis. Male gamete formation – Megasporephyte – Development of megaspore, organization of embryo sac and classification of embryo sac. Components of embryo sac and their functions.

(18 Hours)

UNIT – IV

Pollination – types. Avoidance of self pollination. Fertilization – path of pollen tube from stigma to embryo sac – double fertilization - significance. Endosperm – types and functions.

(18 Hours)

UNIT – V

Embryogeny - classification. Development of dicot embryo (Crucifer type – *Ceratocephalus falcatus*) and Monocot embryo (*Luzula* type – *Najas lacerata*). Nutrition of embryo – pseudo embryo sac, perisperm and chalazosperm. Polyembryony – types, causes and significance. Apomixis – types.

(18 Hours)

TEXT BOOKS

1. Tayal, M.S. “Plant Anatomy”, Third Edition, Rastogi Publications, Meerut, 2004.
2. Bhojwani, S.S. and Bhatnagar, S.P., “The Embryology of Angiosperms.” Fifth Revised Edition. Vikas Publishing House Pvt. Ltd., New Delhi, 2008

REFERENCE BOOKS

1. Pandey, B.P. “Plant Anatomy”, Tenth Edition, S.Chand and Co., New Delhi, 2010.
2. Pijushroy, “Plant Anatomy”, Second Edition, New Central Book Agency Ltd., Kolkatta, 2010.

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SRI KALISWARI COLLEGE (Autonomous), SIVAKASI
M.Sc. Degree Course in Botany
Choice Based Credit System
SEMESTER - I CORE PAPER - III
PLANT DIVERSITY I (Algae, Fungi, Bryophytes and Lichens)

Contact hours per week: 6

Contact hours per semester : 90

Credits : 5

OBJECTIVES

To enable the students to

- study the history and development of phycology
- understand the nomenclature, thallus structure of fungi
- understand the ecological aspect of fungi,
- understand the mechanism of Lichens formation.
- Knowledge on Bryology

Course Outcome:

- Understand the internal and external structure of fungi
- Acquire Basic knowledge on fungi ecology
- Develop sufficient background on economic importance of fungi
- Create Awareness on Lichens
- Gain In depth knowledge in bryology

UNIT I:

Phycology – Introduction – Definition – History and Development of Phycology – Modern Phycology – Classification of algae (F.E. Fritch) – Occurrence and Distribution of algae – range of thallus structure – Ultra structure of algae (Flagella, Chloroplast, Pyrenoids and Eyespot) – Ecology of Algae (Habit and Habitat) -Cytology of algae – Reproduction in algae – Life cycles in algae – Economic importance of algae.

(18 Hours)

UNIT II:

Nomenclature – Significant features – Occurrence- Thallus organisation – Reproduction – Life cycles – Economic importance of Myxophyceae, Chlorophyceae, Xanthophyceae, Bacillariophyceae, Phaeophyceae and Rhodophyceae and their comparative account.

(18 Hours)

UNIT III:

Mycology – Introduction – Systematics of fungi(Ainsworth) – Evolution of fungi – Ecology of fungi (Habit and Habitat) – Reproduction and life cycles –Chemistry of Fungal cell – Growth – Nutrition – Metabolism and regulation of metabolism – Diagnostic characters of Myxomycetes, Oomycetes, Zygomycetes, Ascomycetes, Basidiomycetes and Deutromycetes – Economic importance of Fungi – Fungi as symbionts.

(18 Hours)

UNIT IV:

Lichens – Introduction – Components of lichens – Brief History – Occurrence – Classification – Morphology and anatomy of thallus – Different types of reproduction in lichens – Economic importance of lichens – Phycobionts (Photobionts) – Mycobionts.

(18 Hours)

UNIT V:

Bryology – Introduction – Definition – Origin of Bryophytes – Evolutionary and Ecological significance – Classification of Bryophytes -Biogeography – Ecology of Bryophytes – Physiological ecology of Bryophytes – Reproduction in Bryophytes – Chemical constituents of Bryophytes –Bryophytes as indicators of Pollution - Diagnostic characters of Liverworts, Mosses, Hornworts – Life histories of Marchantia, Porella, Fossaombronia, Anthoceros and moss.

(18 Hours)

TEXT BOOK

1. Pandey, B.P. “College Botany Vol. I,” Eighth Edition, S.Chand and Co., New Delhi, 2011.
2. Sharma.O.P. 2011. Algae. Tata Mc Graw Hill Education Pvt. Ltd., New Delhi.
3. Sharma, O.P. 1989. Text book of Fungi. Tata Mc Graw Hill Pvt Ltd., New Delhi.
4. Thomas H. Nash. 1996. Lichen Biology. Cambridge University Press, London.
5. Alain vanderpoorten and Bernard Griffin. 2009. Introduction to Bryophytes. Cambridge University Press. London.

REFERENCE BOOKS

1. Vashishta, B.R., Sinha,A.K. and Singh,V.P. “Algae”, Nineth Edition S.Chand and Co., New Delhi, 2010.
2. Thakur, A.K. and Bassi,S.K. “A Text Book of Botany- Diversity of Microbes and Cryptogams”. S.Chand and Co., New Delhi, 2007.
3. Vashishta, B.R. “Fungi”, Sixth Edition, S.Chand and Co., New Delhi, 2008.

4. Johri, R.M., Lata, S. And Sharma, S. "A Text Book of Bryophyta" Dominant Publishers and Distributors, New Delhi, 2004.
5. Sharma, P.D., "Fungi and Allied Organisms" Narosa Publishing House, New Delhi, 2005.

SRI KALISWARI COLLEGE (Autonomous), SIVAKASI

M.Sc. Degree Course in Botany

Choice Based Credit System

SEMESTER - I CORE PAPER - IV

LAB IN TAXONOMY OF ANGIOSPERMS, PLANT ANATOMY AND EMBRYOLOGY

Contact hours per week: 6

Contact hours per semester : 90

Credits : 4

OBJECTIVES

- Study the morphological characters of angiosperms
- Describe the identification of morphological and anatomical characters of plants
- Understand the herbarium preparation methods
- Knowledge about the types of forest and Plant collection methods
- Understand the in pollen germination and pollen tube formation
- Describe the different stages of embryo development

Course Outcome:

- Understand the internal and external structure of fungi
- Acquire Basic knowledge on fungi ecology
- Develop sufficient background on economic importance of fungi
- Create Awareness on Lichens
- Knowledge about the pollen biology

Gain In depth knowledge in bryology

B. TAXONOMY OF ANGIOSPERMS

1. Study of examples of the following families :

Annoaceae, Mimosaceae, Brassicaceae, Sterculiaceae, Rutaceae, Meliaceae, Caesalpiniaceae, Mimosaceae, Myrtaceae, Cucurbitaceae, Apiaceae, Rubiaceae, Asteraceae, Apocynaceae, Asclepiadaceae, Solanaceae, Acanthaceae, Lamiaceae, Amaranthaceae, Euphorbiaceae, Orchidaceae, Cannaceae, Liliaceae, Amaryllidaceae and Poaceae.

2. Identification of fresh and herbarium specimens

3. Collection, identification and submission of 20 herbaria

4. A study tour not exceeding nine days shall be conducted and a report should be submitted.

B. ANATOMY

1. Young and old dicot stem and monocot stem

2. Young and old dicot root and monocot root

3. Dorsiventral and isobilateral leaf

4. Unilacunar, trilacunar and multilacunar node

5. Anomalous secondary thickening in *Boerhaavia*, *Achyranthus* and *Dracaena*.

C. Embryology of Angiosperms

1. Analysis of the organs of flowers and observation of stamens and pollen grains
2. Anther T.S. with Microspore Mother cell stage
3. Anther T.S. with Pollen tetrad stage
4. Anther T.S. with Pollen grain stage
5. Effect of sucrose on Pollen germination
6. Study of various Placentation types
7. Study of various ovule types (models only)
8. Dissection of embryo (one stage- globular / cordate)
9. Observation of monocot embryo slides

REFERENCE BOOKS

1. Gamble, J.S. "Flora of the Presidency of Madras", Vol. I, II and III Reprinted Edition of 1910, Allard and Sons, Kolkatta, 1997.
2. Gupta, S.K. "Manual of Botany" Vol. I and II. Kedarnath Ramnath Publishers, Meerut, 1976.
3. Sharma, O.P. "A Manual of Practical Botany" Vol I & II Tata McGraw Hill Co., New Delhi, 2001.
4. Pandey, B.P., "Modern Practical Botany" Vol II. S.Chand and Co., New Delhi, 2001.

SRI KALISWARI COLLEGE (Autonomous), SIVAKASI
M.Sc. Degree Course in Botany
Choice Based Credit System
SEMESTER - I SUBJECT ELECTIVE COURSE - I
TECHNIQUES IN BIOLOGY
(For those admitted in June 2017 and later)

Contact hours per week: 6

Contact hours per semester : 90
Credits : 4

OBJECTIVES

- Know the principle, types and applications of microscopes
- Understand the principles and applications of various separations of phyto-components techniques.
- Acquire the knowledge about the of various centrifuges and their applications.
- Understand the applications of SDS – PAGE techniques
- Learn the principle and applications of various blotting techniques.
- Understand the principle of immuno techniques.

Course Outcome:

- Understand and working knowledge about the different microscopes
- Acquire Basic knowledge on separation of phyto-chemical techniques.
- Develop sufficient background on various centrifuges and their applications
- Knowledge about the applications of SDS – PAGE techniques
- Gain the Knowledge about the immunology techniques

UNIT – I

Microscopy – Principle of optics and application of light microscope, phase contrast microscope. Principle, working function and application – types, dark field, fluorescent and phase contrast. Principle, structure, working function of transmission electron microscope (TEM) and scanning electron microscope (SEM).

(18 Hours)

UNIT – II

Separation techniques: Chromatography- types-TLC, column and paper- principles and procedures involved – partition co-efficient, mobile phase, stationary phase. Electrophoresis: Principle, procedure and applications of SDS – PAGE, agarose gel electrophoresis and zonal electrophoresis.

(18 Hours)

UNIT – III

Centrifugation: Centrifugal force, sedimentation coefficient, types of centrifuges, clinical high speed, ultra. Design and care of preparative rotors, swinging bucket, fixed angle, vertical. Types of centrifugation- differential and density gradient centrifugation and applications.

(18 Hours)

UNIT – IV

Blotting techniques: Principle and types of blotting, procedures involved in Dot blot, Southern, Northern blotting. Detection - dyes used for detection of nucleic acids in electrophoresis.

(18 Hours)

UNIT – V

Antigen – antibody reactions, Monoclonal antibody – production and application, ELISA-principle, procedure and applications. Western blotting- principle and procedure involved in immunodetection of proteins.

(18 Hours)

TEXT BOOKS

1. Palanivelu, P. “Laboratory Manual for Analytical Biochemistry and Separation Techniques”, School of Biotechnology, Madurai, 2000
2. Joagand,K. “Advances in Biotechnology”, Third Edition, Himalaya Publishing Co., Mumbai, 2005.
1. Gurumani, N. “Research Methodology for Biological Sciences” MJP Publishers, Chennai, 2008.
- 2.

REFERENCE BOOKS

- 1.Bajpai,P.K., “Biological Instrumentation and Methodology” S.Chand & Co., New Delhi,2006.
- 2.Plummer, D.T. “An Introduction to Practical Biochemistry”, Third Edition, Tata McGraw Hill Publishers, New Delhi, 2000.
- 3.Wilson K., and Walker.J., “Practical Biochemistry”, University of Cambridge, New York, 1995.
- 4.Chawla, H.S. “Introduction to Plant Biotechnology”, Oxford and IBH Publishing Co., Pvt. Ltd., New Delhi, 2000.
- 5.Gupta, P.K. “Elements of Biotechnology”, Rastogi Publications, Meerut, 2006.
6. Dubey, R.C. “A Text Book of biotechnology”. S.Chand and Co., Ltd. New Delhi, 2008.
7. De Robertis, E.DP. and De Robertis., E.M.F., “ Cell Molecular Biology” Eighth Edition, Lee and Fabiger International Publications, Philadelphia, 2011.

SRI KALISWARI COLLEGE (Autonomous), SIVAKASI
M.Sc. Degree Course in Botany
Choice Based Credit System
SEMESTER - I SUBJECT ELECTIVE COURSE - II
BIOFERTILIZER
(For those admitted in June 2017 and later)

Contact hours per week: 6

Contact hours per semester : 90
Credit : 4

OBJECTIVES

To enable the students to

- learn the cause and loss of soil fertility
- know about symbiotic bacteria
- appreciate the beneficial uses of non-symbiotic bacteria
- understand the merits of Blue green inoculants
- know about Phosphate solubilizing microbes

Course Outcome:

- Understand and knowledge about the cause and loss of soil fertility
- Acquire Basic knowledge on symbiotic bacteria.
- Develop sufficient background on the beneficial uses of non-symbiotic bacteria
- Knowledge about the Blue green inoculants
- Gain the Knowledge about the Phosphate solubilizing microbes

UNIT - I

Soil components - fertility - loss of soil fertility - consequences and maintenance - role of chemical and organic fertilizers - need of biofertilizers - nitrogen fixation - bacterial and algal - importance in agriculture.

(18 Hours)

UNIT - II

Symbiotic bacterial inoculants : *Rhizobium* - N₂ fixation - isolation, classification, identification , mass multiplication and agronomic importance.

(18 Hours)

UNIT - III

Non - symbiotic bacterial inoculants : *Azotobacter* and *Azospirillum* - isolation, identification, mass multiplication and their agronomic importance.

(18 Hours)

UNIT - IV

Blue green algal inoculants : Isolation, cultivation, mass multiplication and its agronomic importance.

(18 Hours)

UNIT - V

Mycorrhizal inoculants: Types - ecto and endo mycorrhizae - mass multiplication. Role of mycorrhizae in agriculture. Phosphate solubilizing bacteria – isolation and mechanism of P-solubilization

(18 Hours)

TEXT BOOK

Subbarao, N.S. “Biofertilizers in Agriculture and Forestry, ”Oxford and IBH , New Delhi, 1988.

REFERENCE BOOK

1. Tilak, K.V.B.R. “Bacterial Biofertilizers,” Indian Council for Agricultural Research, New Delhi, 1991.
2. Subbarao, N.S., “Recent Advances in Biological Nitrogen Fixation”, Oxford and IBH, New Delhi, 2001.
3. Gillings, M. and Holms, A. “Plant Microbiology”, Bios Scientific Publishers, New York, 2005.
4. Smith, S.E. and Read, D.J. “ Mycorrhizal Symbiosis”, Second Edition, Academic Press, London , 2002.
5. Subbarao, N.S., “Soil Microorganism and Plant Growth” Fourth Edition, Oxford and IBH, New Delhi, 1995.
6. Rangaswami, G. and Bagyaraj, D.J., “ Agricultural Microbiology” Second Edition, Prentice-Hall Pvt.Ltd., New Delhi, 2001.

SRI KALISWARI COLLEGE (Autonomous), SIVAKASI
M.Sc. Degree Course in Botany
Choice Based Credit System
SEMESTER – II CORE PAPER - V
GENETICS
(For those admitted in June 2017 and later)

Contact hours per week: 6

Contact hours per semester : 90
Credits : 5

OBJECTIVES

To enable the students to

- understand the principles of heredity
- understand the concept of genetic recombinations at molecular level
- learn the modern concept of gene
- know the recent developments in genetics
- understand the principles of mutation

Course Outcome:

- Understand and knowledge about the principles of heredity
- Acquire Basic knowledge on genetic recombinations at molecular level
- Develop sufficient background on modern concept of gene
- Knowledge about the recent developments in genetics
- Gain the Knowledge about the principles of mutation and types

UNIT - I

Mendel's laws of inheritance with reference to monohybrid and dihybrid crosses - test cross and back cross. Modifications of 3:1 phenotypic ratios due to incomplete dominance and lethal gene action. Modifications of dihybrid ratio due to interactions of genes – Non – epistatic simple gene interaction, comb type in fowls. Dominant epistasis (12:3:1), Recessive epistasis (9:3:4), Complementary genes(9:7). Multiple alleles with reference to ABO Blood groups in human beings, Polygenic inheritance with reference to Ear size in maize.

(18 Hours)

UNIT – II

Linkage and crossing over - example and significance – molecular mechanism of cross over, Gene mapping. Mechanism of determination of sex in plants; Extra chromosomal inheritance with reference to antibiotic resistance in Chlamydomonas.

(18Hours)

UNIT – III

Genetic recombination – Bacterial Transformation and Conjugation. Transduction – generalized and specialized. Genome structure of E.coli and lambda phage. Modern concept of gene – Plasmids, episomes, IS Elements and transposons (A brief account only).

(18 Hours)

UNIT – IV

Proof of DNA as the genetic material .Mechanism of replication of DNA, Transcription and Translation in prokaryotes: Genetic code. Gene regulation in prokaryotes – lac operon.

(18 Hours)

UNIT – V

Gene mutations – induced and spontaneous – molecular basis – mutagens, base transition, inversion, deletion and tautomeric shift.

(18 Hours)

TEXT BOOK

Verma, P.S. and Agarwal., V.K., “Genetics.” Third Edition, S.Chand and Co., New Delhi, 2011.

REFERENCE BOOKS

1. Lewin, B., “ Genes IX” Ninth Edition, Jones and Barlett Publishers, London, 2008.
2. Gardner, E.J., Simmons, M.J. and Snustad, D.P. “Principles of Genetics”, Eighth Edition, John Wiley and Sons, New York, 2005.
3. Freifelder,D.“Microbial Genetics”,Tenth Edition, Narosa Publishing House, New Delhi, 2004.
4. Tamarin, R.H. “Principles of Genetics”, Seventh Edition, Tata McGraw-Hall Publishing Co.Ltd., New Delhi, 2004.
5. Maloy, R.S., Cronon, Jr.J.E., . and Freifelder,D. “Microbial Genetics”, Third Edition, Narosa Publishing House, New Delhi, 2011.

SRI KALISWARI COLLEGE (Autonomous), SIVAKASI
M.Sc. Degree Course in Botany
Choice Based Credit System
SEMESTER – II CORE PAPER - VI
PLANT DIVERSITY II (Pteridophytes, Gymnosperms and Palaeobotany)

Contact hours per week: 6

Contact hours per semester : 90

Credits : 5

Objectives

- understand the salient features of Pteridophytes, Gymnosperms and Palaeobotany
- understand the salient features and importance of fossils and fossilization process in tracing evolution.
- provide a thorough knowledge about structure and life cycle pattern of Pteridophytes and Gymnosperms.
- study the structure and reproduction of various genera mentioned in the syllabus.
- understand the Reproduction and evolutionary trends in Pteridophyte and Gymnosperm.
- Understand the geological era.

Course Outcome:

- Understand and knowledge about the Pteridophytes, Gymnosperms and Palaeobotany
- Acquire Basic knowledge on fossils and fossilization process in tracing evolution.
- Develop sufficient background on structure and life cycle pattern of Pteridophytes and Gymnosperms.
- Knowledge about the structure and reproduction of various genera mentioned in the syllabus
- Gain the Knowledge about the Reproduction and evolutionary trends in Pteridophyte and Gymnosperm.

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UNIT – I

Pteridophytes – Introduction – Vascular cryptogams – Characteristic features – Habitat of Pteridophytes – Lifecycles - Origin of Pteridophytes –Evolution of Sporophyte - Classification (Sporne) – Economic Importance –Pteridology in India.

(18 Hours)

UNIT - II

Morphology, structure and reproduction of Selaginella, Isoetes, Gleichenia, Equisetum, Ophioglossum, Marselia, Salvinia, Adiantum and Pteris. Stelar evolution and sorus evolution. Telome theory - Heterospory and Seed habit. Apogamy and Apospory.

(18 Hours)

UNIT – III

Classification of Gymnosperms (Sporne, 1967). Comparative study of vegetative, anatomy and reproduction structure of Coniferales and Taxales. Woods of gymnosperms.

(18 Hours)

UNIT – IV

Comparative study of vegetative, anatomy and reproductive structure of Ginkgoales and Gnetales. Economic importance of gymnosperms.

(18 Hours)

UNIT – V

Geological times scale. Fossilization, types and age determination. Rajmahal hills, Deccan intertrappean flora. Study of morphology, anatomy and evolutionary trends of following groups of fossil forms. Lepidodendrales, Sphenophyllales, Psilophytales, Pteridospermales, Bennettitales, Cycadales, Cordaitales and Coniferales.

(18 Hours)

TEXT BOOKS

1. Vashishta B.R. 2001. Botany for degree students – Pteridophytes. S Chand & Co Ltd; 5th edition.
2. Parihar N.S. 1959. An introduction of Peridophytes. Central Book Depot. Publishers.
3. Trivedi P.C. 2002. Advances in Pteridology. Pointer Publishers.
4. Rashid A 1978. An introduction of Peridophytes. Vikas publishers.
5. Govil C.M. 2011. Gymnosperm. Krishna Prakashan Media.
6. Bhatnagar S.P. and Alok Moitra 1996. Gymnosperms. New Age International.
7. Sambamurthy, A.V.S.S. 2005. A Textbook of Bryophytes, Pteridophytes, Gymnosperms and paleobotany. I.K. International Publishing House. New Delhi.

REFERENCE BOOKS

1. Bower F.O. 1963. The Ferns
2. Taylor D.V. and Hickey L.J. 1997 Flowering plants: Origin, evolution and phylogeny.
3. Sporne K.R. 1996. Morphology of Pteridophytes. Hutchinson; 3rd edition.
4. Arnold C.A. 1972. An introduction to Paleobotany. New York, McGraw-Hill Publishers.

SRI KALISWARI COLLEGE (Autonomous), SIVAKASI
M.Sc. Degree Course in Botany
Choice Based Credit System
SEMESTER – II CORE PAPER - VII
BIOCHEMISTRY

Contact hours per week: 6

Contact hours per semester : 90

Credits : 5

OBJECTIVES

- know the fundamentals of biochemistry in relation to botany
- understand the structure of protein and lipids
- understand the structure of DNA and RNA
- know the mechanism of enzyme action
- understand the concept and laws of thermodynamics

Course Outcome:

- Understand and knowledge about the biochemistry in relation to botany
- Acquire Basic knowledge on the structure of protein and lipids
- Develop sufficient background on the structure of DNA and RNA
- Knowledge about the enzyme action
- Gain the Knowledge about the thermodynamics

UNIT – I

pH and Buffers : Acids and bases concept. Colorimetry -principle and applications. Concept of pH- pH metry- principle and applications. Buffer– buffer solution of a weak acid and its salt, buffer solution of a weak base and its salt – importance of buffers in biological studies.

Carbohydrates : Classification, general structure -open chain structure & ring structure of glucose. Isomerism – stereoisomers and optical isomers – mutarotation, cyanohydrin synthesis, properties of monosaccharides – reducing and non – reducing sugars, Disaccharides – sucrose – maltose; Polysaccharides – Starch and cellulose.

(18 Hours)

UNIT – II

Amino acid and Protein : General structure and classification of amino acids, amides, peptide linkage – primary, secondary, tertiary and quaternary structures of proteins – bonds of protein molecule, classification of proteins – Fibrous, globular, simple, conjugated and derived proteins – properties of proteins – Amphoteric – Zwitterion – Isoelectric point.

Lipids: Triglycerides, fatty acids – saturated and unsaturated, classification of lipids – simple, compound and derived lipids (brief account only), difference between animal and plant fats, properties – melting point, saponification, rancidity. Biological importance of lipids.

(18 Hours)

UNIT – III

Nucleic acids : Historical aspects – Chargaff's rule, DNA and RNA - Nucleotides – building blocks of DNA and RNA , double helix model of DNA – significance of DNA, denaturation & renaturation of DNA, types of RNA – structure of tRNA.

(18 Hours)

UNIT - IV

Enzymes : Classification, nomenclature, specificity of enzyme catalysis –substrate, absolute, stereo and relative specificity. Mechanism of enzyme action - Lock and Key model and Induced Fit model. Enzyme inhibition. Coenzymes and Isoenzymes. (brief account only). Applications of enzymes.

(18 Hours)

UNIT - V

Bioenergetics: Concept of free energy – ATP as energy rich compound; laws of thermodynamics- enthalpy and entropy. Energy states- ground state, excited state- phosphorescence, fluorescence and bioluminescence.

(18Hours)

TEXT BOOK

1. Jain, J.L., Jain, S.and Jain, N. “Fundamentals of Biochemistry”, Seventh Edition, S.Chand and Co.Ltd., New Delhi, 2011.

REFERENCE BOOKS

2. Conn, E.I. and Stumpf, P.I. “Outlines of Biochemistry”, Fifth Edition, Wiley Eastern Ltd., Bombay, 2002.
3. Stryer, L. “Biochemistry”, Sixth Edition, W.H. Freeman Company, New York, 2010.
4. Salilbose. “Elementary Biophysics”, Jyoti Books, Madurai, 1982.
5. Piramal, V., “Biophysics”, Dominant Publishers and Distributors, New Delhi, 2006.
6. Srivastava, P.K., “Elementary Biophysics”, Narosa Publishing House, New Delhi, 2006.
7. 2006.

SRI KALISWARI COLLEGE (Autonomous), SIVAKASI
M.Sc. Degree Course in Botany
Choice Based Credit System
SEMESTER - I CORE PAPER - VIII
LAB IN PLANT GENETICS AND PLANT DIVERSITY II
(For those admitted in June 2017 and later)

OBJECTIVES

To enable the students to

- learn the quantification of biomolecules such as DNA and RNA.
- gain an insight on the recent developments in genetic engineering
- identify various forms of cryptogams
- learn mounting techniques of various biological specimens

Course Outcome:

- Understand and knowledge about the DNA and RNA
- Acquire Basic knowledge on the genetic engineering
- Develop sufficient background on the cryptogams
- Knowledge about the biological specimens
-

GENETICS

1. To record variations seen in any two species of plants
2. To work out genetic problems from mono and dihybrid cross
3. To construct gene maps
4. To study probability by coin tossing

PTERIDOPHYTES:

1. Study of vegetative, anatomy and reproductive structure of Selaginella, Ophioglossum, Equisetum, Gleichenia, Marselia and Azola.

GYMNOSPERMS:

1. Study of morphology, anatomy and reproductive structures of Araucaria, Cupressus, Podocarpus, Ginkgo, Taxus, Ephedra and Gnetum.

REFERENCE BOOKS

1. Burnet, L. "Essential Genetics", Cambridge University Press, Cambridge, 1986.

2. Smith, R.H., "Plant Tissue Culture- Techniques and Experiments", Second Edition, Academic Press, New York, 2005.
3. Sharma, O.P. "A Manual of Practical Botany" Vol I & II Tata McGraw Hill Co., New Delhi, 2001.
4. Choudhary, S.S. "Practical Botany (Cryptogams and Gymnosperms)" CBS Publishers and Distributors, New Delhi, 2001.
5. Pandey, B.P., "Modern Practical Botany Vol I" S.Chand and Co., New Delhi, 2001.

SRI KALISWARI COLLEGE (Autonomous), SIVAKASI
DEPARTMENT OF BOTANY
M.Sc. Degree Course in Botany
Choice Based Credit System
SEMESTER - I CORE PAPER - IX
LAB IN BIOCHEMISTRY

OBJECTIVES

To enable the students to

- understand the concept of pH and buffer
- quantify the glucose and fatty acids
- Quantify the plant pigments

Course Outcome:

- Understand and knowledge about the pH and buffer
 - Acquire Basic knowledge on the glucose and fatty acids
 - Develop sufficient background on the plant pigments
1. Determination of complementary color and verification of Beer's law
 2. Measurement of pH of solutions – pH paper and pH meter
 3. Preparation of buffers – Phosphate and Acetate
 4. Separation of aminoacids by ascending chromatography
 5. Qualitative tests for Carbohydrates – Benedict's, Fehling, Selwinoff's test and Iodine test
 6. Qualitative tests for Amino acids – Xanthoproteic, Ninhydrin and Biuret test
 7. Quantitative estimation of Glucose in plant tissue – Anthrone method
 8. Quantitative estimation of Fatty acid – Titration method.

REFERENCE BOOKS

1. Jayaraman, J.. "Laboratory Manual in Biochemistry", Seventh Edition, New Age International (P) Ltd., New Delhi, 2011.
2. Plummer, D.T. "An Introduction to Practical Biochemistry", Third Edition, Tata McGraw Hill Publishers, New Delhi, 2007.
3. Annie, R. "Plant Anatomy and Microtechniques", Saras Publication, Nagercoil. 2001.
4. Sawhney, S.K. and Randhirsingh, R., "Introductory Practical Biochemistry", Narosa Publishers, New Delhi, 2006.
5. Bendre, A. "A Text Book of Practical Botany" Seventh Revised Edition, Rastogi Publications, New Delhi, 2000.

SRI KALISWARI COLLEGE (Autonomous), SIVAKASI
M.Sc. Degree Course in Botany
Choice Based Credit System
SEMESTER – III CORE PAPER - X
MICROBIOLOGY AND PLANT PATHOLOGY

Contact hours per week: 6

Contact hours per semester : 90

Credits : 5

OBJECTIVES

To enable the students to

- know the history of microbiology and its applications
- understand the classification of bacteria
- know the various methods of sterilization
- get familiarize with viruses and plant diseases
- know the different types of symptoms and their causative agents.

Course Outcome:

- Understand and knowledge about the microbiology and its applications
- Acquire Basic knowledge on bacteria
- Develop sufficient background on methods of sterilization
- Knowledge about the viruses and plant diseases
- Gain the Knowledge about the symptoms and their causative agents.

UNIT I

History of microbiology- contribution of Anton von Leeuwenhoek, Louis Pasteur and Robert Koch. General characters of microbes- Bacteria, Actinomycetes, Protozoa. Economic importance of Bacteria.

(18 Hours)

UNIT II

Classifications of microbes – five Kingdom concept; classification of bacteria based on size, shape and nature of flagella, fine structure of bacterial cells, reproduction of bacteria.

(18 Hours)

UNIT III

Methods in microbiology: sterilization methods, media preparation-types of culture media. Staining-Gram staining, techniques of pure culture-slant culture, streak plate, microbial growth (growth curve only)

(18 Hours)

UNIT IV

Viruses: Classification and structure - plant virus (TMV). Classification of plant diseases based on symptoms, control of plant diseases.

(18 Hours)

UNIT V

Causal organism, symptoms, disease cycle and control measures of the following:

Bacterial disease – Citrus canker

Fungal disease – Tikka disease of groundnut, White rust of *Albugo* .

Viral disease – Bunchy Top of banana

(18 Hours)

TEXT BOOK

1.Sharma, P. D. “Microbiology and Plant Pathology”, Second Edition, Rastogi Publications, Meerut, 2001.

REFERENCE BOOKS

1. Dubey, H.C. “A Text Book of Fungi, Bacteria and Viruses”, Second Edition, Vikas Publishing House Pvt. Ltd., New Delhi, 2006.
2. Pelczar, Jr. J.J., Chan, E.C.S., and Kreig, R., “Microbiology”, Fifth Edition, Mc Graw Hill Publishers, New York, 2006.
3. Sharma, P.D. “Fungi and Allied Organism”, Narosa Publishing House, New Delhi, 2005.
4. Dubey, R.C. and Maheswari, D.K. “A Text Book of Microbiology”, Second Edition, S.Chand and Co., Ltd. New Delhi, 2010.
5. Rengasamy, G and Mahadevan, A. “ Diseases of Crop Plants in India”. Fourth Edition, Prentice Hall of India, New Delhi, 1999.

M.Sc. Degree Course in Botany
Choice Based Credit System
SEMESTER – III CORE PAPER - XI
ECOLOGY AND BIODIVERSITY

Contact hours per week: 6

Contact hours per semester : 90

Credits : 5

OBJECTIVES

To enable the students to

- understand the vegetation types
- understand the interaction between the abiotic and biotic factors
- study the ecological adaptations of plants
- analyse the concept of biodiversity and conservation strategies
- appreciate the role of various organization assessing the vegetation

Course Outcome:

- Understand and knowledge about the vegetation types
- Acquire Basic knowledge on abiotic and biotic factors
- Develop sufficient background on ecological adaptations of plants
- Knowledge about the biodiversity and conservation strategies
- Gain the Knowledge about the organization assessing the vegetation.

UNIT – I

Ecology as a branch of biology. Brief history of Ecology. Ecological factors – climatic, edaphic and biotic factors; ecosystem dynamics – energy flow. Ecosystem concept and components – biotic and abiotic; ecological pyramids; pond ecosystem ; exobiology – an elementary knowledge of the following ecosystems- coral, estuary, tundra, grassland and forest – Tropical rain forest.

(18 Hours)

UNIT – II

Units of vegetation – plant community; Plant formation, plant association and plant consociation – plant succession - Hydrosere. Study of the following with special reference to morphological, anatomical and physiological adaptations: a) Hydrophytes b) Xerophytes and c) Halophytes with special reference to mangroves.

(18 Hours)

UNIT – III

Causes, effects and control measures of the following pollutions - a) Air Pollution b) Water Pollution c) Thermal pollution d) Noise pollution e) Radioactive pollution. Phytoremediation – brief account only. Plant indicators of pollution.

(18 Hours)

UNIT – IV

Current levels of biodiversity on earth – endangered plant species; endemism; domesticated animals; strategies of conservation – *in situ* and *ex situ* conservation – gene bank – biotechnology and biodiversity. A brief knowledge on Intellectual Property Rights-geographical, patenting. Indicator plants.

(18 Hours)

UNIT – V

The measurement of biodiversity – species richness and evenness - alpha (packing), beta (turn over), gamma (accumulation) and mue (mosaicity). A brief knowledge on landscape and LSE category. Application of GIS and GPS. Red Data Book , CITES and CBD (brief account only).

(18 Hours)

TEXT BOOK

Sharma, P.D.. “Ecology and Environment”, Tenth Edition, Rastogi Publications, Meerut, 2009.

REFERENCE BOOKS

1. Dash, M.,C., “Fundamentals of Ecology”, Second Edition,Tata Mc GrawHill Publications, New Delhi, 2003.
2. Gadgil,M.,Ghate and Pramod, P., “Biodiversity – Resource Material for Course Practical Exercise and Student project at College level and University levels”, Indian Academy of Sciences, Bangalore, 1996.
3. Odum, E.P. “Fundamentals of Ecology”,Third Edition, B. Saunders, International Ltd., Philadelphia, 2002.
4. Krishnamoorthy, K.V., “An Advanced Text Book on Biodiversity” Oxford & IBH Publishing Co. Pvt.Ltd., New Delhi, 2006.
5. Mittal, A.C., “Biodiversity and Sustainable Development” First Edition, Vista International Publishing House, Delhi, 2008.

DEPARTMENT OF BOTANY
Choice Based Credit System
SEMESTER – III CORE PAPER - XII
LAB IN MICROBIOLOGY, PATHOLOGY, ECOLOGY AND BIODIVERSITY

Contact hours per week: 6

Contact hours per semester : 90

Credits : 4

OBJECTIVES

To enable the students to

- know various sterilization methods
- know technique for various media preparation and isolate microbes
- estimate various disease symptoms
- get exposed to the adaptive features of plant growing in various habitats
- understand the concept of biodiversity

Course Outcome:

- Understand and knowledge about the sterilization methods
- Acquire Basic knowledge on media preparation
- Develop sufficient background on disease and symptoms
- Knowledge about the plant growing in various habitats
- Gain the Knowledge about the concept of biodiversity.

A. MICROBIOLOGY AND PLANT PATHOLOGY

1. Basic equipments used in microbiology laboratory
2. Sterilization of glassware - Steam sterilization and dry sterilization
3. Motility of bacteria – wet mount method
4. Simple staining of bacteria
5. Gram staining of bacteria
6. Preparation of culture media – nutrient broth and nutrient agar
7. Isolation of microbes from air, water and soil
8. Examination of symptoms of Tikka disease of ground nut, citrus canker, White rust of Albugo .

B. PLANT ECOLOGY AND BIODIVERSITY

1. To study the morphological, anatomical and physiological adaptations of ecological groups -Hydrophytes, Xerophytes and Halophytes
2. To conduct ecological field study – Quadrat and Transect method
3. Study of aquatic ecosystems with reference to life forms of local pond
4. Preparation of landscape diagram of any field
5. A record on local flora, endangered flora, sanctuaries and mapping shall be prepared.

6. A study tour not exceeding five days shall be conducted to various biosphere reserves and National parks and a report should be submitted.

REFERENCE BOOKS

1. Gunasekaran, P.. “Laboratory Manual in Microbiology”, Reprinted First Edition, New Age International Publishers, New Delhi, 2009.
2. Rengasamy, G and Mahadevan, A. “Diseases of Crop Plants in India”. Fourth Edition, Prentice Hall of India, New Delhi, 1999.
3. Gupta, S.K. “Manual of B.Sc. Botany Practical”, Kedarnath and Ramnath Publishers, Meerut, 1976.
4. Sharma,O.P. “A Manual of Practical Botany Vol. I and II, ” Pragati Prakasham Publishers, Meerut, 1974.
5. Kannan, N. “Laboratory Manual in General Microbiology”, Fourth Edition, Paramount Publication, Palani, 2003.
6. Sharma, P.D.. “Ecology and Environment”, Tenth Edition, Rastogi Publications, Meerut, 2009.